



November 28, 2018

Richard Dwyer  
Manager of Licensing  
Nunavut Water Board  
P.O Box 119  
Gjoa Haven, NU X0B 1J0

**Re: Agnico Eagle Mines – Meadowbank Division Responses to Mammoth Dike Design Report Comments**

Dear Mr. Dwyer,

As requested, the following responses are intended to address the comments made in the below letter:

- CIRNAC – November 20 4, 2018, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) response to Agnico Eagle Mines Limited's (AEM's) Mammoth Dike Design – Whale Tail Pit Project under AEM's Type "A" Water Licence No. 2AMWTP1826.

Should you have any questions or require further information, please do not hesitate to contact me.

Best regards,

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## 1 Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)

### 1.1 Dam Classification and Safety Criteria

**Reference:** Section 4.2 - Page 8 of the Design Report

**Comment 1:** CIRNAC recommends AEM clarify the specific measures included in the design for erosion protection purpose.

**Agnico Eagle's Response:**

*Mammoth Dike is considered as a non-erodible structure as its shell is made of rockfill, which is a non-erodable material.*

*The construction of Mammoth Dike will occur during winter period which will limit the potential for erosion by limiting flow from the construction area.*

*Agnico will follow the water quality-monitoring program as detailed in Section 4.2 and 4.3 of the Water Quality Monitoring and Management Plan for Dike Construction and Dewatering. The monitoring will be, minimally, on a weekly basis in the receiving environment Mammoth Lake. Agnico Eagle is committed to proactive and effective response to any potential TSS problems; the monitoring program, detailed in Section 4.2 has been designed to provide quick feedback. Based on experience at the Meadowbank Mine, the TSS-turbidity relationship will be use.*

*As detailed in Water Quality Monitoring and Management Plan For Dike Construction and Dewatering, during the dike construction, Agnico Eagle will abide by limits established by the NWB in the Water License 2AM-WTP1826. The following maximum monthly mean (MMM) and short term maximum (STM) TSS concentrations will be met.*

Parameter	Maximum Monthly Mean (mg/L)	Short Term Maximum (mg/L)
TSS in areas where there is spawning habitat and at times when eggs or larvae are expected to be present	6	25
TSS in all other areas and at times when eggs/larvae are not present	15	50
TSS in impounded areas (e.g. North Basin of Whale Tail Lake) at all times in all areas	15	50

*Trigger values have been developed with corresponding management action plans; should TSS concentrations in the water body exceed the trigger values during either dike construction, a management action plan consisting of a series of steps to be undertaken will be initiated. The trigger value for the short term maximum concentration is a single sample that exceeds the STM*



*concentration. The trigger value for the maximum monthly mean is a 7-day moving average concentration that exceeds the MMM.*

*The strategy used by Agnico to manage risk related to erosion during construction and operation of the structure are detailed in the Whale Tail Pit Water Management Plan (Section 3.1.4.5). As discussed, best management practice (BMPs) might be implemented if required.*

*Temporary BMPs may include:*

- Silt fences and fabric installations ;*
- Turbidity curtains ;*
- Sediment control basin to detain sediment-laden water ;*
- Diversion of flows away from construction area.*

*Mammoth Dike will be constructed in shallow water. Based on Agnico Eagle experience regarding Vault Dike, which was also constructed in shallow water, Agnico does not expect any erosion problem with the Mammoth Dike Construction, especially during winter.*

## **1.2 Construction**

**Reference:** Section 8.0 - Page 11 of the Design Report

**Comment 2:** CIRNAC noted a series of QC/QA narratives in the provided technical specifications. However, considering the dike's performance is largely governed by the care and thoroughness demonstrated during its construction, AEM is to clarify and provide a clear description of site specific criteria (available dike materials, investigation of construction material sources, etc.) incorporated in the design for the execution phase.

### **Agnico Eagle's Response:**

*Agnico is committed to ensure that the best practice will be followed during construction and operation.*

*During construction a Quality Assurance (QA) and Quality Control (QC) program will be implemented to ensure that the dike construction meets the specification and the design intent. The content of the QA/QC program that will be implemented is detailed in Appendix 3 of the Technical Specification. All QA/QC results will be documented in the as-built report.*

*Agnico also has an Engineer of Record (EOR) assigned for all Nunavut operation who provide technical direction on behalf of Agnico and ensure that the structure has been designed, constructed and is performing throughout the life cycle, in accordance with the design intent and performance objectives.*

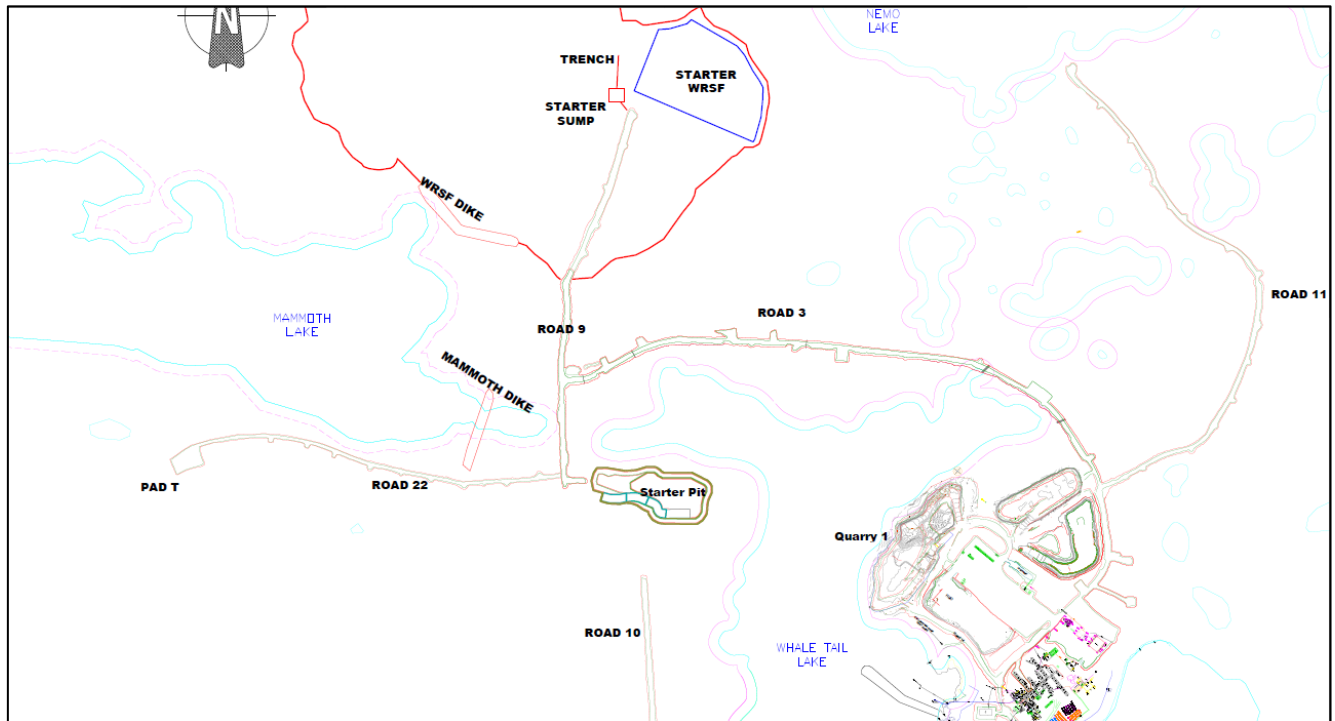
*The material used for the construction of the dike and their estimated required quantity are presented in Table 10-1 of the design report. The rockfill, coarse filter and fine filter material will be NAG and NML rockfill from Whale Tail Pit (including Quarry 1 and Starter Pit). Agnico will follow the Whale Tail Pit Waste Rock Management Plan to ensure that the rockfill used for dike construction is NAG and NML. The specification of the bituminous geomembrane that will be used for construction is indicated in Appendix 2 of the design report. The bentonite used for the dike construction has been bought from a supplier and is conform to section 3.3.5 of the Technical Specification (Appendix A).*

### **1.3 Access Roads**

**Comment 3:** No dike access details have been provided. CIRNAC recommends AEM to provide adequate details for any required access roads to access the dike during high flow periods for routine inspections and regular maintenance.

#### **Agnico Eagle's Response:**

*The access road to Mammoth Dike was not included in the dike design. A site road adjacent to the dike (road #22), subjected to a 60 day notice sent on July 13<sup>th</sup> 2018 and approved for construction on September 4<sup>th</sup> 2018, is already existing and will be used as the access road. Access to the dike crest will be restricted to light vehicle for inspection and maintenance purpose.*





## 1.4 Geotechnical Comments

**Reference:** Design Report Section 1.2 - Page 6

**Comment 4:** All assumptions based on past experience should be included in the report for completeness.

**Agnico Eagle's Response:**

*All assumptions and technical work done for the dike design is included in the submitted design report. SNC Lavalin meant that a similar design methodology was used for Mammoth Dike than for Whale Tail Dike but that the complexity of the Whale Tail Dike analysis were higher due to the use of a different construction technique (Whale Tail Dike use a secant pile cutoff wall instead due to the higher water head).*

## 1.5 Geotechnical Comments

**Reference:** Design Report Section 6.2 - Page 10

**Comment 5:** What is the impact if the FFAB layer is unfrozen? If there is a risk of lowered performance of the FFAB in an unfrozen state, is there a proposed mitigation plan? See comment on dike stability below.

**Agnico Eagle's Response:**

*The Fine Filter amended with bentonite (FFAB) and the bituminous geomembrane are low permeability element that act as a seepage barrier at the upstream toe of the dike. If these elements are unfrozen the performance of the dike should not be impacted.*

*If the foundation of the dike was unfrozen there could be a risk for seepage through the bedrock. For this reason thermistor will be installed to monitor the thermal regime of the dike and the foundation. Frequent inspection will also be done to ensure proper performance of the structure.*

*Any seepage through the structure would report on the downstream side of the structure or into Whale Tail Pit. Mitigation measure for potential seepage could include:*

- Increasing the extent of the thermal berm to promote permafrost penetration*
- Collecting the water into sump on the downstream side of the dike or into the pit and pumping it back into the attenuation pond (or directly in Mammoth Lake if water quality is compliant)*



## **1.6 Geotechnical Comments – Dike Stability**

**Reference:** Dike Stability Appendix B

**Comment 6:** Have thermistor readings being taken between March 2018 and September 2018 to capture the full depth of thaw through the summer months? Are readings available between 2015 and 2017?

**Agnico Eagle's Response:**

*One thermistor was installed at Mammoth Dike location in 2016. Data from this thermistor have been read manually starting on August 1, 2016. This thermistor is still operational and data are being taken every month. All data obtained from this thermistor can be found in Appendix 1.*

## **1.7 Geotechnical Comments – Specs**

**Reference:** Specs Appendix A Section 1.3 – Page 1

**Comment 7:** As thermistors will be placed to monitor the FFAB: will these be placed during construction or placed post construction in boreholes?

**Agnico Eagle's Response:**

*All instrumentation will be installed after construction in drilled borehole.*



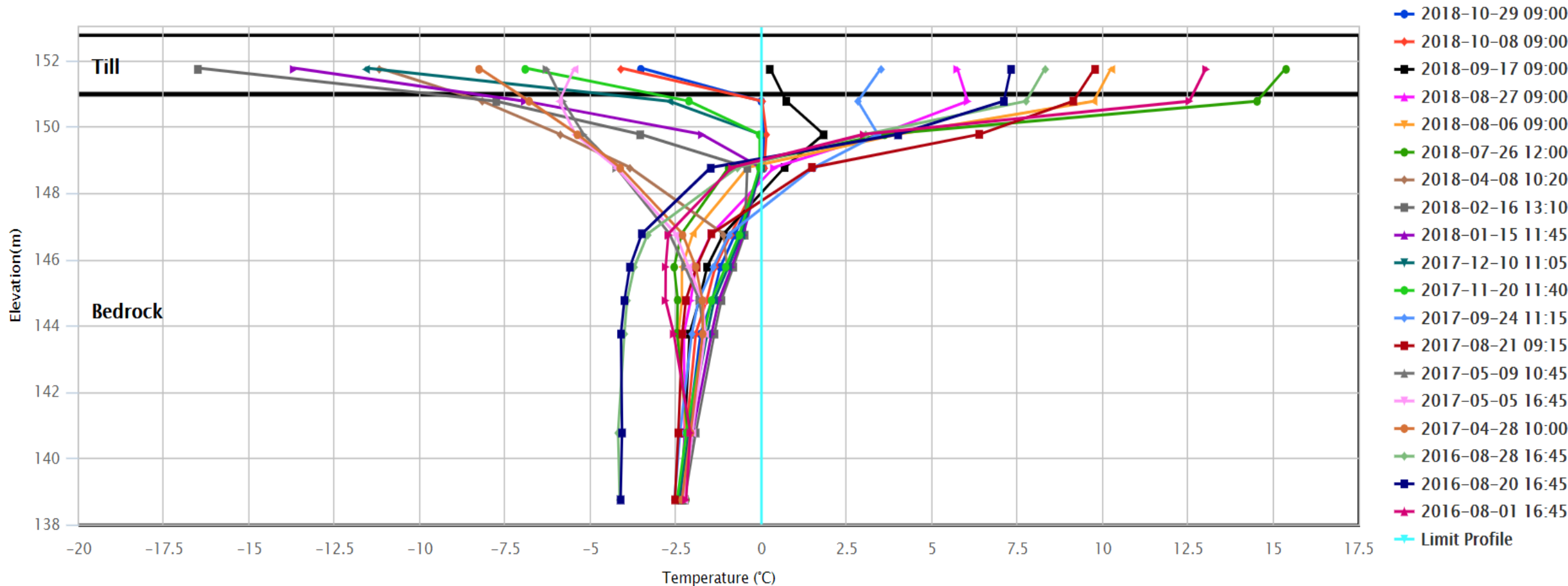
## **APPENDIX 1**

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### ***Thermistor Data***

# Mammoth Dike Thermistor MD-AMQ15-02 (all reading available)

70 - MD - AMQ15-02





# Mammoth Dike Thermistor MD-AMQ15-02 (from February to September 2018)

70 - MD - AMQ15-02

