Design Report for IVR Diversion

Detailed Engineering Design of Water Management and Geotechnical Infrastructures
Phase 2 - Whale Tail Project Expansion

Agnico Eagle Mines Limited - Meadowbank Division

Mining & Metallurgy

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SNC-LAVALIN INC.
1140 De Maisonneuve West Blvd
Montreal, QC
Canada H3A 1M8
Tel: (514) 393-1000
Fax: (514) 390-2765

Montreal, June 24, 2020

Mr. Alexandre Lavallée
Agnico Eagle Mines Limited – Meadowbank Division
Suite 540 – Baker Lake
Nunavut, Canada
X0C 0A0

Subject: Detailed Engineering Design of Water Management and Geotechnical Infrastructures Phase 2 – Whale Tail Project Expansion
Design Report for IVR Diversion
File no.: 6127-695-132-REP-004 (668284-7000-4GER-0001), Rev 00

Dear Mr. Lavallée

We are pleased to submit the preliminary version of the report mentioned in the above subject.

Do not hesitate to communicate with the undersigned should you have further questions regarding the content of this report.

Truly yours,

SNC LAVALIN INC.

Anh-Long Nguyen ing.

Anh-Long Nguyen, P. Eng., M. Sc.
#OIQ: 122858, #NAPEG L2756
Project Manager
Mining and Metallurgy

List of Revisions

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1.0 Introduction

1.1 Context

Agnico Eagle Mines Limited, Meadowbank Division (AEM) is developing the Whale Tail Project, a satellite deposit located on the Amaruq property (Kivalliq Region of Nunavut, Canada). The Whale Tail Project construction is ongoing and commercial production has started in the third quarter of 2019. To continue mining and milling, AEM is proposing to expand the Whale Tail Project by expanding the Whale Tail pit, developing another open pit called the IVR pit and including underground mining operations. As part of the expansion project, new water management and geotechnical infrastructures shall be required for surface water management. One such new structure is the IVR Diversion which will divert non-contact water away from the mine site, IVR pit.

This design report for the IVR Diversion is submitted as per the amended Water License 2AM-WTP1830, Part D, Item 1.

1.2 Background Information

As part of the expansion project, the surface water management and geotechnical infrastructures required for the Amaruq site include the IVR Diversion.

The principal purpose of this infrastructure is to collect and divert all the runoff (non-contact water) that will come from the North East watershed into Nemo Lake. This is part of the water-management strategy to minimize the treatment volumes of water at the treatment facility of the site. The watershed is located just north of the proposed IVR WRSF and east of the IVR Pit, and it has an approximate area of 68.2 ha (with the IVR Diversion in place).

Figure 1-1 presents the general location of the 68.2-ha-area and the general location of the IVR Diversion.

The alignment of the IVR Diversion was selected to collect non-contact water from a 68.2 ha - watershed and convey it into Lake C44's sub-watershed. This lake is naturally connected to Lake C43, and this in turn is connected to Nemo Lake.

It is noted that in the Prefeasibility Study Phase (SNC-Lavalin, 2019), the conceptual design for the IVR Diversion was a berm. The conceptual design was based on the available hydrological and topographical data at the time. The initial design was reviewed and with the recent data obtained for this study, the location of the IVR Diversion and design have been changed from the PFS design.

The IVR Diversion is required before freshet of 2021 and will be built in Q3 of 2020.

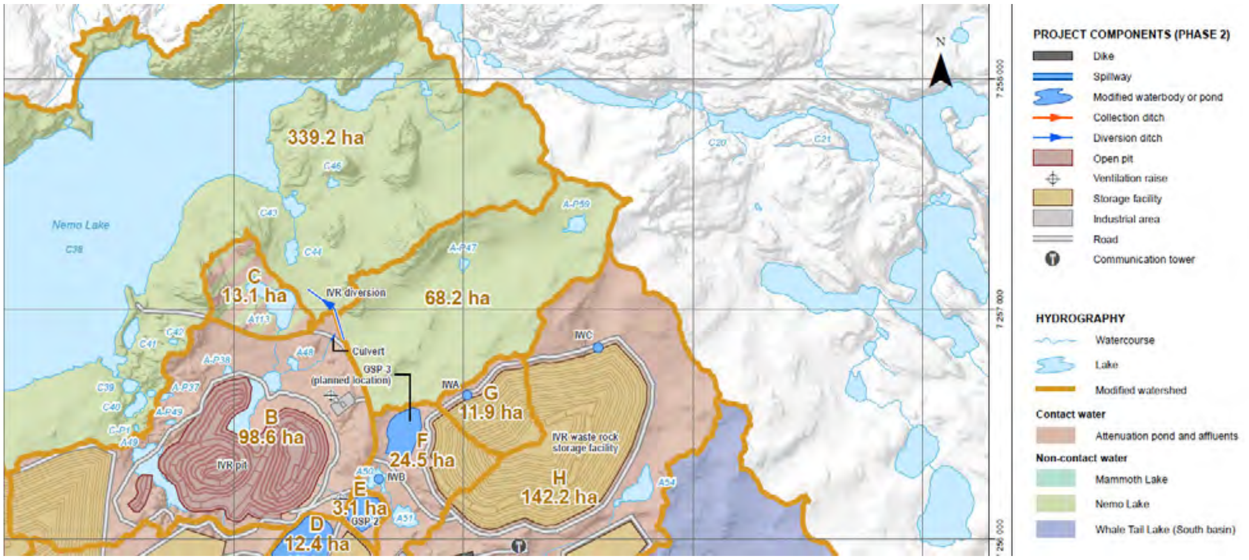

Figure 1-1: IVR Diversion Location

1.3 Organization of the Report

This report presents the available geotechnical information, the design basis, the hydrological and geotechnical design related to the IVR Diversion.

2.0 Available Geotechnical Data

Drawing No. 668284-7000-4GDD-0001 (Appendix D) shows the locations of investigation test pits and boreholes carried out in the vicinity of East Diversion Channel. A total of eleven (11) test pits were carried out in September 2019 and ten (10) boreholes were drilled in May 2020. All the boreholes are destructive boreholes with Tamrock drill rig allowing an estimation of bedrock elevation. Because the test pits were completed in 2019 prior to the hydrology updates, their locations are further east and concentrated more on the southern part of the current location of the IVR Diversion. The topography of the area is relatively flat and thus it is assumed that the current IVR Diversion has the similar soil characteristics as shown on the test pits.

The overburden consists of about 0.4 m to 0.6 m of thick and black organic materials underlain by about 0.5m to 1.5m of brown to grey sand and gravel/cobbles with trace of silt, moist to wet. The depth to frozen ground varies from 1.3m to 2.1m below ground surface. The depth to bedrock varies from 3m to 7.4m. The field logs of test pits and boreholes are presented in the Appendix A.

3.0 Design Basis

The design basis is presented in detail in the document 668284-7000-4GEC-0001 (AEM No.: 6127-695-132-DGC-001) from SNC-Lavalin (2020b).

Overall, the IVR Diversion will reroute the runoff volumes from the 68.2 ha-watershed, non-contact water. The structure will be discharging into to Nemo Lake's areas, upstream of Lake C43, shown in Figure 1-1. The proposed diversion system consists of trapezoidal section channel in combination with a pervious perimeter berm that will be delimiting the west boundary of the system. The trapezoidal section will consist of geotextile (as per requested by AEM instead of filter material) placed on at the bottom the excavation and overlain by riprap. The berm will be part of the hydraulic section that will provide the extra capacity for the system (IVR Diversion) to properly reroute the runoff volumes from the 68.2 ha-watershed during flood events (i.e. 1:100-Yr Flood). This berm will also be used as an access road for inspection and maintenance of the system. The access road has a minimum height of 1.5 m as per minimum requirement for access road at Amaruq site.

It must be noted that during flood events a fringe area of the natural ground located along the east shoreline of the structure will be temporarily flooded. Some recommendations are provided is Section 4.6 to protect this area against erosion based on flow velocities (i.e. flow velocities < 1.0 m/s)

The design basis related to hydraulic aspects of the IVR Diversion are summarized in Table 3-1.

Table 3-1: Hydraulic Design Basis for IVR Diversion

Parameters	Values
Design Flood	
Design Flood Event	1:100 Storm Flood
Rain Data	From I-D-F Curves from Baker Lake A Station (Update version from the IDF-CC Tool)
Watershed’s physical characteristics	Will be obtained from terrain model, DEM 1.0 m resolution
Runoff Coefficient “C” = 1.0	Assuming saturated conditions of the soil
Time of concentration	Bransby Williams for C>0.4, MTQ (2014)
Peak Inflow	Rational Method, MTQ (2014)
Diversion’s physical characteristics	
Side slopes	Based on type of soil
Manning “n” roughness	Based on riprap revetment
Freeboard	0.3m
Side slope	Between 2H:1V to 3H:1V
Width of the base	3.0 m
Bed slope	Min 0.3 %
Flow velocities	Based on hydraulics equations for trapezoidal section
Water levels	Based on hydraulics equations for trapezoidal section
Rip-Rap: Rip-rap size will be obtained following the recommendations in USAGE (1994)	
D50	Based on Maximum Velocities in the diversion
Rip-Rap Layer thickness	USAGE (1994) and MTQ (2014)
Rip-Rap Gradation	Typical

4.0 Hydrological and Hydraulic Design

4.1 Hydrological Data

The closest climatological station to the Amaruq mine site is the Baker Lake Station A, approximately 130 km south of the site. This station, ID No. 2300500, is operated by Environment Canada (EC) and has intensity-Duration-Frequency (I-D-F) relationships available with 22 years of data from 1987 to 2009. These data were updated in the last version of the IDF- CC Tool, version 4 (from Western University) with additional data up to the year 2016. This data was adopted for the design of the IVR Diversion, and it is presented in Figure 4-1.

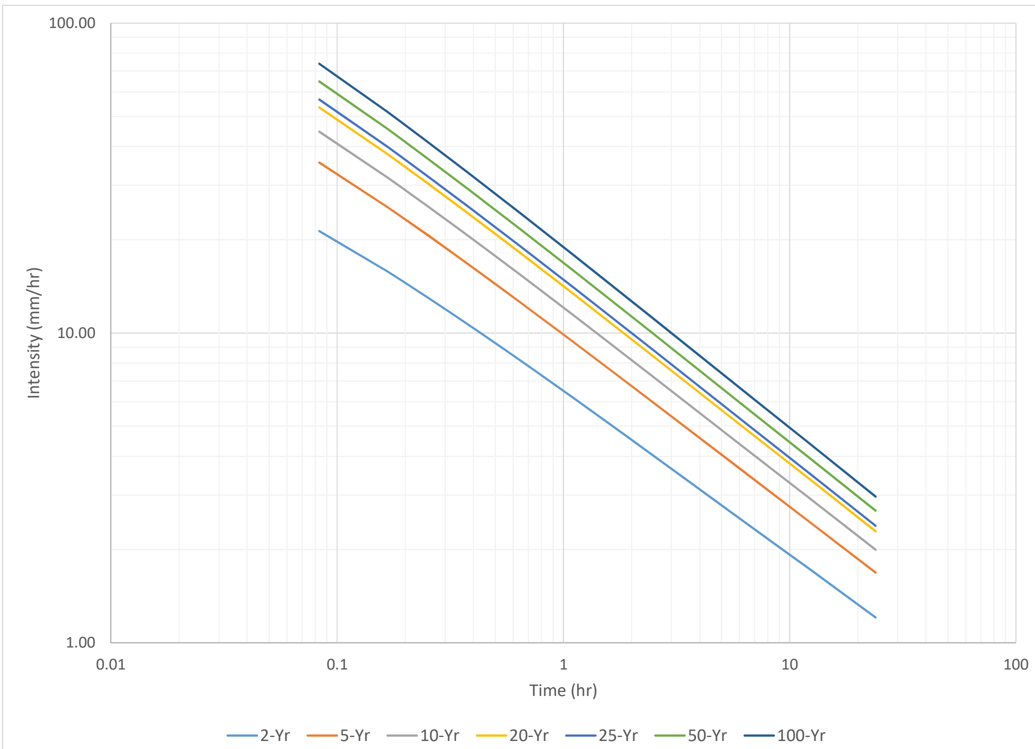

Figure 4-1: Bake Lake Station IDF (1987-2016)

4.2 Diversion Alignment

The proposed location of the IVR Diversion was determined based on observations of the terrain, digital elevation model (DEM), where the diversion will be able to intersect the runoff volumes resulted from the 68.2 ha-watershed. Once that was determined, the alignment was optimized based the terrain elevations with the objective to minimize excavation. The proposed alignment is presented in Figure 1-1. The length was established based on discussions with AEM, as follows:

i. On April 14 2020, it was concluded that to minimize the length of the IVR Diversion, this should be discharging onto the natural ground, upstream of Lake C44, at the approximate natural ground elevation of El. 156.5 m. AEM confirmed that discharging at this location is feasible since in summer 2019, some runoff-volumes (non-contact) were pumped out from other locations and discharged around this location, which from there, these were conveyed by gravity through the natural ground towards Lake C44. The location provided by AEM is presented as a red dashed-line in Figure 4-1.
ii. On June 8, 2020, AEM suggested to start the inlet invert of the IVR Diversion at the current elevation of the natural ground, which is approximately at El. 157.5 m, based on the proposed alignment location.

With the elevations described in items i and ii, the IVR Diversion length would be approximately 284 m with a bed slope of approximately 0.36%, which is slightly higher than the minimum slope established in Table 3-1. The IVR Diversion bed profile is shown in Figure 4-2.

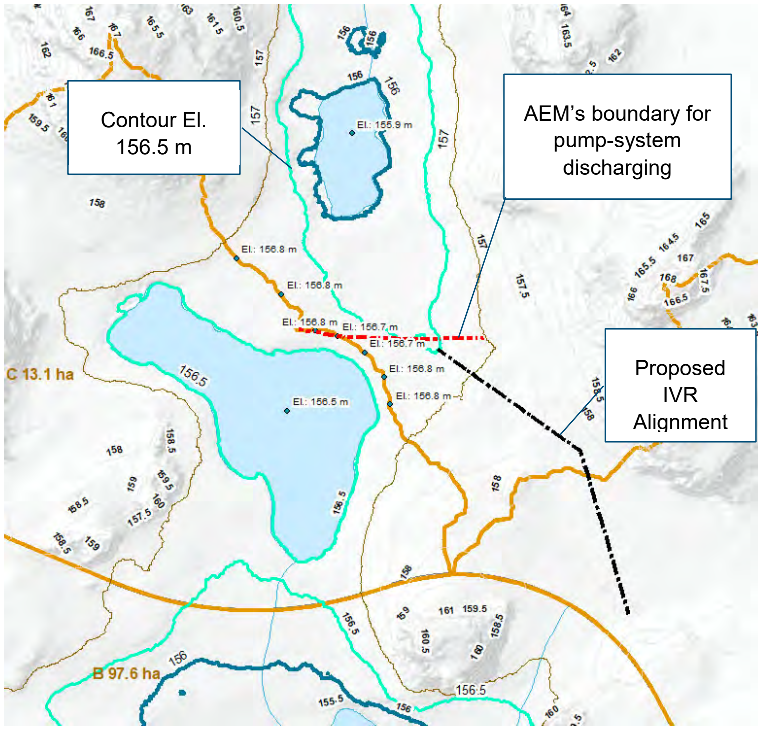

Figure 4-2: Location of the Proposed IVR Diversion's Alignment

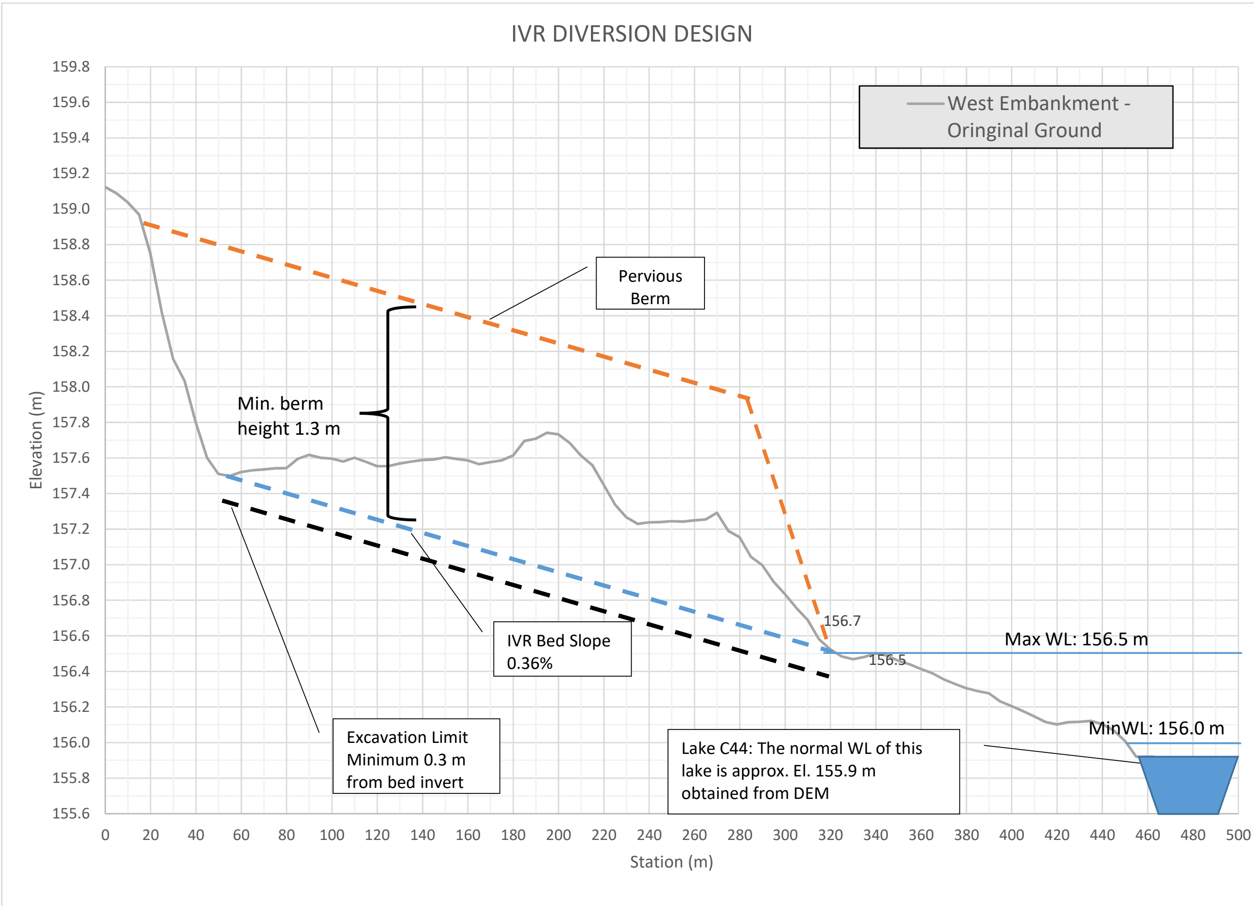

Figure 4-3: IVR Diversion Design – Profile View

4.3 Peak Discharge Flow

The peak discharge was determined by applying the rational method, as recommended in MTQ (2014) for watersheds with areas of 25 km^2 or less. The method consist of applying the equation below by using watershed characteristics and the I-D-F curves described in Section 4.1 for the desire return period which for the design is the 1:100-Yr, as established in design basis presented in Table 3-1.

$$Q = \frac{CIA}{360}$$

Where:

Q: Peak discharge in (m^3/s),

C: Peak discharge runoff coefficient. Assumed as 1.0 due to the mine location in permafrost areas.

I: Average rainfall intensity in (mm/hr). This was determined based on the I-D-F curves and the watershed time of concentration that was obtained by applying the Bransby Williams formula, as recommended in MTQ (2014)

A: Watershed area in (ha)

Based on the methodology described here the following peak floods were determined:

Table 4-1: Peak Flow Discharges

Return Period T	Peak Flood (m^3/s)
1:-10-Yr	2.9
1:-25-Yr	3.6
1:-100-Yr (Design Flood)	4.6

As indicated in the design basis, only the 1:100-Yr flood was used to design/validate the size of IVR Diversion. The 1:10-Yr and 1:25-Yr Floods were used only to investigate the sensibility of the system during higher frequent events.

Since inflow hydrographs are required for HEC-RAS simulations in 2D (describe in Section 0), inflow hydrographs were determined based on the peak discharges. The shape of the hydrographs was obtained by applying the alternating block method for rainfalls in 24 hr for the peak flows presented in Table 4-1. The inflow hydrographs include a steady inflow at the beginning of the hydrograph to simulate snowmelt of 0.3 m^3/s. It must be noted that this was only used to check the system during snowmelt periods, but it was not used to determine the discharge capacity of the system. The snowmelt value is conservative since it is greater than rapid snowmelts with return periods larger than the 1:100-Yr. These were obtained from available snow data from 1955 to 2019[1] at Baker Lake Station which are presented in Table 4-2.

[1] Statistical Snowpack is described in detail in SNC-Lavalin (2020).

Table 4-2 : Maximum Annual Statistical Snowpack

Return Period	Maximum Annual Snowpack
[year]	[mm water-eq]
2	105
5	144
10	168
25	195
50	213
100	229
1000	284
PMS*	452
*Not associated with any return period	

The design of the IVR Diversion is based on the peak discharge flow of the 1:100-Yr Flood. The 1:100-Yr inflow hydrograph is presented in Figure 4-4. The volumes derived from the hydrograph are not expected to affect the capacity of the channel.

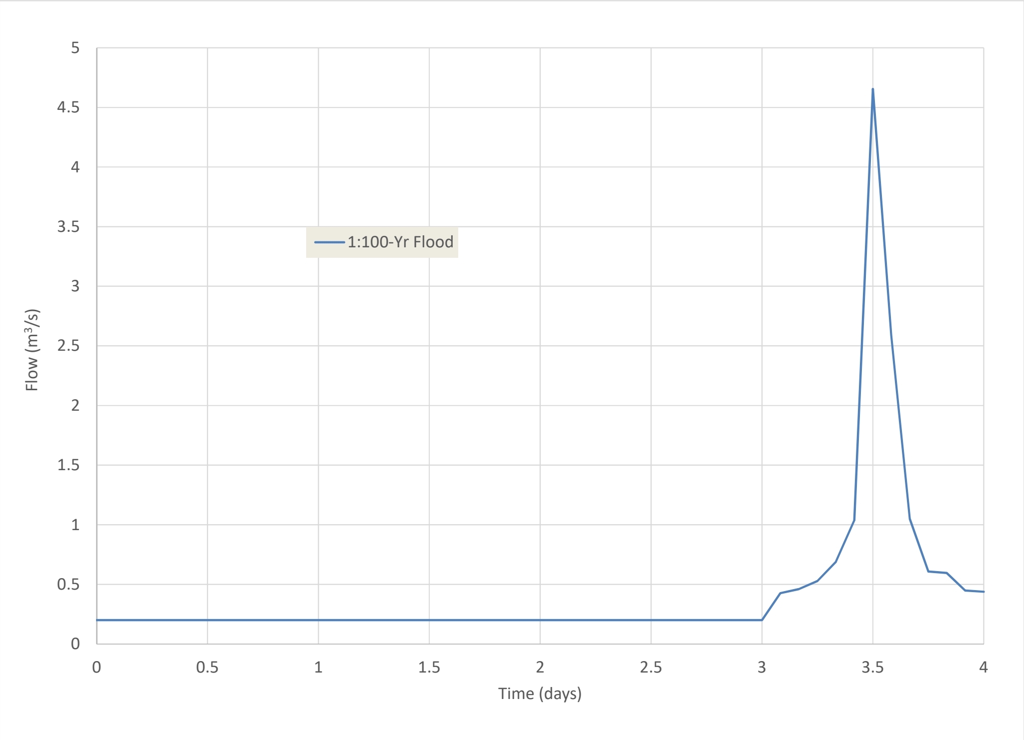

Figure 4-4: Inflow Hydrograph (1:100-Yr Flood)

4.4 IVR Diversion Geometry

The proposed channel consists of a trapezoidal section and a berm located at the west side. The size of these structures was established based on the basis outlined in Section 3-1 and the peak flow design (1:100-Yr). A typical section for the channel was adopted as follows:

- Side slopes of 3H:1V
- Base width of 3.0 m
- West Berm with slopes 2.5H:1V

A section with these dimensions will provide sufficient discharge capacity to convey the runoff volumes that will be generated by the 68.2 ha-watershed during the 1:100-Yr design flood event. The section will also provide a discharge capacity that minimize as much as possible the flood inundation areas on the east side of the channel.

Figure 4-5 shows the typical section of the IVR Diversion.

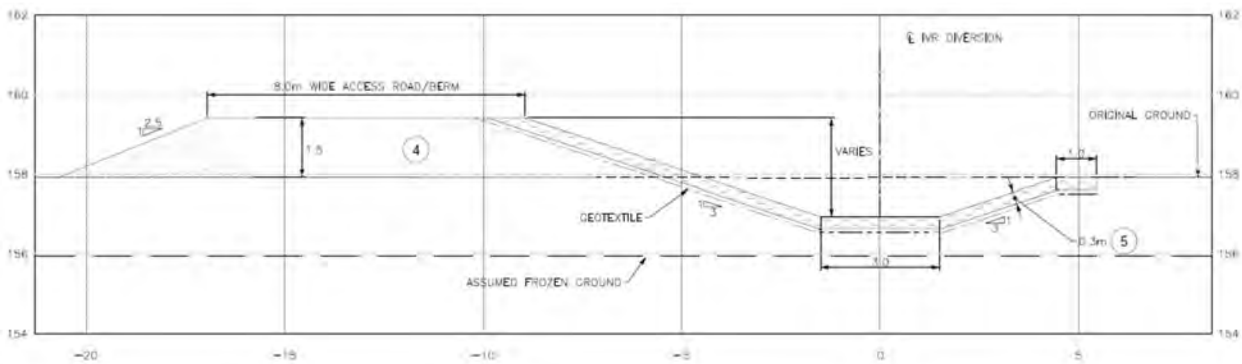

Figure 4-5: IVR Diversion – Typical Section

4.5 HEC RAS Model

To validate the capacity of IVR Diversion, a model was prepared using the program HEC-RAS Version 5.0.7, developed by the U.S. Army Corps of Engineers (USACE), using the two-dimensional hydrodynamic approach.

The model includes the 68.2 ha-watershed, the areas that correspond to the lakes A113, C44 and C43 as well the IVR system (channel and berm), all represented in 2D areas based on the DEM.

The boundary conditions for the model included:

- Inflow hydrographs upstream of the IVR Diversion, at the 68.2 ha-watershed, described in Section 4.3
- Downstream boundary condition located at Nemo Lake. For this condition, an elevation of 156.5 m was adopted. This assumption is conservative, but reasonable since water level record for this lake were not available. The elevation of El. 156.5 m was established as the maximum water level in the

lake before this lake starts overflowing into Lake A113's watershed. It must be noted that this sector is very sensitive to the water fluctuations of Nemo Lake and at the proposed elevation (El. 156.5 m) the lakes C44 and C43 will be completely flooded. This can be seen in Figures 4-2. Also, note that the purpose of the 2D model was to verify that runoff volumes from the 68.2 ha-watershed will properly be conveyed by the IVR Diversion. Complex modeling downstream of Nemo Lake were not part of the scope of this mandate.

Representative Manning's n-values were used to simulate the resistance to flow along the channel bed and banks. Manning's n-values of 0.03 were adopted for the channel, while values of 0.07 were used for the overbank areas. These were assigned based on the conditions observed during the site visit and on the available aerial imageries.

Table 4-3 summarizes the results obtained from the HEC-RAS model for a typical section of the IVR Diversion. To convey the 1:100-Yr design flood, a channel section of 3.0 m wide and side slopes 3H:1V, including a west berm with a minimum height of 1.3 m will provide sufficient capacity to transfer the design flood into Nemo Lake's watershed, including a 0.3 of freeboard.

Table 4-3: IVR Diversion Dimensions from HEC-RAS Simulation Results

IVR Diversion Design		
Design Flow	1:100-Yr	Flood
Base Width :	3.0	(m)
Side Slopes (z) :	3.0	(m)
Maximum Flow Depth :	1.0	(m)
Freeboard:	0.3	(m)
Maximum Flow Velocity:	1.5	(m/s)

Figure 4-6 shows the flow depths for the 1:10-Yr, 1:25-Yr and 1:100-Yr Floods obtained from the HEC-RAS model.

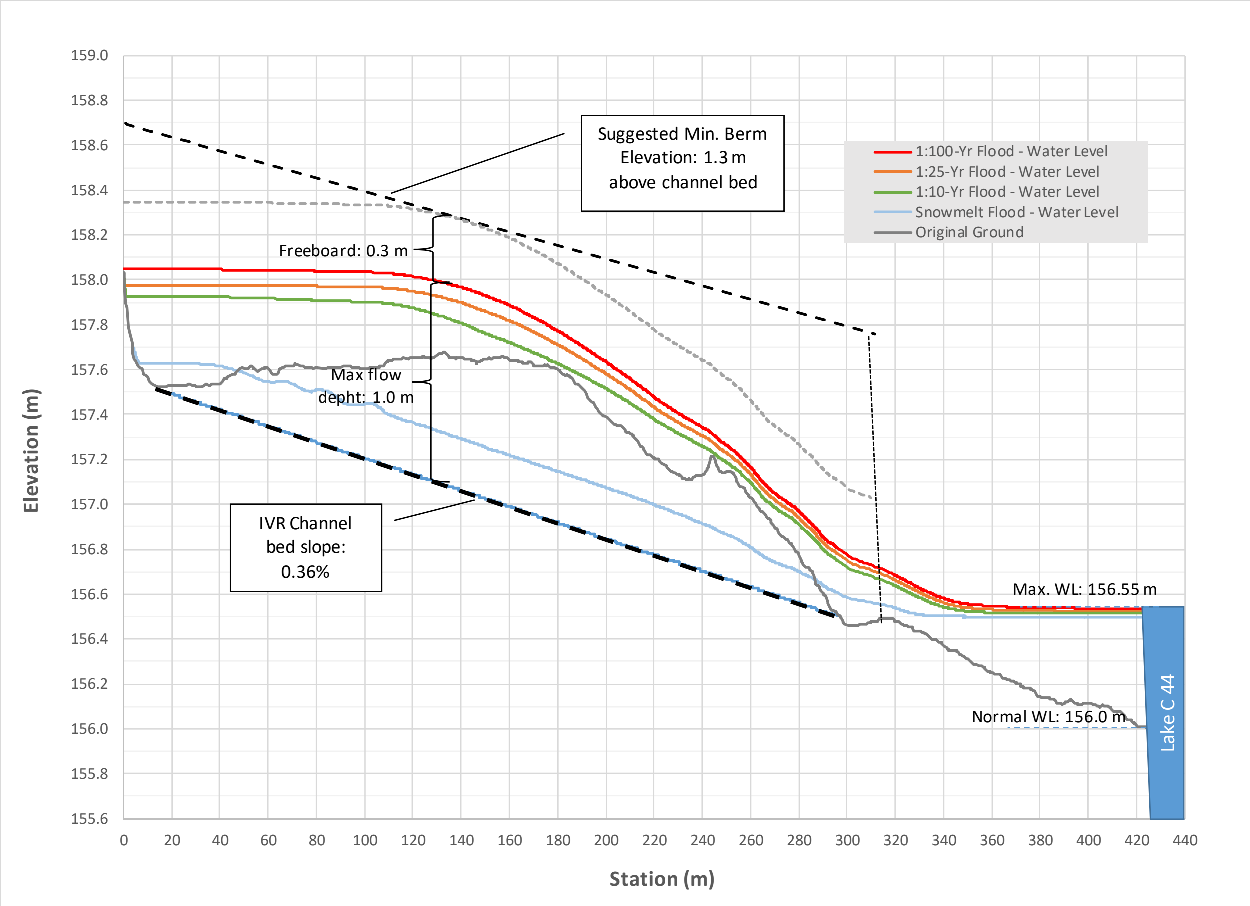

Figure 4-6: HEC-RAS Results

During a design flood event, non-contact water shall start flowing toward IVR Diversion. Once it reaches the diversion, it will be conveyed toward Lake C44 and eventually toward Nemo Lake. When the peak flood arrives into the channel, the water level in the channel shall gradually increase to a point where water shall start ponding temporarily onto the natural ground on the east side of the diversion. After a while, the water level in the diversion shall decrease and the ponded water shall drain out into the diversion. Figure 4-6 present snap-shot of the temporary ponding of water along the east side of the channel, during a design flood event (Figure 4-6 D). The figure also shows the flow depth results during the initial conditions (A), snowmelt rate of 0.3 m^3/s (B), as well as during 1:25-Yr Flood (C).

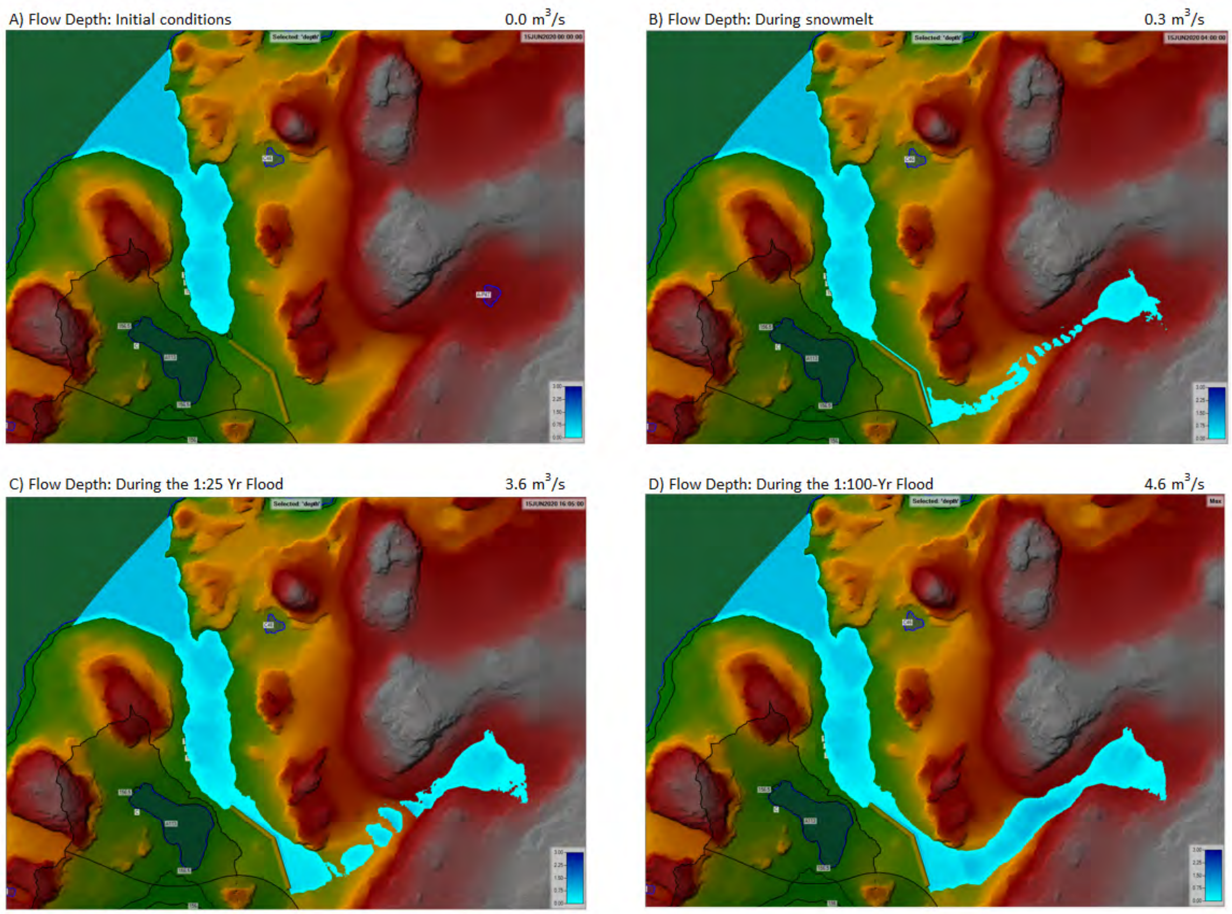

Figure 4-7: Water Depth During Flood Events in (m)

4.6 Erosion Protection

4.6.1 Rip-Rap Design

The IVR diversion will require erosion/scour protection based on rip-rap. The rip-rap D50 protection was estimated for channel based on different methodologies listed below:

- NEH (2007);
- USBR (1983);
- USACE (1994);
- MTQ (2006).

The maximum value of D50 obtained from these methodologies was adopted as the minimum size recommended for protection. This was based on the flow velocities obtained for the 1:100-Yr Flood. The minimum-recommended size of the rip-rap is 100 mm.

The channel design includes the outlet structure which essentially consist of extending the rip-rap layer to a certain distance to reduce the flows velocities. For the channel section at the outlet, the required minimum length (L) was estimated as a horizontal stilling basin following the methodology (USBR, 1983) for Type I basins. The results of the applied methodologies are presented in Table 4-4.

Table 4-4: Rip-Rap Protection at Outlet of Diversion

Protection D/S of Stilling Basin	
Riprap D50 (mm):	100
Layer Thickness 2D50 or min 300 (mm):	300
Suggested Rip-Rap Length(m) at the end of the channel	3.5

Details of the rip-rap in the diversion and at its outlet can be found in drawing 61-695-230-201 (refer to Appendix D).

All of the water flowing into the IVR Diversion enters perpendicularly from its east side. For erosion protection on the east side of the diversion, the HEC-RAS model results showed that the flow velocities just east of the diversion ranges between 0.5 m/s to 1.0 m/s approximately. Hence, it is recommended to extend the rip-rap on the east at least 1.0 m to minimize erosion at this location, as shown in Figure 4-5.

4.6.2 Erosion Protection Within Natural Watershed

Maximum flow velocities entering within the IVR Diversion, obtained from the HEC-RAS model, during the 1:100-Yr Flood are shown in Figure 4-6.

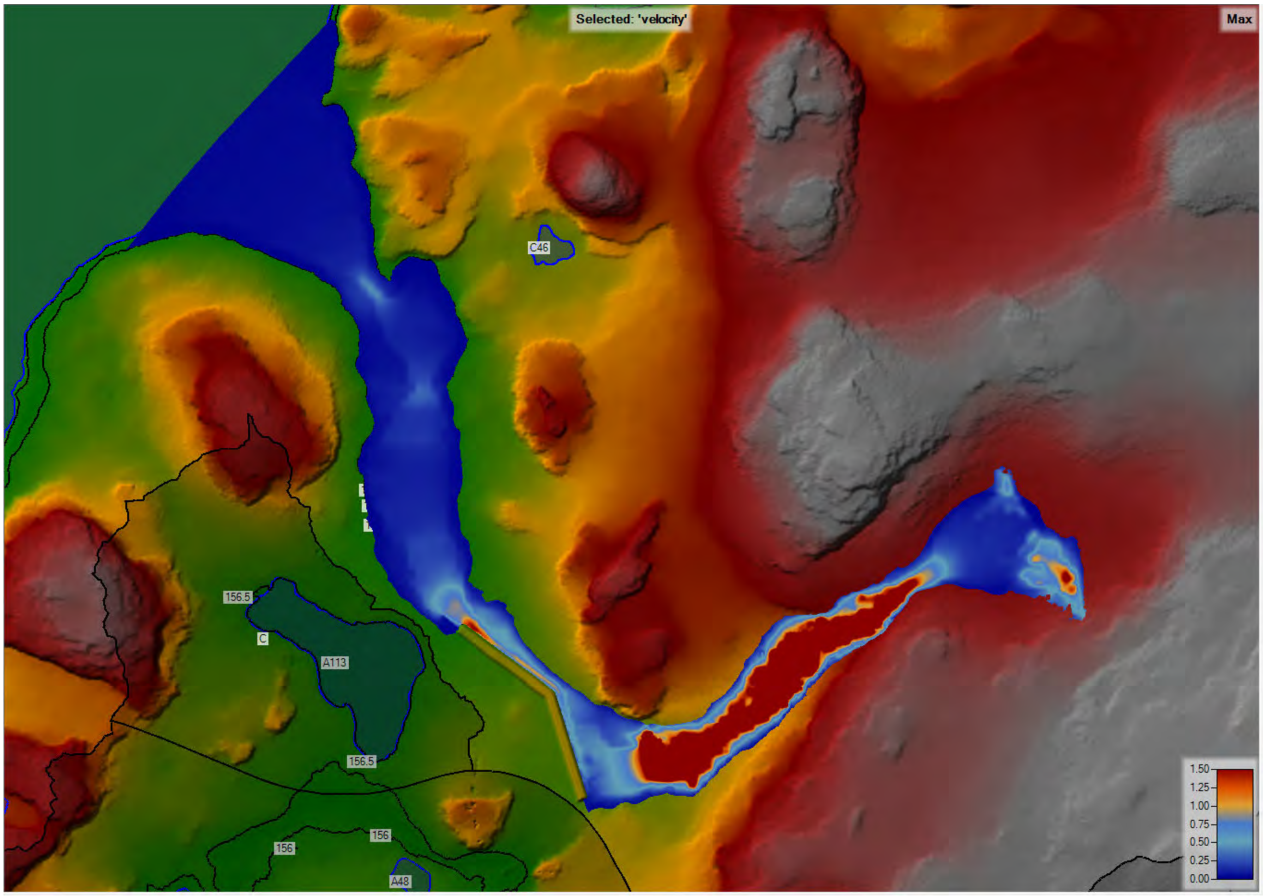

Figure 4-8: IVR Diversion - Flow Velocities

For the areas located a bit further to the east of the IVR Diversion, the HEC-RAS model shows velocities ranging approximately between 0.01 m/s to 0.75 m/s. For this range of velocities, substantial erosion or scouring of the natural ground is not expected. However, if erosion or scouring of the exposed soil is experienced during the operation of the IVR diversion, leading to higher total suspended solids (TSS) at the discharge of the IVR Diversion, additional erosion protection can be provided such as spreading non-erodible granular material (i.e. gravel of crashed rock material) in the affected area (Artic, 1981).

The model also shows velocities higher than 1.5 m/s at the natural areas upstream of the IVR Diversion, within the 68.2 ha-watershed. These higher flow velocities could lead to some natural soil erosion in the area. However, since the flow then decreases as it approaches the diversion, most of the sediments should settle out on the ground before it reaches the diversion. In the event that the erosion of this natural watershed leads to a higher Total Suspended Solids (TSS) at the discharge of the IVR diversion, different mitigation approach could be implemented, such as check berm and/or straw bales that shall help reduce flow velocity and control sediment load. This mitigation approach is commonly installed to control erosion along drainage ditches (Artic, 1981). These type of mitigation structures can place at the locations where the HEC-RAS model show high flow velocities. Temporary check berm should not be more than 0.6 m high. However, if the temporary check berm shall become a permanent structure, it can be built with coarse granular material up to 1.2 m (Artic, 1981).

5.0 Geotechnical Design

The geotechnical design of the IVR Diversion was developed based on the results from the hydrological and hydraulic modelling described in Section 4. Drawing 61-695-230-201 (668284-7000-4GDD-0001) provides details of the IVR Diversion design.

The general characteristic of the IVR Diversion are summarized in Table 5-1.

Table 5-1: General Characteristics of IVR Diversion

Parameters	Value
Typical cross-section shape	Trapezoid
Base width (m)	3.0
Side slope (east and west side)	3H:1V
Total length (m)	284 m approx.
Channel slope (%)	0.36%
Invert at inlet of channel (m)	157.51 m
Invert at outlet of channel (m)	156.5 m

The IVR Diversion consist of:

- An excavated area with a trapezoidal cross-section.
- A geotextile is placed at the bottom of the excavation to prevent fine sediment scouring.
- A 0.3 m thick rip-rap, size 100mm minimum, is placed above the geotextile to provide erosion protection to the diversion. The riprap should be composed of crushed rock from quarry and should be NPAG.
- On the east side of the IVR Diversion, the rip-rap is extended by 1.0 m horizontally to provide erosion protection of the embank considering that most of the flows enters perpendicularly into the IVR Diversion.
- On the west side of the IVR Diversion, an access road/pervious berm will be built out of Esker material consisting of gravel and sand with fine content. Table 5-2 presents the gradation limits of Esker. Appendix B contains the suggested particle size distribution of Esker that can be potential construction material. It is noted that Esker was the selected as construction material based on the assumption that there will be no traffic on this berm except for maintenance of the channel. The access road shall allow for inspection and maintenance of the IVR Diversion. Based on the test pit logs, the channel will be above the frozen ground. The purpose of this channel is to re-route the surface water and not the underground water. However, if the construction of the berm can be done

at the end of winter season the berm may serve as thermal layer and may contribute to the freeze back of the foundation. The performance of it shall be evaluated in a thermal analysis. The seepage flow underneath the channel to the IVR pit could be impacted.

Table 5-2: Esker Gradation

Particle size (mm)	Finer than (%)
300	100
76.2	91-100
25.4	80-90
12.7	60-80
4.76	20-70
0.425	0-20
0.075	0-10

- The outlet of the IVR Diversion is equipped with an energy dissipator to reduce the flow velocity exiting the structure, which will prevent scouring downstream of it. The energy dissipator is an excavated structure. A geotextile is placed at the bottom of the excavation to prevent fine sediment scouring. A 0.3 m thick of rip-rap, 100 mm minimum in size, is placed above the geotextile, providing erosion protection at the outlet.

6.0 Construction

6.1 Construction Timeline

The IVR Diversion is planned to be constructed between mid-August to September 2020. It is noted that there is a possibility that the channel invert will be sitting on ice-rich material or thaw softening layer and induce the deformation. The characterization of the foundation shall be performed during the construction to develop localized mitigation strategy.

6.2 General Methodology

The IVR Diversion shall be built by excavating the natural ground, followed by placement of the geotextile and rip-rap. Extra care shall be given during the Work to minimize as much as possible the disturbance of the tundra area outside of the structure limits. The access road shall also be progressively built on the west side of the structure. Further details on the installation methodology can be found in the installation specifications 668284-7000-4GEF-0001 (see Appendix C).

6.3 Material of Construction

Only rockfill and granular fill that is Non-Potential Acid Generating (NPAG) and non-metal leaching (NML) shall be used for the construction of the IVR Diversion. The NPAG/NML rock shall be sourced from waste rock material from Whale Tail Pit that has been tested in laboratory as described in Meadowbank Operational ARD-ML Sampling and Testing Plan – Whale Tail Pit Expansion Project, April 2019, version 5.

6.4 Environmental Consideration

During construction, the main environmental consideration is related to potential release of Total Suspended Solids (TSS) into the surrounding lakes. To minimize TSS reporting to the lakes during the construction of the IVR Diversion and its access road, any TSS containing water shall be pumped to the Whale Tail Attenuation Pond where it will further be treated at the WTP. Silt barriers curtain could also be installed around the excavation work and at the outlet of the structure.

7.0 Operation

7.1 Operation Procedure

The diversion of non-contact water from the 69.5 ha watershed to Lake C44, C43 and eventually Nemo Lake via the IVR Diversion occurs passively. The IVR Diversion is sloped to ensure gravity flow to Lake C44.

During the freshet, summer and fall seasons, visual inspection of the IVR Diversion shall be undertaken regularly to monitor for any significant accumulation of sediments or debris in the structure and any significant erosion of the structure's bed, embankments and outlet. If required, prior to next year's freshet, repairs to the IVR Diversion shall be undertaken and debris shall be removed. During the operation of this structure, water elevation shall be monitored.

Per the amended Water License 2AM-WTP1830, Schedule I, Tables 1 and 2, samples of the non-contact water existing the IVR Diversion shall be taken three times per calendar year (freshet, summer, fall) and analyzed for MDMER parameters (arsenic, copper, lead, nickel, zinc, total suspended solids, pH), sulphate, turbidity and total aluminum.

7.2 Environmental Consideration

Per the amended Water License 2AM-WTP1830, Part F, item 7, non-contact water discharged from structures such as the IVR Diversion shall not exceed the following effluent limits presented in Table 7-1.

Table 7-1: Maximum Allowable Water Quality Concentration at Discharge of the IVR Diversion

Parameters	Maximum Monthly Mean (MMM)	Short Term Maximum Grab Sample
Total Suspended Solids (TSS)	15.0 mg/l	30 mg/L

The source of TSS that could report to the discharge of the IVR Diversion can come from two sources:

1. Scouring and erosion of the excavated soil in the IVR Diversion structure.
2. Natural erosion of the exposed overburden from the natural watershed area being diverted.

To prevent scouring and erosion in the IVR Diversion, the geotextile is placed between the excavated ground and the rip-rap will reduce the amount of the TSS that may be generated from the excavated area. The rip-rap placed along the IVR Diversion and at its outlet is sized for the peak discharge flood and shall help prevent erosion and scouring in the structure.

As described in Section 4.5.2, different mitigation approaches could be implemented upstream of the IVR Diversion to reduce the load of sediments reporting to it. These mitigation measure include the installation of temporary or permanent ditch checks and the installation of straw bales. These structures shall help reduce the flow velocity and promote sediment settling. Straw bales could also be placed within the IVR Diversion to promote further sediment settling within the structure.

7.3 Maintenance

During operation, visual inspection of the IVR Diversion shall be undertaken regularly to monitor for any significant accumulation of sediments or debris in the structure and any significant erosion of the structure's bed, embankments, the berm and outlet. If detected, proper mitigation actions shall be undertaken to remedy the situation. In the case of erosion occurs within the berm, mitigation measure shall be implemented, for example installing geotextile and riprap on the downstream.

8.0 Materials Take-Off

Table 8-1 summarize the material take-off for the construction of the IVR Diversion.

Table 8-1 : Material Take-Off for the Construction of IVR Diversion

Material	Units	Value
Geotextile	m^2	3,450
Rip-Rap (100 mm)	m^3	1,000
Esker	m^3	4,300
Excavation	m^3	1,500
Clearing and grubbing	m^2	6,300

9.0 Conclusions

As part of the Amaruq Expansion project, the surface water management and geotechnical infrastructures include the IVR Diversion. The principal purpose of this infrastructure is to divert all the runoff (non-contact water) that will come from the North East watershed into Nemo Lake. This is part of the water-management strategy to minimize the treatment volumes of water at the treatment facility of the site. The watershed is located just north of the proposed IVR WRSF and east of the IVR Pit, and it has an approximate area of 68.2 ha.

The IVR Diversion design is summarized below:

- I-D-F Curves from Baker Lake Station A were adopted for the analysis since this is the closest climatological station to the Amaruq mine site. This station, ID No. 2300500, is operated by Environment Canada (EC) and has intensity-Duration-Frequency (IDF) relationships available with 22 years of data from 1987 to 2009. These data were updated in the last version of the IDF- CC Tool, version 4 (From Western University) with additional data up to the year 2016. This data was adopted for the design of the IVR Diversion
- The IVR Diversion will be discharging into to Nemo Lake’s areas, upstream of Lake A43. The proposed IVR Diversion system consists of trapezoidal section in combination with a perimeter berm that will be delimiting the west boundary of the system. The berm will part of the hydraulic section to provide the extra capacity for the system to properly convey the runoff volumes that will be resulted from extreme events (i.e. 1:100-Yr Flood).
- The IVR Diversion length will be approximately 284 m with a bed slope of approximately 0.36%. The invert inlet will have an elevation of approximately 157.5 m, while the outlet invert will have and elevation of approximately 165.5 m.
- A typical base width of 3.0 m wide with side slopes 3:1, and a minimum berm height of 1.3 m will provide sufficient capacity to convey the 1:100-Yr Flood.
- Rip-Rap - D50 of minimum 100 mm and minimum layer thickness of 300 mm will provide adequate protection for the diversion and berm.
- A horizontal section of 3.5 m of riprap length (D50 of 100 mm) will provide enough protection against erosion from the channel outflows. This layer will dissipate and reduce the flow velocities and to safely discharge into the natural ground downstream of the diversion.
- For erosion protection on the east side of the IVR Diversion, the model results show that velocities just east of it ranges between 0.5 m/s to 1.0 m/s, approximately; Therefore, the rip-rap shall be extended at least 1.0 m in order to provide erosion protection.
- The model shows velocities higher than 1.5 m/s at the natural areas upstream of the IVR Diversion, at the 68.2 ha-watershed. To reduce flow velocity and to control the sediment load, ditch checks or straw bales can serve this purpose.
- During operation, visual inspection of the IVR Diversion shall be undertaken regularly to monitor for any significant accumulation of sediments or debris in the structure and any significant erosion of the structure’s bed, embankments and outlet. If detected, proper mitigation actions shall be undertaken to remedy the situation.

10.0 Personnel

This report has been prepared by Mr. Holman Tellez and Mrs. Nina Quan and reviewed by Mr. Anh-Long Nguyen.

We trust that this report is to your satisfaction. Should you have any question, please do not hesitate on contacting me.

SNC LAVALIN INC.

Prepared by:

Holman Tellez

Digitally signed by Holman Tellez
DN: CN=Holman Tellez, O=SNC-Lavalin, OU=Mining & Metallurgy, E=Holman.Tellez2@snclavalin.com, C=CA
Reason: I am the author of this document
Location: your signing location here
Date: 2020-06-24 15:18:13
Foxit PhantomPDF Version: 9.6.0

Holman Tellez, P. Eng.,M. Eng
#PEO: 100016945
Hydrotechnical Engineer
Mining & Metallurgy

Prepared by:

Nina Quan, P.Eng.
#PEO: 100110574
Geotechnical Engineer
Mining & Metallurgy

PERMIT TO PRACTICE
SNC-LAVALIN INC.
Signature NAME
Date DATE
PERMIT NUMBER: P 260
The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
H.U. BABA
LICENSEE
2020-06-24
NT/NU

Hafeez Baba, P. Eng., Ph.D
#PEO: 100059870, #NAPEG: L3167
Project Manager
Mining & Metallurgy

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
2020-06-24
A.-L. NGUYEN
LICENSEE
NT/NU

Anh-Long Nguyen, P. Eng., M. Sc.
#OIQ: 122858, #NAPEG: L2756
Project Manager
Mining & Metallurgy

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Appendix A

Field Investigation Test Pit logs and Tamrock Borehole Summary

Meadowbank Gold Mine

Amaruq

2019 WMGI Ph. II Geotechnical investigation campaign

Test pits and Bedrock Soundings

January 2020

Version 00

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LIST OF FIGURES

1. DESCRIPTION OF THE INVESTIGATION CAMPAIGN

Investigation Period: 2019-SEP-28 to 2019-OCT-27

By: Bruno Lessard (Project Technician), Thomas Dahm (Geotechnical Technician), Marion Habersetzer (Geotechnical Engineer)

Contractors: Kivalliq Contractors Group KCG (Drilling and excavator operators)

During the 2019 WMGI Phase II Investigation Campaign, thirty-nine (39) test pits and twenty-three (23) bedrock soundings were performed in different areas to gather information on soil conditions and bedrock depth. The objective was to characterize the subsurface conditions in order to provide an input for the design of the WMGI Ph. II infrastructures. An AEM representative supervised the test pits excavation as well as the bedrock soundings, and took soil samples in the test pits for laboratory testing.

Appendix A presents the coordinates of the test pits and boreholes.
Appendix B presents the drilling daily reports.
Appendix C presents the drilling logs.
Appendix D presents the test pit logs.

The test pits were excavated and the boreholes drilled by Kivalliq Contractors Group (KCG). A Tamrock drill (Sandvik Dx800) with 4 inches rods was used for the bedrock sounding. A Komatsu 450 excavator was used for the test pits. More details on the installations sequence is described in Section 2.

2. SEQUENCE OF EVENTS

Test pits:

The works started on September 28, 2019, with the excavation of test pits with a Komatsu 450 excavator ***(Figure 1).***

- Five (5) test pits within the projected footprint of the IVR Dike (September 28);
- Eleven (11) test pits within the projected footprint of the IVR Diversion Channel (October 13 to 17);
- Twelve (12) test pits within the projected footprint of the IVR Waste Rock Storage Facility (October 13 to 16);
- Eleven (11) test pits within the projected footprint of the extension of the Whale Tail Waste Rock Storage Facility (October 17).

Test pits were excavated until refusal on either frozen soil or bedrock.

Soil samples were taken in each test pit when practically possible, for geotechnical characterization of each stratigraphic unit in a laboratory. The samples were placed in plastic bags and are stored in a seacan. Selected samples will be used for geotechnical laboratory testing at the request of the Designer.

Photographs were taken in each test pit, except IVRNR-TP1. Photographs taken during the test pits are filed in the following directory:
\\Cambfs01\groups\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- WMGI Ph-2 - 2019\9- Photo\1. Test Pits

Bedrock soundings:

Twenty-three (23) bedrock soundings were drilled on October 26 and 27, 2019 within the projected footprint of the IVR Dike with a Tamrock drill (see ***Figure 5***). Destructive drilling was performed through the overburden and bedrock to identify the depth of poor bedrock and sound bedrock, where present. The identification of interfaces was based on the driller's observation of the drilling speed variations as well as AEM's representative visual observation of cuttings. The holes were advanced at least 2 m into sound bedrock to confirm its presence. When boulders or ice layers were encountered in a hole, they were also noted on the drilling logs.

Some of the planned holes were not drilled due to access issues (electrical cables or pipes in the way). Additional bedrock soundings were planned within the projected footprint of the IVR Diversion Channel as well, however due to a mechanical break on the drill, these boreholes were put on hold until the drill is available again for bedrock investigation.

The daily reports are enclosed in Appendix B, while drilling logs are enclosed in Appendix C.

Photographs were taken during the bedrock sounding campaign, and are filed in the following directory:
\\Cambfs01\groups\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- WMGI Ph-2 - 2019\9- Photo\2. Tamrock Investigation

3. ENCOUNTERED CONDITIONS

During the campaign, the following conditions were observed.

- *General stratigraphy from test pits:*
    - o Soils are generally composed of a top layer of organic materials, underlain by a mix of various proportions of fine sand, gravel, cobbles and silt with boulders, brown to grey, moist to wet. The stratigraphy as well as frost and water inflow depths are summarized in Table 1 below.

Table 1: Summary of the Test Pits General Stratigraphy

Area	Depth of organic materials (m)	Depth of silt, sand, gravel, cobbles (m)	Presence of boulders	Depth of water inflow (m)	Depth of frost (m)
IVR Dike	0.12 to 0.14	> 1.40 (no bedrock encountered)	Yes in all test pits	0.14 to 1.50	1.40 to 2.10
IVR Diversion Channel	0.15 to 0.70	>1.30 to 2.00 (no bedrock encountered)	Yes in IVRDC-TP1, IVRDC-TP6 and IVRDC-TP7	0.20 to 1.90	0.25 to 2.10 (ice lenses in IVRDC-TP1 below organic materials)
IVR WRSF	0 to 0.40	1.40 to >2.80	Yes in IVRDC-TP7, IVRDC-TP8, IVRDC-TP10, IVRDC-TP11	0.30 to 2.00	0.30 to 2.60
WT WRSF extension	0.20 to 0.40	1.20 to 2.00	No	0.80 to 1.80	1.20 to 2.00

- Test pit walls in the IVR Dike area were unstable and soils were loose and sloughing into the excavation. In the other areas, test pits had stable walls, indicating dense or frozen soils.

- *Bedrock profile from Tamrock drilling:*
  - Poor bedrock depth ranges from 0 m to 8.2 m below ground surface.
  - Sound bedrock depth ranges from 3.7 m to 9.1 m below ground surface. The bedrock profile is quite variable over the IVR Dike footprint, as confirmed by subsequent drilling for instrumentation (see IVR Dike instrumentation report).
  - Bedrock joints or weathered zones were identified in some holes (see borehole logs in Appendix D).
  - The overburden encountered in the boreholes is generally brown sand and gravel. Poor bedrock is mostly brown. Sound bedrock is mostly grey rock with some reddish brown areas.

- *Presence of ice lenses in soils*:
  - Large ice lenses (up to 500 mm wide) were observed in IVRDC-TP1 (see ***Figure 3***), indicating ice-rich soils are present at least in the Diversion Channel area.
  - An ice layer was also identified in borehole #3 at 4.6 m depth.

- *Saturated soil conditions*:
  - Various quantities of water were present in some test pits in all sectors (see test pit logs in Appendix D). During the excavation of test pit IVRWRSF-TP11, the excavation

immediately flooded with water up to the surface (see ***Figure 4***). Visual observation of the stratigraphy and soil sampling were impossible. As a result, the test pit was only advanced to 0.40 m below the surface.

- Lots of water came out of hole #8 during drilling. The drill slightly sank into a water puddle while tracking between holes #14 and 8 (thin ice cover, see ***Figure 6***). This corresponds to the channel near lake A53 which was still unfrozen at the time of the campaign. No other wet area was encountered during drilling.

Figure 1: Test pit excavation (IVR-TP2, 2019-09-28).

Figure 2: Soil sampling in a test pit (IVR-TP2, 2019-09-28).

Figure 3: Presence of ice lenses indicating ice-rich soil (IVRDC-TP1, 2019-10-13).

Figure 4: Flooded test pit (IVRWRSF-TP11, 2019-10-16).

Figure 5: Bedrock sounding with a Tamrock drill (borehole #19, 2019-10-27).

Figure 6: Water in the tracks of the drill between boreholes #14 and 8 (2019-10-27).

APPENDIX A – TEST PITS AND BOREHOLES COORDINATES

		Easting X (m)	Northing Y (m)	Elevation Z (m)
Diversion Channel	IVRDC-TP1	607555.504	7256781.122	159.473
	IVRDC-TP2	607596.698	7256824.051	159.131
	IVRDC-TP3	607617.592	7256924.919	159.150
	IVRDC-TP4	607521.168	7256962.900	157.861
	IVRDC-TP5	607467.134	7256988.561	157.981
	IVRDC-TP6	607654.014	7256636.001	165.010
	IVRDC-TP7	607597.996	7256716.009	161.590
	IVRDC-TP8	607542.990	7256907.002	157.859
	IVRNR-TP1	607074.384	7256916.095	157.098
	IVRNR-TP2	607168.937	7256917.451	156.730
	IVRNR-TP3	607244.437	7256904.180	156.853
IVR Dike	IVR-TP1	607840.238	7255567.544	164.79
	IVR-TP2	607867.61	7255546.262	163.242
	IVR-TP3	608077.475	7255431.169	164.193
	IVR-TP4	608097.439	7255432.718	164.266
	IVR-TP5	608156.982	7255439.415	164.171
IVR WRSF	IVRWRSF-TP1	608704.441	7256797.726	174.603
	IVRWRSF-TP2	608652.366	7256847.644	174.931
	IVRWRSF-TP3	608546.868	7256851.902	174.021
	IVRWRSF-TP4	608445.138	7256829.352	179.412
	IVRWRSF-TP5	608371.557	7256809.12	180.319
	IVRWRSF-TP6	608180.704	7256750.575	180.386
	IVRWRSF-TP7	608009.959	7256652.482	174.49
	IVRWRSF-TP8	607849.577	7256566.446	174.682
	IVRWRSF-TP9	607739.059	7256451.005	166.333
	IVRWRSF-TP10	607664.088	7256272.543	161.814
	IVRWRSF-TP11	607691.124	7256111.005	162.3
	IVRWRSF-TP12	607870.392	7255949.188	165.391
WT WRSF	WTWRSF-TP1	606041.502	7256291.834	169.148
	WTWRSF-TP3	606163.192	7256327.14	165.358
	WTWRSF-TP5	606301.659	7256378.535	164.728
	WTWRSF-TP7	606447.282	7256376.625	164.295
	WTWRSF-TP9	606435.376	7256142.658	163.802
	WTWRSF-TP10	606418.313	7255943.839	164.177
	WTWRSF-TP11	606343.732	7255780.851	163.073
	WTWRSF-TP12	606178.06	7255654.898	159.996
	WTWRSF-TP13	606072.68	7255481.035	159.281
	WTWRSF-TP14	605960.558	7255467.581	161.061
	WTWRSF-TP15	605859.992	7255626.948	164.515
	WTWRSF-TP2	606096.1026	7256296.147	
	WTWRSF-TP4	606233.2	7256357.375	
	WTWRSF-TP6	606304.4	7256379.64	
	WTWRSF-TP8	606464.9	7256339.972	

cancelled by SNC

	Borehole #	Easting X (m)	Northing Y (m)	Elevation Z (m)
IVR Dike	1	608266.521	7255452.766	165.501
	2	608216.941	7255446.886	164.922
	3	608167.369	7255441.462	164.541
	4	608117.892	7255434.941	164.447
	5	608067.916	7255432.404	164.162
	6	608023.881	7255455.951	163.468
	7	607980.342	7255481.07	162.572
	8	607937.265	7255506.295	162.083
	9	607893.619	7255531.11	162.563
	11	607806.76	7255663.199	165.717
	13	607878.423	7255505.661	162.593
	14	607889.033	7255456.753	162.134
	15	608008.824	7255430.107	163.451
	16	608075.609	7255462.016	163.974
	17	608114.677	7255465.261	164.039
	18	608164.093	7255470.362	164.235
	19	608213.903	7255475.609	164.462
	20	608263.798	7255480.878	165.105
	21	608270.452	7255421.738	166.005
	22	608220.691	7255416.439	164.768
	23	608171.146	7255410.562	164.437
	24	608120.622	7255405.454	164.569
	25	608060.352	7255404.211	164.442
	26	607965.487	7255454.852	162.4
	27	607909.017	7255557.383	162.381
	28	607865.466	7255582.376	164.059
	29	607847.87	7255604.198	164.575
	30	607851.895	7255627.255	164.537
Diversion Channel	DC1	607570.000	7256950.000	
	DC2	607490.000	7256975.000	
	DC3	607630.000	7256920.000	
	DC4	607525.000	7256895.000	

(grey)	borehole cancelled (access issues with pipes or rockfill pad)
(yellow)	borehole to do

APPENDIX B – TEST PIT LOGS

INSTRUMENTATION CAMPAIGN - FIELD REPORT
ENGINEERING DEPARTMENT
AGNICO-EAGLE MINES AMARUQ PROJECT

AGNICO EAGLE MEADOWBANK

Campaign:	**Bedrock Investigation- IVR Dike/DC (TAMROCK)**	**Campaign start date:**	2019-10-26
		Campaign end date:	TBD
JHA:	MBK-ENG-JHA -Grouting and instrumentation of Drill holes		
Contractors:	☑ SANA (FGL/TCG)	☐ GKM	
	☐ Orbit Garant	☐ SNC	
	☐ Other:	***Driller : Dominique Drolet***	

Date : **26-Oct-2018** **BY: Marion Habersetzer**

Line Numbers # :	-	
Number of drilled holes	**10**	
Drilling size :	4" (w/ 12' rods)	
Area :	IVR Dike	
Cum. Drilled vs Total/Area:	**10/33 holes**	
Depth Drilled (end of Shift):	-	
End Of Hole (Final depth):	-	

Equipments : Tamrock #9932 (SANA) **Drill time Charged (hrs): 3**
615930000.2035.130

☑ Mob. or Drill move ☑ Down Time : 0.25 hour ☐ Others : .

Water Level: no water **Time:** **Clear Hose Reels used:** m

Work activity : Weather: -2 degrees, overcast

Driller & Drill arrived at drilling area at 14:30. Drill had to go around the fuel farm to avoid passing over pipes and cables.
Started drilling on DH # A at 14:35.
Maintenance at 16:40 to grease the rods (-0.25 hr).
Stopped drilling at 17:40, drill tracked from DH# 32 to side of the road.

Drill Holes done (#): **A, B, C, D , E, 15, 22, 23, 24, 25**
(A to E will be re-ID, due to survey not writing the numbers on stakes)

Injected Grout (Liters): -

Installed Instruments Info -
(Number, Depth, etc.)

Comments:

	Date :	27-Oct-2018	BY: Marion Habersetzer
Line Numbers # :	-		
Number of drilled holes	**14**		
Drilling size :	4" (w/ 12' rods)		
Area :	IVR Dike, DC		
Cum. Drilled vs Total/Area:	**24/30 holes**		
Depth Drilled (end of Shift):	-		
End Of Hole (Final depth):	-		

Equipments : Tamrock #9932 (SANA) **Drill time Charged (hrs): 5.5**

615930000.2035.130

☑ Mob. or Drill move ☑ Down Time : 2 hours ☐ Others : ____________.

Water Level: variable **Time:** **Clear Hose Reels used:** m

Work activity : Weather: -10 degrees, overcast and windy

Driller & Drill arrived at IVR Dike drilling area at 7:30. Walkaround inspection.
Had to wait for fuel truck until 8:00.
Mechanical issue at DH #9 (-0.25 hr).
Started drilling on DH # 27 at 8:10.
Between DH # 14 and 8, drill slightly sank in a water pond under the snow. No issue to pass.
Finished IVR Dike area at 12:00. No more survey stakes reachable (2 beyond a pipe).
Checked Diversion Channel (DC) with drillers. Drill arrived at 14:55.
Started drilling on DH # DC4 at 15:00. Drill broke down at 15:10.
Mechanics inspected the drill (-1.75 hr). The mast is broken and extensive repairs are required.
Drill tracked from DH# DC4 to the garage at 17:00.

Drill Holes done (#): 6, 7, 8, 9, 13, 14, 16, 17, 18, 19, 20, 26, 27, 28

Injected Grout (Liters):

Installed Instruments Info :
(Number, Depth, etc.)

Comments:
Campaign on hold until the drill is fixed and available.

APPENDIX C – DRILLING DAILY REPORTS

AgnicoEagle - Amaruq

Bedrock Investigation 2019 - IVR Dike

Drill: # 9932 (Sandvik Dx800) ***Logged by:*** Marion Habersetzer (AEM)

Driller: Dominique Drolet (SANA) ***DH Size:*** 4" w/ 12' rods

* Elevations surveyed may be above the ground or lake ice surfaces (due to the snow during the survey)

** The depths are measured for the ground or lake ice surfaces.

Hole ID	Easting	Norting	Elevation*	Water in hole	Water in hole	Top Ice Thickness	Top Ice Thickness	Thickness of Overburden		** Depth of POOR Bedrock		** Depth of GOOD bedrock		End of hole		** Depth of ICE		ICE Thickness	Date and time	Details / Comments
ID from Surveyors	(m)	(m)	(masl)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(m)		
1	608267	7255453	165.50					24.0	**7.3**			24.0	**7.3**	30.0	**9.1**				26/Oct/19 14:35	First DH of the campaign. Bedrock seems uniform in strength.
2	608217	7255447	164.92					26.0	**7.9**	26.0	**7.9**			30.0	**9.1**				26/Oct/19 15:05	Bouler at 3.7 m (about 2 m in vertical thickness). Drilling speed highly variable in bedrock, indicating heterogeneity, probably poor bedrock only.
3	608167	7255441	164.54					26.0	**7.9**	26.0	**7.9**			30.0	**9.1**	15.0	**4.6**	**1.5**	26/Oct/19 15:25	Ice rich soil layer at 4.6 m. Top 1 m of bedrock is reddish brown while the rest is grey.
4	608118	7255435	164.45							0.0	**0.0**			24.0	**7.3**				26/Oct/19 15:45	Drillers says that everything felt like poor bedrock, from the surface. Soft layer at 4 m depth, 0.5 m thickness.
5	608068	7255432	164.16					13.0	**4.0**			13.0	**4.0**	18.0	**5.5**				26/Oct/19 16:05	
6	608024	7255456	163.47					25.0	**7.6**	25.0	**7.6**			31.0	**9.4**				27/Oct/19 10:40	
7	607980	7255481	162.57					26.0	**7.9**	26.0	**7.9**	30.0	**9.1**	32.0	**9.8**				27/Oct/19 10:05	
8	607937	7255506	162.08	0.0	**0.0**			19.0	**5.8**			19.0	**5.8**	25.0	**7.6**				27/Oct/19 9:50	Lots of water coming out fo hole from surface. Water flowing out of puddle 10 m from hole during drilling.
9	607894	7255531	162.56					18.0	**5.5**	18.0	**5.5**	20.0	**6.1**	25.0	**7.6**				27/Oct/19 8:40	Between 6.7 and 7 m: poor bedrock layer.
13	607878	7255506	162.59					21.0	**6.4**			21.0	**6.4**	28.0	**8.5**				27/Oct/19 9:05	Poor bedrock layer/joint at 7.6 m depth.
14	607889	7255457	162.13	14.0	**4.3**			17.0	**5.2**			17.0	**5.2**	25.0	**7.6**				27/Oct/19 9:25	Between 6.1 and 6.4 m: poor bedrock layer.
15	608009	7255430	163.45					23.0	**7.0**			23.0	**7.0**	30.0	**9.1**				26/Oct/19 16:20	Yellowish soil layer at 5.5 m depth, 1 m thickness.
16	608076	7255462	163.97					15.0	**4.6**	15.0	**4.6**			21.0	**6.4**				27/Oct/19 10:55	
17	608115	7255465	164.04					12.0	**3.7**			12.0	**3.7**	18.0	**5.5**				27/Oct/19 11:05	
18	608164	7255470	164.24					27.0	**8.2**	27.0	**8.2**			36.0	**11.0**				27/Oct/19 11:15	Reddish brown rock.
19	608214	7255476	164.46					18.0	**5.5**	18.0	**5.5**	24.0	**7.3**	27.0	**8.2**				27/Oct/19 11:30	Possible boulder at 3.7 m depth.
20	608264	7255481	165.11					25.0	**7.6**			25.0	**7.6**	31.0	**9.4**				27/Oct/19 11:45	Mud coming out at 5.5 m depth.
22	608221	7255416	164.77					25.0	**7.6**			25.0	**7.6**	30.0	**9.1**				26/Oct/19 17:25	
23	608171	7255411	164.44					23.0	**7.0**			23.0	**7.0**	30.0	**9.1**				26/Oct/19 17:05	
24	608121	7255405	164.57					15.0	**4.6**			15.0	**4.6**	21.0	**6.4**				26/Oct/19 17:00	
25	608060	7255404	164.44					16.0	**4.9**			16.0	**4.9**	26.0	**7.9**				26/Oct/19 16:35	10 min down time at 16:40 to grease the rods. Probable joint in bedrock at 7.3 m depth (weaker zone).
27	607909	7255557	162.38					12.0	**3.7**			12.0	**3.7**	18.0	**5.5**				27/Oct/19 8:10	Very fine cuttings, brown.
28	607865	7255582	164.06					18.0	**5.5**	18.0	**5.5**	21.0	**6.4**	25.0	**7.6**				27/Oct/19 8:25	

Notes:

overburden: brown sand and gravel

good bedrock: mostly grey rock with some reddish areas

poor bedrock: mostly brown

APPENDIX D – DRILLING LOGS

AMQ - IVR Dike Test Pits Description
Performed on 9/28/2019

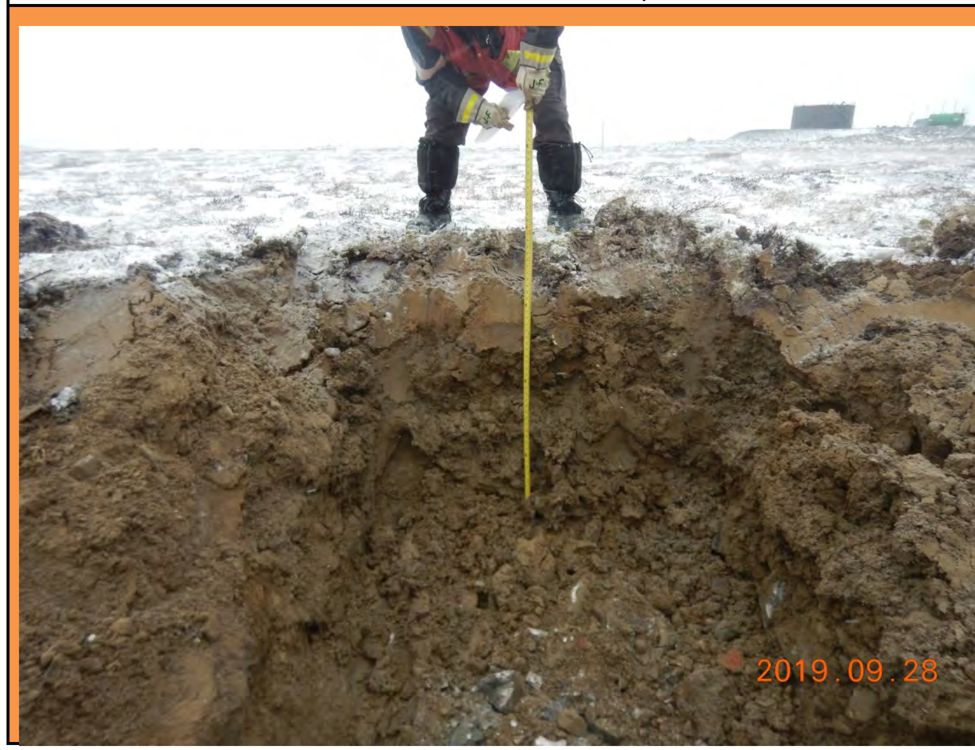
By B. Lessard & J-F. Beland Reviewed by: M. Habersetzer

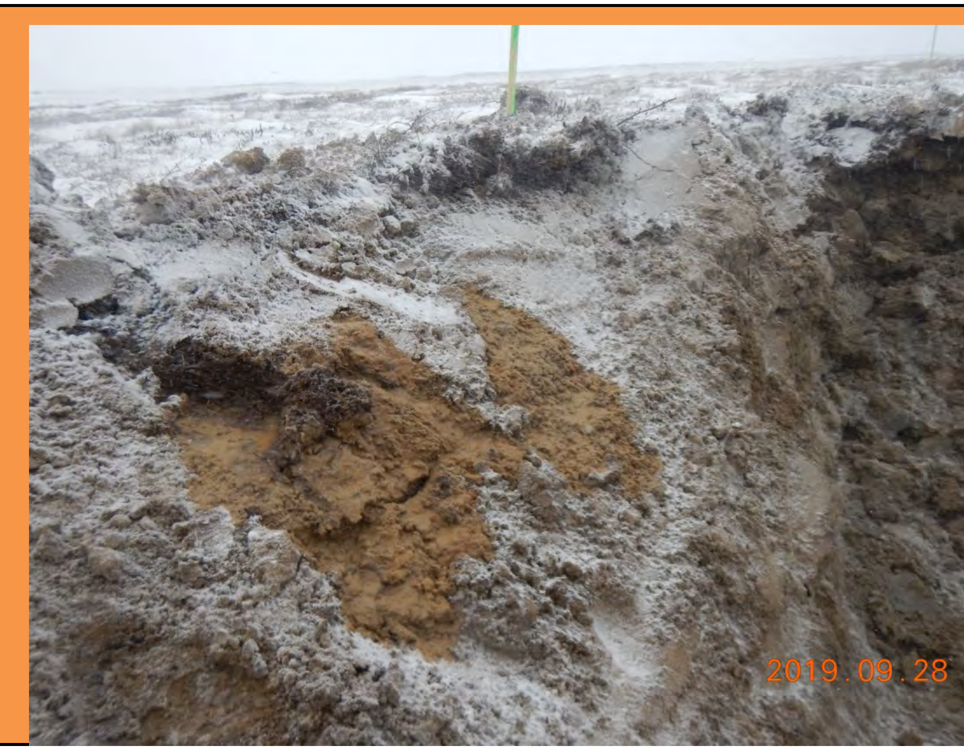
All pictures are in ***P:\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- IVR WRSF Geotech Investigation (WMGI Ph-2) - Sept 2019\9- Photo\2019-9-28 AMQ IVR Dike Test Pits***

IVR-TP1				
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607840.238,7255567.544,164.79**	
0.00	to	0.14	Organic materials	Comments :
0.14	to	1.50	Fine beige Sand, Gravel, Cobbles and Boulders	Mix of fine sand w/ pebbles and cobbles. Some boulders. Water content and unstable soil
1.50	to	1.55	Fine gray Sand, Gravel, Frozen	Frozen at the Gray Sand transition
				2 samples: A (0.5 m), B (1.5 m)
Depth of Test Pit :		**1.55**	Refusal (frozen soil)	
Water :		1.50	Slight water inflow	

IVR-TP2				
Depth (m)			Surveyed Coordinates (X,Y,Z) : 607867.61,7255546.262,163.242	
0.00	to	0.12	Organic materials	Comments :
0.12	to	1.40	Fine beige Sand, Gravel, Cobbles and Boulders	Mix of fine sand w/ pebbles and cobbles. Some boulders. Water content and unstable soil
				2 samples: A (0.5 m), B (1.4 m)
Depth of Test Pit :		**1.40**	Refusal (bedrock or frozen soil)	Refusal seems to be a mix of Bedrock and Frozen soil.
Water :		1.40	Slight water inflow	

IVR-TP3				
Depth (m)			Surveyed Coordinates (X,Y,Z) : 608077.475,7255431.169,164.193	
0.00	to	0.14	Organic materials	Comments : The test pit is on a flat area (wetland, low point).
0.14	to	1.40	Fine beige Sand, Gravel, Cobbles and Boulders	Mix of fine sand w/ pebbles and cobbles. Some boulders. Water content and unstable soil
				Water flow was coming out mostly under the organic layer and 0.50m depth with higher water content.
Depth of Test Pit :		**1.40**	Refusal (frozen soil)	3 samples: A and C (0.5 m, taken on opposite walls), B (1.4 m)
Water :		0.14	Mostly from surface	





IVR-TP4				
Depth (m)			Surveyed Coordinates (X,Y,Z) : 608097.439,7255432.718,164.266	
0.00	to	0.14	Organic materials	Comments : The test pit is on a flat area (wetland, low point).
0.14	to	1.45	Fine beige sand w/ Gravel, Cobbles and stones.	Mix of fine sand w/ pebbles and cobbles. Some boulders. Water content and unstable soil
				2 samples: A (0.5 m), B (1.45 m)
				Water flow was coming out mostly under the organic layer.
Depth of Test Pit :		**1.45**	Refusal (frozen soil)	
Water :		0.14	Mostly from surface	

IVR-TP5				
Depth (m)			Surveyed Coordinates (X,Y,Z) : 608156.982,7255439.415,164.171	
0.00	to	0.14	Organic materials	Comments : The test pit is on a flat area (wetland, low point). Water ponding on surface everywhere around.
0.14	to	2.00	Fine beige sand w/ Gravel, Cobbles and boulders.	Mix of fine sand w/ pebbles and cobbles. Some boulders. Water content and unstable soil
2.00	to	2.10	Fine gray sand w/ Grave and Cobbles.	2 samples: A (0.7 m), B (2.1 m)
				Water flow was coming out mostly under organic layer and from saturated soil (0.14m to 2.00m depth).
Depth of Test Pit :		**2.10**	Refusal (frozen soil)	The Water content was very high and unstable soil, no sample was taken from inside. Sample was taken from\
Water :	YES	0.14		shovel bucket at 0.70m and from bottom 2.10m.

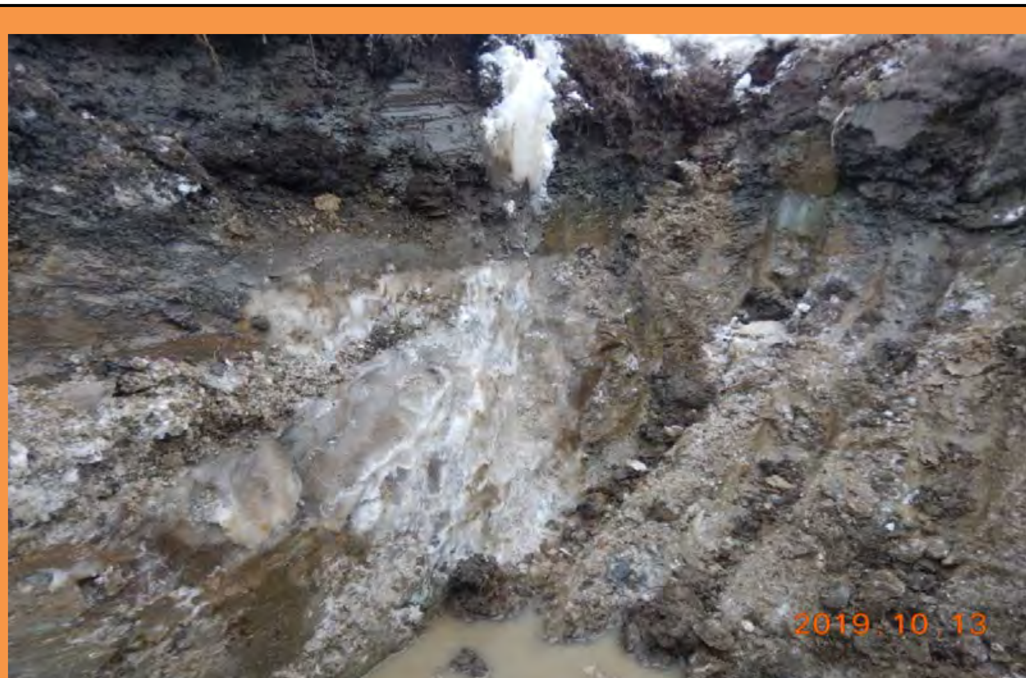
AMQ - IVR DC Test Pits
Performed on 13/10/2019, 16/10/2019 and 17/10/2019

Reviewed by: M. Habersetzer

All pictures are in: P:\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- IVR WRSF Geotech Investigation (WMGI Ph-2) - Sept 2019\9- Photo\IVR DC Test Pit

IVRDC-TP1 by B. Lessard

Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607555.504,7256781.122,159.473**	
0.00	to	0.25	Organic materials	Comments :
0.25	to	1.40	Sand and cobbles, grey to brown, frozen, presence of blocks and ice lenses.	Large ice lenses (up to 500 mm) in the soils
1.40	to			2 samples: A (0.7 m), B (1.4 m)
Depth of Test Pit :		**1.40**	Refusal frozen soil)	
Water :		1.40	Slight water inflow	



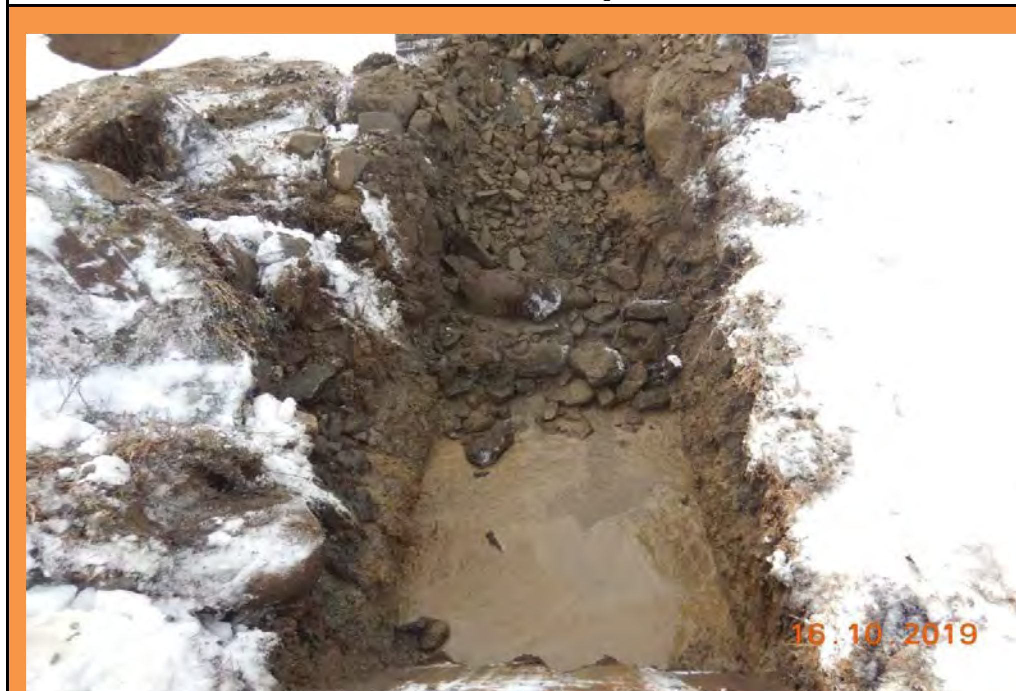
IVRDC-TP2			by B. Lessard
Depth (m)			Surveyed Coordinates (X,Y,Z) : 607596.698,7256824.051,159.131
0.00	to	0.15	Organic materials
0.15	to	1.70	Sand and gravel with presence of coarer gravel pockets, grey, wet
Depth of Test Pit :		**1.70**	Refusal (frozen soil)
Water :		1.60	Slight water inflow

Comments :

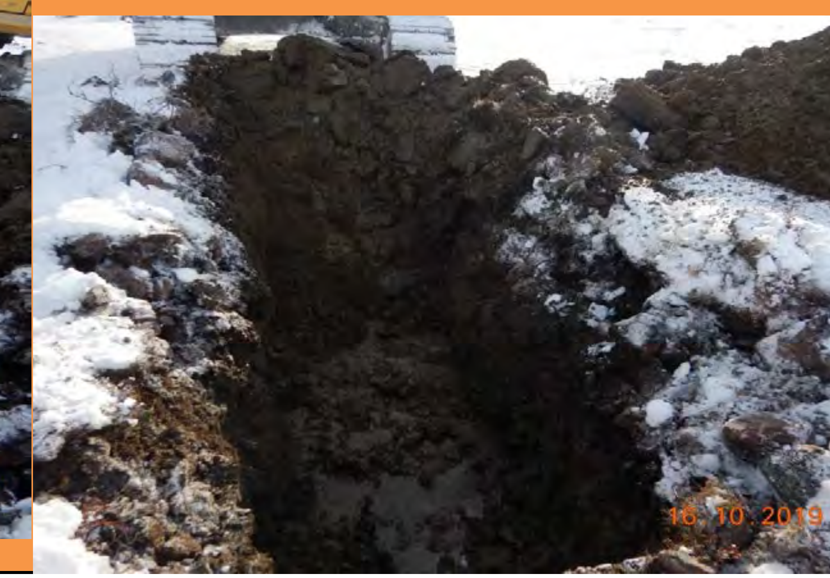
Wet walls and water coming into the excavation

2 samples: A (0.5 m), B (1.7 m)

IVRDC-TP3			by T. Dahm	
Depth (m)			Surveyed Coordinates (X,Y,Z) : 607617.592,7256924.919,159.15	
0.00	to	0.20	Organic materials, very dark in colour	Comments :
0.20	to	0.80	Brown sand and gravel with cobbles, wet	Water was coming in just under the organics, large amounts. Hard to continue this hole and get good samples
0.80	to	1.40	Brown sand and gravel with cobbles, wet	You can see by the pics it was very rocky material with minimal fines
				1 sample: 1.0 m
Depth of Test Pit :		**1.40**	Refusal (bedrock or frozen soil)	
Water :		0.20	large inflow	



IVRDC-TP4			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607521.168,7256962.9,157.861**	
0.00	to	0.60	Organic materials, thick and black on top	Comments :
0.60	to	2.10	Brown, Wet sand and gravel with cobbles, tr. Silt	Lots of water inflow when opening up the hole. Water was coming from the top area
2.10	to			
Depth of Test Pit :		**2.10**	Refusal (bedrock or frozen soil)	
Water :		0.00	slight water inflow from the surface	

IVRDC-TP5			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607467.134,7256988.561,157.981**	
0.00	to	0.40	Organic materials, very thick and wet and dark	Comments :
0.40	to	1.30	Brown sand and gravel with silt, moist	there is a finer layer of material then it has more stones and cobbles in it and less fines
1.30	to	2.00	Brown sand and gravel with cobbles, trace silt, moist	3 samples: 0.5 m, 1.0 m, 2.0 m
Depth of Test Pit :		**2.00**	Refusal (bedrock or frozen soil)	
Water :		N/A		

IVRDC-TP6			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) :**	**607654.014, 7256636.001, 165.01**
0.00	to	0.50	Organic materials with boulders	Comments : You can see the large influx of water when excavating. Large amount of organics and boulders during the beginning of the excavation.
0.50	to	1.30	brown silty sand and gravel, wet	
1.30	to			
Depth of Test Pit :		**1.30**	Refusal (bedrock or frozen soil)	
Water :		0.50	large water inflow	

IVRDC-TP7			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) :**	**607597.996, 7256716.009, 161.59**
0.00	to	0.70	Organic materials and cobbles plus boulders	Comments :
0.70	to	1.00	Grey sand and gravel with silt, wet	Water was incoming from the contat point between the tundra and soils and made the hole wet
1.00	to	1.30	Grey sand and gravel with silt, wet	Used shovel bucket to confirm depth. Scooped bucket and then grabbed samples.
Depth of Test Pit :		**1.30**	Refusal (bedrock or frozen soil)	
Water :		0.70	Significant water inflow	

IVRDC-TP8			by T. Dahm	
Depth (m)			Surveyed Coordinates (X,Y,Z) :	607542.99, 7256907.002, 157.859
0.00	to	0.60	Organic materials with cobbles	Comments :
0.60	to	1.00	grey sand and gravel with silt, moist	3 samples: 0.5 m, 1.0 m, 1.5 m
1.00	to	1.30	grey sand and gravel with cobbles some silt, moist	
Depth of Test Pit :		**1.30**	Refusal (bedrock or frozen soil)	
Water :		N/A		

IVRNR-TP1			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607074.384,7256916.095,157.098**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.50	brown sand and gravel with silt, wet	No pics were recorded on the camera
0.50	to	1.20	brown silty sand and gravel, wet	3 samples: 0.5 m, 0.8 m, 1.5 m
1.20	to	2.00	brown sand and gravel with cobbles, some silt, wet	
Depth of Test Pit :		**2.00**	Refusal (bedrock or frozen soil)	
Water :		N/A		

No Pics

IVRNR-TP2			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607168.937,7256917.451,156.73**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	1.10	brown silty sand and gravel, moist	3 samples: 0.8 m, 1.2 m, 1.8 m
1.10	to	1.90	brown silty sand, trace gravel, moist	
Depth of Test Pit :		**1.90**	Refusal (bedrock or frozen soil)	
Water :		N/A		

IVRNR-TP3			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607244.437,7256904.18,156.853**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.80	Brown sand and gravel with silt, moist	Water started to come in at the end of the hole. Not too much came in
0.80	to	1.90	brown sand and gravle with cobbles, some silt, moist	3 samples: 0.5 m, 1.0 m, 1.7 m
Depth of Test Pit :		**1.90**	Refusal (bedrock or frozen soil)	
Water :		1.90	slight water inflow	

AMQ - IVR WRSF Test Pits
Performed on 13/10/2019 and 16/10/2019

Reviewed by: M. Habersetzer

All pictures are in: P:\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- IVR WRSF Geotech Investigation (WMGI Ph-2) - Sept 2019\9- Photo\IVR WRSF Test pit

IVRWRSF-TP1			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) :**	**608704.441,7256797.726,174.603**
0.00	to	0.30	Organic materials	Comments :
0.30	to	1.30	Brown Silty sand and gravel, moist	you can see where the material begins to change with larger particles at 1.3m
1.30	to	1.80	Brown sand and gravel with cobbles, trace silt, moist	1 sample: 1.0 m
Depth of Test Pit :		**1.80**	Refusal (frozen soil)	
Water :		N/A		

IVRWRSF-TP2			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608652.366,7256847.644,174.931**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	1.10	Brown sand and gravel, some silt, moist	Some inflow of water was present at the end of the hole. Coming in from the side.
1.10	to	1.90	Brown sand and gravel with cobbles, some silt, moist	1 sample: 0.5 m
Depth of Test Pit :		**1.90**	Refusal (frozen soil)	
Water :				

IVRWRSF-TP3			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608546.868,7256851.902,174.021**	
0.00	to	0.30	organic materials	Comments :
0.30	to	1.30	brown sand and gravel, moist	Sand and gravel throughout the hole and water inflow at 2m
1.30	to	2.60	brown sand and gravel with cobbles, moist	3 samples: 0.8 m, 1.2 m, 1.7 m
Depth of Test Pit :		**2.60**	Refusal (frozen soil)	
Water :		2.00	water coming into excavation	

IVRWRSF-TP4 by T. Dahm

Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608445.138,7256829.352,179.412**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	1.60	Light brown sand and gravel with silt, moist	End of hole was filled with big rocks and cobbles but overall was sand and gravel mix
1.60	to	2.20	Brown sand and gravel with cobbles, some silt, moist	
Depth of Test Pit :		**2.20**	Refusal (frozen soil)	
Water :		N/A		

IVRWRSF-TP5			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608371.557,7256809.12,180.319**	
0.00	to	0.30	Organic materials	<u>Comments</u> :
0.30	to	1.60	Grey sand and gravel, moist	Appeared to be some moisture in the hole but no visible water present.
1.60	to	2.10	brown sand and gravel, trace silt with cobbles, moist	1 sample: 1.0 m
Depth of Test Pit :		**2.10**	Refusal (frozen soil)	
Water :		N/A		

IVRWRSF-TP6			by B. Lessard
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608180.704,7256750.575,180.386**
0.00	to	0.20	Organic topsoil
0.20	to	1.70	Coarse gravel with pockets of fine sand, grey to brown, moist.
1.70	to		bedrock
Depth of Test Pit :		**1.70**	Refusal (bedrock)
Water :		N/A	

Comments :

Bedrock outcropping at 1.2 m on one side of the excavation.

3 samples: A (0.5 m), B (1.0 m), C (1.7 m)

IVRWRSF-TP7			by B. Lessard	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 608009.959,7256652.482,174.49**	
0.00	to	0.50	Boulders and cobbles, grey to brown, moist.	Comments :
0.50	to	1.50	Coarse gravel, brown, moist.	Many boulders at the surface.
1.50	to	2.20	Fine sand and gravel, brown, moist to wet.	3 samples: A (1.0 m), B (1.5 m), C (2.0 m)
Depth of Test Pit :		**2.20**	Refusal (frozen soil)	
Water :		1.60	water coming into excavation	

IVRWRSF-TP8			by B. Lessard	
Depth (m)			Surveyed Coordinates (X,Y,Z) : 607849.577,7256566.446,174.682	
0.00	to	0.20	Organic topsoil, frozen. Presence of boulders on surface.	Comments :
0.20	to	1.40	Fine sand and gravel, brown, presence of cobbles, mostly frozen. Presence of gravel pockets.	2 samples: A (0.8 m), B (1.4 m)
1.40	to			No water, frozen surface 0.35m
Depth of Test Pit :		**1.40**	Refusal (bedrock)	
Water :		N/A		

IVRWRSF-TP9			by B. Lessard	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607739.059,7256451.005,166.333**	
0.00	to	0..08	Organic topsoil, frozen	Comments :
0..08	to	2.80	Sand and gravel, brown, moist to wet	5 samples: A (0.5 m), B (1.0 m), C (1.5 m), D (2.0 m), E (2.8 m)
				Frozen surface 0.3m
Depth of Test Pit :		**2.80**	Refusal (frozen soil)	
Water :		1.50	water coming into excavation	

IVRWRSF-TP10			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607664.088,7256272.543,161.814**	
0.00	to	0.10	Ice	<u>Comments</u> :
0.10	to	0.30	Organic materials with boulders	From the organic and boulder layer there was a major flow of water into the hole.
0.30	to	1.80	brown sand and gravel, wet	Descriptions were from taking material under the water
Depth of Test Pit :		**1.80**	Refusal (frozen soil)	
Water :		0.30	Large inflow	

IVRWRSF-TP11			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607691.124,7256111.005,162.3**	
0.00	to	0.40	Organic materials and boulders	Comments : There was large amounts of standing water. It seemed to have just stones and very difficult to collect a proper sample for analysis. Hole was abaondoned. You can see a .4m layer of organics and large rocks.
0.40	to			
0.00	to			
Depth of Test Pit :		**0.40**	Abandoned (too much water)	
Water :		0.00	excavation flooded almost to the surface	

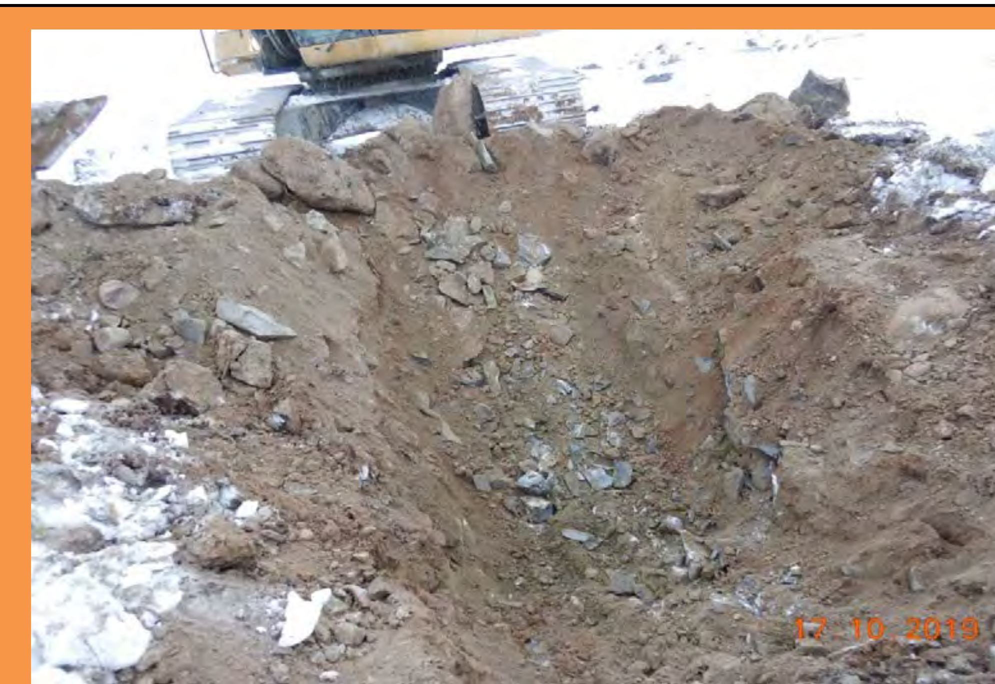
IVRWRSF-TP12			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 607870.392,7255949.188,165.391**	
0.00	to	0.20	Organic materials	<u>Comments</u> :
0.20	to	1.30	Light brown silty sand and gravel, moist	Finer material at the top section of the hole with more stones and cobbles at the bottom
1.30	to	1.90	Light brown silty sand and gravel with cobbles, moist	1 sample: 1.2 m
Depth of Test Pit :		**1.90**	Refusal (frozen soil)	
Water :		N/A		

AMQ - WT WRSF Extension Test Pits
Performed on 17/10/2019

All pictures are in: P:\Engineering\05-Geotechnic\14- Amaruq\05- Field Campaign\22- IVR WRSF Geotech Investigation (WMGI Ph-2) - Sept 2019\9- Photo\IVR WRSF Test pit

WTWRSF-TP1 by T. Dahm

Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606041.502,7256291.834,169.148**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.60	Sand and gravel, brown, moist.	The end of the hole also had broken rock material that occurred while digging. This hole was on a mound
1.50	to	1.60	Sand and gravel with some cobbles, brown, moist.	that appeared to be a large rock pile. The rest of the area around is flat terrain.
				1 sample: 1.2 m
Depth of Test Pit :		**1.60**	Refusal (frozen soil)	
Water :		N/A		



WTWRSF-TP3			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606163.192,7256327.14,165.358**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	1.20	brown silty sand trace gravel, moist	the lower layer was a greyish brown colour, appeared to be more frozen type material
1.20	to	2.10	brownish grey sitly sand with gravel and cobbles, moist	3 samples: 0.9 m, 1.3 m, 1.9 m
Depth of Test Pit :		**2.10**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP5			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606301.659,7256378.535,164.728**	
0.00	to	0.20	Organic materials	Comments : hole appeared to have lots of loose bedrock material, was in a hilly boulder field. Lots of blocky material in hole. The rest of the area around is flat terrain. 2 samples: 0.6 m, 0.9 m
0.20	to	1.20	brown sand and gravel, some silt, moist	
Depth of Test Pit :		**1.20**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP7			by T. Dahm	
Depth (m)			Surveyed Coordinates (X,Y,Z) : 606447.282,7256376.625,164.295	
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.80	Brown sandy silt some gravel, moist	1 sample: 1.3 m
0.80	to	1.30	sand and gravel with cobbles, some silt, moist	
Depth of Test Pit :		**1.30**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP9			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606435.376,7256142.658,163.802**	
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.60	Greyish Brown silty sand and gravel, moist	There was water inflow at 0.8m. It was a slow seepage.
0.60	to	1.60	Brown silty sand and gravel with cobbles, moist	3 samples: 0.9 m, 1.1 m, 1.5 m
Depth of Test Pit :		**1.60**	Refusal (frozen soil)	
Water :		0.80	slight water inflow	

WTWRSF-TP10			by T. Dahm
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606418.313,7255943.839,164.177**
0.00	to	0.20	Organic materials
0.20	to	0.50	Brown silty sand and gravel, moist
0.50	to	1.20	Brown silty sand and gravel with cobbles, moist
Depth of Test Pit :		**1.20**	Refusal (frozen soil)
Water :		N/A	

<u>Comments</u> :
Hole was stable and good . As the hole gets deeper the larger the rocks
2 samples: 1.0 m, 2.0 m

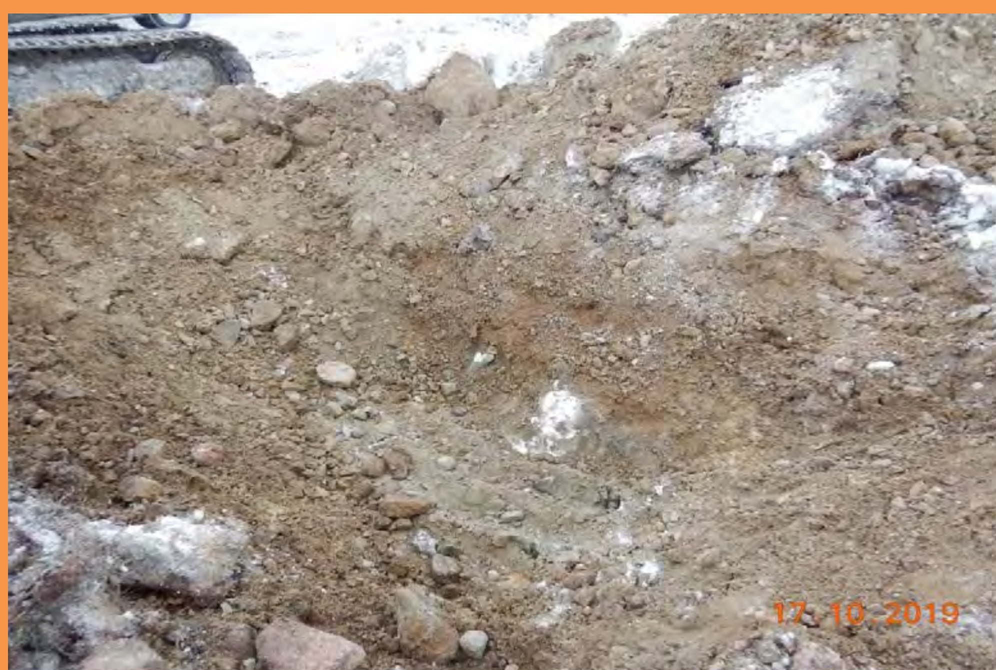
WTWRSF-TP11			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) :**	**606343.732,7255780.851,163.073**
0.00	to	0.20	Organic materials	Comments :
0.20	to	0.80	Brown sand and gravel, some silt, moist	Hole was moved as original co ordinates were in the side of Road #7
0.80	to	1.60	Brown sandy silt with cobbles, moist	2 samples: 0.6 m, 1.6 m
Depth of Test Pit :		**1.60**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP12			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) :**	**606178.06,7255654.898,159.996**
0.00	to	0.20	Organic materials	Comments :
0.20	to	1.20	brown silty sand, trace gravel, moist	Hole was moved as original co ordinates were in the side of Road #7
1.20	to	1.60	brown silty sand, some gravel, moist	1 sample: 0.1 m
1.60	to	2.00	grey silty sand and gravel, moist	
Depth of Test Pit :		**2.00**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP13			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 606072.68,7255481.035,159.281**	
0.00	to	0.30	Organic materials	Comments :
0.30	to	1.10	brown silty sand and gravel, moist	Hole was moved as original co ordinates were in the side of Road #7
1.10	to	1.60	grey brown sand and gravel with cobbles, some silt, moist	3 samples: 0.5 m, 1.2 m, 1.6 m
Depth of Test Pit :		**1.60**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP14			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 605960.558,7255467.581,161.061**	
0.00	to	0.40	Organic materials	Comments :
0.40	to	1.10	Grayish brown silt sand and gravel, moist	Hole was moved as original coordinates were in the side of Road #7
1.10	to	1.70	brown sand and gravel with cobbles, some silt, moist	2 samples: 0.5 m, 1.1 m
Depth of Test Pit :		**1.70**	Refusal (frozen soil)	
Water :		N/A		

WTWRSF-TP15			by T. Dahm	
Depth (m)			**Surveyed Coordinates (X,Y,Z) : 605859.992,7255626.948,164.515**	
0.00	to	0.30	Organic materials	Comments :
0.30	to	1.10	Brown silty sand and gravel, moist	4 samples: 0.5 m, 1.2 m, 1.6 m, 1.8 m
1.10	to	1.80	sand and gravel with cobbles, some silt	
Depth of Test Pit :		**1.80**	Refusal (frozen soil)	
Water :		1.80	Bottom of the hole was showing some slight water	



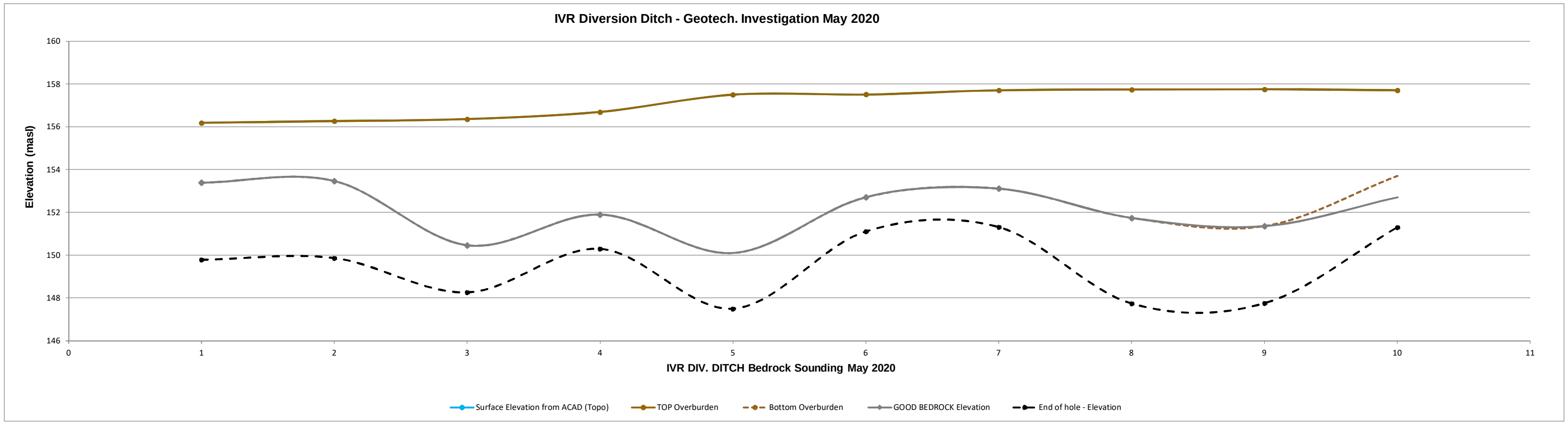
AgnicoEagle - Amaruq

IVR DIV. Ditch bedrock sounding_May 2020

Drill: # 9932 ***Logged by:*** Guillaume Baril (AEM)

Driller: Bobby Gagne ***DH Size:*** 4" bit w/ 12' or 3.6m rods

Hole ID	Easting (Garmin GPS)	Norting (Garmin GPS)	Surface Elevation *from ACAD (Topo)*	Top Ice Thickness	Thickness of Overburden	TOP Overburden	Bottom Overburden	POOR Bedrock Elevation	** Depth of GOOD bedrock	GOOD BEDROCK Elevation	Depth of hole	End of hole - Elevation	** Depth of ICE Layer	ICE Layer Thickness	Date and time	Comments	Drilling starting Surface (0.0m)
ID from Surveyors	(m)	(m)	(masl)	(m)	(m)	(masl)	(masl)	(masl)	(m)	(masl)	(m)	(m)	(m)	(m)			
IVRDIV1	607257.772	7257198.094	156.19		**2.8**	**156.19**	**153.39**	**N/A**	**2.8**	**153.39**	**6.4**	**149.79**			May-20		
IVRDIV2	607278.289	7257161.22	156.268		**2.8**	**156.27**	**153.47**	**N/A**	**2.8**	**153.47**	**6.4**	**149.87**			May-20		
IVRDIV3	607301.03	7257121.375	156.366		**5.9**	**156.37**	**150.47**	**N/A**	**5.9**	**150.47**	**8.1**	**148.27**			May-20		
IVRDIV4	607327.943	7257078.088	156.7		**4.8**	**156.70**	**151.90**	**N/A**	**4.8**	**151.90**	**6.4**	**150.30**			May-20		
IVRDIV5	607358.867	7257045.634	157.504		**7.4**	**157.50**	**150.10**	**N/A**	**7.4**	**150.10**	**10.0**	**147.50**			May-20		
IVRDIV6	607389.03	7257009.786	157.514		**4.8**	**157.51**	**152.71**	**N/A**	**4.8**	**152.71**	**6.4**	**151.11**			May-20		
IVRDIV7	607416.945	7256972.984	157.714		**4.6**	**157.71**	**153.11**	**N/A**	**4.6**	**153.11**	**6.4**	**151.31**			May-20		
IVRDIV8	607445.125	7256934.691	157.745		**6.0**	**157.75**	**151.75**	**N/A**	**6.0**	**151.75**	**10.0**	**147.75**			May-20		
IVRDIV9	607468.838	7256899.07	157.76		**6.4**	**157.76**	**151.36**	**N/A**	**6.4**	**151.36**	**10.0**	**147.76**	**1.8**	**2.0**	May-20	Hit an ice pocket @ 1.8 deep, 2m thick	
IVRDIV10	607490.592	7256866.663	157.708		**4.0**	**157.71**	**153.71**	**153.7**	**5.0**	**152.71**	**6.4**	**151.31**			May-20		



Appendix B

Particle Size Distribution of Esker (Potential Contruction Material)

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11204932-B1**
		Sample N°:	AMQ-ES-002
Projet:	Derivation channel	**Sampling Date:**	2020-01-17
		Sampled by:	Mathieu Côté
Description of Material:	Esker		
Origin:	WRSF stockpile	**Location of Sampling:**	WRSF stokpile
Proposed Use:	Under the fine filter		

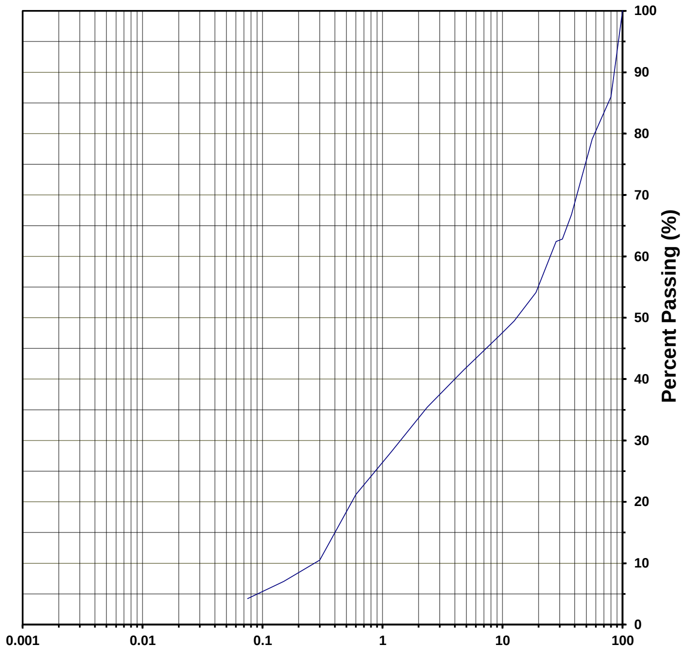
Sieve Analysis (% Passing) (LC 21-040)

Sieve		100 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	86	79	67	63	62	54	49	47	41	35	28	21	11	7	4.2
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
PSPI			
Moisture Content (%)	1.1		
Agreggate Density (Coarse)			
Absorption granulats (fins)			
Micro Deval (coarse)			
Los Angeles (Coarse)			
% Crushed Particles			
Methylene Blue Index			
Organic Matter Content			

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	(kg/m³)
Optimum Moisture Content	(%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
4	37	59

Remarks

Prepared by: Mathieu Côté　　Verified by:　　Date: 2020-01-18

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-004
Projet:	Derivation channel	**Sampling Date:**	
		Sampled by:	Yaotree Amegnran
Description of Material:	soil in place	**Location of Sampling:**	Western slope of channel. ch.0+820
Origin:	In place, as used		
Proposed Use:	Back filling		

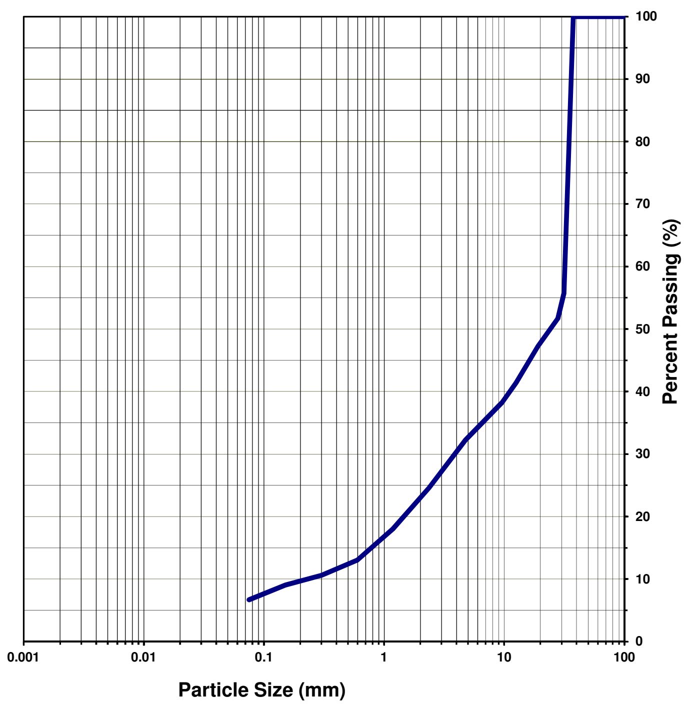
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	100	100	100	56	52	47	41	38	32	25	18	13	11	9	6.7
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	5.3		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m^3)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
7	25	68

Remarks ____

Prepared by: Yaotree Amegnran

Verified by: ____

Date: ____

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-004
Projet:	Derivation channel	**Sampling Date:**	2020-02-01
		Sampled by:	Yaotree Amegnran
Description of Material:	soil in place		
Origin:	In place, as used	**Location of Sampling:**	Western slope of channel. ch.0+820
Proposed Use:	Back filling		

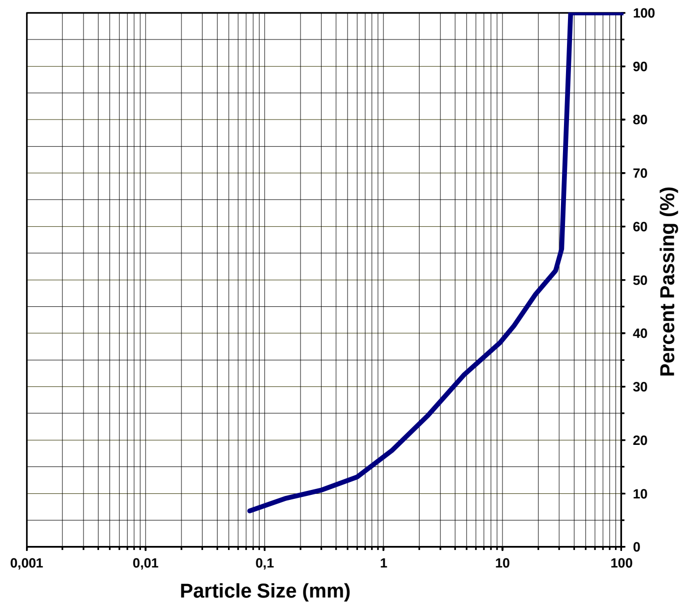
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37,5 mm	31,5 mm	28 mm	19 mm	12,5 mm	9,5 mm	4,75 mm	2,36 mm	1,18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	100	100	100	56	52	47	41	38	32	25	18	13	11	9	6,7
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	5,3		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m^3)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
7	25	68

Remarks ______________________

Prepared by: Yaotree D. Amegnran Date : 2020-02-02 Verified by: ______________ Date: ______

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client: AEM

Project N°: 11202247-B1

Sample N°: AMQ-ES-008

Projet: Derivation channel

Sampling Date: 2020-02-04

Sampled by: Stéphane Dorvelus

Description of Material: Esker

Origin: In place, as used

Location of Sampling: Eastern slope of channel. ch.0+860

Proposed Use: Slope of the channel

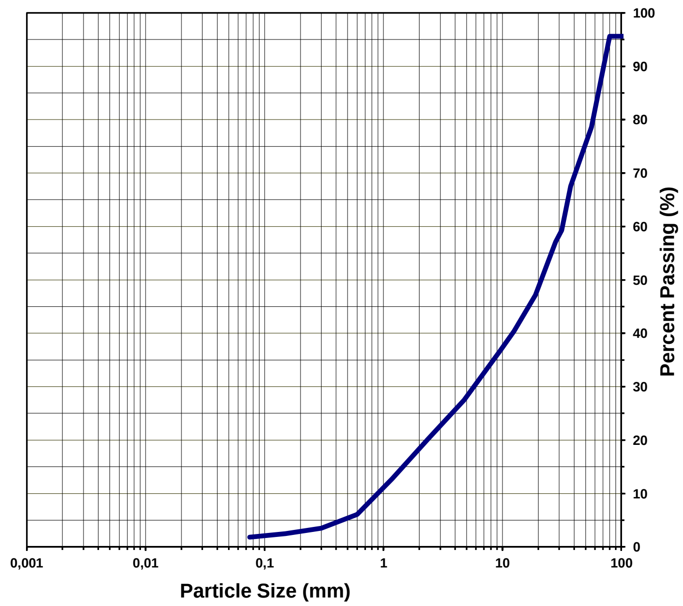
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37,5 mm	31,5 mm	28 mm	19 mm	12,5 mm	9,5 mm	4,75 mm	2,36 mm	1,18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		96	96	79	68	59	57	47	40	37	27	20	13	6	3	2	1,8
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	11		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m^3)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
2	25	73

Remarks

Prepared by: Yaotree Amegnran Date : 2020-02-05 Verified by: Date:

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client: AEM

Project N°: 11202247-B1

Sample N°: AMQ-ES-009

Projet: Derivation channel

Sampling Date: 11-02-2020

Sampled by: Mathieu côté

Description of Material: soil in place

Origin: Base fill

Location of Sampling: 0+760 W slope

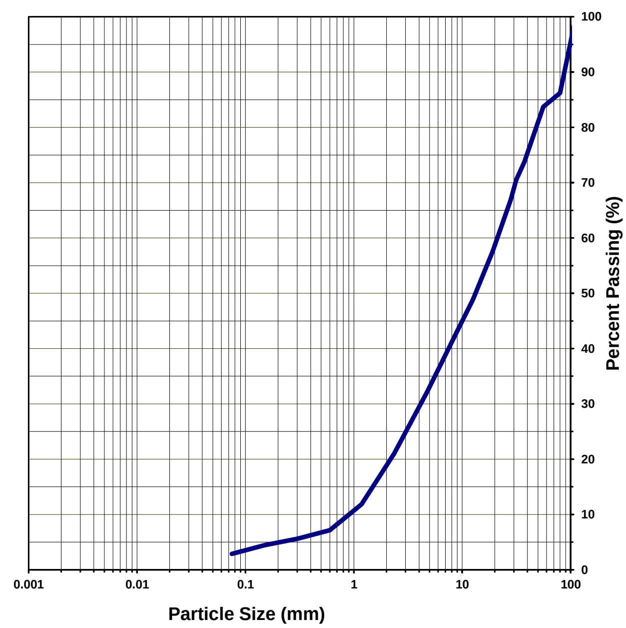
Proposed Use: Foundation

Sieve Analysis (% Passing) (LC 21-040)																	
Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	86	84	74	71	67	57	49	44	32	21	12	7	6	4	2.9
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	3.4		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m³)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
3	29	68

Remarks

Prepared by: Mathieu Côté

Verified by:

Date: 13-02-2020

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-010
Projet:	SWTC	**Sampling Date:**	2020-02-18
		Sampled by:	Richard Jean Tremblay
Description of Material:	Esker		
Origin:		**Location of Sampling:**	0+700 west slope
Proposed Use:	Backfill in bottom excavation		

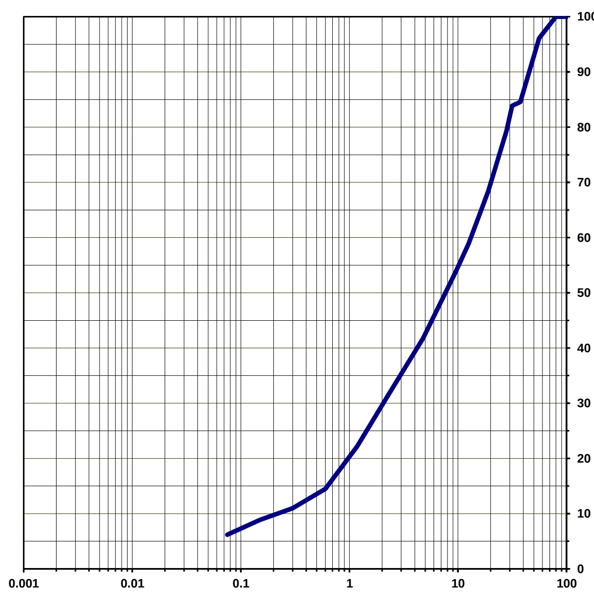
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	100	96	85	84	79	68	59	54	42	32	22	14	11	9	6.2
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	7.3		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m³)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
6	36	58

Remarks

Prepared by: Mathieu Côté et Richard Jean Tremblay

Verified by:

Date: 2020-02-19

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Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-011
Projet:	Derivation channel	**Sampling Date:**	2020-02-18
		Sampled by:	Richard J.Tremblay
Description of Material:	soil in place		
Origin:	Esker stockpile	**Location of Sampling:**	SWTC ST.0+690
Proposed Use:	Backfill before Fine filter placement		

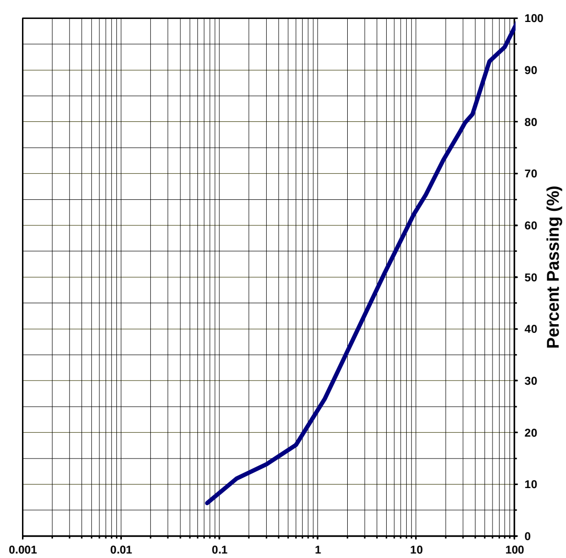
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		100	94	92	81	80	78	73	66	62	51	38	26	18	14	11	6.4
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	6.8		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m³)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
6	45	49

Remarks: Some fine material in separator

Prepared by: Mathieu Côté

Verified by:

Date: 2020-02-20

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-012
Projet:	Derivation channel	**Sampling Date:**	2020-02-29
		Sampled by:	Stéphane Dorvelus
Description of Material:	Esker as used on slope		
Origin:	Esker in place	**Location of Sampling:**	SWTC ST.0+670 Eastern Slope of channel
Proposed Use:	Backfill before Fine filter placement		

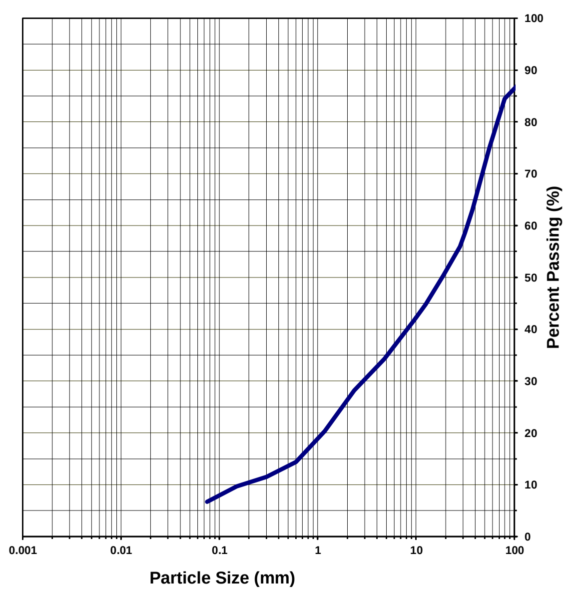
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		87	84	75	63	59	56	50	45	42	34	28	20	14	12	10	6.7
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	7.80%		

Proctor Test (NQ 2501-255, method)	Results
Maximum Dry Unit Weight	#REF! (kg/m^3)
Optimum Moisture Content	#REF! (%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
7	27	66

Remarks

Prepared by: Yaotree Amegnran **Date:** Start : 2020-03-01 Finish : 2020-03-04 Verified by: Date:

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-013
Projet:	Derivation channel	**Sampling Date:**	2020-02-29
		Sampled by:	Stéphane Dorvelus
Description of Material:	Esker as used on slope		
Origin:	Esker in place	**Location of Sampling:**	SWTC ST.0+620 Western slope of channel
Proposed Use:	Backfill before Fine filter placement		

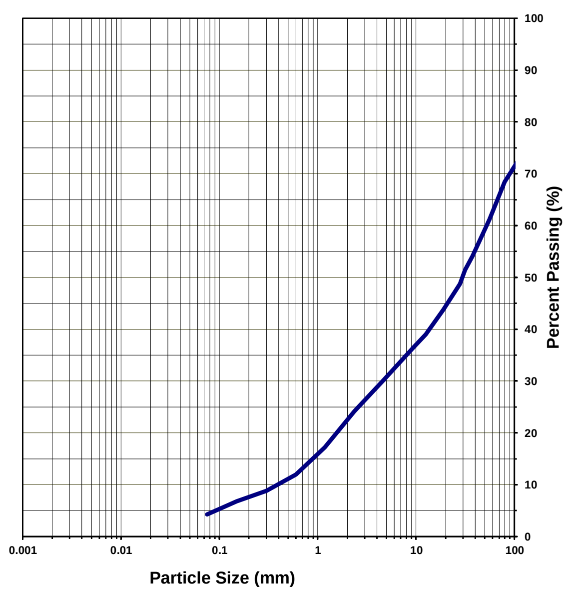
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		73	68	61	54	51	49	44	39	37	30	24	17	12	9	7	4.3
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	4.82%		

Proctor Test (NQ 2501-255, method)	Results	
Maximum Dry Unit Weight	#REF!	(kg/m³)
Optimum Moisture Content	#REF!	(%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
4	26	70

Remarks

Prepared by: Yaotree Amegnran Date: Start: 2020-03-01 Finish : 2020-03-04 Verified by: Date:

GHD Consultants Ltée. 4600 boul. de la Côte-Vertu Montréal Qc H4S 1C7

Analysis Report - Soils and Aggregates

Client:	**AEM**	**Project N°:**	**11202247-B1**
		Sample N°:	AMQ-ES-014
Projet:	Derivation channel	**Sampling Date:**	2020-03-01
		Sampled by:	Stéphane Dorvelus
Description of Material:	Esker as used on slope		
Origin:	Esker in place	**Location of Sampling:**	SWTC Eastern slope ST.0+580
Proposed Use:	Backfill before Fine filter placement		

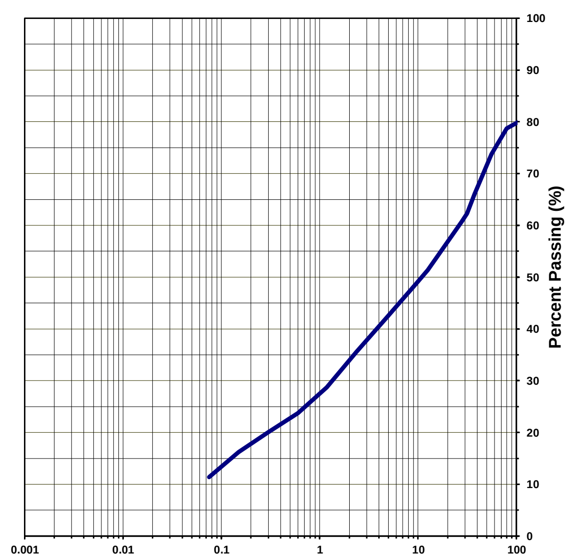
Sieve Analysis (% Passing) (LC 21-040)

Sieve		112 mm	80 mm	56 mm	37.5 mm	31.5 mm	28 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 µm	300 µm	150 µm	75 µm
Cumulative Results		80	79	74	66	62	61	56	51	49	42	36	29	24	20	16	11.4
Require-ments	min.																
	max.																

Autres essais	Résultats	Exigences min.	Exigences max.
Moisture Content (%)	5.70%		

Proctor Test (NQ 2501-255, method)	Results	
Maximum Dry Unit Weight	#REF!	(kg/m³)
Optimum Moisture Content	#REF!	(%)

Sieve Analysis Graph



Clay and silt	Sand	Gravel
11	31	58

Remarks ______________________________

Prepared by: Stephane Dorvelus Date: 2020-03-03 Verified by: ____________ Date: ________

Appendix C

Technical Specifications

TITRE: **TECHNICAL SPECIFICATIONS FOR THE CONSTRUCTION OF IVR DIVERSION**

CLIENT: **AGNICO EAGLE MINES LIMITED – MEADOWBANK DIVISION**

PROJECT: **DETAILED ENGINEERING OF WATER MANAGEMENT AND GEOTECHNICAL INFRASTRUCTURE PHASE 2 WHALE TAIL EXPANSION**

PREPARED BY : Nina Quan, P.Eng.

REVIEWED BY : Hafeez Baba, Ph.D, P.Eng.
Mathieu Durand-Jézéquel, P.Eng., M. Sc.

APPROVED BY : Anh Long Nguyen, P.Eng.

Index of revisions

	Revision				Revised pages	Remark
No.	**Prep.**	**Rev**	**App.**	**Date**		
PA	NQ	MDJ/HB		06/19/2018	All	Issued for internal review
PB	NQ	MDJ/HB	ALN	06/19/2018		Issued for AEM comments
00						Issued for construction

INSTRUCTION TO PRINT CONTROL: (Indicate X where applicable)

- [ ] Entire Criteria revised. Reissue all pages
- [ ] Reissue revised pages only

STAMP THE CRITERIA AS FOLLOWS:

- [ ] Released for internal revision
- [x] Issued for comments and approval
- [ ] Released for bid
- [ ] Released for construction (installation specifications only)

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1.0 WORK DESCRIPTION

1.1 Description of the project

Agnico Eagle Mines Limited, Meadowbank Division (AEM) is developing the Whale Tail Project, a satellite deposit located on the Amaruq property (Kivalliq Region of Nunavut, Canada). The Whale Tail Project construction is ongoing and commercial production has started in the third quarter of 2019. To continue mining and milling, AEM is proposing to expand the Whale Tail Project by expanding the Whale Tail pit, developing another open pit called the IVR pit and including underground mining operations. As part of the expansion project, new water management and geotechnical infrastructures shall be required for surface water management. One such new structure is the IVR Diversion which will divert non-contact water away from the mine site, IVR pit.

The principal purpose of this infrastructure is to collect and divert all the runoff (non-contact water) that will come from the North East watershed into Nemo Lake. This is part of the water-management strategy to minimize the treatment volumes of water at the treatment facility of the site. The watershed is located just north of the proposed IVR WRSF and east of the IVR Pit, and it has an approximate area of 68.2 ha. The alignment of the IVR Diversion was selected to collect non-contact water from a 68.2 ha - watershed and convey it into Lake C44's sub-watershed. This lake is naturally connected to Lake C43, and this in turn is connected to Nemo Lake.

1.2 Work included

The work shall include mobilization of all necessary equipment and materials as well as providing supervision, technical personnel (including surveyors) and skilled labour for the construction of IVR Diversion.

The Contractor shall prepare a detailed work plan outlining its proposed method of execution with particular focus on the channel excavation and foundation preparation, placement of the fill, erosion protection and protection of materials. The work plan shall be approved by the Owner and the Design Engineer.

The Work includes but is not limited to the following items:

1. The preparation of all documentation that the Contractor is required to provide prior to the start of the Work.
2. Site preparation including snow, ice, unsuitable materials and boulder removal and its proper disposal.
3. Clearing, stripping, excavation and grading.
4. Granular fill loading, hauling, placement and compaction.

5. Controls including sampling and testing.
6. Sediment control and erosion protection

If judged necessary by the QA inspectors and/or the QC representatives, or the applicable representatives, additional tests shall be performed by an external laboratory.

1.3 List of drawings

The list of drawings is presented in Table 1-1 and the drawing is included in Appendix 1.

Table 1-1: List of Drawings

DRAWING NO	TITLE	REVISION
61-965-230-201(668284-7000-4GDD-0001)	IVR Diversion Plan view, Profile and Typical Section	00

2.0 GENERALITIES

2.1 Unit system

Unless indicated otherwise, Amaruq’s coordinate system is used and all elevations are tied to the UTM Zone 14, NAD83 (CSR), and the metric unit system (SI) is used.

2.2 Codes and Standards

Whenever mention is made of a standard or regulation, it is understood that the reference is the most recent issue of the said standard or regulation unless specifically mentioned.

The Contractor may suggest the application of alternative standards provided that the resulting final product is at least equal in quality to that specified.

The standards presented in the following table shall be respected during the execution of the works.

Table 2-1: Standards and Codes

Activity / Tests	Standard
Particle Size Analysis (*)	ASTM D422 - 63(2007), Standard Test Method for Particle-Size Analysis of Soils†
Compaction	ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

†An additional sieve of 12.7 mm is required for the gradation of esker material.

2.3 Definition of terms and stakeholders

Below is a list of the stakeholders engaged in the IVR Diversion construction process:

1. The **Owner** is represented by the AEM Geotechnical Engineer.
2. Quality Assurance (**QA**) is represented by AEM or a subcontractor.
3. The **Designer** is represented by SNC-Lavalin.
4. The **Contractor** is represented by Kivaliq Contractors Group (KCG) and includes the surveyors and all subcontractors (if any).
5. Quality Control (**QC**) is represented the contractor or a subcontractor of AEM and is responsible of QC for the entire work.

2.4 Scope of responsibilities

The responsibilities of each stakeholder are defined as follows:

2.4.1 Owner's Representative (AEM)

- Review working plan and documents from the Contractor to confirm that it is in accordance with the design.
- Identify changes to be made in the design or drawings, collect information and share it with the Designer.
- Oversee the execution and coordination of the entire work.
- Primary point of contact for the QA inspector, QC representatives and the Contractor.
- Review work and monitoring of construction.
- Share data with QA inspectors and QC representatives including but not limited to layout, scope limit control and data collection for as-built drawings and report.
- Review quantities.
- Coordination, daily interaction with QA and QC personnel.

- Follow-up the construction schedule.
- Confirm the waste disposal area.
- Plan or approve platforms to stockpile materials.
- Responsible of the health and safety and Environmental issues and procedures on site.
- Supply Esker, riprap material and geotextile.

2.4.2 Quality Control Representative (contractor or a subcontractor of AEM)

- Inspection and documentation of work procedures to ensure the works meet the drawings (lines and grades) and the specifications.
- QC testing as required by the specifications (Appendices 2).
- Prepare daily reports.
- Prepare approval forms.
- Work under the supervision of the Owner’s Representative as applicable.
- Request additional testing when required.
- Review survey data.

2.4.3 Quality Assurance Inspectors (AEM or a subcontractor)

- Inspection, documentation and review QC work to ensure that the control meets the specifications and the Design.
- QA personnel may perform occasional independent checks. The Contractor shall co-operate in a timely manner during sampling and testing. Loading and disposal of sampling materials, when no longer required by AEM or its subcontractor, shall be carried out by the Contractor.
- Request additional testing when required and review QC testing and procedures.
- Collect signed forms (approval and non-conformity forms) and give copy to Owner’s Representative.
- Prepare QA report to be included in as-built report.
- Prepare as-built report, including testing results, drawings and reports.

2.4.4 Contractor (KCG)

- Construction of the IVR Diversion in compliance with the requirements of the drawings and the specifications.

- Carry out all survey and stake out and provide all material volumes to the Owner's Representative, QA Inspectors and/or QC Representatives.
- Supervise all its sub-contractors.
- Share all collected data with Owner's Representative, QA Inspectors and/or QC Representatives.
- Prepare construction drawings, collect information and share it with the Owner's Representative.
- Erosion and sediment control measures during construction

2.4.5 AEM Geotechnical Coordinator

- Communicate with the Designer for any technical questions or issues.
- Report design deviations to the Designer.

2.4.6 Designer (SNC-Lavalin)

- Review documentation requested from the Contractor prior to the beginning of the Work.
- Be informed of the construction schedule and the advancement of the Work.
- Send a sealed technical memorandum to the AEM Geotechnical Coordination within appropriate timeframe to confirm the design deviation(s).

2.5 Work method and equipment

The Contractor shall submit to the Owner's Representative its working methods with the specific equipment and procedures he plans to use at least 30 days prior to the start of the work. The complete list of documentation to be provided prior the beginning of the Work is presented in Section 2.12.

2.6 Subsurface conditions

Drawing No. 668284-7000-4GDD-0001 shows the locations of investigation test pits and boreholes carried out in the vicinity of IVR Diversion. A total of eleven (11) test pits were carried out in September and October 2019 and ten (10) destructive boreholes were drilled in May 2020. Because the test pits were completed in 2019 prior to the hydrology updates, their locations are further east and concentrated more on the southern part of the current location of the IVR Diversion. The topography of the area is relatively flat and thus it is assumed that the current IVR Diversion has the similar soil characteristics as shown on the test pits.

All the boreholes are destructive boreholes with down-the-hole Tamrock drill rig allowing an estimation of bedrock elevation.

The overburden consists of about 0.4 m to 0.6 m of thick and black organic materials underlain by about 0.5 m to 1.5 m of brown to grey sand and gravel/cobbles with trace of silt, moist to wet. The depth to frozen ground varied from 1.3 m to 2.1 m below ground surface at the time of test-pitting. The depth to bedrock varies from 3 m to 7.4 m.

2.7 Lines, grades and tolerances

- Lines and grades shall be obtained from the drawings presented in Appendix 1.
- Bench marks for the layout of the channel will be provided by the Contractor's surveyor.
- The Contractor's surveyor shall be responsible for all staking and other survey requirements such as lines and grades specified or shown on the drawings.
- Lines and grades are subject to modifications by the Designer and/or the Owner's Representative (when justified) and additional lines and grades may be required as the work progresses. Tolerance on lines and grades is of ± 0.1 m of the theoretical lines. However, when a minimum dimension or elevation is specified in the Drawings, the actual line or grade must meet the minimum dimension specified and not exceed by more than 0.1 m.
- The Contractor shall use the applicable control points to complete the layout of all the works. Any additional control point required to execute the work adequately shall be provided by AEM.
- If the Contractor or any of its subcontractors or any of their representatives or employees move, destroy or render inaccurate any survey control point, such control point shall be replaced at the Contractor's expense.

2.8 Additional drawings

The Designer may provide additional drawing(s) if considered necessary. These drawings shall form part of the contractual document and will be the result of a design deviation.

2.9 Land, lake, environment and infrastructure protection

- The Contractor shall limit traffic to the area inside the boundary established by the Owner's Representative.
- The Contractor shall respect the Environmental procedures of AEM.
- The Contractor shall present an environmental mitigation control plan for the Work. This shall include, but not limited to, a water management plan during construction and appropriate controls on site to implement before and during the Work. The Contractor is responsible of the performance of these mitigation controls.
- Fires are not allowed on site.

- The Contractor shall make sure that all personnel under his responsibility will do everything possible to protect the environment.
- Unless approved by the Owner's Representative, once construction is completed, no fill material shall be left at the construction site.
- All frozen excavated materials must be disposed of as directed by the Owner's Representative.
- Unless approved by the Owner's Representative, all excavated snow shall be disposed of as per AEM's Snow Management Plan.

2.10 Site cleanup

The Contractor is responsible for the cleanup and removal of garbage and other foreign materials from the construction site to the satisfaction of the Owner's Representative.

2.11 Health and safety

- All construction work shall be conducted in accordance with Agnico Eagle's sustainable development and Health and Safety standards and regulations.
- All personal protection equipment appropriate for the work shall be used by all workers.
- Detailed work procedures for every construction task shall be provided by the Contractor and approved by the Owner's Representative.
- A daily coordination meeting shall be held between the Contractor, QA and QC Inspectors and AEM representatives to discuss planning and safety.

2.12 Documentation to be provided to AEM by the Contractor

At least 30 days prior to the beginning of the Work, the Contractor shall submit the following documents:

- The location of the stockpile area(s) he plans to use as well as the location of borrow sources and access roads.
- The proposed construction schedule, construction method and a list of specific tools and equipment which will be used during the Work.
- Procedure and technique of fill placement for Esker material, geotextile and riprap protection layer.
- The proposed method that will minimize thaw induced ditch slope instability or excessive lateral deformation if the excavation exposes large ice lenses or ice rich and thaw softening layer(s).

- A detailed written procedure for water management and an environmental mitigation control plan for the Work.

3.0 CONSTRUCTION MATERIALS

3.1 General

- Only sound and suitable materials meeting the requirements of this document and approved by the QC and/or QA personnel shall be used.
- Great care shall be taken to limit particle segregation during stockpiling, loading and placement of fill materials. Occasionally, the QC representatives and/or the QA inspectors may ask the Contractor to modify its construction procedures to meet this requirement.
- Fill materials shall be free from all organic matter or other deleterious, unapproved, unstable or unsuitable materials such as ice/snow, frozen fill or peat.
- Unless approved by the Owner's Representative as well as supported by random inspections by the QC and/or QA personnel, all fill materials shall only be obtained from stockpiles or sources identified at the beginning of the construction works.
- All materials shall be manufactured from good quality non-potentially acid generating (NPAG) sources.

3.2 Definitions

- ''Sound'' or ''Suitable'' fill materials are defined as being free from deleterious matter, having a gradation which permits compaction or placement to a stable state, and having the characteristics specified for the particular materials after handling, re-handling, processing and reprocessing have taken place.
- ''Unstable'' or ''Unsuitable'' fill materials are defined as being too wet, containing oversized or segregated particles, organic or other deleterious matter, such as ice or snow, or having poor characteristics which may result in undesirable settlement or other movement of the fill or within the fill, or otherwise not meeting the requirements of the specifications. However, this definition permits drying, dewatering, watering, screening, raking and any other processing or reprocessing to make the material stable and suitable prior to incorporating it into the fill.
- The term Ice-rich material is defined as having greater than 10% visible ice and/or a water content greater than 30% (by mass).

3.3 Materials

3.3.1 Esker

The material to be used for construction of the berm on the west of the IVR Diversion shall be well graded with limited fines and meet the gradation limits specified below in Table 3-1.

Table 3-1: Esker gradation

Particle size (mm)	Finer than (%)
300	100
76.2	91-100
25.4	80-90
12.7	60-80
4.76	20-70
0.425	0-20
0.075	0-10

As mentioned in Table 2-1, the particle size of 12.7 mm (0.5 in.) does not appear in the list of sieves mentioned in the ASTM D422 – 63 Standard. A 12.7 mm sieve shall be added for compliance with the gradation limits specified in Table 3-1.

3.3.2 Riprap

The material to be used as riprap in the channel to avoid erosion shall be a clean blasted rock from a quarry, pre-production or production zone (runoff mine). After placement, it shall meet the gradation limits specified below in Table 3-3.

Table 3-2: Riprap gradation

Particle size (mm)	Finer than (%)
200	95-100
100	0-5

3.3.3 Geotextile

The geotextile shall be Tencate Mirafi 1600 or equivalent, polypropylene, continuous filament, needle punched and non-woven and meet the following properties:

Table 3-4: Required Properties of Geotextile Fabric

Property	Units	Required Value	Test Method
Grab Tensile Strength	N	1650	ASTM D 4632
Elongation at Break	%	45 to 105	ASTM D 4632
Trapezoid Tear Strength	N	600	ASTM D 4533
Mullen Burst	MPa	5.0	ASTM D 3786
Apparent Opening Size	μm	150	ASTM D 4751

The geotextile will be placed on the slope of the Diversion to prevent erosion and protect fine material in the foundation.

3.4 Non-conforming materials

Where and when directed by the QC Representative or the QA Inspector, the Contractor shall excavate and/or remove all unsuitable materials to the designated spoil or dump.

4.0 EXECUTION OF WORKS

The Contractor's attention is drawn to the fact that the work might be executed during arctic winter and that the work will be carried out in a protected area (in an environmental context). Special care shall be taken to ensure the safety of all employees, to avoid damage to the land and breaking ice outside the designated working area.

4.1 Work method and sequence

- The method of construction and the sequence of execution shall be adapted to conditions that may change often, in order to minimize fill cross contamination and foundation disturbance.
- Heavy equipment traffic shall be adapted to the site conditions that may change often so to minimize surface disturbance and the formation of ruts in the work area. The Contractor shall restore disturbed areas as close as possible to the original condition to the satisfaction of the Owner's Representative.

4.2 Site preparation

4.2.1 General

- The Contractor shall remove snow, ice and boulders within the IVR Diversion footprint prior to any fill placement and shall keep the work area dry.
- The QC Representative may occasionally request that additional soil stripping and removal of snow and ice be carried out from areas in the channel's footprint shown on the drawing.
- The removed material shall be stockpiled separately in areas approved by Owner's Representative.
- The prepared foundation shall be approved by the QC/QA personnel prior to fill placement.
- All survey shall be done by the Contractor.
- The approval and visual inspection forms shall be prepared by QC/QA personnel.

4.2.2 Access Roads

- The Contractor shall use in a proper manner the access road that leads to the construction site.
- If required, the Contractor shall submit to the Owner's Representative full details of all temporary construction roads, ramps and access planned for the construction of the channel. Details related to these temporary works shall include location, alignment, required safety berm or traffic signs, period of use, materials used and plan for their removal.
- The Contractor shall maintain in good condition all existing or new access roads used for the execution of the work such as the access roads connecting the work area to stockpiles and waste dump areas to the satisfaction of the Owner's Representative.
- All the temporary access roads shall be constructed on top of the existing ground. No stripping or excavation shall be undertaken unless approved by the Owner's Representative.
- The Contractor shall supply and install all required traffic signs and safety equipment to ensure worker safety on the construction site for the complete duration of the work.
- Access road maintenance shall be planned and executed in such a way that worker safety is not compromised. Access roads shall be kept clean of snow and if required, sprinkled with abrasive materials such as gravel to the satisfaction of the Owner's Representative.

- Once the construction work is completed, all temporary access roads shall be removed and the material disposed of as directed by the Owner's Representative.

4.3 Water management during construction

The Contractor shall be responsible for the construction of temporary swales, ditches and sumps and be equipped with all the necessary pumps, hoses, and other equipment needed to maintain excavations dry for the complete duration of the work and to the satisfaction of the QC and the QA personnel. The pumped water shall be discharged into the Attenuation Pond for subsequent treatment or other location approved by the Owner's Representative. However, a detailed written procedure of water management during construction shall be submitted to the Owner's Representative for approval prior to the beginning of the Work (Section 2.12).

4.4 Foundation preparation

4.4.1 General

Foundation preparation involves making sure that the footprint of IVR Diversion is free of snow, ice, boulders and any other deleterious materials or soft pocket at all times during the first layer of fill placement regardless of the type or fill zone.

The construction method shall minimize disturbance of Tundra outside of the IVR Diversion footprint.

4.4.2 Channel Excavation

- Based on the available geotechnical information described in Section 2.7, the channel excavation is expected to be entirely in overburden.
- To avoid the channel invert to be sitting on ice-rich material or any thaw softening layer, the channel invert shall be sitting on the ice-poor glacial till surface or on the bedrock surface.
- The channel excavation depth as well as longitudinal and lateral dimensions shall meet those shown on the drawings and shall be approved by the Owner's Representative and the QC/QA personnel prior any fill placement.
- Remove all sharp objects and large stone. Excavated materials shall be set aside separately or stockpiled in areas approved by the Owner's Representative.
- The QC/QA personnel may, from time to time, request that additional soil stripping and removal of snow and ice be carried out in the channel's footprint.
- The excavation shall be dewatered (when applicable) and all thawed soil removed prior to any backfilling. Ice or ice-rich material have to be completely removed from the excavated channel before any fill placement to the satisfaction of the QC/QA personnel.

- All the excavated materials shall be placed at the disposal area approved by the Owner's representative.

4.5 Stockpile and disposal areas

- Unless authorized otherwise, all excavated materials including ice and soil shall be disposed in the area approved by the Owner's representative. During the construction, any other waste disposal area requires written authorization by the Owner's Representative.
- The Contractor shall develop its stockpiles to facilitate drainage and minimize fill segregation.

4.6 Material placement and compaction

4.6.1 General

The Contractor shall prepare the surface to be filled, load, unload and handle the fill in such a way that segregation and loss of fines are limited and shall meet the requirements of Section 3.0 after placement.

4.6.2 Esker

- Prior to the esker material placement, the QC Representative shall conduct at least one (1) standard proctor test on the esker material to fully define the moisture content vs dry density relationship. QA Inspector may request an additional standard proctor test to be carried out, if deemed necessary.
- Haul trucks shall dump their load on horizontal surface and not in the slope to limit fill segregation.
- Any snow and ice accumulated on the previous lift shall be removed before placement of the new lift.
- Each lift shall be placed with an excavator bucket in maximum lift thickness of 0.5 m. Great care must be taken to limit particle segregation during placement. Occasionally the QC and QA personnel may ask the Contractor to modify his construction procedure to meet this requirement.
- Each lift shall be compacted with a roller and the dry density of the esker material shall reach at least 95% of standard proctor value. The Sand-Cone method or equivalent approved by the QC/QA personnel shall be used to monitor the dry density of the compacted esker material on the field. The compaction testing shall be distributed among the different 0.5 m lifts.

- In summer construction, the addition of water may be required on the field to get closer to the optimum water content defined by standard proctor test, thus allowing to reach 95% of maximum dry density value.
- The overlap during compaction shall not be greater than ¼ of the drum width to avoid over compaction.
- Placement and compaction of Esker must be performed to the satisfaction of the QC and QA personnel.

4.6.3 Riprap

- The Contractor shall avoid excessive handling of the riprap to prevent particle segregation.
- Haul trucks shall dump their load on horizontal surface and not in the slope to limit fill segregation.
- Riprap shall be placed with an excavator bucket in a single lift. Great care must be taken to limit segregation during placement. Occasionally the QC and QA personnel may ask the Contractor to modify their construction procedure to meet this requirement.
- Placement of the fill must be performed to the satisfaction of the QC and QA personnel.

4.6.4 Geotextile

- Prepare installation site by excavation of existing materials and foundation preparation shall be free of sharp objects and large stones. The Contractor shall handle all geotextiles in such a manner as to ensure that they are not damaged in any way, and the following shall be complied with:
  - Carefully unroll the geotextile according to the manufacturer's instructions. Roll out and keep the geotextile relatively taut and aligned to minimize any wrinkles or folds in the material, especially along overlaps.
  - In the presence of wind, all geotextiles shall be weighted with sandbags or the equivalent.
  - Geotextile shall be cut using an approved geotextile cutter only.
- The minimum overlaps at ends of rolls or between parallel rolls of fabric shall be 600 mm for overlapped joints.
- No horizontal overlaps shall be allowed on side slopes (i.e. overlaps shall be along, not across, the slope).

4.7 Adverse conditions

The Contractor shall not carry out any excavation, placement or compaction of fill materials when conditions are such that in the opinion of the QC Representative and the QA Inspector, the quality of the work or adjacent works would be adversely affected. After any operation has been stopped owing the adverse conditions, operations shall not be re-started without the approval of the QC Representatives and/or the QA Inspectors and the Owner's Representative.

4.8 Acceptance

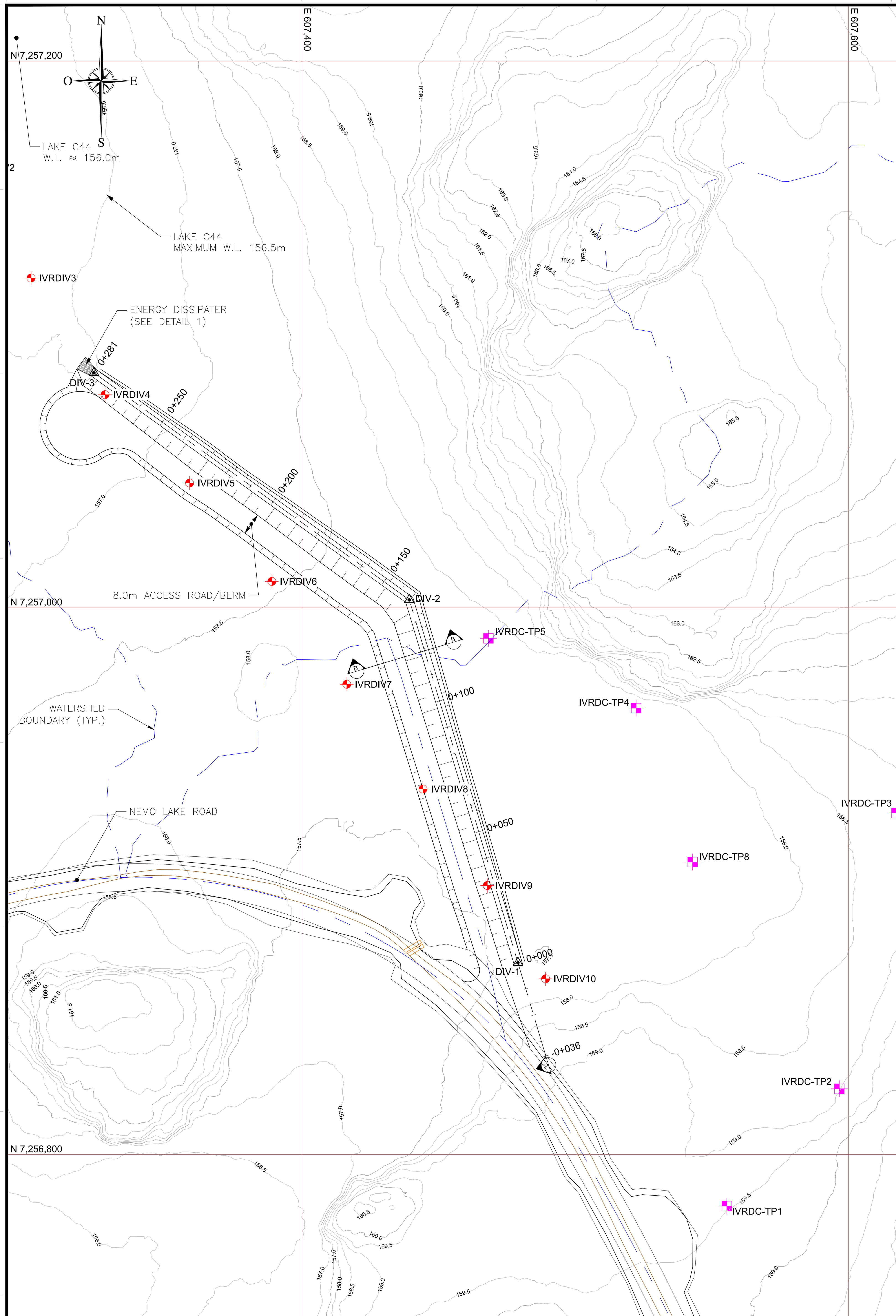
The Contractor shall submit works or sections of works completed in accordance to the lines and grades shown on the drawings for Owner's Representative approval.

5.0 QUALITY CONTROL AND QUALITY ASSURANCE PROGRAM

- The QC/QA approval form is included in Appendix 3 and the tasks for QC/QA are presented in Appendix 2.
- The Contractor shall be entitled to be represented during all field tests carried out by the QC Representative in order to determine whether fill materials meet the requirements of the Specifications.
- The QC Representative will notify the Contractor prior to the start of such tests but the QC Representative shall not be required to wait for the arrival of the Contractor.
- The Contractor shall provide assistance when required for collecting and handling the samples.
- Sampling or testing required by the QC Representative shall be executed by the Contractor without delay. All samples and tests shall be taken or performed in accordance with the appropriate standard, approved by the QC Representative, and shall meet the requirements of the present document.
- Visual inspections of excavation and sources of imported fills will be carried out by the QC Representative on a regular basis to ensure that the excavation work and fill materials meet the requirement of the present document.
- The QC Representative shall provide QA inspector and Owner's Representative calibration sheets for each standardized equipment used for testing of the materials prior to the commencement of the Work (e.g. sieves, tensiometer).

APPENDIX 1
Drawings

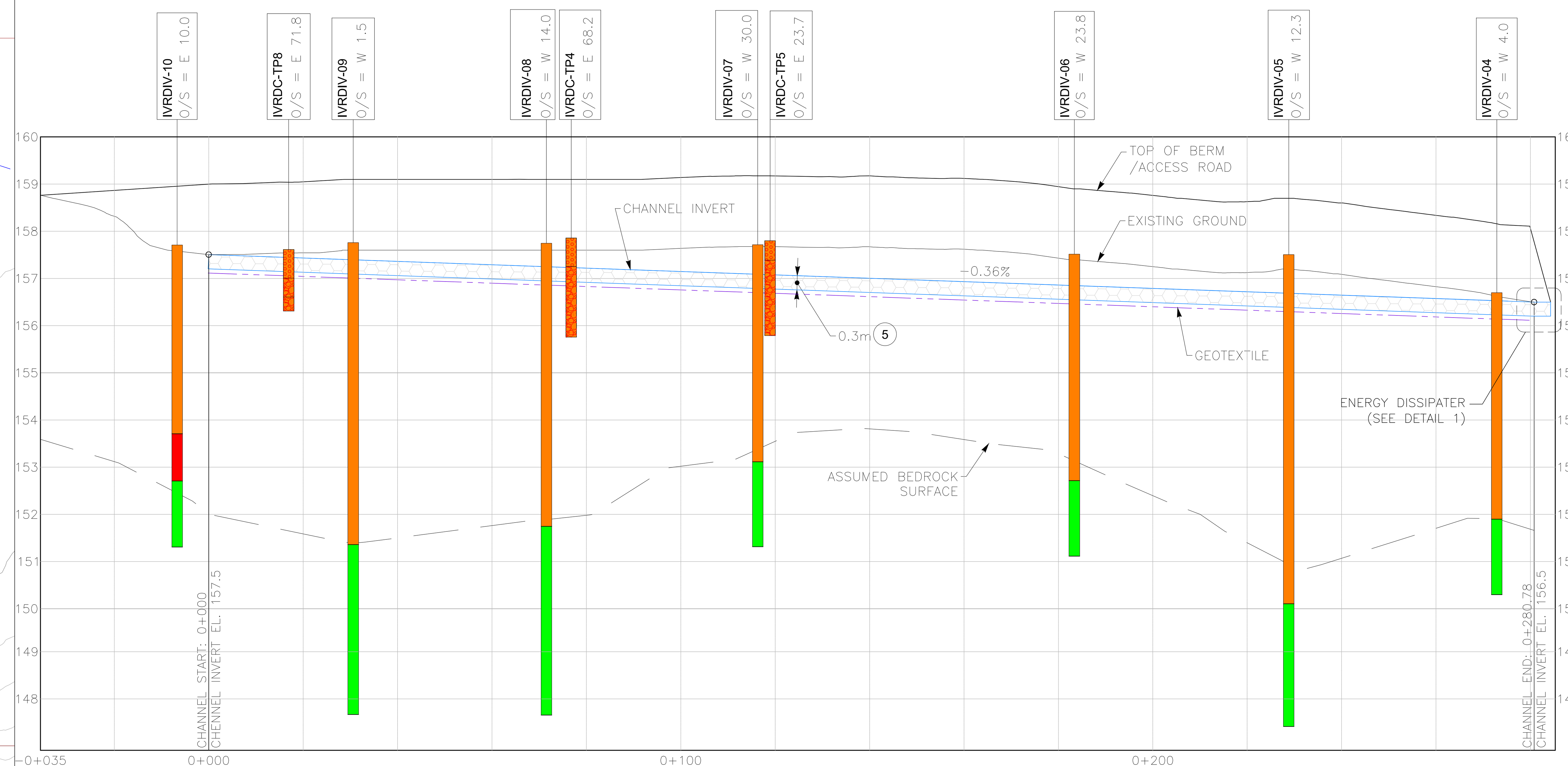
NO. DESSIN DRAWING NO. 61-695-230-201



PLAN VIEW
SCALE = 1:1000

SETTING OUT POINTS

NAME	EASTING	NORTHING	STATION
DIV-1	607,479.05	7,256,870.17	0+000.00
DIV-2	607,439.29	7,257,002.92	0+138.57
DIV-3	607,323.87	7,257,085.98	0+280.78



SECTION A
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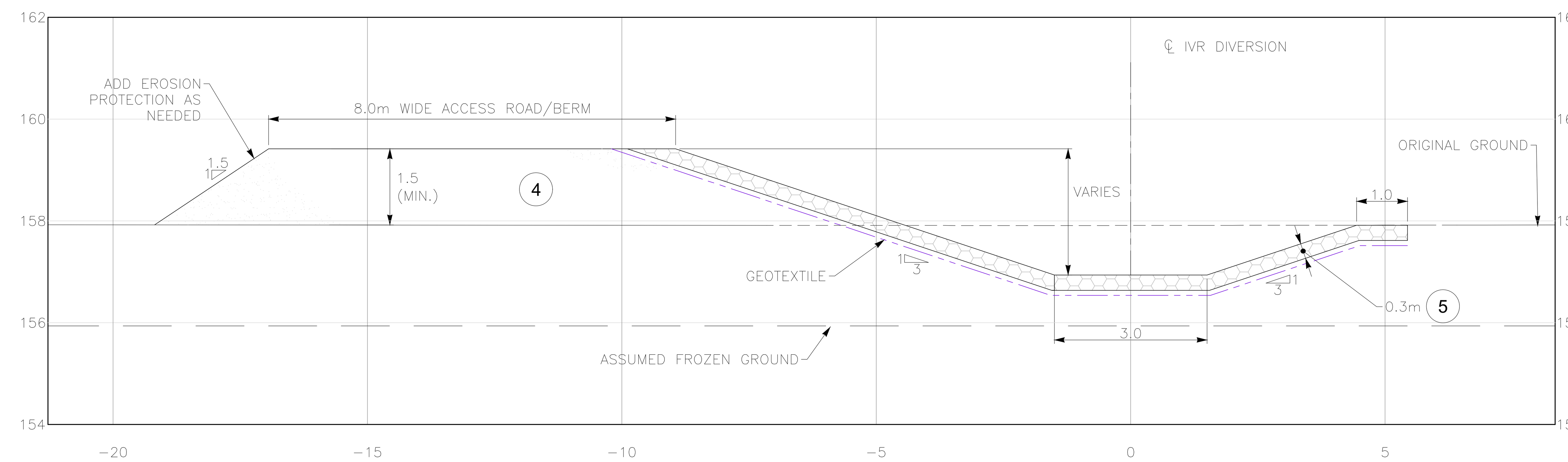
VERTICAL SCALE= 1:75



SECTION B
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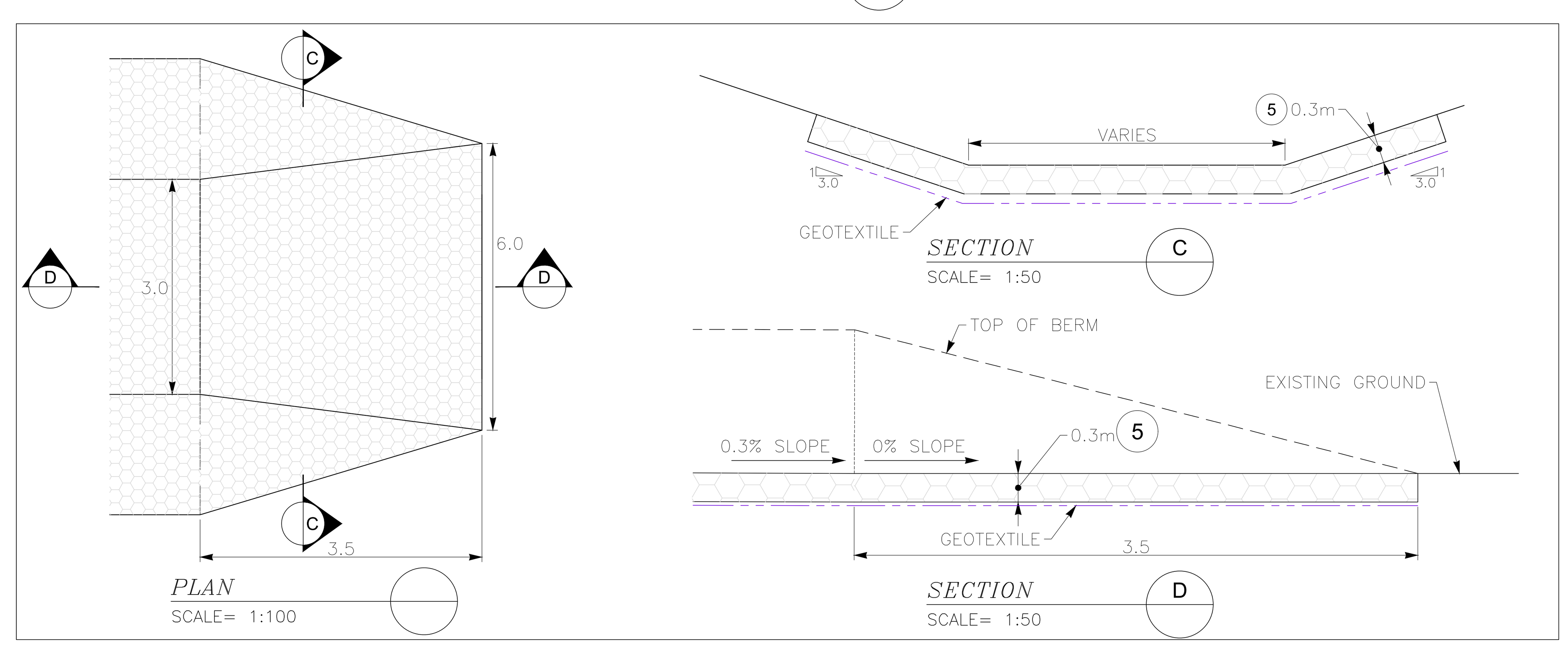

PLAN
SCALE= 1:100

SECTION C
SCALE= 1:50

SECTION D
SCALE= 1:50

DETAIL 1
ENERGY DISSIPATOR

SCALE= 1:1000

SCALE= 1:750

SCALE= 1:75

PLAN CLÉ
KEY PLAN

SNC·LAVALIN

Mining & Metallurgy
5500, des Galeries Blvd., bur. 200, Quebec (Quebec), Canada G2K 2E2
Telephone: (418) 621-5500, Fax: (418) 621-8887

PROJECT No	SUBDIVISION	SUBJECT	SERIAL	REV.
668284	7000	4G DD	0001	PC

NOTES GÉNÉRALES / GENERAL NOTES

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4. ALL DRAWINGS SHOULD BE READ IN CONJUNCTION WITH DETAILED DESIGN REPORT DOC NO. 6127-695-132 REP-004

- ORGANICS
- SAND AND GRAVEL
- OVERBURDEN
- POOR BEDROCK
- GOOD BEDROCK

O/S OFFSET DISTANCE FROM CHANNEL CENTER LINE.
E = EAST OF CENTER LINE
W = WEST OF CENTER LINE

4 ESKER SILT/SAND/GRAVEL
5 RIPRAP (100mm MIN.)
GEOTEXTILE

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
R0	2020-06-18	ISSUED FOR CONSTRUCTION	M.S./N.Q	A.L.N.	
RC	2020-05-19	ISSUED FOR CLIENT COMMENTS	M.S./N.Q	A.L.N.	
RB	2020-03-12	ISSUED FOR COMMENTS	M.S/N.Q	A.L.N.	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
695 – WATER MANAGEMENT
230 – GENERAL EARTHWORKS
PLAN VIEW, PROFILE AND TYPICAL SECTION
AMARUQ PHASE 2
IVR DIVERSION

DESSINÉ PAR DRAWN BY	M. SYKES	DATE 2020-06-18
VERIFIÉ PAR CHECKED BY	N. QUAN / H. BABA	2020-06-18
APPROUVÉ PAR APPROVED BY	A. L. NGUYEN	2020-06-18
ÉCHELLE SCALE	AS SHOWN	DATE 2020-06-18

NO. DESSIN DRAWING NO. 61-695-230-201

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6127	R0	1 / 1

FORMAT ARCHD

AE-CART-ARCH D

FILE NO. 61-695-230-201

APPENDIX 2
IVR Diversion – QA/QC Program

Item	Material	QA Inspector			QC Representatives			Owner's representative – Geotechnical Engineer
		Task	Frequency	Form to be filled	Task	Frequency	Form to be filled	
Survey	All placed materials	Review daily drawings for grade limits	Periodically	Daily report	Ensure that the surveyors use the latest information, bench marks and other data and have a good understanding of the Project and meet requirements	Continuously	Daily report	Coordinate and compile information
Material Placement and Compaction	Geotextile	Visual assessment and manufactory datasheet	Daily during its installation	Daily report	Visual inspection of its installation and verifications of the manufactory testing datasheet	Continuously	Daily report	Request changes on the installation technique of the Contractor. Be sure that the material is adequate. Reject non-conform rolls.
	Esker	Visual assessment and Field sampling for external laboratory testing Review QC data and procedure	Periodically or as requested	Daily report	Visual inspection and testing - Grain Size distribution - Sand-cone test	min. 1 sample per 50 m length min. 1 per 70 m length	Daily report	Collect and assess the QC results.
	Riprap	Visual assessment	Periodically	Daily report	Visual inspection Grain Size distribution Review that the Contractor respects lines and grades.	1 per 150 m length Continuously	Daily report	Modify the source or the method of crushing and/or processing. Adapt the screening if required.
Storage	Geotextile	Visual inspection	Once	Daily report	Visual inspection	Once	Daily report	Ensure that the storage is in conformity with the manufacturer's specifications.
Foundation approval	Bedrock / Ice-poor Till	Visual inspection for foundation approval and verify the excavation limit with the surveyor. Request sampling and testing when needed	Continuously during the excavation.	Daily report / QA / QC approval form	Visual inspection to detect ice and/or any unsuitable material. Coordination with the Contractor to remove the above undesirable materials and drain surface to evacuate water. Verify the excavation limits with the surveyor. Sampling and testing (gradation and water content).	Continuously Periodically or as requested	Daily report / QA / QC approval form	Collect, review and compile completed QC/QA original forms

1 PAG/NPAG = potentially acid generating/non-potentially acid generating

APPENDIX 3
Approval Form

SNC·LAVALIN

SITE REPORT
(Detailed)

Document number

Visit date	Time (Start/End)	Project No.	Prepared by

Project	Client: Agnico Eagle

Consultant: SNC-Lavalin	Contractor

Weather : ☐Sunny ☐Cloudy ☐Rain ☐Storm ☐ Snow ☐Glaze

Wind : ☐None ☐Light ☐Moderate ☐Strong, gusts

Temperature : __________ °C

Comments :

Appendix : ☐Yes ☐No Pictures ☐Yes ☐No Inspection report or other :

ACTIVITIES PERFORMED BY SNC-LAVALIN (indicate if test forms were used)

SITE GUIDELINES (guidelines, memos, modification proposals, etc.)

No	Subject	Given to

SPECIFIC ELEMENTS VERIFIED

Elements	Location	Scope and comments

SAFE AND SAFETY REMARKS

Issued by :

Signature

Date

Verified by :

Signature

Date

SKETCH

SNC • LAVALIN

Sustaining capital
Mining & Metallurgy
1140 Maisonneuve boul. West
Montreal (Québec)
Canada H3A 1M8

Telephone: (514) 393-8000
Fax: (514) 390-2765
www.snclavalin.com

APPROVAL FORM

PROJECT : ______________________

PROJECT #: ______________________ **DATE:** ____________

DOCUMENT #: ______________________ **TIME:** ____________

(YYYYMMDD-DS/NS-01) DS/NS = Day/Night shift (24 hour clock)

APPROVAL FOR :

- ❐ Foundation approval (footprint)
- ❐ Foundation approval (key trench)
- ❐ Fill placement: ______________________
- ❐ CB cutoff wall approval
- ❐ Other: ______________________

LOCATION	**PREVIOUS APPROVALS**
Station ____________	**Station:** ____________
Inclination: ____________	**Details:** ____________
ELEVATION : ❐ varies _________ m	

COMPLIANCE WITH TECHNICAL SPECIFICATIONS:

(Add additional items if needed)

	VERIFICATIONS DONE BY:				
	QA		**QC**		**N/A**
	Y	**N**	**Y**	**N**	
1. Lines and grades					
2. Free of ice/snow/water					
3. Cleaning of trench and/or pile bottom					
4. Gradation (visual)					
5. Placement (lift thickness, segregation, etc.)					
6. Compaction					
7. Foundation on bedrock					
8. Key-in depth into bedrock					
9. Water quality					
10. CB slurry viscosity and density					
11. Elevation of CB Piles					
12. Primary piles strength (Minimum of 50 kPa UCS)					
13. Keying between primary and secondary					
14. Cracks on top of cutoff wall					

	QA		QC		N/A
	Y	N	Y	N	
15. CB mix/slurry tested (UCS, permeability, and pinhole tests)					
16. As built survey completed					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					

DETAILS

(Refer to list above for item #)

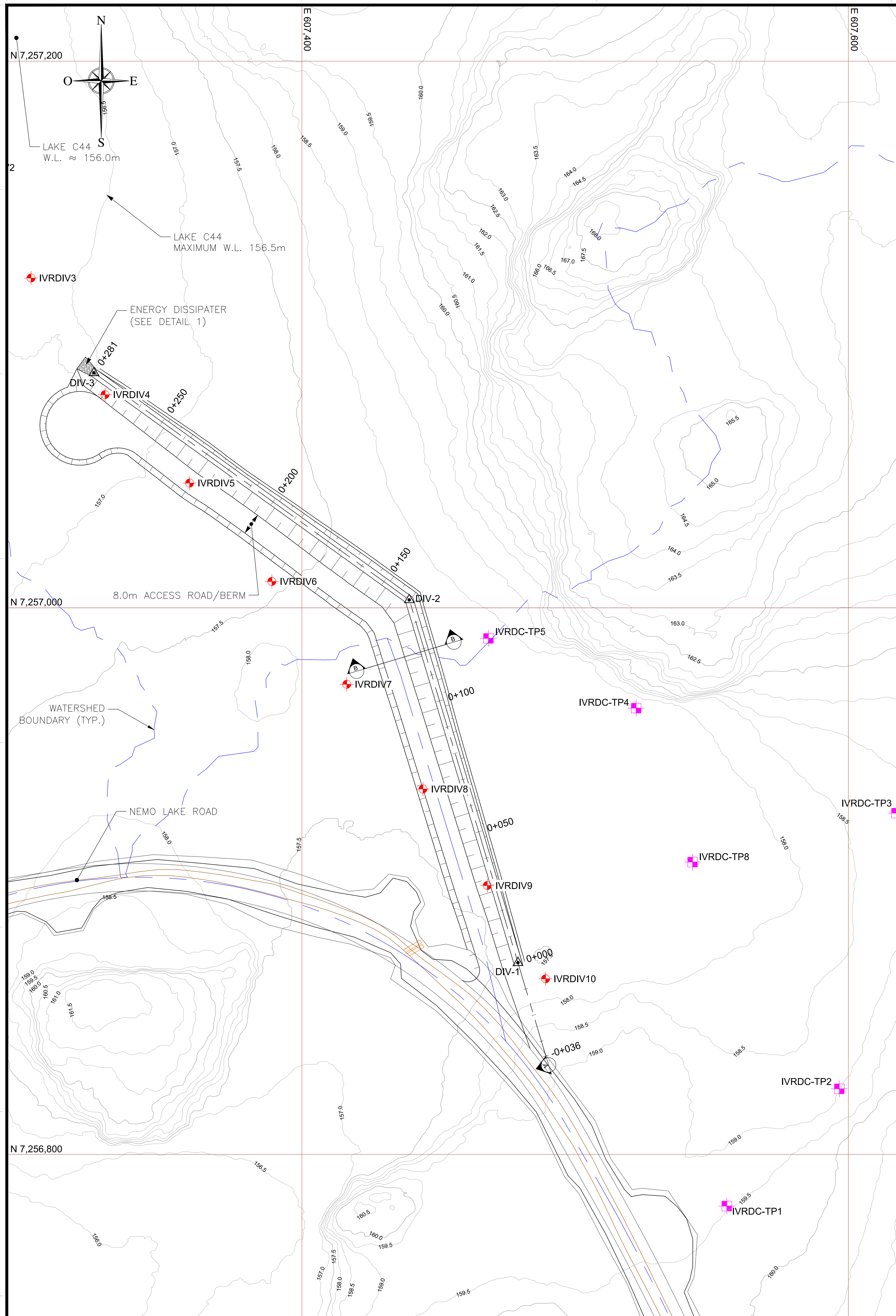
ITEM		APPROVED BY: QA Y	QA N	QC Y	QC N

APPROVED BY:	**NAME**	**SIGNATURE**	**DATE**
QA REPRESENTATIVE	____________	____________	____________
QC REPRESENTATIVE	____________	____________	____________
OWNER'S REPRESENTATIVE	____________	____________	____________

Appendix D

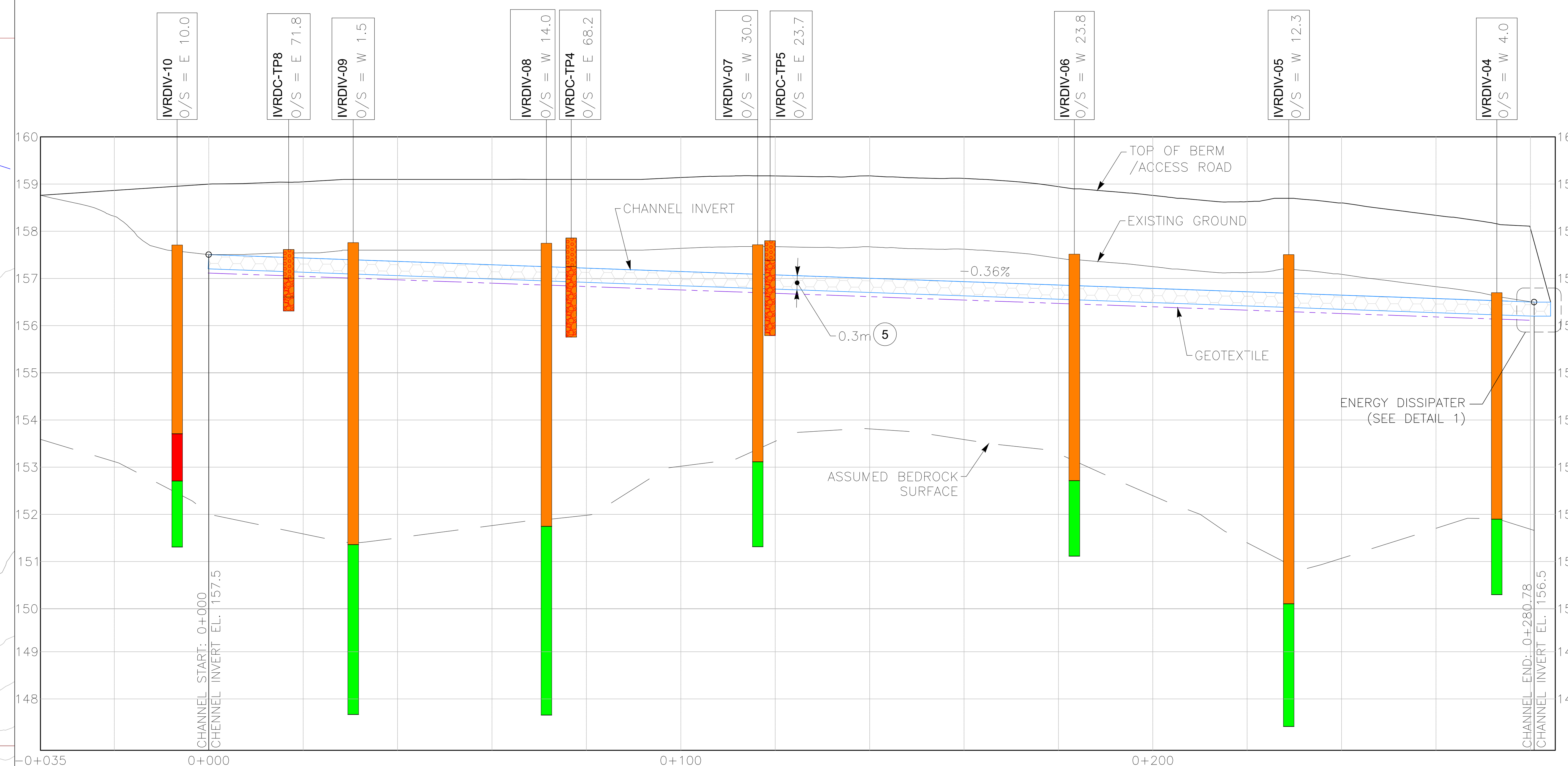
Drawing

NO. DESSIN DRAWING NO. 61–695–230–201

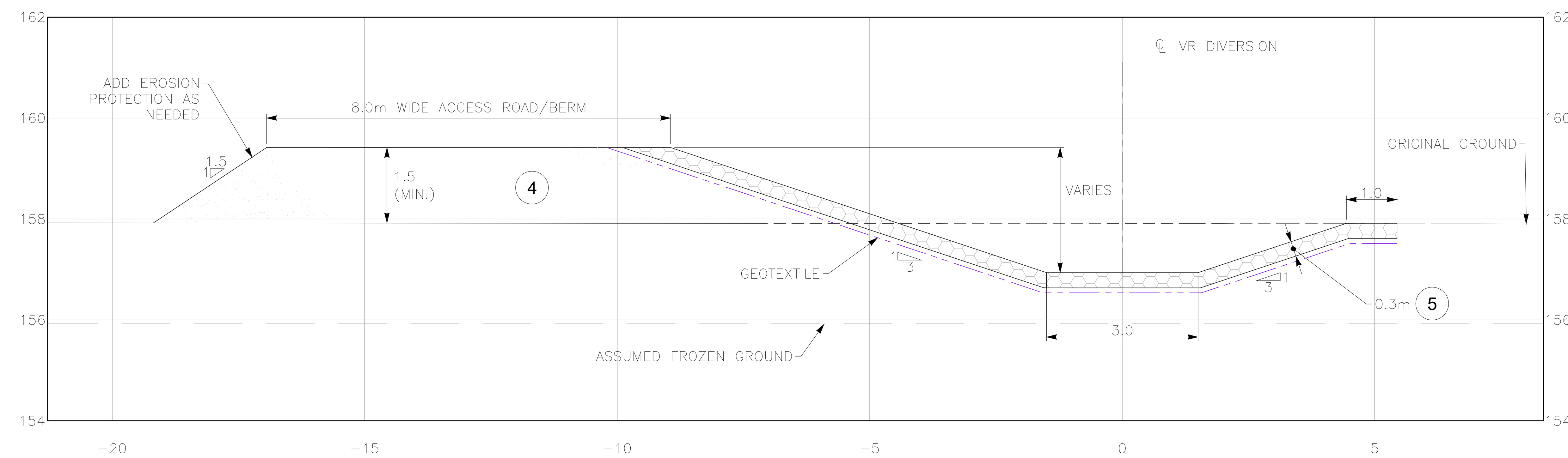


PLAN VIEW
SCALE = 1:1000

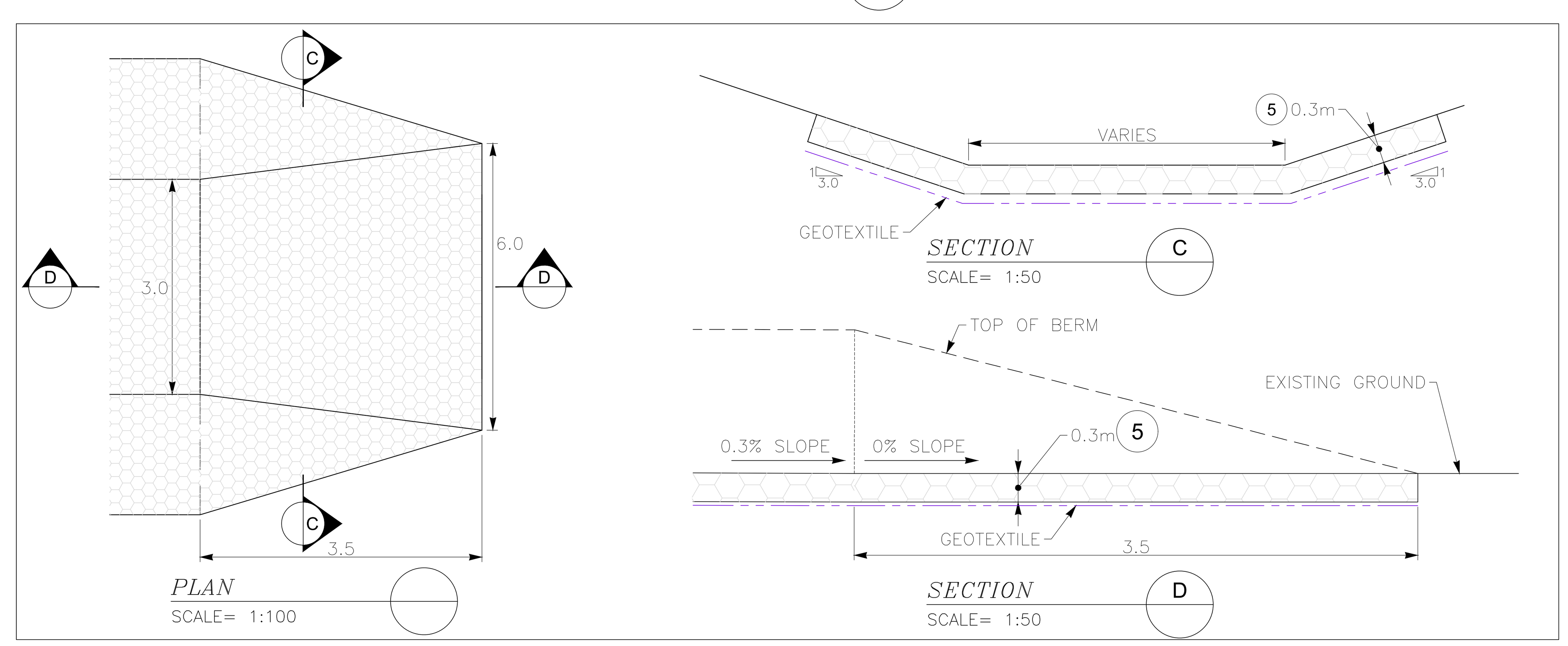
SETTING OUT POINTS			
NAME	EASTING	NORTHING	STATION
DIV–1	607,479.05	7,256,870.17	0+000.00
DIV–2	607,439.29	7,257,002.92	0+138.57
DIV–3	607,323.87	7,257,085.98	0+280.78



SECTION A
HORIZONTAL SCALE= 1:750
VERTICAL SCALE= 1:75



SECTION B
SCALE= 1:75



PLAN
SCALE= 1:100

SECTION C
SCALE= 1:50

SECTION D
SCALE= 1:50

DETAIL 1
ENERGY DISSIPATOR

SCALE= 1:1000 (0 20 40 60m)
SCALE= 1:750 (0 15 30 45m)
SCALE= 1:75 (0 1.5 3.0 4.5m)

FORMAT ARCHD

PLAN CLÉ
KEY PLAN

SNC·LAVALIN
Mining & Metallurgy
5500, des Galeries Blvd., bur. 200, Quebec (Quebec), Canada G2K 2E2
Telephone: (418) 621-5500, Fax: (418) 621-8887

PROJECT No	SUBDIVISION	SUBJECT	SERIAL	REV.
668284	7000	4G DD	0001	PC

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DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

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REVISIONS

REGISTERED PROFESSIONAL ENGINEER H.U. BABA LICENSEE 2020-06-24 NT/NU

PERMIT TO PRACTICE SNC-LAVALIN INC. Signature NAME Date DATE PERMIT NUMBER: P 260 The Association of Professional Engineers, Geologists and Geophysicists of NWT/NU

REGISTERED PROFESSIONAL ENGINEER 2020-06-24 A. L. NGUYEN LICENSEE NT/NU

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
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6127	R0	1 / 1

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FILE NO. 61–695–230–201

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SNC·LAVALIN

195, The West Mall Street
Toronto, ON, Canada
(416) 252-5315