Appendix D.4

Seloam Brook Diversion Channel Technical Response,

Knight Piésold Ltd

April 14, 2020

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Mr. James (Jim) Millard
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Atlantic Mining NS Corp
6749 Moose River Rd. RR#2
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Canada, B0N 1X0

Dear James,

RE: Seloam Brook Diversion Channel Design

Knight Piésold Ltd. (KP) has completed a feasibility level design for the Seloam Brook Diversion (Diversion) in support of the Environmental Impact Statement (EIS) submission for the Fifteen Mile Stream Project (Project). This letter describes the design of the Seloam Brook Diversion, including the Seloam Diversion Berm (Diversion Berm), Seloam Brook Diversion Channel (Diversion Channel), haul road from the Open Pit to the Organics Waste Dump, the associated culvert at the road crossing, and relevant fish features. The natural environment upstream and downstream of the Seloam Brook Diversion including potential change in stream stability along with the associated mitigation measures is under investigation by others.

1.0 DESIGN BASIS

The Diversion is required to provide conveyance of flood flows and prevent flooding of the Open Pit while enabling low flow conductivity around the Diversion Berm. The Diversion Channel incorporates fish habitat features and will provide fish passage under normal and low flow conditions. The Diversion Channel is sized to pass a flow of 6 m^3/s with a 0.3 m freeboard, with a maximum channel capacity equivalent to a 10-year flood event (Q10). The channel is also required to remain stable throughout the operational life of the Project and in the long-term following closure.

The haul road crossing the Diversion provides access from the Open Pit area to the Organics Waste Dump. The road is required to provide single lane traffic for approximately 5 m wide haul trucks, including appropriately sized safety berms on either side of the road.

The culvert design is based on the requirement to pass the 1 in 200 year flood event (Q200) without overtopping the haul road or the Diversion Berm. The probability of a 200 year flood occurring during the seven-year mine life is 3.4%, or 0.5% in any year of operations. The culvert will also provide fish passage under normal and low flow conditions. Additional considerations for the culvert include a requirement for an energy dissipation pool at the outlet (Nova Scotia 2015), and sufficient clearance to allow construction crews to work inside the culvert to construct any required fish friendly features.

Six species of fish are noted to be present within the Fifteen Mile Stream (FMS) project area; Brook Trout, White Sucker, Lake Chub, Brown Bullhead, Banded Killfish, and Ninespine Stickleback. The design of the Diversion Channel and culvert is not intended to target a specific fish species or specific life stage habitat, but rather to provide fish friendly features that will enable passage for different species and provide refuge from high velocities during high flow periods and adequate depths during low flow periods.

2.0 DIVERSION CHANNEL AND CULVERT DESIGN

2.1 SELOAM BROOK DIVERSION CHANNEL DESIGN CAPACITY

The minimum dimensions for the Diversion Channel required to satisfy the design flow requirements and maintain the appropriate freeboard are summarized in Table 2.1. The channel plan view is shown on Drawing FM-C1000, and the channel profile and a typical cross-section are shown on Drawing FM-C1001. The drawings include the proposed liner and riprap armoring specifications. The specified riprap size is larger than the minimum required for normal operating flow conditions in the Diversion Channel in order to satisfy the requirement for the channel to remain stable over the life of mine and in the long term.

Table 2.1 Seloam Brook Diversion Channel Sizing

Channel Slope (%)	0.5
Minimum Channel Depth (m)	1.5
Freeboard (m)	0.3
Channel bottom width (m)	1.0
Channel Side Slopes (H:V)	2:1
Riprap Size D50 (mm)	75

Two inlet structures are planned to convey water from the Seloam Reservoir and Trafalgar Creek tributaries into the Diversion Channel. In addition, an energy dissipation pool will be constructed at the outlet of the culvert, along with an outlet structure located downstream of the haul road crossing that will convey water to the natural environment.

The inlets, outlet, and energy dissipation pool will include riprap armor to protect against erosion during high flow events. The locations for these structures are shown on Drawing FM-C1000, and additional concept details are shown on Drawings FM-C1001, and FM-C1003.

2.2 HAUL ROAD AND CULVERT DESIGN

The haul road between the Open Pit and the Organics Waste Dump was designed for single lane haul traffic with a road width of 20 m, including 1.8 m high safety berms on either side, and 2H:1V side slopes, consistent with the design of other haul roads within the mine property. The road is designed with an approximate 0.8% grade from the Organics Waste Dump to the Diversion Berm, and an approximate -2.5% grade from the Diversion Berm to the Open Pit area. The road surface also includes a 2% lateral slope on either side of the centerline to help promote drainage during rain events. The haul road design is presented on Drawing FM-C1002.

The culvert selected for under the haul road is a single Corrugated Steel Pipe (CSP) culvert that will contain a similar bed material to the bed material of the Diversion Channel. The primary design consideration for the culvert was to pass the Q200 without overtopping the haul road or the Diversion Berm. Consideration was also given to the size required to allow access for the construction crew, and to enable construction of applicable fish features within the culvert as necessary.

An energy dissipation pool will be constructed at the outlet of the culvert in order to reduce the exit velocity of the diverted flow and to help prevent erosion of the downstream environment. In accordance with the Watercourse Alteration Standards for Nova Scotia (Nova Scotia 2015); at least 70% of the riprap must be between 0.3 m and 0.45 m based on the expected flow velocities out of the culvert. In addition, a minimum of three 1.0 m boulders will be placed in the pool in a triangular pattern to create resting areas for fish.

The dimensions for the culvert and energy dissipation pool that satisfy the design requirements are summarized in Table 2.2 and are shown on Drawing FM-C1003.

Table 2.2 Haul Road Crossing Culvert and Energy Dissipation Pool

Culvert Sizing	
Culvert Slope (%)	0.5
Culvert Type	CSP
Culvert Diameter (m)	3.0
Embedded material depth (mm)	750
Minimum cover required (mm)	1,500
Steel Thickness (mm)	2.8
Energy Dissipation Pool Sizing	
Bottom width (m)	6.0
Bottom length (m)	9.0
Depth below culvert outlet (m)	1.0
Side Slope (H:V)	2:1

3.0 FLOW MODELLING

The Seloam Brook Diversion design was an iterative process that included flow modelling used to confirm or modify the sizing of the Diversion Channel, haul road culvert, required riprap, and heights for the Diversion Berm and the haul road.

3.1 GENERAL

A two-dimensional (2D) flow model was developed for the Diversion Channel, road crossing, culvert, and surrounding area to support the design. The model was developed using the HEC-RAS 2D modelling software (Version 5.0.7).

The 2D mesh in HEC-RAS 2D was set to a 10 x 10 m grid within the floodplains, a 5 x 5 m grid within the natural channels, and a 2 x 2 m grid within the Diversion Channel. A four second computational timestep was used to calculate the results. The applied 2D mesh is shown on Figure 3.1, along with inflow locations for various tributaries. Modelling of the downstream environment and the impact assessment on stream stability and mitigation requirements is under investigation by others and is not part of this scope.

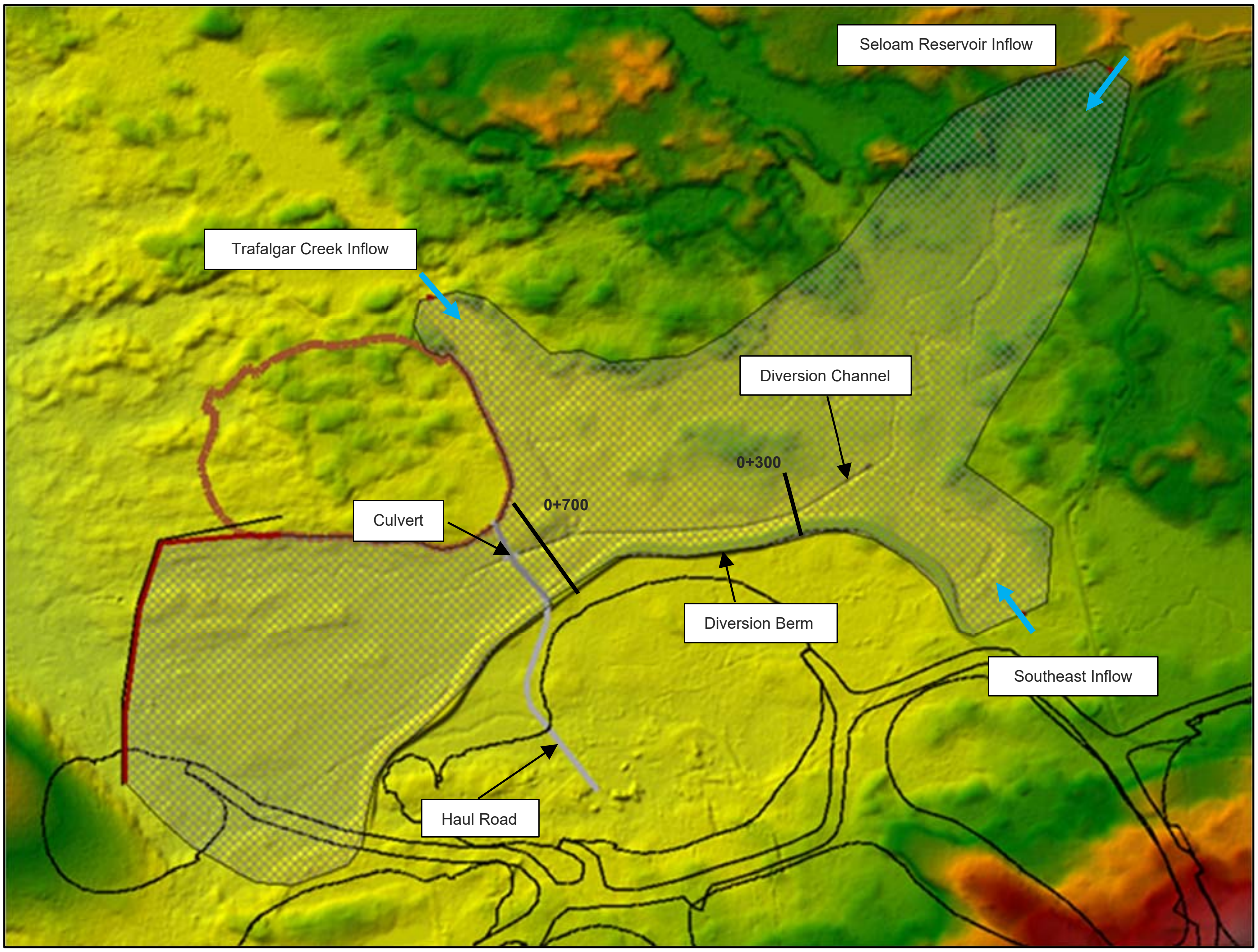

Figure 3.1 HEC-RAS 2D Model Boundary and Computational Mesh

3.2 MODELLING SCENARIOS

Four flow scenarios were modelled to assess the functionality of the Seloam Brook Diversion.

- 1 in 20 year Annual Dry condition: Modelled to confirm flow conveyance is achieved under low flow conditions.
- Mean Annual Discharge (MAD): Modelled to confirm flow conveyance is achieved under normal operating conditions.
- Q10 (1 in 10 year flood event): Modelled to confirm the channel design provides sufficient flow capacity under 10 year flood conditions.
- Q200 (1 in 200 year flood event): Modelled to assess the inundation around the Diversion Berm and the haul road, evaluate whether overtopping would occur, and support the riprap sizing for the channel to remain stable under these flood conditions.

3.3 MODEL INPUTS

Model inputs include data representing the terrain, roughness or resistance to flow, and hydrology (inflows).

3.3.1 TERRAIN

A Digital Elevation Model (DEM) was generated from the terrain data based on Light Detection and Ranging (LiDAR), sourced from the provincial database. Typically, LiDAR data do not provide sufficient information for defining the bed elevations for stream channels and other water bodies (e.g. lakes, wetlands), as the data cannot be collected below the water surface. In order to model the incoming tributaries and other waterbodies, a channel bed was manually cut into the terrain approximating the natural systems based on Google Earth imagery of the area.

3.3.2 RESISTANCE TO FLOW (ROUGHNESS COEFFICIENT)

The Manning's n roughness coefficient was assumed to be 0.06 within the natural channels that contribute flows to the Diversion Channel, and 0.1 within the overbank areas. This was considered to be a reasonable approximation based on available photos of the stream channels and surrounding area (see Photos 5.1 and 5.2 in Section 5 of this letter).

Manning's n for the Seloam Brook Diversion Channel was estimated to be 0.035 based on the modified channel method (Chow, 1959), using the following equation:

$$n = (n_0 + n_1 + n_2 + n_3 + n_4) * m$$

where

n_0 is a base value of n based on the channel surface (assumed 0.026 for a gravel channel)

n_1 is a correction factor for the effect of surface irregularities (assumed 0, as this is a constructed riprap channel, that will prevent bed and bank erosion)

n_2 is a correction factor for variations in the shape and size of cross-sections (assumed 0.003, as several pools will be implemented within the channel, which will vary the channel cross-section)

n_3 is a correction factor for the effect of obstructions (assumed 0.006 for obstructions like logs of boulders occupying between 5% and 15% of the channel cross-section area)

n_4 is a correction factor for the effect of vegetation (assumed 0 as instream or overbank vegetation are not expected in a riprapped channel)

m is a correction factor for the effect of the meandering of the channel (assumed 1.00 as the channel does not meander much)

3.3.3 HYDROLOGY

The modelled inflows were determined by scaling the regional return period unit runoffs developed for the Project, as presented in the Preliminary Engineering Hydrometeorology Report (KP, 2018), along with flood estimates generated with a rainfall runoff model developed using the HydroCAD stormwater modelling software. Flows in Seloam Brook represent the outflows from the Seloam Reservoir that are regulated by the Seloam Reservoir Dam. The mean annual discharge developed for the Seloam Reservoir outflows is within the range of observed Seloam Reservoir outflows from 2007 to 2018 as provided by Nova Scotia Power (NSP 2018).

The available information regarding the Seloam Reservoir operations was used for flood flow modelling in this study (NSP 2009). The spillway outflows from the reservoir for various return period flood events were estimated in the developed HydroCAD model, which accounts for the reservoir and spillway characteristics

(NSP 2009) and includes the estimated attenuation of the lake. A 15% climate change factor was also applied to the peak flow estimates in order to account for potential future increases in storm intensity as a result of climate change, as recommended in the Preliminary Engineering Hydrometeorology report (KP 2018).

The resulting discharge inputs are summarized in Table 3.1. The Seloam Reservoir inflow node includes the flow from the reservoir outlet and the incremental inflow that is estimated to contribute to the Diversion Channel between the Seloam Reservoir inflow node and the Trafalgar Creek inflow node.

Table 3.1 Seloam Brook Diversion Inflows for 2D Modelling Scenarios

Scenario Modelled	Inflow Node	Discharge Input (m^3/s)
1 in 20 Year Annual Dry	Seloam Reservoir	0.22
	Southeast Inflow	0.02
	Trafalgar Creek	0.04
MAD	Seloam Reservoir	0.64
	Southeast Inflow	0.07
	Trafalgar Creek	0.11
Q10	Seloam Reservoir	4.8
	Southeast Inflow	2.5
	Trafalgar Creek	3.8
Q200	Seloam Reservoir	11.2
	Southeast Inflow	4.4
	Trafalgar Creek	6.6

4.0 FLOW MODELLING RESULTS

4.1 Q10, MAD, AND 1 IN 20 YEAR DRY FLOW SCENARIOS

The results of modelling the Q10 flood flow scenario confirm that the Diversion Channel is capable of passing the design flow from the upstream environment through the channel and culvert without overtopping. The results for MAD and the 1 in 20 year dry flows confirm that the channel design is sufficient to convey average and low flows, providing sufficient depth for fish passage. The resulting water depths in the Diversion Channel for Q10, MAD, and the 1 in 20 year dry flow scenarios are presented on Figure 4.1. Chainage 0+700 m represents a typical cross section of the channel with a minimum depth of 1.5 m, noting that the channel is deeper than the minimum required depth in many areas due to the natural topography, as shown for chainage 0+300 m. The average water depths for each flow condition are summarized below:

- 1 in 10 year flood event (Q10) = 1.27 m
- MAD = 0.44 m
- 1 in 20 year Annual Dry = 0.24 m

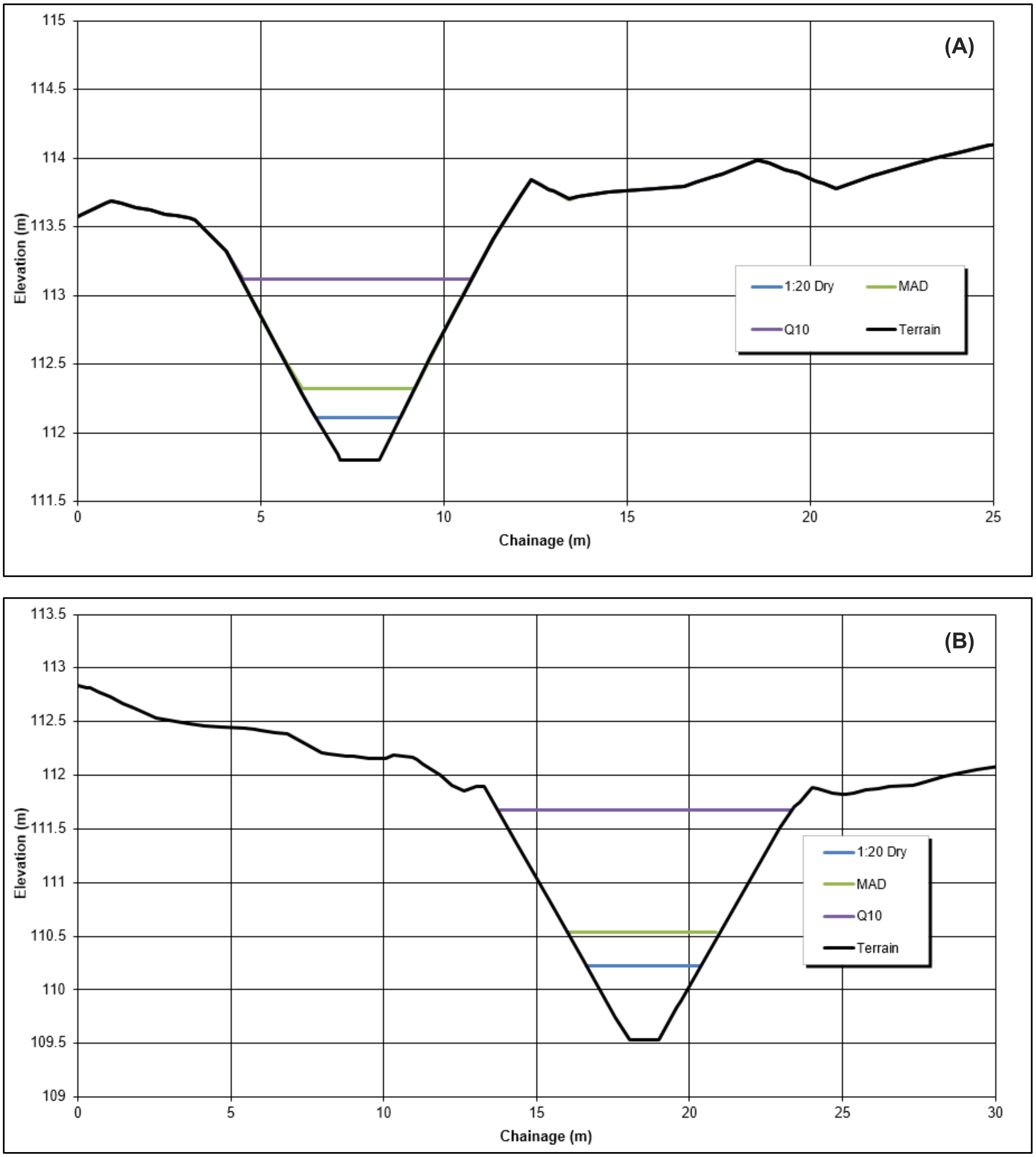

Figure 4.1 Diversion Channel Water Depths – (A) Chainage 0+300 and (B) Chainage 0+700

4.2 Q200 FLOOD FLOW SCENARIO

The results of the Q200 flood flow scenario indicate that there is sufficient freeboard along the haul road and the Diversion Berm such that neither is overtopped during the modeled peak flood event. Figure 4.2 shows the estimated water depth at the approximate chainage of 0+300 m and 0+700 m.

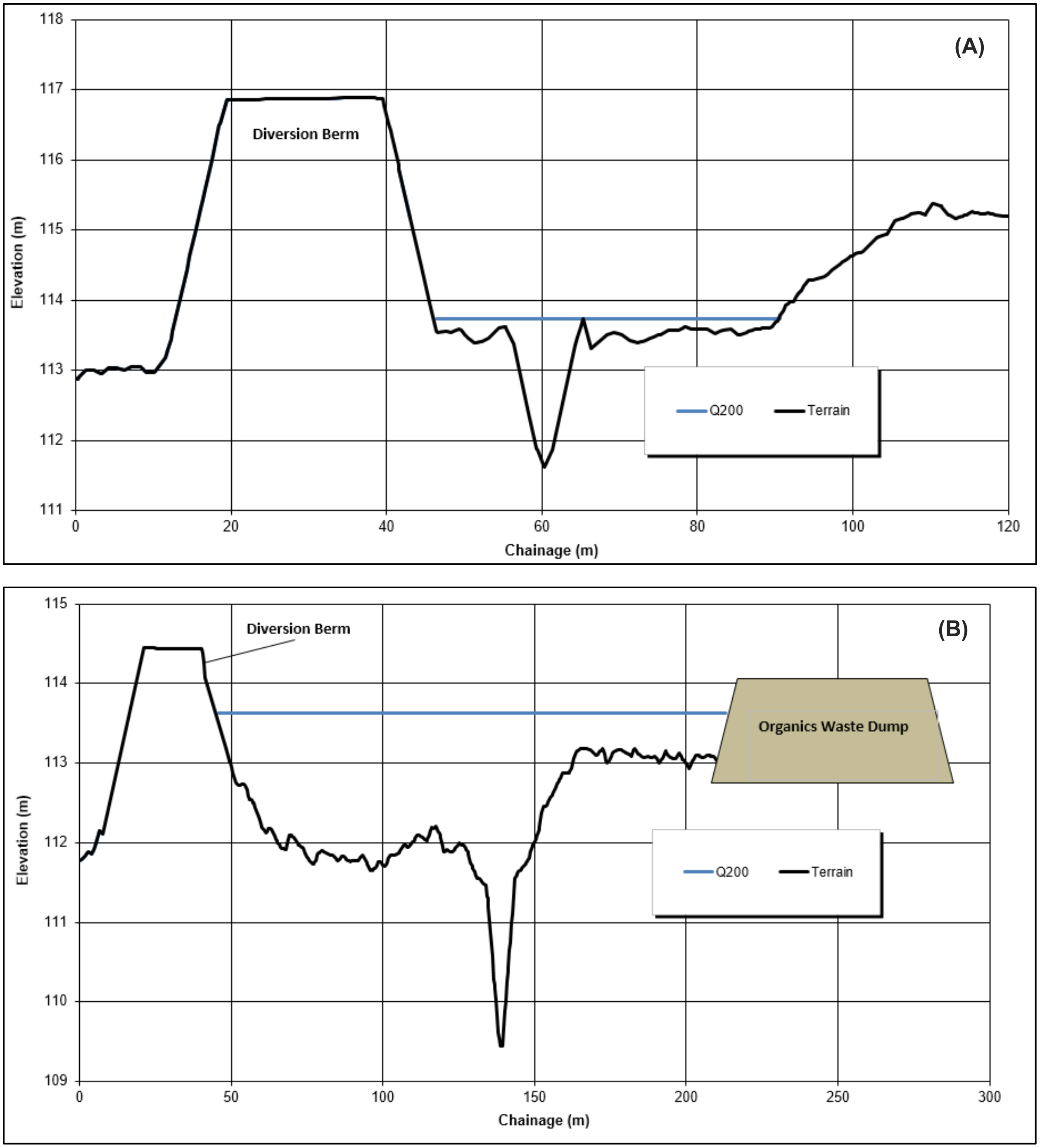

Figure 4.2 Diversion Flooding Depths for Q200 – (A) Chainage 0+300 and (B) Chainage 0+700

In addition to the water depths, shear stress was calculated to estimate the size of material that would mobilize under the peak flow scenario. The calculated shear stresses were then used to confirm that the specified riprap size within the channel that would remain stable under the design flood conditions.

Shear stress is defined as follows:

$$\tau = \gamma_w R S$$

where:

- τ - shear stress (units of force per unit area)
- γ_w – unit weight of water (units of force per unit volume)
- R – hydraulic radius or wetted cross-sectional area / wetted perimeter (units of length)
- S – channel slope (dimensionless, units of length / length)
- The critical shear stress required to mobilize bed material of a given size can be estimated using the Shields equation:

$$\tau_c = \tau^* (\rho_s - \rho_w) g D$$

where:

- τ_c – critical shear stress (units of force per unit area)
- τ^* - non-dimensional critical shear stress (selected representative values range from 0.03 to 0.06)
- ρ_s, ρ_w – density of bed material and water (units of mass per unit volume)
- g – gravitational acceleration (units of length per unit time squared)
- D – characteristic bed material grain size (units of length)

Riprap armor with a D_{50} = 75 mm is specified within the Diversion Channel (Drawing FM-C1001), in consideration of modelled shear stresses that indicate material between 2 mm and 64 mm in diameter may be mobilized. As a result, it is expected that the specified riprap is sufficiently large to withstand the shear stresses expected during the Q200 flood event, with potential for minimal channel repair required following such an event.

5.0 SELOAM BROOK DIVERSION CHANNEL DESIGN FOR FISH PASSAGE

In order to design the Seloam Brook Diversion Channel such that it would provide adequate fish passage, it is proposed that the Diversion Channel and culvert mimic existing conditions in the surrounding watercourses to the extent practical.

Photo 5.1 shows the channel characteristics at the SW2 hydrometric monitoring station, located downstream of the Seloam Reservoir. Photo 5.2 shows the channel characteristics at the SW5 hydrometric station, located roughly 1,200 m downstream of the Seloam Brook Diversion.

Photo 5.1 Channel Morphology at SW2 (August 22, 2017)

Photo 5.2 Channel Morphology at SW5 (June 18, 2018)

Although the site photos provide a general overview of the channel morphology, a field study is recommended in order to obtain more detailed information with respect to the contributing watercourses around the Seloam Brook Diversion Channel prior to the detailed design.

In order to approximate the natural conditions, several fish friendly features are proposed to be implemented throughout the Diversion Channel. The proposed fish friendly features are presented on Drawing FM-C1004 and include:

- Deflector Logs – Typically used to force the stream into a more meandering pattern and to create pools. By partially blocking flow, a deflector causes water to backup to some extent which results in increased water depths upstream of the log and faster velocities around the log. In natural systems, a deflector log will cause a pool to form downstream and opposite of the log as a result of the faster velocities; however, as the Diversion Channel would be riprap lined, a pool would not form naturally through erosion, but could be created during construction. In this application, the primary purpose of deflector logs would be to create zones of slower moving water providing areas of refuge for fish.
- Rock Weirs – Used to create pools within a channel and provide resting and refuge areas for fish. Pools are typically designed to work in conjunction with food producing areas such as riffles.
- Riffles – Used to provide higher energy sections in a creek system that tend to be shallower than other portions of the system, which help support a variety of aquatic life. Water flowing over a riffle will add oxygen to the system. Insects and plants can often be found in and around riffles, providing areas where fish can find food.
- In-Line or Off-Channel Ponds – Provide fish with refuge from fast moving flow, refuge during extreme low flow conditions, and hiding places from predators. In addition, ponds provide areas for a variety of food sources to grow.

We trust that the information provided in this letter is sufficient for your needs at this time. If you have any questions or comments, please contact the undersigned.

Yours truly,
Knight Piésold Ltd.

2020-04-14

PROFESSIONAL
PROVINCE OF
B. T. S. WORRALL
45441
BRITISH COLUMBIA
ENGINEER

Prepared: ______________________ Reviewed: Violeta Martin

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Project Engineer

Violeta Martin, Ph.D., P.Eng.
Specialist Hydrotechnical Engineer
Associate

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

Attachments:

Drawing FM-C1000 Rev B	Seloam Brook Diversion Plan
Drawing FM-C1001 Rev B	Seloam Brook Diversion Channel Profile and Section and Inlet/Outlet Concept
Drawing FM-C1002 Rev B	Seloam Brook Diversion Haul Road Profile and Section
Drawing FM-C1003 Rev B	Seloam Brook Diversion Haul Road Culvert and Dissipation Pool Sections
Drawing FM-C1004 Rev B	Seloam Brook Diversion Typical Fish Habitat Details

References:

Chow, V.T. 1959 (Chow 1959). Open-Channel Hydraulics. McGraw-Hill Kogakusha, Ltd.

Knight Piésold Ltd. 2018 (KP 2018) Moose River Consolidated Phase II Preliminary Engineering Hydrometeorology Report, Report No. VA101-00708/4-1 Rev 0.

Nova Scotia Environment (Nova Scotia 2015). 2015 Nova Scotia Watercourse Alterations Standard. Version 2, June 1, 2015.

Nova Scotia Power, An Emera Company. 2009 (NSP 2009). East River Sheet Harbour Hydro System. Relicensing Report. Author: Environmental Services. Version: Two. Date: February 16, 2009.

Nova Scotia Power. 2018 (NSP 2018). Excel Spreadsheet summarizing reservoir elevations, gate openings and low level outlet discharges for the period June 11, 2007 to Oct 15, 2018.

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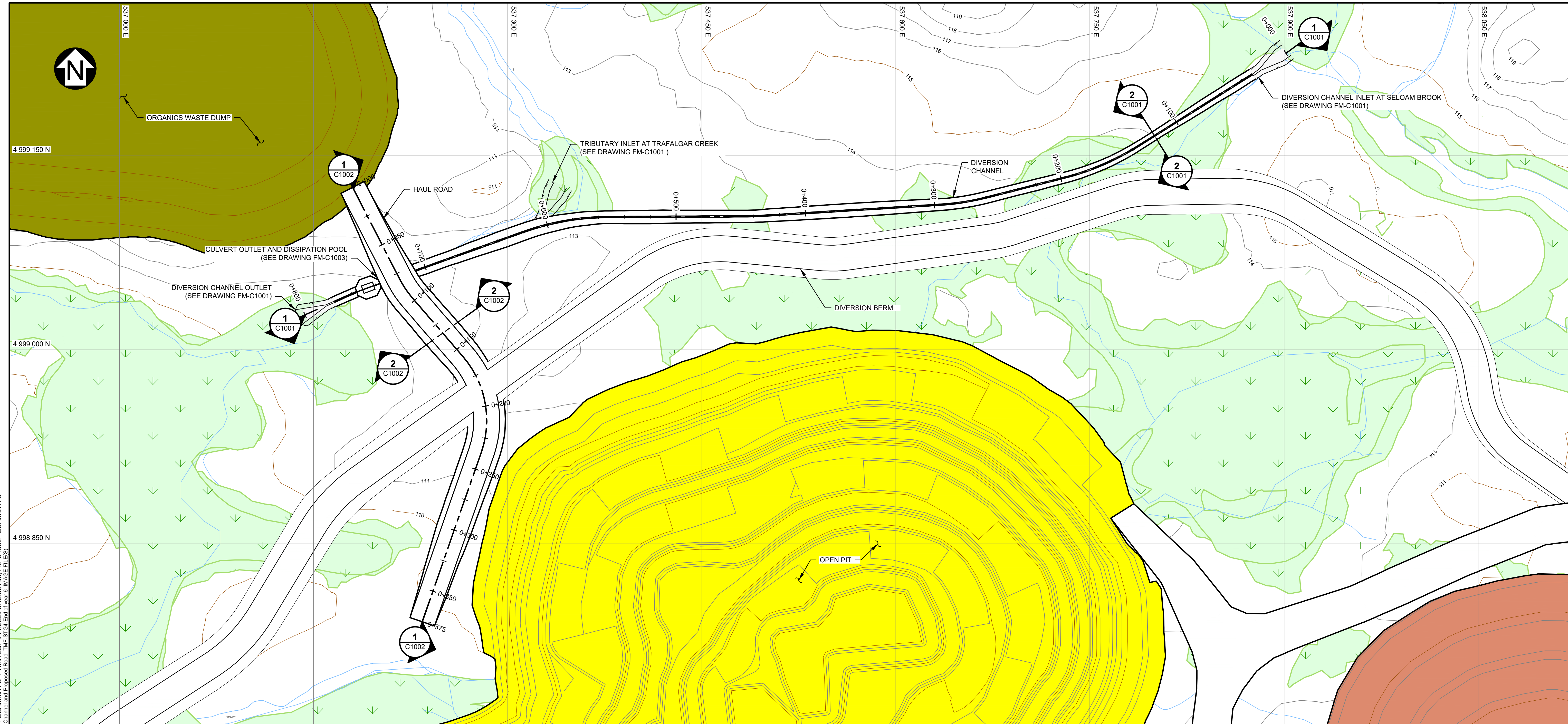


PLAN

DIVERSION CHANNEL AND PROPOSED ROAD DESIGN

SCALE A

FOR INFORMATION ONLY

SCALE A 30 15 0 50 100 150 m

NOTES:

1. COORDINATE GRID IS NAD83, ZONE 20 N.
2. CONTOURS BASED ON 2014 LIDAR OBTAINED FROM GEONOVA, REPRODUCED AND DISTRIBUTED WITH THE PERMISSION OF INTERNAL SERVICES. CONTOURS HAVE BEEN PRODUCED BY KNIGHT PIESOLD LTD. AND INCLUDE DATA PROVIDED BY INTERNAL SERVICES. THE INCORPORATION OF DATA SOURCED FROM INTERNAL SERVICES WITHIN THIS PRODUCT SHALL NOT BE CONSTRUED AS CONSTITUTING AN ENDORSEMENT BY INTERNAL SERVICES OF OUR PRODUCT.
3. WETLAND AND WATER COURSE MAPPING PROVIDED BY McCALLUM ENVIRONMENTAL LTD. SEPTEMBER 06, 2018. DATA PROVIDED IN DRAFT WITH NO IMPLIED WARRANTIES AND SHALL BE CONSIDERED PRELIMINARY.
4. DIMENSIONS AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.

Knight Piésold CONSULTING

ATLANTIC MINING NS CORP

FIFTEEN MILE STREAM PROJECT

SELOAM BROOK DIVERSION PLAN

P/A NO.	DRAWING NO.	REVISION
VA101-708/4	FM-C1000	B

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
C1001	SELOAM BROOK DIVERSION CHANNEL - PROFILE AND SECTION, AND INLET/OUTLET CONCEPTS
C1002	SELOAM BROOK DIVERSION - HAUL ROAD - PROFILE AND SECTION

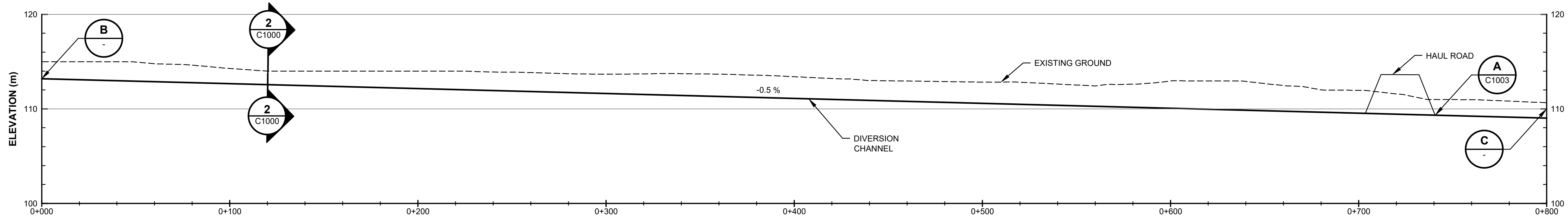
REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

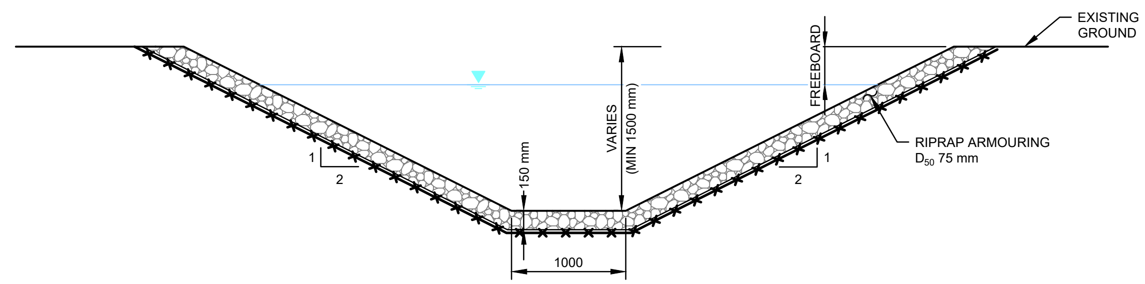
REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
B	09APR'20	ISSUED FOR INFORMATION	BW	RF	VM	DDF

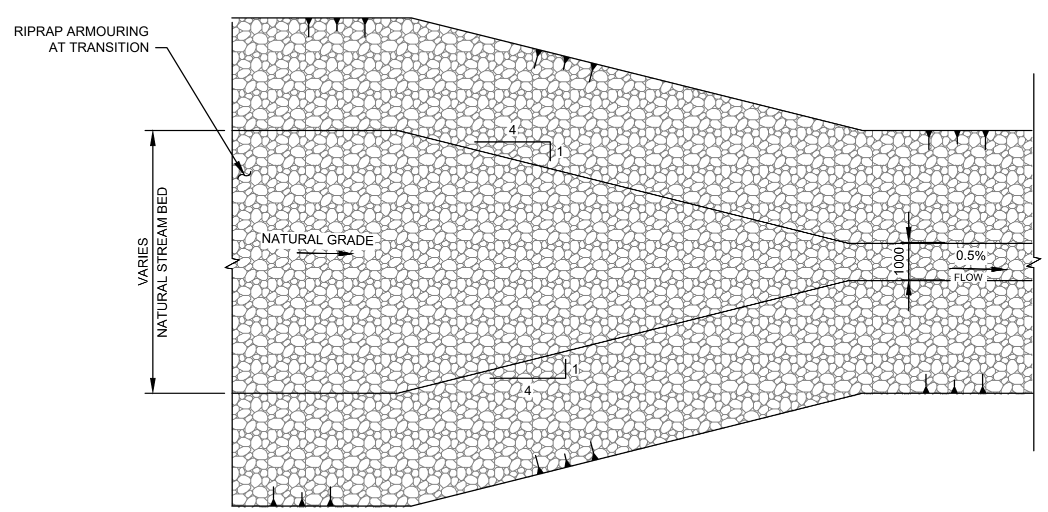
SAVED: M:\1\01\00708\04\A\Acad\DWGS\FM-C1000-C1002\FM-C1000-C1002, 4/9/2020 5:01:14 PM , SCAMMAYO PRINTED: 4/14/2020 9:12:50 AM, FM-C1000, SCAMMAYO



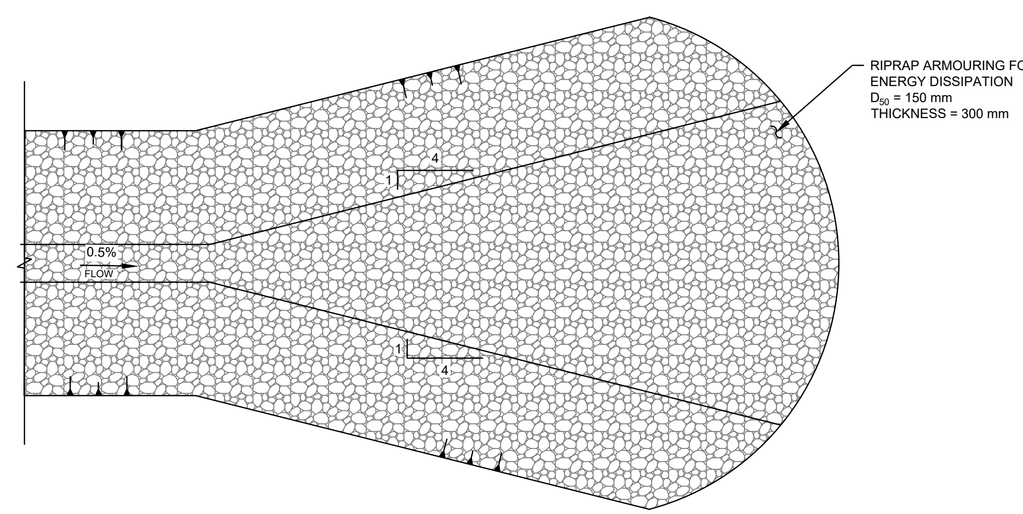
1 / C1000 PROFILE
DIVERSION CHANNEL
HORIZONTAL: SCALE A
VERTICAL: SCALE B



2 / C1000 CROSS SECTION
DIVERSION CHANNEL
SCALE C



B / - DIVERSION CHANNEL INLET CONCEPT - PLAN
NTS



C / - DIVERSION CHANNEL OUTLET CONCEPT - PLAN
NTS

SCALE A: 25 12.5 0 25 50 75 100 125 m
SCALE B: 5 2.5 0 5 10 15 20 25 m
SCALE C: 0.6 0.3 0 1 2 3 m

LEGEND:

- WEARING COURSE
- COMPACTED SUITABLE FILL MATERIAL
- BEDDING MATERIAL
- WELL GRADED BASE COURSE
- RIPRAP ARMOURING
- NON-WOVEN GEOTEXTILE
- WATER SURFACE

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
2. DESIGN FLOW = 6.0 m³/s.
3. FREEBOARD = 300 mm.

FOR INFORMATION ONLY

DRG. NO.	DESCRIPTION
C1000	SELOAM BROOK DIVERSION - PLAN
C1003	SELOAM BROOK DIVERSION - HAUL ROAD CULVERT AND DISSIPATION POOL SECTIONS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
B	09APR'20	ISSUED FOR INFORMATION	BW	RF	VM	DDF

REVISIONS

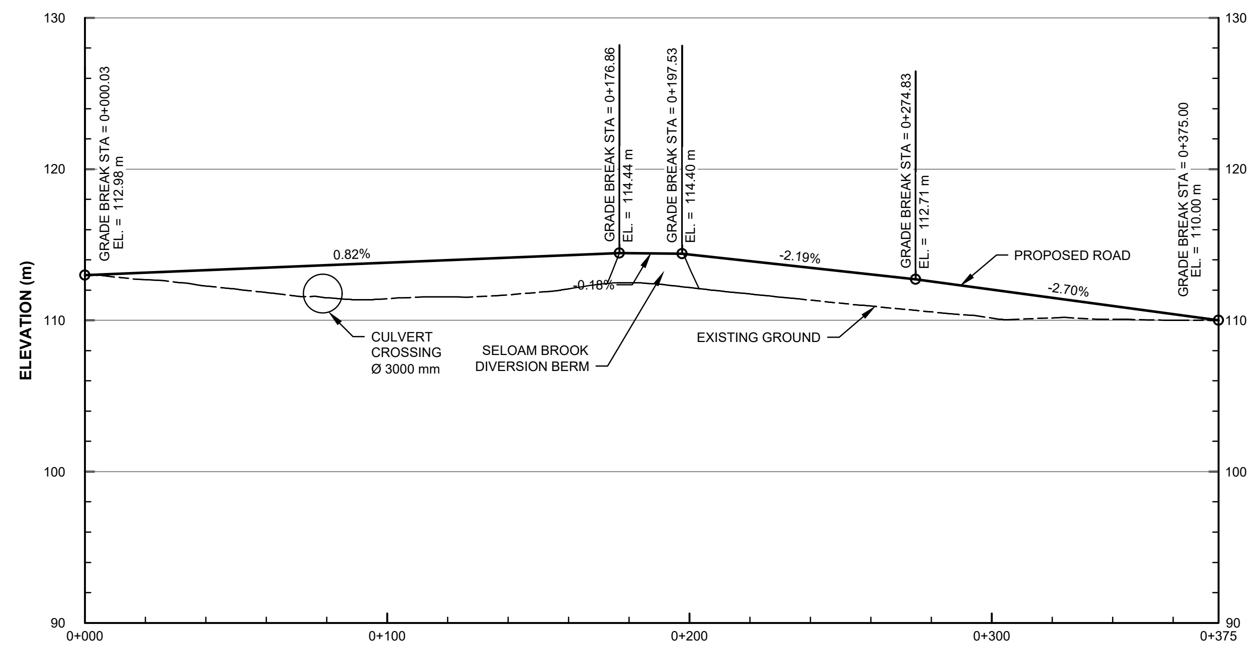
Knight Piésold CONSULTING

ATLANTIC MINING NS CORP

FIFTEEN MILE STREAM PROJECT

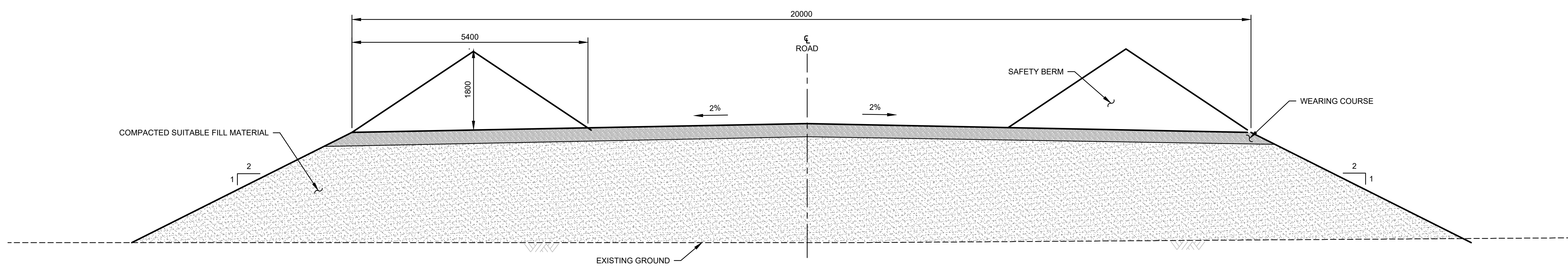
SELOAM BROOK DIVERSION CHANNEL PROFILE AND SECTION, AND INLET/OUTLET CONCEPTS

P/A NO.	DRAWING NO.	REVISION
VA101-708/4	FM-C1001	B



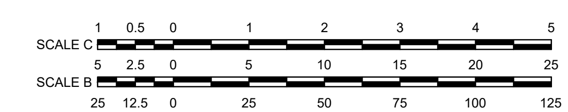
1 C1000 **PROFILE**

HAUL ROAD
HORIZONTAL: SCALE A
VERTICAL: SCALE B



2 C1000 **TYPICAL SECTION**

HAUL ROAD
SCALE C



LEGEND:

- WEARING COURSE
- COMPACTED SUITABLE FILL MATERIAL

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

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ATLANTIC MINING NS CORP

FIFTEEN MILE STREAM PROJECT

SELOAM BROOK DIVERSION
HAUL ROAD
PROFILE AND SECTION

P/A NO.	DRAWING NO.	REVISION
VA101-708/4	FM-C1002	B

DRG. NO.	DESCRIPTION
C1000	SELOAM BROOK DIVERSION - PLAN

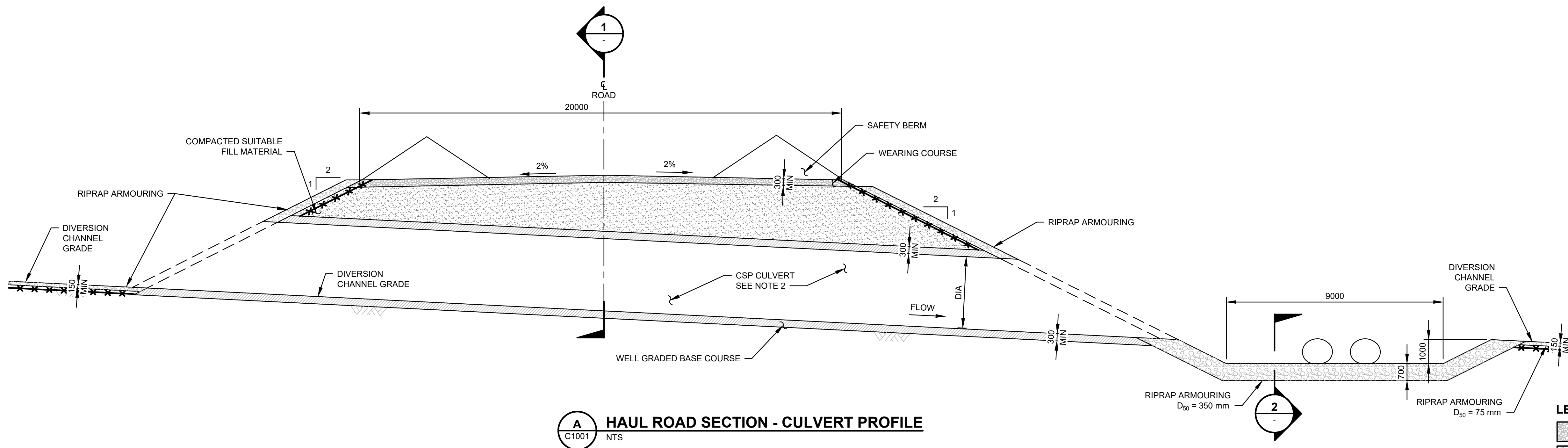
REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
B	09APR'20	ISSUED FOR INFORMATION	BW	RF	VM	DDF

REVISIONS



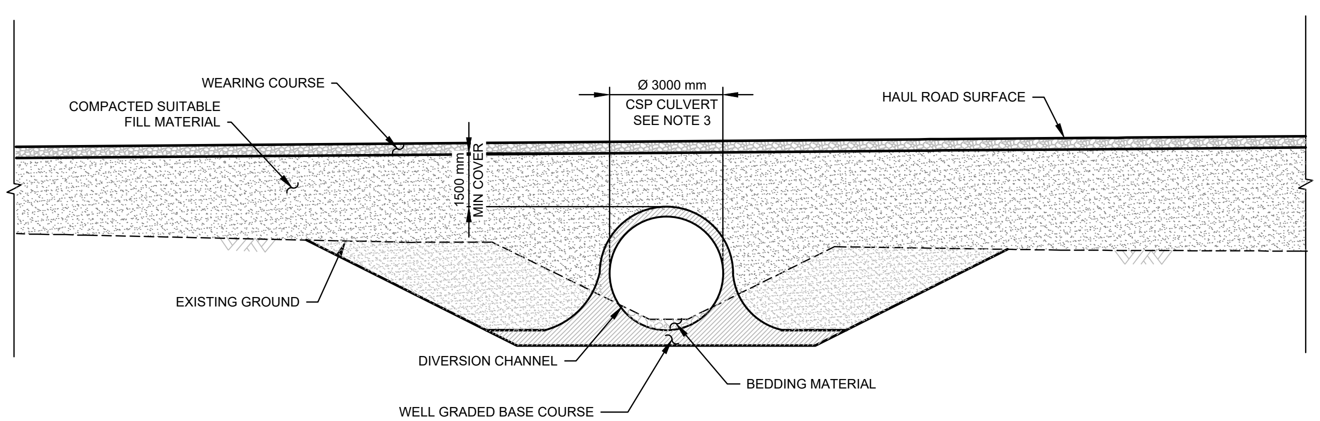
A
C1001

HAUL ROAD SECTION - CULVERT PROFILE

NTS

LEGEND:

- WEARING COURSE
- COMPACTED SUITABLE FILL MATERIAL
- BEDDING MATERIAL
- WELL GRADED BASE COURSE
- RIPRAP ARMOURING



1
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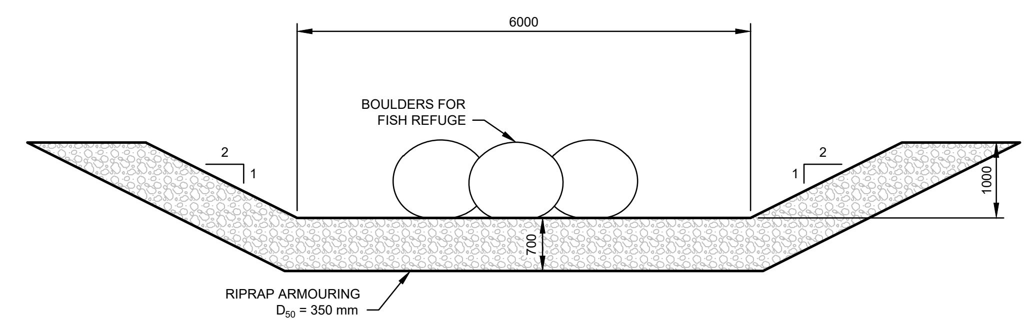
CULVERT SECTION

NTS



2
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DISSIPATION POOL SECTION

SCALE A

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS ARE IN METRES, UNLESS NOTED OTHERWISE.
2. CULVERT TO BE INSTALLED AT SAME SLOPE OF DIVERSION / COLLECTION DITCHES.
3. CORRUGATED STEEL PIPE SPECIFICATION :
   - 3.1. CORRUGATED STEEL PIPE SPECIFICATION 76 X 25 .
   - 3.2. CULVERT WALL THICKNESS OF 2.8 mm.
4. DISSIPATION POOL TO CONTAIN AT MINIMUM THREE 1.0 m BOULDERS ARRANGED IN A TRIANGLE PATTERN TO CREATE RESTING AREAS FOR FISH.
5. 70% OF THE RIP RAP IN THE DISSIPATION POOL MUST BE BETWEEN 0.3 m 0.45 m.

FOR INFORMATION ONLY

SCALE A 1 0.5 0 1 2 3 4 5 m

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ATLANTIC MINING NS CORP

FIFTEEN MILE STREAM PROJECT

SELOAM BROOK DIVERSION
HAUL ROAD CULVERT AND DISSIPATION POOL SECTIONS

P/A NO.	DRAWING NO.	REVISION
VA101-708/4	FM-C1003	B

DRG. NO.	DESCRIPTION
C1001	SELOAM BROOK DIVERSION CHANNEL - PROFILE AND SECTION, AND INLET/OUTLET CONCEPTS

REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
B	09APR'20	ISSUED FOR INFORMATION	BW	RF	VM	DDF

REVISIONS

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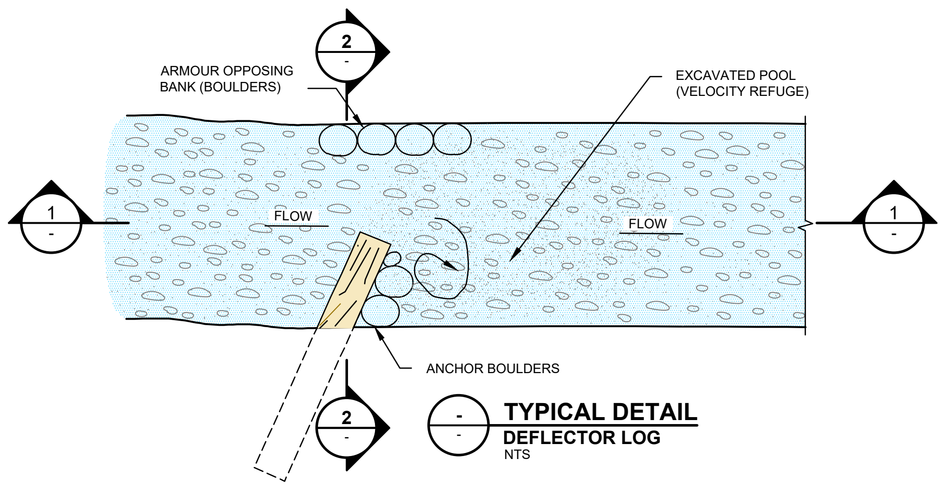
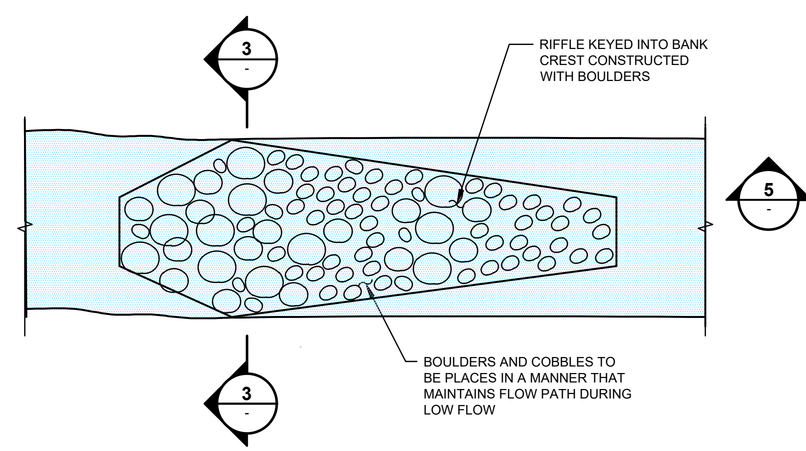
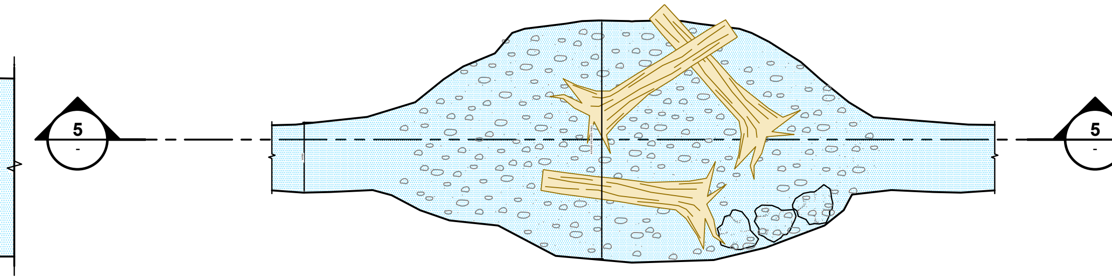


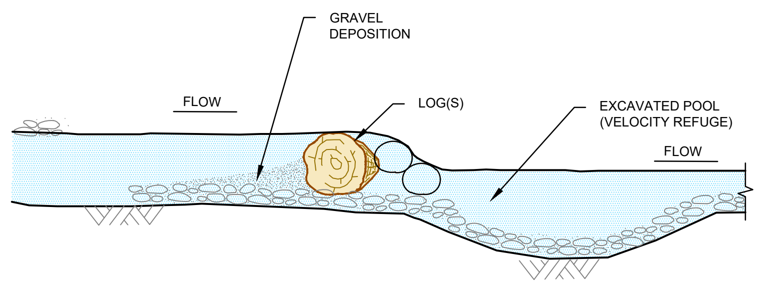
TYPICAL DETAIL
DEFLECTOR LOG
NTS



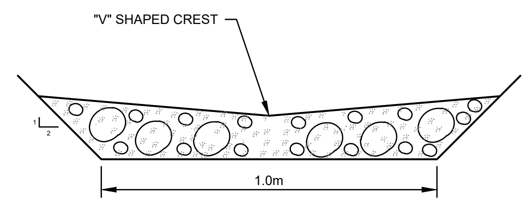
TYPICAL DETAIL
RIFFLE
NTS



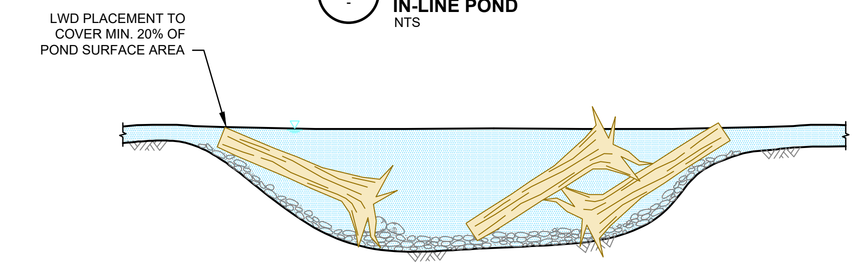
TYPICAL PLAN
IN-LINE POND
NTS



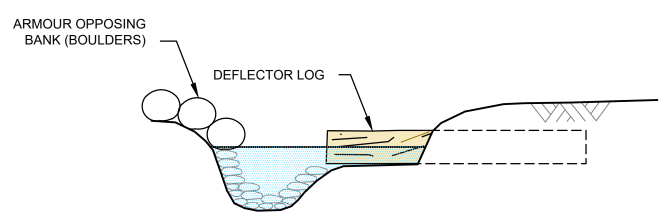
1 TYPICAL PROFILE
DEFLECTOR LOG
NTS



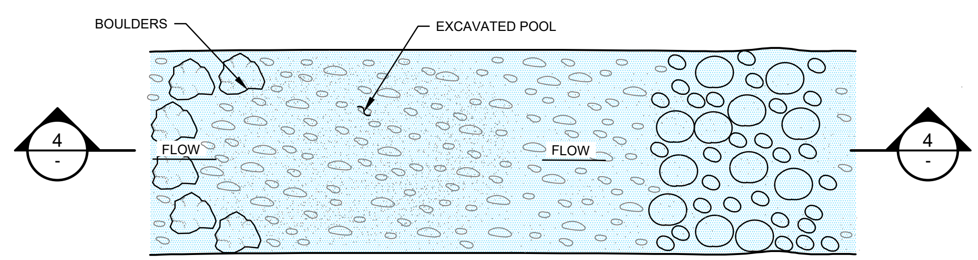
3 SECTION
RIFFLE
NTS



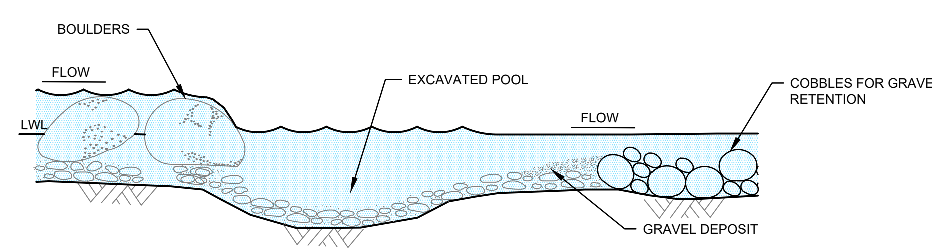
5 TYPICAL SECTION
IN-LINE POND
NTS



2 TYPICAL SECTION
DEFLECTOR LOG
NTS



TYPICAL DETAIL
ROCK WEIR CONSTRUCTION
NTS



4 TYPICAL SECTION
ROCK WEIR CONSTRUCTION
NTS

NOTES:

1. LWD (LARGE WOODY DEBRIS) SHOULD RETAIN ROOTWADS AND LIMBS IF POSSIBLE.
2. CABLING OF LWD MAY NOT BE REQUIRED IF THE STEMS CAN BE PINNED UNDER BOULDER COMPLEXES.
3. ALL ON-SITE SWD (SMALL WOODY DEBRIS) IS TO BE INCORPORATED INTO THE POOL OR CHANNEL MARGINS WHERE APPLICABLE. OVERSIZED OR UNDERSIZED BOULDERS MAY ALSO BE INCORPORATED INTO THE CHANNEL DESIGN.
4. BOULDERS TO BE EMBEDDED A MINIMUM DEPTH OF 20 % OF THEIR DIAMETER.
5. DEFLECTOR LOGS TO BE EMBEDDED IN BANK FOR MINIMUM 50%OF LWD LENGTH. IN STREAM LWD LENGTH NOT TO EXCEED 30% OF THE CHANNEL WIDTH.

FOR INFORMATION ONLY

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ATLANTIC MINING NS CORP

FIFTEEN MILE STREAM PROJECT

SELOAM BROOK DIVERSION
TYPICAL FISH HABITAT DETAILS

P/A NO.	DRAWING NO.	REVISION
VA101-708/4	FM-C1004	B

REFERENCE DRAWINGS

DRG. NO.	DESCRIPTION
-	-

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED

REVISIONS

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED	APPROVED
B	09APR'20	ISSUED FOR INFORMATION	BW	RF	VM	DDF

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