AGNICO EAGLE

Meadowbank Division

Whale Tail Pit
Waste Rock Management Plan

MAY 2019
VERSION 5_NWB

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing an expansion to the Whale Tail Pit and Haul Road Project (Approved Project), a Meadowbank satellite deposit located on the Amaruq property. As an expansion to the Approved Project (Project Certificate No. 008 and Type A Water Licence 2AM-WTP1826) Agnico Eagle is proposing to expand and extend the Whale Tail Pit operations (the Expansion Project or the Project) to include a larger Whale Tail Pit, development of the IVR Pit, and underground operations while continuing to operate and process ore at the Meadowbank Mine.

On December 2018, the Nunavut Water Board approved the Whale Tail WRSF, NPAG Stockpile and Overburden Stockpile Design Report and Drawings; Type "A" Water Licence 2AM-WTP1826, Whale Tail Pit Project (60-day notice). Agnico Eagle Mines Limited is planning to construct and monitor the WRSF in accordance to this approved design report and as per water license conditions.

The Amaruq property is a 408 square kilometre (km^2) site located on Inuit Owned Land (IOL) approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km north of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit would be mined as two open pits (i.e., Whale Tail Pit and IVR Pit) and underground operations, and ore will be hauled to the approved infrastructure at Meadowbank Mine for milling.

The Whale Tail Pit Project (Approved Project), mined by truck-and-shovel operation, will produce 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock, and 5.6 Mt of overburden waste, processed over a three to four-year mine life. The Expansion Project proposes mining an additional 15.2 Mt of ore from the expanded Whale Tail Pit, the IVR Pit and underground operations until 2025. In total, the resources for the Whale Tail project will be expanded and extended over approximately a seven year period from 2019 to 2025.

Project mining facilities include accommodation buildings; ore stockpiles; overburden stockpiles; permanent waste rock storage facilities (WRSFs) area planned to receive waste rock and waste overburden; temporary waste rock facility to received underground waste rock, a water management system that includes collection ponds, water diversion channels, and retention dikes/berms; and a water treatment plant.

One area, located north-west of the Whale Tail Pit, has been identified as the Whale Tail WRSF and a second, located east of the IVR Pit, has been identified as the IVR WRSF for the waste rock placement. Waste rock and overburden will be trucked to the Whale Tail WRSF and IVR WRSF until the end of operations, with distribution according to the operations schedule. Waste rock and overburden will be co-disposed in one of the two piles constituting the Whale Tail WRSF and IVR WRSF. All waste rock material will be sampled and tested during operations to verify their ARD and ML potential in support of waste segregation. Waste rock and overburden produced during mining will be used in the construction of the mine site infrastructure, while some of the non-potentially acid generating (NPAG) and non-metal leaching (NML) waste rock will be put aside for capping at closure. Because of the large material requirement for construction and the NPAG/NML rock cover, as well as the importance for adequate disposal to meet closure objectives, waste rock management will be a key component of the mining planning for the Whale Tail Project.

The Underground WRSF, located east of the Whale Tail Pit, is a temporary facility; all mine waste rock from underground operations will be temporary stored before being returned underground as backfill material.

Agnico Eagle is planning to store the tailings generated from the processing of Whale Tail Project in the Meadowbank Tailings Storage Facility detailed in the “Agnico Eagle Mines Meadowbank Modification - In-Pit Tailings Disposal”. The Meadowbank In-Pit Disposal project was approved by the Nunavut Impact Review Board and the Minister on November 27, 2018 following the reconsideration of the Meadowbank Mine Project Certificate 004. The Meadowbank Tailings Storage Facility Management Plan for Whale Tail Pit - Version 2_NIRB (Agnico Eagle, 2018) outlines the required management of tailings produced through the Whale Tail Pit approved project (2019 to 2023) and a tailings deposition plan that includes the Whale Tail Pit Expansion Project (2023 to 2026).

The generation of metal-rich leachate in acidic drainage is a concern for mining projects. Climate control strategies rely on cold temperatures to reduce the rate at which oxidation occurs and freezing to prevent contaminant transport. The low net precipitation in permafrost regions limits infiltration of water into waste rock and tailings disposal areas. Consequently, the climate of the Expansion Project will act as a natural control to reduce the production of acid mine drainage and minimize the release of leachate. Climate control strategies are best applied to materials placed at a low moisture content to reduce the need for additional controls on seepage and infiltration. This strategy is considered to be effective for waste rock in arid climate such as the one of Whale Tail Pit Expansion.

The Expansion Project WRSFs and the ore stockpiles were designed to minimize the impact on the environment and to consider geotechnical and geochemical stability. The surface runoff and potential seepage water from these facilities will be collected in water collection ponds as part of the water management strategy. If water quality does not meet the discharge criteria as per the Whale Tail Water Licence requirement, the collected water will be treated prior to being discharged to the outside environment during operation and closure.

Closure of the Whale Tail WRSF and IVR WRSF will begin when practical as part of the progressive reclamation program. The Whale Tail WRSF and IVR WRSF will be covered with non-potentially acid generating and non-metal leaching waste rock to promote freezing as a control strategy against acid generation and migration of contaminants. Thermistors will be installed within the Whale Tail WRSF and IVR WRSF to monitor permafrost development. Thermal and water quality monitoring will be carried out during all stages of the mine life to demonstrate geotechnical stability and the safe environmental performance of the facilities. If any non-compliant conditions are identified, then maintenance and planning for corrective measures will be completed in a timely manner to ensure successful completion of the Whale Tail Pit- Expansion Project Interim Closure and Reclamation Plan.

This plan has been updated for the Expansion Project in support of the Nunavut Impact Review Board review process and will be updated for review and approval by the Nunavut Water Board.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	January 2017	ALL	-	Comprehensive plan for Whale Tail Pit project
2	May 2018	ALL	-	Comprehensive review of the plan for Whale Tail Pit project
3	September 2018	ALL	-	Comprehensive review of the plan for Whale Tail Pit project
4	October 2018	2.5, 3.2, 9.3	7, 11, 29	Updated to align with recommendations issued by CIRNAC and ECCC in October 2018
5_NIRB	November 2018	ALL	ALL	Waste Management plan for Whale Tail pit – Expansion Project
5_NWB	May 2019	ALL	ALL	Updated for the Expansion Project in support of the Nunavut Water Board (NWB) Type A Water License

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ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Division
Approved Project	Whale Tail Pit and Haul Road
ARD	Acid Rock Drainage
CCME	Canadian Council of Ministers of the Environment
Expansion Project	Whale Tail Pit – Expansion Project
FEIS	Final Environmental Impact Statement
IOL	Inuit Owned Land
IPCC	Intergovernmental Panel on Climate Change
LOM	Life of Mine
ML	Metal Leaching
NIRB	Nunavut Impact Review Board
NML	Non-Metal Leaching
NPAG	Non-Potentially Acid Generating
NWB	Nunavut Water Board
PAG	Potentially Acid Generating
PGA	peak ground acceleration
SWD	Stormwater Dike
TSF	Tailings Storage Facility
WRSF	Waste Rock Storage Facility
WTP	Water Treatment Plant

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per metre
g	gram
ha	hectare
km	kilometre(s)
km^2	square kilometre(s)
m	metre
masl	metre above sea level
mbgs	metre below ground surface
mm	millimetre
m^3	cubic metre(s)
m^3/hr	cubic metre(s) per hour
Mm^3	million cubic metre(s)
Mt	million tonne(s)
t	tonne
t/day	tonne(s) per day
t/m^3	tonne(s) per cubic metre

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing an expansion to the Whale Tail Pit and Haul Road Project (Approved Project), a Meadowbank satellite deposit located on the Amaruq property. As an expansion to the Approved Project (Project Certificate No. 008 and Type A Water Licence 2AM-WTP1826) Agnico Eagle is proposing to expand and extend the Whale Tail Pit operations (the Expansion Project or the Project) to include a larger Whale Tail Pit, development of the IVR Pit, and underground operations while continuing to operate and process ore at the Meadowbank Mine.

The Amaruq property is a 408 square kilometre (km2) site located on Inuit Owned Land (IOL) approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km north of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit would be mined as two open pits (i.e., Whale Tail Pit and IVR Pit) and underground operations, and ore will be hauled to the approved infrastructure at Meadowbank Mine for milling.

The Whale Tail Pit mine (Approved Project), mined by truck-and-shovel operation, will produce 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock, and 5.6 Mt of overburden waste, processed over a three to four-year mine life. The Expansion Project proposes mining an additional 15.2 Mt of ore from the expanded Whale Tail Pit, the IVR Pit and underground operations. This expanded resource will be extracted over approximately four year period. In total, the resources for the Whale Tail project will be expanded and extended over approximately an seven year period from 2019 to 2025.

The general mine site location for the Project is shown in Figure 1.1. The mine development will include the following major infrastructure:

- industrial area (camp and garage);
- crusher;
- ore stockpiles;
- waste rock and overburden storage facilities;
- landfill;
- haul and access roads;
- open pits mine
- underground mine; and
- Water management facilities (attenuation ponds, dikes).

This document presents the Waste Rock Management Plan (the Plan) and is submitted as per Part B, conditions 14 and 15 of the NWB Whale Tail Type A Water License 2AM-WTP1826.

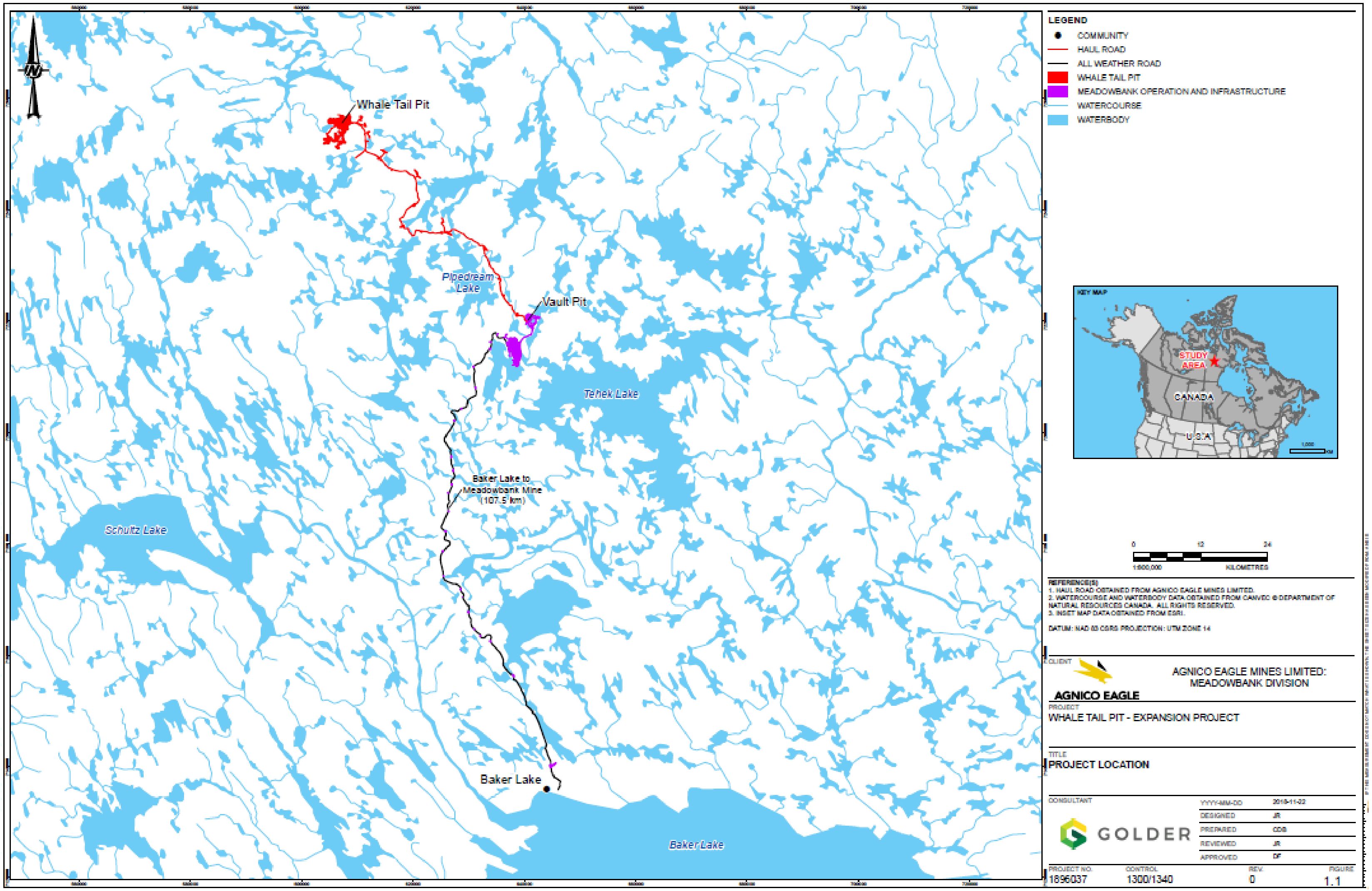

Figure 1.1 Location of Whale Tail Pit- Expansion Project

The purpose of the Plan is to provide consolidated information on the management ore stockpiled on site, waste rock and overburden, including strategies for runoff and dust control and monitoring programs for the storage facilities.

Agnico Eagle is planning storing the tailings generated from the processing of Whale Tail Project ore in the Meadowbank Tailings Storage Facility detailed in the “Agnico Eagle Mines Meadowbank Modification - In-Pit Tailings Disposal”. The Meadowbank In-Pit Disposal project was approved by the Nunavut Impact Review Board and the Minister on November 27, 2018 following the reconsideration of the Meadowbank Mine Project Certificate 004. The Meadowbank Tailings Storage Facility Management Plan for Whale Tail Pit - Version 2_NIRB (Agnico Eagle, 2018) outlines the required management of tailings produced through the Whale Tail Pit approved project (2019 to 2023) and a tailings deposition plan that includes the Whale Tail Pit Expansion Project (2023 to 2026).

As per the Nunavut Impact Review Board (NIRB) Whale Tail Project Certificate No. 008, term and condition 7, the Whale Tail Waste Rock Management Plan is submitted to the NIRB at least 60 days prior to the start of construction of the Waste Rock Storage Facility, with subsequent updates or revisions to the Plan submitted annually thereafter or as may otherwise be required by the NIRB for the life of the Project.

On December 2018, the Nunavut Water Board approved the Whale Tail WRSF, NPAG Stockpile and Overburden Stockpile Design Report and Drawings; Type “A” Water Licence 2AM-WTP1826, Whale Tail Pit Project (60-day notice). Agnico Eagle Mines Limited is planning to construct and monitor the Expanded Whale Tail WRSF and the new IVR WRSF in accordance to this approved design report and as per water license conditions.

SECTION 2 • BACKGROUND INFORMATION

2.1 Expansion Project Operations

The construction phase is anticipated to start in at the beginning of the third quarter of Year -1 (2018) and focus on site preparation and the construction of infrastructure, with the start of the Whale Tail Pit development to produce construction material. The operations will continue approximately 7 years, from Year 1 (2019) to Year 7 (2025), with a rate of extraction targeted between 9,000 and 12,000 tonnes per day (t/day) of ore at an average stripping ratio of 8. Mining activities are expected to end in Year 7 (2025) and ore processing with stockpiled material is expected to end in Year 8 (2026). During this time, reclamation of the WRSFs will occur progressively through ongoing cover placement. Closure will occur from Year 8 (2026) to Year 24 (2042) after the completion of mining and will include removal of the non-essential site infrastructure and flooding of the mined-out open pits and underground operations, as well as reestablishment of the natural Whale Tail Lake level. Post-closure and monitoring phases will commence after closure is completed in Year 24 (2042) and will continue until it is shown that the site and water quality meet regulatory closure objectives. Table 2.1 summarizes the Project timeline and general activities.

Table 2.1 Overview of Timeline and General Activities

Phase	Year	General Activities
Construction	Year -1	• Construct site infrastructure • Develop open pit mine • Stockpile ore
Operations	Year 1 to 7	• Open pits operations • Underground operations • Transport ore to Meadowbank Mine • Stockpile ore • Discharge Tailings in Meadowbank TSF
	Year 8	• Complete transportation of ore to Meadowbank Mine • Complete discharge tailings in Meadowbank TSF
Closure	Year 8 to 24	• Remove non-essential site infrastructure • Flood mined-out open pits and underground operations • Re-establish natural Whale Tail Lake level
Post-Closure	Year 24 forwards	• Site and surrounding environment monitoring

TSF = Tailings Storage Facility

2.2 Meadowbank Mine Operations

As a requirement of the Type A Water Licence, any modifications to the dewatering process, life of mine (LOM), tailings storage facilities (TSF), and any other aspect associated to the water management at Meadowbank are adhered to and updated in the annual submission of the Meadowbank Water Management Plan and associated water balance.

2.3 Expansion Project Site Layout

Site layouts are presented in Appendix A.

2.4 Climate

Climate characteristics presented herein were extracted from the permitting level engineering report (SNC, 2015).

The Expansion Project is located in an arid arctic environment that experiences extreme winter conditions, with an annual mean temperature of -11.3 degrees Celsius (°C). The monthly mean temperature ranges from -31.3 °C in January to 11.6 °C in June, with above-freezing mean temperatures from June to September. The annual mean total precipitation at the Expansion Project is 249 millimetres (mm), with 59 percent (%) of precipitation falling as rain, and 41% falling as snow. Mean annual losses were estimated to be 248 mm for lake evaporation, 80 mm for evapotranspiration, and 72 mm for sublimation. Mean annual temperature, precipitation, and losses characteristics are presented in 2.

Short-duration rainfall events representative of the Expansion Project are presented in Table 2.3, based on intensity-duration-frequency curves available from the Baker Lake A meteorological station (Station ID 2,300,500) operated by the Government of Canada (2015).

Table 2.2 Estimated Mine Site Monthly Mean Climate Characteristics

Month[a]	Mean Air Temperature (°C) [a]	Monthly Precipitation (mm) [a]			Losses [a]		
		Rainfall (mm)	Snowfall Water Equivalent (mm)	Total Precipitation (mm)	Lake Evaporation (mm)	Evapo-transpiration (mm)	Snow Sublimation (mm)
January	-31.3	0	7	7	0	0	9
February	-31.1	0	6	6	0	0	9
March	-26.3	0	9	9	0	0	9
April	-17.0	0	13	13	0	0	9
May	-6.4	5	8	13	0	0	9
June	4.9	18	3	21	9	3	0
July	11.6	39	0	39	99	32	0
August	9.8	42	1	43	100	32	0
September	3.1	35	7	42	40	13	0
October	-6.5	6	22	28	0	0	9
November	-19.3	0	17	17	0	0	9
December	-26.8	0	10	10	0	0	9
Annual	**-11.3**	**146**	**103**	**249**	**248**	**80**	**72**

[a] SNC (2015). mm = millimetre; °C = degrees Celsius.

Table 2.3 Estimated Mine Site Extreme 24-Hour Rainfall Event

Return Period (Years) [a]	24-hour Precipitation (mm) [a]
2	27
5	40
10	48
25	57
50	67
100	75
1000	101

[a] SNC (2015). mm = millimetre.

2.5 Climate Change

Climate change information presented herein was extracted from the Approved Project Final Environmental Impact Statement (FEIS), Volume 4, Section 4.2 (Agnico Eagle, 2016).

The climate in the Arctic is changing faster than at mid-latitudes (IPCC, 2014). The most recent set of climate model projections (CMIP5) predict an Arctic-wide year 2100 multi-model mean temperature increase of +13°C in late fall and +5°C in late spring under the Intergovernmental Panel on Climate Change (IPCC)'s "business as usual scenario" (RCP8.5). IPCC climate change mitigation scenario RCP4.5 results in a year 2100 multi-model Arctic wide prediction of +7°C in late fall and +3°C in late spring (Overland et al., 2013). The effects of changes of this magnitude to terrestrial, aquatic and marine ecosystems, and social and economic systems of the Arctic are an active area of research. However, due to the short duration of the proposed Project, climate change related effects to the Project are likely negligible.

2.6 Permafrost

The mine site is located in an area of continuous permafrost, as shown on Figure 2.1. Based on measurements of ground temperatures (Knight Piésold, 2015), the depth of permafrost at the mine site is estimated to be in the order of 425 metres (m) outside of the influence of waterbodies. The depth of the permafrost and active layer will vary based on proximity to the lakes, overburden thickness, vegetation, climate conditions, and slope direction. The typical depth of the active layer is 2 m in this region of Canada. The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at the depth of below 15 m) is approximately -8.0 °C in areas away from lakes and streams. The geothermal gradient measured is 0.02 degrees Celsius per metre (°C/m) (Knight Piésold, 2015). Late-winter ice thickness on freshwater lakes is approximately 2.0 m. Ice covers usually appear by the end of October and are completely formed in early November. The spring ice melt typically begins in mid-June and is complete by early July.

Since the completion of the Approved Project, thermal assessments have been completed that contribute to the understanding of the permafrost conditions near the Whale Tail Pit, IVR Pit and Underground. The following summarizes the updated understanding of permafrost conditions in the Expansion Project Area:

- The depth of the regional permafrost below land was estimated to be on the order of 425 to 495 metres below ground surface (mbgs);
- The IVR Pit, which has a maximum depth of approximately 105 mbgs, is located within the regional permafrost;
- Closed talik is present near Whale Tail Pit. The talik is inferred to extend to a depth of 113 m below lake level (152.5 m) and is estimated to thin towards the eastern and western lobes of the lake. Whale Tail Pit extends through this talik and into the underlying permafrost, with the base of the pit located in permafrost. Further to the south and outside of the pit footprint, the closed talik transitions to full open talik with direct connection to the deeper groundwater flow system;
- With the formation of a pit lake during closure, permafrost near and beneath Whale Tail Pit is predicted to start melting. After approximately 11 years of closure, the base of the Whale Tail Pit Lake is predicted to be hydraulically connected to the deeper groundwater flow system, and after 50 years, the permafrost below the full pit footprint is predicted to have completely melted;
- The formation of the IVR Pit Lake during closure is also predicted to melt the underlying permafrost. Unlike Whale Tail Pit, IVR Pit is located within the regional permafrost and it is predicted that it will take approximately 1000 years to fully melt the permafrost below the pit footprint.

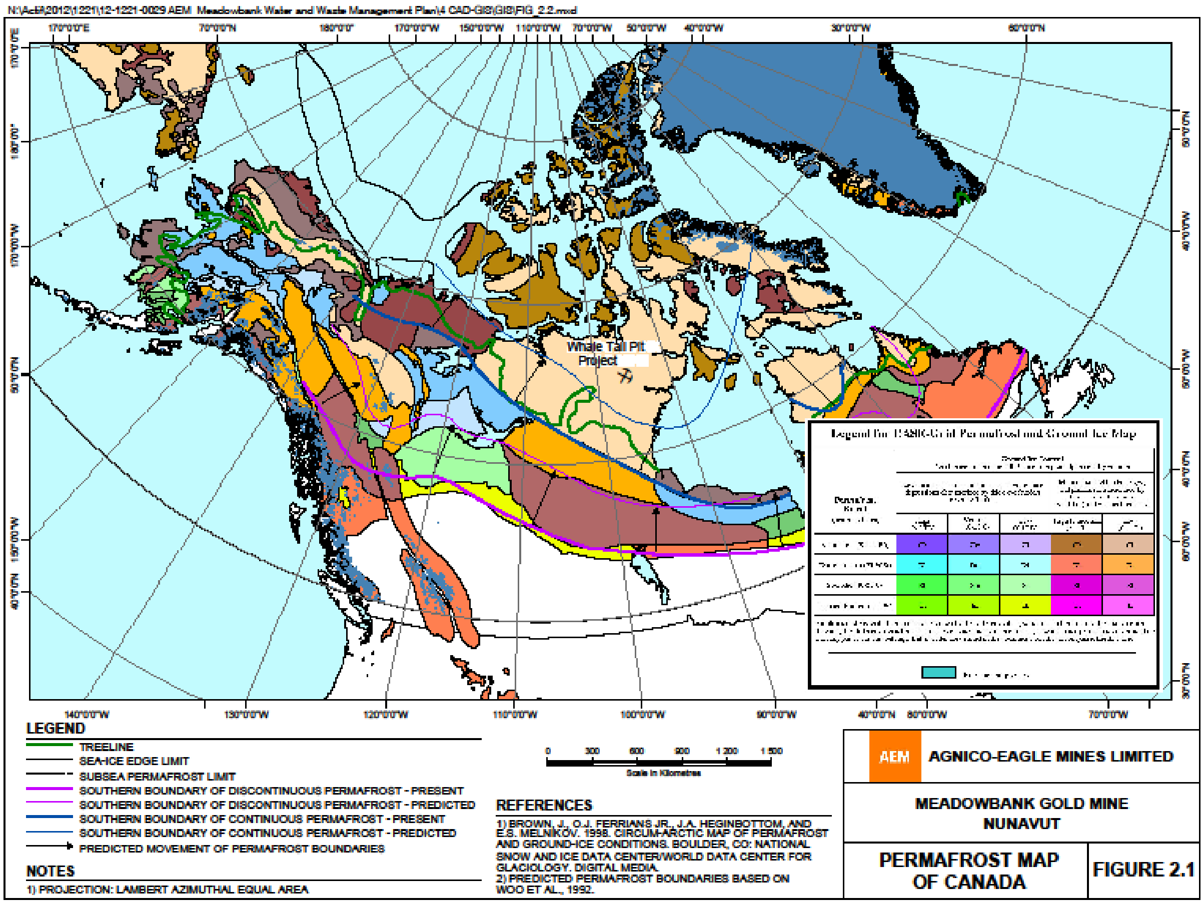

Figure 2.1 Permafrost Map of Canada

2.7 Seismic Zone

The mine site is situated in an area of low seismic risk. The peak ground acceleration (PGA) for the area was estimated using the seismic hazard calculator from the 2010 National Building Code of Canada website (http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index_2010-eng.php). The estimated PGA is 0.019 grams (g) for a 5% in 50-year probability of exceedance (0.001 per annum or 1 in 1,000 year return) and 0.036 g for a 2% in 50-year probability of exceedance (0.000404 per annum or 1 in 2,475 year return) for the area.

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SECTION 3 • EXPANSION PROJECT DEVELOPMENT PLAN

3.1 Expansion Project Life of Mine

Several LOM scenarios were analyzed by Agnico Eagle, which ultimately retained the best one based on economic viability of the Expansion Project. The chosen scenario is not expected to change significantly from that existing at Meadowbank, and will remain on average 9,000 t/day and up to a peak mill throughput of 12,000 t/day (which is the current rate capacity at Meadowbank Mill). Tailing will be disposed in the approved Tailings Storage Facility, authorized under Project Certificate (No. 004) and Type A Water Licence (2AM-MEA1526) . Table 3.1 summarizes the Expansion Project LOM.

Table 3.1 Projected Expansion Project Mined Tonnages

Year	Ore Mined (t)	Ore Processed in Mill (t)	Production Days
2017	0	0	-
2018	179,003	0	
2019	2,196,993	1,642,500	214
2020	3,070,121	3,040,090	366
2021	3,915,563	3,829,885	365
2022	4,674,860	3,070,030	365
2023	3,970,053	3,224,997	365
2024	4,793,044	3,238,079	366
2025	720,634	2,063,214	365
2026		3,411,477	
Total	**23,520,271**	**23,520,271**	

t = tonne.

The Expansion Project deposition plan is proposed to be a continuation of the current Meadowbank deposition plan according to the Expansion Project production rates and mill feed presented in Table 3.1.

3.2 Mine Waste Production Sequence

Two mine waste streams will be produced at Expansion Project, waste rock and overburden. A third mine waste stream, tailings, will be produced at Meadowbank Mine (Refer to the Mine Waste Rock and Tailings Management Plan, submitted under Water Licence 2AM-MEA1526). Approximately 167.8 Mt of waste rock and 11.3 Mt of overburden will be generated by the Expansion Project as presented in Tables 3.2 and 3.4. The operation management and monitoring of the TSF is regulated under Agnico Eagle Type A Water Licence 2AM-MEA1526.

The term "waste rock" designates all fragmented rock mass that has no economic value and needs to be stored separately. Waste rock is also commonly referred to as "mine rock" in the mining industry.

Typically, waste rock is produced during the initial stripping phase and during the subsequent development of open pits and underground workings.

The term "overburden" designates all soils above the bedrock that needs to be stripped at surface prior to developing the open pits. Generally, the overburden at the site consists of a thin layer of organic material overlying a layer of non-cohesive soil with variable amounts of silt, sand, and gravel.

Table 3.2 Projected Mined Tonnages and Ore Stockpile Balance (2017 – 2025)

Year	Ore Mined (t)	Waste Rock Excavated (t)	Overburden Excavated (t)	Total Material Excavated (t)	Total Material Excavated (t/day)	Strip ratio
2017	0	461,625	199,454	661,079		
2018	179,003	1,087,633	1,236,488	2,503,124		13
2019	2,196,993	17,238,276	4,111,005	23,546,274	64,688	10
2020	3,070,121	29,701,313	2,947,150	35,718,583	97,592	11
2021	3,915,563	31,461,155	1,342,271	36,718,989	100,600	8
2022	4,674,860	31,707,096	281,150	36,663,106	100,447	7
2023	3,970,053	31,075,034	1,226,057	36,271,144	99,373	8
2024	4,793,044	24,002,432	0	28,795,476	78,676	5
2025	720,634	1,090,886	0	1,811,520	4,963	2
Total	**23,520,271**	**167,825,450**	**11,343,574**	**202,028,216**		**8**

t = tonne; t/day = tonnes per day.

The proposed usage or destination of the three mine waste materials is presented in Table 3.3. Further details on the management of the mine waste materials are presented in Section 5 of this Plan.

The site layouts presented in Appendix A show the evolution of the site in 2019 to 2025 and after mine. Most of the waste rock excavated in 2018 at the start of the open pit development will be used for the construction of the water management structures, the infrastructures pads, and the access roads (Table 3.4). During the Year 1 to end of the Year 3 (2021), the remaining required facilities for the operations will be completed.

Table 3.3 Summary of Mine Waste Tonnage and Destination

Mine Waste Stream	Estimated Quantities	Waste Destination
Overburden	11.3 Mt	• Temporary storage West of Whale Tail Lake (~ 0.1 Mt for operations) • Co-disposed with waste rock in Whale Tail WRSF
Total PAG and/or Moderate to High Arsenic Leachability Waste	109.4 Mt	• Underground backfill material • Whale Tail and IVR WRSFs
Total NPAG and/or Low Arsenic Leachability Waste	58.4 Mt	• Construction material • Closure and site reclamation
Total Waste Rock Excavated (excluding Overburden)	167.8 Mt	• Sum of PAG/ML and NPAG/NML waste

Mt = million tonnes; WRSFs = Waste Rock Storage Facilities.

Table 3.4 Projected Waste Rock Tonnages Used for Construction (2017 – 2025)

Year	Waste Rock and Overburden Excavated (t)	Waste Rock Used for Water Management Infrastructure, Pad and Road Construction (t)	Waste Rock Used for Underground Backfill Material	Waste Rock and Overburden Stored in WRSFs (t)
2017	661,079	356,879	-	304,199
2018	2,324,121	310,094	-	2,014,027
2019	21,349,281	1,217,499	-	20,131,782
2020	32,648,462	0	-	32,648,462
2021	32,803,426		536,392	32,267,034
2022	31,988,246	64,730	666,663	31,256,853
2023	32,301,091		622,943	31,678,148
2024	24,002,432		673,215	23,329,217
2025	1,090,886		306,390	784,496
Total	**179,169,024**	**1,949,202**	**2,806,142**	**174,413,680**

t = tonne; WRSFs = Waste Rock Storage Facilities.

Over the LOM, non-potentially acid generating (NPAG)/non-metal leaching (NML) and potentially acid generating (PAG)/metal leaching (ML) waste rock will be segregated according to the requirement for construction (refer to the Operational Acid Rock Drainage (ARD)/Metal Leaching (ML) Testing and Sampling Plan) and capping of the WRSFs (refer to Sections 5 and 9).

SECTION 4 • EXPANSION PROJECT OVERBURDEN MATERIALS

A detailed description of soils in the Project footprint is presented in FEIS Addendum Volume 5, Section 5.3 - Terrain, Permafrost, and Soils (Agnico Eagle, 2016). Soils in the Project footprint are predominantly coarse to moderately coarse-textured glacial till and colluvium with high coarse fragment content commonly overlying bedrock at shallow depths (less than 1 m). Soils are dominated by Cryosols which develop on till dominated landscapes. Saturated soil layers overlying frozen layers have been observed on site. Other soils identified include Brunisols which are most prevalent on glaciofluvial material (e.g., eskers), Gleysols which develop on till in transition areas between upland and depressional landscape positions, and Regosols which are poorly developed soils. Organic Cryosolic soils have been found in wetlands.

Field results suggest that the mineral soils are predominantly acidic to neutral, ranging from pH 5.14 to 6.96, with pH tending to increase with soil depth (FEIS Addendum Volume 5, Appendix 5-A, Appendix E). Due to their mineralogy, the mineral soils in the Project area are increasingly sensitive to adverse effects due to acid deposition with decreasing baseline pH. Soils in the Project footprint are generally not susceptible to compaction. Soils prone to compaction are limited to low-lying, imperfectly and poorly drained areas where the clay content of soils is slightly higher.

Most soils in the Project area are rated as having moderate erosion potential, with the exception of areas with morainal blankets or colluvial deposits on slopes greater than 60%, and areas containing glaciofluvial soils. In areas of gullied or dissected terrain, the erosion potential would increase.

There is a level of uncertainty associated with the location of ice-rich permafrost within the Project footprint as no detailed permafrost studies regarding the thickness of the active layer or the ice content of the soils were completed for this area. It is assumed that ground ice content is between 0 and 10% as suggested by Heginbottom et al. (1995). Conditions are considered to be similar to Meadowbank, with ice lenses and ice wedges present locally on land, as indicated by permafrost features such as frost mounds. These areas of local ground ice are generally associated with low-lying areas of poor drainage.

A chemical characterization program investigated the geo-environmental properties of surficial overburden and Whale Tail Lake sediments. Static geochemistry tests, mineralogy and kinetic leaching tests were carried out to investigate the reactivity of these materials with respect to their potential to generate ARD and to release metals (metal leaching or ML) to the receiving environment. The surficial overburden, as described in FEIS Addendum Volume 5, Appendix 5-E, is NPAG and has low leachability but the fines portion of the material could be amenable to erosion and transport as suspended solids in contact water.

The overburden expected to be excavated over the LOM is presented in the Table 3.2. According to Meadowbank Mine experience, lakebeds will consist of water saturated and soft soils.

The remainder of the overburden materials will consist of till excavated on land. Some of the till or till-like material (approximately 100,000 t) is expected to be used during operations and will be temporarily stockpiled on the Overburden Storage pad (having approximate footprint of 3.2 hectares (ha)) near Whale Tail Dike and where the contact runoff will naturally flow into the Whale Tail Attenuation Pond. The remaining 11.3 Mt of overburden will be piled at the base of the Whale Tail WRSF and IVR WRSF and surrounded with waste rock to stabilize the material (. All the overburden stockpiled in the Whale Tail WRSF and IVR WRSF will be eventually covered with NPAG/NML waste rock if deemed required. Further details on mine site closure and reclamation can be found in the Whale Tail Interim Closure and Reclamation Plan.

SECTION 5 • EXPANSION PROJECT WASTE ROCK FACILITIES

The location of the Expansion Project WRSFs took into consideration the following environmental, social, economic, and technical aspects of waste rock management:

- minimize the overall footprint of the Expansion Project WRSFs to the extent practicable while maintaining the short-term and long-term stability of the facilities;
- avoid or minimize impact to adjacent fish bearing lakes;
- minimize the haul distance from the open pits and underground operations to the Expansion Project WRSFs;
- minimize the number of the water catchment areas potentially affected by drainage from the Expansion Project WRSFs;
- when feasible, divert upstream clean natural non-contact run-on water away from the Expansion Project WRSFs; and
- facilitate the collection and management of the contact water from the Expansion Project WRSFs during mine operations to avoid potentially negative impacts on the surrounding environment.

The areas selected for the storage of waste rock and overburden materials is shown in Figures A.1 to A.8 of Appendix A. Those areas have an approximate total footprint of 240 ha. Waste rock and overburden from the Whale Tail Pit, the IVR pit and the underground operations not used for site development purposes will be trucked to the Expansion Project WRSFs until the end of mine operations.

Waste rock will be managed in accordance with the Plan, as per Part F, condition 19 of the Water License 2AM-WTP1826.

5.1 Waste Rock Properties

A chemical characterization program investigated the geo-environmental properties of waste rock and ore at the Project (Golder, 2018b). Static geochemistry tests, mineralogy and kinetic leaching tests were carried out to investigate the reactivity of these materials with respect to their potential to generate ARD (potentially acid generating, or PAG) and to release metals (ML) to the receiving environment.

The Expansion Project deposit mineralization is low sulphur but the sulphur carries arsenic which is enriched in many waste rock types, while other rock types are PAG. Arsenic, sulphur, and carbonate-buffering capacity are the parameters of environmental interest present in mining wastes. Mine waste from open pits and undergrounds operations will be segregated during operations. All mine waste rock from open pits will be managed such that all PAG and/or ML material will be managed within the Whale Tail WRSF and IVR WRSF, and all material that is NPAG and NML will be used for site construction and WRSFs closure. All mine waste from underground operations will be temporary store in the Underground WRSF and will be returned underground to backfill the mine, with no underground waste rock remaining on surface at the end of the mine life.

Table 5.1 below summarizes the various waste rock types and their ARD/ML potential.

Table 5.1 Anticipated ARD/ML Potential of Waste Rock Types at Whale Tail (Golder, 2018b)

Waste Type	Rock Unit Code	ARD Potential	ML Potential[1]
Komatiite North	V4a – 0a	No	High
Komatiite South	V4a – 0b	No	Moderate
Greywacke Central	S3C – 3b	Yes	Variable
Greywacke South	S3S – 3b	No	Low
Greywacke North	S3N-3b	Variable	Variable
Chert	S10 – 3b	Yes	Variable
Iron Formation	S9E – 3b	No	High
Basalt	V3 – 1b	No	Moderate
Diorite	I2 – 8b	No	Low
Overburden	n.a.	No	Low[2]
Lake sediment	n.a.	Yes	High[2]

n.a. not applicable

[1] based on large column kinetic test results

[2] based on Shake Flask Extraction results

Most of the waste rock lithologies from open pits to be disturbed by mining are NPAG including komatiite, iron formation, basalt, southern greywacke and diorite units. Together, these lithologies comprise approximately 72% of the waste rock (120.8 Mt). These units will not require means to control ARD. Of these, however, the basalt, komatiite and iron formation units, which account for 50% of waste rock (83,9 Mt), as well as some of the lake sediments, leach arsenic in static and kinetic leaching tests at concentrations that exceed the Effluent Quality Criterion (EQC) developed for the site. The south greywacke and the diorite within the open pits have low leachability in addition to being NPAG and represent approximately 22% of the waste rock (36.9 Mt). The north greywacke has variable ARD and arsenic leaching potential and represents 11% of waste rock (6.8 Mt).

The ore and waste rock from the central greywacke and chert units are PAG. Chert and central greywacke represent 13% of waste rock to be generated by mining (22,7 Mt). They are silicified and, compared with the other greywacke waste rock, have a lower buffering capacity and/or a slightly higher sulphur content which results in a PAG classification of this material. The PAG waste rock also leaches arsenic but at concentrations that are well below the EQC. Kinetic leaching tests, mineral depletion calculations and consideration of the scale and site differences between laboratory tests and field conditions suggest a time lag to possible ARD development at site of more than a decade. Upper tier ARD materials (high sulphur/low buffering capacity greywacke or chert waste rock) generated acidic drainage earlier under laboratory conditions but without the benefit of added buffering capacity from mixing with other NPAG rock piles. The delay to onset of ARD from the bulk of PAG waste rock and ore is expected to be substantially longer than the nine years of mine construction and operations. Further, ARD control mechanisms for PAG materials will be implemented during operations as PAG/ML material will be in place in the center of the Whale Tail WRSF and IVR WRSF and progressively covered with NPAG material.

All open pits waste material will be sampled and tested during operations to confirm their ARD and ML potential in support of waste segregation. Based on results to date, a sulphur content of 0.1 wt% appears to be a suitable threshold to identify PAG material. Arsenic leaching material will be evaluated based on a strong correlation between total and leachable arsenic in the current results, which indicates that material below 75 mg/kg is not expected to result in waste rock contact water quality above the EQC. The diorite and south greywacke material, which are both NPAG/NML, as well as other material below these threshold values, can be used as construction materials on site, as cover material for the Whale Tail WRSF and IVR WRSF and as reclamation material. All material above these thresholds, as well as the lake sediments, will require long-term management and will be stored in the Whale Tail WRSF and IVR WRSF.

5.2 Waste Rock and Waste Rock Storage Facility Management

5.2.1 Landform Water Balance Modelling of Whale Tail and IVR WRSF

O'Kane Consultants developed a landform water balance model in April 2019. The objectives of the landform water balance was to estimate the runoff, interflow, and basal seepage rates for different slopes and aspects of the WRSFs. The results of the modelling were reported in a technical memorandum presented in appendix A.

The results of the landform water balance for the Amaruq WRSFs are provided in Table 5.2. The results summarize the volume of annual runoff expected from the landforms as a percentage of incident precipitation (both snow and rainfall). Results of the surface water balance support the conceptual thermal model of the WRSFs which assume that the hydrologic regimes are expected to be different based on North and South aspect. Generally, higher net radiation results in greater evaporation and soil heating. With more evaporation, less water is available to runoff and/or infiltrate. Higher net radiation will also result in more sublimation, as more energy is available to convert snow into water vapour.

Table 5.2 Summary of average surface water balance for different specs of the WRSF

Water Balance Parameters	Plateau	SE Aspect	NW Aspect
Total Precipitation (mm)	296 mm	296 mm	296 mm
Rainfall (% of Total Precipitation)	55-60%	55-60%	55-60%
Snow (% of Total Precipitation)	40-45%	40-45%	40-45%
Actual Evaporation (% of Total Precipitation)	25-30%	30-35%	25-30%
Runoff (% of Total Precipitation)	<5%	<5%	10-15%
Net Percolation (% of Total Precipitation)	30-35%	25-30%	20-25%
Sublimation (% of Total Precipitation)	35-40%	40-45%	40-45%

Source: OKC (2019).

These results in an overall runoff rates from the Whale Tail and IVR WRSFs of approximately 5% of incident precipitation. Runoff was assumed to interact with surficial materials to a depth of 30 cm. The surficial materials interacting with landform runoff will change over time as progressive reclamation is completed. The majority of runoff from the WRSFs is expected to occur as a result of spring melt; however, some runoff is expected throughout the unfrozen period.

- **Basal Seepage**

The high infiltration capacity of the cover system materials and waste rock materials result in a propensity for incident precipitation to result in infiltration, rather than runoff (Table 5.2). As water infiltrates into the surficial materials, net percolation flows vertically through the WRSF, eventually freezing back at depth. Modelling indicates that freeze-back throughout the depth of the pile is consistently occurring by 2073 (Figure 5.1). However, the base layer of the WRSF is consistently frozen from the time of placement. As a result, basal seepage from the landform is negligible.

- **Interflow**

There is some lateral flow of water within the cover system on the angle of repose slopes (known as interflow), however, lateral flow infiltrates vertically in zones of enhanced infiltration along the toe of each bench of the WRSF. This is shown conceptually in Figure 5.2.

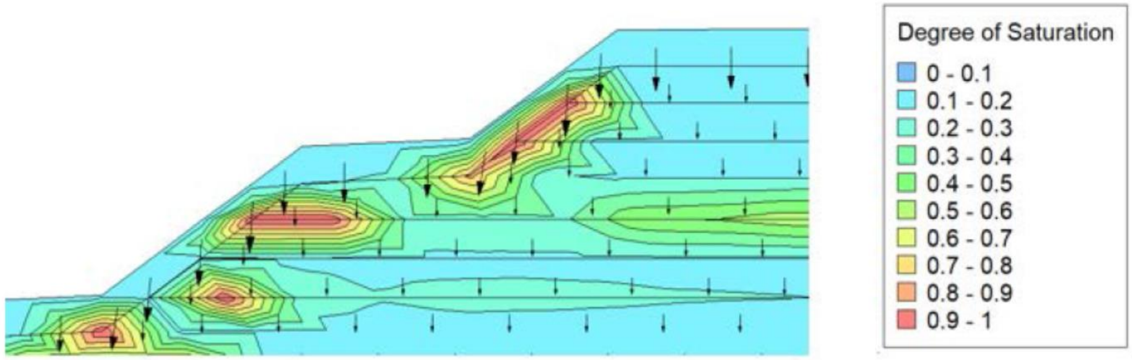

Figure 5.1 Sketch of hydrologic regime of the Whale Tail WRSF near surface with water flow vectors (black) shown.

Source: OKC (2019).

A small portion (less than 1%) of incident precipitation over the entire landform(s) is expected to exit the landform as interflow. This occurs when infiltration occurs along the slope of the lowest bench of the WRSF. This flow path interacts with the entire 4.7 m depth of the cover system, along a maximum flow path of approximately 10 m. Interflow does not interact with the potentially acid generating and metal leaching waste rock. This is shown conceptually in Figure 5.3.

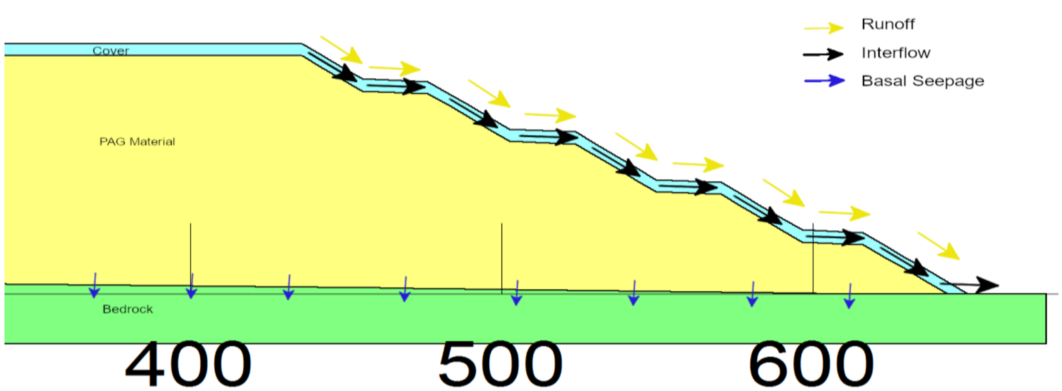

Figure 5.2 Sketch of estimated runoff, interflow, and basal seepage within the WRSFs

Source: OKC (2019).

The results of the WRSF landform water balance were used as inputs for the update of the site wide Water Balance of the project expansion. Tables 5.3 and 5.4 show a comparison between the estimated water inflows reporting to the Whale Tail Attenuation Pond and the IVR Attenuation Pond, respectively, that were calculated for the FEIS (2018) vs. the FEIS update of the annual water balance to support the NWB submission for the project expansion.

Table 5. 3 Comparison of estimated water inflow reporting to the Whale Tail Attenuation pond

Year	Total Inflow (m3)		
	FEIS 2018 (m^3)	Update 2019 (m^3)	Percent change (%)
2018	3,412,446	3,462,214	1.46
2019	1,229,194	1,275,572	3.77
2020	1,351,245	1,285,051	-4.90
2021	1,520,985	1,461,483	-3.91
2022	595,276	610,248	2.52
2023	355,539	347,979	-2.13
2024	355,114	348,453	-1.88
2025	355,170	347,979	-2.02
2026	605,809	518,658	-14.39
2027	566,128	523,543	-7.52
2028	561,167	527,615	-5.98
2029	562,008	528,743	-5.92
2030	561,713	529,629	-5.71
2031	557,533	526,409	-5.58
2032	553,234	521,834	-5.68
2033	549,050	517,180	-5.80
2034	544,299	513,958	-5.57
2035	532,587	507,150	-4.78
2036	516,178	491,269	-4.83
2037	512,750	477,466	-6.88
2038	523,503	482,127	-7.90
2039	502,857	492,490	-2.06
2040	3,876,129	455,845	-88.24
2041	4,444,164	4,023,224	-9.47

Source: Golder (2019d).

Table 5. 4 Comparison of estimated water inflow reporting to the IVR Attenuation pond

Year	Total Inflow (m3)		
	FEIS 2018 (m^3)	Update 2019 (m^3)	Percent change (%)
2018	241,682	237,711	-1.64
2019	241,682	237,715	-1.64
2020	241,711	237,744	-1.64
2021	241,682	237,715	-1.64
2022	1,303,705	1,208,976	-7.27
2023	1,483,305	1,355,124	-8.64
2024	1,457,334	1,307,746	-10.26
2025	1,459,131	1,321,091	-9.46
2026	173,719	149,870	-13.73
2027	172,197	148,292	-13.88
2028	172,219	148,311	-13.88
2029	172,197	148,292	-13.88
2030	172,197	148,292	-13.88
2031	172,197	148,292	-13.88
2032	172,219	148,311	-13.88
2033	172,197	148,292	-13.88
2034	172,197	148,292	-13.88
2035	172,197	148,292	-13.88
2036	172,219	148,311	-13.88
2037	172,197	148,292	-13.88
2038	172,197	148,292	-13.88
2039	172,197	148,292	-13.88
2040	172,219	148,311	-13.88
2041	172,197	148,292	-13.88

Source: Golder (2019d).

As shown in tables 5.3 and 5.4, the update water balance shows an overall reduction in the inflow volume to the ponds. A reason to reduction in water inflow to the ponds is associate to the reduction of seepage from the WRSFs as presented in section 5.2.2., of this management plan

5.2.2 Waste Rock Storage Facilities Water Management

The results from the landform water balance (O'Kane 2019) shows that only a small portion of incident precipitation will exit the WRSFs as interflow and basal seepage is expected to freezeback at depth.

The majority of runoff from the WRSFs is expected to occur as a result of spring melt, however some runoff is expected throughout the unfrozen period. These results show a significant reduction in the assumptions made for the FEIS (November 2018).

Any potential seepage and runoff water from the Expansion Project WRSFs will be managed by a combination of water retention dikes and water collection ponds (Whale Tail WRSF and IVR WRSF Contact Water Collection Systems, Whale Tail and IVR Attenuation Ponds and Groundwater Storage Ponds). Water quality will be monitored as per the Whale Tail Water License requirements. If water quality does not meet discharge criteria, contact water in the water collection ponds will be treated at the Whale Tail Operation Water Treatment Plant (WTP) prior to discharge to the outside environment.

5.2.2.1 Whale Tail WRSF

The Whale Tail WRSF was located considering advantageous topography in the form of a gentle valley presenting one low topographic point near Mammoth Lake where a contact water pond will be built. Only one low topographic point is observed north of the Whale Tail WRSF where potential runoff could escape from the Whale Tail WRSF footprint. As part of the surrounding road, a saddle dam will be constructed at this location to avoid contamination of the sub-watershed located northward of the Whale Tail WRSF.

As mentioned in the document Amaruq Stage 1 WRSF, Ore Stockpile 1 and Starter Pit Design Report and Drawings (Agnico Eagle, 2018), while awaiting the construction of the Whale Tail WRSF dike expected in winter 2019, a Stage 1 WRSF will be initiated. The Stage 1 WRSF, located within the footprint of the final location of the WRSF, will be positioned as to be able to control the watershed using the topography in combination with temporary water management structures in order to prevent potentially contaminated contact water from seeping into the environment. The duration of this Stage 1 WRSF will be during the second half of 2018 until the aforementioned WRSF dike is constructed or when weather conditions are sufficiently cold that no thawing or water runoff can occur.

To avoid any potential contact water from entering the environment, a low-permeability access road built of overburden will be established first to reach the Stage 1 WRSF location and will act as a barrier to any water not naturally diverted towards a containment sump that will be established once the access road is completed and prior to any placement of PAG / ML material. The location of the Stage 1 WRSF was chosen as to use the topography to control water runoff, in combination with the access road and collection sump designed to sustain a 1:100 year rain event. All water collected in the sump will be directed towards Quarry 1 in a closed circuit. Refer to Figure A.1 of Appendix A.

The construction of Whale Tail WRSF Pond (Whale Tail WRSF Dike) and Whale Tail Attenuation Pond (Whale Tail Dike) are among the most important water management infrastructure for the Project Construction of Whale Tail Dike will be initiated in the third quarter of 2018 and the construction of the Whale Tail WRSF Dike will start in 2019. The source of construction material for these facilities will be the first development of the open pit where NPAG/NML rocks are located. The overburden will be removed and stockpiled in the Whale Tail WRSF. During the construction, berms and sumps will be built inside the footprint of the Whale Tail WRSF area if required to limit seepage and runoff from overburden and waste rock. As soon as waste rock material will be available from the open pit, the overburden will be surrounded with waste rock material to control the stability of the pile. If deemed necessary, turbidity barriers in Mammoth Lake will also be installed.

During the operations of the mine, seepage and runoff from the Whale Tail WRSF will be captured by the Whale Tail WRSF Pond and pumped to the Whale Tail Attenuation Pond where the contact water will be treated in the Whale Tail WTP prior to discharge to the outside environment.

The Whale Tail WRSF water management infrastructure will remain in place until mine closure activities are completed and monitoring results demonstrate that the contact water quality from the Whale Tail WRSF meets discharge criteria (refer to Section 9.1).

Refer to the Whale Tail Pit – Water Management Plan for additional details on water management of the Whale Tail WRSF.

5.2.2.2 IVR WRSF

Seepage and runoff from the IVR WRSF will be captured by perimeter ditches and will be conveyed to the IVR WRSF Contact Water Collection System prior to being pumped to the active attenuation pond (i.e., either the Whale Tail Attenuation Pond or the IVR Attenuation Pond).

This conveyance system is decommissioned at closure thereby re-establishing natural drainage patterns towards Whale Tail Lake (North Basin) via the IVR Pit. The total catchment of the IVR WRSF increases proportionally with the increase in waste rock footprint which encroaches on the natural catchment of the IVR Attenuation Pond over time.

Refer to the Whale Tail Pit – Water Management Plan for additional details on water management of the IVR WRSF.

5.2.2.3 Underground WRSF

Seepage and runoff from the Underground WRSF will be managed separately from any surface infrastructure contact water. Run off from Underground WRSF will be collected in the Groundwater Storage Pond system (GSP). Three GSPs are planned to provide operational flexibility and adaptive management opportunity. The first pond (GSP-1will be used to store high salinity water from early mining operations through the permafrost, a second pond (GSP-2) will be used to store low salinity water and a third pond (GSP33) for contingency ;

- Excess water volumes in the mine will be managed through the Underground Mine Stope and the GSP-1 for high salinity water, and through the GSP-2 for low salinity water. Excess water volumes may also be managed with GSP-3 planned for contingency, operational flexibility, and adaptive management opportunity;

- At the end of underground mining, any remaining water in GSP ponds will be pumped underground for flooding of the underground workings.

Refer to the Whale Tail Pit –Expansion Project Water Management Report for additional details on water management of the underground WRSF.

5.2.3 Waste Rock Management Planning

5.2.3.1 Whale Tail Pit and IVR Pit

Waste rock and overburden produced during mining will be used in the construction of the mine site infrastructure, while some of the NPAG/NML waste rock will be put aside for capping at closure and for underwater structures for fish habitat compensation if required. The balance of the PAG or NPAG waste rock that will not be used will be placed in the Whale Tail WRSF or IVR WRSF and will remain in the dedicated rock storage facility areas for PAG or NPAG material.

As a first step in waste rock management planning, options are developed to define the main use and destination for each rock type based on the results of geochemical testing. The second step required accounting of the quantity and timing of extraction of each waste rock type on an annual basis. This included further refinement of the quantity, type and timing of construction material requirements for each infrastructure of the project.

The lithology of waste rock is added to the geological block model for each deposit and a detailed account of construction requirements is made, based on the most advanced infrastructure designs available at the moment of planning. The Waste Rock Management Plan is updated annually with current production quantities and actual LOM, dictating the production and mining schedule. Planning of the placement of waste rock material is reviewed for each LOM exercise, considering the different waste rock facility locations and capacity, as well as the closure NPAG/NML cover requirements.

Waste rock management is also part of the day to day planning of the mine operation. Part of the mining planning includes the management of waste rock, to ensure the plan established with the LOM is followed, to ensure material required for construction or closure purposes are properly stored, and also to plan for adequate and permitted storage areas. Because of the material requirement for construction and NPAG/NML rock cover, as well as the importance for adequate disposal to meet closure objectives, waste rock management will be a key component of the mining planning for the Expansion Project.

5.2.3.2 Underground Operations

Waste rock from underground operations will be temporarily stored on surface in the Underground WRSF until used for underground backfill as the stopes will be filled with cemented rock fill and rock fill. All underground waste rock will be reclaimed during operation.

5.2.4 Waste Rock Management Execution

5.2.4.1 Whale Tail Open Pit and IVR Pit

Segregation of ore, waste rock as potentially acid generating (PAG) or non-potentially acid generating material (NPAG), as well as metal leaching (ML) and non-metal leaching material (NML), is based on operational testing during mining activity to differentiate waste rock type. Sampling and testing of waste materials for acid rock drainage (ARD) and metal leaching will be conducted during mine operation in order to segregate PAG/ML waste rock from NPAG/NML waste rock material, so that waste material can be assigned to specific locations or use. This practice has been ongoing since the beginning of the mining operations at Meadowbank, and will continue during the operation period at Expansion Project.

Operational sampling and analysis will be completed at the laboratory on site, at specified frequency during mining activities, in order to identified and delineate the material type in the pits during mining. The results from these analyses will be used to differentiate the PAG/ML and NPAG/NML materials. Once characterized, the waste rock material will be segregated and placed in appropriate locations.

The geochemical properties of all Whale Tail and IVR mining wastes will also be confirmed by certified laboratory, through both static and kinetic testing on numerous representative samples, by various test methods and through multiple Project development stages.

These data will be used to update the Waste Rock Management Plan and implement adaptive management strategies to adequately ensure the protection of the environment and meet regulatory requirements (refer to the Whale Tail ARD/ML Plan for more details).

The dispatch system is a computer system used to manage and control surface mining equipment. This system has been implemented at Meadowbank and will also be used at the Expansion Project . The system offers real time fleet management and machine guidance technology that records data related to mining equipment activity, location, time, production, and maintenance. This information is also displayed to machine operators and other mining personnel. The system connects with mobile computers on field equipment such as excavators and haul trucks. For example, operators of loading equipment in the pit have information on screens about the type of material they are excavating. The haul truck drivers also have access to information in their equipment, about what type of material they are hauling and where is the appropriate disposal destination for the material. Information regarding the waste rock characterization is also managed and recorded by the mine dispatch system, tracking in real time loads of material, including waste rock, and their respective destination. The system and the dispatcher in charge guide the operators and ensure the ore and waste rock material are transported to the appropriate destination.

As part of the planning and execution of the waste rock management strategy, waste rock presenting geological characteristics leading to metal leaching such as arsenic will be managed in the Whale Tail WRSF and IVR WRSF in order to ensure their encapsulation and geochemical stability. Certain type of waste rock material or lithology will be placed in specific locations within the Expansion Project WRSFs in order to provide sufficient cover of NPAG/NML waste rock material to prevent metal leaching and ensure geochemical stability.

5.2.4.2 Underground Operations

Waste rock from underground operations will be temporarily stored on surface in the Underground WRSF until used for underground backfill as the stopes will be filled with cemented rock fill and rock fill. All underground waste rock will be reclaimed during operation.

5.2.5 Waste Rock Facilities Monitoring

Monitoring will be carried out during all stages of the operation to demonstrate geotechnical stability, safe environmental performance of the facilities and efficiency of the waste management procedures. Whale Tail WRSF and IVR WRSF will be monitored similarly as they are permanent infrastructure but the underground WRSF is a temporary infrastructure and will not require the same level of monitoring. If any non-compliant conditions are identified, adaptive management including modification of waste management practices and planning for corrective measures will be completed in a timely manner to ensure the environmental performance of the Expansion Project WRSFs, the protection of the environment and that regulatory requirements are met.

In order to assess and monitor the performance of the waste rock management procedure, a number of methods can be put in place during the operation, such as:

- QA/QC laboratory analysis program with an accredited commercial laboratory to validate the procedure and results of the onsite laboratory for determination of PAG/NPAG and ML/NML waste rock;
- Mine dispatch database, ensuring tracking and location of all waste rock material at any locations on site. With the information in the system, recovery of waste rock material disposed in an inappropriate location will be possible in a timely manner;
- Clear indication and marking of the PAG/ML zones, NPAG/NML zones and NPAG/NML cover within the waste rock storage facility, to provide visual guidance for the operators and during environmental inspection;
- Survey of the WRSFs to provide a record plan of the waste rock material placement within the facility;
- Thermal monitoring of the WRSFs to observe freezeback with thermistors installed at strategic locations. The purpose of the thermistors is to monitor the temperature within the facility as freezing progresses. The thermistors will be monitored regularly throughout the

operational period, as presented in the Thermal Monitoring Plan, to verify and validate the WRSFs thermal model with operational data from site.
- Water quality monitoring will be completed as per the Water Quality Flow and Monitoring Plan and the Water License requirements.

A specific set of procedures for segregation and monitoring of the waste rock material at the Expansion Project is presented in the Operational Acid Rock Drainage (ARD)/ Metal Leaching (ML) Testing and Sampling Plan.

5.3 Expansion Project Waste Rock Storage Facility Dimensions

The evolution of the Expansion Project WRSFs is shown in Figures A.1 to A.8 of Appendix A. At completion, the crest elevation of the Whale Tail WRSF will be approximately at 250 m (maximum height of approximately 95 m) in an environment where the adjacent topography elevation varies between 154 and 170 m. The crest elevation of the IVR WRSF will be approximately at 221 m (maximum height of approximately 60 m) in an environment where the adjacent topography elevation varies between 154 and 170 m. All underground waste rock will be reclaimed during operation.

The Expansion project WRSFs are designed to minimize the impact on the environment and consider both the physical and geochemical stability of the stored waste rock and overburden. The design criteria are presented in the Approved Project FEIS Volume 2, Appendix 2-J (Agnico Eagle, 2016). Final design details for the Expansion Project WRSFs will be provided to the regulators for approval at least 60 days prior to construction. The Expansion Project WRSFs are designed considering the placement of the waste rock and overburden in layers spread using a dozer to minimize the footprint and the dust. Each bench of 20 m maximum height is going to be composed of 4 layers of 5 m thickness, and where the bench toe will start at a setback distance of 20 m from the crest of the previous bench. The current design and overall side slope angle of the Expansion project WRSFs will be 2.5V:1V, an angle generally considered stable for such a facility (see Figure 5.1 for a typical cross section). However, slope stability analyses will be performed during the next engineering phases to determine the final design. If needed, the Expansion Project WRSFs could be expanded for additional capacity.

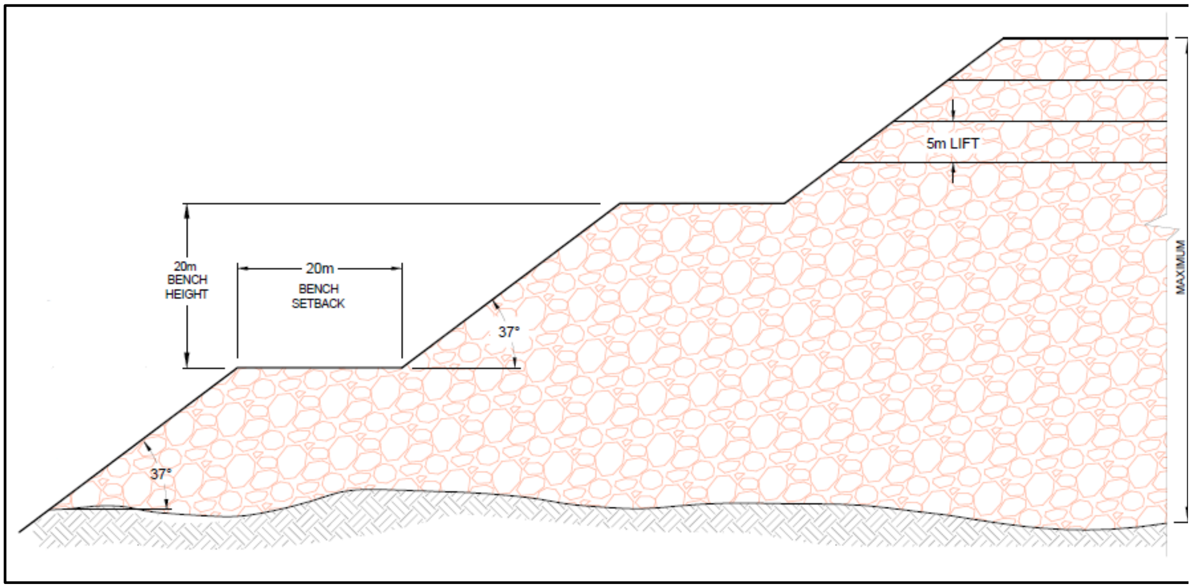

Figure 5.3 Typical Cross Section of the Whale Tail Waste Rock Storage Facility

Source: SNC (2015).

SECTION 6 • EXPANSION PROJECT ORE STOCKPILES

The six areas selected for stockpiling of ore are identified as Whale Tail Ore Stockpiles (No.1 to No.3), , IVR Ore Stockpile No.4, and Underground Ore Stockpile No.1 and No.2 on Figure A.7 of Appendix A. These ore stockpile pads have the following approximate footprint:

Table 6.1 Ore Stockpile footprint

Ore Stockpile	Area (m2)
WHL Ore Stockpile (No.1)	70,662
WHL Ore Stockpile (No.2)	82,191
WHL Ore Stockpile (No.3)	102,756
IVR Ore Stockpile (No.4)	146,329
Underground Ore Stockpile (No.1)	16,029
Underground Ore Stockpile (No.2)	1,476

No ore will remain on stockpile pads at the end of operations.

6.1 Ore Properties

A chemical characterization program investigated the geo-environmental properties of waste rock and ore report (FEIS Addendum Volume 5, Appendix 5-E). Static geochemistry tests, mineralogy and kinetic leaching tests were carried out to investigate the reactivity of these materials with respect to their potential to generate ARD and to release metals (ML) to the receiving environment.

The ore is PAG, and is enriched in arsenic, antimony, bismuth, chromium, selenium, silver and to a lesser extent, nickel. Some of the ore samples leached arsenic at concentrations that exceed the Portage effluent criterion in static (shake flask extraction) tests but exceedances were short-lived in the first cycles of kinetic leaching tests. The delay to onset of ARD from ore is expected to be substantially longer than the seven years LOM.

6.2 Ore Stockpile Management

Seepage and runoff water from WHL Ore Stockpile No.1 and 2 will naturally flow to the Whale Tail Attenuation Pond; channels will be constructed if deemed required to direct the seepage and runoff to the pond. If the water quality does not meet discharge criteria, the contact water will be treated at the Whale Tail Operation WTP prior to discharge to the outside environment.

Contact water from Underground Ore Stockpile 1 and Ore Stockpile 2 seepage will be managed separately from any surface infrastructure contact water. Contact water from Underground Ore Stockpiles will be collected and managed in the Groundwater Storage Ponds.

The Ore Stockpile pad 1, which constitute the first stage of the ore stockpile development, was designed based on the following considerations. A minimum 1.0 m of overburden and/or waste rock will be placed over original ground to reduce any thaw-induced differential settlements. Waste rock will then be placed to follow the natural topography, thereby reducing the likelihood of water ponding on the surface of the pad requiring additional maintenance. A final grade of about 0.5% sloping towards the Whale Tail Attenuation Pond will be achieved. Any surface run off from the ore stockpile or the pad will therefore be directed to the Attenuation Pond containment area (Agnico Eagle, 2018).

6.3 Ore Stockpile Facility Dimensions

6.3.1 Whale Tail Pit and IVR Pit

The four primary stockpiles at the Whalt Tail Pit site occupy an area of approximately 40.2 ha. A typical cross section of these facilities is presented in Appendix A (Drawing no. 6108-687-210-001). Currently, Ore Stockpiles Whale Tail Ore Stockpile 1, to Whale Tail Ore Stockpile 3, and IVR Ore Stockpile No.4 are designed to stack four layers of 5 m maximum thickness for a total height of 20 m. The sideslope angle of these ore stockpiles will be 3V:1V, an angle generally considered stable for such facility. Slope stability analyses will be performed during the next engineering phases and a final design will be presented prior to construction.

6.3.2 Underground Operations

The two ore stockpiles for underground operations will occupy an area of approximately 1.7 ha. A typical cross section of these facilities is presented in Appendix A (Drawing no. 6108-687-210-001). Currently, Underground Ore Stockpile 1 and Underground Ore Stockpile 2 are designed to stack four layers of 5 m maximum thickness for a total height of 20 m. The slope angle of these ore stockpiles will be 3V:1V, an angle generally considered stable for such facility. Slope stability analyses will be performed during the next engineering phases and a final design will be presented prior to construction.

SECTION 7 • MEADOWBANK TAILINGS STORAGE FACILITY – TAILINGS MANAGEMENT FOR EXPANSION PROJECT

Agnico Eagle is planning storing the tailings generated from the processing of Whale Tail Project ore in the Meadowbank Tailings Storage Facility detailed in the "Agnico Eagle Mines Meadowbank Modification - In-Pit Tailings Disposal". The Meadowbank In-Pit Disposal project was approved by the Nunavut Impact Review Board and the Minister on November 27, 2018 following the reconsideration of the Meadowbank Mine Project Certificate 004.

The Meadowbank Tailings Storage Facility Management Plan for Whale Tail Pit - Version 2_NIRB (Agnico Eagle, 2018) outlines the required management of tailings produced through the Whale Tail Pit approved project (2019 to 2023) and a tailings deposition plan that includes the Whale Tail Pit Expansion Project (2023 to 2026). This version of the Tailings Storage Facility Management Plan is an updated plan to assist the NIRB in the review of proposed Whale Tail Pit Expansion. In parallel with the NIRB review of the Whale Tail Pit Expansion Project, Agnico Eagle will continue to work with the Nunavut Water Board to amend the Licence 2AM-MEA1526 in 2019 to begin tailings deposition in the Portage and Goose pits in accordance with the approved Meadowbank (PC No.004) and Whale Tail Pit Projects (PC No.008). Agnico Eagle is proposing all tailings to continue to be stored in the Meadowbank Tailings Storage Facility, which upon approval by the NWB will include In-pit deposition.

SECTION 8 • CONTROL STRATEGIES FOR ACID ROCK DRAINAGE AND METAL LEACHATE IN COLD REGIONS

The generation of metal leachate in acidic drainage is a concern for mining projects. In evaluating the potential control strategies for the disposal of the mine waste for the Expansion Project, consideration was given to strategies that are effective in cold regions. A discussion of the alternative control strategies considered is summarized below.

Common control strategies for the prevention or reduction of acid mine drainage in cold regions are:

1. Control of acid generating reactions;
2. Control of migration of contaminants; and
3. Collection and treatment.

In assessing the overall control strategies for the Project, emphasis has been placed on methods that satisfy (1) and (2) in the above list, which then has an impact on (3) by potentially reducing the requirements for these activities. Table 8.1 presents various acid mine drainage control strategies.

Table 8.1 Acid Mine Drainage Control Strategies of the Arctic

Strategy	Description
Freeze Controlled	Requires considerable volumes of non-acid waste rock for insulation protection. Better understanding of air and water transport through waste rock required for reliable design.
Climate Controlled	Requires control of convective airflow through waste rock, infiltration control with modest measures and temperature controls. Better understanding of waste rock air, water, and heat transport for reliable design.
Engineered Cover	Special consideration for freeze-thaw effects. Availability and cost of cover materials are major impediments.
Subaqueous Disposal	Very difficult to dispose of waste rock beneath winter ice.
Collection and Treatment	Costly to maintain at remote locations Long-term maintenance cost.

Source: Dawson and Morin (1996).

The Expansion Project site is located within the zone of continuous permafrost, and has a mean annual air temperature of about -11.3 °C. Based on thermal data collected during baseline studies, the mine area is underlain by permafrost to be on the order of 425 to 495 mbgs. In developing this Plan, freeze control and climate control strategies have been adopted.

Freeze control strategies rely on the immobilization of pore fluids to control acid mine drainage reactions, and the potential migration of contaminated pore water outside of the storage facility. The climate conditions in the project area are amenable to freeze control strategies, and hence should be taken advantage of. In addition to immobilization of pore fluids, permafrost can reduce the hydraulic conductivity of materials by several orders of magnitude. Consequently, freeze control strategies are effective methods for reducing the migration of contaminants through materials. According to

Dawson and Morin (1996), freeze control strategies can only be effective if sufficient quantities of NPAG waste rock are available for use as a cover and insulation protection.

Climate control strategies rely on cold temperatures to reduce the rate at which oxidation occurs. The low net precipitation in permafrost regions limits infiltration of water into waste rock and tailings disposal areas. Consequently, the climate of the Expansion Project will act as a natural control to reduce the production of acid mine drainage and metal leachate. Climate control strategies are best applied to materials placed at a low moisture content to reduce the need for additional controls on seepage and infiltration. This strategy is considered to be effective for waste rock in arid climate such as the one of the Expansion Project.

Meadowbank Mine uses the climate control strategy for the reclamation of the WRSF and TSF. Research activities are ongoing about the behaviour and the performance of the proposed cover systems for Meadowbank Mine with the participation of the Université du Québec en Abitibi-Témiscamingue and Polytechnique: Research Institute Mines and Environment since 2014. Experience and knowledge acquired at Meadowbank Mine regarding the design, the closure cover conception and the monitoring of the facility and the cover system will be applied to the Expansion Project waste rock storage facilities.

SECTION 9 • MONITORING AND CLOSURE

9.1 Expansion Project Waste Rock Storage Facilities

9.1.1 Whale Tail WRSF and IVR WRSF

Progressive reclamation includes closure activities that take place prior to permanent closure in areas or at facilities that are no longer actively required for current or future mining operations. Reclamation activities can be done during operations with the available equipment and resources to reduce future reclamation costs, minimize the duration of environmental exposure, and enhance environmental protection. Progressive reclamation may shorten the time for achieving reclamation objectives and may provide valuable experience on the effectiveness of certain measures that might be implemented during permanent closure. The Whale Tail WRSF and IVR WRSF will be operated to facilitate progressive reclamation; detailed mine closure and reclamation activities are provided in the Whale Tail Interim Closure and Reclamation Plan.

A closure cover system will be added on the slopes and top surface of the Whale Tail WRSF and IVR WRSF, to encapsulate the PAG/ML waste rock. The cover design proposed is similar to that of the Meadowbank Portage WRSF. Based on results calibrated to the Meadowbank WRSF thermal data to date and climate change predictions, the maximum predicted thickness of the WRSF active layer is 4.2 m and a contingency of 0.5 m will be added. Thus, the cover will consist of a 4.7 m thick NPAG/NML waste rock placement as a final surface cover, or otherwise dictated by thermal monitoring and updated thermal modelling during operations. The intent of the cover is to contain the annual active layer inside the thickness of the cover and maintain a temperature below 0 °C for the underlying PAG/ML waste rock. The objective of the cover is the control of acid generating reactions and migration of contaminants.

The segregation of the PAG/NPAG and ML/NML waste rock will occur during operations (see the Operational ARD-ML Sampling and Testing Plan and Section 5.2), as will the progressive placement of the final cover on the WRSFs slopes. The covering of the top of the Whale Tail WRSF and IVR WRSF will be completed at the start of the closure period using the stockpiled NPAG and NML waste rock. There is sufficient NPAG/NML material for the 4.7 m cover, if needed. It is anticipated that the native lichen community will naturally re-vegetate the surface of the Whale Tail WRSF and IVR WRSF over time.

During operation and closure, thermal monitoring will be conducted in the cover and the facility. These results, along with thermal modelling, will assess the performance of the Whale Tail WRSF and IVR WRSF cover and identify if adjustments in the cover placement or thickness will be required.

Thermal and water quality monitoring will be carried out during construction, operation and closure of the mine life to demonstrate geotechnical stability and the safe environmental performance of the facilities. If any non-compliant conditions are identified, then maintenance and planning for corrective measures will be completed in a timely manner to ensure successful completion of the Whale Tail Interim Closure and Reclamation Plan.

Mine closure and the reclamation of the Whale Tail WRSF and IVR WRSF will use currently accepted management practices and appropriate mine closure techniques that will comply with accepted protocols and standards.

Geochemical testing indicates that some waste rock material is NPAG/NML, but some waste rock is characterized as PAG and/or ML (refer to Section 5.1) and therefore, means to limit oxidation and water infiltration need to be put in place. By containing the yearly active layer inside the thickness of NPAG/NML waste rock cover and maintain a temperature below 0 °C for the underlying PAG/ML waste rock, the cover will provide control of acid generating reactions and prevent the migration of contaminants. Increased active thaw depth/rock cover from 4.0 to 4.7 m is expected to have no effect on WRSFs contact water quality during operations, and long-term post closure effects to water quality of a thicker active layer are expected to be within model accuracy where a clean (low leaching) waste rock cover present.

The contact water management system for the Whale Tail WRSF and IVR WRSF (WRSF Dikes and WRSFs Ponds) will remain in place until mine closure activities are completed and monitoring results demonstrate that water quality conditions from the Whale Tail WRSF and IVR WRSF are acceptable for discharge with no further treatment required. Water quality will be monitored as per the Expansion Project Water License requirements. Once water quality meets the discharge criteria established through the water licensing process, the contact water management system will be decommissioned to allow the water to naturally flow to the outside environment. Water quality predictions for Whale Tail Pit are provided in Addendum Volume 6, Appendix 6-H of the FEIS (Agnico Eagle, 2016).

9.1.2 Underground WRSF

The underground WRSF is a temporary facility as the mine waste from underground operations will be returned underground as backfill during mining operation, with no underground waste rock remaining on surface at the end of the mine life.

The reclamation of the underground WRSF will use currently accepted management practices and appropriate mine closure techniques that will comply with accepted protocols and standards.

9.2 Ore Stockpiles

All ore stockpiles will be used over the operations to stockpile ore and will be freed in 2026. During the following summer, if metal contamination of ore pads is measured, the pad section targeted by the contamination will be excavated and placed in the Expansion Project WRSFs before completing its cover with NPAG waste rock. If deemed required, the Ore Stockpiles will be covered with NPAG/NML waste rock or soils. In the event of a short-term temporary closure, the water and dust management strategies for the ore stockpiles will be kept the same as used during active mine operations. In the event of a long-term temporary closure, surface water control structures will be maintained as required. Further details on mine site closure and reclamation, including the ore stockpiles, can be found in the Whale Tail Interim Closure and Reclamation Plan.

9.3 Water Quality Forecast for Expansion Project Operation and Closure

Mine closure is integral to the mine design and will be adapted during operations. Planning for permanent closure is an active and iterative process. The intent of the process is to develop a final closure plan including specific water management components using adaptive management. This begins during the mine design phase and continues through to closure implementation. Adaptive management enables the plan to evolve as new information becomes available through analysis, testing, monitoring, and progressive reclamation. The detailed mine closure and reclamation activities are provided in the Whale Tail Pit Interim Closure and Reclamation Plan (Golder 2019a).

The Whale Tail WRSF and IVR WRSF will be progressively covered with NPAG/non-ML waste rock throughout operations and are expected to be completely covered at the beginning of closure. The runoff and seepage from the Whale Tail WRSF and IVR WRSF will continue to be collected in the designated collection ponds and pumped to Whale Tail Lake North Basin during active closure (re-filling). Water will be monitored during the 16 years of flooding until results demonstrate that water quality conditions from the WRSFs are acceptable for direct discharge. Once water quality meets the discharge criteria, the water management systems will be decommissioned to allow the water to naturally flow to the receiving environment.

Results from the updated modelling (Golder, 2019c) show that effluent discharge into Mammoth Lake will be well mixed. Steady-state untreated WRSFs contact water released is predicted to meet SSWQO for arsenic outside the mixing zone in the Lake post-closure, under the anticipated cover performance scenario (from the 4.7 meter cover of low arsenic leaching waste rock). Mammoth Lake is sensitive to cover material seepage quality, in turn sensitive to cover composition and WRSFs pile contact water volume. Observational data at Meadowbank WRSF and the landform water balance of the WRSFS (OKC 2019) suggest that pile contact water volumes are substantially lower than originally predicted (Portage is 20 to 40% lower, Vault WRSF contact water is minimal compared to 178,000m3 predicted at maximum footprint year) using similar modelling assumptions. Modelling results reflect a conservative chemical load estimate to Mammoth Lake in WRSFs seepage that will be verified with monitoring. As per Type A Water Licence 2AM-WTP1826 Part E, conditions 7 and 8 , Agnico Eagle anticipates a site wide water balance and end pit water quality model update will be required for the Whale Tail Pit – Expansion Project site as part of the annual water management plan.

In closure, water from the Whale Tail WRSF Contact Water Collection System is used to actively flood IVR Pit, and the IVR WRSF water is directed to Whale Tail Pit. In post-closure, water from the Whale Tail WRSF Contact Water Collection System is allowed to flow passively to Mammoth Lake as baseline drainage patterns are re-established. Lower volumes and chemical loading of water originating from either of the WRSFs would improve water quality throughout closure in Whale Tail and IVR Pits, and in Mammoth Lake in post-closure.

9.4 Water Quality Forecast for Meadowbank Operation and Closure

The management operation and monitoring of the TSF and of the Portage and Goose pits water quality is regulated under Agnico Eagle existing Type A Water Licence 2AM-MEA1526.

9.5 Monitoring of Freezeback

In December 2018, the Nunavut Water Board approved the Whale Tail WRSF, NPAG Stockpile and Overburden Stockpile Design Report and Drawings; Type "A" Water Licence 2AM-WTP1826, Whale Tail Pit Project (60-day notice). The instrumentation and monitoring actions described in this section are also presented in the approved design report, as per water license conditions.

9.5.1 Expansion Project Waste Rock Storage Facilities

Thermal monitoring will be carried out during all stages of the mine life to demonstrate geotechnical and geochemical stability and the safe environmental performance of the facilities. If any non-compliant conditions are identified, then maintenance and planning for corrective measures will be completed in a timely manner to ensure successful completion of the Whale Tail Interim Closure and Reclamation Plan.

To observe the freezeback of Whale Tail WRSF and IVR WRSF, a series of subsurface thermistors will be installed at strategic locations. The purpose of the thermistors is to monitor the temperature within the facility as freezing progresses. The thermistors will be monitored regularly throughout the operational period as well as during closure according to the Whale Tail Water Licence and as described in the Thermal Monitoring Plan. The results will be used to evaluate the predicted thermal response of the facility, and will allow for revision of the thickness of the final cover if required. As the Underground WRSF will be reclaimed completely, no monitoring is needed.

9.1.5.1 Instrumentation during construction

The Whale Tail and IVR WRSFs will be instrumented with thermistor chains in order to monitor the evolution of temperature profiles with time and to evaluate if the process of permafrost aggradation and pile freeze back is developing as anticipated. Thermistor chains will be installed along targeted instrumentation sections. The location and the number of instrumented sections will be selected to take into account factors such as dominant wind and sun exposure and will be aligned with the results of the thermal model of the WRSFs.

Vertical thermistors will be drilled through the rockfill of completed benches on the setback of targeted benches. The objective will be to vertically instrument a minimum of two benches per instrumentation section as soon as they are completed and capped.

Instruments will be installed on the first bench of the WRSFs and will extend into the foundation to gather information on the thermal regime of the foundation at the toe of the WRSF. The other chains will be drilled to a depth, which allows monitoring of the temperature profile within the instrumented section. To gather data on the convection process, AEM will look at the feasibility of installing horizontal thermistor on the edge of the WRSF at mid bench height. Once the middle lift of a bench is completed, a thermistor chain would be laid down in the setback area of that bench and carefully buried to avoid being damaged when it is backfilled. The objective will be to instruments two benches of each instrumentation section using this technique.

The actual schedule for installation of instrumentation in operation will be defined based on the mining plan, WRSF development schedule and accessibility. An adaptive monitoring strategy will be implemented in which the decision to install additional thermistor in operation will be based on the analysis of the results of the thermal monitoring program.

9.1.5.2 Instrumentation at closure/post-closure

Additional vertical thermistors will be installed on top of the pile upon end of operations and the installation of the cover system for closure of the facility. The location and depth of installation of these thermistor chains will be based on the results of the monitoring program in operation.
The thermistor chains will be connected to data loggers for automatic data collection, storage and transmission. Data will be reviewed periodically or as needed. Results will be summarized in monitoring reports on a yearly basis during the operation.

In general terms, Agnico Eagle intends to evaluate WRSF freeze-back performance by monitoring thermistor strings, collecting water quality which will be compared against sensitivity and 'base case' freeze-back modelling, and site-wide load balance modelling. The results of the performance and monitoring will presented within the Annual Report. It is expected that a range of freeze-back performance will occur due to inherent variability in construction technique, physical material properties and chemical material properties. Significant divergence of in situ measurements outside of the range of expected and acceptable variability from the numerical model will be evaluated to determine potential impact on closure and additional monitoring and/or mitigations required.

Specifically, should daily temperature readings of thermistors located at the interface of the waste rock and thermal cover system indicate that the waste rock is not frozen, resulting in water quality exceedances beyond permitted values in the WRSF collection ponds or groundwater monitoring prior to post-closure, these will trigger the installation of additional monitoring and/or mitigation to reduce uncertainty in variability and reducing the overall risk to water quality. This overall performance will be based on the integration of the various monitoring data used as model inputs.

9.6 Adaptive Management

Adaptive management will be achieved through performance monitoring and management actions that will be implemented, should they be triggered. Action level responses taken during the year will be documented in Agnico Eagle's annual report submitted to the NWB.

For more details on the adaptive management actions Agnico eagle is planning to implement related to the Waste Rock Storage Facilities, please refer to the ARD/ML plan (Section 5, table 5.1).

SECTION 10 • REFERENCES

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APPENDIX A • LANDFORM WATER BALANCE MODELLING OF WHALE TAIL AND IVR WRSFS

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Memorandum

To: Michel Groleau – Nunavut Permitting Lead, Agnico Eagle Mines Ltd.

From: Gillian Allen, Geoenvironmental Engineer

Cc: Jenyfer Mosquera – Agnico Eagle Mines Ltd.

Our ref: 948-011-M-006 Rev3

Date: May 10, 2019

Re: **Agnico Eagle Mines Ltd. - Landform Water Balance Modelling of Whale Tail and IVR WRSF**

O’Kane Consultants Inc. (Okane), is currently undertaking thermal modelling of the waste rock storage facilities (WRSFs) at Agnico Eagle Mines Ltd.’s (AEM’s) Amaruq project. Thermal modelling will assist in developing the expected seasonal active layer thickness under climate change conditions, as well as determine if permafrost conditions within the WRSFs are sustainable under climate change conditions. The ultimate objective of the project is to demonstrate the physical and chemical stability of the Whale Tail and IVR WRSFs while optimizing risk and cost for AEM.

As part of this objective, a landform water balance was completed, including estimates of runoff, interflow, and basal seepage rates for different slopes and aspects of the WRSF (if applicable). The following memorandum summarizes the results of the landform water balance. A separate detailed modelling report summarizes specific modelling background and methodology (Okane, 2019[1]).

Conceptual Hydrologic Model of Amaruq WRSFs

The following summarizes the conceptual model of the hydrologic regime at the Whale Tail and IVR WRSFs:

- The existing proposed thermal cover system (4.7 m of NAG/NML material) is not expected to promote runoff / interflow from the cover system due to sufficient infiltration capacity of the waste rock and cover system materials as a result of the expected coarse texture of materials.
- High infiltration rates will result in gradually (over several years) increasing interflow and/or basal flow reporting to WRSF collection ponds as the WRSF is constructed and reaches its final extent.
- Slopes are expected to be more susceptible to infiltration entering waste rock prior to freeze back compared to the plateau.

[1] O’Kane Consultants Inc. 2019. Agnico Eagle - Detailed Thermal Modelling Report for the Whale Tail and IVR WRSFs – DRAFT.

- Cover system material (NAG/NML) is expected to experience less weathering compared to Portage (increase in fines) due to lithology (greywacke vs. ultramafic) resulting in higher long-term infiltration rates and higher propensity for convective cooling compared to Portage.

- Decreased reactivity in NAG waste rock is expected to result in decreased arsenic load generation (but not zero load generation).

- Any interflow / runoff from the thermal cover system is not expected to report to collection ponds as 'plug flow' due to the variance in transit times across the landform. Put simply, incident precipitation at the toe of the WRSF will report to water collection systems much sooner than precipitation which lands on the plateau of the landform. Any contaminants of potential concern present within the thermal cover system material (eg. Arsenic), will therefore also be released gradually.

- Gradual decrease in arsenic loading over time is expected due to the hydrology of WRSFs.

- The thermal and hydrologic regimes are expected to be different based on North and South aspect.

Methodology

GeoStudio Version 10[2] was used to conduct the modelling for this project. This version of GeoStudio is a substantial upgrade to previous versions software as it is able to account for advective air flow as well as gas consumption due to mineral oxidation within the WRSF and associated heat generation via an add-in module developed for the software. Four components of the GeoStudio suite of programs were used in combination for this project: SEEP/W; TEMP/W; AIR/W, and CTRAN/W (with the gas consumption and exothermic reactions add-in incorporated into the CTRAN analysis).

Models representative of selected locations of thermistor strings at Meadowbank's Portage WRSF were simulated for the same period of time as the thermistor strings have been operational. The model results were then compared to the field data to determine that the model reasonably estimated field thermal conditions. Material inputs for the model were calibrated to provide a reasonable comparison to the field data. A detailed description of all material inputs can be found in the detailed thermal modelling report (Okane, 2019).

Following the one-dimensional calibration described above, a two-dimensional (2-D) cross section was developed (Figure 1) to determine the main factors promoting and inhibiting freeze-back of and seepage (amount and timing) from the WRSFs. The existing 4.7 m cover system design was modelled as the base case. Models consider coupled gas, heat, water, and air transfer processes. Additionally, the models account for the exothermic oxidation of sulphide materials. Therefore, TEMP/W, SEEP/W, and AIR/W components of the GeoStudio software suite were used in combination with the Gas Consumption and Exothermic Reactions add-in module GEOSLOPE developed with Okane to simulate sulphide oxidation.

[2] GEOSLOPE, 2018. GeoStudio 2019. Online. https://www.geoslope.com

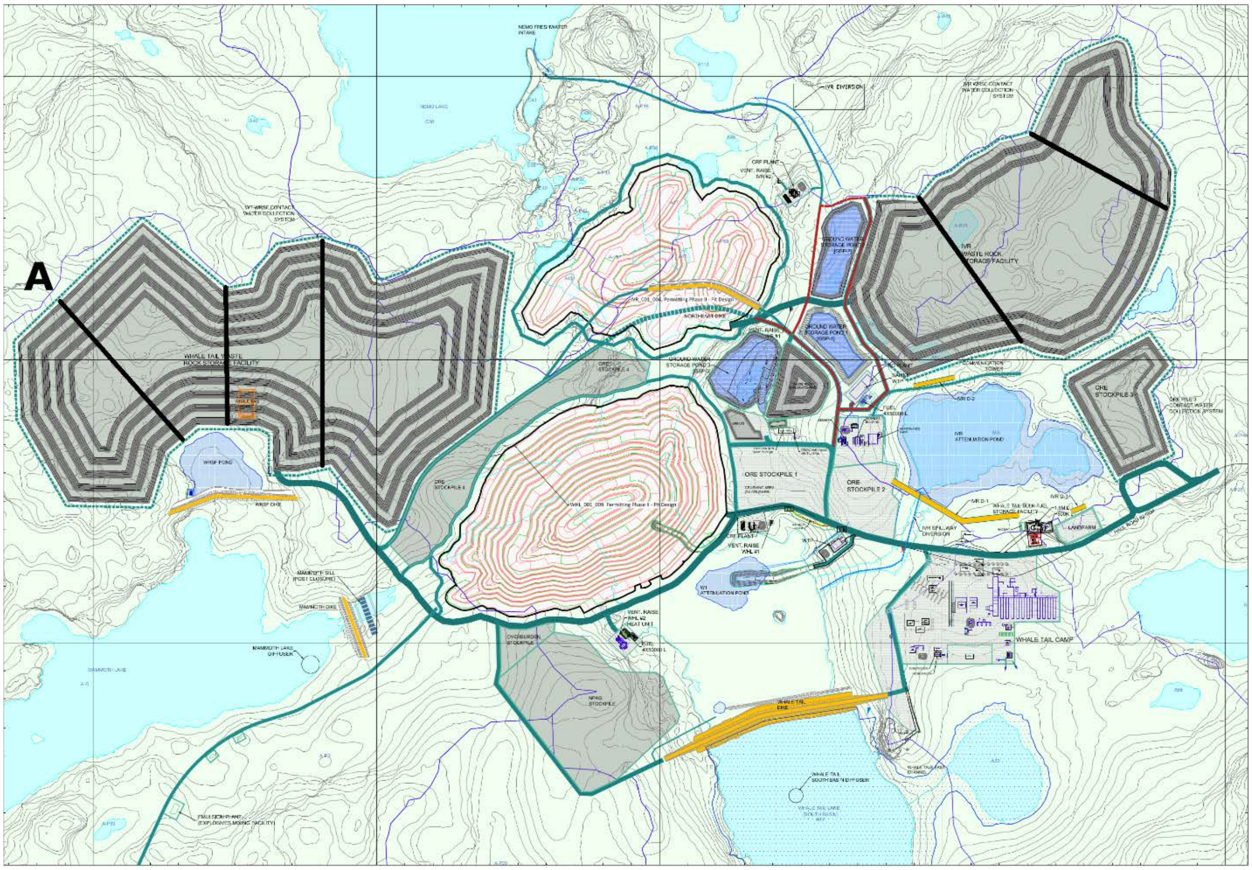

Figure 1: Location of the cross section 'A" used in modelling.

In order to capture the effects of construction on the landform water balance, the cross section modelled was 'built-up' in three-month intervals, according to the construction schedule provided (AEM, 2018[3]).

Results

Surface Water Balance

A summary of the surface water balance for the Amaruq WRSFs is provided in Table 1. This summarized the volume of annual runoff expected from the landforms as a percentage of incident precipitation (both snow and rainfall). Results of the surface water balance support the conceptual model that the hydrologic regimes are expected to be different based on North and South aspect. Generally, higher net radiation results in greater evaporation and soil heating. With more evaporation, less water is available to runoff and/or infiltrate. Higher net radiation will also result in more sublimation, as more energy is available to convert snow into water vapour.

[3] Agnico Eagle. 2018. Agnico Eagle – Meadowbank Division Amaruq Mine Project 005 – Site Preparation 210 General Arrangement Amaruq Mine Site Arrangement Permitting Dwg, 2019Q4 v7, 2020Q4 v7, 2021Q4 v7, 2022Q4 v7, 2023Q4 v7, 2025Q4 v7, & AFTER MINE v7. October 18, 2018.

Table 1: Summary of average surface water balance for different aspects of the WRSF.

Water Balance Parameters	Plateau	SE Aspect	NW Aspect
Total Precipitation (mm)	296 mm	296 mm	296 mm
Rainfall (% of Total Precipitation)	55-60%	55-60%	55-60%
Snow (% of Total Precipitation)	40-45%	40-45%	40-45%
Actual Evaporation (% of Total Precipitation)	25-30%	30-35%	25-30%
Runoff (% of Total Precipitation)	<5%	<5%	10-15%
Net Percolation (% of Total Precipitation)	30-35%	25-30%	20-25%
Sublimation (% of Total Precipitation)	35-40%	40-45%	40-45%

In order to simplify runoff outputs from the surface water balance, the runoff values for each aspect were weighted based on the relative area represented by each aspect. This results in an overall runoff rates from the Whale Tail and IVR WRSFs of approximately 5% of incident precipitation. Runoff was assumed to interact with surficial materials to a depth of 30 cm.

The surficial materials interacting with landform runoff will change over time as progressive reclamation is completed. Table 2 and Table 3 summarize the relative percentage of runoff expected to interact directly with the cover system material and waste rock material over time.

Table 2: Relative amount of runoff from bare waste rock vs cover system materials at the Whale Tail WRSF.

Year	Percentage of Runoff from Bare Waste Rock	Percentage of Runoff from Cover System
2019	100%	0%
2020	82%	18%
2021	82%	18%
2022	71%	29%
2023	71%	29%
2024	61%	39%
2025	0%	100%

Table 3: Relative amount of runoff from bare waste rock vs cover system materials at the IVR WRSF.

Year	Percentage of Runoff from Bare Waste Rock	Percentage of Runoff from Cover System
2021	50%	50%
2022	50%	50%
2023	75%	25%
2024	75%	25%
2025	0%	100%

The majority of runoff from the WRSFs is expected to occur as a result of spring melt, however some runoff is expected throughout the unfrozen period. The distribution of runoff by month is provided in Table 4.

Table 4: Runoff distribution by month for the Whale Tail and IVR WRSF.

Month	Percent of Total Annual Runoff by Month (%)
January	0%
February	0%
March	0%
April	0%
May	0%
June	85-90%
July	5-10%
August	5-10%
September	<5%
October	0%
November	0%
December	0%

Basal Seepage

The high infiltration capacity of the cover system materials and waste rock materials result in a propensity for incident precipitation to result in infiltration, rather than runoff (Table 1). As water infiltrates into the surficial materials, net percolation flows vertically through the WRSF, eventually freezing back at depth. The base layer of the WRSF is consistently frozen from the time of placement. As a result, basal seepage from the landform is negligible.

Interflow

There is some lateral flow of water within the cover system on the angle of repose slopes (known as interflow), however, lateral flow infiltrates vertically in zones of enhanced infiltration along the toe of each bench of the WRSF. This is shown conceptually in Figure 2.

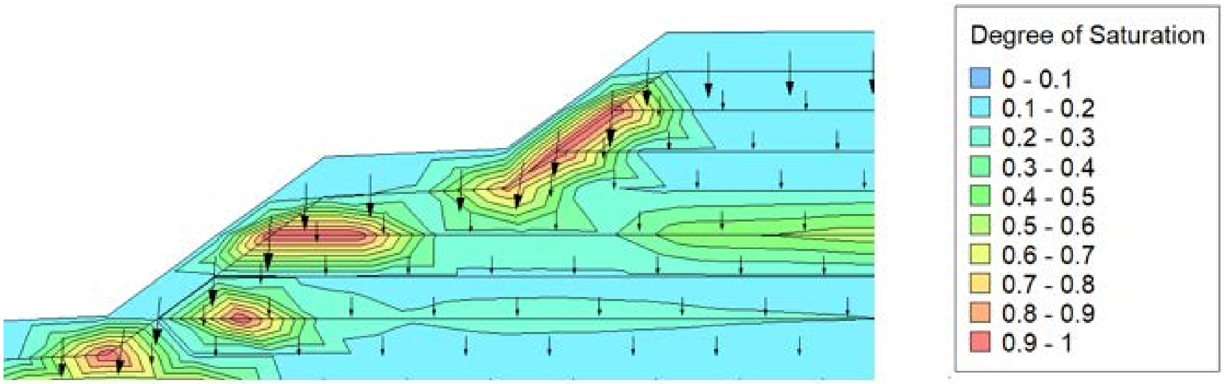

Figure 2: Sketch of hydrologic regime of the Whale Tail WRSF near surface with water flow vectors (black) shown.

A small portion (less than 1%) of incident precipitation over the entire landform(s) is expected to exit the landform as interflow. This occurs when infiltration occurs along the slope of the lowest bench of the WRSF. This flow path interacts with the entire 4.7 m depth of the cover system, along a maximum flow path of approximately 10 m. Interflow does not interact with the potentially acid generating and metal leaching waste rock.

We trust information provided in this memorandum is satisfactory for your requirements. Please do not hesitate to contact me at 306-713-1568 or gallen@okc-sk.com should you have any questions or comments.

APPENDIX B • DRAWINGS - SITE LAYOUTS