Appendix 23

Whale Tail Waste Rock Management Plan Version 9

AGNICO EAGLE

Meadowbank Complex

Whale Tail Project – Waste Rock Management Plan

MARCH 2022
VERSION 9

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is developing the Whale Tail Pit and Haul Road Project (Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine. In 2020 the Whale Tail Expansion Project (Expansion Project) was approved, permitting Agnico Eagle to expand and extend the Whale Tail Pit operations 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. In 2021, a positive conformity determination was issued by the Nunavut Planning Commission for pushbacks on the IVR and Whale Tail pits (Pushback Project).

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 is currently being mined as two open pits (i.e., Whale Tail Pit and IVR Pit) and underground operations, and ore is hauled to the approved infrastructure at Meadowbank Mine for milling.

The open pit mine, mined by truck-and-shovel operation, includes four development phases: 1 year of construction (complete), 7 years of mine operations, 17 years of closure, and the post closure period. On September 30th, 2019 commercial production began at the Whale Tail Pit. The mine, mined by truck-and-shovel operation, will produce in total 23.7 million tonnes (Mt) of ore, 176.7 Mt of waste rock, and 8.9 Mt of overburden waste. The Pushback Project includes mining an additional 0.8 Mt of ore and produces 7.9 Mt of additional waste material (rock and overburden) which will be stored in the existing Waste Rock Storage Facilities (WRSF). Non-leachable material will also be stored in the pits.

The addition of pushbacks to the Whale Tail Pit Project will generate an additional 0.8 Mt (dry) of tailings to the Meadowbank Tailings Storage Facility (TSF) and In-Pit Tailings Deposition sites for a total of 53.6 Mt.

Project mining facilities include accommodation buildings, ore stockpiles, overburden stockpiles, waste rock storage facilities (WRSFs) areas planned to receive waste rock and waste overburden, a temporary waste rock facility to receive underground waste rock, a water management system that includes collection ponds, water diversion channels, and retention dikes/berms, and a Water Treatment Plant.

Two waste rock storage facilities are currently in operation: the Whale Tail WRSF, located north-west of the Whale Tail pit, and the IVR WRSF, located east of the IVR pit. Waste rock and overburden will be trucked to both facilities until the end of operations, with distribution according to the operations schedule. Waste rock and overburden will be co-disposed and progressive reclamation will take place using thermal encapsulation. All waste rock material will be sampled and tested during operations to verify their ARD and ML potential in support of waste segregation. Non-potentially acid generating (NPAG) and non-metal leaching (NML) material can be used for infrastructure construction, for the thermal cover of the WRSF, or disposed of using in-pit methodology.

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

Tailings from the Project will be stored in the Meadowbank TSF and the In-Pit Tailings Deposition sites. The management, operation, and monitoring of the TSF is regulated under Agnico Eagle's existing Type A Water Licence 2AM-MEA1530. In summary, the TSF consists of a North Cell and South Cell located within the basin of the former north-west arm of Second Portage Lake previously dewatered to allow mining in the Portage Pit. To store tailings from processing of ore, Agnico Eagle maximized storage in the South Cell, and constructed internal dike structures to store additional tailings within the current footprint of the North Cell. In-Pit Tailings Deposition commenced at Meadowbank in July 2019 and will be the main method used to store the remaining tailings produced by the Project. Additional details on tailings management is presented in the Meadowbank Waste Management Plan.

Freeze control and climate control strategies will be used to mitigate chemical stability risk of the waste rock storage facilities in the long-term. Thermal encapsulation of the waste rock will reduce the oxidation rate and prevent water migration. The low net precipitation in permafrost regions limits infiltration of water into waste rock and tailings disposal areas. Consequently, the climate of the Project area will act as a natural control to mitigate risks arising from PAG-ML lithologies.

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 WRSFs will begin when practical as part of the progressive reclamation program. The Whale Tail WRSF and IVR WRSF will be covered with non-acid generating and non-metal leaching waste rock to promote freezing as a control strategy against acid generation and migration of contaminants. Both WRSFs will be instrumented to monitor permafrost development. Thermal and water quality monitoring will be carried out during all stages of the mine life to demonstrate 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 Interim Closure and Reclamation Plan, according to measures in line with the Adaptive Management Plan.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	January 2017	All	-	Comprehensive plan for the Whale Tail Pit project
2	May 2018	All	-	Comprehensive review of the plan for the Whale Tail Pit project
3	September 2018	All	-	Comprehensive review of the plan for the Whale Tail Pit project
4	October 2018	2.5, 3.2, 9.3	7, 11,	Updated to align with recommendations issued by CIRNAC and ECCC in October 2018
5	March 2020	All	-	Comprehensive review of the plan for the Whale Tail Pit project
6	July 2020	All	-	Waste Management Plan for the Whale Tail Pit – including Expansion Project
7	April 2021	All	-	Comprehensive review of the plan for the Whale Tail Pit project – including Expansion Project
8	June 2021	Summary,3,5.1,9.1.3,Appendix	-	Inclusion of Pushback Project, Adjusted all tables for waste and ore tonnages, Included description of in-pit disposal for IVR, Added section “IVR Pit”
9	March 2022	All	-	Comprehensive review of the plan for the Whale Tail Pit project – including Expansion and Pushback Projects

Prepared By: Environment Department

Approved by:

Alexandre Lavallee – Environment & Critical Infrastructure Superintendent

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ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Division
Approved Project	Whale Tail Pit, Haul Road and Whale Tail Pit – Expansion Project
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
Pushback Project	Whale Tail Pit Pushback and IVR Pit Pushback
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 currently operating the Whale Tail Pit and Haul Road Project. The satellite deposit is located on the Amaruq property and continues to feed the mill at Meadowbank Mine. In 2020 the Whale Tail Expansion Project (Expansion Project) was approved, permitting Agnico Eagle to expand and extend the Whale Tail Pit operations to include a larger Whale Tail open pit, development of the IVR open pit, and underground operations while continuing to operate and process ore at the Meadowbank Mine. In 2021, two additional pushbacks (one in each pit) were approved. A pushback is a discrete zone of an open pit mining operation that can be mined continuously.

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 northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit is mined as two open pits (i.e., Whale Tail Pit and IVR Pit) and underground operations, and ore is hauled to Meadowbank Mine for milling.

The open pit mine, mined by truck-and-shovel operation, includes four development phases: 1 year of construction (complete), 7 years of mine operations, 17 years of closure, and the post closure period. On September 30th, 2019 commercial production began at the Whale Tail Pit. The mine, mined by truck-and-shovel operation, will produce 23.7 million tonnes (Mt) of ore, 176.7 Mt of waste rock, and 8.9 Mt of overburden waste. The Pushback Project includes mining an additional 0.8 million tonnes of ore. Milling will take place from 2019 through 2026, including mining until 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 pit mines
- underground mine
- water management facilities (attenuation ponds, dikes, etc.).

This document presents the Waste Rock Management Plan (the Plan) and is submitted as per the NWB Whale Tail Type A Water License 2AM-WTP1830. The purpose of the Plan is to provide consolidated information on the management of ore stockpiled on site, waste rock and overburden, including strategies for runoff and dust control and monitoring programs for the storage facilities.

Tailings from the Project will be stored in the Meadowbank TSF and the In-Pit Tailings Deposition sites. The management, operation, and monitoring of the TSF is regulated under Agnico Eagle's existing Type A Water Licence 2AM-MEA1530. The Meadowbank Waste Management Plan outlines the required management of tailings produced through the Whale Tail Project (2019 to 2026).

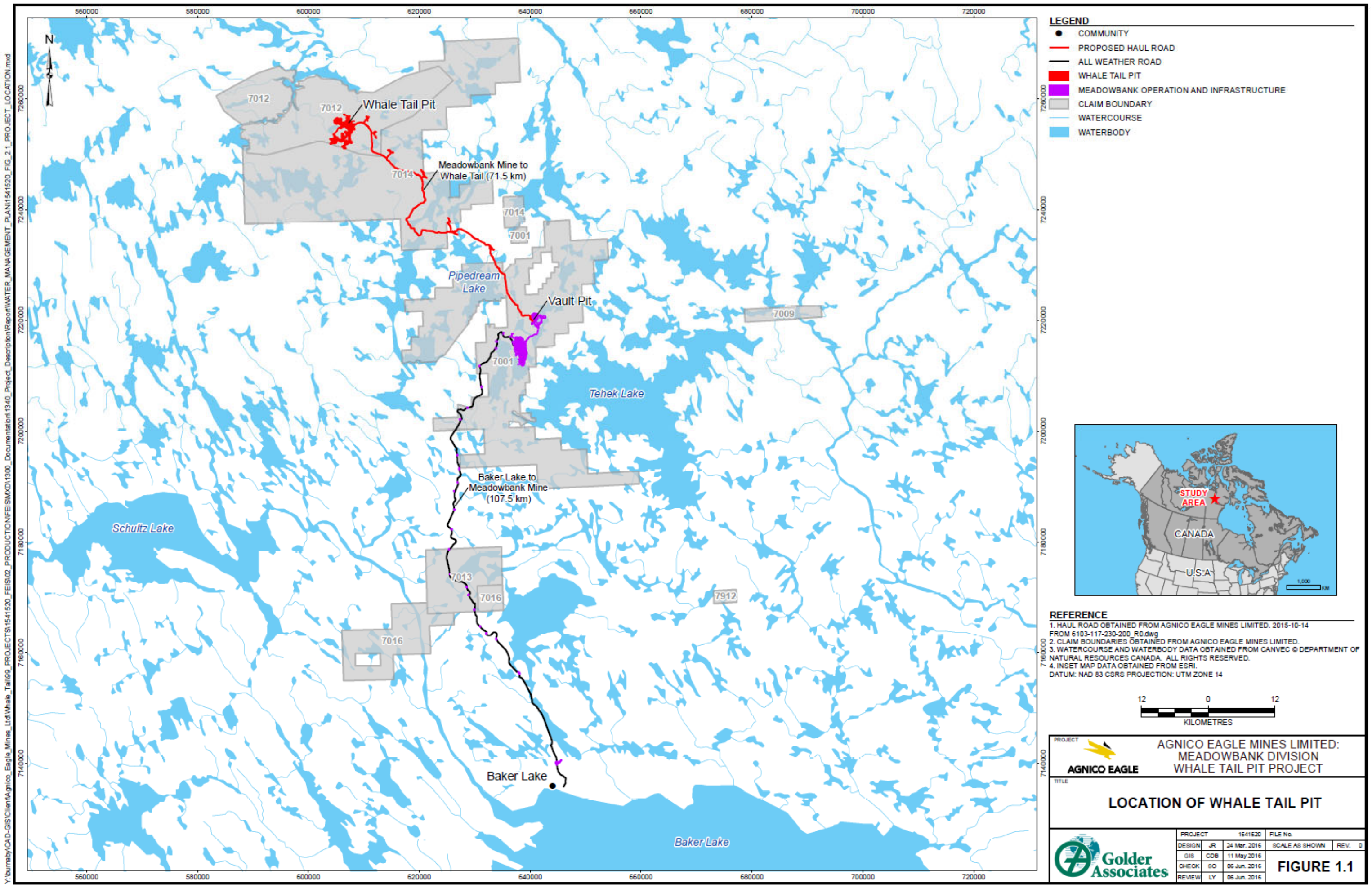

Figure 1.1 Location of Whale Tail Project

SECTION 2 • BACKGROUND INFORMATION

2.1 Site Conditions

Site layouts are presented in Appendix A.

2.1.1 Climate

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

The Project is 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 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 **Error! Reference source not found.**1.

Short-duration rainfall events representative of the Project are presented in Table 2.2, based on intensity-duration-frequency curves available from the Baker Lake A meteorological station (Station ID 2300500) operated by the Government of Canada (2015).

Table 2.1 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.

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Table 2.2 Estimated Mine Site Extreme 24-Hour Rainfall Events

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.

2.1.2 Permafrost

The mine site is 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.

During the 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 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

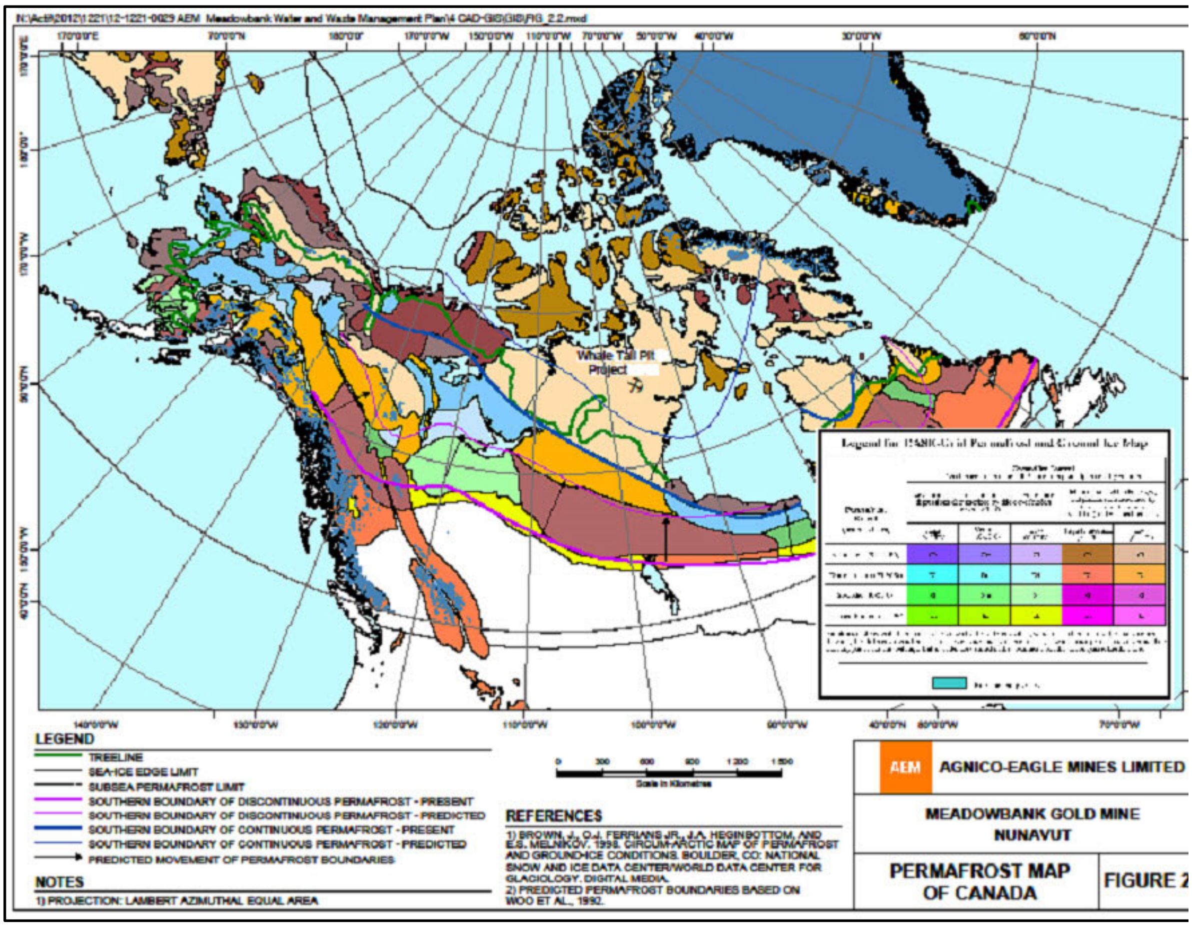

Figure 2.1 Permafrost Map of Canada

2.1.3 Climate Change

Table 2.3 presents a summary of climate change predictions used on a number of northern projects that have been reported in the engineering and scientific literature. Further studies incorporating climate change references will be done using the climate change predictions from the IPCC (Intergovernmental Panel on Climate Change) RCPs (Representative Concentration Pathways) RCP6.

Table 2.3 Estimated Summary of Reported Climate Change Rates Used in Northern Projects Engineering Studies

Reference	Increase in MAAT by Year 2100 (°C)	Notes
Hayley (2004)	4.7	Used in design studies for the Inuvik Regional Health Center. Reported as increase of 0.47°C per decade.
Hayley and Cathro (1996)	5.0	Used for Raglan Dam analyses.
Diavik	3.2	Used for the Processed Kimberlite Containment Facility Design
Burn (2003)	6.0	For use in the Western Arctic for pipeline design projects. Reported as increase of 1.75°C over a 29 year period
Intergovernmental Panel on Climate Change (AR5)	See Figure 2.3	RCP 6.0 to be used as base case

As part of the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5), the IPCC adopted new Representative Concentration Pathways (RCPs) to replace the previous emission scenarios of the Special Report on Emission Scenarios (SRES) (IPCC 2013). The four adopted RCPs differ from the SRES in that they represent greenhouse gas concentration trajectories, not emissions trajectories. The four scenarios (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) are named after the radiative target forcing level for 2100, which are based on the forcing of greenhouse gases and other agents and are relative to pre-industrial levels.

The climate change database for the Meadowbank and Whale Tail projects was developed following the recommendations outlined on the Canadian Climate Data and Scenarios (CCDS) website, which is wholly supported by ECCC (CCDS, 2018). The website recommends the use of statistical downscaling to "downscale" a GCM's (Global Circulation Model) predictions to a specific location based on historical observations. Statistical downscaling is a two-step process consisting of i) development of statistical relationships between local climate variables (e.g., surface air temperature and precipitation) and large-scale predictors (e.g., pressure fields), and ii) application of such relationships to the output of GCM experiments to simulate local climate characteristics in the future. The Pacific Climate Impact Consortium (PCIC) at the University of Victoria provides statistically downscaled daily temperature and precipitation under the RCP2.6, RCP4.5 and RCP8.5 scenarios for all of Canada at a resolution of approximately 10 km (PCIC, 2018). The second-generation Canadian Earth System Model (CanESM2), developed by the Canadian Centre for Climate Modelling and Analysis (CCCma), was used as the predictor GCM to downscale and make climate change databases representative of site conditions.

Statistical downscaling is limited by the availability of large-scale predictors. Current CCCma CanESM2 model runs are limited temporally to 2100. In order to predict beyond 2100, the radiative forcing trend was applied to the temperature. RCP4.5 and RCP6.0 are expected to stabilize shortly after 2100, while RCP8.5 is expected to continue along the same trend until after 2200.

Temperatures are anticipated to rise at about the same rate (approximately 0.06°C/year) for RCP4.5 and RCP6.0 until approximately 2070, after which RCP4.5 estimates a reduction in the temperature increase rate. Under RCP8.5, temperatures are expected to increase at a higher rate (approximately 0.12°C/year) for the duration of the modelled period. All three scenarios predict an increase in precipitation with time of approximately 0.5 mm/year (75 mm total increase over 150 years) for RCP4.5, 0.6 mm/year (90 mm total increase over 150 years) for RCP6.0 and 0.7 mm/year (100 mm total increase over 150 years) for RCP8.5.

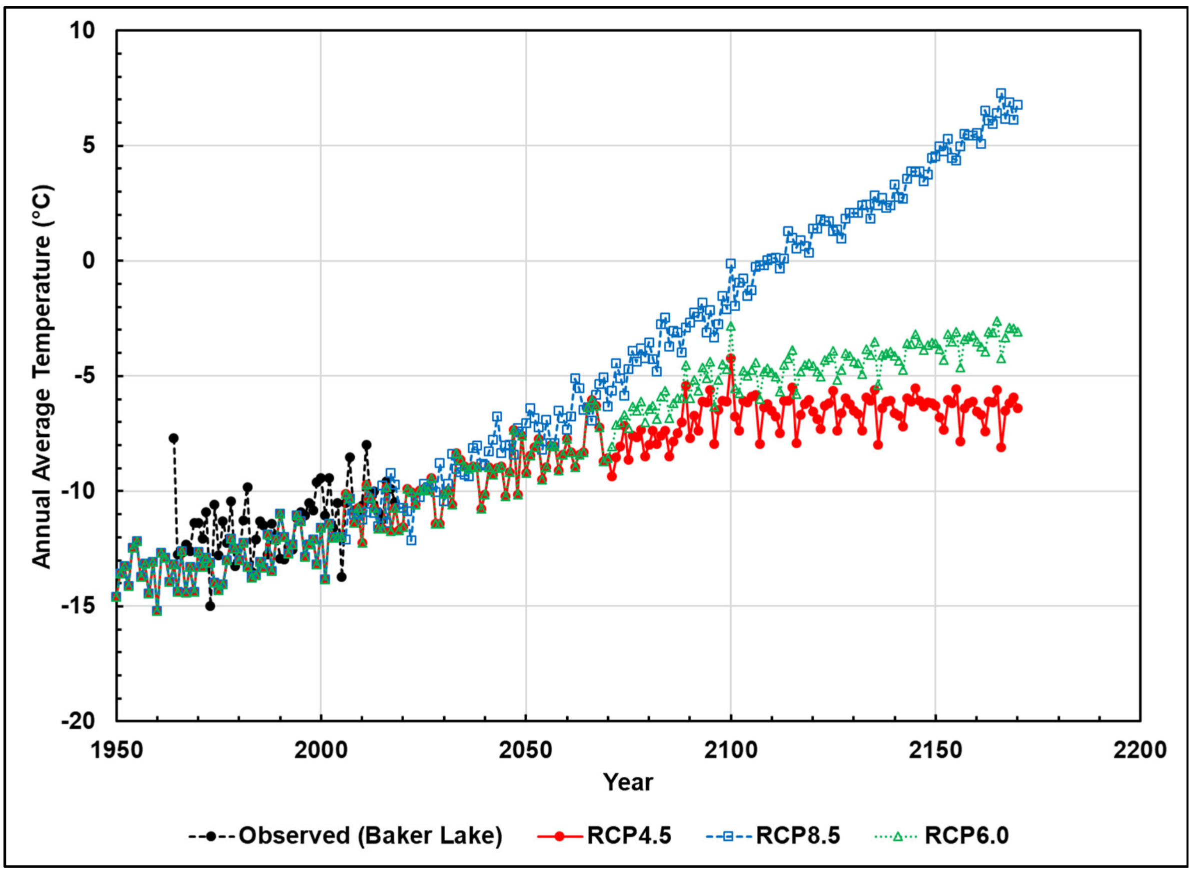

Figure 2.2 Annual average temperature estimated for the RCP4.5, RCP6.0 and RCP8.5 climate change scenarios. Observed temperature at Baker Lake is also shown.

2.1.4 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.

2.2 Mine Operations Description

2.2.1 Project Operations

The construction phase began at the beginning of the third quarter of Year -1 (2018) and focused on site preparation and the construction of infrastructure, with the start of the open pit development producing construction material. The mining 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 8.3. Ore processing will continue approximately 8 years, from Year 1 (2019) to Year 8 (2026). Mining activities and ore processing activity are expected to end respectively in Year 7 (2025) and 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 as closure is completed in Year 24 (2042) and will continue until it is shown that the site and water quality meets regulatory closure objectives. Table 2.4 summarizes the Project timeline and general activities.

Table 2.4 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 and In-Pit Tailings Deposition sites
	Year 8	• Complete transportation of ore to Meadowbank Mine • Complete discharge of tailings in Meadowbank TSF and In-Pit Tailings Deposition sites
Closure	Year 9 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 25 onwards	• Site and surrounding environment monitoring

TSF = Tailings Storage Facility

SECTION 3 • PROJECT DEVELOPMENT PLAN

3.1 Project Life of Mine

Several LOM scenarios were analyzed by Agnico Eagle, which ultimately retained the best one based on economic viability of the Project. Table 3.1 summarizes the Project LOM.

Table 3.1 Project Mined Tonnages

Year	Ore Mined (t)	Ore Processed in Mill (t)	Production Days
2017*	0	0	-
2018*	46,149	0	
2019*	1,140,323	2,750,306	214
2020*	3,032,794	2,602,827	366
2021*	4,065,016	3,570,491	365
2022	4,487,657	4,035,000	365
2023	3,115,195	4,222,000	365
2024	4,055,939	4,255,000	366
2025	3,716,966	4,265,000	365
2026	0	2,452,605	365
Total	**23,660,039**	**28,153,229**	

*Achieved values t = tonne

Tailings will be disposed in the approved Tailings Storage Facility, authorized under Project Certificate (No. 004) and Type A Water Licence (2AM-MEA1530). The Project deposition plan is a continuation of the current Meadowbank deposition plan according to the 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 the Project: waste rock and overburden. A third mine waste stream, tailings, will be produced at Meadowbank Mine (Refer to the Meadowbank Mine Waste Rock and Tailings Management Plan, submitted under Water Licence 2AM-MEA1530). Approximately 176.7 Mt of waste rock and 8.9 Mt of overburden will be generated by the Project as presented in Tables 3.2 and 3.3. The operation, management, and monitoring of the TSF is regulated under Agnico Eagle Type A Water Licence 2AM-MEA1530.

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 need 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 Mine Waste Tonnages (2017 – 2026)

Year	Waste Rock Excavated	Overburden Excavated	Total Material Excavated	Strip ratio
	(t)	(t)	(t)	
2017*	272,090	199,454	471,543	
2018*	1,903,018	735,664	2,684,831	41.2
2019*	12,101,399	1,510,888	14,752,610	11.9
2020*	31,846,323	1,699,327	36,578,444	10.5
2021*	33,805,525	622,159	38,492,701	7.3
2022	33,480,781	2,082,613	40,051,051	7.9
2023	30,000,316	1,499,712	34,615,223	10.1
2024	21,158,310	504,261	25,718,510	5.3
2025	12,169,036	0	15,886,002	3.3
2026	0	0	0	0.0
Total	**176,736,798**	**8,854,078**	**209,250,915**	7.7

*Achieved values t = tonne

The proposed usage or destination of the two 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 mining. Most of the waste rock excavated in 2018 at the start of the open pit development was used for the construction of the water management structures, the infrastructure pads, and the access roads. During Year 1 to the end of Year 3 (2021), the remaining required facilities for the operations were completed.

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 Whale Tail and IVR WRSF (refer to Sections 5 and 9). Table 3.4 indicates the projected production and use of this material during operation. Table 3.5 indicates the main areas that will require NPAG/NML waste rock for closure and reclamation.

Table 3.3 Summary of Mine Waste Tonnage and Destination

Mine Waste Stream	Estimated Quantities	Waste Destination
Total Mine Waste Material	176.7 Mt	Whale Tail and IVR WRSFs (168.4 Mt)
		Construction material (8.3 Mt)
		Backfill material: IVR (1.9 Mt) & Underground (2.8 Mt)
Total Overburden	8.9 Mt	Temporary storage West of Whale Tail Lake (0.1 Mt for operations)
		Co-disposed with waste rock in Whale Tail WRSF (8.8 Mt)
Total PAG and/or Moderate to High Arsenic Leachability Waste	116.8 Mt	Underground backfill material (2.8 Mt)
		Whale Tail and IVR WRSFs (114.0 Mt)
Total NPAG and/or Low Arsenic Leachability Waste	59.9 Mt	Co-disposed with PAG in WRSF (31.6 Mt)
		IVR Backfill Material (1.9 Mt)
		Construction material (8.3 Mt)
		WT and IVR WRSF Cover placed in operation (12.0 Mt)
		Temporary NAG stockpile (available for closure) (5.3 Mt)

Table 3.4 Projected Waste Rock Tonnages (NAG/NML) in Operation (2017 – 2026)

Year	Waste Rock Excavated (NPAG/NML)	Waste Rock (NPAG/NML) Used for Water Management Infrastructure, Pad and Road Construction	Waste Rock (NPAG/NML) Used for Pit Backfill Material	Waste Rock (NPAG/NML) use for WRSF Capping	Waste Rock (NPAG/NML) stored in NPAG stockpile (available for closure and site reclamation)	Material co-disposed with PAG in WRSF
	(t)	(t)	(t)	(t)	(t)	
2017*	196,488	196,488	-	-	-	-
2018*	1,212,719	768,625	-	-	-	444,094
2019*	2,453,310	980,535	-	-	981,526	491,249
2020*	5,178,436	3,527,647	-	-	813,584	837,205
2021*	5,228,353	2,284,576	-	2,430,119	119,436	394,222
2022	22,632,559	500,000	-	3,824,782	1,675,307	16,632,470
2023	15,391,697	-	1,926,478	3,144,761	1,139,324	9,181,134
2024	6,388,979	-	-	2,273,474	472,925	3,642,580
2025	2,693,092	-	-	312,347**	90,118	-
2026		-	-	-		
Total	**59,900,000**	**8,257,871**	**1,926,478**	**11,985,483**	**5,292,220**	**31,622,954**

t = tonne; WRSF = Waste Rock Storage Facility

*Achieved values
**In 2025, partial quantity of NAG needs to be reclaimed from NAG stockpile to complete WRSF cover

Table 3.5 Projected Use of NPAG/NML Waste Rock Tonnage for Closure and Reclamation

Area	Activity	Volume Required of NAG /NML waste (tonnes)
WT and IVR WRSF	Completion of cover placement	4,016,000
GSP-1	Backfill of the area	436,600
Pit	Placement of cover on exposed ML lithology in IVR pit above water line	177,020
IVR Attenuation Pond	Backfill of the area	662,600
Total		5,292,220

The waste rock storage facilities, at the end of the life of mine, will still host a tonnage that is smaller than approved limits from the WRSF design.

SECTION 4 • PROJECT OVERBURDEN MATERIALS

A detailed description of soils in the Project footprint is presented in FEIS 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 Amendment 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, except for 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 like 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 Amendment 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 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 is expected to be used during operations and will be temporarily stockpiled on the Overburden

Storage pad as required near Whale Tail Dike and where the contact runoff will naturally flow into the Whale Tail Attenuation Pond. The remaining overburden will be stored in the Whale Tail WRSF and surrounded with waste rock to stabilize the material (see Appendix A).

SECTION 5 • PROJECT WASTE ROCK FACILITIES

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

- minimize the overall footprint of the 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 Project WRSFs
- minimize the number of the water catchment areas potentially affected by drainage from the Project WRSFs
- when feasible, divert upstream clean natural non-contact water away from the Project WRSFs
- facilitate the collection and management of the contact water from the Project WRSFs during mine operations to avoid potentially negative impacts on the surrounding environment

The area selected for the storage of waste rock and overburden materials is shown in Appendix A. This area has an approximate footprint of 240 ha. Waste rock and overburden from the Whale Tail Pit, the IVR pit, and the underground operations that is not used for site development purposes will be trucked to the Project WRSFs until the end of mine operations.

Waste rock will be managed in accordance with the Plan, as per Part F, condition 20 of the Water License 2AM-WTP1830.

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 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 underground will be segregated during operations, 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 closure. All mine waste from underground operations will be temporarily stored 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 the open pits to be disturbed by mining are NPAG including komatiite, iron formation, basalt, southern greywacke, and diorite units. Together, these lithologies comprise approximately 75% of the waste rock. These units will not require means to control ARD. Of these, however, the basalt, komatiite and iron formation units, which account for 47% of waste rock, 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 pit have low leachability in addition to being NPAG and represent approximately 23% of the waste rock. The north greywacke has variable ARD and arsenic leaching potential and represents 9% of waste rock.

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. 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 the 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 placed in the Whale Tail WRSF and IVR WRSF and progressively covered with NPAG/NML 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. As detailed in the Operational ARD-ML Sampling and Testing Plan (Version 6, November 2020), the ARD and ML potential of each waste rock lithology was evaluated through a static and kinetic testing program (Golder, 2018). Details on the test methods used and results obtained are provided in Golder (2018). The Whale Tail Pit geochemical characterization study (Golder, 2018) examined the use of carbonate neutralization potential (NP) as a surrogate for bulk NP using data obtained from exploration drilling (Golder, 2018). The carbonate NP and bulk NP correlate well (R^2= 0.97), implying that net potential ratio (NPR) calculated using carbonate NP is a safe assessment of available buffering capacity. Further, the maximum potential acidity (MPA) is calculated based on the total sulphur content of the samples (rather than sulphide content), which is conservative. This approach to ARD classification is based on observed trends in rock chemistry, mineralogy, and reactivity of neutralizing minerals (Golder, 2018). The ARD potential of waste materials from Whale Tail Pit are classified first based on total sulphur content and then using the NPR-based guidelines published by MEND (2009). Total sulphur will be used as an initial screening criterion to identify NPAG material, whereby a sample will be considered NPAG when it contains less than 0.1 wt% sulphur, regardless of the NP (Golder, 2018). Where total sulphur is above 0.1%, the calculated carbonate NPR value will be used for sample classification and summarized in Table 3.2 of the ARD-ML Management Plan. The cut-off content to determine PAG and NAG material has been selected to ensure sufficient neutralization potential and thus, it is Agnico Eagle's intent to continue to operate in compliance with the approved Operational ARD-ML sampling and Testing Plan (Version 6, November 2020).

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 Facilities Management

5.2.1 Waste Rock Storage Facilities Water Management

Seepage and runoff water from the Project WRSFs is 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 is monitored as per the Whale Tail Water License requirements. If water quality does not meet discharge criteria,

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contact water in the water collection ponds is treated at the Whale Tail water treatment plant (WTP) prior to discharge to the outside environment.

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

5.2.1.1 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 was built.

The WRSF Dike construction was completed in 2019 to form the WRSF Pond. During the operations of the mine, seepage and runoff from the Whale Tail WRSF is captured by the Whale Tail WRSF Pond and pumped to the Whale Tail Attenuation Pond where the contact water is treated in the Whale Tail WTP prior to discharge to the outside environment. Refer to the Water Management Plan for additional details on water management of the Whale Tail WRSF.

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).

Additionally, the Pushback Projects include in-pit disposal of some NPAG, NML waste rock which overlap the Whale Tail WRSF. NPAG-NML rock will be used as IVR pushback backfill material. Figure 5.1 provides a sketch representing this undertaking. Prior to being backfilled the IVR pushback may be used as a staging sump as part of the site water management.

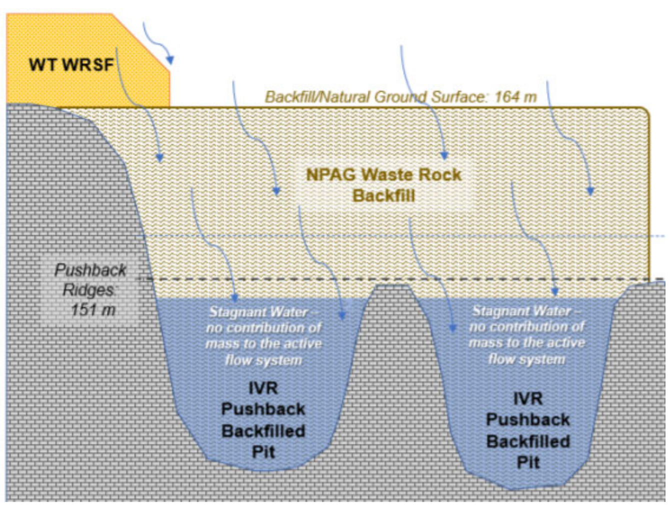

Figure 5.1 Conceptual Representation of Backfill and WRSF Interaction

5.2.1.2 IVR WRSF

Seepage and runoff from the IVR WRSF will be captured and 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 Water Management Plan for additional details on water management of the IVR WRSF.

5.2.1.3 Underground WRSF

Runoff from the Underground WRSF will be collected in the Groundwater Storage Pond system (GSP). Three GSPs are planned to provide operational flexibility and adaptive management opportunity.

- Excess water volumes in the mine will be managed through the Underground Mine Stope and GSP-1 and GSP-2. 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 the GSP ponds will be pumped underground for flooding of the underground workings

Refer to the Water Management Plan for additional details on water management of the underground WRSF.

5.2.2 Waste Rock Management Planning

5.2.2.1 Whale Tail Pit and IVR Pit

Waste rock and overburden produced during mining is used in the construction of the mine site infrastructure, while some of the NPAG/NML waste rock is put aside for closure and for 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. The IVR pit will be partially backfilled with NPAG-NML material as shown in Figure 5.1.

As a first step in waste rock management planning, options were 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 to plan for adequate and permitted storage areas. Because of the material requirement for construction and the NPAG/NML rock covers, as well as the importance for adequate disposal to meet closure objectives, waste rock management is a key component of the mining planning for the Project.

5.2.3 Waste Rock Management Execution

5.2.3.1 Whale Tail Pit and IVR Pit

Segregation of ore and 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 types. Sampling and testing of waste materials for acid rock drainage (ARD) and metal leaching is conducted during mine operations to segregate PAG/ML waste rock from NPAG/NML waste rock material, so that waste material can be assigned to specific locations or use.

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

The geochemical properties of all Whale Tail and IVR mining wastes are also confirmed by a 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. More details on the methodology can be found in the latest version of the Whale Tail ARD-ML Sampling Plan.

The dispatch system is a computer system used to manage and control surface mining equipment. 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, as well as 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 to ensure their geochemical stability. Certain types of waste rock material or lithology will be segregated and placed in specific locations within the WRSFs to provide sufficient cover of NPAG/NML waste rock material to prevent metal leaching and ensure geochemical stability.

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 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. The 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 Project WRSFs, the protection of the environment, and that regulatory requirements are met.

To assess and monitor the performance of the waste rock management procedure, several methods are in place during the operation:

- 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 recorded 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 Project is presented in the Operational Acid Rock Drainage (ARD)/ Metal Leaching (ML) Testing and Sampling Plan.

5.3 Project Waste Rock Storage Facilities Dimensions

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

The 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). The 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. Benches are built in layers of 5 m thickness.

Slope stability analyses have been performed to ensure the construction parameters are consistent with approved Portage and Vault Waste Rock facilities at Meadowbank Mine. From the stability analysis the typical configuration of the WRSF has 20 m benches with 20 m offset. The stability analyses indicate that higher benches (up to 40 m) could be built and still provide satisfactory geotechnical stability. If needed, the Project WRSFs could be expanded for additional capacity, within the approved limits of the Project and upon regulatory approval.

SECTION 6 • PROJECT ORE STOCKPILES

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

Table 6. 1 Ore Stockpile Footprints

Ore Stockpile	Area (m^2)
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 material 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 (FEIS Amendment 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. 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 in the ore (and waste rock) at the site of more than a decade (Section 4.7.5, FEIS Amendment Volume 5, Appendix 5-E). Mineral depletion calculations provide an estimate of time to depletion of acid generating (sulphide) minerals and acid-consuming minerals (carbonates), and thus can be used to evaluate the likelihood of the generation of ARD and approximate time to onset of ARD. Theoretical mineral depletion calculations for pyrite and buffering capacity were completed based on the MEND (2009) guidance using ABA data, the measured kinetic test sulphate and alkalinity release rates, and the leachate volumes, which assumes that the depletion of the neutralization potential occurs theoretically at the same rate as the experimentally determined sulphate production rate. The rate of dissolution of buffering minerals depends on the rate of sulphide mineral oxidation and effectiveness of the available buffering minerals. The rate of sulphide mineral oxidation and neutralization potential (NP) dissolution under laboratory conditions is accelerated compared to site conditions due to several factors; including slower sulphide mineral oxidation kinetics at lower site temperatures; winter freezing conditions at site; and the lower rock to liquid ratio in the field that slows the rate of buffering mineral dissolution.

6.2 Ore Stockpile Management

Seepage and runoff water from WHL Ore Stockpiles 1, 2, and 3 and IVR Ore Stockpile 4 will naturally flow to the Whale Tail Attenuation Pond or IVR 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 WTP prior to discharge to the outside environment.

Contact water seepage from Underground Ore Stockpile 1 and Underground Ore Stockpile 2 will be collected and managed in the Groundwater Storage Ponds.

6.3 Ore Stockpile Facility Dimensions

6.3.1 Whale Tail Pit and IVR Pit

The four primary ore stockpiles at the Whale Tail Pit site occupy an area of approximately 40.2 ha. Ore Stockpiles Whale Tail Ore Stockpile 1, to Whale Tail Ore Stockpile 3, and IVR Ore Stockpile 4 are designed to stack four layers of 5 m maximum thickness for a total height of 20 m.

6.3.2 Underground Operations

The two ore stockpiles for underground operations will occupy an area of approximately 1.7 ha. 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.

SECTION 7 • MEADOWBANK TAILINGS STORAGE FACILITY - TAILINGS MANAGEMENT FOR PROJECT

According to the Whale Tail Pit Life of Mine (LOM) calculation, the addition of the Whale Tail Pit Project to the actual Meadowbank LOM (LOM 2015) will generate an addition of approximately 25.7 Mt (dry) of tailings to the Meadowbank Tailings Storage Facility (TSF) and In-Pit Tailings Deposition sites for a total of 53.6 Mt. The Pushback Project will generate 0.8 Mt of tailings in the facilities.

Tailings from the Project are stored within the approved Meadowbank TSF footprint and in the In-Pit Tailings Deposition sites. To store the full volume of tailings from processing of the Whale Tail Pit ore, Agnico Eagle maximized storage in the South Cell, and constructed internal dike structures to store additional tailings within the current footprint of the North Cell. In-Pit Tailings Deposition (IPD) will be the main method used to store the remaining tailings.

The Meadowbank Waste Management Plan outlines the required management of tailings produced through the Whale Tail Project (2019 to 2026).

The management, operation, and monitoring of the TSF and IPD is regulated under Agnico Eagle's existing Type A Water Licence 2AM-MEA1530. More details on this are provided in the Meadowbank Waste Management Plan.

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 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
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 air flow 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 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 Project area 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 effective for waste rock in arid climates such as the one of the Project.

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 the Meadowbank Complex regarding the design, the closure cover concept, and the monitoring of the facility and the cover system will be applied to the Project waste rock storage facilities.

SECTION 9 • MONITORING AND CLOSURE

9.1 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. As for the Meadowbank WRSF, the NPAG/NML cover to be placed over the PAG/ML waste rock will be constructed during operations with the available equipment and resources in areas safe to access for work.

In 2018, studies were initiated with a consultant (Okane) to develop the detailed engineering design for the capping of the Whale Tail and IVR WRSFs. This mandate included thermal modelling to re-assess the capping thickness. This information was also used to inform the instrumentation program to ensure that the WRSF covers perform according to their design intent. These studies were completed in 2019 and provided to the authorities (Landform Water Balance Modelling of Whale Tail and IVR WRSF under RCP8.5., Okane Reference No. 948-011-015 rev4 and Amaruq Waste Rock Storage Facility Thermal Cover System Design Basis. Okane Reference No. 948-011-M-007 Rev3).

The cover design planned is like the Meadowbank Portage WRSF based on results calibrated to the Meadowbank WRSF thermal data to date and climate change predictions. The cover will consist of a 4.7 m thick NPAG/NML waste rock layer placed as a final surface cover, or as otherwise dictated by monitoring and updated modelling during operations. 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 during 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 (Golder, 2018b).

During operation thermal monitoring will be conducted in the covers and the facilities. These results, along with thermal modelling, will assess the performance of the WRSFs closure covers and identify if adjustments in the cover placement or thickness will be required for closure.

Thermal and water quality monitoring will be carried out 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. The cover will provide control of acid generating reactions and prevent the migration of contaminants.

The contact water management system for the Whale Tail WRSF and IVR WRSF (WRSF Dikes and WRSF 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 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 surface runoff and seepage water from the Whale Tail WRSF and IVR WRSF 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). An updated water quality forecast report including the Whale Tail WRSFs operation and closure was completed in March 2022 and is included in the 2021 Whale Tail Project Water Management Plan.

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 operations, 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.

9.1.3 IVR Pit

The pushbacks from the IVR Pit will be backfilled with NPAG-NML waste rock, which is referred to as in-pit disposal. This technique is used in order to increase storage capacity of mining by-products and limit additional materials placed in the Whale Tail and IVR WRSFs. It also reduces the time required in closure to obtain natural water elevations. A conceptual representation of this technique is shown in Figure 5.1.

9.2 Ore Stockpiles

All Ore Stockpiles will be used during operations to stockpile ore and will emptied in 2026. During the following summer, if metal contamination of ore pads is measured, the contaminated pad section will be excavated and placed in the WRSFs before its final covering 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 those 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 Monitoring of Freezeback at the WRSFs

Thermal monitoring will be carried out 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 the Whale Tail WRSF and IVR WRSF, a series of 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 as described in the 2021 Thermal Monitoring Plan. The results will be used to evaluate the predicted thermal response of the facilities 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.

9.3.1 Instrumentation During Operation

Vertical and horizontal thermistor chains will be installed along targeted instrumentation sections during operation. The monitoring program also includes near surface arrays installed on targeted benches. 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 thermistors in operation will be based on the analysis of the results of the thermal monitoring program.

9.3.2 Instrumentation at 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. Data will be reviewed periodically or as needed. Results will be summarized in monitoring reports on a yearly basis during the operation.

9.4 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 Section 5, Table 5.1 of the Operational ARD/ML Testing and Sampling Plan (Version 6, 2020). In addition, the Whale Tail Pit Expansion Project – Adaptive Management Plan (Agnico Eagle, 2020) includes the specific adaptive management strategies that will be implemented in the WRSF to meet water quality objectives, and chemical and physical stability of the WRSFs during operations, closure, and post-closure phases.

Evaluation of the appropriate operational level is done through the annual reporting process.

SECTION 10 • REFERENCES

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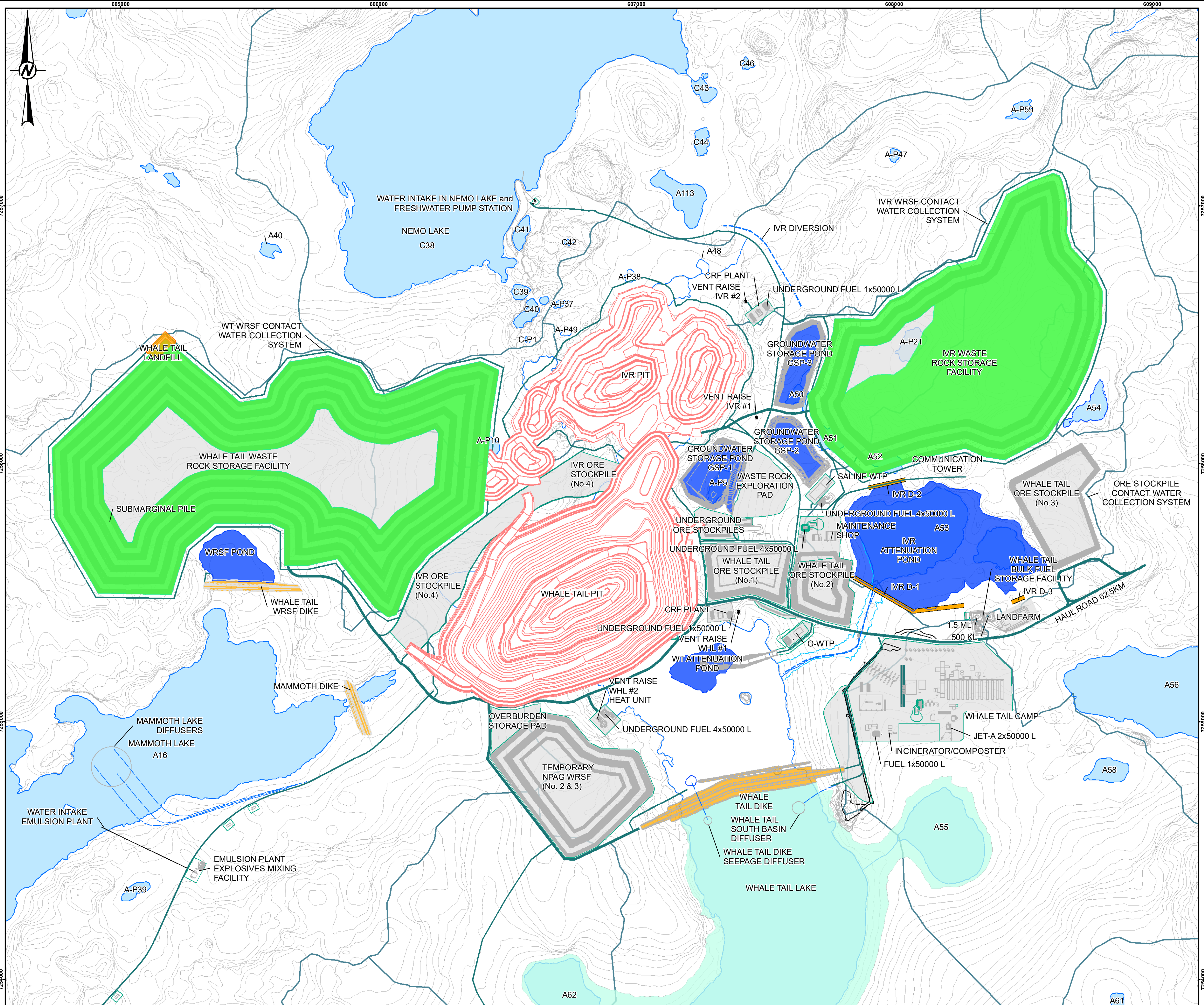
APPENDIX A • DRAWINGS - SITE LAYOUTS



LEGEND

- CLOSED FACILITY
- WHALE TAIL WASTE ROCK STORAGE FACILITY
- WHALE TAIL LAKE (SOUTH BASIN) FLOODED LIMIT (WATER LEVEL 156.0m)
- NATURAL WATERSHED
- DIKE
- POND/SUMP
- ROAD
- WATERCOURSE
- WATERBODY

DRAFT

0 300 600

1:15,000 METRES

NOTE(S)

1. IVR PIT PUSHBACK BACKFILLED PRIOR TO WRSF CONSTRUCTION.

REFERENCE(S)

1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM AMQ_2025Q4V7.DWG
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION

PROJECT

WHALE TAIL PIT - EXPANSION PROJECT

TITLE

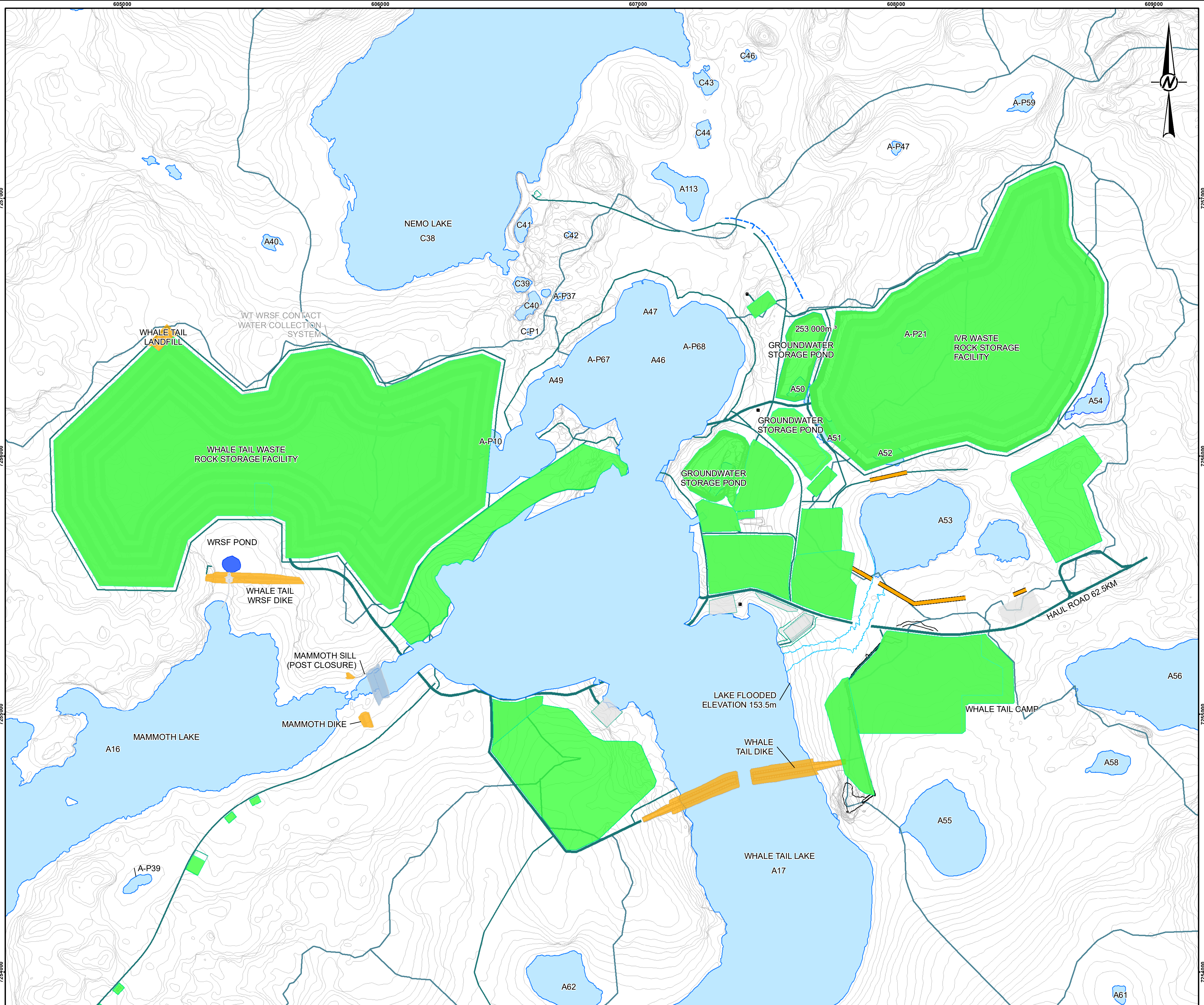
GENERAL ARRANGEMENT PLAN AT END OF PROJECT OPERATIONS

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-06-09
DESIGNED	EP
PREPARED	CDB
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136436	2000/2020	A	1



LEGEND

- CLOSED FACILITY
- WHALE TAIL LAKE (SOUTH BASIN) FLOODED LIMIT (WATER LEVEL 156.0m)
- NATURAL WATERSHED
- DIKE
- POND/SUMP
- ROAD
- WATERCOURSE

0 300 600
1:15,000 METRES

NOTE(S)
1. IVR PIT PUSHBACK BACKFILLED PRIOR TO WRSF CONSTRUCTION.

REFERENCE(S)
1. INFRASTRUCTURE OBTAINED FROM AGNICO EAGLE MINES LIMITED FROM AMQ_2029_AFTER MINEV7.DWG
2. WATERCOURSE AND WATERBODY DATA OBTAINED FROM PHOTOSAT

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

CLIENT
AGNICO EAGLE
AGNICO EAGLE MINES LIMITED: MEADOWBANK DIVISION

PROJECT
WHALE TAIL PIT - EXPANSION PROJECT

TITLE
POST-CLOSURE GENERAL ARRANGEMENT PLAN

CONSULTANT
GOLDER MEMBER OF WSP

YYYY-MM-DD	2021-06-09
DESIGNED	EP
PREPARED	CDB
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136436	2000/2020	A	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
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