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Memo

To	Mathieu Gallant, Behzad Soltani (AEM)	**Client**	Agnico Eagle Mines Limited
From	Peter Luedke, PEng (SRK) John Kurylo, MSc, PEng (SRK)	**Project**	CAPR003128
		Date	February 7, 2025
Subject	Doris Pad U Rock Storage Facility - Design Overview for Notice of Construction		

File name: HopeBay_PadU_CWP_NoticeofConstructionMemo_CAPR003128_20250207.docx

1 Introduction

SRK Consulting (Canada) Inc. was retained by Agnico Eagle Mines Limited (Agnico Eagle) to develop a detailed design for the Doris Pad U temporary rock storage facility (RSF), contact water pond (CWP) berm and associated surface water management infrastructure at the Hope Bay mine in Nunavut. This memo summarizes the design of the rock storage facility water management infrastructure and supports the notice of construction submission. The final detailed design and field investigation is ongoing which will inform and be documented in the comprehensive design report.

AEM personnel contributed to sections of the memorandum to include site environmental and operational considerations, schedules and equipment availability.

2 Project Purpose

Agnico Eagle intends to construct and utilize the proposed and permitted Pad U temporary ore storage and laydown areas at the Hope Bay site and the pad will also be used to store ore and waste rock from the Existing Doris Run of Mine (ROM) pad (otherwise referred to a Pad T rock storage facility). Storage of ore and waste rock at Pad U is critical to allow construction of the new Doris power plant and mill facilities within the western portion of the current footprint of the Doris ROM pad. In accordance with the approved design, contact water pond and water management infrastructure will be constructed as per 2AM-DOH1335, Part A, Item 1:

The Licensee may conduct mining and associated activities at the Doris-Madrid Project, in the Kitikmeot Region of Nunavut at the following project extents […] included in general, the following: The construction of additional surface infrastructure, including […] a temporary ore storage and laydown area on Pad U and its associated Contact Water Ponds and Non-Contact Water Pond […] Activities at the Madrid North and Madrid South sites will include: […] The development and operation of site facilities, including maintenance facilities, laydown areas, roads, […].

3 Existing Design Documents:

- Water license and permitting design: Doris North Project: Expanded Laydown Area (Pad U) (SRK, 2015).
- Engineering Drawings for the Pad U Waste Rock / Ore Storage Area Doris North Project, Nunavut, Canada, Issued for Construction (SRK, 2018).
- Hope Bay Madrid Infrastructure Hydrological Design & Operations Water Balance Update (SRK, 2024).

4 Design Basis

4.1 Temporary Rock Storage Facility Design Criteria

The design basis for the Pad U RSF includes:

- A ROQ base pad beneath the planned RSF to mitigate permafrost degradation and allow removal of waste rock. The ROQ pad has a minimum fill thickness of 1.0 m.
- Ramp grades shall not exceed 10%.
- Ramps shall have a minimum width of 8 m and a turning radius of 12 m.
- The maximum particle size for ROQ is 500 mm for fill thickness of 850 mm, and 900 mm for fill thickness exceeding 850 mm. All material shall be free from organic matter, soil, snow and ice.
- The underlying ROQ pad shall be constructed with a general drainage gradient of 0.5% directed towards the Sedimentation/Pollution Control Pond.

4.2 Inflow Design Flood

Hydrological assessment was completed using a rainfall-runoff modelling approach to estimate the inflow hydrographs to each of the structures, in response to the selected Inflow Design Flood, or IDF (SRK 2022a, 2023, 2024). Rainfall-runoff analyses were performed in MS Excel using a simplified hydrologic model, referred to as the Rational Method (Chin 2000), using the updated IDF and physical watershed characteristics to estimate peak flows.

The following input parameters were used to complete the infrastructure hydrological assessment:

- A 100-year 24-hour rainfall depth, adjusted to RCP4.5 2050s, of 62.3 mm, and distributed using an alternating block storm hyetograph (Millar 2017).
- An average year (i.e., 2.33-year return period) 30-day snowmelt volume of 163 mm.
- No time of concentration, per Agnico Eagle Design Standards (2021).
- A runoff coefficient of 1.0 (i.e., no infiltration), per Agnico Eagle Design Standards (2021).

4.3 Hydrologic Design Basis

SRK assessed the hydrologic design in accordance with Agnico Eagle's current corporate water management standards (Agnico 2021) and the updated Inflow Design Flood for the site (SRK 2024). The updated hydrological design basis is provided in Table 4-1.

Table 4-1: Pad U RSF updated hydrological input parameters.

Item	Pad U CWP	Non-Contact Water Diversion
Upstream Catchment (ha)	3.6	1.3
Time of Concentration (min)	0	0
Runoff Coefficient	1	1
100-year 24-hour Rainfall (mm)	62.3	62.3
30-day Snowmelt (mm)	163	163
Design Flood Volume (m^3)	8,100	2,900

Sources:~NACAPR003128/Internal/Pad%20U/HydrologyInput/CAPR003128_Hydrological_Assessment_Update_PadUDesign_Rev02.xlsx

Due to the substantial portion of the design volume being associated with snow melt and considering the typical snow melt duration of 15 to 30 days, larger magnitude rainfall events during freshet will be managed through the CWP dewatering system. The design pond capacity is also larger than the summer PMP rainfall (128 mm) runoff volume and therefore can also be managed by active dewatering. A passive culvert spillway design has been included to provide additional redundancy; however, it is expected that the pond capacity is adequate for most potential runoff scenarios without the culvert, provided it is maintained in a dewatered state prior to the event.

4.4 Contact Water Pond Operational Design Basis

The design basis for the Pad U CWP operational water level is based on maintaining a dewatered pond within 48 hours of a runoff event. By maintaining a dewatered pond shortly after a runoff event, the thermal impacts of an elevated water level will be minimized on the frozen foundation at the key trench. This dewatering strategy and timeframe of 48 hours is consistent with the Hope Bay project requirement that all surface water collection points be supported by infrastructure (i.e., pumps and pipelines) capable of dewatering the stored IDF volume within a (maximum) 48-hour period.

4.5 Contact Water Pond Thermal and Geotechnical Design

The proposed contact water pond berm is a lined berm, keyed into frozen overburden. The contact between the liner and overburden within the key trench is required to remain frozen and the frozen contact between the liner and overburden upstream of the key trench will provide additional hydraulic containment. There are two primary sources of heat applied to the system, atmospheric heat transfer to the rock fill boundary and heat transfer from water stored in the pond against the liner. The more significant risk to the structure comes from heat transfer due to flowing water should a seep form. This highlights the importance of construction quality along the key trench and liner interface.

In order to address atmospheric heat transfer into the foundation of the CWP berm the entire berm requires a minimum of 2.0 meters of rock fill above the liner and overburden contact, this depth of ROQ causes permafrost active layer to increase to within the berm and therefore maintain a frozen foundation when the pond is operated in a dewatered state.

During the short periods following a runoff event where the water level will remain elevated, additional heat transfer into the upstream liner foundation is expected, however by dewatering within 48 hours under and runoff event, this will mitigate the thermal impacts on the foundation. Previous thermal analysis of the prior 2018 design, similar to the proposed cross section, have undergone thermal analysis including climate change consideration. This analysis indicates that under conditions where the pond is at the maximum water level, the key trench will remain below -2°C for at least 15 years. Due to the duration of the upstream pond boundary condition in this analysis, this is a highly conservative analysis relative to the proposed water management strategy for Pad U CWP and represents an end member of poor water management scenario (not realistic). Similarly, site investigations are planned and ongoing within the alignment of the CWP which will inform updated geotechnical and thermal analyses.

Standard thermal modelling cannot effectively analyze the convective and advective heat transfer that could occur due to seepage or bypass past the liner, which highlights the need for good construction QA, maintenance of a minimal water level to maintain the frozen liner contact and having adequate monitoring in place to confirm the performance of the structure.

The current structure cross-section is being further analyzed for thermal and geotechnical performance to confirm the integrity of the facility can be maintained over the design life.

4.6 Contact Water Pond Berm Instrumentation

The contact water pond relies on maintaining a frozen foundation and therefore will be monitored to confirm these conditions are met. The proposed instrumentation design includes 17 vertical ground temperature cables distributed throughout the berm and two transverse ground temperature cables to monitor along the length of the foundation for seepage detection. A plan and typical section of instrumentation is shown in the drawings. Surficial survey monitoring points (survey pins installed in large boulders) within the contact water pond berm rock fill will be installed along the crest and face of the berm at 10-meter intervals to monitor for displacement.

4.7 Diversion Berms

The downstream diversion berm to the west of the contact water pond is sized to divert seepage flows within and up to the full depth of the ROQ pad with an additional 0.3 meters of freeboard above the pad elevation to limit bypass should an area of ponding occur on the ROQ pad. Based on the catchment areas of the downstream berm, contact water runoff is expected to only flow through the ROQ pad unless the ROQ pad freezes and becomes impermeable.

The upstream diversion berm is designed to divert the upstream non-contact water towards Doris Lake. The low-permeability portion of the berm will be a minimum of 0.5 meters high for practical

construction, however flow depths are expected to be less than 0.20 m during a 24-hr 100-yr design event. The upstream berm will be field fit to optimize diversion efficiency and may be converted to a rock lined ditch where necessary.

The diversion berms will be constructed and lined with HDPE and non-woven geotextile, keyed into overburden. Clean run-of-quarry material is recommended for armoring the ditches, with a grain-sizes ranging from 25 mm – 250 mm. The armoring layer will be a minimum of 0.5 m thick.

The proposed layout of the facility, typical sections of the contact water pond and diversion berm are shown in the attached drawings.

5 Construction Materials

All construction materials shall be sourced from quarry materials which are competent and geochemically suitable (not acid generating or metal leaching). All construction materials must also meet the Technical Specifications (SRK 2022b). All rock construction materials shall be inspected and tested as per the established quarry rock management and testing plans on site.

Table 5-1: Material Take Off

Material	Quantity[1]	Unit	Use
Run Of Quarry	12,300	m^3	CWP and Diversion Berm
Run of Quarry (Pad)	27,100	m^3	Pad U
Run of Quarry (Road)	1,410	m^3	Access road realignment
Transition Material	1,400	m^3	
Surfacing	250	m^3	Road surfacing and liner bedding
Bedding	2,200	m^3	
HDPE/LLDPE Liner	4,630	m^2	
Non-woven Geotextile	9,300	m^2	
Culvert 600 mm diameter	16	m	
Bentonite chips or powder	44	m^3	
Vertical Ground Temperature Cables	15-17	ea	10 – 13 meters
Transverse Ground Temperature Cables	1-2	ea	240 meters

Source: https://srk.sharepoint.com/:x:/s/FS208/EbBWaE7VgnFEuo8lAJd-zRQBCG14YpEKt3dmX3WGmkXXag?e=GRxwwk

Notes:

[1] All quantities provided are neat line design volumes and do not include any considerations for bulking factors, overlap, waste or contingency.

6 Construction Considerations

The proposed construction of the Pad U Contact Water Pond and RSF will include the following key construction considerations:

- All construction will be in accordance with the Hope Bay Earthworks and Geotechnical Engineering Technical Specifications (SRK 2022b), to be updated prior to construction as required.
- All rockfill placement must be completed during the winter to at least 1.0 meters above original ground level to provide thermal protection. Berm construction could continue above the 1.0 meter fill thickness into the spring, provided no waste rock has been moved to the Pad U.
- The ROQ pad (already under construction) should not exceed the proposed footprint and a 10 meter buffer from the existing Float Plane and Dock Access Road shall be maintained until the diversion berm is complete.
- Drilling investigations planned for February 2025 may require changes to the design prior to construction if the foundation conditions are significantly different that the current assumed.
- Ground temperature cables installed prior to or during construction will need to be protected to avoid damaging the cables. It is preferred to install the cables during construction to minimize potential for damage and to align them with the final constructed geometry.
- The existing sump (to be removed) or a new culvert sump should be installed at the low point of the contact water pond within the containment footprint (minimum 3 meter offset from the upstream toe). Installation of a sump will assist with pumping and maintaining the low water level within the pond during routine runoff events.
- The upstream diversion berm will need to be field fit to optimize diversion towards Doris Lake. This should be completed during the summer when existing flow paths can be observed.
- No waste rock or ore can be placed on the pad until the contact water pond construction is complete.
- The Doris Lake pipelines, pumps and the float plane and dock access road will require realignment prior to construction.
- Pipelines along the TIA access road will need to be relocated to avoid conflict with the Pad U ROQ pad.
- All pipelines and utilities shall be located and flagged prior to the start of construction in the area.
- Exposed or disturbed permafrost overburden remaining after construction shall be minimized, and covered by a minimum of 0.5 m of ROQ fill (thermal protection) to the extent practicable. Maintenance will be completed as necessary following construction.
- Construction traffic shall be maintained within the ultimate construction footprint of the proposed works, so as to minimize disturbance to the tundra.
- All surface runoff for the duration of construction will be managed according to water license 2AM-DOH1335 Part D, Item 9.

7 Quality Control and Quality Assurance

Quality Control (QC) and Quality Assurance (QA) shall be conducted in accordance with the Technical Specifications. Important considerations are listed below:

- Ensure all approvals are in place prior to commencing construction. AEM Environment and Permitting team to be consulted for approval.
- An representative of the design engineer (in this case SRK) should be on site to monitor construction and ensure the design is adhered to or approve field design changes. Depending on construction schedule and AEM's capacity on site to provide internal construction QA, SRK may reduce the monitoring to select inspection(s) of the project at critical stages or once complete.
- Complete surveys of the area are required at key stages including:
  - The existing ground where materials are expected to be placed, with an adequate buffer to ensure that any overbuilt areas are covered.
  - Each interface / surface of material placement prior to a change in material type
  - The final as-built condition including earthworks and liner placement.
- Quarry and construction rock monitoring program and the quarry management plan.
- A set of construction record drawings shall be produced, accompanied by a summary memorandum.
- A monitoring plan based on the installed instrumentation.

8 Environmental and Monitoring Considerations

The existing road immediately downstream of the construction area will provide substantial erosion and sediment management for most of the construction area. Activity downstream of this existing road may require silt fencing or straw waddles installed immediately downstream of the construction area to assist to contain any sediment that may be mobilized should a rainfall event occur during or during the spring/summer following construction.
Having approximately 250 meters of straw waddles or silt-fence on hand will meet the needs of the project; however, having some extra supplies available is important to manage erosion and sedimentation.

Additional requirements include:

- Best practices for construction and erosion control measures will be implemented and license requirements for construction will be adhered to.
- For the first year, periodic inspections will be completed prior to and during freshet and following any notable rain events.
- All surface runoff for the duration of construction will be sampled according to Water Licence 2AM-DOH1335 Part D, Item 9.

9 Construction Equipment

The planned construction equipment list is expected to include, but may not be limited to:

- CAT 740/745 haul trucks
- CAT D6 or D8 Dozer to place road materials
- CAT 345/350 Excavator to assist with construction of the structure
- CAT 988 Loader to load construction materials at the source

10 Construction Timeline

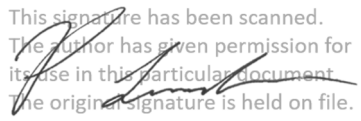
Key construction milestones are listed below:

- Construction is planned to commence in Q1 2025
  - Berm construction would ideally be completed during the winter to ensure the key trench and rock fill start at cold temperatures.
  - In case of construction delays, the key trench excavation for the berm and backfill up to at least 1.0 meter above original ground is required to be complete before May 2025. Upper fill and liner placement could occur following May 2025.
  - The structure is planned to be complete in Q2 2025, prior to placement of waste rock or ore on Pad U.

Closure

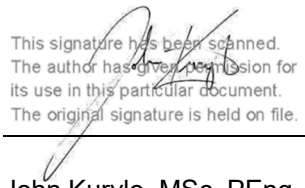
It you have any questions or concerns regarding the design summary or notice of construction, please contact SRK.

Regards,
SRK Consulting (Canada) Inc.



Peter Luedke, PEng
Senior Consultant

Reviewed by



John Kurylo, MSc, PEng
Principal Consultant

Attachments:

Attachment 1 Drawings

References

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Attachment 1 Drawings