APPENDIX E

Design Change Forms

MARY RIVER – TOTE ROAD ROUND CSP CULVERTS

REQUEST FOR APPROVAL BY DESIGN OFFICE FOR CHANGE

February 26, 2024

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile and Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Rudolf Dietrich, Baruck Wile, Michael Burns, Frank Hynes, Dale Tulloch, Abid Najey, Jim Patterson (Baffinland), Michael Johnson (NSC), Richard Cook, Greg Johnstone, Michael Bourdignon, Darren Kocken, Matthew Trask, Mackenzie Aiken (KP)**	**REF. NO.:**	**11**
CHANGE/SUBSTITUTION NO.:	**CVDC-01**	**PAGES:**	**2**

AREA OF WORK:

This design change form is for the culvert bedding material.

GENERAL AREA OF PROPOSED WORK:

The purpose of the design change is to change part of the 25 mm minus bedding material (Fine Culvert Backfill) to a finer 3/16 inch minus material to meet the culvert manufacturer's recommendations. The design change will result in a 50 mm (2 inch) minimum thick, ½ culvert diameter wide, uncompacted zone of 3/16 inch minus crushed material being placed under the culvert(s) in place of the 25 mm minus material (See Figure 1). This design change will apply to all 10 round CSP culvert installations.

This change was requested by KP following receipt of recommendations from the culvert manufacturer (Armtec) to use a smaller size material that will fit between the round CSP culvert corrugations.

No. of Sheets Attached: 0

Reference Drawings: Dwg. No. 706 R2

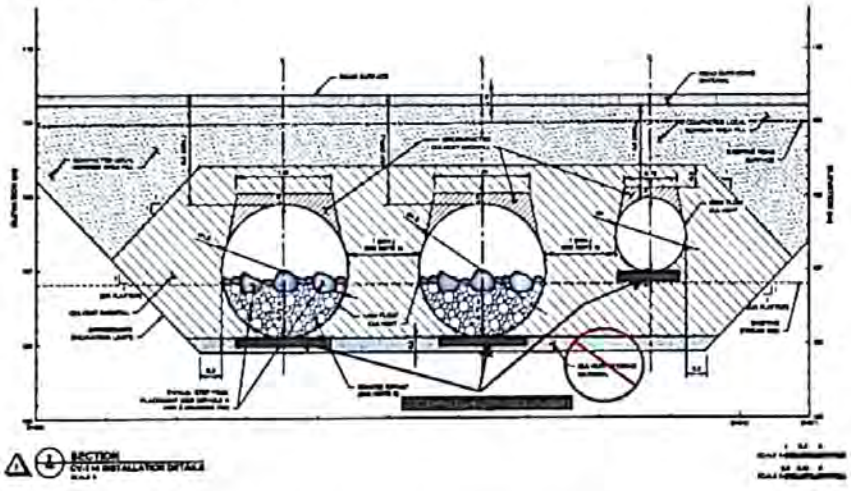


Figure 1 Example of design change shown on Drawing 706 R2 CV-114

MARY RIVER – TOTE ROAD ROUND CSP CULVERTS

REQUEST FOR APPROVAL BY DESIGN OFFICE FOR CHANGE

February 26, 2024

Prepared:

Name: For: Greg Johnstone Michael Bourdignon

Title: Project Engineer Geological Engineering

Signature:

FOR DESIGN OFFICE USE

Date Received: February 27, 2024

Proposed change substitution (*circle one*): Not Approved / Approved as Submitted / Approved as Amended:

No. of Sheets Attached: 0 (amendments only)

Reviewed:

Name: Andy Phillips

Title: Senior Engineer

Signature:

Approved:

Name:

Title: Specialist Engineer

Signature: KEVIN HAWTON

Date Returned:

Knight Piésold CONSULTING

Knight Piésold CONSULTING

Management System Certified By: bsi ISO 9001 Quality Management Systems CERTIFIED FS 64925 | ISO 14001 Environmental Management CERTIFIED EMS 550121 | ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 550122

MEMORANDUM

Date:	April 17, 2024	**File No.:**	NB102-00181/77-A.01
		Cont. No.:	NB24-00434
To:	Mr. Jim Patterson		
Copy To:	Connor Devereaux, Rudolf Dietrich		
From:	Greg Johnstone		
Re:	**CV-216 Design Change due to Massive Ice**		

1.0 INTRODUCTION

Knight Piésold Ltd. (KP) is providing Baffinland Iron Mines Corporation (Baffinland) with a design change to account for massive ice exposed during blasting and excavation of crossing CV-216 on the Milne Inlet Tote Road (Tote Road).

KP provided the attached Figure 1 on April 12, 2024 showing proposed foundation design changes to account for the massive ice. This memo provides additional details on the proposed design change.

2.0 BACKGROUND

KP provided the updated Tote Road Permanent Crossing Plan - Round CSP Culvert Installation on February 8, 2024 (KP, 2024). Following the completion of the design report, construction began on the round CSP culverts in mid-February 2024.

Drilling and blasting at CV-216 during the week of April 8, 2024 exposed massive ice in the northeast portion of the culvert excavation (Photos 1 and 2). Following the discovery of the massive ice on April 12, 2024, Baffinland halted excavation and informed KP. KP reviewed the photos and survey of the massive ice in relation to the design and developed the design change details illustrated on Figure 1.

Photo 1 **Looking at the Initial Discovery of Massive Ice at CV-216**

Photo 2 **Looking at the Massive Ice after further excavation at CV-216**

3.0 GEOTECHNICAL INVESTIGATIONS

No previous geotechnical investigations were completed at the culvert locations, therefore, the underlying foundation conditions and permafrost regime in these areas are not known. KP completed the design with the limited information available at the time and made some assumptions to the degree of ice rich soils in areas where construction is required outside the current normal streambed flow limits.

4.0 PROPOSED DESIGN

The proposed design change for CV-216 consists of over-excavation of the massive ice below the culvert and the installation of fill and insulation to minimize the impacts of ambient temperatures and heat laden water flows on the ice beneath the culvert foundation (i.e. minimize potential for thawing).

The culvert foundation construction will include installation of an insulation layer above a 0.5 m thick layer of compacted non-frost susceptible culvert backfill material. The insulation will consist of two layers of 2 inch (50 mm) thick Styrofoam™ Highload 60 Extruded Polystyrene, or approved equivalent. Joints in the insulation sheets will be offset to prevent gaps in the coverage and enhance effectiveness. Following the insulation installation, a 0.2 m thick layer of compacted culvert backfill will be placed over the insulation as the base course for culvert installation.

The inlet and outlet of the culvert will be over-excavated and backfilled with compacted non-frost susceptible culvert backfill material. Bentonite will be mixed with ¾ inch minus material for the initial and final 3 m of the culvert length to act as an impermeable layer to minimize the potential for water to migrate beneath the culvert/insulation and transmit heat into the underlying ice.

The CV-216 inlet and outlet areas will be constructed similar to locations CV-102 and CV-106 as shown on Drawing 781 Detail D provided with the original design report (KP, 2024). The proposed design change is shown on the attached Figure 1 and the inlet and outlet apron detail is shown on Figure 2.

The proposed design measures are intended to reduce the potential for settlement, slumping, damage, or other structural issues due to the installation of the culvert over massive ice; however, it is noted that there is no guarantee that issues related to thawing of ice will not occur. As such, KP takes no responsibility for any settlement, slumping, damage, or other structural issues due to the installation of culverts on or above ice-rich soils and/or massive ice. Ideally, this work will be completed and the culverts backfilled in a timely manner to reduce the risk of ice thaw. High ambient temperatures could result in increased temperatures locked into the fill zones, thereby increasing the risk of ice thaw.

Design alternatives, such as relocating the culvert within the streambed, were explored; however, due to the absence of prior geotechnical investigations, it remains uncertain whether massive ice persists throughout the entire streambed area. Additionally, through discussions with Baffinland it was determined to leave the culverts in the existing position since the drilling and blasting has already occurred.

5.0 SUMMARY

The design for Tote Road culvert location CV-216 was revised due to the discovery of massive ice below the culvert foundation. KP has prepared a revised design by incorporating extra thermal safeguards around the culvert's inlet and outlet, as well as within the foundation below the culvert. This revision was executed based on the current available data; however, it is important to acknowledge that there is no assurance against potential ice thawing-related problems. Therefore, KP does not take responsibility for any settlement, slumping, damage, or structural issues arising from culvert installation on ice-rich soils.

6.0 REFERENCES

Knight Piésold Ltd. (KP), 2024. *Mary River Project - Tote Road Permanent Crossing Plan - Round CSP Culvert Installations*. February 8. Ref. No. NB102-181/77-4, Rev 2.

7.0 CLOSING

We trust that meets with your present requirements. Please contact the undersigned with any questions.

Yours truly,
Knight Piésold Ltd.

Prepared: Greg Johnstone, P.Eng., CPESC
Project Engineer

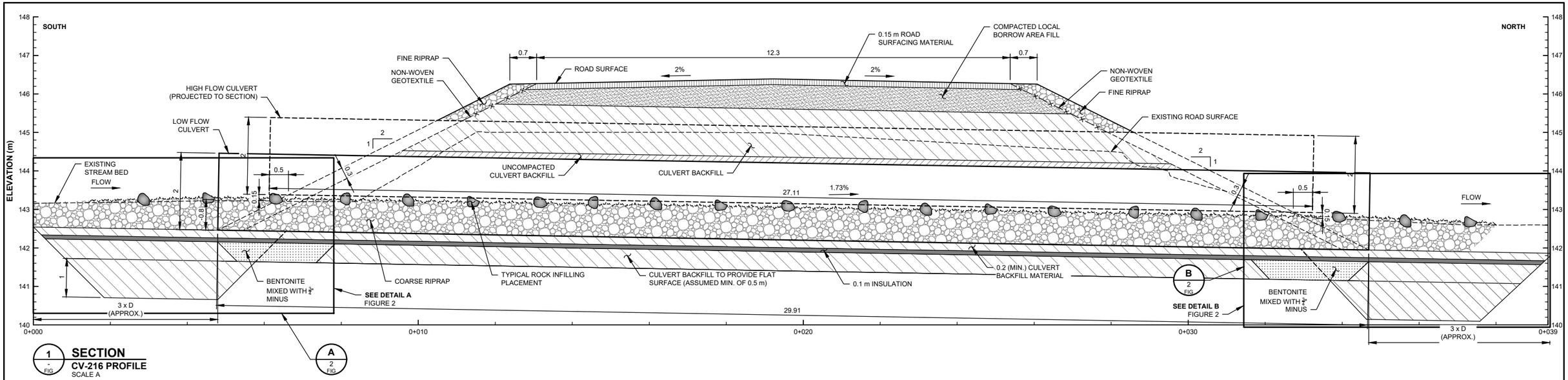
Reviewed: C. A (Andy) Phillips, P.Eng.
Senior Engineer

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

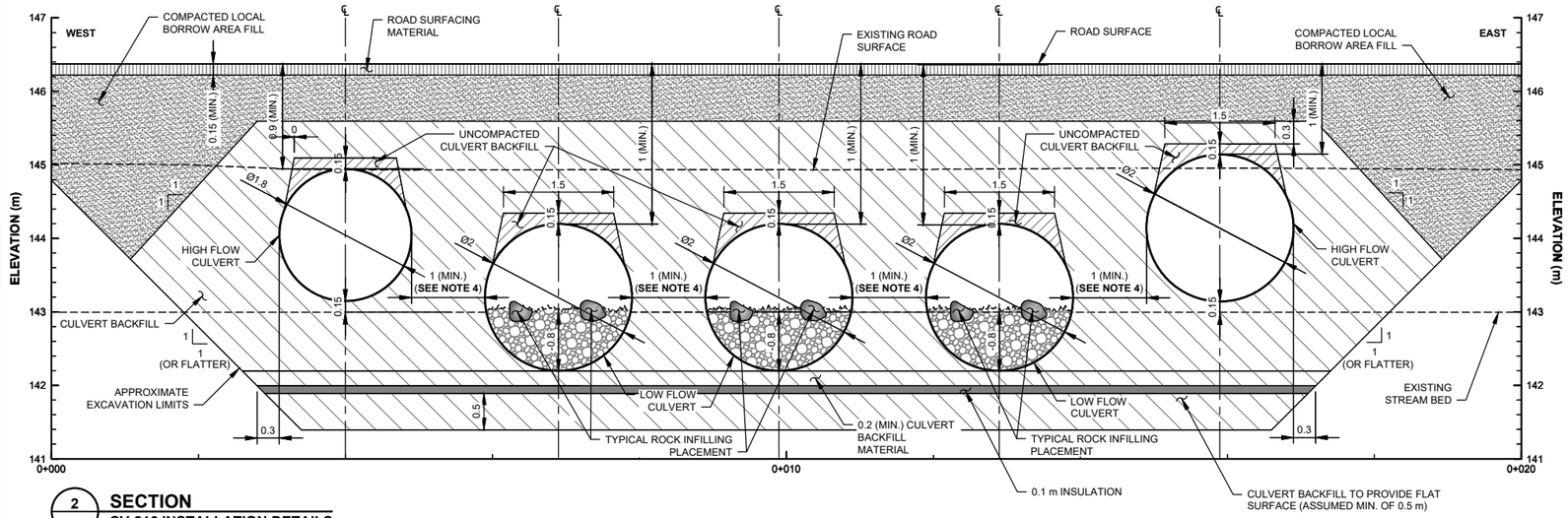
Attachments:

Figure 1 Rev 0	CV-216 Proposed Design Change
Figure 2 Rev 0	CV-216 Culvert Inlet and Outlet Apron Details

/gj



1 - FIG **SECTION**
CV-216 PROFILE
SCALE A



2 - FIG **SECTION**
CV-216 INSTALLATION DETAILS
SCALE B

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- BENTONITE MIXED WITH 3" MINUS
- INSULATION
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.

SCALE A: 1 0.5 0 1 2 3 4 5 m

SCALE B: 0.8 0.4 0 1 2 3 4 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	17APR'24	ISSUED WITH MEMO	GMJ	AS	CAP

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

CV-216 PROPOSED DESIGN CHANGE

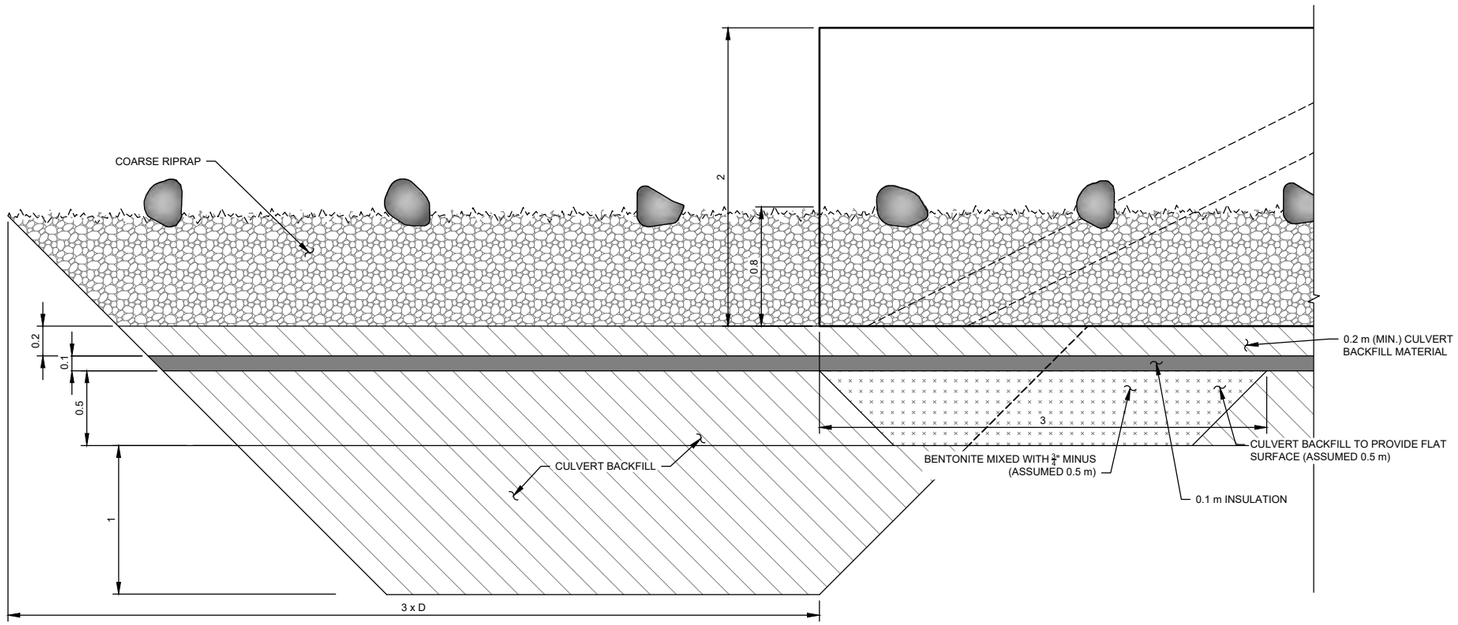
Knight Piésold CONSULTING

P/A NO. NB102-181/77

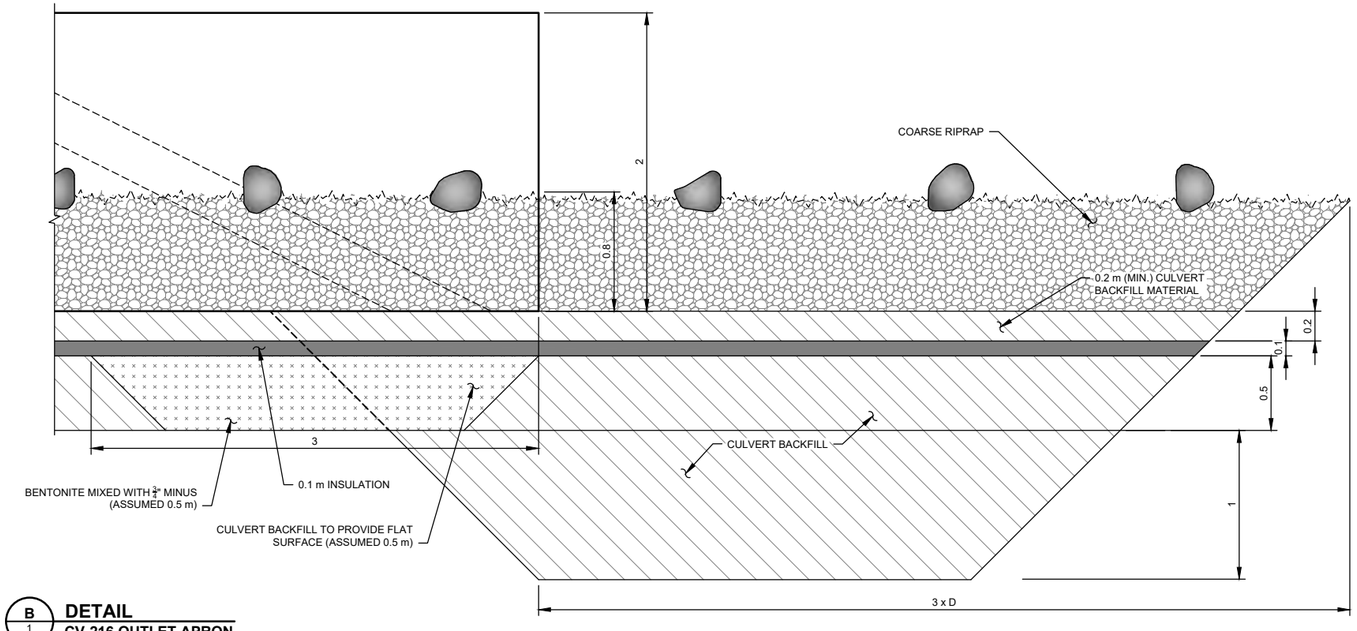
REF NO. NB24-00434

FIGURE 1

REV 0



A 1 FIG **DETAIL**
CV-216 INLET APRON
SCALE A



B 1 FIG **DETAIL**
CV-216 OUTLET APRON
SCALE A

LEGEND:

- RIPRAP
- CULVERT BACKFILL
- BENTONITE MIXED WITH ¾" MINUS
- INSULATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. FOR ADDITIONAL INFORMATION SEE THE PERMANENT CROSSING PLAN - ROUND CSP CULVERTS REV 2 REPORT.

SCALE A 0.4 0.2 0 0.4 0.8 1.2 1.6 2.0 m

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

CV-216 CULVERT INLET AND OUTLET APRON DETAILS

Knight Piésold CONSULTING

P/A NO. NB102-181/77 | REF NO. NB24-00434

FIGURE 2 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	17APR'24	ISSUED WITH MEMO	GMJ	AS	CAP

SAVED: I:\102\00181\77\A\Acad\FIGS\B38 R0, 4/17/2024 8:16:05 AM, ASIMPSON PRINTED: 4/17/2024 8:16:46 AM, FIG 2, ASIMPSON ACAD VERSION: 24.3S (LMS TECH)
XREF FILE(S): X-C-ROAD-DJLV-CV-C216 IMAGE FILE(S): 73604_cv-216 Tote Road Culvert Locations

Knight Piésold CONSULTING

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

MEMORANDUM

Date:	April 18, 2024	**File No.:**	NB102-00181/93-A.01
		Cont. No.:	NB24-00444
To:	Baruck Wile Rudolf Dietrich		
Copy To:	Dale Tulloch Jim Patterson Sharon Dyke Michael Burns SCP Admin BIM Document Control		
From:	Greg Johnstone		
Re:	**Permanent Crossing Plan - Round CSP Culverts, Response to Request for Information (RFI) No. 014**		

1.0 INTRODUCTION

This memo provides Knight Piésold Ltd.'s (KP) response to Request for Information (RFI) No. 014 provided by Nuna on the Permanent Crossing Plan - Round CSP Culverts Issued for Construction Drawings (IFC). Responses to the provided questions are included below.

2.0 RESPONSE

Nuna Question No. 1:
A large ice mass has been encountered in the foundation of culvert CV216 (see photo below). The ice mass in this location has prompted a potential design change by the Engineer for this culvert.

Nuna requests the revised CV216 design to be provide through Document Control bimdc@nunagroup.com as soon as possible as the construction of this culvert is currently underway.

KP Response No.1:

KP provided a memorandum and figure to Baffinland on April 17 describing the design change details for the foundation at CV-216 (attached). Following the issuance of this memorandum Baruck Wile from Baffinland informed KP that there are not sufficient quantities of bentonite to construct the foundation per the design change. As such, KP has revised the design change to incorporate geomembrane with a key in trench in place of bentonite mixed with ¾" minus material. The proposed geomembrane key-in trench is shown on Figure 1. The key in trench is to be backfilled with compacted ¾" minus material.

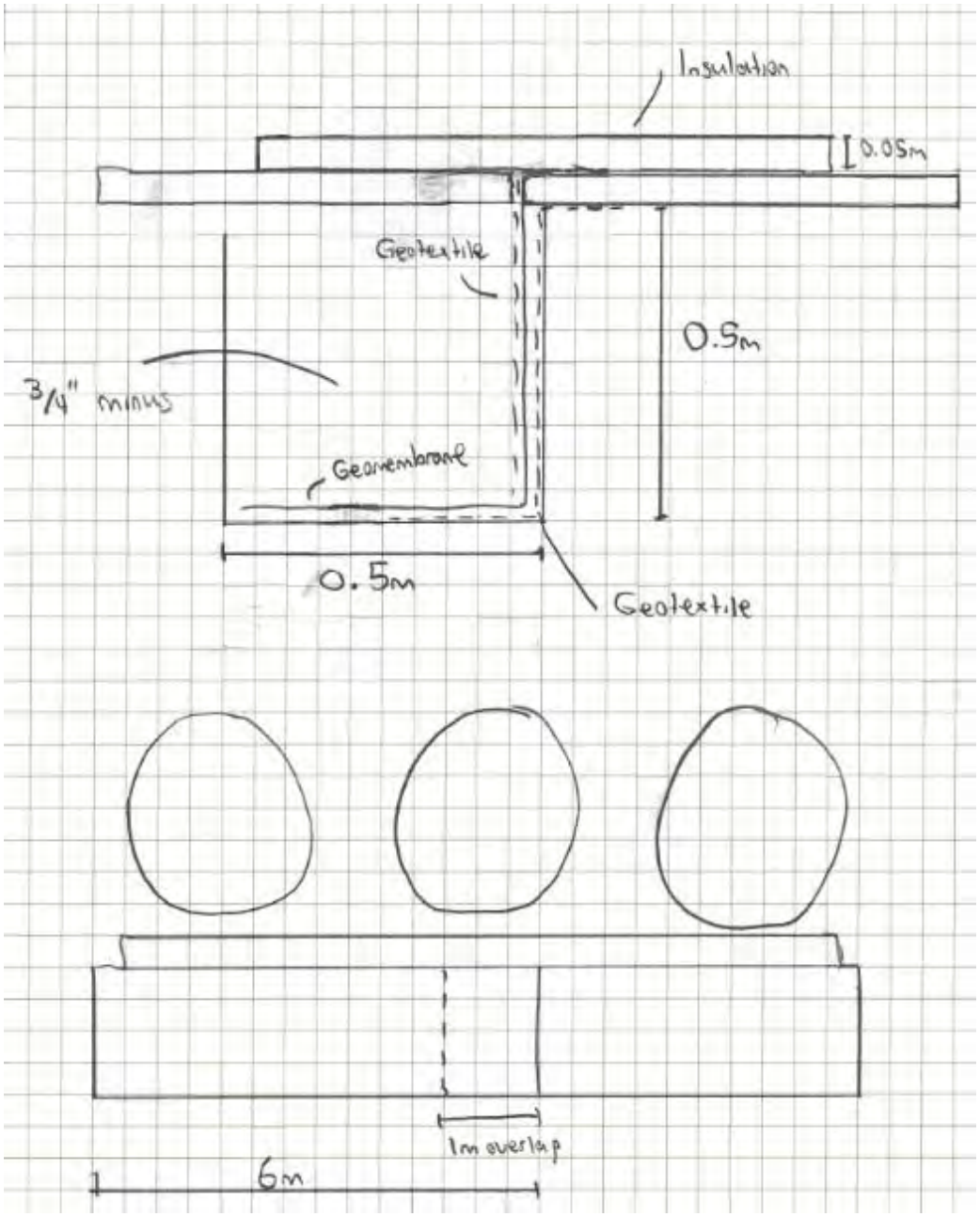


Figure 1 CV-216 Geomembrane Key-In Trench Design Change

3.0 REFERENCES

Nuna, 2024. Request for Information #014 to Baruck Wile and Rudolf Dietrich submitted by Darko Filipic. April 13.

Yours truly,
Knight Piésold Ltd.

Prepared: Greg Johnstone, P.Eng., CPESC
Project Engineer

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

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

Attachments:
Nuna Request for Information #014
CV-216 Design Change Due to Massive Ice Memorandum

/gj

Form

Request for Information

Department	QUALITY DEPARTMENT		
Section	Procedure Forms	**Date**	January 9, 2024
Form Number	NGCQF 06	**Revision**	1

		ITP No.:N/A	ITP Activity No.:N/A	Seq. No.:
Project Name:	Tote Road Culvert Upgrade	**Project #**	PO 9500000670	
RFI #	014	**Contract #**	4192708	
Originator:	Mason Fischer	**RFI Submitted On:**	April 13, 2024	
Prepared By:	Darko Filipic	**Requested Response By:**	April 15, 2024	
Submitted To:	Baruck Wile / Rudolf Dietrich	**Company:**	BIM Projects Team	

NGC requires a response on this query within 48 hours of submission

Reference Document / Tag # / Attachment	Rev	Comment
735r2 PCP	**2**	**Round CSP Culverts - CV-216 - General Arrangment**
736r2 PCP	**2**	**Round CSP Culverts - CV-216 - Plan and Section**

(Note: Sections 1, 2 & 3 are to be completed by the Originator)

Section 1: *Description of Issue / Clarification / Reason for Request*

A large ice mass has been encountered in the foundation of culvert CV216 (see photo below). The ice mass in this location has prompted a potential design change by the Engineer for this culvert.

Section 2: *Corrective Action*	☐ **Taken**	☐ **Suggested**	☒ **Required**
Nuna requests the revised CV216 design to be provide through Document Control bimdc@nunagroup.com as soon as possible as the construction of this culvert is currently underway.			
Potential Cost Impact?	**Yes** ☐ **No** ☒ **Unsure** ☐	**Potential Schedule Impact?**	**Yes** ☐ **No** ☒ **Unsure** ☐
Section 3: *Approval Required by*	☐ **Internal**	☐ **Client**	☒ **Engineering**

(Note Section 4 to be completed by the recipient of the RFI)

Section 4: *RFI Response*	☐ **Corrective Action Approved**	☐ **Correct as Follows**

Response by:		**Date:**	
Reference Document / Tag # / Attachment		**Rev**	**Comment**

5. Distribution: Superintendents and Area Foreman **(applicable as per the following disciplines)**			
☐Civil	☐Electrical	☐Instrumentation	☐Mechanical
☐Const. Manager	☐Management	☐QC Department	☐Originator

6. Completion:		
Completion Manager/Supervisor:	**Completion Signature for QA/QC:**	**Completion Red-Line Drawings:**
Signature:	Signature:	Signature:
Date:	Date:	Date:

Knight Piésold CONSULTING

Management System Certified By: bsi ISO 9001 Quality Management Systems CERTIFIED FS 64925 | ISO 14001 Environmental Management CERTIFIED EMS 550121 | ISO 45001 Occupational Health and Safety Management CERTIFIED OHS 550122

MEMORANDUM

Date:	April 17, 2024	**File No.:**	NB102-00181/77-A.01
		Cont. No.:	NB24-00434
To:	Mr. Jim Patterson		
Copy To:	Connor Devereaux, Rudolf Dietrich		
From:	Greg Johnstone		
Re:	**CV-216 Design Change due to Massive Ice**		

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5.0 SUMMARY

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6.0 REFERENCES

Knight Piésold Ltd. (KP), 2024. *Mary River Project - Tote Road Permanent Crossing Plan - Round CSP Culvert Installations*. February 8. Ref. No. NB102-181/77-4, Rev 2.

7.0 CLOSING

We trust that meets with your present requirements. Please contact the undersigned with any questions.

Yours truly,
Knight Piésold Ltd.

Prepared: Greg Johnstone, P.Eng., CPESC
Project Engineer

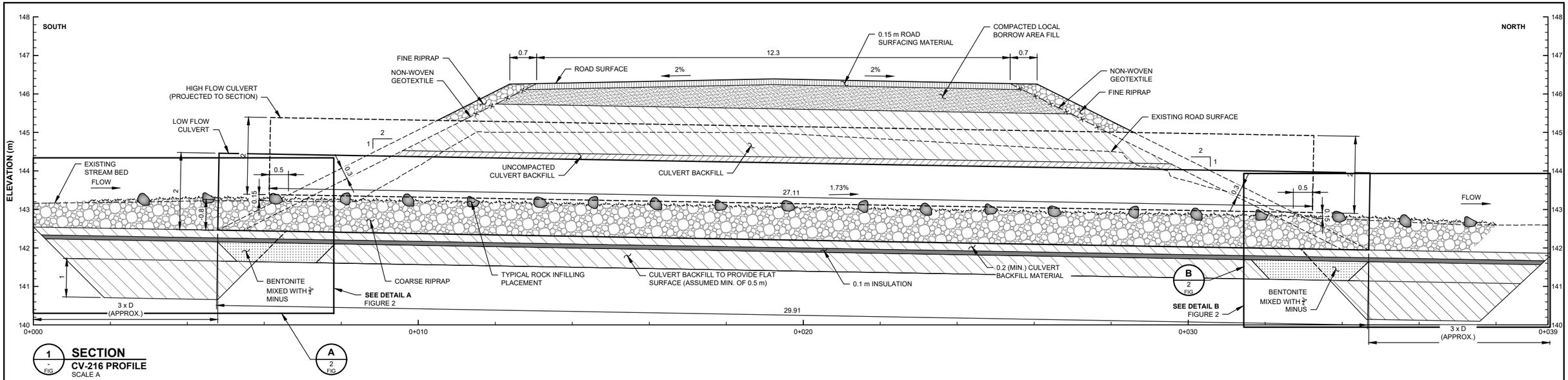
Reviewed: C. A (Andy) Phillips, P.Eng.
Senior Engineer

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

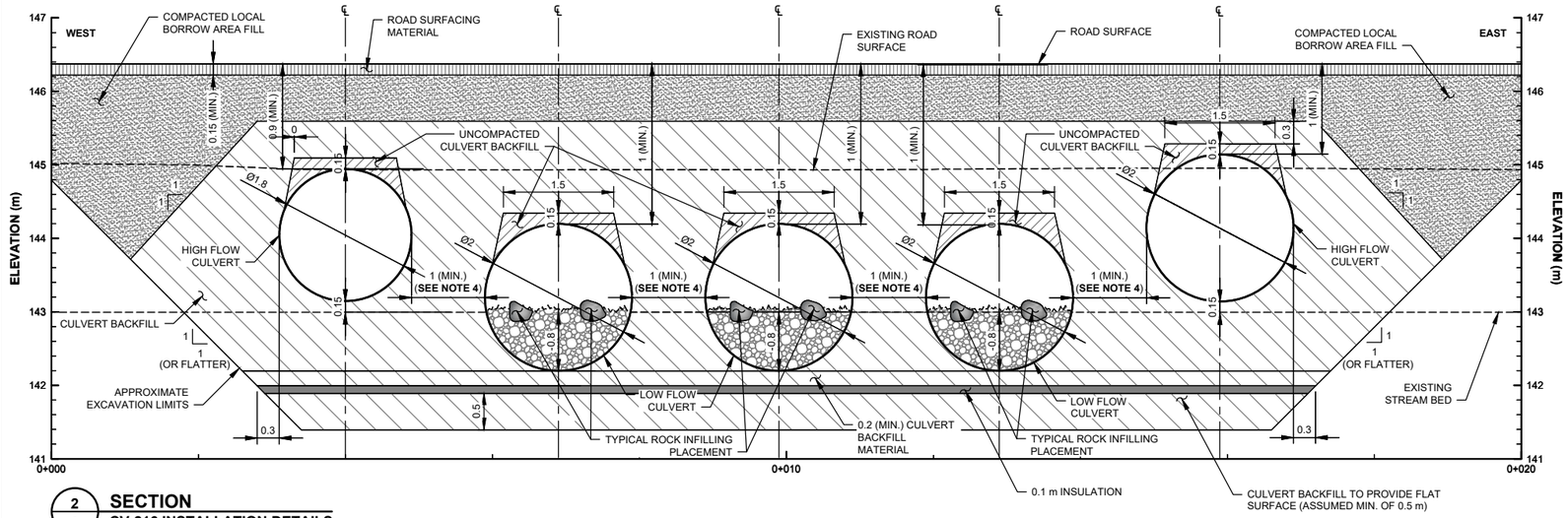
Attachments:

Figure 1 Rev 0	CV-216 Proposed Design Change
Figure 2 Rev 0	CV-216 Culvert Inlet and Outlet Apron Details

/gj



1 - FIG **SECTION**
CV-216 PROFILE
SCALE A



2 - FIG **SECTION**
CV-216 INSTALLATION DETAILS
SCALE B

LEGEND:

- COMPACTED LOCAL BORROW AREA FILL
- UNCOMPACTED CULVERT BACKFILL
- CULVERT BACKFILL
- ROAD SURFACING MATERIAL
- COARSE RIPRAP
- FINE RIPRAP
- BENTONITE MIXED WITH 3" MINUS
- INSULATION
- EXISTING STREAM BED
- NON-WOVEN GEOTEXTILE

NOTES:

1. COORDINATE GRID IS UTM NAD83, ZONE 17.
2. CULVERT SURVEYS AND DRONE IMAGERY PROVIDED BY KITIKMEOT CHALLENGER, AUGUST 2023.
3. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
4. 1 m (MIN.) OR A SUITABLE WIDTH TO ALLOW SPACE FOR COMPACTOR TO PASS BETWEEN CULVERTS.
5. VEHICLE SAFETY BERMS ARE REQUIRED IN AREAS WITH A DROP OFF GREATER THAN 3.0 m.

SCALE A: 1 0.5 0 1 2 3 4 5 m

SCALE B: 0.8 0.4 0 1 2 3 4 m

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	17APR'24	ISSUED WITH MEMO	GMJ	AS	CAP

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

CV-216 PROPOSED DESIGN CHANGE

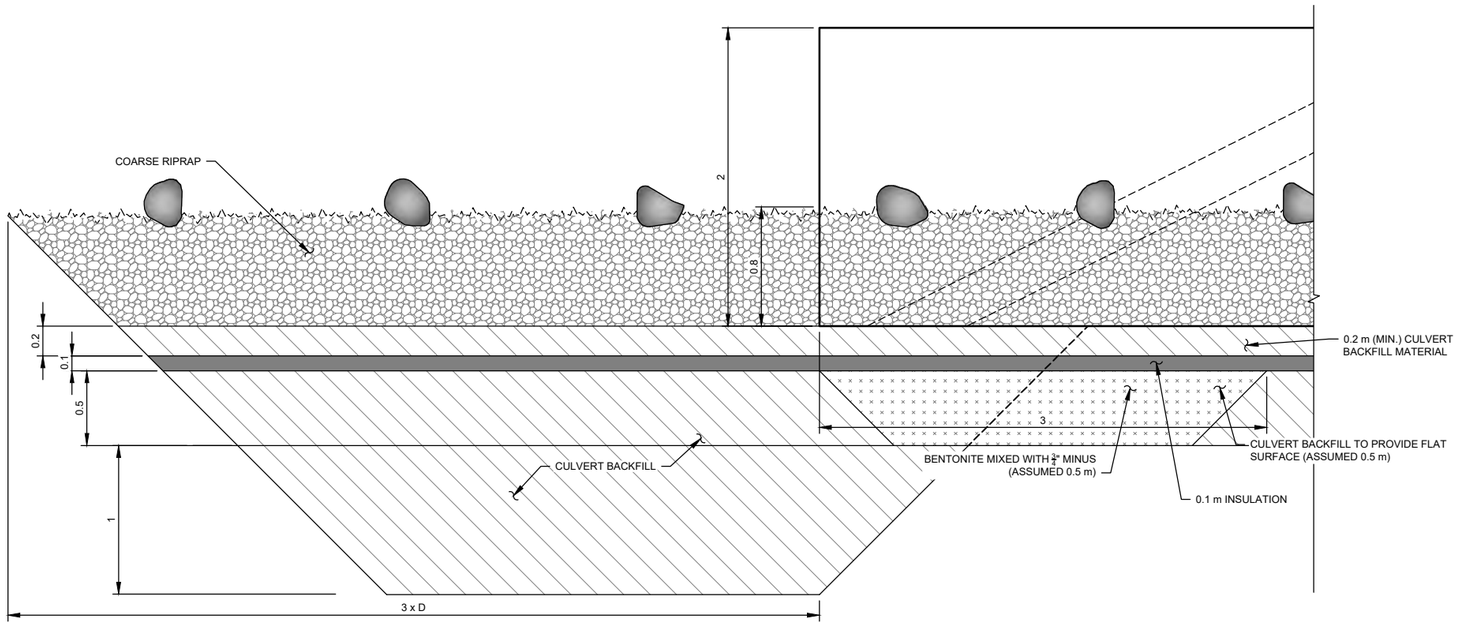
Knight Piésold CONSULTING

P/A NO. NB102-181/77

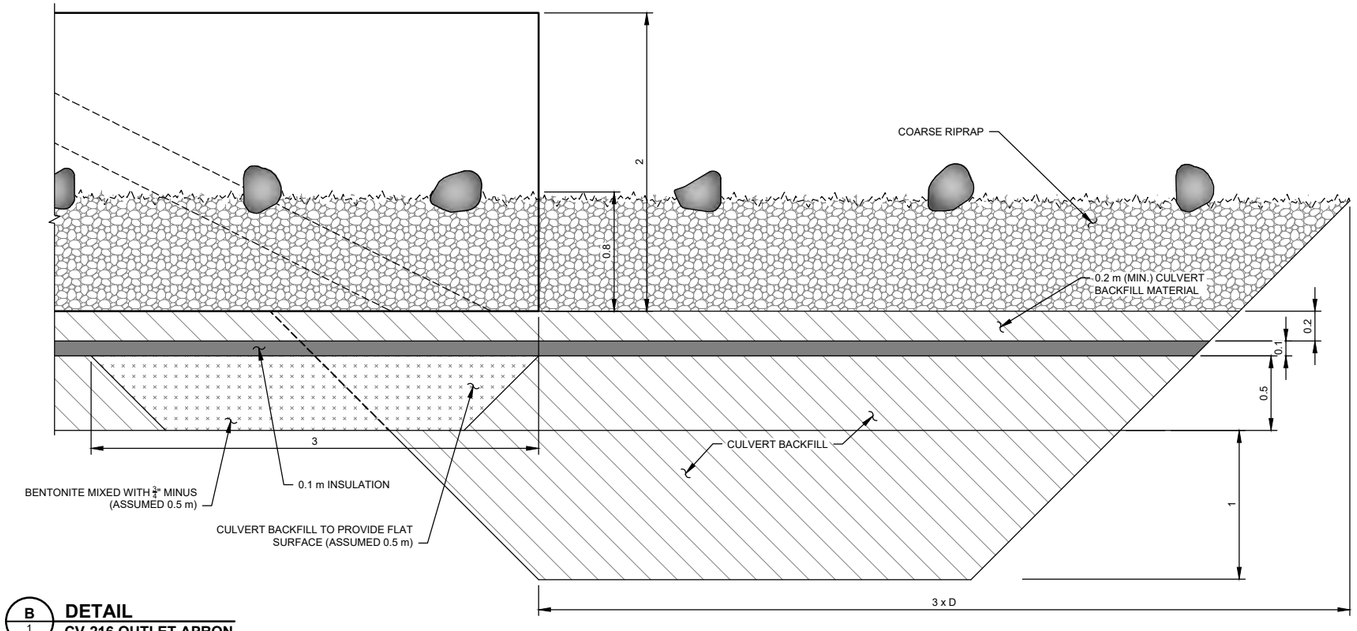
REF NO. NB24-00434

FIGURE 1

REV 0



A 1 FIG **DETAIL**
CV-216 INLET APRON
SCALE A



B 1 FIG **DETAIL**
CV-216 OUTLET APRON
SCALE A

LEGEND:

- RIPRAP
- CULVERT BACKFILL
- BENTONITE MIXED WITH ¾" MINUS
- INSULATION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
2. FOR ADDITIONAL INFORMATION SEE THE PERMANENT CROSSING PLAN - ROUND CSP CULVERTS REV 2 REPORT.

SCALE A 0.4 0.2 0 0.4 0.8 1.2 1.6 2.0 m

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

CV-216 CULVERT INLET AND OUTLET APRON DETAILS

Knight Piésold CONSULTING

P/A NO. NB102-181/77 | REF NO. NB24-00434

FIGURE 2 | REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	17APR'24	ISSUED WITH MEMO	GMJ	AS	CAP

SAVED: I:\102\00181\77\A\Acad\FIGS\B38 R0, 4/17/2024 8:16:05 AM, ASIMPSON PRINTED: 4/17/2024 8:16:46 AM, FIG 2, ASIMPSON ACAD VERSION: 24.3S (LMS TECH)
XREF FILE(S): X-C-ROAD-DJLV-CV-C216 IMAGE FILE(S): 73604_cv-216 Tote Road Culvert Locations

APPENDIX F

Surveillance Forms

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

SURVEILLANCE FORM **April 3, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns (Baffinland), Dale Tulloch (Baffinland), Abid Najey (Baffinland), Jim Patterson (Baffinland), Richard Cook (KP), Toby Perkins (KP), Andy Phillips (KP), Greg Johnstone (KP), Michael Johnson (NSC), Mackenzie Aiken (KP) Darren Kocken (KP), Michael Bourdignon (KP), Matthew Trask (KP)**	**REF. NO.:**	**58**
ACCEPTANCE NO.:	**BG-04-SRV-01**	**PAGES:**	**6**

1 – DESCRIPTION OF ACTIVITY

Placement of the Culvert Infill Material (Coarse Riprap mixed with Stream Substrate Material) for the two (2) low flow culverts at BG-04 on April 2, 2024 (See Figure 1 and 2 and Photos 1 to 4). Stream Substrate Material is being sourced from a stockpile at km 94.

2 – OBSERVATIONS OF NON-CONFORMING WORK

During the beginning of nightshift of April 2, 2024, it was observed that the Culvert Infill Material being placed by Nuna to backfill the inside of the two (2) low flow culverts at BG-04, for the first 8 m of fill on the inlet ends contained entrained snow (See Figure 1 and Figure 2). The Stream Substrate Material being used to mix with the Coarse Riprap, as well as the Coarse Riprap was observed to have snow mixed into the stockpiles which were then used for the culvert infilling.

The Culvert Infill Material within the identified area of the two (2) low flow culverts at BG-04 therefore did not meet the technical specifications identified in Note 3 in the Permanent Crossing Plan Culvert Fill Materials and Geosynthetics Specifications Drawing No. 703, Rev 3.

3 – PROPOSED REMEDIAL ACTIONS

Removal of the placed Culvert Infill Material is the preferred option; however, this is recognized as being very difficult to complete due to the size of the material and difficulty using mechanization. In lieu of removing the material, additional natural stream substrate material should be placed on the surface of the 8 m section of each infilled culvert. It is recommended that this material consist of an approximately 10 cm thick lift of Stream Substrate Material only (no riprap). The expectation is that this additional material will assist in filling any voids that might be caused by the melting of the snow mixed with the Culvert Infill Material.

For the remaining length of the culvert infilling (and all future infilling), natural stream substrate material not containing snow or ice must be used. KP will complete control tests to document that the Stream Substrate Material is viable and does not contain significant quantities of snow.

SURVEILLANCE FORM **April 3, 2024**

4 – CERTIFICATION

We, the undersigned are authorized representatives of the companies listed and, do hereby accept the observations and required remedial work over the area described above.

Knight Piésold Ltd.:

Mackenzie Aiken, KP Field Staff, Knight Piésold Ltd.

Nuna:

Donald Weber, Project Supervisor, Nuna

Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

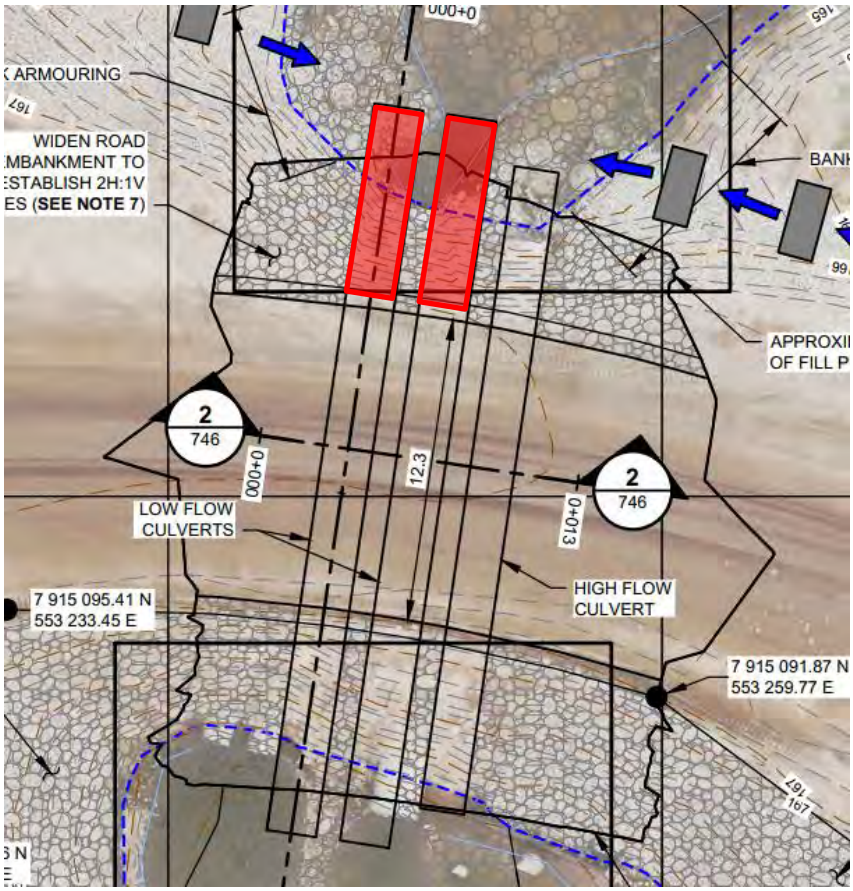


Figure 1 Approximate area of placed Culvert Infill Material containing snow at BG-04 Culvert shown in red (From Drawing 745 R2)

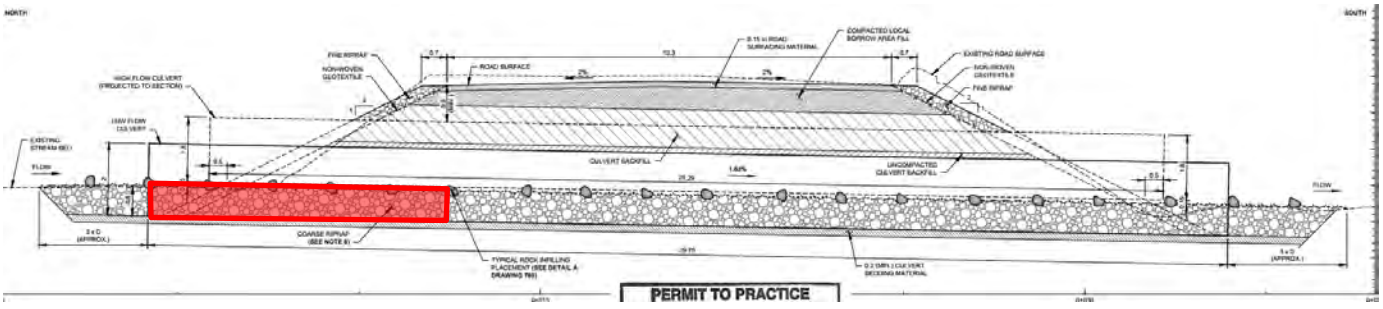


Figure 2 Approximate area of placed Culvert Infill Material containing snow at BG-04 Culvert shown in red (From Drawing 745 R2)

Knight Piésold CONSULTING

SURVEILLANCE FORM **April 3, 2024**

Photo 1 **Placed Culvert Infill Material in the east low flow culvert at BG-04 (Facing Inlet)**

Photo 2 **Placed Culvert Infill Material in the west low flow culverts at BG-04 (Facing Inlet)**

SURVEILLANCE FORM **April 3, 2024**

Photo 3 **Hole made to inspect the snow mixed in with Culvert Infill Material at BG-04**

Photo 4 **Sample of the snow and stream substrate material mix from hole in Photo 3**

SURVEILLANCE FORM **April 3, 2024**

Photo 5 **Snow mixed in with the Culvert Infill Material at BG-04 culvert**

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

SURVEILLANCE FORM **April 12, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Greg Johnstone, Mackenzie Aiken Darren Kocken, Mackenzie Aiken, Matthew Trask (KP), Michael Johnson (NSC)**	**REF. NO.:**	**70**
ACCEPTANCE NO.:	**BG-04-SRV-02**	**PAGES:**	**13**

1 – DESCRIPTION OF ACTIVITY

Placement of the Culvert Infill Material (Coarse Riprap mixed with Stream Substrate Material) for the two (2) low flow culverts at BG-04 on April 2, 2024 (See Figure 1 and 2 and Photos 1 to 4). Stream Substrate Material is being sourced from a stockpile at km 94 along the Tote Road.

This surveillance form supersedes BG-04-SRV-01 (Reference number 58) due to additional samples collected to assess the Culvert Infill Material.

2 – OBSERVATIONS OF NON-CONFORMING WORK

During the beginning of nightshift of April 2, 2024, it was observed that the Culvert Infill Material being placed by Nuna to backfill the inside of the two (2) low flow culverts at BG-04 contained entrained snow (See Figures 1 and 2). The material with snow was observed along the first 8 m from the inlet ends of both low flow culverts. Further review identified that the stockpiles of both the Stream Substrate Material and the Coarse Riprap had snow mixed into the stockpiled materials.

The placed Culvert Infill Material within the identified area of the two (2) low flow culverts at BG-04 therefore did not appear to meet the technical specifications identified in Note 3 on Drawing No. 703, Rev 3 (Permanent Crossing Plan Culvert Fill Materials and Geosynthetics Specifications).

One (1) sample was collected from the identified area of the two (2) low flow culverts at BG-04 on April 3 and allowed to thaw to estimate the volume of snow/ice within the sample. The results indicated that greater than 50% of the volume of the material similar to natural stream substrate (finer portion of the matrix) was comprised of snow/ice (See Photo 6 and 7).

To confirm the observations and initial test results, an additional eight (8) samples were collected on April 9 from the identified non-conforming material in the two low flow culverts at BG-04. Four of the samples were delivered to the on-site ALS laboratory for moisture content testing, and four duplicate samples were retained by KP for comparison. The results of all eight samples indicate that approximately 80% of the volume of the natural stream substrate (finer portion of the matrix) samples consisted of snow and/or ice (See Photos 8 to 18).

SURVEILLANCE FORM **April 12, 2024**

3 – PROPOSED REMEDIAL ACTIONS

Due to the sample results, the recommendations from the original surveillance form, BG-04-SRV-01 have been updated.

It is KP's official recommendation that the material in question be removed from the identified areas of the two low flow culverts at BG-04. This material should be replaced by more suitable Stream Substrate Material without an excess of snow and/or ice. This solution is considered lowest risk of non-compliance with DFO requirements.

However, based on a discussion with Baffinland, Nuna and KP on April 11, it was agreed that a test of applying heat or heating and steam combined to the Culvert Infill to melt the entire snow/ice would be conducted to a portion of the non-compliant infill material as an initial step. The next steps would be determined based on an assessment of the effectiveness of this test.

SURVEILLANCE FORM **April 12, 2024**

4 – CERTIFICATION

We, the undersigned are authorized representatives of the companies listed and, do hereby accept the observations and required remedial work over the area described above.

Knight Piésold Ltd.:

Michael Bourdignon, KP Field Staff, Knight Piésold Ltd.

Nuna:

Donald Weber, Project Supervisor, Nuna

Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

SURVEILLANCE FORM **April 12, 2024**

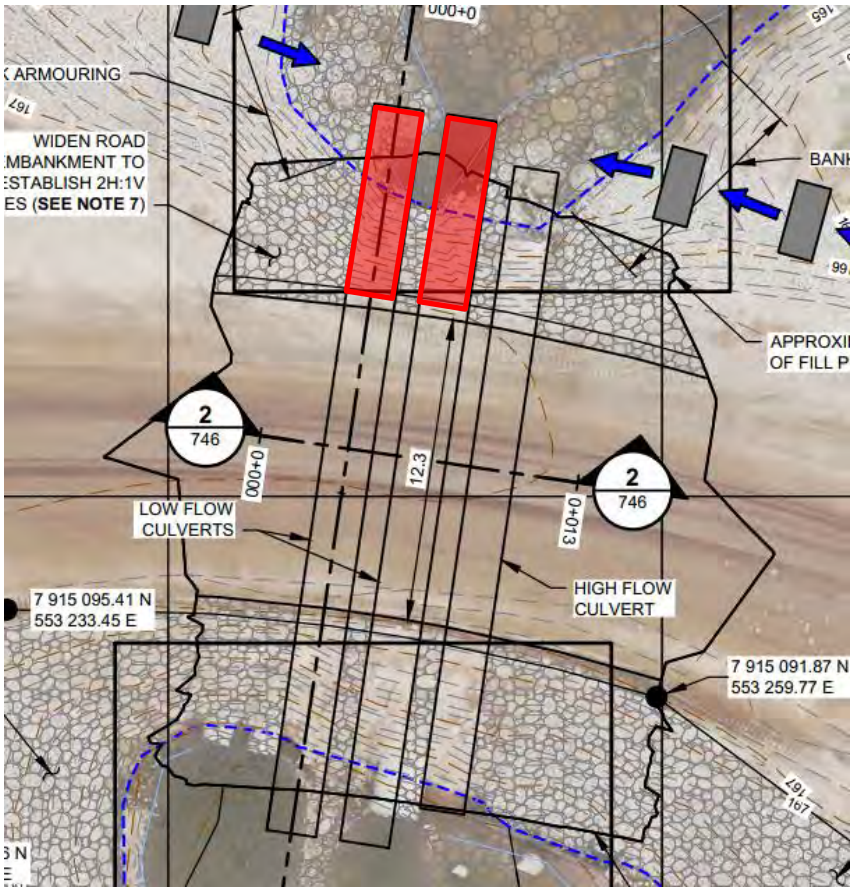


Figure 1 **Approximate area of placed Culvert Infill Material containing snow at BG-04 Culverts shown in red (From Drawing 745 R2)**

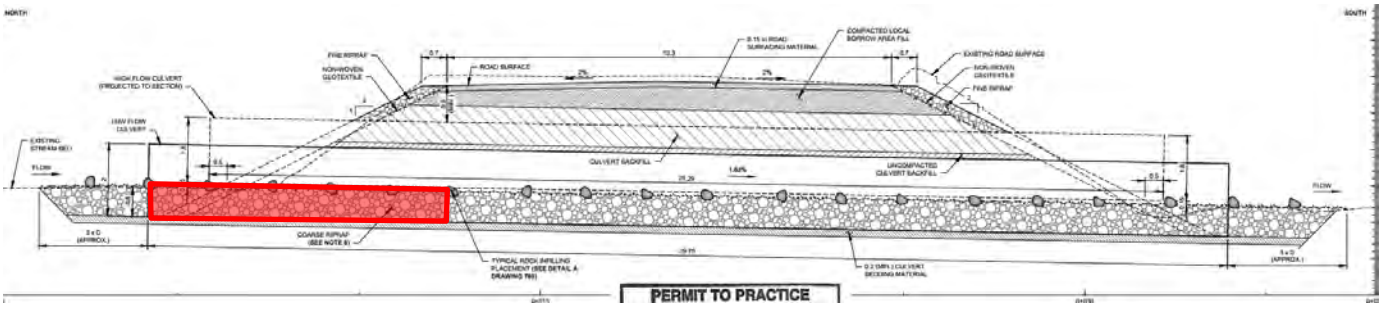


Figure 2 **Approximate area of placed Culvert Infill Material containing snow at BG-04 Culverts shown in red (From Drawing 745 R2)**

Knight Piésold CONSULTING

SURVEILLANCE FORM **April 12, 2024**

Photo 1 **Placed Culvert Infill Material in the east low flow culvert at BG-04 (Facing Inlet).**

Photo 2 **Placed Culvert Infill Material in the west low flow culverts at BG-04 (Facing Inlet).**

SURVEILLANCE FORM **April 12, 2024**

Photo 3 **Hole made to inspect the snow mixed in with Culvert Infill Material at BG-04.**

Photo 4 **Sample of the snow and stream substrate material mix from hole in Photo 3.**

Photo 5 **Snow mixed in with the Culvert Infill Material at BG-04.**

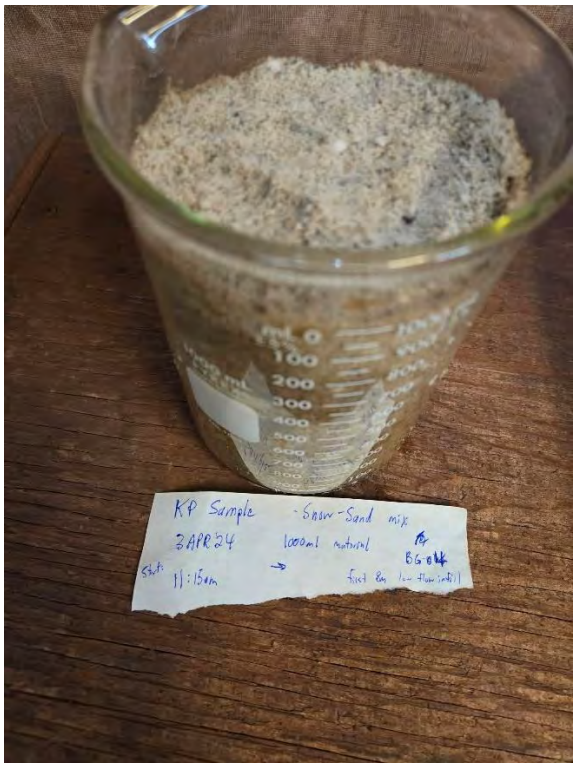


Photo 6 **April 3rd Culvert Infill Sample Before Melting.**

SURVEILLANCE FORM **April 12, 2024**

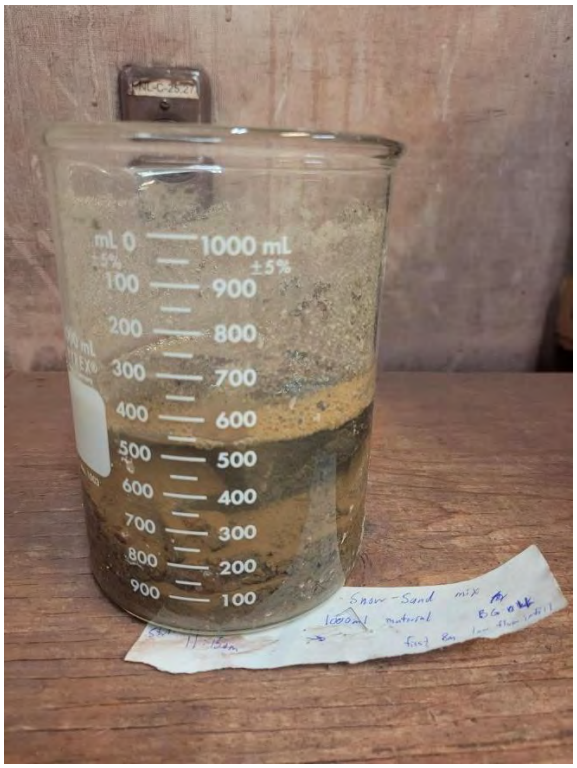


Photo 7 **April 3rd Culvert Infill Sample After Melting.**

Photo 8 **Samples 01 and 02 and duplicates 01 and 02 collected from the south west culvert at BG-04.**

Photo 9 Samples 03 and 04 and duplicates 03 and 04 collected from the northeast culvert at BG-04.

Photo 10 Samples 01, 02, 03, and 04 delivered to the ALS laboratory at the Mine Site Complex (MSC).

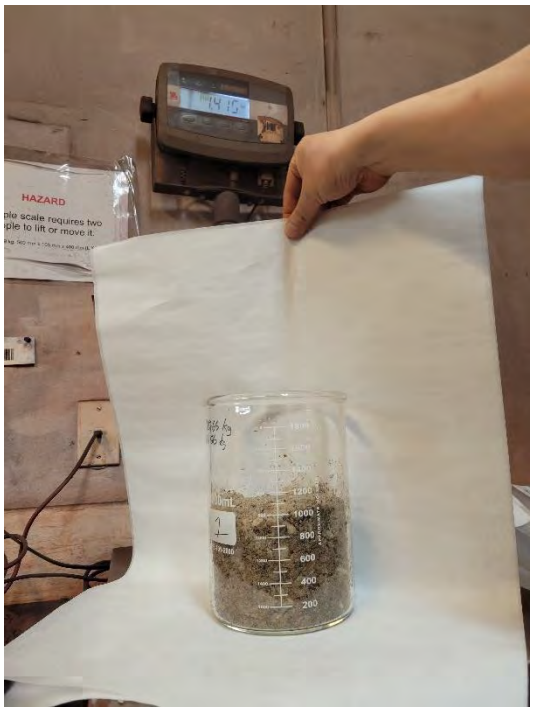


Photo 11 **Sample 01 prior to melting of snow and ice.**

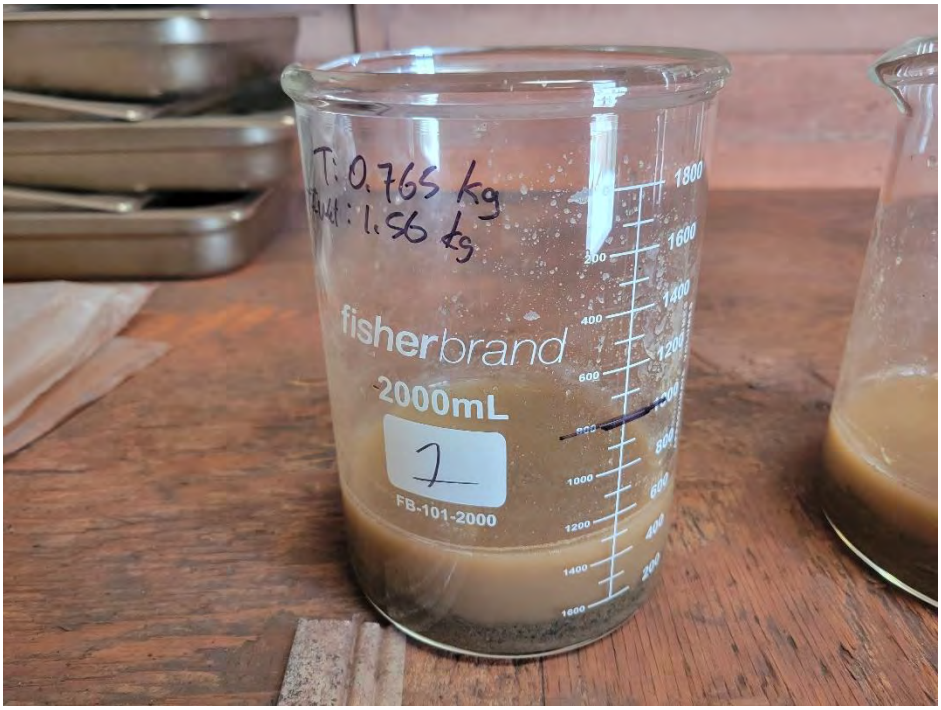


Photo 12 **Sample 01 results after melting of snow and ice.**

SURVEILLANCE FORM **April 12, 2024**

Photo 13 **Sample 02 prior to melting of snow and ice.**

Photo 14 **Sample 02 results after melting of snow and ice.**

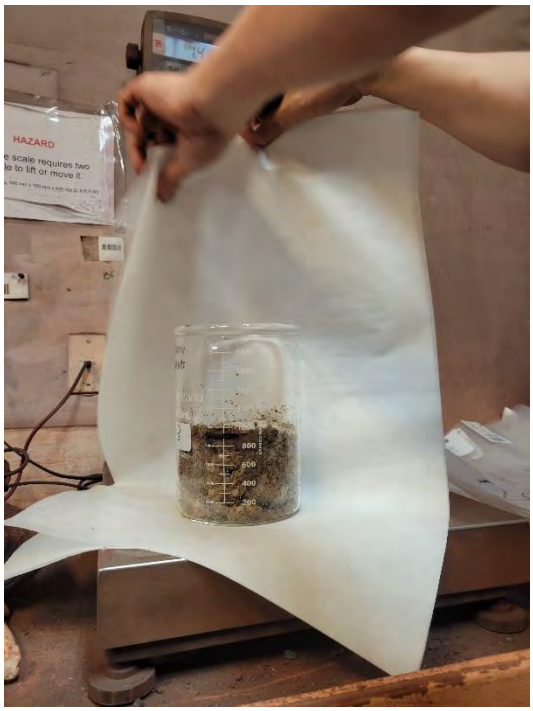


Photo 15 **Sample 03 prior to melting of snow and ice.**

Photo 16 **Sample 03 results after melting of snow and ice.**

Photo 17 **Sample 04 prior to melting of snow and ice.**

Photo 18 **Sample 04 results after melting of snow and ice.**

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

SURVEILLANCE FORM **April 23, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Greg Johnstone, Mackenzie Aiken, Darren Kocken, Matthew Trask (KP), Michael Johnson (NSC)**	**REF. NO.:**	**84**
ACCEPTANCE NO.:	**BG-04-SRV-03**	**PAGES:**	**4**

1 – DESCRIPTION OF ACTIVITY

Placement of the embedded Boulder Clusters and Protruding Boulders within the two, 2.0 m diameter low flow corrugated steel pipe (CSP) culverts at BG-04 (See Figures 1 and 2 and Photos 1 and 2).

2 – OBSERVATIONS OF NON-CONFORMING WORK

The infilling of the two low flow CSP culverts at BG-04 commenced on April 2, 2024, and was completed on April 7, 2024. Following the completion of infilling the culverts, it was observed that the required embedded Boulder Clusters and Protruding Boulders were not installed within the culverts as per the design.

As per Drawing No. 746, Boulder Clusters are required to be installed at a spacing of 3.5 m within the low flow culverts at BG-04. Additionally, protruding embedded boulders are to be field fit within the culvert as specified by the engineer. Boulder Clusters and Protruding Boulders were installed as per the design in the northern half of the low flow culverts at BG-04; however, the required Boulder Clusters and Protruding Boulders were not installed properly within the southern half of the low flow culverts.

The Boulder Clusters that are present in the southern half of the northwestern low flow culvert require replacement as they are not installed as per the design specifications on Drawing No. 780 (See Photo 1). The boulders placed are too small and not properly imbedded to prevent movement during high flow conditions. There are no Boulder Clusters or Protruding Boulders currently present in the southern half of the southeastern low flow culvert (See Photo 2).

The Boulder Clusters are necessary to provide a velocity shadow (resting place) for fish passing through the culvert. Without the Boulder Clusters, the fish passage parameters such as maximum swim distance and flow velocity are exceeded. The fish passage parameters must be met for each culvert to be in conformance with the Department of Fisheries and Oceans (DFO) corrective measures order.

3 – PROPOSED REMEDIAL ACTIONS

KP recommends that the required Boulder Clusters and Protruding Boulders be installed within the southern half of the southeastern low flow culvert and that those present in the southern half of the northwestern low flow culvert be replaced at BG-04. As previously noted, this is required to comply with the DFO corrective measures order. It will be important to consider the safety concerns identified by Nuna in any remedial measures completed.

SURVEILLANCE FORM **April 23, 2024**

4 – CERTIFICATION

We, the undersigned are authorized representatives of the companies listed and, do hereby accept the observations and required remedial work over the area described above.

Knight Piésold Ltd.:

Michael Bourdignon, KP Field Staff, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Project Supervisor, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile Project Supervisor, Baffinland Iron Mines Corporation

SURVEILLANCE FORM **April 23, 2024**

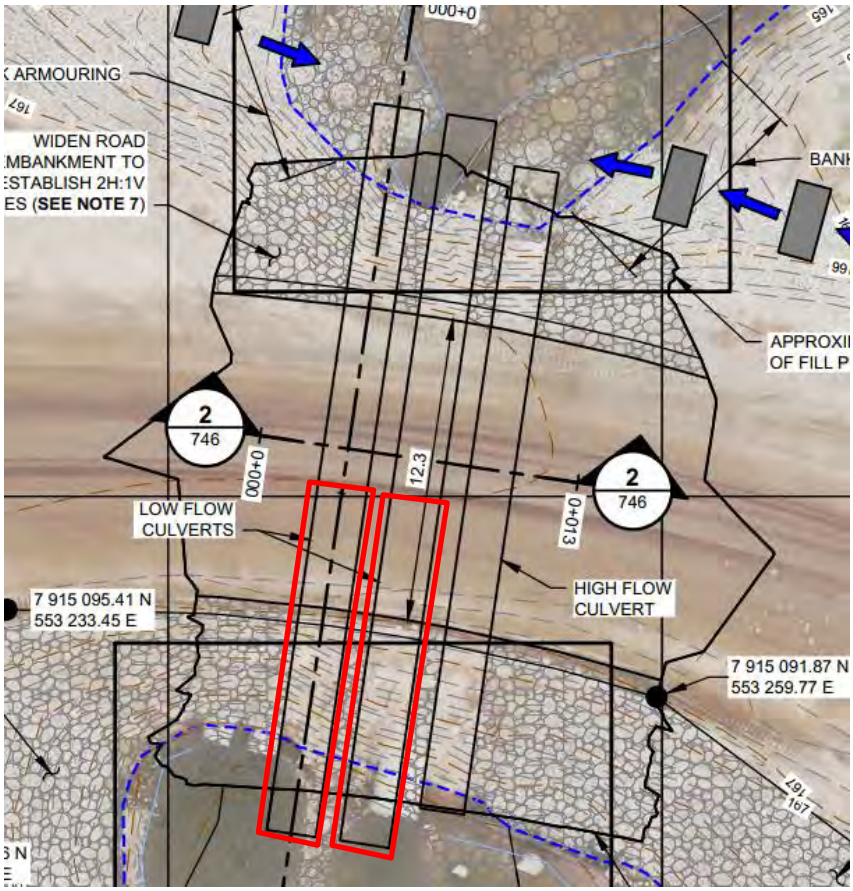


Figure 1 **Approximate area within the low flow culverts at BG-04 that lack the required Boulder Clusters and Protruding Boulders shown in red (From Drawing 745 R2)**

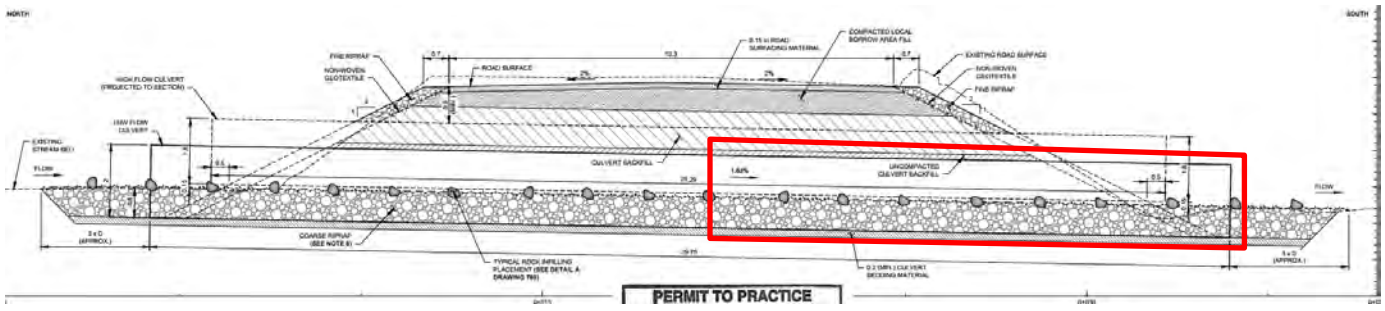


Figure 2 **Approximate area within the low flow culverts at BG-04 that lack the required Boulder Clusters and Protruding Boulders shown in red (From Drawing 746 R2)**

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

SURVEILLANCE FORM **April 23, 2024**

Photo 1 **Boulder Clusters and Protruding Boulders (inadequately sized boulders) in the southern half of the low flow culverts at BG-04.**

Photo 2 **Lack of Boulder Clusters and Protruding Boulders in the southern half of the low flow culverts at BG-04.**

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-216

SURVEILLANCE FORM

April 30, 2024

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Greg Johnstone, Mackenzie Aiken, Darren Kocken, Michael Bourdignon (KP), Michael Johnson (NSC)**	**REF. NO.:**	**96**
ACCEPTANCE NO.:	**CV-216-SRV-01**	**PAGES:**	**5**

1 – DESCRIPTION OF ACTIVITY

Damaged section of the northern high flow corrugated steel pipe (CSP) culvert at CV-216. See Figures 1 and 2 and Photos 1 to 4.

2 – OBSERVATIONS OF NON-CONFORMING WORK

The placement of the northern high flow CSP culvert was completed during nightshift on April 25, 2024. Following the placement, the culvert was backfilled with 32 mm minus culvert backfill material commenced using 200 mm lifts and compacted by 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper. Backfilling of the northern high flow CSP culvert was completed during nightshift of April 28, 2024.

It was observed at 7:30 am on April 29, 2024, that a large dent was created in the northern side of the northern high flow 1.8 m diameter CSP culvert approximately 8.5 m from the inlet end. The dent measures approximately 1.5 m wide and 1.0 m high and is located entirely within the second segment of 8 m CSP measured from the inlet.

The location of the damage is located directly under the wheel loading area of the road surface.

3 – POTENTIAL PROBLEMS FROM NON-CONFORMING WORK

A culvert compromised by dents or deformations will have a decreased ability to resist applied loads, which can then exacerbate the deformation, and may lead to failure of the culvert. A dent or deformation will also reduce the cross-sectional area and may reduce the hydraulic capacity of the culvert.

4 – PROPOSED REMEDIAL ACTIONS

KP recommends that the culvert manufacturer be consulted to determine the severity of the damage and to determine any potential remedial measures that may be taken to reinstate the structural stability of the culvert barrel. In lieu of this direction, KP recommends that the damaged 8 m CSP culvert segment be replaced. Planning to push out the dent. Will take and get Amtecs opinion after solution executed.

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-216

April 30, 2024

SURVEILLANCE FORM

5 – CERTIFICATION

We, the undersigned are authorized representatives of the companies listed and, do hereby accept the observations and required remedial work over the area described above.

Knight Piésold Ltd.:

Matthew Trask, KP Field Staff, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Project Supervisor, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile Project Supervisor, Baffinland Iron Mines Corporation

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-216

SURVEILLANCE FORM

April 30, 2024

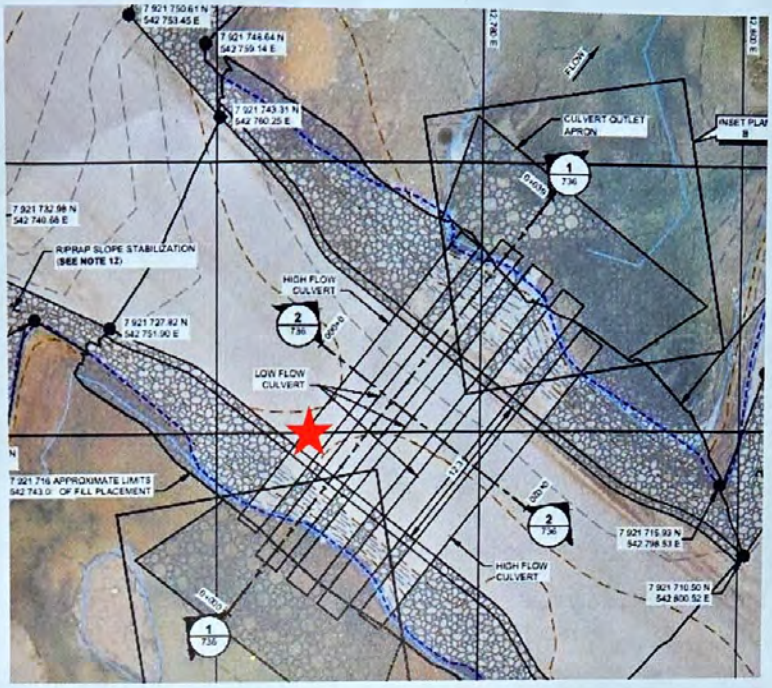


Figure 1 Approximate location of damaged CSP culvert at CV-216 shown in red (From Drawing 735 R2)

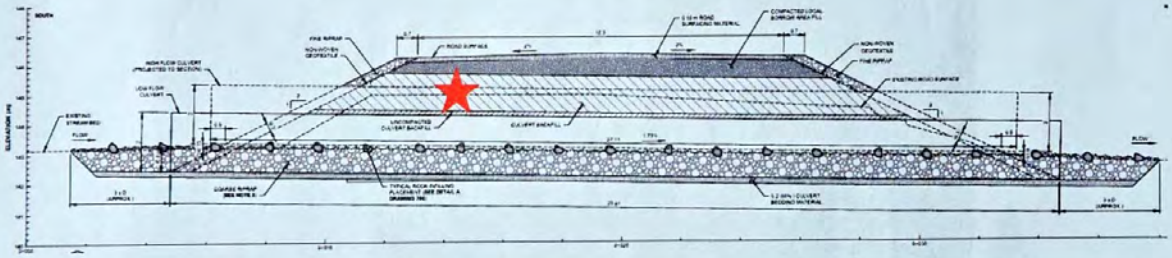


Figure 2 Approximate location of damage within the northern high flow CSP culvert at CV-216 in red (From Drawing 736 R2)

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-216

SURVEILLANCE FORM

April 30, 2024

Photo 1 **Northern high flow CSP culvert installed at CV-216, location of future damage approximated in red. Photo taken April 26, 2024, facing east.**

Photo 2 **Northern high flow CSP culvert backfilled at CV-216. Photo taken April 29, 2024, facing northeast.**

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-216

SURVEILLANCE FORM

April 30, 2024

Photo 3 Northern high flow CSP culvert at CV-216, showing damaged section inside the culvert. Photo taken April 29, 2024, facing outlet.

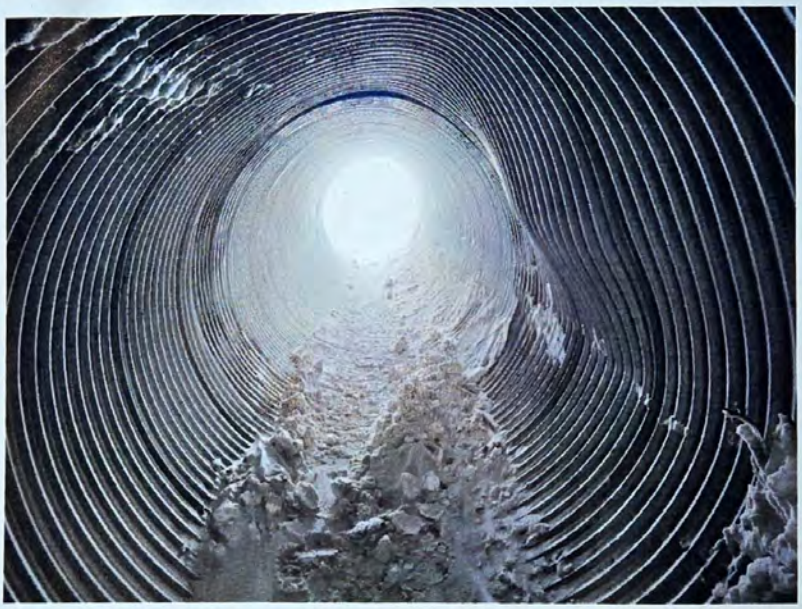


Photo 4 Northern high flow CSP culvert at CV-216, showing damaged section inside the culvert. Photo taken April 29, 2024, facing inlet.

APPENDIX G

Foundation Approvals

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-059

FOUNDATION ACCEPTANCE **March 9, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Darren Kocken, Michael Bourdignon, Matthew Trask (KP), Michael Johnson (NSC)**	**REF. NO.:**	**24**
ACCEPTANCE NO.:	**CV-059-FND-01**	**PAGES:**	**7**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for CV-059. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 7.

Date of Inspection: March 4, 2024

Date of Approval: March 4, 2024

The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200mm lift of Culvert Backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covered the extents of the culvert inlet apron and the culverts (road crossing).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons. The Culvert Backfill material should also be kept within the Foundation Accepted limits for subsequent foundation preparation activities.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

FOUNDATION ACCEPTANCE **March 9, 2024**

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Michael Bourdignon EIT, Geological Engineering, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile, Project Supervisor, Baffinland Iron Mines Corporation

FOUNDATION ACCEPTANCE **March 9, 2024**

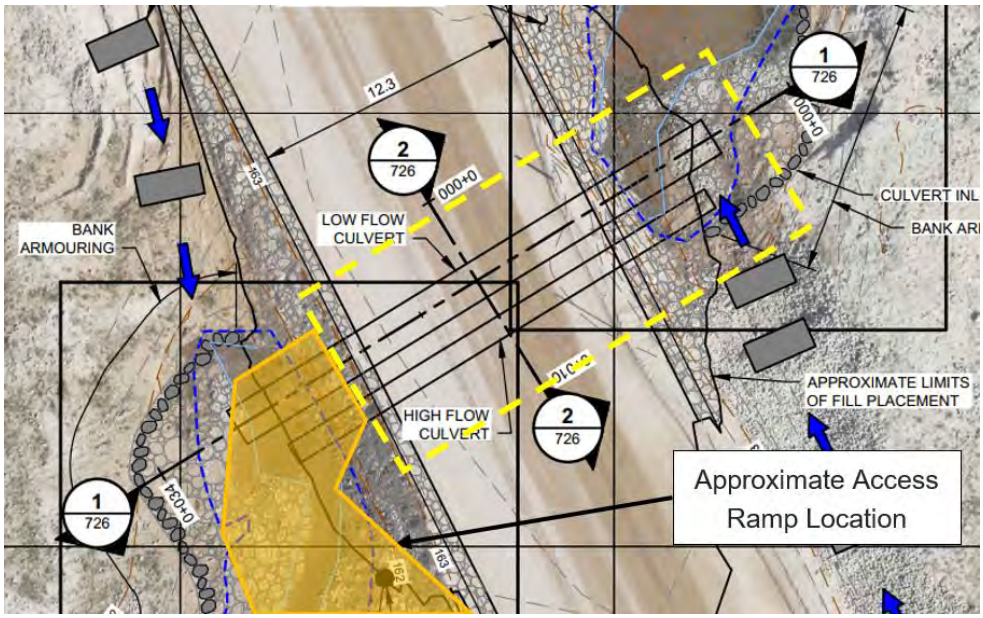


Figure 1: Approximate Foundation Acceptance Area, Plan View (Yellow dotted line).

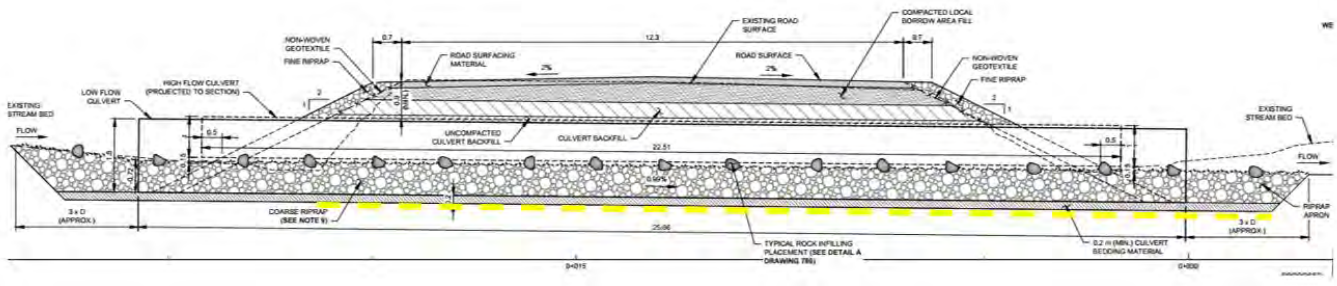


Figure 2: Approximate Foundation Acceptance Surface, Sectional View (Yellow dotted line).

Knight Piésold CONSULTING

Photo 1 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

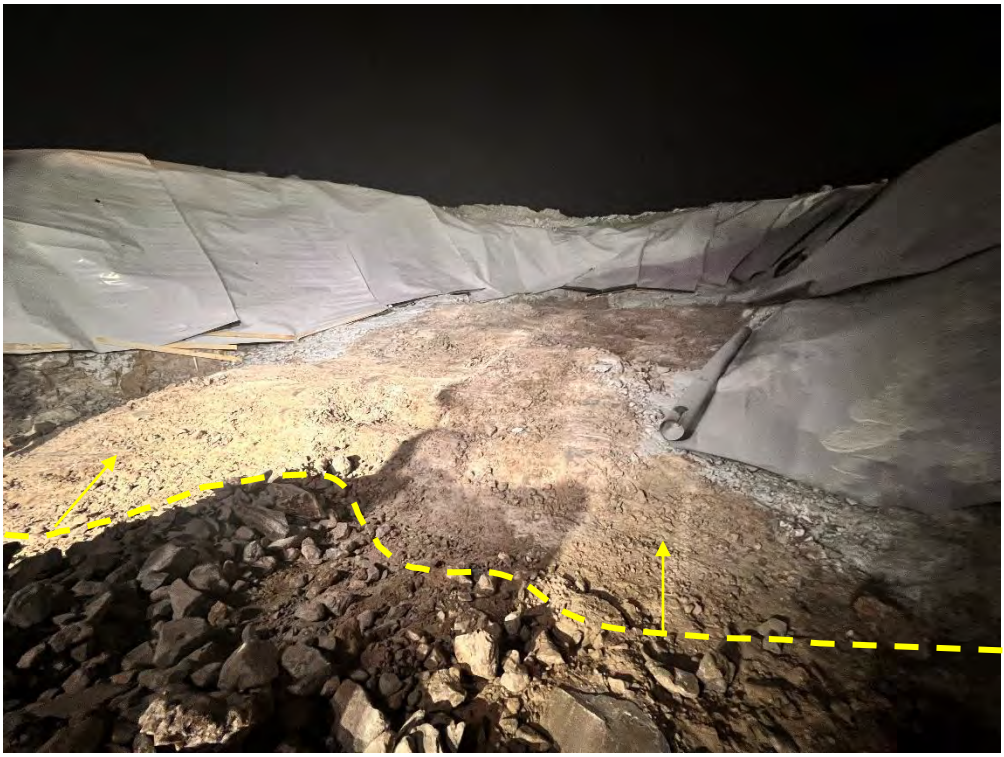


Photo 2 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 3 **Approximate Foundation Acceptance Area. Photo taken March 4, 2024.**

Photo 4 **Cleared area with excavator prior to Foundation Acceptance. Photo taken March 4, 2024.**

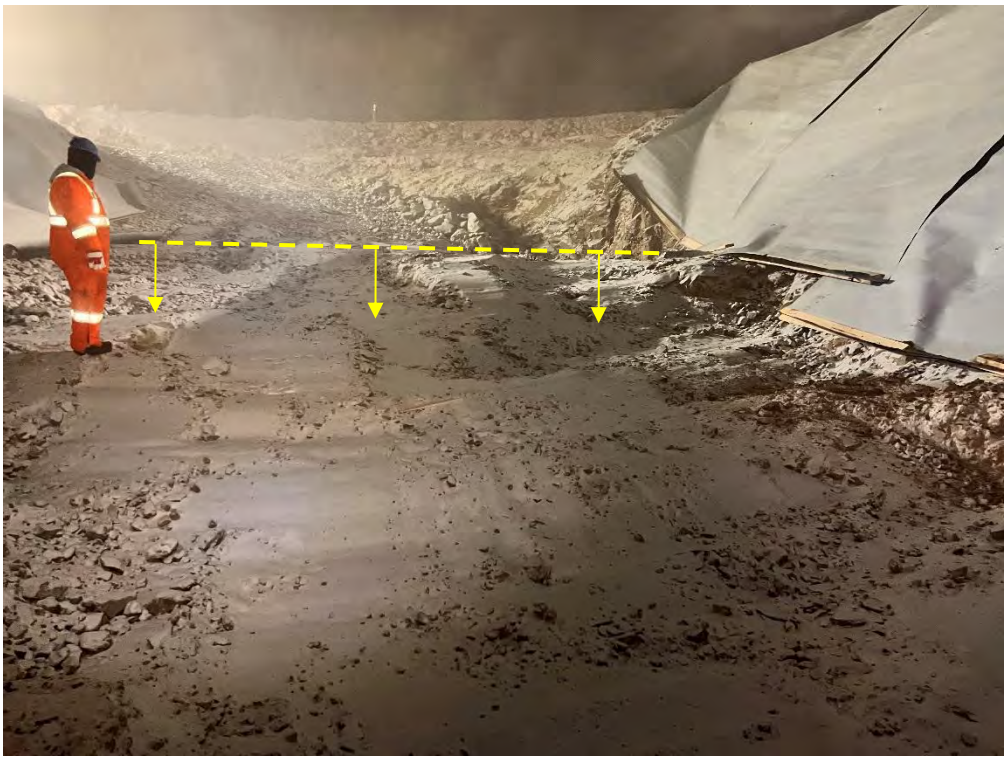


Photo 5 Approximate Subgrade Acceptance Area. Photo taken March 4, 2024.

Photo 6 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 7 **Approximate Foundation Acceptance Area. Photo taken March 4, 2024.**

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-059

FOUNDATION ACCEPTANCE March 9, 2024

CLIENT:	Baffinland Iron Mines Corporation	PROJECT NO.:	181/93
TO:	Baruck Wile/Rudolf Dietrich	FILE NO:	.F11
CC:	Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Darren Kocken, Michael Bourdignon, Matthew Trask (KP), Michael Johnson (NSC)	REF. NO.:	24
ACCEPTANCE NO.:	CV-059-FND-01	PAGES:	7

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for CV-059. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 7.

Date of Inspection: March 4, 2024

Date of Approval: March 4, 2024

The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200mm lift of Culvert Backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covered the extents of the culvert inlet apron and the culverts (road crossing).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons. The Culvert Backfill material should also be kept within the Foundation Accepted limits for subsequent foundation preparation activities.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

Knight Piésold CONSULTING

FOUNDATION ACCEPTANCE **March 9, 2024**

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Michael Bourdignon EIT, Geological Engineering, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile, Project Supervisor, Baffinland Iron Mines Corporation

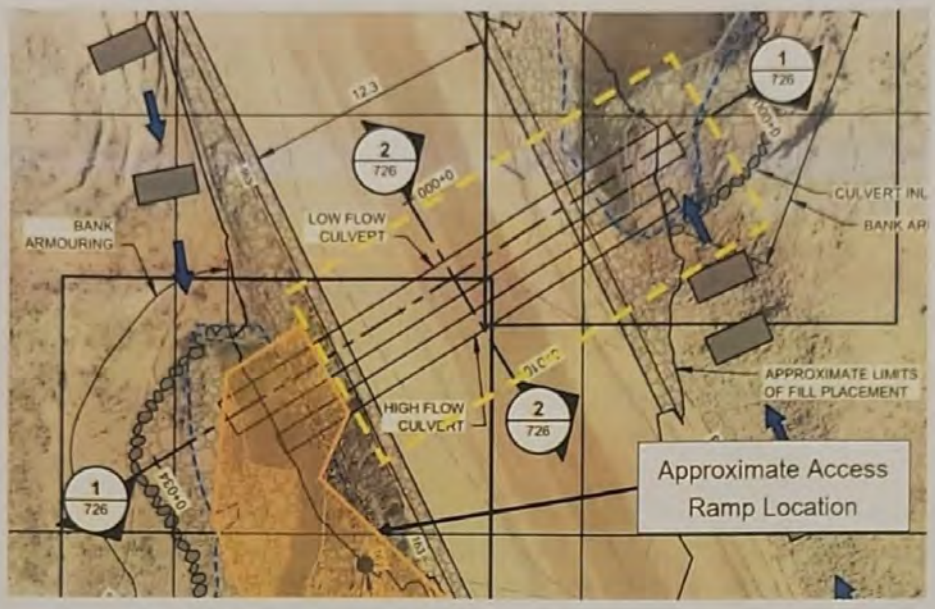


Figure 1: Approximate Foundation Acceptance Area, Plan View (Yellow dotted line).

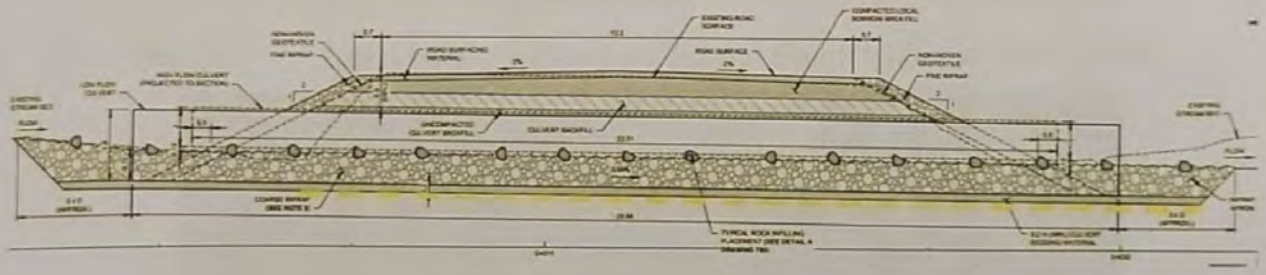


Figure 2: Approximate Foundation Acceptance Surface, Sectional View (Yellow dotted line).

FOUNDATION ACCEPTANCE March 9, 2024

Photo 1 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 2 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 3 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 4 Cleared area with excavator prior to Foundation Acceptance. Photo taken March 4, 2024.

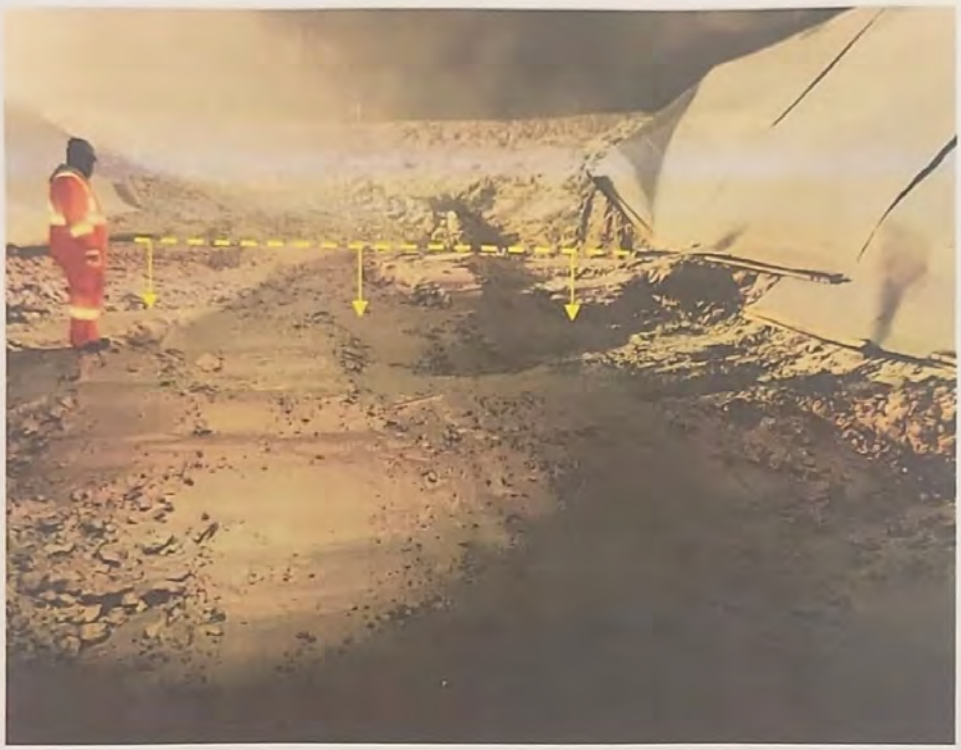


Photo 5 Approximate Subgrade Acceptance Area. Photo taken March 4, 2024.

Photo 6 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Photo 7 Approximate Foundation Acceptance Area. Photo taken March 4, 2024.

Mary River - TOTE ROAD ROUND CSP CULVERTS

CV-057

FOUNDATION ACCEPTANCE **March 19, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Michael Bourdignon, Matthew Trask (KP), Michael Johnson (NSC)**	**REF. NO.:**	**38**
ACCEPTANCE NO.:	**CV-057-FND-01**	**PAGES:**	**7**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for CV-057. The accepted foundation area is shown in Figure 1 and Figure 2 and in Photos 1 to 7.

Date of Inspection: March 15, 2024

Date of Approval: March 15, 2024

The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200 mm lift of culvert backfill material. Nuna surveyed the base of the approved foundation area prior to placing backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the culvert aprons (inlet and outlet) and the culverts (road crossing). The entire foundational area for CV-057 has now been approved.

The foundation preparation work at CV-057 was broken up into four (4) sections. This was due to access issues into the excavation. The main area of the excavation was approved first, followed by three (3) incremental sections covered by the access ramp. All four (4) sections are included in this Foundation Acceptance Form. Please refer to Figure 1 for clarification.

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or placed and spread in 300 mm thick lifts and compacted with 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

FOUNDATION ACCEPTANCE **March 19, 2024**

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Darren Kocken EIT, Geological Engineering, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile, Project Supervisor, Baffinland Iron Mines Corporation

FOUNDATION ACCEPTANCE **March 19, 2024**

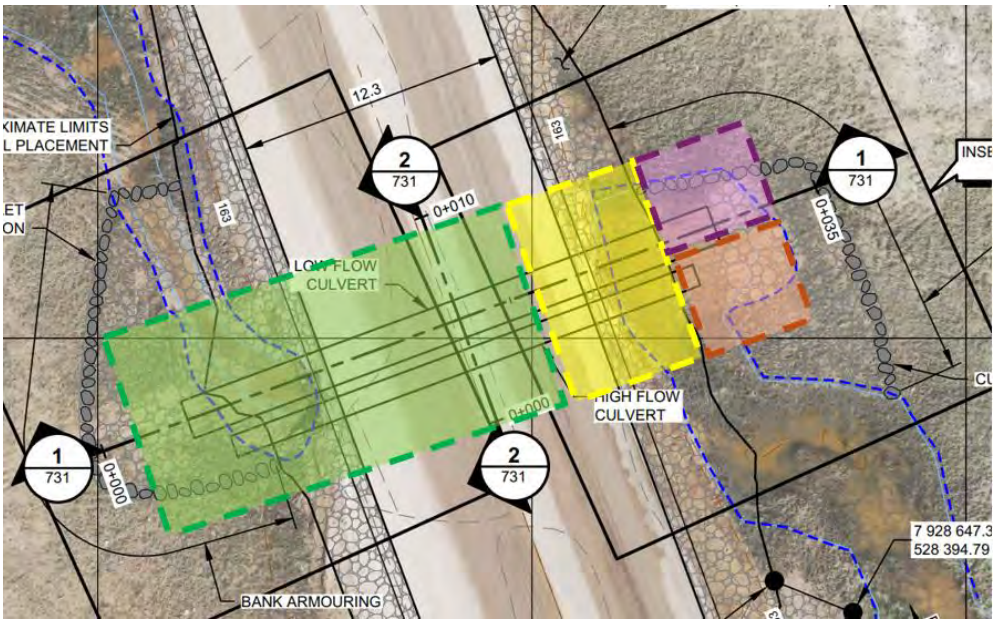


Figure 1: Approximate Foundation Acceptance Area, Plan View. Section 1 highlighted in green, Section 2 highlighted in yellow, Section 3 highlighted in purple, Section 4 highlighted in orange.

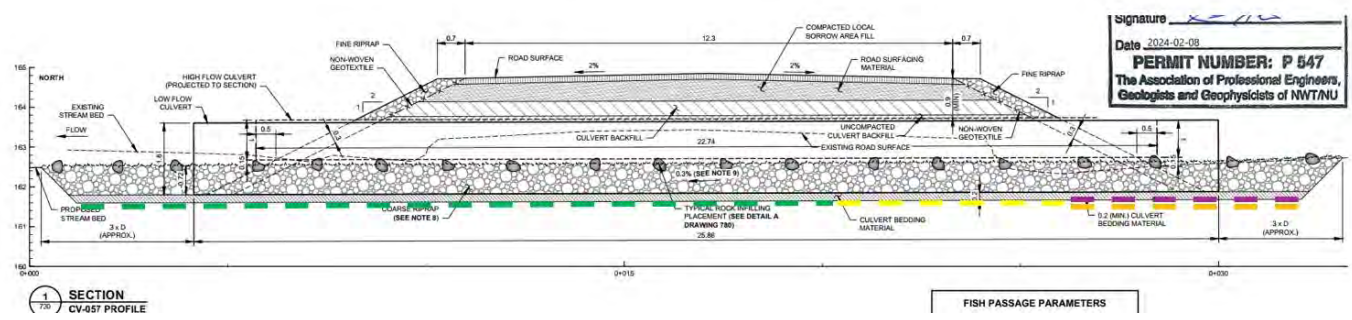


Figure 2: Approximate Foundation Acceptance Area, Sectional View. Section 1 displayed in green, Section 2 displayed in yellow, Section 3 displayed in purple, Section 4 displayed in orange.

Photo 1: Approximate Foundation Acceptance Area - Section 1, indicated in green. Photo taken March 11, 2024.

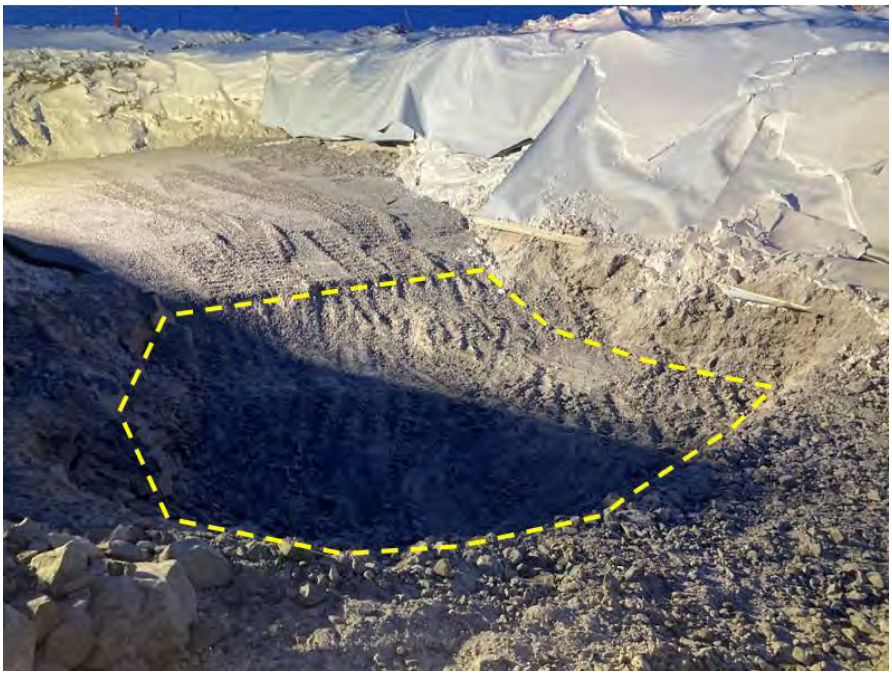


Photo 2: Approximate Foundation Acceptance Area - Section 2, outlined in yellow. Photo taken March 13, 2024.

Photo 3: Approximate Foundation Acceptance Area - Section 3, outlined in purple. Photo taken March 14, 2024.

Photo 4: Approximate Foundation Acceptance Area - Section 4, outlined in orange. Photo taken March 15, 2024.

Photo 5: Excavating unsuitable materials within Section 2. Photo taken March 14, 2024.

Photo 6: Excavating unsuitable materials within Section 3. Photo taken March 14, 2024.

Photo 7: Excavating unsuitable materials within Section 4. Photo taken March 15, 2024.

FOUNDATION ACCEPTANCE **March 19, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Michael Bourdignon, Matthew Trask (KP), Michael Johnson (NSC)**	**REF. NO.:**	**38**
ACCEPTANCE NO.:	**CV-057-FND-01**	**PAGES:**	**7**

1 - DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for CV-057. The accepted foundation area is shown in Figure 1 and Figure 2 and in Photos 1 to 7.

Date of Inspection: March 15, 2024

Date of Approval: March 15, 2024

The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200 mm lift of culvert backfill material. Nuna surveyed the base of the approved foundation area prior to placing backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the culvert aprons (inlet and outlet) and the culverts (road crossing). The entire foundational area for CV-057 has now been approved.

The foundation preparation work at CV-057 was broken up into four (4) sections. This was due to access issues into the excavation. The main area of the excavation was approved first, followed by three (3) incremental sections covered by the access ramp. All four (4) sections are included in this Foundation Acceptance Form. Please refer to Figure 1 for clarification.

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or placed and spread in 300 mm thick lifts and compacted with 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

FOUNDATION ACCEPTANCE **March 19, 2024**

4 - CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Darren Kocken EIT, Geological Engineering, Knight Piésold Ltd.

Nuna:

Harvey Blouin, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Baruck Wile, Project Supervisor, Baffinland Iron Mines Corporation

FOUNDATION ACCEPTANCE **March 19, 2024**

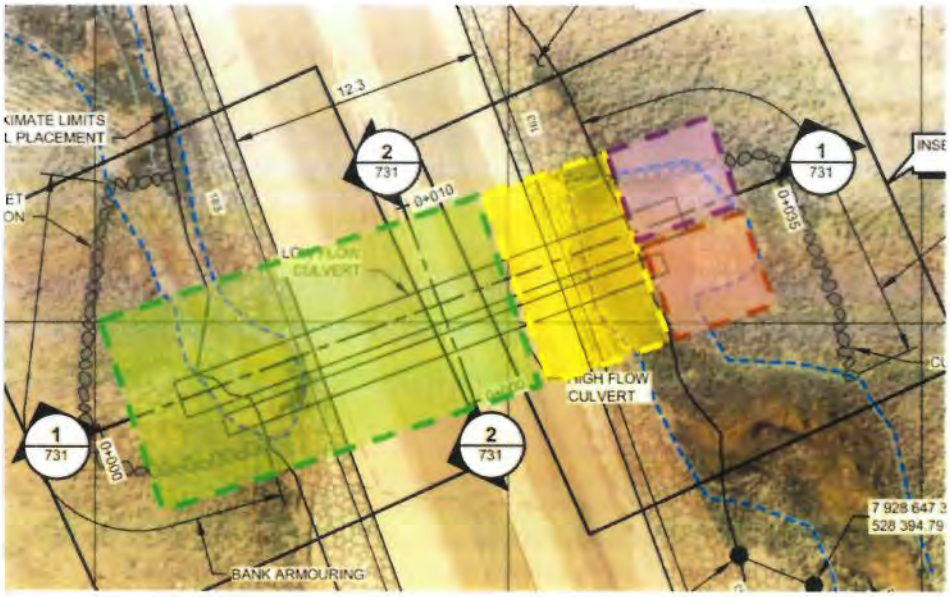


Figure 1: Approximate Foundation Acceptance Area, Plan View. Section 1 highlighted in green, Section 2 highlighted in yellow, Section 3 highlighted in purple, Section 4 highlighted in orange.

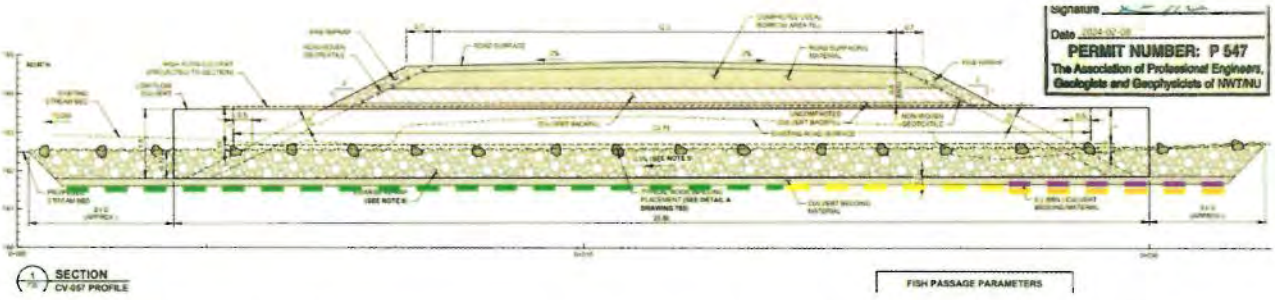


Figure 2: Approximate Foundation Acceptance Area, Sectional View. Section 1 displayed in green, Section 2 displayed in yellow, Section 3 displayed in purple, Section 4 displayed in orange.

FOUNDATION ACCEPTANCE **March 19, 2024**

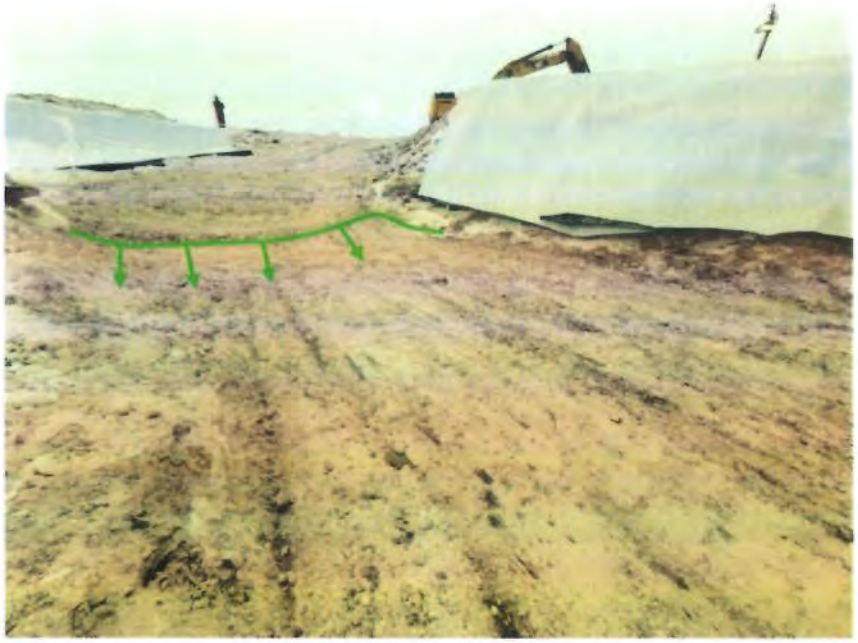


Photo 1: Approximate Foundation Acceptance Area - Section 1, indicated in green. Photo taken March 11, 2024.

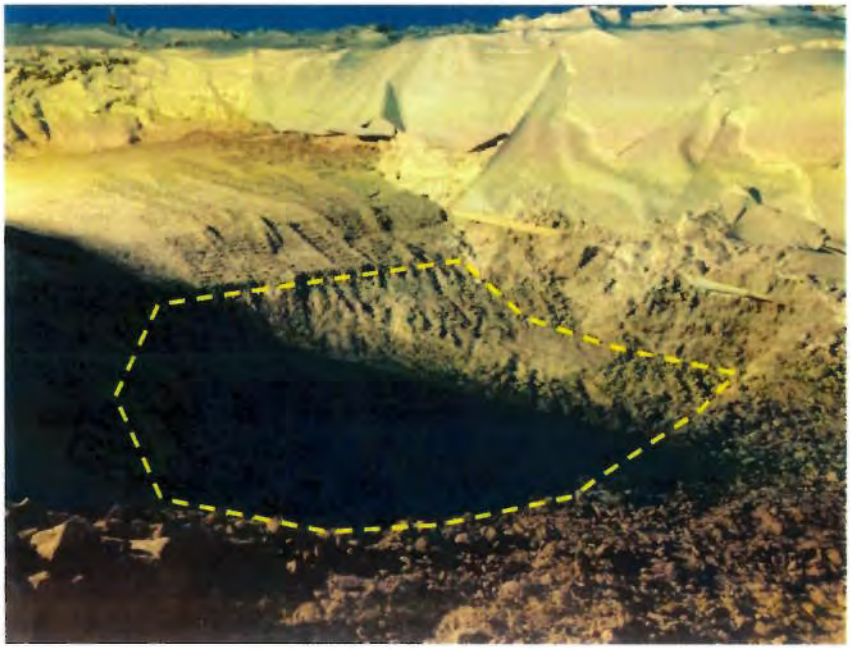


Photo 2: Approximate Foundation Acceptance Area - Section 2, outlined in yellow. Photo taken March 13, 2024.

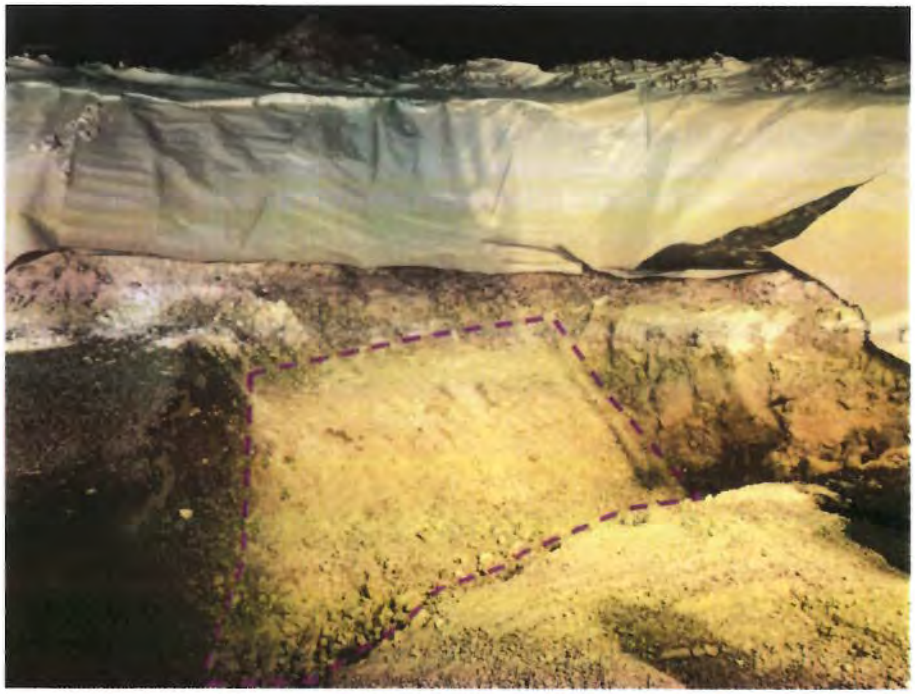


Photo 3: Approximate Foundation Acceptance Area - Section 3, outlined in purple. Photo taken March 14, 2024.

Photo 4: Approximate Foundation Acceptance Area - Section 4, outlined in orange. Photo taken March 15, 2024.

Photo 5: Excavating unsuitable materials within Section 2. Photo taken March 14, 2024.

Photo 6: Excavating unsuitable materials within Section 3. Photo taken March 14, 2024.

Photo 7: Excavating unsuitable materials within Section 4. Photo taken March 15, 2024.

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

FOUNDATION ACCEPTANCE **April 1, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Michael Bourdignon, Darren Kocken (KP), Michael Johnson (NSC)**	**REF. NO.:**	**55**
ACCEPTANCE NO.:	**BG-04-FND-01**	**PAGES:**	**5**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for BG-04. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 4.

Date of Inspection: March 28, 2024

Date of Approval: March 28, 2024

The existing culvert and roadway area at BG-04 were blasted on March 20, 2024, at 5:00 pm. The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The base of the excavation surface was initially at an elevation approximately 0.40 m above the design specified surface. Additional “honeycomb” drilling and ripping of the excavation was conducted using a CAT 349F excavator with a ripper attachment. The ripped materials were removed and hauled to the excess material stockpile at km 97. Nuna GPS survey confirmed that the design foundation elevation has been reached everywhere within the culvert placement area.

The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200mm lift of culvert backfill material. Nuna surveyed the base of the approved foundation area prior to placing backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the low flow culverts and high flow culvert (road crossing) area. Approximately 80% of the foundation area for BG-04 has now been approved (See Figure 1).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or placed and spread in 300 mm thick lifts and compacted with 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.

Knight Piésold CONSULTING

- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Matthew Trask, Geological Engineering, Knight Piésold Ltd.

Nuna:

Donald Weber, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

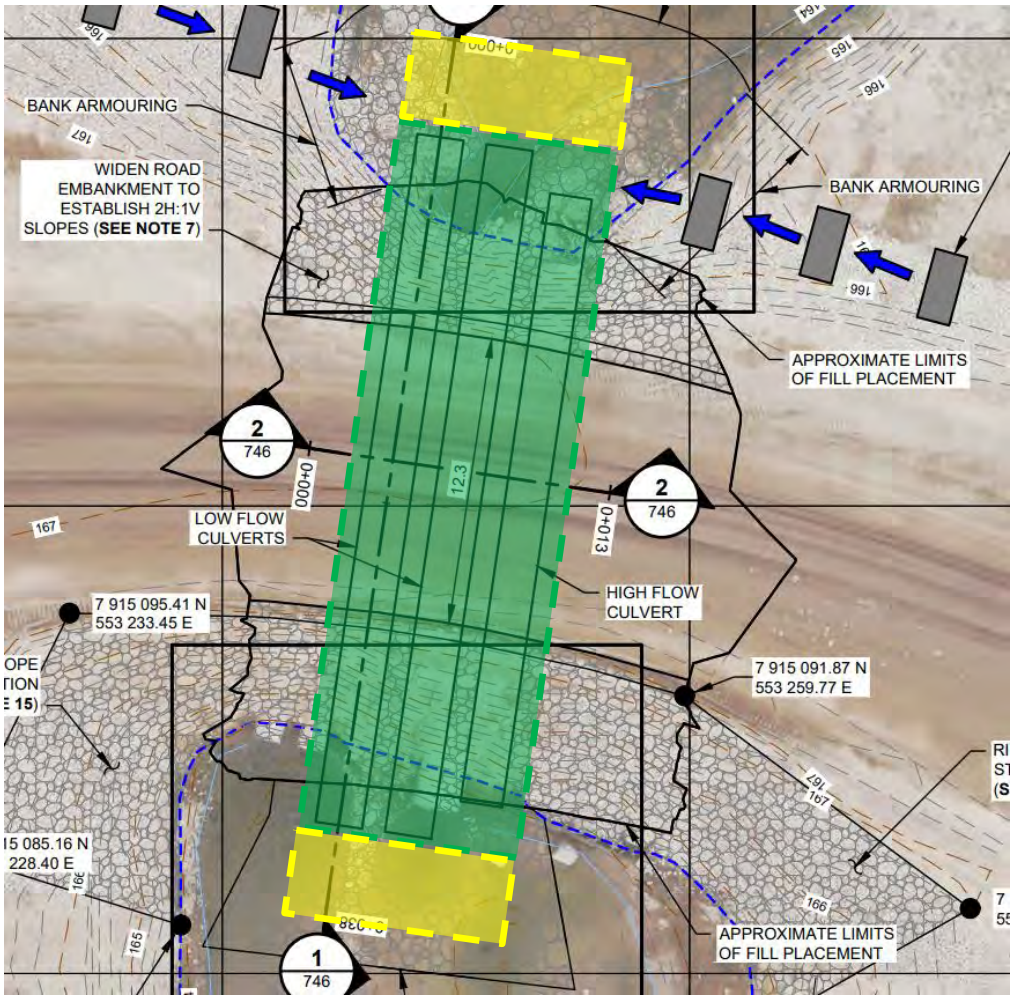


Figure 1: Approximate Foundation Acceptance Area, Plan View. Approved area shown in green and not-yet approved area shown in yellow.

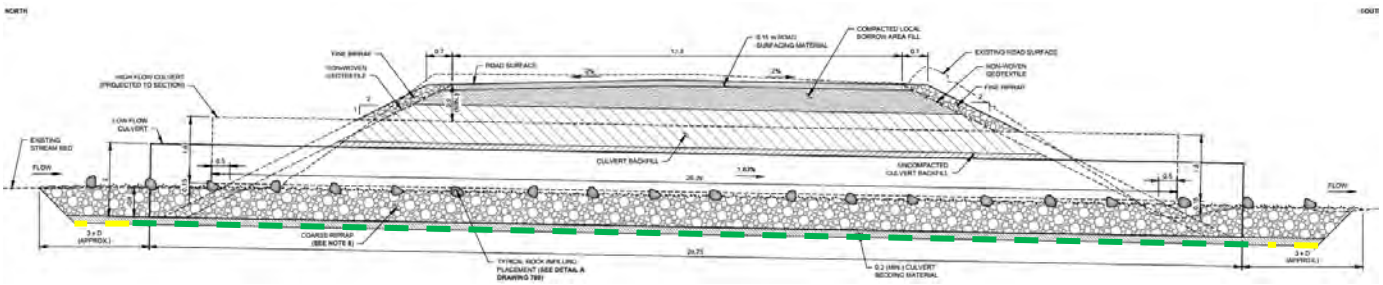


Figure 2: Approximate Foundation Acceptance Area, Sectional View. Approved area shown in green and not-yet approved area shown in yellow.

FOUNDATION ACCEPTANCE **April 1, 2024**

Photo 1 **Ripping excavation surface for foundation preparation at BG-04. Photo taken March 26, 2024.**

Photo 2 **Prepared foundation surface at BG-04 highlighted in green. Photo taken March 28, 2024, looking south.**

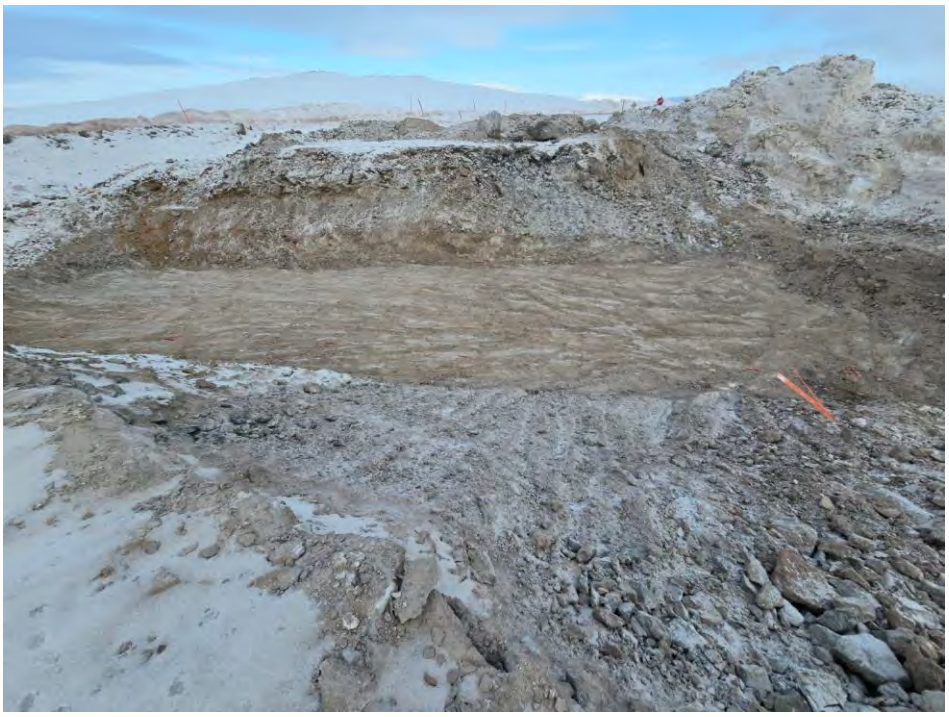


Photo 3 Prepared foundation surface at BG-04. Photo taken March 28, 2024, looking east.

Photo 4 Prepared foundation surface at BG-04. Photo taken March 28, 2024, looking north.

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

FOUNDATION ACCEPTANCE

April 1, 2024

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Michael Bourdignon, Darren Kocken (KP), Michael Johnson (NSC)**	**REF. NO.:**	**55**
ACCEPTANCE NO.:	**BG-04-FND-01**	**PAGES:**	**5**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint for the first lift of Culvert Backfill material for BG-04. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 4.

Date of Inspection: March 28, 2024

Date of Approval: March 28, 2024

The existing culvert and roadway area at BG-04 were blasted on March 20, 2024, at 5:00 pm. The Culvert Backfill foundation was prepared by removing the blasted frozen soil from the foundation area with a CAT 349F excavator. The base of the excavation surface was initially at an elevation approximately 0.40 m above the design specified surface. Additional "honeycomb" drilling and ripping of the excavation was conducted using a CAT 349F excavator with a ripper attachment. The ripped materials were removed and hauled to the excess material stockpile at km 97. Nuna GPS survey confirmed that the design foundation elevation has been reached everywhere within the culvert placement area.

The prepared foundation will be used for placement of culvert backfill material and upon visual and physical inspections, the foundation is suitable for the first 200mm lift of culvert backfill material. Nuna surveyed the base of the approved foundation area prior to placing backfill material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the low flow culverts and high flow culvert (road crossing) area. Approximately 80% of the foundation area for BG-04 has now been approved (See Figure 1).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The Culvert Backfill material must be placed and spread in 200 mm thick lifts and compacted with 8 passes of a 1000lbs Mikasa MVH-408DZ Hand Guided Plate Tamper or placed and spread in 300 mm thick lifts and compacted with 6 passes of a Smooth Drum Vibratory Compactor with a minimum static weight of 10 tons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.

Knight Piésold CONSULTING

- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Matthew Trask, Geological Engineering, Knight Piésold Ltd.

Nuna:

Donald Weber, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

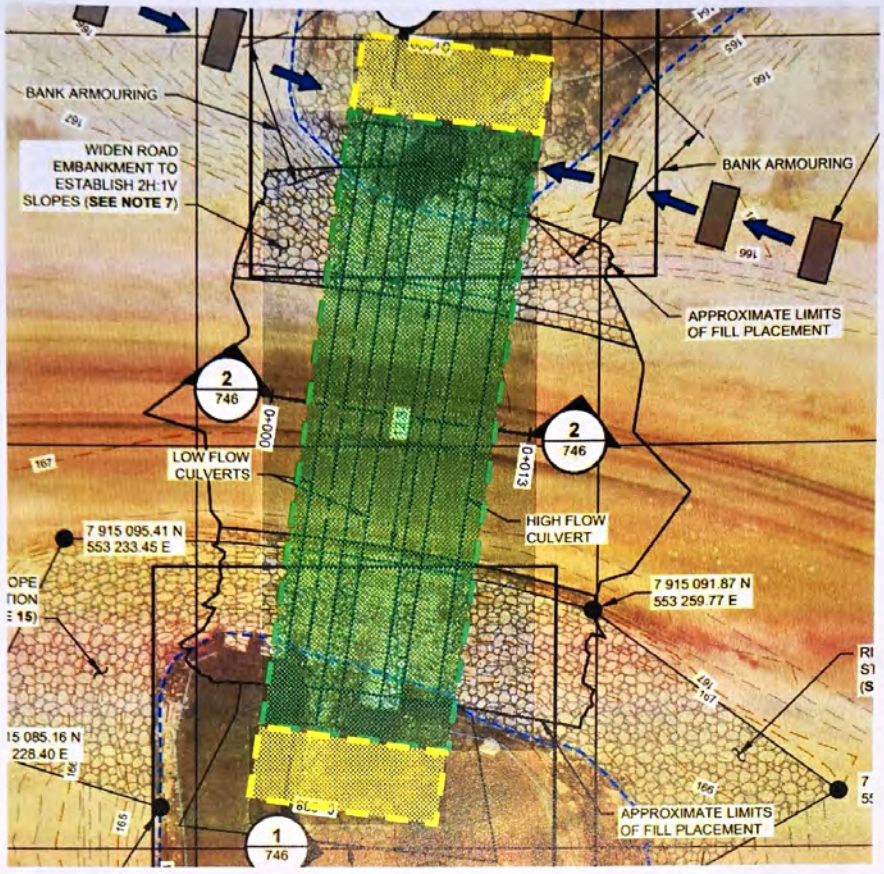


Figure 1: Approximate Foundation Acceptance Area, Plan View. Approved area shown in green and not-yet approved area shown in yellow.

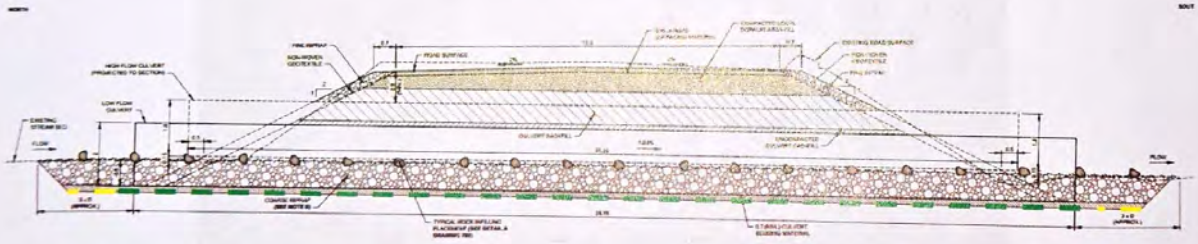


Figure 2: Approximate Foundation Acceptance Area, Sectional View. Approved area shown in green and not-yet approved area shown in yellow.

Photo 1 Ripping excavation surface for foundation preparation at BG-04. Photo taken March 26, 2024.

Photo 2 Prepared foundation surface at BG-04 highlighted in green. Photo taken March 28, 2024, looking south.

Photo 3 Prepared foundation surface at BG-04. Photo taken March 28, 2024, looking east.

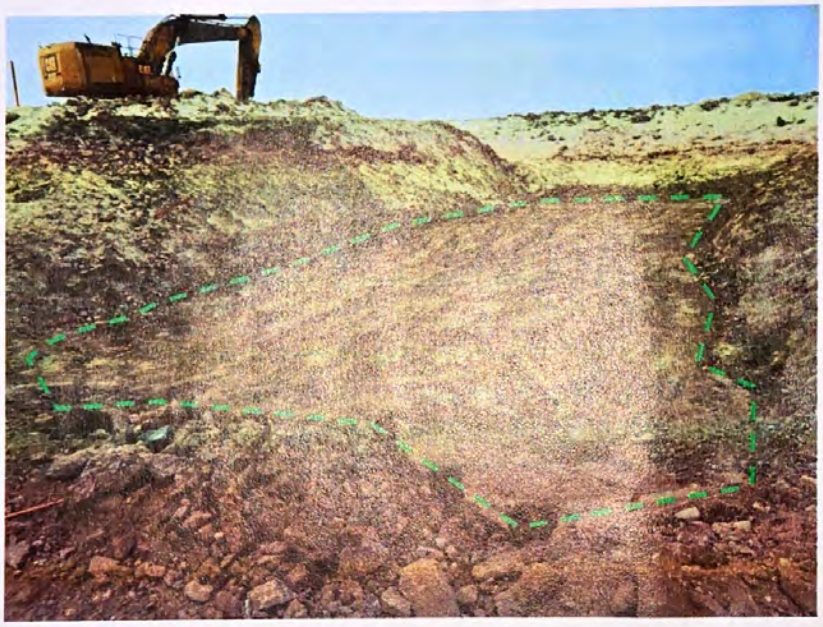


Photo 4 Prepared foundation surface at BG-04. Photo taken March 28, 2024, looking north.

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

FOUNDATION ACCEPTANCE **April 12, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Matthew Trask, Darren Kocken (KP), Michael Johnson (NSC)**	**REF. NO.:**	**69**
ACCEPTANCE NO.:	**BG-04-FND-01**	**PAGES:**	**5**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint of the inlet and outlet aprons of BG-04. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 4.

Date of Inspection: April 10, 2024

Date of Approval: April 10, 2024

The existing culvert and roadway area at BG-04 were blasted on March 20, 2024, at 5:00 pm. The inlet and outlet aprons were prepared by removing snow and ice and excess frozen soil and road material from the foundation area with a CAT 349F excavator. The base of the excavation surface was initially at an elevation approximately 0.40 m above the design specified surface. Additional “honeycomb” drilling and ripping of the excavation was conducted using a CAT 349F excavator with a ripper attachment. The ripped materials were removed and hauled to the excess material stockpile at km 97. Nuna surveyed the foundation area and confirmed that the design foundation elevation has been reached everywhere within the culvert placement area.

The prepared foundation will be used for placement of coarse riprap and stream substrate material and upon visual and physical inspections, the foundation is suitable for the placement of this material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the inlet and outlet apron areas. 100% of the foundation area for BG-04 has now been approved (See Figure 1).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The coarse riprap and stream substrate material must be mixed and placed to a final thickness of 0.8 m within the extents of the inlet and outlet aprons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

FOUNDATION ACCEPTANCE **April 12, 2024**

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.:

Michael Bourdignon, Geological Engineering, Knight Piésold Ltd.

Nuna:

Donald Weber, Construction Superintendent, Nuna

Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

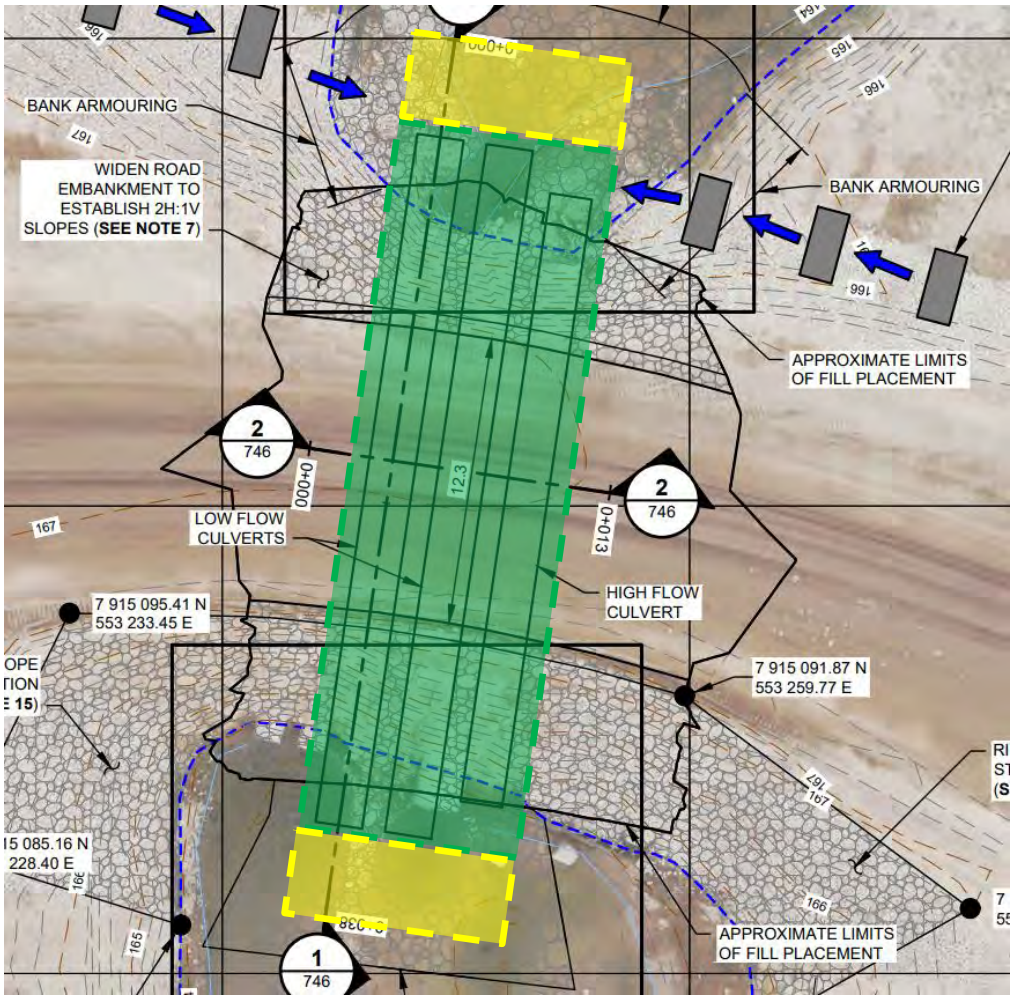


Figure 1: Approximate foundation acceptance area FND-02, plan view, highlighted in yellow. Previous foundation acceptance BG-04 FND-01, highlighted in green.

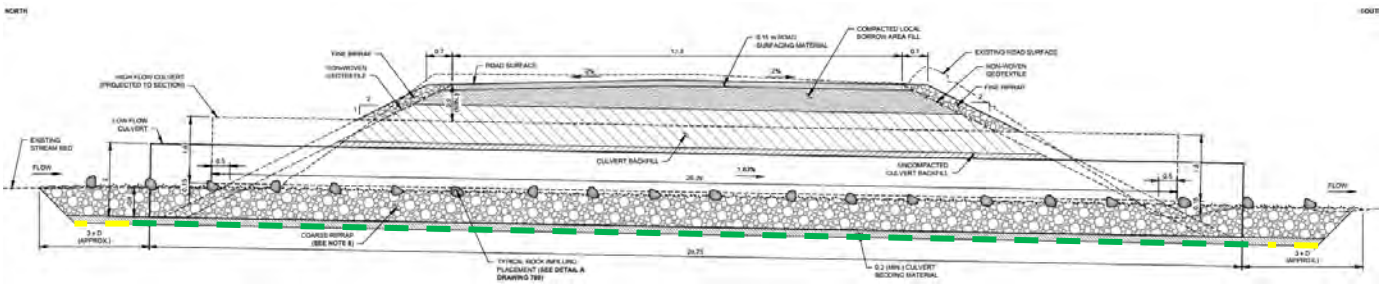


Figure 2: Approximate foundation acceptance area FND-02, sectional view, highlighted in yellow. Previous foundation acceptance BG-04 FND-01, displayed with the green dotted line.

FOUNDATION ACCEPTANCE **April 12, 2024**

Photo 1 **Ripping excavation surface for foundation preparation at BG-04. Photo taken April 10, 2024.**

Photo 2 **Prepared foundation surface of outlet at BG-04 highlighted in green. Photo taken April 10, 2024, looking north-west.**

Photo 3 **Prepared foundation surface of inlet at BG-04 highlighted in green. Photo taken April 10, 2024, looking east.**

Mary River - TOTE ROAD ROUND CSP CULVERTS

BG-04

FOUNDATION ACCEPTANCE **April 12, 2024**

CLIENT:	**Baffinland Iron Mines Corporation**	**PROJECT NO.:**	**181/93**
TO:	**Baruck Wile/Rudolf Dietrich**	**FILE NO:**	**.F11**
CC:	**Michael Burns, Dale Tulloch, Abid Najey, Jim Patterson, Shannon Mulhall, David Bruce, Environment Superintendents (Baffinland), Richard Cook, Toby Perkins, Andy Phillips, Mackenzie Aiken, Matthew Trask, Darren Kocken (KP), Michael Johnson (NSC)**	**REF. NO.:**	**69**
ACCEPTANCE NO.:	**BG-04-FND-01**	**PAGES:**	**5**

1 – DESCRIPTION OF AREA ACCEPTED

The Foundation Acceptance area is within the footprint of the inlet and outlet aprons of BG-04. The accepted foundation is shown in Figures 1 and 2 and in Photos 1 to 4.

Date of Inspection: April 10, 2024

Date of Approval: April 10, 2024

The existing culvert and roadway area at BG-04 were blasted on March 20, 2024, at 5:00 pm. The inlet and outlet aprons were prepared by removing snow and ice and excess frozen soil and road material from the foundation area with a CAT 349F excavator. The base of the excavation surface was initially at an elevation approximately 0.40 m above the design specified surface. Additional "honeycomb" drilling and ripping of the excavation was conducted using a CAT 349F excavator with a ripper attachment. The ripped materials were removed and hauled to the excess material stockpile at km 97. Nuna surveyed the foundation area and confirmed that the design foundation elevation has been reached everywhere within the culvert placement area.

The prepared foundation will be used for placement of coarse riprap and stream substrate material and upon visual and physical inspections, the foundation is suitable for the placement of this material.

2 – APPROXIMATE AREA ACCEPTED

The accepted area covers the extents of the inlet and outlet apron areas. 100% of the foundation area for BG-04 has now been approved (See Figure 1).

3 – CONDITIONS

- Nuna is responsible for maintaining the condition of the accepted foundation area and cleaning and preparing the area as specified by Knight Piésold. This includes the responsibility of the safety, stability, maintenance, support, and protection of all temporary excavated surfaces until the completion of backfill.
- The coarse riprap and stream substrate material must be mixed and placed to a final thickness of 0.8 m within the extents of the inlet and outlet aprons.
- Degradation to the foundation soils from equipment may require repair and additional foundation preparation prior to subsequent material placement.
- Ice, snow and/or loose frozen fill materials must be removed from prepared foundations prior to placing any fill material. No frozen material shall be placed.

Knight Piésold CONSULTING

FOUNDATION ACCEPTANCE **April 12, 2024**

4 – CERTIFICATION

The area accepted was inspected by Knight Piésold Ltd., Nuna, and Baffinland Iron Mines Corporation.

We, the undersigned are authorized representatives of the companies listed, and do hereby accept the Foundation Preparation over the area described above.

Knight Piésold Ltd.: Michael Bourdignon — Digitally signed by Michael Bourdignon Date: 2024.04.12 09:52:59 -04'00'

Michael Bourdignon, Geological Engineering, Knight Piésold Ltd.

Nuna: Don Weber 2024 04 12

Donald Weber, Construction Superintendent, Nuna

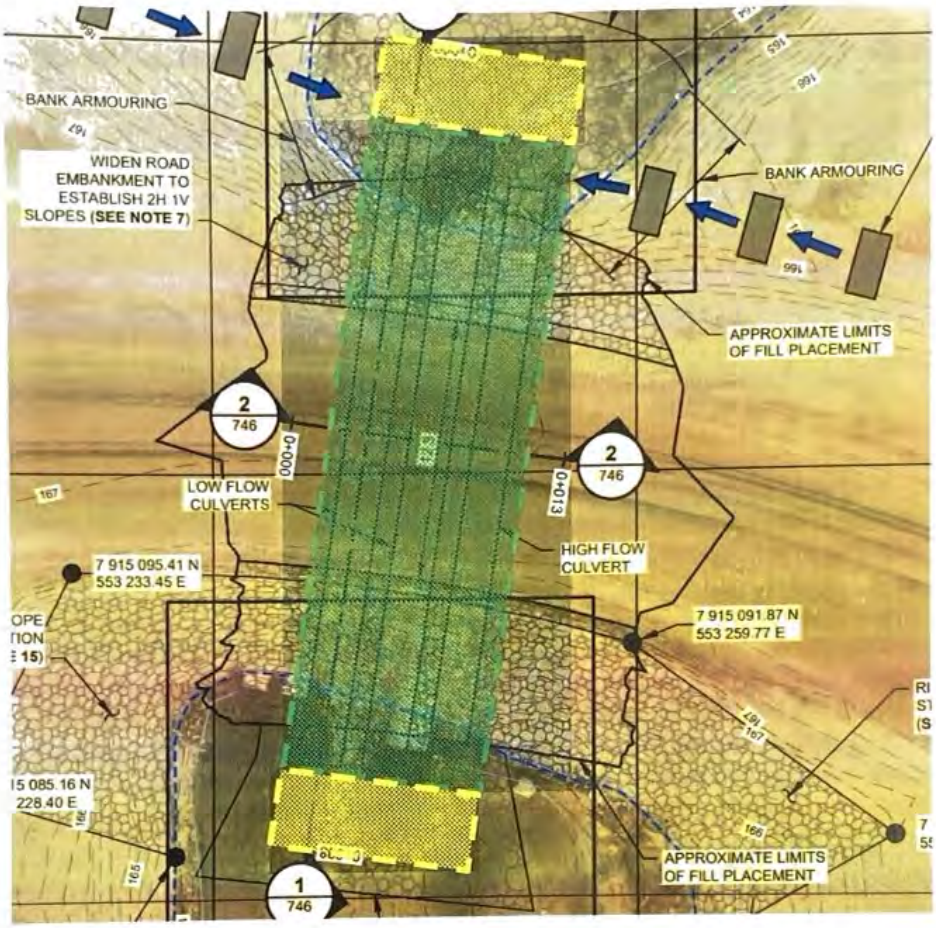
Baffinland Iron Mines Corporation:

Rudolf Dietrich, Project Supervisor, Baffinland Iron Mines Corporation

Knight Piésold CONSULTING

FOUNDATION ACCEPTANCE

April 12, 2024



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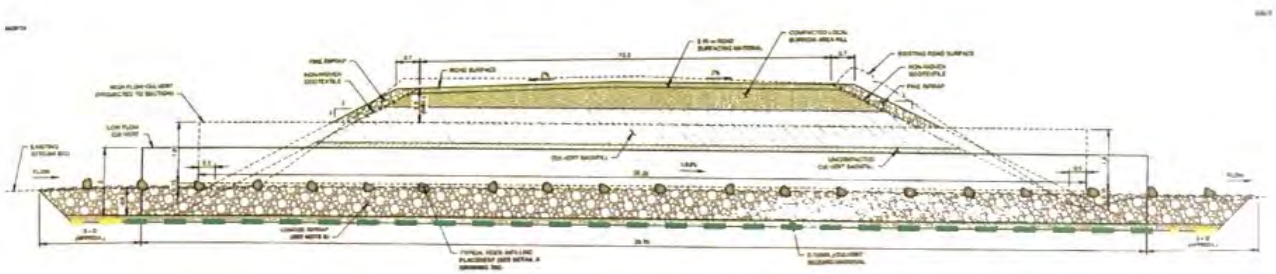

Figure 2: Approximate foundation acceptance area FND-02, sectional view, highlighted in yellow. Previous foundation acceptance BG-04 FND-01, displayed with the green dotted line.

Photo 1 Ripping excavation surface for foundation preparation at BG-04. Photo taken April 10, 2024.

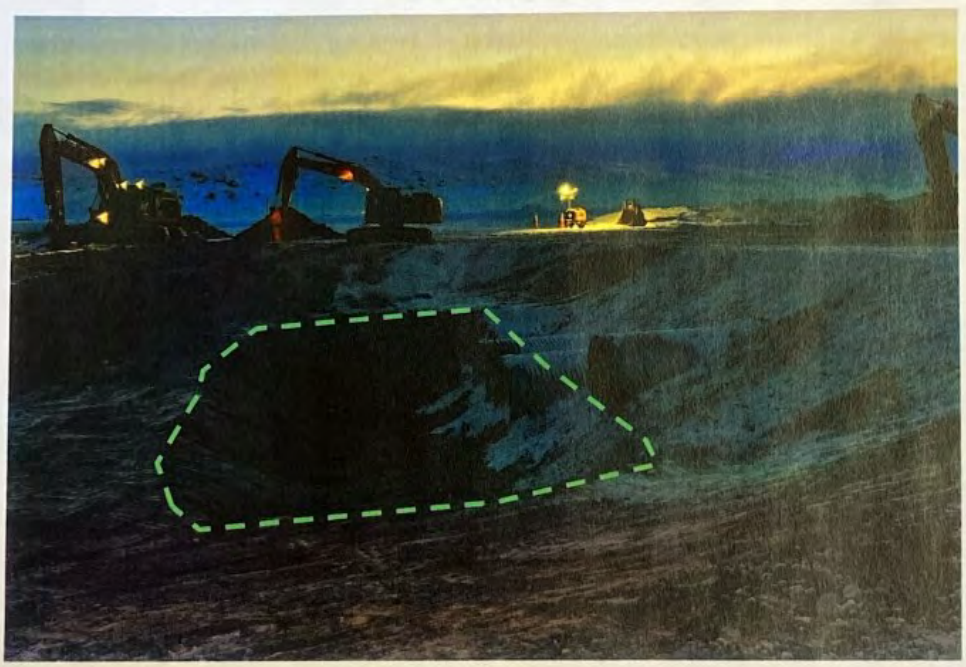

Photo 2 Prepared foundation surface of outlet at BG-04 highlighted in green. Photo taken April 10, 2024, looking north-west.

FOUNDATION ACCEPTANCE April 12, 2024

Photo 3 **Prepared foundation surface of inlet at BG-04 highlighted in green. Photo taken April 10, 2024, looking east.**