AGNICO EAGLE

MELIADINE GOLD MINE

Mine Waste Management Plan

JULY 2020
VERSION 7
6513-MPS-09

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ᐊᒡᓃᑯ ᐄᒍ ᐅᔭᕋᒃᑕᕆᐊᓕᕆᔨᒃᑯᑦ (ᐊᒡᓃᑯᒃᑯᑦ) ᒫᓐᓇ ᐊᐅᓪᓚᖅᑎᑦᑎᔪᑦ ᑕᓯᕐᔪᐊᕐᒥᑦ ᒌᓗᒧᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ (ᐅᔭᕋᒃᑕᕆᐊᖅ), 25 ᑭᓛᒥᑕᐃᑦ ᐅᐊᓐᓇᓐᖓᓂᑦ ᑲᖏᖅᖠᓂᕐᒥᑦ ᐅᙱᓯᒃᑎᑦᓯᔪᖅ, ᐊᒻᒪᓗ 80 ᑭᓛᒥᑕᐃᑦ ᓂᒋᖅᐸᓯᐊᓂᑦ ᐱᖓᓐᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒫᕐᔪᐊᓐᒥᑦ ᐅᙱᓯᒃᑎᑦᓯᔪᖅ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒥᑦ. ᐅᔭᕋᒃᑕᕆᐊᕐᒧᑦ ᐸᕐᓇᐅᑎᒥᑦ ᐃᓚᐅᔪᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖅ ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᑦ ᐱᕙᓪᓕᐊᔭᐅᓂᖓᓄᑦ ᑎᑎᕋᓂᐊᖅ ᒌᓗᑕᓕᒃ, ᒪᕐᐳᓐᓂᒃ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖃᖅᓗᓂ (ᑎᑎᕋᓂᐊᖅ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖅ 1 ᐊᒻᒪᓗ ᑎᑎᕋᓂᐊᖅ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖅ 2) ᐊᒻᒪᓗ ᐊᑕᐅᓯᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᖅ.

ᓯᑕᒪᐅᓕᖓᔪᖅ ᐱᕙᓪᓕᐊᔭᐅᓂᖓ ᑎᑎᕋᓂᐊᖅ: 3.5 ᐅᑭᐅᓂᒃ ᓴᓇᔭᐅᓗᓂ (Q4 ᐅᑭᐅᖅ -5-ᒥᑦ Q2 ᐅᑭᐅᖅ -1-ᒧᑦ), 8.5 ᐅᑭᐅᓂᒃ ᐅᔭᕋᒃᑕᕆᐊᖅ ᐊᐅᓪᓚᕐᓗᓂ (Q3 ᐅᑭᐅᖅ -1-ᒥᑦ ᐅᑭᐅᖅ 8-ᒧᑦ), ᐱᖓᓱᑦ ᐅᑭᐅᓄᑦ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓗᓂ (ᐅᑭᐅᖅ 9-ᒥᑦ ᐅᑭᐅᖅ 11-ᒧᑦ), ᐊᒻᒪᓗ ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ (ᐅᑭᐅᖅ 11-ᒥᑦ ᐅᖓᑖᓄᑦ). 15.4 ᒥᓕᔾᔪᓐ ᑕᓐ-ᓗᐊᑦ ᐅᔭᕋᒃᑕᖅᑕᐅᔪᑦ ᐱᔭᐅᓂᐊᖅᑐᑦ. ᐅᔭᕋᒃᑕᖅᑕᐅᔪᑦ ᓯᖃᓪᓕᑎᖅᑕᐅᓗᑎᒃ 8 ᐅᑭᐅᓪᓗᐊᓄᑦ ᐅᔭᕋᒃᑕᕆᐊᖅ ᐊᐅᓪᓚᕐᓂᖓᓂᑦ ᐱᐊᓚᑎᒋᓂᖓ 3,000 ᑕᓐ-ᓗᐊᑦ ᐅᓪᓗᑕᒫᑦ ᐅᑭᐅᖅ 1-ᒥᑦ ᐅᑭᐅᖅ 3-ᒧᑦ ᐊᒻᒪᓗ 5,000 ᑕᓐ-ᓗᐊᑦ ᐅᓪᓗᑕᒫᑦ ᐅᑭᐅᖅ 4-ᒥᑦ ᐅᑭᐅᖅ 8-ᒧᑦ.

ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᐃᑦ ᐊᒻᒪᓗ ᐅᖓᑕᐅᑎᑦᑎᔪᑦ ᓄᓇᒃᑰᕈᑎᒃᑯᑦ ᐊᒡᔭᖅᑐᖅᑕᐅᖃᑦᑕᕐᓂᐊᖅᑐᑦ ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᓐᓄᑦ ᑭᓯᐊᓂ ᐃᓱᓕᑉᐸᑦ ᐅᔭᕋᒃᑕᕆᐊᑉ ᐊᐅᓪᓚᕐᓂᖓ, ᐊᒡᔭᖅᑐᖅᑕᐅᖃᑦᑕᕐᓗᑎᒃ ᒪᓕᒡᓗᒍ ᐊᐅᓪᓚᕐᓂᕐᒧᑦ ᖃᖓᒃᑰᖓᔪᖅ. ᐱᖓᓱᑦ ᐃᓂᐅᔪᑦ ᐃᓂᐅᓂᐊᖅᑐᑦ ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᐅᓂᖏᓐᓄᑦ. ᐅᒃᑯᐊᕐᓂᖏᑦ ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕖᑦ ᐱᒋᐊᕐᓂᐊᖅᑐᖅ ᐊᔪᕐᓇᙱᓕᖅᐸᑦ ᐃᓚᒋᔭᐅᓗᓂ ᐅᑎᖅᑎᑎᕆᕙᓪᓕᐊᓂᕐᒧᑦ. ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕖᑦ ᖃᓕᖅᑕᐅᔾᔮᙱᑦᑐᑦ ᐊᒻᒪᓗ ᐱᕈᖅᑐᓂᒃ ᐃᓪᓕᕆᔭᐅᖏᓪᓗᑎᒃ ᐊᒻᒪᓗ ᐃᓚᓯᓂᖃᒃᑲᓐᓂᔾᔮᙱᑦᑐᑦ ᒪᓕᒃᑯᒍ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ. ᐆᓇᕐᓂᕐᒥᒃ ᖃᐅᔨᓴᐃᔾᔪᑏᑦ ᐃᓕᔭᐅᓂᐊᖅᑐᑦ ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑲᖅᓯᓯᒪᕝᕕᓐᓄᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᒋᑦ ᖁᐊᙳᐃᓐᓇᐅᔭᖅᑐᓕᐅᕐᓃᑦ.

15.4 ᒥᓕᔾᔪᓐ ᑕᓐ ᕿᒪᒃᑎᑦᑐᓂᑦ, 10.9 ᒥᓕᔾᔪᓐ ᑕᓐ-ᓗᐊᑦ ᓴᓗᒪᐃᔭᐃᔾᔪᑎᖃᖅᑐᑦ ᕿᒪᒃᑎᑦᑐᑦ ᐃᓕᔭᐅᓂᐊᖅᑐᑦ ᕿᒪᒃᑎᑦᑐᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕙᓐᒧᑦ ᐸᓂᖅᓱᑎᒃ ᑲᑎᓯᒪᔪᑦ ᕿᒪᒃᑎᑦᑐᑦ, ᐊᒥᐊᒃᑯᐃᓪᓕ 4.5 ᒥᓕᔾᔪᓐ ᑕᓐ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᑦ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᕿᑯᓕᖅᑕᐅᓗᓂ. ᕿᒪᒃᑎᑦᑐᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᒃ ᒪᕐᐳᓐᓂᕐ ᐃᓂᖃᖅᑐᖅ, ᐊᐅᓪᓚᖅᑎᑕᐅᓂᐊᖅᑐᑦ ᐊᑕᐅᓯᐅᖃᑦᑕᕐᓗᒋᑦ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓂᐊᕐᓗᓂ ᐅᔭᕋᒃᑕᕆᐊᖅ ᐊᐅᓪᓚᕐᓂᖓᓂᑦ. ᐃᓚᖓ ᖃᓕᒃ ᐅᖓᑕᐅᑎᑦᑎᔪᓂᑦ ᐊᒻᒪᓗ ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᐃᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᑦ ᕿᒪᒃᑎᑦᑐᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᒃ ᐅᒃᑯᐊᖅᑕᐅᓂᖓᓄᑦ. ᐆᓇᕐᓂᕐᒥᒃ ᖃᐅᔨᓴᐃᔾᔪᑏᑦ ᐃᓕᔭᐅᓂᐊᖅᑐᑦ ᖃᐅᔨᓴᕐᓂᐊᕐᓗᒋᑦ ᖁᐊᒃᑲᓐᓂᖃᑦᑕᕐᓃᑦ ᐊᒻᒪᓗ ᖁᐊᙳᐃᓐᓇᐅᔭᓕᐅᕆᓂᕐᒧᑦ.

ᐊᒃᑑᖅᑕᐅᔪᑦ ᐅᔭᖅᑲᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕖᑦ ᐊᒻᒪᓗ ᕿᒪᒃᑎᑦᑐᓄᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᒃ ᐋᖅᑭᒃᑕᐅᓯᒪᔪᑦ ᐊᒻᒪᓗ ᐊᐅᓪᓚᖅᑎᑕᐅᓗᑎᒃ ᒥᑭᓪᓕᒃᑰᖅᑎᓐᓂᐊᕐᓗᒋᑦ ᐊᕙᑎᒥᒃ ᐊᒃᑐᖅᓯᓃᑦ ᐊᒻᒪᓗ ᐃᓱᒪᒋᐸᓗᒋᑦ ᓄᓇ ᐊᒻᒪᓗ ᓄᓇᒧᑦ ᐃᓚᒋᔭᐅᔪᑦ ᐊᔪᙱᓐᓂᐊᕐᓂᙱᓐᓄᑦ. ᓄᓇᐅᑉ ᖃᖓᓂ ᑯᕙᔪᖅ ᐊᒻᒪᓗ ᐃᒪᕐᒥᑦ ᑯᕙᓂᐅᔪᖅ ᑐᖅᑯᖅᓯᓯᒪᕝᕙᓐᓂᑦ ᓱᐸᓗᓕᒃᑰᖅᑎᑕᐅᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᑲᑎᑕᐅᓗᑎᒃ ᐃᒪᕐᒥᒃ ᑲᑎᖅᓱᐃᓂᕐᒧᑦ ᑕᓯᕋᔭᓐᓂᑦ. ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᑎᑭᐅᑎᙵᐱᑦ ᑯᕕᑦᑎᓂᕐᒧᑦ ᐊᑐᕆᐊᓕᖕᒥᑦ ᒪᓕᒃᑯᒍ Type A ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯ 2AM-MEL1631-ᒥᑦ ᐱᔭᕆᐊᓕᒃ, ᑲᑎᑕᐅᔪᖅ ᐃᒪᖅ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᖅ ᑯᕕᑎᑕᐅᓂᐊᕕᓴᕐᓗᓂ ᓯᓚᒧᑦ.

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (Meliadine), located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The mine plan includes open pit and underground mining methods for the development of the Tiriganiaq gold deposit, with two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and one underground mine.

There are four phases to the development of Tiriganiaq: 3.5 years construction (Q4 Year -5 to Q2 Year -1), 8.5 years mine operation (Q3 Year -1 to Year 8), 3 years closure (Year 9 to Year 11), and post-closure (Year 11 forward). Approximately 15.4 million tonnes (Mt) of ore will be produced. The produced ore will be milled over approximately 8 years of mine life at a rate of approximately 3,750 tonnes per day (tpd) in Year 1 to Year 3 and 5,500 tpd in Year 4 to Year 8.

Waste rock and overburden will be trucked to the waste rock storage facilities (WRSFs) until the end of mine operation, with distribution according to an operation schedule. Three areas have been identified as the WRSFs. Closure of the WRSFs will begin when practical as part of the progressive reclamation program. The WRSFs will not be covered and vegetated and no additional re-grading activity will be required under the closure plan. Thermistors will be installed within the WRSFs to monitor permafrost development.

Of the 15.4 Mt of tailings produced, about 10.9 Mt of filtered tailings will be placed in the tailings storage facility (TSF) as dry stack tailings, while the remaining 4.5 Mt will be used underground as cemented paste backfill. The TSF consists of two cells, which will be operated one by one to facilitate progressive closure during mine operation. A layer of overburden and waste rock will be used for the TSF closure. Thermistors installed within the facility will monitor freeze-back and permafrost development.

The WRSFs and TSF were designed and will be operated to minimize the impact on the environment and to consider geotechnical and geochemical stability. The surface runoff and seepage water from the storage facilities will be diverted via channels and collected in water collection ponds (CPs). If the water quality does not meet the discharge criteria as per the Type A Water Licence 2AM-MEL1631 requirement, the collected water will be treated accordingly prior to being discharged to the receiving environment.

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Tables in Text

APPENDIX A • FIGURES

DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
1	April 2015			First draft version of Mine Waste Management Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval.	Tetra Tech EBA Inc.
2	June 2016	1.1, 1.2, 1.3 3.3 5.5, 6.1, 9.1, 9.2	1-2 12-15 22-24 34-35; 37-38	Update to reflect issuance of the Type A Water Licence. Removal of original Section 1.3 as was specifically linked to the application. Update to reflect receipt of Type A Water Licence. The Plan updated to comply with Part B Section 13, and Part F Sections 12 and20 of the Type A Water Licence 2AM-MEL1631 and commitments made during the licensing process.	Golder Associates Ltd.
3	March 2018			Minor revisions	Environment, Engineering Departments
4	December 2018	All 1.3 3.1, 3.2 4.1, 4.3, 4.4 4.2 5.2, 5.4 5.5, 5.6 6.1 7 8.2 9.2 Appendix A	All 11,14 20-23 24, 27-28 29 30-32 33-35 36-38 43 46-47 50-52	Plan update in response to approved TSF Design Report (6515-583-163-REP-001). Update of production timeline. Update of tailing quantities. Update of closure cover material values. Inclusion of temporary waste rock stockpile for construction of saline pond 2 (Figure 4.1.1; Tables 4.1.1, 4.1.2, 4.1.3). Update of TSF design, parameters, and schedule. Update of tailings placement plan dimensions within each cell of TSF. Update of Water Management based on TSF design report (6515-583-163-REP-001) and infrastructure updates. Minor dust management revision. Updates to closure plan based on approved TSF design report (6515-583-163-REP-001). Monitoring program update based on Type A Water Licence 2AM-MEL1631 requirements and TSF design report (6515-583-163-REP-001). Figs 1.2, 5.1, 5.4 updated. Add Figs 5.2, 5.3.	Environment Department

5	March 2019	Table 1.1		Updated according to current status.	Environment Department
		Table 4.2, 4.3, 5.1		Update quantities according to the latest mine plan.	
		6.1.1 and 6.1.3		Catchment ponds name changes.	
		4.1 T 4.1.3 8.1	26 31 45	Name Change from MMER to MDMER.	
6	March 2020	All	All	Update to reflect Meliadine operational status from Project to Mine; Major revisions throughout.	Engineering, Environment Departments
7	July 2020	Section 1	1	Minor text edits to add the rationale for the update.	Tetra Tech Canada Inc.
		Table 3.1	5	Minor text edits to remove WRSF2.	
		Table 4.1	9	Remove WRSF2, add waste rock quantities of WRSF2 to be placed into WRSF3.	
		4.1.2	10	Added text related to overburden production from construction and management.	
		Table 4.2	10	Remove WRSF2, add overburden quantities of WRSF2 to be placed into WRSF3.	
		4.2	11, 12, 13	Minor text edits, removal of original Section 4.2.2 related to WRSF2, edit of Section 4.2.3 related to WRSF3.	
		4.3	14	Remove design parameters for WRSF2 from Table 4.3, add design parameters for WRSF3.	
		4.4	15	Add texts related to design performance of WRSF3.	
		6.1	21	Add texts related to water management associated with WRSF3.	

ACRONYMS

ABA	Acid Base Accounting
Agnico Eagle	Agnico Eagle Mines Limited
ARD	Acid Rock Drainage
ML	Metal Leaching
CP	Collection Pond
CRA	Commercial, Recreational, and Aboriginal
DFO	Department of Fisheries and Oceans Canada
EWTP	Effluent Water Treatment Plant
MEND	Mining Environment Neutral Drainage
MDMER	Metal and Diamond Mining Effluent Regulations
MWMP	Mine Waste Management Plan
NAG	Non-Acid Generating
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement
NML	Non-metal Leaching
NPAG	Non-potential Acid Generating
NPR	Net Potential Ratio
NWB	Nunavut Water Board
PAG	Potential Acid Generating
PGA	Peak Ground Acceleration
Project	Meliadine Gold Project
SFE	Shake Flask Extraction
STP	Sewage Treatment Plant
TSF	Tailings Storage Facility
WRSF	Waste Rock Storage Facility

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per meter
ha	hectare
km	kilometre(s)
L	liter(s)
m	metre
mm	millimetre
m^2	square metre(s)
m^3	cubic metre(s)
Mm^3	million cubic metre(s)
t	tonne
t/m^3	tonne per cubic metre
Mt	million tonne(s)

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) operates the Meliadine Gold Project (the Mine) located approximately 25 kilometres (km) north of Rankin Inlet (Figure 1.1), Nunavut, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The Mine is subject to the terms and conditions of both the amended Project Certificate issued by the Nunavut Impact Review Board (NIRB) in accordance with the Nunavut Land Claims Agreement (NLCA) Article 12.5.12 on February 26, 2019 (NIRB 2019) and the Type A Water Licence No. 2AM-MEL1631 (the Licence) issued by the Nunavut Water Board (NWB) on April 1, 2016 (NWB 2016).

Agnico Eagle is planning to apply for amendments to the Water Licence to incorporate changes required for mine operation. This document presents an updated version of the Mine Waste Management Plan (MWMP), that encompasses the changes to the mine waste management in support of the Water Licence Amendment application. The major change to the MWMP is that waste rock and overburden originally planned to be stored in WRSF2 will be placed within an increased footprint of the WRSF3. The previous designated footprint for WRSF2 will be used for further expansion of the ore stockpile and construction of infrastructure to support open pit mining operations.

1.1 Waste Management Objectives

The waste management objectives are to minimize potential impacts to the environment during all phases of mining. The purpose of the MWMP is to provide information to applicable mine departments (Environment, Engineering, Mine, Energy and Infrastructure etc.) for sound mine waste management practices, proposed and existing infrastructure, and provide strategies for water management (runoff), dust control, and monitoring programs.

Mine waste management structures (tailings storage, waste, and overburden storage) are utilized to contain and manage mine waste from areas affected by mining activities. Measures have been implemented for the Mine Construction and Mine Operation phases.

1.2 Management and Execution of the Mine Waste Management Plan

Revisions of the MWMP can be initiated by changes in the Mine Development Plan (Mine Plan), operational performance, personnel, or organizational structure, regulatory or social considerations, and/or design philosophy. The MWMP will be reviewed annually by Agnico Eagle and updated as necessary.

SECTION 2 • BACKGROUND

2.1 Site Conditions

The Mine is located in an area of poorly drained lowlands near the northwest coast of Hudson Bay. The dominant terrain in the area consists of glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and many small lakes. The topography is gently rolling with a mean elevation of 65 metres above sea level (masl) and a maximum relief of 20 meters.

The climate is extreme in the area, with long cold winters and short cool summers, and mean air temperatures of 12°C in July and -31°C in January. The mean annual air temperature at the Mine site is approximately -10.4°C (Golder 2012a). Strong winds blow from the north and north-northwest direction more than 30 percent (%) of the time.

The mean annual precipitation in the area is approximately 412 mm and is typically equally split between rainfall and snowfall.

2.1.1 Local Hydrology

The Mine is located within the Meliadine Lake watershed. Meliadine Lake has a water surface area of approximately 107 square kilometres (km^2), a maximum length of 31 km, features a highly convoluted shoreline of 465 km, and has over 200 islands. Unlike most lakes, it has two outflows that drain into Hudson Bay through two separate river systems. It has a drainage area of 560 km^2 upstream of its two outflows. Most drainage occurs via the Meliadine River, which originates at the southwest end of the lake. The Meliadine River flows for a total stream distance of 39 km. The Meliadine River flows through a series of waterbodies, until it reaches Little Meliadine Lake and then continues into Hudson Bay. A second, smaller outflow from the west basin of Meliadine Lake drains into Peter Lake, which discharges into Hudson Bay through the Diana River system (a stream distance of 70 km). At its mouth, the Diana River has a drainage area of 1,460 km^2.

Watersheds in the Mine area are comprised of an extensive network of waterbodies, and interconnecting streams. The hydrology of these watersheds is dominated by lake storage and evaporation.

2.1.2 Ice and Winter Flows

Late-winter ice thicknesses on freshwater lakes in the Mine area range between 1.0 m to 2.3 m with an average thickness of 1.7 m. Ice covers usually appear by the end of October and are completely formed in early November. The spring ice melt (freshet) typically begins in mid-June and is complete by early July (Golder 2012b).

2.1.3 Spring Melt (Freshet) and Freeze-up Conditions

With the exception of the main outlet of Meliadine Lake, which has been observed to flow continuously throughout the year, outlets of waterbodies near the Mine typically start flowing late May or early June, followed by freshet flows in mid-to-late-June. Flows steadily decrease in July and low flows are ongoing from August to the end of October, prior to winter freeze.

2.1.4 Permafrost

The Mine is located in an area of continuous permafrost. The depth of permafrost is estimated to be in the order of 360 m to 495 m. The depth of the active layer ranges from about 1 m in areas with shallow overburden, up to 3 m adjacent to the lakes. The typical permafrost ground temperatures at the depths of zero annual amplitude (typically at the depth of below 15 m) are in the range of -5.0°C to -7.5°C in the areas away from lakes and streams. The geothermal gradient ranges from 0.012 °C/m to 0.02 °C/m (Golder 2012b).

2.1.5 Local Hydrogeology

Groundwater characteristics at areas of continuous permafrost that are generally present in the Mine area include the following flow regimes:

- A shallow flow regime located in an active layer (seasonally thawed) near the ground surface and above permafrost; and
- A deep groundwater flow regime beneath the base of the permafrost.

From late spring to early autumn, when temperatures are above 0˚C, the shallow active layer thaws. Within the active layer, the water table is projected to be a subdued replica of topography. Groundwater in the active layer flows to local depressions and ponds that drain to larger waterbodies. The talik beneath large waterbodies will be open. The open talik will connect to the deep groundwater flow regime beneath the permafrost.

Elongated waterbodies with terraces and a width of 340 m to 460 m or greater are expected to have open taliks extending to the deep groundwater flow regime at the Mine. Meliadine Lake and Lake B7 are likely to have open taliks connected to the deep groundwater flow regime (Golder 2012a). No impact is expected to Lake B7 by mine activities.

2.1.6 Subsurface Conditions

The general subsurface conditions of the various waste facilities is similar. Typically, a thin veneer of organic material overlays ice-rich silty sand or sandy silt, gravely sand and silt, with traces of clay, shells, cobbles and boulders. The overburden thickness ranges between 1.3 m to 13.6 m. Excess ice and ice layers have been observed in many of the boreholes where recovery was possible.

Soil porewater salinity tests (Tetra Tech EBA 2013a) indicated that the overburden soils at the mine site may have a porewater salinity of 4 to 12 parts per thousand.

Bedrock at the Mine site area consists of a stratigraphic sequence of clastic sediments, oxide iron formation, siltstones, graphitic argillite, and mafic volcanic flows (Snowden 2008; Golder 2009a).

2.1.7 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 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 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.

SECTION 3 • MINE WASTE DEVELOPMENT

3.1 Mine Development Plan

The Mine Plan and key mine development activities, including water management, are currently used concurrently with the MWMP.

The Mine Plan includes one underground mine (Tiriganiaq Underground Mine) and two open pits (Tiriganiaq Open Pit 1 and Tiriganiaq Open Pit 2) for the development of the Tiriganiaq gold deposit.

The Mine is expected to produce approximately 15.4 Mt of ore, 31.4 Mt of waste rock, 7.0 Mt of overburden waste, and 15.4 Mt of tailings. The following phased approach is proposed for the development of the Tiriganiaq gold deposit:

- Phase 1: 3.5 years for Mine Construction (Q4 Year -5 to Q2 Year -1);
- Phase 2: 8.5 years for Mine Operations, beginning in 2019 (Q2 Year -1 to Year 8);
- Phase 3: 3 years Mine Closure (Year 9 to Year 11); and
- Phase 4: Post-Closure (Year 11 forward).

Mining facilities on surface include a plant site and accommodation buildings, ore stockpiles, a temporary overburden stockpile, a tailings storage facility (TSF), three waste rock storage facilities (WRSFs), a water management system that includes containment ponds, water diversion channels, retention dikes/berms, and a series of water treatment plants. The general mine site layout plan is shown on Figure 3.1, while Table 3.1 provides the key mine development activities and sequence.

Table 3.1: Key Mine Development Activities and Sequence

Mine Year	Mine Development Activities and Sequence
Q4 of Yr -5 (2015)	• Started construction of industrial pad • Developed ramp to Tiriganiaq underground mine • Constructed portion of rock pad for stockpiles to store ore from Tiriganiaq underground ramp development
Yr -4 (2016)	• Continued construction of industrial pad • Constructed and operated the temporary landfill • Started temporary storage of waste rock in the future WRSF2 footprint for construction purposes
Yr -3 (2017)	• Constructed and utilized Type A landfarm • Constructed and began operation of Type A landfill • Erected and closed all main buildings except crusher, paste plant, and crushed ore storage • Erected incinerator • Erected and operated effluent water treatment plant (EWTP) • Installed fuel tanks 3 ML and 250 kL at Portal1 • Erected fuel tank 13.5 ML in Rankin
Yr -2 (2018)	• Started construction of Ore Storage Pad 2 (OP2) • Erected and closed crusher, paste plant, and crushed ore storage buildings • Erected fuel tank 20 ML in Rankin • Erected fuel tanks 6 ML and 250 kL at industrial pad • Started process commissioning at end of Q4

Table 3.1: Key Mine Development Activities and Sequence

Mine Year	Mine Development Activities and Sequence
Yr -1 (2019)	• Completed industrial pad • Completed construction of OP2 • Started to place filtered tailings in Cell 1 of TSF at end of Q1 • Started full capacity ore processing early Q2 • Created temporary waste rock storage area within footprint of Tiriganiaq Pit 2 from construction of Saline Pond 2 (SP2) • Began placement of waste materials from Saline Pond 4 (SP4) in WRSF1
Yr 1 (2020)	• Place waste rock from temporary storage within footprint of Tiriganiaq Pit 2 to construct haul roads for open pits and to WRSFs • Create temporary waste rock storage area between footprints of Tiriganiaq Pits 1 and 2 from construction of SP4 • Start to mine Tiriganiaq Pit 2 • Begin placement of waste materials from Tiriganiaq Pit 2 within WRSF3
Yr 2 (2021)	• Start to mine Tiriganiaq Pit 1 • Place overburden from Tiriganiaq Pit 1 in WRSF1 • Continue placement of waste materials from Tiriganiaq Pit 2 in WRSF3 • Construct temporary overburden stockpile to store the selected ice-poor overburden that will be used for progressive reclamation of TSF
Yr 3 (2022)	• Complete mining of Tiriganiaq Pit 2 • Continue placement of waste materials from Tiriganiaq Pit 1 in WRSF1 • Begin placement of waste materials from Tiriganiaq Pit 1 into WRSF3 • Expand process plant to reach the process capacity of 5,500 tpd • Complete additional ore storage construction (OP1)
Yr 4 (2023)	• Start to place filtered tailings in Cell 2 of TSF
Yr 5 (2024)	• Place final closure cover on top of tailings surface in Cell 1 of TSF • Stop placement of waste rock in WRSF1 when design capacity reached
Yr 6 (2025)	• Stop placement of waste rock in WRSF3 when design capacity reached
Yr 7 (2026)	• Stop mining of Tiriganiaq Pit 1 when the open pit reaches design elevation • Stop Tiriganiaq underground operation when underground mine reaches design elevation
Yr 8 (2027)	• Process the ore from OP1 and OP2 until all stored ore is processed • Decommission underground mine surface openings as needed

3.2 Mine Waste Development Plan

3.2.1 Mine Waste Designation and Destination

Three mine waste streams will be produced: waste rock, tailings, and overburden material.

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 and 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.

Tailings are the processed material by-product of the gold recovery process and generally comprise of sand, silt, and clay sized particles.

The overall usage or destination of the three mine waste materials is presented in Table 3.2, while Figure 3.2 provides a graphical representation of the mine waste management flow sheet.

Table 3.2: Summary of Mine Waste Tonnage and Destination

Mine Waste Stream	Estimated Quantities		Waste Destination
Overburden	7.0 Mt		Temporary storage in the Overburden Stockpile ~0.1 Mt for reclamation of TSF
			Closure and site reclamation for the TSF
			Co-disposed with waste rock within WRSFs
Waste Rock	31.4 Mt		Infrastructure construction (surface and underground)
			WRSFs (i.e., WRSF1 and WRSF3)
			Closure and site reclamation for the TSF
Tailings	15.4 Mt	10.9 Mt	As dry stack tailings placed in the TSF
		4.5 Mt	Used in underground mine as cemented paste backfill

3.2.2 Tiriganiaq Development Schedule and Quantities

The Tiriganiaq gold deposit will be developed using traditional open-pit and underground mining methods. Two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and an underground mine (Tiriganiaq Underground) will be developed.

The following mining development sequence is planned:

- Tiriganiaq underground will be developed and operated from Year -5 to Year 8;
- Tiriganiaq Pit 2 will be mined from Year 1 to Year 3; and
- Tiriganiaq Pit 1 will be mined from Year 2 to Year 7.

Table 3.3 summarizes the schedule and quantities of mine waste to be mined from the open pit and underground mining operations

Table 3.3: Summary of Mine Waste Production Schedule and Bank Quantities (V11_3)

Year	Mine Year	Mine Waste and Ore from Underground (t)		Mine Waste and Ore from Tiriganiaq Pit 1 (t)			Mine Waste and Ore from Tiriganiaq Pit 2 (t)		
		Waste Rock	Ore	Overburden	Waste Rock	Ore	Overburden	Waste Rock	Ore
2019	Yr -1	482,736	1,108,666	334,383*	--	--	77,301	236,219	--
2020	Yr 1	871,289	1,392,153	238,208	853,138	1,183	554,928	2,772,255	128,238
2021	Yr 2	705,814	1,560,327	1,959,165	159,028	46,388	--	2,50,994	143,042
2022	Yr 3	734,254	1,542,547	1,644,159	2,583,128	558,777	--	230,031	264,851
2023	Yr 4	766,156	1,516,664	2,020,044	2,733,105	415,189	--	--	--
2024	Yr 5	805,326	1,486,178	130,110	6,171,994	735,511	--	--	--
2025	Yr 6	541,685	1,453,224	--	4,946,761	944,834	--	--	--
2026	Yr 7	332,451	1,503,865	--	3,220,643	600,057	--	--	--
2027	Yr 8	5,006	--	--	--	--	--	--	--
Total (t)		**5,244,718**	**11,563,624**	**6,326,068**	**20,667,797**	**3,301,939**	**632,230**	**5,489,498**	**536,131**

* *Includes approximately 142,446 of overburden from various excavation work constructed 2016 to 2018 (CP3, CP4, SP2 etc.)*

SECTION 4 • WASTE ROCK AND OVERBURDEN MANAGEMENT

Overburden and waste rock will be co-disposed within the same facilities, with the overburden being encapsulated within the rock to increase overall stability. Geochemically, both materials are similar in that neither requires a means to prevent oxidation. Waste material from underground and the open pits will be trucked to the designated storage facilities, end-dumped and spread into lifts.

4.1 Expected Waste Rock and Overburden Quantities and Distribution

4.1.1 Waste Rock Quantities and Distribution

Approximately 31.4 Mt of waste rock will be mined from the open pits and underground mine operations, with the majority of the waste rock produced (about 21.1 Mt) to be placed and stored within the designated WRSFs. The remaining 10.3 Mt of waste rock will be used for other purposes, including: about 3.6 Mt backfilled to the underground mine, 4.1 Mt of waste rock will be used for construction activities (including thermal protection and aggregate production to support the open pits), and 2.5 Mt of waste rock will be used as TSF closure cover material.

The production schedule, quantities, and distribution of waste rock by year is presented in Table 4.1.

Table 4.1: Schedule, Quantities, and Distribution of Waste Rock by Year

Year	Mine Year	Total Waste Rock from Mine Operation (t)	Utilization of Waste Rock (t)			Waste Rock to be Placed in WRSFs (t)	
			Surface Construction / Thermal Protection	Rockfill for Underground Backfill	TSF Closure Cover	WRSF1	WRSF3
2019	Yr -1	718,955	355,753	90,024	141,154	--	--
2020	Yr 1	4,496,682	933,341	353,880	192,926	244,280	2,772,255
2021	Yr 2	3,115,835	977,039	457,130	188,949	--	1,492,717
2022	Yr 3	3,547,414	100,000	425,235	166,920	2,625,228	230,031
2023	Yr 4	3,499,261	922,281	361,568	229,319	1,916,093	--
2024	Yr 5	6,977,320	220,831	437,801	538,419	1,753,283	4,026,986
2025	Yr 6	5,488,446	262,505	433,045	277,896	--	3,706,341
2026	Yr 7	3,553,094	100,000	416,418	245,524	--	--
2027	Yr 8	0	100,000	316,672	99,050	--	--
2028	Yr 9	0	100,000	313,388	453,339	--	--
Total (t)		**31,402,013**	**4,141,751**	**3,605,160**	**2,533,496**	**6,538,884**	**12,228,330**
Volume (m^3)		**16,703,198**	**2,203,059**	**1,917,638**	**1,347,604**	**3,478,130**	**6,504,431**

4.1.2 Overburden Quantities and Distribution

Approximately 7.0 Mt of overburden will be produced, with about 6.9 Mt of overburden being co-disposed within the WRSFs. The remaining, approximately 0.1 Mt, will be stored in a temporary overburden stockpile that will be used as cover material for progressive closure and reclamation of the TSF area.

In addition, small tonnages of the overburden will be generated from construction activities such as channel and collection pond excavation. Some of this overburden will be reused for other construction activities such as berm and dikes. The remaining balance will be stored within the WRSFs.

The approximate quantities and proposed placement location of the overburden is presented in Table 4.2. It should be noted that Table 4.2 does not include the balance of material from the abovementioned excavation constructions activities. Accordingly, the actual tonnages of overburden to be placed to the WRSFs will be slightly higher. WRSFs have the capacity to accommodate these excess construction additional tonnages.

Table 4.2: Schedule, Quantities, and Distribution of Overburden by Year

Year	Mine Year	Total Overburden from Mine Operation (t)	Overburden Stockpile for TSF Closure Cover (t)	Overburden to be Placed in WRSFs (t)	
				WRSF1	WRSF3
2019	Yr -1	411,683*	--	319,821	--
2020	Yr 1	793,136	--	238,208	554,928
2021	Yr 2	1,959,165	--	1,959,165	--
2022	Yr 3	1,644,159	--	861,581	782,578
2023	Yr 4	2,020,044	--	--	2,020,044
2024	Yr 5	130,110	37,163	--	92,259
2025	Yr 6	--	--	--	--
2026	Yr 7	--	--	--	--
2027	Yr 8	--	--	--	--
2028	Yr 9	--	74,326	--	--
Total (t)		**6,958,296**	**111,488**	**3,378,774**	**3,449,808**
Volume (m^3)		**4,295,245**	**68,820**	**2,085,663**	**2,129,511**

4.2 Waste Rock Storage Facility Locations

The design locations of the WRSFs took into consideration the environmental, social, economic, and technical aspects of waste rock management, including long-term physical stability of the facility, the availability of storage capacity, maintaining minimum distances between the toe of the WRSFs and the open pits, haul and access roads, and adjacent lakes.

To achieve the above considerations, three areas will be utilized for the combined storage of waste rock and overburden material as shown in Figure 3.1. These areas are designated as follows:

- WRSF1: located north of Tiriganiaq Pit 1; and
- WRSF3: located north of Tiriganiaq Pit 2.

In addition to the permanent WRSFs, two temporary waste rock storage pads will be generated in the area around the future open pits: one from construction of SP2 (within the Tiriganiaq Pit 2 footprint) and one from construction of SP4 (between the Tiriganiaq Pits 1 and 2 footprints). The material from these temporary facilities will be used for construction of haul roads, access roads, and thermal protection of the saline ponds and open pits. Details of the temporary facilities are provided in Section 4.2.4 of this plan.

4.2.1 Waste Rock Storage Facility 1

WRSF1 will occupy an area of approximately 30.7 ha and will be located to the north of Tiriganiaq Pit 1. One small shallow pond (Pond A17) is located within the footprint of WRSF1 and will be covered by the facility as shown in Figure 4.3. The pond is less than 2 m deep and freezes to the bottom annually during the winter season. This pond does not provide habitat for fish designated as commercial, recreational, or aboriginal (CRA) fish species (Golder 2015).

A portion of overburden and waste rock from the SP4 excavation (within Tiriganiaq Pit 1 footprint) and waste rock from underground will be placed in WRSF1 in Year -1 and Year 1. The majority of WRSF1 construction; however, will occur from Year 2 to Year 5, when the facility will accommodate all of the overburden from Tiriganiaq Pit 1 and a portion of the waste rock. WRSF1 is expected to reach its design capacity in Year 5.

The detailed design report and IFC construction drawings for WRSF1 (Agnico Eagle 2019) were approved by the NWB in February 2020. The waste rock volumes in the 2020 MWMP have been updated to reflect the detailed design volumes.

4.2.2 Waste Rock Storage Facility 2

With the start of operations, the mine recognized the requirement for additional surface laydown and storage space in a centralized location to the portals and open pits. As detailed design has not been completed on WRSF2, the footprint of this facility was chosen to provide this additional storage. As shown in Figure 4.3, the northern half of this footprint will provide additional ore storage capacity, while the southern portion will accommodate increased garage and laydown area to support open pit operations, in addition to providing space for a permanent staging area for the aggregate crusher and stockpiles.

4.2.3 Waste Rock Storage Facility 3

The detailed design report and IFC construction drawings for WRSF3 (Agnico Eagle 2020a) were approved by the NWB at the end of March 2020. Following the removal of WRSF2 as stated in Section 4.2.2, the footprint of WRSF3 has been increased. The updated detailed design for WRSF3 and associated water management infrastructure will be carried out once Agnico Eagle obtains the approval of the Water Licence Amendment. The detailed design report and construction drawings will be submitted to the NWB for approval prior to construction as per Water Licence Conditions.

WRSF3 is located north of Tiriganiaq Pit 2 and will fully cover former Lake H20 and partially cover former Lake H19.The proposed footprint extension of WRSF3 is approximately 28.6 ha for a total approximate footprint of 51.3 ha. No additional waterbody will be impacted by this modification as shown in Figure 4.3.

The runoff water from WRSF3 will be collected within Collection Pond (CP6 former Pond H19) and CP2, to be located to the northwest of Lake J1. Two diversion channels (Channel 9 and Channel 10), along the north and east sides of the WRSF3 will be constructed to divert the contact water from the WRSF3 to CP2. Maximum water depths for former Lakes H19 and H20 were 1.4 m and 1.6 m, respectively. No fish species were found in these two lakes and both were partially dewatered in the fall of 2019 to begin permafrost aggradation.

WRSF3 will accommodate all waste material from Tiriganiaq Pit 2 in Year 1 to Year 3, as well as portions of waste rock from Tiriganiaq Pit 1 from Year 3 to Year 6 until capacity is reached. The waste rock volumes in the 2020 MWMP have been updated to reflect the design volumes.

4.2.4 Temporary Waste Rock Stockpiles (Saline Pond 2 and Saline Pond 4)

As part of the strategy to manage excess groundwater infiltration of saline water within the underground portion of the mine, Agnico Eagle applied to the NIRB for approval to discharge saline water to the sea (Melvin Bay, Rankin Inlet). Agnico Eagle received approval from the Minister for the project.

Based on adaptive management strategies, the mine recognized the requirement for additional surface saline water storage ponds in 2019. SP2 was constructed within the footprint of Tiriganiaq Pit 2 (Figure 4.4) in Q2 2019 with the purpose of accommodating excess saline water from the Underground Mine until treatment and discharge to sea performance was sufficient to dewater surface saline storage. Construction of SP2 required the extraction of approximately 92,320 m^3 (bank volume) of waste rock which was temporarily stored immediately east of SP2, within the Tiriganiaq Pit 2 footprint. Monitoring for seepage and/or runoff from the temporary waste rock stockpile was undertaken in accordance with Type A Water License. The waste rock was sampled and tested during and after the construction process and was indicated to have a low potential for acid generation and metal leaching.

SP2 was decommissioned in Q2 2020 and replaced by SP4. The addition of SP4 allows both the mining of Tiriganiaq Pit 2, as well as provides additional surface saline water storage due to continued groundwater infiltration to the underground workings. The water contained within SP2 was transferred to SP4 once construction of SP4 was completed.

Like SP2, SP4 will be temporary in nature and constructed in bedrock within the footprint of Tiriganiaq Pit 1 (Figure 4.4). A bank total of 249,708 m^3 of overburden was removed during construction, with this material transported and placed within WRSF1. The haul roads to accommodate this phase of SP4 construction, as well as the thermal rockfill covering to protect the overburden excavation, were built using the temporary stockpile of SP2 waste rock. The remainder of the SP2 waste rock stockpile was utilized to construct access to the CP6 and WRSF3 areas, as well as complete the road access from the open pits to the primary crusher.

In addition to overburden, the excavation of SP4 generated approximately 305,393 m^3 (bank volume) of waste rock, a portion of which is temporarily stockpiled between the footprints of Tiriganiaq Pit 1 and Tiriganiaq Pit 2. This material was used as thermal protection of the overburden slopes during mining of Tiriganiaq Pit 2. The remainder of the rock from the SP4 excavation will be placed as overburden protection on WRSF1, used for general construction purposes and crushed for aggregates. As with the temporary waste rock stockpile from SP2, the temporary stockpile from SP4 will be monitored for seepage and/or runoff and the excavated waste rock is being sampled and tested for Acid Rock Drainage (ARD)/Metal Leaching (ML) potential.

4.3 Waste Rock Storage Facility Design Parameters

Table 4.3 summarizes some of the key physical parameters used for the detailed design of the WRSF1 and WRSF3. The design parameters adopted for the proposed extension of WRSF3 are similar to the parameters used for the detailed design of the WRSF3. These will be further refined during the update of the detailed design phase. Each WRSF will be constructed in a similar fashion, with material placed in controlled lifts and compacted by traffic. The side slopes of each lift of material will be at the angle of repose, while the overall side slopes of each facility will be determined by stepping in each lift of material. Figure 4.1 shows design plan view of WRSF3, while a typical cross section of WRSF1 is provided in Figure 4.2.

Table 4.3: Design Parameters for Waste Rock Storage Facilities

Design Parameters	WRSF1	WRSF3
Maximum height of each overburden and waste rock bench (m)	5	5
Side slope of each lift of waste rock	Angle of repose (approximately 1.3H:1V)	
Typical width of the horizontal offset between adjacent waste rock lifts (m)	16.5	14.5
Average overall side slopes of each WRSFs (from bottom toe of first lift to top crest of final lift)	3(H):1(V)	3(H):1(V)
Side slope for each lift of overburden	Angle of repose (approximately 1.8H:1V)	
Typical width of horizontal offset between adjacent overburden lifts (m)	20.5	NA
Internal overburden setback distance from toe of WRSF for the first lift (m)	40	To be determined
Maximum crest elevation above the sea level (masl)	112.0	97.0
Assumed waste rock in place bulk density (t/m^3)	1.88	
Assumed overburden in place bulk density (t/m^3)	1.62	

Based on the above design criteria, the WRSFs will provide a 5.6 Mm^3 and 9.2 Mm^3 design capacity for WRSF1 and WRSF3, respectively, which provides sufficient capacity to store waste generated during mine development.

Due to future expansion work planned at Meliadine (in which the full permitting process will be followed) beginning in early 2024, storage of any excess waste rock will be accounted for within the expansion infrastructure. In parallel, Agnico Eagle will utilize an adaptive, performance-based management system of the WRSFs. Opportunities to increase the capacity of the facilities may present themselves dependent on the mining sequence, greater understanding of the foundation conditions and findings from performance monitoring as the proposed extended footprint is located on land and do not cover any waterbody.

4.4 Anticipated Design Performance of Waste Rock Storage Facilities

Updated slope stability analyses for WRSF1 and WRSF3 was conducted during the detailed design of these facilities. Using the geometric parameters presented in Section 4.3, the results of the stability analysis indicates that the calculated minimum factors of safety for the WRSFs meet or exceed the industry and Agnico Eagle acceptable factors of safety. The performance of the WRSF3 which involves an extended footprint is expected to be similar as the previous WRSF3 as the design parameters and geometry are comparable. Furthermore, the foundation conditions of the extended footprint of WRSF3 are expected to be better than the footprint of the initial design of WRSF3 since there are no lake beds nor partial taliks.

Thermal analyses were also updated to estimate the thermal regime of the WRSFs and foundations during mine operations and after closure. Although the results for both facilities indicate that material placed in the winter period will likely stay in a frozen condition while the material placed in the summer period will eventually freeze back, the stability of both facilities is closely linked to the temperatures of the underlying ground.

4.5 Waste Rock and Overburden Deposition

The general construction sequence of the WRSFs will be as follows:

- A topographical survey of the original ground will be conducted and stakes placed to mark the dumping limits; and
- Overburden and/or waste rock will be hauled and end-dumped to its designated location. The material will be spread after dumping with a dozer and track-packed. Side slopes of each lift will be the natural angle of repose.

Various strategies to promote freeze-back and permafrost development will be deployed, including:

- Snow/ice removal prior to material placement over either original ground or an existing lift; and
- Overburden placement of first couple lifts restricted to 2.5 m maximum height and will only be placed when underlying ground is frozen

Temperatures within the waste and the underlying ground will be closely monitored throughout the operational lifespan of the facilities and will be discussed in further detail in Section 9.0. An adaptive, performance-based management approach will be applied to the WRSFs and opportunities to increase the capacities may present themselves depending on the mining sequence and foundation temperatures.

4.6 Additional Waste Material Placed in Waste Rock Storage Facilities

Although the WRSFs were designed to accommodate mine waste materials, additional waste matter may also be periodically deposited within the core of the facilities. This additional waste will not affect the freeze-back or stability of the facilities and will be approved for placement by the geotechnical engineer. It is expected that this additional waste will consist of:

- Solid STP material. Agnico Eagle invested in a screw press technology in 2019 to remove approximately 85% of the water from the treated sewage. The remaining semi-solid product will be placed and covered with overburden/waste rock in the WRSFs under Section 3.2 of the Sewage Treatment Plant (STP) Operation and Maintenance Manual (Agnico Eagle 2017). The volume of sewage material will be recorded on a monthly basis, pursuant to Part I Item 9h of the Type A Water License 2AM-MEL 1631.
- Limited volumes of liquid STP material. During planned and unplanned maintenance on the STP screw press, liquid sludge will be produced. This material will also be placed within the WRSFs as per the bullet above.

SECTION 5 • TAILINGS MANAGEMENT

Tailings generated by mill production at Meliadine will be dewatered by pressure filtration to a solids content of approximately 85% by weight. The filtered tailings will have the consistency of damp, sandy silt and will be transported by haul truck to either the paste plant for use underground as backfill or for placement and storage in the TSF in a process conventionally referred to as “dry stacking”.

5.1 Expected Quantities and Distribution

5.1.1 Tailings Quantities and Distribution

Commissioning of the process plant started near the end of Q4 2018 and actual production commenced in early Q2 2019. Approximately 15.4 Mt of tailings will be produced over an 8.5-year period. Approximately 10.9 Mt or 71% of the tailings will be deposited within the TSF and the remaining 4.5 Mt or 29% will be used as underground cemented paste backfill.

The current production schedule, quantities, and distribution of tailings by year are presented in Table 5.1.

Table 5.1: Schedule, Quantities, and Distribution of Tailings by Year (V11_3)

Year	Mine Year	Tailings Solids from Mill (t)	Tailings Solids to be Used as Underground Backfill (t)	Tailings Solids to be Placed in Dry Stacked TSF (t)
2019	Yr -1	976,706	394,680	582,026
2020	Yr 1	1,519,200	634,163	885,037
2021	Yr 2	1,709,655	657,048	1,052,607
2022	Yr 3	1,775,614	778,607	997,007
2023	Yr 4	1,770,250	280,999	1,489,251
2024	Yr 5	2,013,000	302,926	1,710,074
2025	Yr 6	2,190,000	500,187	1,689,813
2026	Yr 7	2,190,000	521,941	1,668,059
2027	Yr 8	1,255,251	408,999	846,252
Total (t)		**15,399,676**	**4,479,550**	**10,920,127**

5.1.2 Waste Rock Quantities and Distribution

The expected quantities of waste rock to be placed at the TSF as progressive cover material and yearly distribution are provided in Sections 4.1.1 and 8.2.

5.1.3 Overburden Quantities and Distribution

The expected quantities of overburden to be placed as closure cover and distribution are provided in Sections 4.1.2 and 8.2.

5.2 Tailings Storage Facility Location

The TSF is located on high ground west of the proposed mill and east of Lake B7, as shown in Figure 3.1. The direct distance from the mill to the tailings stack ranges from 400 m to 800 m. The minimum setback distance from the edge of Lake B7 is approximately 200 m.

5.3 Tailings Storage Facility Design Parameters

Detailed design of the TSF (Agnico Eagle 2018) utilizes tailings placement in a two-cell system (Figure 5.1). The two-cell system (Cell 1 and Cell 2) is designed to limit dust generation, control tailings surface erosion, and to facilitate the progressive reclamation and closure of the TSF. As the tailings reach final elevation, the tailings will be progressively encapsulated with either waste rock or a layered combination of waste rock and overburden. A typical cross section is shown in Figure 5.2.

Table 5.2 summarizes some of the key physical parameters used for the design of the TSF.

Table 5.2: Design Parameters for the Tailings Storage Facility

Parameters	Value
Average height of TSF over original ground surface	33 m
Side slope for lower placed tailings (or below elevation 80.2 m)	4H:1V
Side slope for upper placed tailings (or above elevation 80.2 m)	3H:1V
Slope of the final tailings surface at crest	4%
Final top tailings surface area (Cell 1)	46,359 m^2
Final bottom tailings surface area (Cell 1)	179,741 m^2
Final top tailings surface area (Cell 2)	84,655 m^2
Final bottom tailings surface area (Cell 2)	149,632 m^2
Assumed moisture content of tailings to TSF	17.6%
Minimum target dry density of compacted tailings	1.65 t/m^3

Based on the above design criteria, the TSF has a capacity for 6.61 Mm^3 (10.9 Mt) of filtered tailings.

5.4 Anticipated Design Performance of Tailing Storage Facility

The TSF is designed to minimize the impact to the environment and the design does not rely on freeze-back of the tailings to meet the design intent of the structure. However, the freeze-back of the TSF and the foundations will provide additional benefits such as increasing stability and minimizing seepage from the TSF during operation and closure of the TSF.

The stability analysis of the TSF indicates that the calculated minimum factors of safety meet or exceed the acceptable factors of safety. Thermal analysis predicts that the majority of tailings will be frozen after the closure cover is placed and will remain frozen for many years after mine closure.

5.5 Tailings Deposition

Generally, deposition at the TSF consists of the following sequence:

- Tailings placement started from Cell 1 in the first quarter of Year -1. The filtered tailings are hauled to the TSF Cell 1 with haul trucks, end dumped, and bladed into lifts of maximum height 0.3 m using a dozer. Each tailings lift is then compacted using a vibratory drum roller. This compaction is intended to promote runoff, reduce the potential for oxygen ingress and water infiltration, and maintain geotechnical stability.
- A starter waste rock berm was initially placed along the outside perimeter to contain the initial lifts of the tailings; the berm will become a part of the closure cover. Additional lifts of compacted waste rock (with a maximum lift thickness of 1 m) are placed as the tailings surface is brought up as erosion and thermal protection. Safety berms are placed on each lift of the waste rock that also help to reduce dust generation from the tailings surface.
- Surface water or excess snow/ice is removed from the natural ground within the footprint prior to tailings placement.

Table 5.3 presents the yearly schedule of deposition per cell, as well as the average height of tailings placed in each cell.

Table 5.3: Tailings Placement Schedule and Estimated Tailings Heights (V9A_8yrs)

Year	Mine Year	Tailing Solids to be Placed in Dry Stack TSF (t)		Estimated Avg. Height of Tailings Placed Per Cell (m)		Planned Tailings Placement Period	
		Cell 1	Cell 2	Cell 1	Cell 2	Cell 1	Cell 2
2019	Yr -1	582,026		1.6		Jan to Dec	
2020	Yr 1	885,037		5.3		Jan to Dec	
2021	Yr 2	1,052,607		10.3		Jan to Dec	
2022	Yr 3	997,007		16.1		Jan to Dec	
2023	Yr 4	868,728	620,522	22.7	2.6	Jan to Jul	Aug to Dec
2024	Yr 5	717,635	992,439	33.0	6.9	Jan to May	Jun to Dec
2025	Yr 6		1,689,813		15.2		Jan to Dec
2026	Yr 7		1,668,059		24.7		Jan to Dec
2027	Yr 8		846,252		33.0		Jan to Aug
Total		**5,103,041**	**5,817,086**				

In order to promote freeze-back, the initial lift of tailings over original ground will be placed during winter conditions whenever feasible. Efforts to limit tailings thickness during the initial year of placement to 2.6 m while the total yearly thickness of the tailings placed in a cell will be limited to no greater than 10.3 m will also aid permafrost aggradation of the facility.

5.6 Additional Waste Materials Placed in Tailings Storage Facility

Due to the design specifications regarding placement of the tailings and waste rock at the facility, generally no other waste materials will be placed in the TSF during its operational life. Exceptions must be approved by the geotechnical engineer and include:

- Used filter cloths from the Mill. These cloths are collected from the process plant and brought periodically to the TSF for placement. Each cloth is unrolled and placed flat on the tailings surface before backfilling with tailings material as per specified; and
- Limited volume of STP sludge. A temporary decantation pond was constructed and used for storage of STP sludge in Cell 2 during 2019. This pond was decommissioned in Q2 2020 by covering with waste rock. Tailings placement will continue over the decommissioned pond as per the deposition plan.

SECTION 6 • WATER MANAGEMENT ASSOCIATED WITH MINE WASTE MANAGEMENT

The water management objectives for the Project are to minimize potential impacts to the quantity and quality of surface water at the site. Seepage and runoff water from the waste management facilities will be managed with water diversion channels, water retention dikes/berms, and water collection ponds.

Additional details regarding the water management systems and infrastructures can be found in the *Water Management Plan* (Agnico Eagle 2020b).

6.1 Water Management Associated with Waste Rock Storage Facilities

As shown in Figure 3.1, WRSF1 will straddle three catchment areas (catchment of CP1, catchment of Pond CP5, and catchment of Lake B7). WRSF3 will straddle two catchment areas (catchment of CP6 and catchment of CP2).

Seepage and runoff from the WRSFs during construction and operation phases will be managed using the water management system described below:

- Seepage and runoff from WRSF1 within the catchment of CP1 will be diverted to CP1 via Channels 1, 7, and 8;
- Seepage and runoff from WRSF1 within the catchment of CP5 will be diverted to CP5 via Channel 5;
- Seepage and runoff from WRSF1 within the catchment of Lake B7 will be diverted and collected in CP4 via Channel 4;
- Seepage water and runoff from WRSF3 within the catchment of CP6 will be flow directly into CP6;
- Seepage water and runoff from WRSF3 within the catchment of CP2 will be diverted to CP2 via Channels 9 and 10 or flow directly into CP2; and
- The water collected in CP2, CP4, CP5, and CP6 will be pumped to CP1, where it will be treated by the EWTP prior to discharging to the outside environment.

6.2 Water Management Associated with Tailings Storage Facility

The TSF is located within the catchment of Lake B7 with a small portion straddling the water catchment of CP1, as shown in Figure 3.1. Water sources from the TSF during construction and operation will be managed as follows:

- Seepage and runoff from the placed filtered tailings within the CP1 catchment will stream through Culverts 1, 18, 2, and 3 to deposit in CP1;
- Seepage and runoff within the Lake B7 catchment will be collected in Pond CP3 either directly or via Channel 3. CP3 water quality will be monitored; and
- Water within CP3 will be pumped to H13 where it will flow through Culvert 2, Channel 1, and Culvert 3 into CP1.

SECTION 7 • DUST MANAGEMENT ASSOCIATED WITH MINE WASTE MANAGEMENT

The possible sources of dust related to the waste rock, overburden, and filtered tailings management during construction, operation, and closure include:

- Site preparation prior to placement of waste materials i.e., stripping, excavation and/or placement of foundation pad;
- Wind erosion of fine particles from the WRSFs and TSF surface;
- Vehicle traffic dislodging fine particles from the surface of WRSFs and TSF, and associated service and haul roads to WRSFs and TSF;
- Waste rock, overburden, and filtered tailings handling and transfer - loading, hauling, unloading, placement, and compaction; and
- Placement of closure and capping layers.

Dust suppression measures, which are considered to be typical of the current mine practices (i.e., Meadowbank Mine) and consistent with best management practices, will be considered through design, operation, and closure phases to control the dust.

Minimal site preparation is required for the WRSFs and the TSF during the construction phase. Therefore, dust from this source is not expected to be problematic.

Dust is expected to be a minor issue during the operation of the WRSFs as the waste rock produced at the mine generally comprises large pieces of rock that is not be susceptible to wind erosion. Although overburden contains material that is fine-grained and thus more susceptible to wind erosion, the plan is to store the majority of the overburden materials within the core of the WRSFs. Dust from the overburden materials is therefore not expected to be a concern.

The surface compaction of the filtered tailings lifts and limiting traffic over the compacted surface will significantly reduce the potential for wind erosion of the tailings surface. Dust related to TSF operation during the winter season will be further managed by limiting the exposed surface area of the tailings. Other control measures considered in the design of TSF to minimize dust generation include:

- Placement of waste rock cover over the final perimeter tailings slope surface as soon as possible. Safety berms around the perimeter of the waste rock slopes are expected to both trap dust from leaving the TSF and cut exposure of the tailings surface to wind erosion;
- TSF will be operated by cells to limit the tailings surface area exposed to wind and facilitate progressive closure;
- Consideration of prevailing north-northwest wind direction by development of the southern portion of Cell 1 first and progression northward;
- Tailings surface will be covered progressively once it reaches the design elevation; and

- Flat side slope of 4(H):1(V) for the TSF was adopted to minimize the erosion potential and maintain overall stability of the tailings stack.

Dust generated from vehicles travelling on the surface of the associated access roads will be controlled principally by spraying water on the traffic area, which will be carried out regularly by mine services during dry periods in the summer. Watering the haul and access roads is only possible when temperatures are above freezing. When the temperature is below freezing, dust suppression using water or chemical will pose a safety hazard for travel; therefore, reducing the speed limit will be the principal way of controlling dust during these periods. More details on the dust management for traffic are described in the *Roads Management Plan* (Agnico Eagle 2020c).

Other control measures considered in design and operation related to dust generation by vehicles travelling include:

- Roads will be designed as narrow and short as possible while maintaining safe construction and operation practices;
- Coarse size rock will be used as much as possible for road construction;
- Roads will be regularly graded to mix the fines found on the road surface with coarser material located deeper in the roadbed; and
- As required, roads and travel areas will be topped with additional aggregate.

Dust from material handling is not expected to be problematic on site. Long end dumps, which can generate significant amounts of dust, will not occur since waste rock, overburden, and filtered tailings will be dumped in lifts and spread with a dozer. Where possible, multiple handlings of materials that have the potential to generate dust will be avoided. However, should dust related to material handling occur on site, specific control measures will be evaluated and applied, as required.

At closure, the TSF will be fully covered to prevent further wind erosion of the tailings. The proposed closure cover includes a layer of 0.5 m thick overburden followed by a layer of 2.5 m thick waste rock on the top of the facility. The TSF closure slopes cover includes a 3.7 m to 4.2 m thick waste rock layer depending on the elevation. The overburden will be surrounded by waste rock in the WRSFs; therefore, dusting is not expected to be an issue. The need for dust control at closure will be further evaluated during closure activities.

SECTION 8 • RECLAMATION AND CLOSURE OF THE WASTE ROCK STORAGE FACILITIES AND TAILINGS STORAGE FACILITY

Detailed mine closure and reclamation activities were provided in the Interim Closure and Reclamation Plan (SNC-Lavalin 2019), which was submitted in December 2019 as per the Water License requirement Part J Item 1 and approved in March 2020. An update of detailed mine closure and reclamation activities are provided in the Interim Closure and Reclamation Plan (SNC-Lavalin 2020). This plan will be submitted in August 2020 as per the Water License requirement Part J Item 1.

Key mine development activities during the closure process are summarized in Table 8.1.

Table 8.1: Key Mine Development Activities and Sequence during Closure

Mine Year	Mine Development Activities and Sequence
Yrs 9-11 (2028 to 2030)	• Place final closure cover on top of tailings surface in Cell 2 (Yr 9) • Decommission non-essential mine infrastructure and support buildings (Yrs 9 and 10) • Start monitoring and maintenance (Yr 9)
Post Closure	• Continue monitoring and maintenance until Yr 18 (2037)

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 WRSFs and TSF will be operated to facilitate progressive reclamation. Closure and reclamation activities of these facilities will use currently accepted management practices and appropriate mine closure techniques that will comply with accepted protocols and standards.

Monitoring will be carried out during all stages of the mine life to demonstrate geotechnical stability and the safe environmental performance of the facilities (Section 9). 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 Mine Closure and Reclamation Plan.

8.1 Closure and Reclamation of Waste Rock Storage Facilities

Geochemical testing indicates that the waste rock and overburden from the Tiriganiaq area is non-potentially acid generating (NPAG) and non-metal leaching (NML). Kinetic tests completed on all waste rock types and at various scales show that drainage water quality is expected to meet Metal and Diamond Mining Effluent Regulations (MDMER) monthly mean effluent limits, including results for arsenic. Therefore, a closure cover system is not proposed for the WRSFs.

The WRSFs were designed for long-term stability and no additional re-grading will be required at closure. It is anticipated that the native lichen community will naturally re-vegetate the surface of the WRSFs over time.

8.2 Closure and Reclamation of the Tailing Storage Facility

Results of geochemical characterization indicates that most of the tailings produced to-date at the mine are either Potential Acid Generating (PAG) or uncertain, while ML has not been observed to be an issue. Despite the PAG classification, the TSF is not considered to pose an ARD risk due to the placement methodology used, assumption of freeze-back within the facility, and progressive reclamation cover placement.

Specifically, the closure plan for the TSF is to progressively place an engineered cover over the tailings surface. The current closure cover design includes the following:

- A minimum thickness of 4.5 m waste rock cover over the lower toe of the final tailings side slopes and a minimum thickness of 4.0 m waste rock cover over the upper side slopes; and
- A minimum thickness of 2.5 m waste rock cover over 0.5 m thick select overburden till fill over the top surface of final tailings. The top closure cover material will be placed when each cell reaches its operational capacity and sloped 4% to discourage ponding and surface infiltration.

Waste rock cover will consist of 600 mm minus NPAG waste rock. Select overburden till will be placed and compacted in an unfrozen condition over the top surface of the tailings. The till material is intended to reduce surface infiltration and will consist of inorganic, sandy silt or silty sand with a fines content of 20% to 60% and maximum particle size of 300 mm.

The expected quantities and schedule of TSF cover materials is presented in Table 8.2.

Table 8.2: Summary of TSF Cover Material Quantities during Mine Operations

Year	Mine Year	Volume of Waste Rock Placed on Side Slopes (m³)	Volume of Waste Rock Placed on Final Top Surface (m³)	Total Volume of Waste Rock Placed as Closure Cover (m³)	Total Volume of Overburden Placed on Top Surface (m³)
2019	-1	39,760		39,760	
2020	1	97,036		97,036	
2021	2	89,103		89,103	
2022	3	110,124		110,124	
2023	4	139,379		139,379	
2024	5	117,037	123,942	240,979	22,940
2025	6	154,474		154,474	
2026	7	127,840		127,840	
2027	8	46,250		46,250	
2028	9	--	230,180	230,180	42,610
Total		**921,003**	**354,122**	**1,310,899**	**65,550**

An adaptive closure strategy has been adopted for the Project. The preliminary closure cover design adopted for the TSF at this stage will be further evaluated and updated based on the TSF performance monitoring, water quality monitoring and evaluation, and the overall mine closure plan. The final closure cover design for the TSF will be developed before mine closure.

8.3 Closure and Reclamation of Mine Waste Water Management Systems

The contact water management systems for the WRSFs and TSF will remain in place until mine closure activities are completed and monitoring results demonstrate that water quality conditions are acceptable for the discharge of all contact water to the environment with no further treatment required. Once the water quality meets the discharge criteria established through the water licensing process, the water management infrastructures will be decommissioned to allow the water to naturally flow to the receiving environment.

SECTION 9 • MONITORING PROGRAM

This section presents a summary of the monitoring programs that will be carried out during construction and operation related to mine waste storage management. The monitoring program presented here includes; stability and deformation, ground temperature, and annual inspections per the Type A Water Licence 2AM-MEL1631. The detailed information on monitoring of runoff and seepage from the WRSFs and the TSF is described in the *Water Management Plan* (Agnico Eagle 2020b). General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.

9.1 Monitoring Activities for WRSFs

Table 9.1 summarizes the monitoring activities for the WRSFs and incorporates the latest design reports.

Table 9.1: Waste Rock Storage Facilities Monitoring Activities

Monitoring Component		Monitoring Frequency	Reporting
Verification Monitoring	Quantities of waste rock produced	Monthly	Monitoring data will be used by Agnico Eagle internally
	Routine visual inspections of WRSFs	Daily during active rock placement, Monthly to semi-annually after placement	
	Elevation and geometry survey	Annually	
	Waste rock and overburden sampling	To be determined	
	Seepage collection and monitoring	Monthly over the open water season	
General Monitoring	Quantities of waste rock placed into facilities	Monthly	Monitoring data will be reported to the Regulators in the annual water licence report or annual inspection report
	Geochemical monitoring	Approximately eight samples per 100,000 tonne (t) s of mined material	
	Thermal and freeze-back monitoring	Monthly during first year; then quarterly	
	Dust monitoring related to WRSFs	Governed by Air Quality Monitoring Plan	
	Geotechnical inspection by qualified Geotechnical Engineer	Annually or more frequent at the request of an Inspector	

9.1.1 Verification Monitoring Program for Waste Rock Storage Facility

Verification monitoring data will be used by Agnico Eagle for the management of waste rock and overburden. The following verification monitoring data will be collected, compiled, and managed internally:

- Each WRSF was designed to store a specific volume of waste rock and overburden material during mine operations. Monthly quantities of the waste materials produced and placed during mine operation will be recorded.
- During the active development of each WRSF, site staff will carry out daily visual inspections in relation to the performance and condition of each structure as per Mine Act requirements. When placement activity ceases on an interim or seasonal basis, the inspection frequency will shift to monthly. Following the completion of a WRSF, inspections will continue on a semi-annual basis until closure. The purpose of these inspections is to identify and document any potential hazards or risks to the facility, such as deformations, unusual seepage, slumping, local failure etc.
- The maximum heights of the WRSFs are estimated to be approximately 40 m. During operations, an annual elevation survey of the WRSFs will be performed to estimate the overall volume placed, determine the reclamation progress, and provide input information to the operation plan.
- Surface runoff and seepage from the WRSFs will be monitored during the construction and operation phases by visual inspection during the ice-free season. Additional inspections will be carried out after rainfall events and during the freshet period. The detailed information on the monitoring of surface runoff and seepage from the WRSFs is described in the *Water Management Plan* (Agnico Eagle 2020).

9.1.2 General Monitoring Program for Waste Rock Storage Facility

The following general monitoring data will be reported to the NWB through either the Water Licence Annual Report or an Annual Inspection Report:

- Monthly quantities of the waste rock and overburden placed into the WRSFs during mine operation.
- Waste rock samples from both underground and the open pits will be taken from the production blast holes and analyzed for the percentage of sulphur and carbon. The results from these analyses will be used to differentiate NPAG and PAG based on the derived Net Potential Ratio (NPR). To validate the classification method of NPAG/PAG based on NPR, additional samples will be taken evenly at a rate of one sample per 100,000 t of mined material. The collected samples will be sent to an accredited commercial laboratory for ARD and ML using the Acid Base Accounting (ABA, the modified Sobek method) and Shake Flask Extraction (SF)E analyses.

- The placed waste rock and overburden are expected to freeze back and permafrost is likely to develop within the WRSFs with time. Thermistors will be installed in each WRSF to monitor the rate of freeze-back and permafrost development progress in the facilities during closure. Temperature readings will be taken monthly during the first year after installation and then quarterly to track permafrost development within the WRSFs.
- Dust related to waste rock and overburden management is not expected to be an issue by employing the dust suppression measures presented in Section 7.0 through design, operation, and closure phases. Air quality at the mine site will be monitored during construction, operation, and closure through air quality monitoring stations and reported annually.
- The performance of the WRSFs will be inspected and assessed during the annual geotechnical site inspection by a geotechnical or civil engineer registered in Nunavut. The visual assessment and recommended actions to be taken related to the WRSFs will be summarized in the Annual Inspection Report. Inspections may occur more frequently at the request of the Inspector. Records of all inspections will be maintained for the review of the Inspector upon request.

The results from the general monitoring program related to waste rock and overburden management will be reported to the Regulators in the annual water license report or in the annual geotechnical inspection report.

9.2 Monitoring Activities for the Tailing Storage Facility

Table 9.2 summarizes the monitoring activities for the TSF. The TSF Detailed Design Report was approved by the NWB in December 2018. A more detailed monitoring plan was included in the report and has been incorporated in the following tables.

Table 9.2: Tailings Storage Facility Monitoring Activities

Monitoring Component		Monitoring Frequency	Reporting
Verification Monitoring	Tailings production rate and solid content	Continuous	Monitoring data will be used by Agnico Eagle internally, and will be reported to the Regulators upon request
	Design verification of placed tailings (moisture content, density, particle size)	Quarterly/Bi-annually	
	Routine visual geotechnical inspections of TSF	Weekly	
	Elevation and geometry survey	Annually	
	Water quality monitoring of CP3	Monthly over the open water season or when water is present	
General Monitoring	Quantities of tailings placed into facilities	Monthly	Monitoring data will be reported to the Regulators in annual water licence report or annual inspection report
	Thermal and freeze-back monitoring	Monthly during first year and quarterly thereafter	
	Dust monitoring related to TSF	Daily during operation phase	
	Geochemical monitoring	Bi-monthly	
	Geotechnical inspection by qualified Geotechnical Engineer	Annually or more frequent at the request of an Inspector	

9.2.1 Verification Monitoring Program for Tailing Storage Facility

A summary of the verification monitoring program for the TSF is presented below.

- The tailings production rate at the mill and solid content will be continuously monitored during mine operation.
- Off-site geotechnical testing of tailings properties (density, moisture content, and particle size) tailings will be carried out quarterly to ensure that the placed tailings meet the design criteria. Bi-annual testing of in situ density and moisture contents will be conducted by a third-party geotechnical firm.
- Visual inspections and monitoring can provide early warning of many conditions that can contribute to structure failures and incidents. Pursuant Part F Item 20 of the Type A Water Licence 2AM-MEL 1631, Agnico Eagle will undertake weekly visual inspections of the TSF and note areas of seepage, unusual settlement or deformation, cracking or other signs of instability. Records of all inspections will be maintained.
- The average final height of the TSF will be approximately 33 m. An annual elevation survey of the TSF will be performed to estimate the overall volume placed, determine the reclamation progress, and provide input information to the operation plan.
- The runoff and seepage monitoring procedures and protocols for the WRSFs during mine operation will also apply to the TSF. Specifically, CP3 water quality will be monitored at a monthly frequency or when water is present in accordance with Part I Items 14 and 15 of the Type A Water Licence 2AM-MEL1631.

9.2.2 General Monitoring Program for Tailing Storage Facility

A summary of the general monitoring program for the TSF is presented below.

- The monthly quantities of tailings placed into the TSF will be recorded.
- In accordance with Part I Item 13 of the Type A Water Licence 2AM-MEL1631, a TSF thermal monitoring regime will be implemented. This will include a minimum of eight thermistor cables being installed in the TSF to monitor the permafrost development within the facility during operation and closure. The planned locations of these thermistors is shown in Figure 5.1. The temperature readings will be taken monthly during Year -1 and quarterly (i.e., four times per year) thereafter to verify thermal conditions and assumptions. The monitoring schedule will be reviewed and modified as necessary. The measured temperatures within the TSF will also provide the background information for the study of permafrost development.
- Dust related to tailings management is not expected to be an issue by employing the dust suppression measures presented in Section 7 through design, operation, and closure phases. Air quality at the mine site will be monitored during construction, operation, and closure through air quality monitoring stations.
- Filtered tailings samples will be taken from the mill bi-monthly and analyzed for the percentage of sulphur and carbon. The results from these analyses will be used to differentiate NPAG and PAG based on the derived NPR. The collected samples will be sent to an accredited commercial laboratory for ARD and ML using the ABA (the modified Sobek method).
- Pursuant Part I Item 14 of the Type A Water Licence 2AM-MEL 1631, the performance of the TSF will be inspected and assessed during the annual geotechnical site inspection by a geotechnical or civil engineer registered in Nunavut. The visual assessment and recommended actions to be taken related to the TSF will be summarized in the annual inspection report. Inspections may occur more frequently at the request of the Inspector. Records of all inspections will be maintained for the review of the Inspector upon request.

The results from general monitoring program related to tailings management will be reported to the Regulators in the Annual Water License Report or in the Annual Geotechnical Inspection Report.

REFERENCES

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APPENDIX A • FIGURES

Figure 1.1 General Mine Site Location Plan

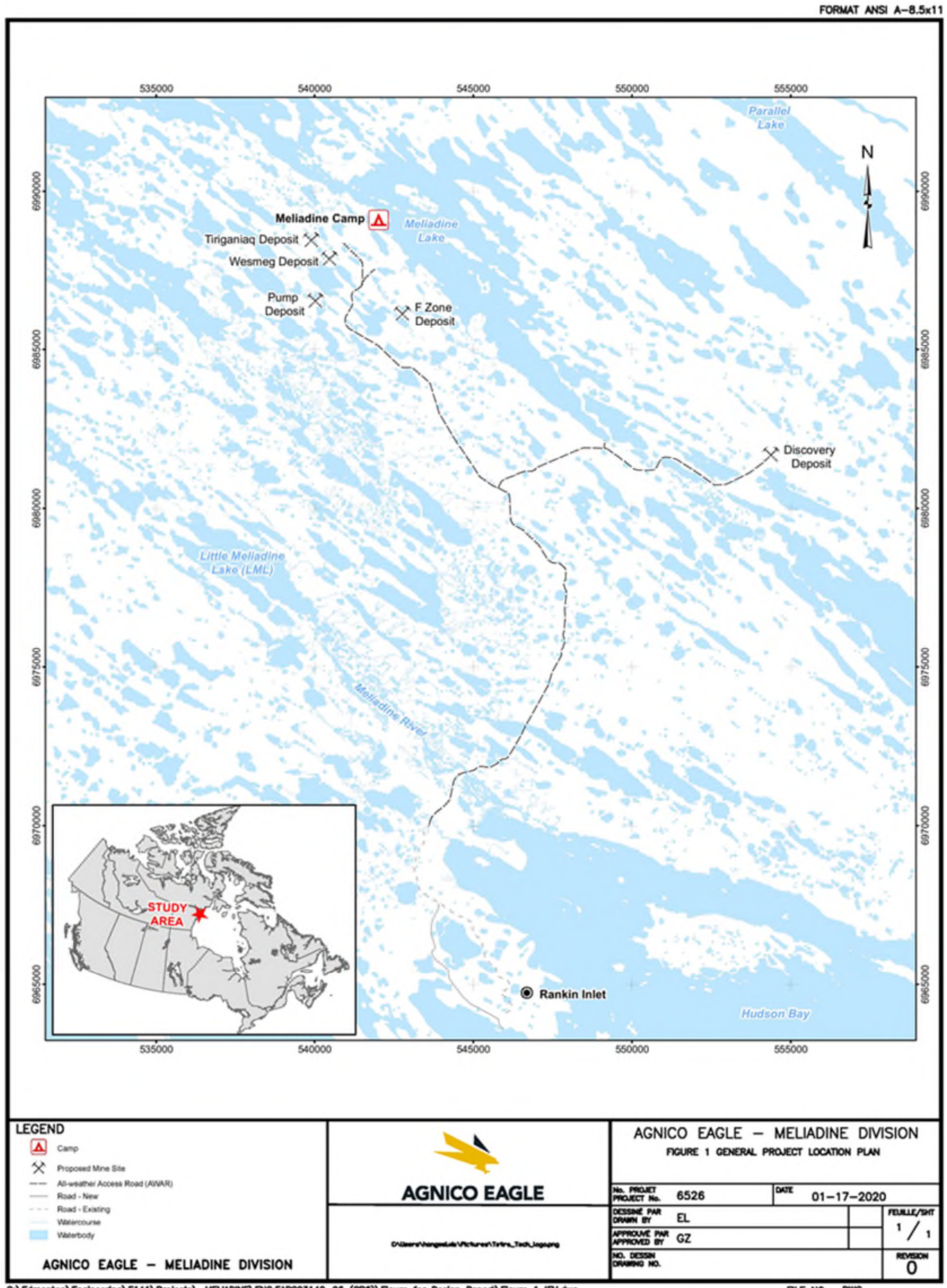

Figure 3.1 General Mine Site Location Plan

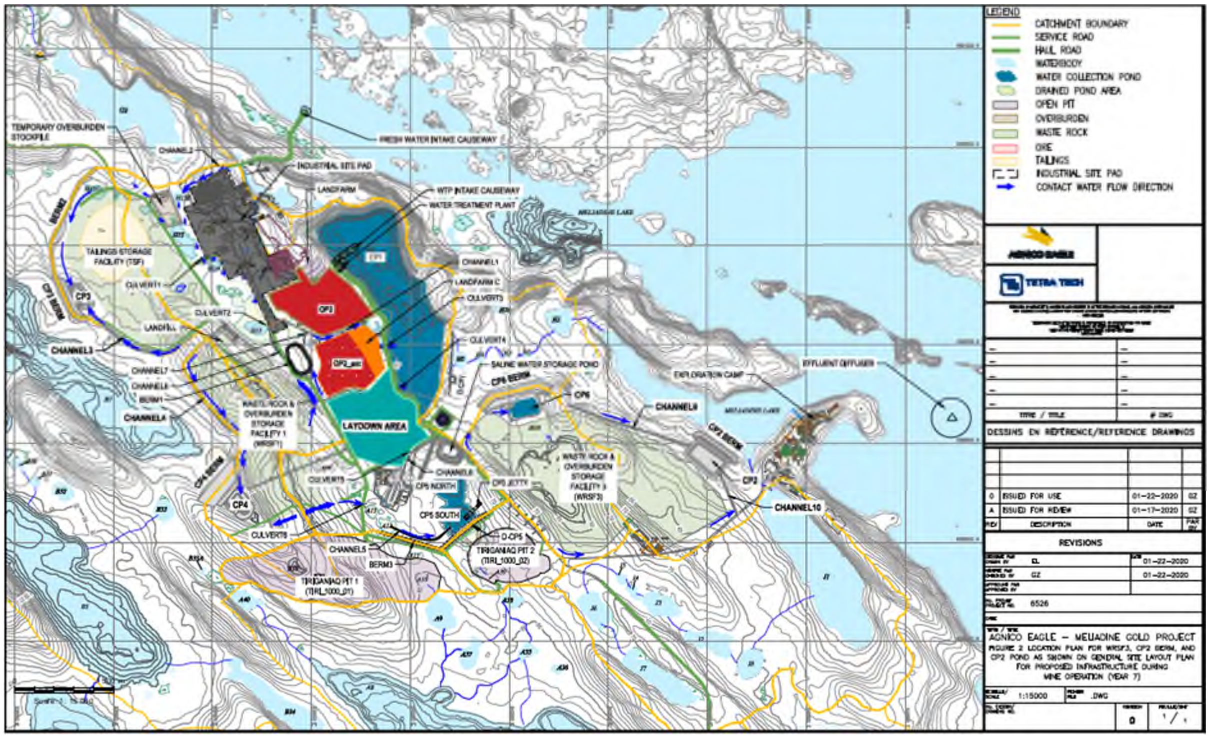

Figure 3.2 Mine Waste Management Flow Diagram

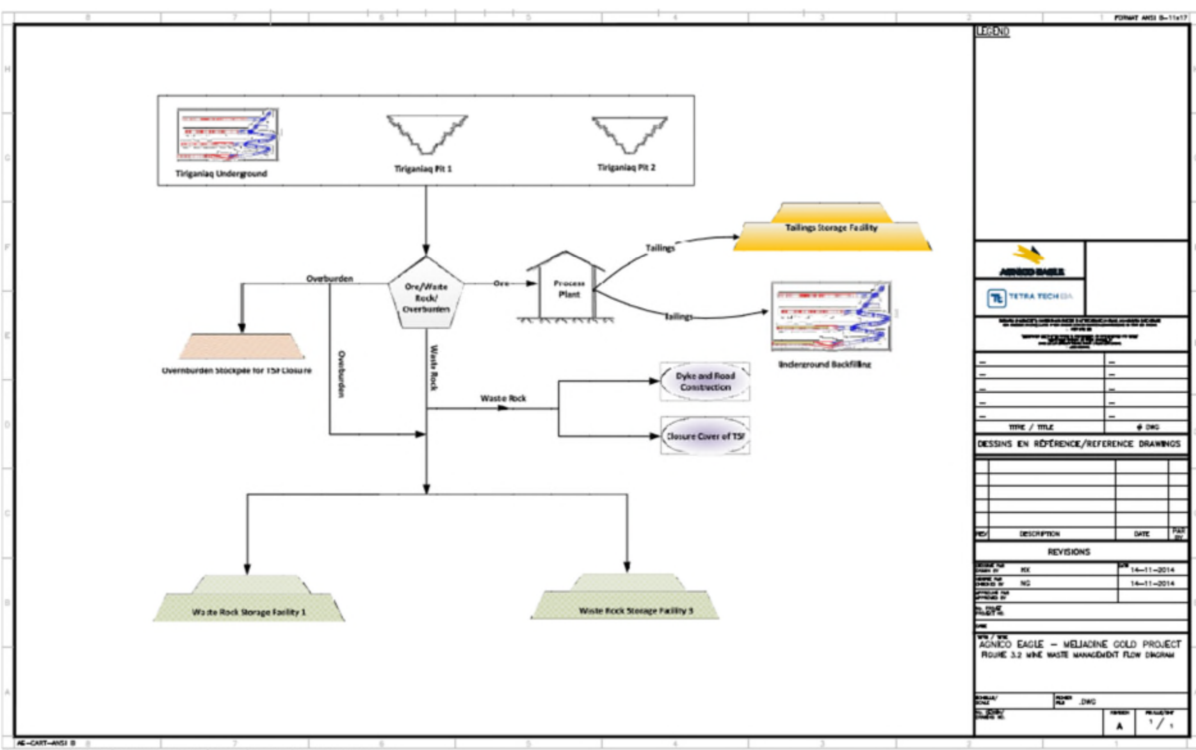

Figure 4.1 WRSF3 Design Plan View

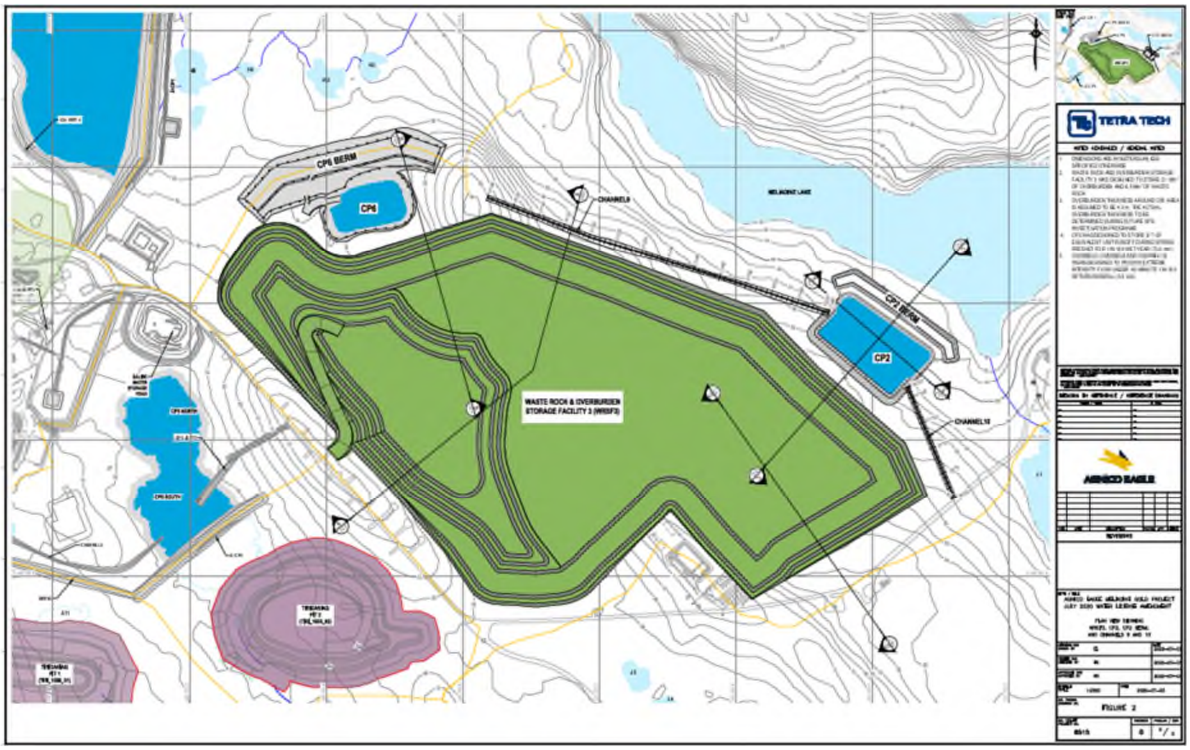

Figure 4.2 WRSF1 Typical Section

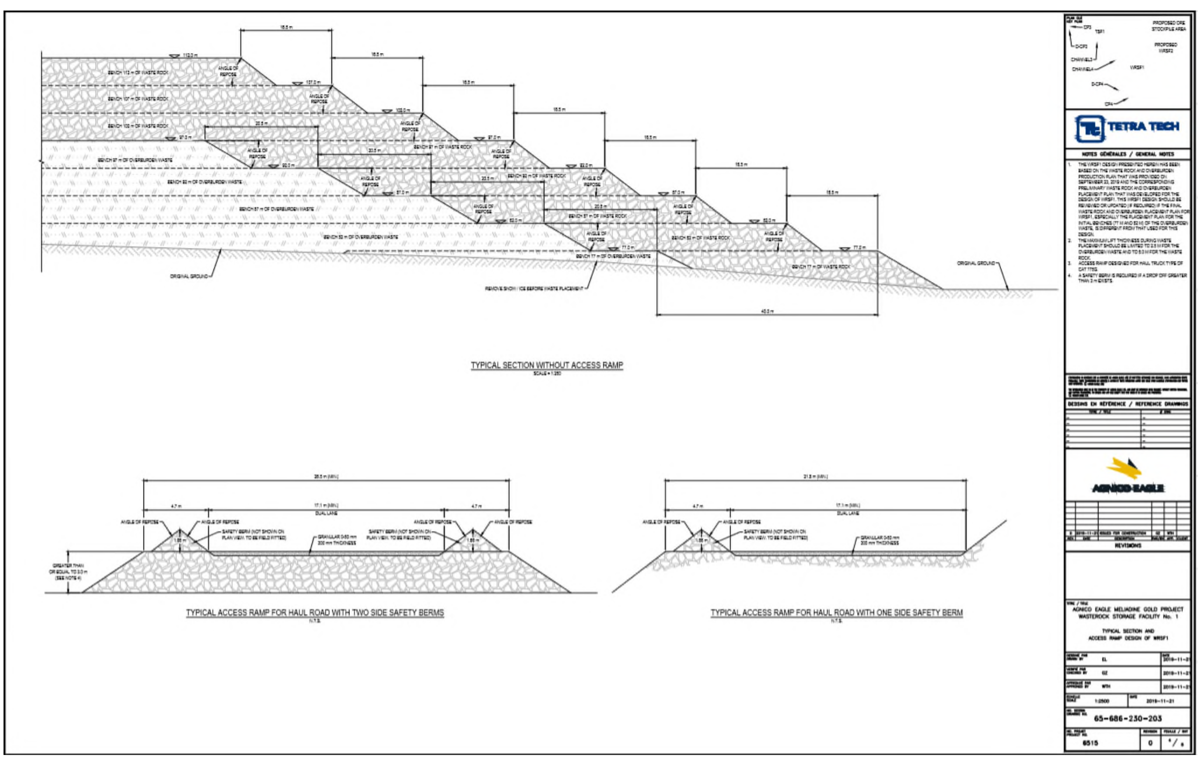

Figure 4.3 Watershed and Waterbodies Affected by Site Infrastructure

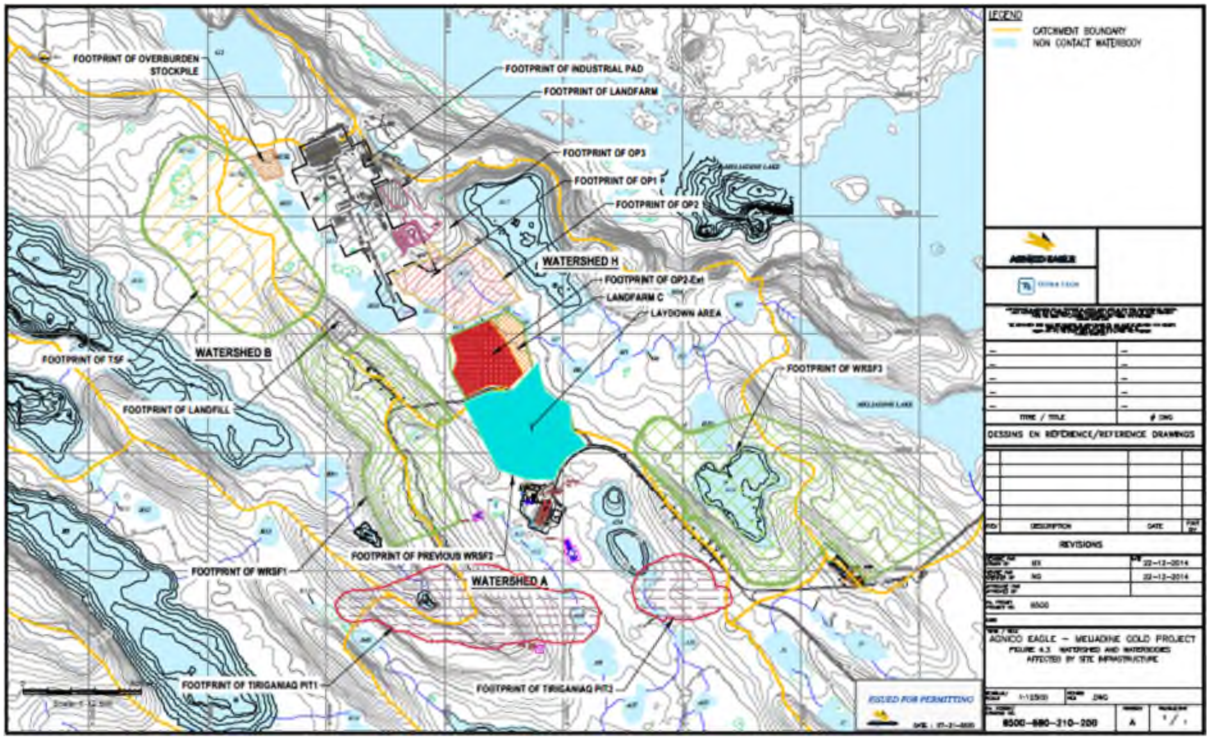

Figure 4.4 Temporary Waste Rock Stockpiles for Saline Pond 4

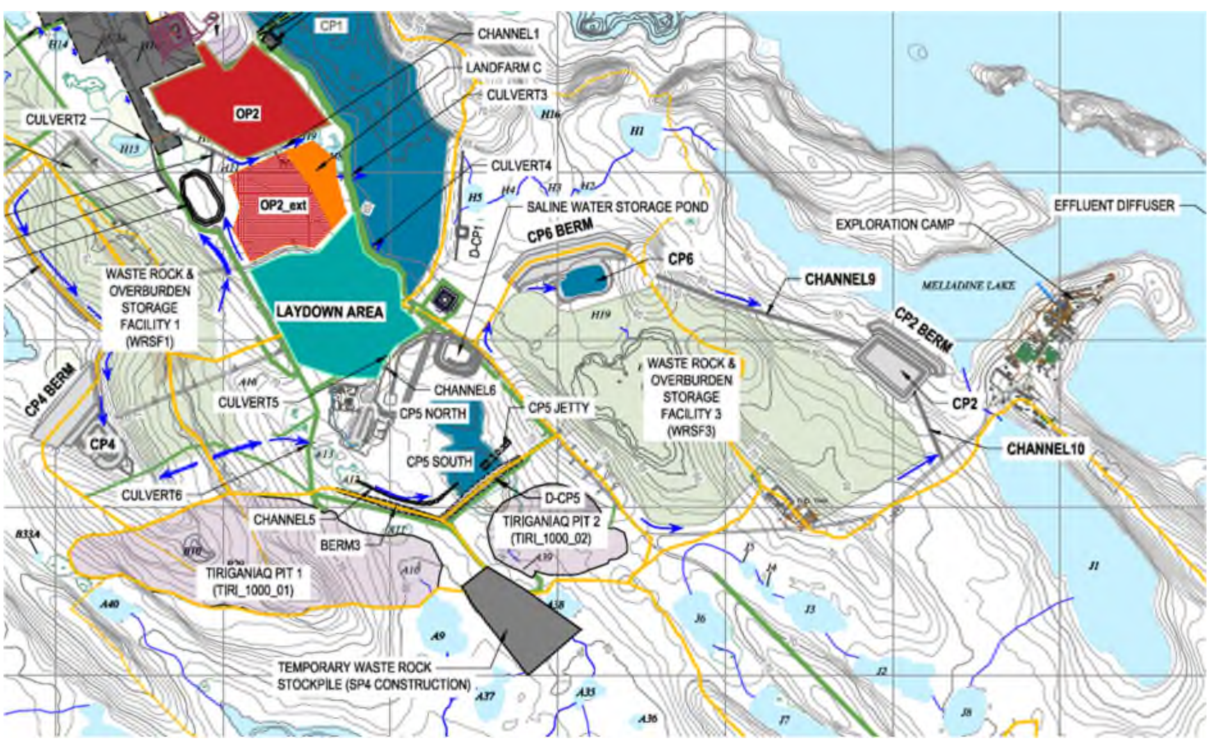

Figure 5.1 Tailings Placement Plan in Cells – Year 2

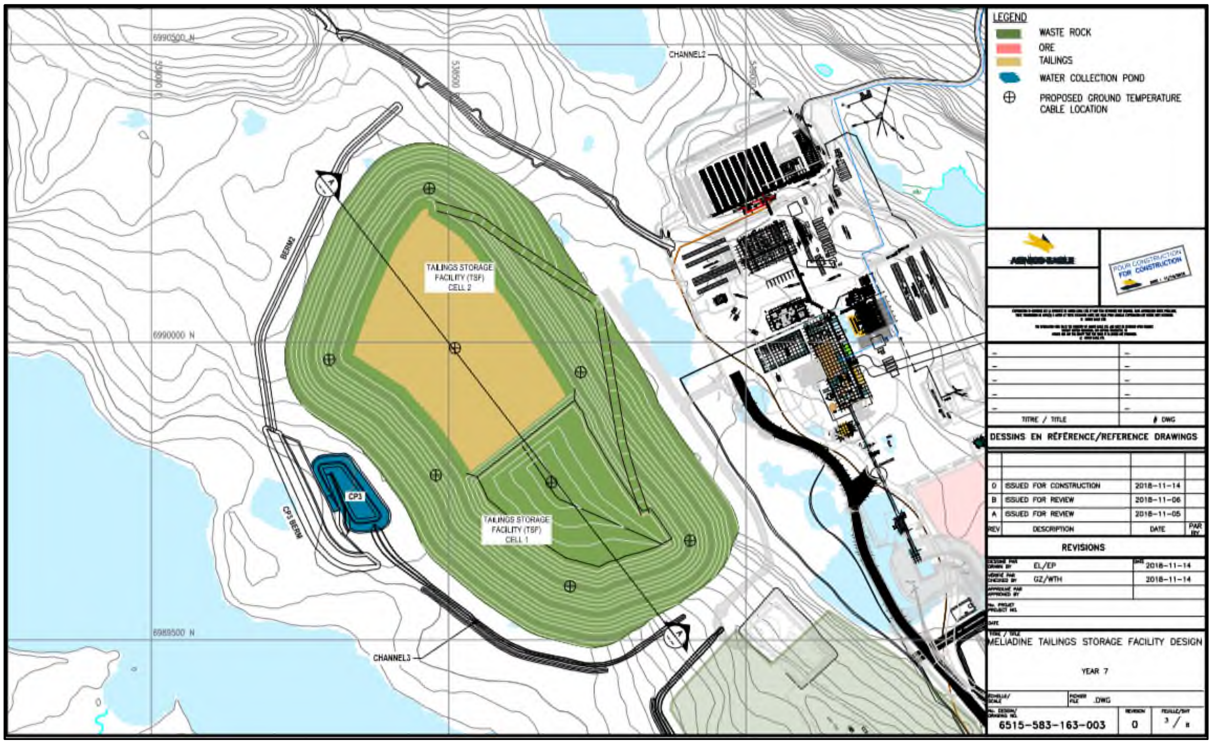

Figure 5.2 Typical Design Cross-Section for TSF