AGNICO EAGLE

MELIADINE GOLD PROJECT

Water Management Plan

MARCH 2020
VERSION 9
6513-MPS-11

EXECUTIVE SUMMARY (ENGLISH)

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the Mine), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The Mine Plan proposes 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.

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the Mine. Water management structures (surface ponds, water retention dikes/berms, water diversion channels and culverts) are in place and will be constructed as needed to contain and manage the contact water from the areas affected by the Mine or mining activities. The major water management infrastructure includes: water containment ponds, water retention dikes, berms, channels, a potable Water Treatment Plant (WTP), a Sewage Treatment Plant (STP), a Saline Water Treatment Plant (SWTP), a Reverse Osmosis (RO) Plant, an Effluent Water Treatment Plant (EWTP), and a Saline Effluent Treatment Plant (SETP).

During mine Construction and Operations, contact water originating from affected areas on surface will be intercepted, diverted and collected within the various containment ponds. The collected water at the Mine will be eventually pumped and stored in Containment Pond 1 (CP1), where the contact water will be treated by the EWTP for removal of Total Suspended Solids (TSS) prior to discharge to the outside environment or as make-up water by the Process Plant. Contact water from the Underground Mine will be collected in underground storage stopes and sumps. Some water from Underground will be reused for underground operations. Excess saline contact water will be pumped to and stored in surface saline ponds, and subsequently treated at the SWTP or SETP for discharge to the sea.

The long-term, post-closure water quality in the containment ponds and in the flooded open pit lakes will meet Metal and Diamond Mining Effluent Regulations (MDMER) , Canadian Council of Ministers of the Environment Water Quality Guidelines (CCME-WQG) for the protection of aquatic life and/or the Site Specific Water Quality Objectives (SSWQO's) developed for the Mine.

During mine closure, the water management infrastructure on site will remain in place until mine closure activities are completed and monitoring demonstrates that the water quality is acceptable for environmental discharge without treatment.

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ᐊᒡᓂᖁ ᐄᒍ ᐅᔾᕋᒃᑕᕆᐊᒃᑯᑦ (ᐊᒡᓂᖁᒃᑯᑦ) ᑕᓯᕐᔪᐊᕐᒥᑦ ᐅᔾᕋᒃᑕᕆᐊᓕᐅᖅᐸᓪᓕᐊᔪᑦ (ᐅᔾᕋᒃᑕᕆᐊᖅ), 25 ᑭᓛᒥᑕᓂᒃ ᐅᙱᓯᒃᑎᒋᔪᖅ ᐅᐊᖕᓇᖕᒐᓂᑦ ᑲᖏᖅᓵᓂᐅᑉ, ᐊᒻᒪᓗ 80 ᑭᓛᒥᑕᓂᒃ ᐅᙱᓯᒃᑎᒋᑉᐳᓂ ᓂᒋᐊᓂᑦ ᐱᖕᒐᖕᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒫᕐᔫᑉ ᕿᕚᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ. ᐅᔾᕋᒃᑕᕆᐊᕐᒧᑦ ᐸᕐᓇᐅᑎ ᐅᔾᕋᒃᑖᕐᓂᕐᒧᑦ ᐱᓕᕆᐊᖃᕈᒪᔪᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖕᒐᔪᒥᑦ ᐊᒻᒪᓗ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᐱᕙᓪᓕᐊᓗᒍ ᑎᑎᕋᓂᐊᖅ ᒎᓗᑕᓕᒃ, ᒫᕐᐹᖕᓂᒃ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖕᒐᔪᓂᑦ (ᑎᑎᕋᓂᐊᖅ 1 ᐊᒻᒪᓗ ᑎᑎᕋᓂᐊᖅ 2) ᐊᒻᒪᓗ ᐊᑕᐅᓯᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔾᕋᒃᑖᕐᓂᖅ.

ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᒥᑮᓛᒃᑰᖅᑎᓪᓗᒋᑦ ᐊᒃᑐᖅᓯᓂᐅᔪᖕᓇᖅᑐᑦ ᐃᒪᖄᖅᑎᒋᓂᖕᒐ ᐊᒻᒪᓗ ᖃᓄᐃᓐᓂᖕᒐᑕ ᖃᖕᒐᓃᑦᑐᑦ ᐃᒪᐃᑦ ᐅᔾᕋᒃᑕᕆᐊᕐᒥᑦ. ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐋᖅᑭᐅᒪᔪᑦ (ᓄᓇᐅᑉ ᖄᖕᒐᓂᑦ ᐃᒪᖅᓱᐃᑦ, ᐃᒪᕐᒥᒃ ᐸᐸᑦᑎᓂᕐᒧᑦ ᐊᕙᓗᐃᑦ, ᐃᒪᕐᒥᒃ ᓴᖑᑎᑦᑎᓂᕐᒧᑦ ᓱᑉᐳᐃᑦ ᐊᒻᒪᓗ ᓱᑉᐳᕖᑦ) ᑕᐃᒪᐅᔪᑦ ᐊᒻᒪᓗ ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᐱᔭᕆᐊᖃᕐᒪᑕ ᓄᖅᑲᖕᒋᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒃᑐᖅᑕᐅᔪᑦ ᐃᒪᐃᑦ ᐃᓂᐅᔪᓂᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐅᔾᕋᒃᑕᕆᐊᕐᒥᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐅᔾᕋᒃᑕᖅᑎᓪᓗᒋᑦ. ᐃᒪᓕᕆᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᐅᓗᐊᖅᑐᓄᑦ ᐱᖁᑎᓂᑦ ᐃᓚᐅᔪᑦ: ᐃᒪᖃᕐᐋᑦ ᑕᓯᕋᔭᐃᑦ, ᐃᒪᖃᕐᕙᖕᓄᑦ ᐊᕙᓗᐃᑦ, ᓱᑉᐳᐃᑦ, ᐊᑐᖅᑕᐅᔪᖕᓇᖅᑐᒥᒃ ᐃᒪᓕᕆᕝᕕᒃ (WTP), ᖁᕐᕕᖕᒥᙱᖅᑐᓕᕆᕝᕕᒃ (STP), ᑕᕆᐅᓕᖕᒥᑦ ᐃᒪᓕᕆᕝᕕᒃ (SWTP), ᐃᒪᑦᑎᐊᕙᓕᐅᕐᕕᒃ (RO), ᐊᒻᒪᓗ ᑯᕙᔪᒥᒃ ᐃᒪᓕᕆᕝᕕᒃ (EWTP), ᐊᒻᒪᓗ ᑕᕆᐅᓕᖕᒥᑦ ᑯᕙᔪᒥᒃ ᐃᒪᓕᕆᕝᕕᒃ (SETP).

ᐅᔾᕋᒃᑕᕆᐊᖅ ᓴᓇᔭᐅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐊᐅᓃᖅᑎᓪᓗᒍ, ᐃᒪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐃᓂᐅᔪᓂᑦ ᐱᔭᐅᑉᐳᓂ ᓄᓇᐅᑉ ᖃᖕᒐᓂᑦ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᑦ, ᓴᖑᑎᑕᐅᓗᑎᒃ ᐊᒻᒪᓗ ᑲᑎᑕᐅᓗᑎᒃ ᐊᔾᔨᑴᙱᑦᑐᓄᑦ ᓄᖅᑲᖓᑎᑦᑎᓂᕐᒧᑦ ᑕᓯᕋᔭᖕᓄᑦ. ᑲᑎᑕᐅᔪᖅ ᐃᒪᖅ ᐅᔾᕋᒃᑕᕆᐊᕐᒥᑦ ᑯᕕᑎᑕᐅᓕᕋᑕᕐᓂᐊᖅᑐᖅ ᐊᒻᒪᓗ ᓄᖅᑲᖓᑎᑦᑎᓂᕐᒧᑦ ᑕᓯᕋᔭᒃ 1-ᒧᐊᖅᑕᐅᓗᓂ, ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᖅ EWTP-ᒧᑦ ᐲᖅᑕᐅᓗᓂ ᑲᑎᕝᕙᒋᑦ ᑖᓂᖅᓵᖅᑐᑦ ᓯᑎᔪᑦ (TSS) ᑯᕕᑎᑕᐅᖅᑳᖅᑎᓐᓇᒋᑦ ᓯᓚᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᑐᖅᑕᐅᔾᔭᓕᐊᖑᓂᐊᕐᓗᓂ ᐱᓕᐅᕆᕙᓪᓕᐊᕝᕕᖕᒧᑦ. ᐊᒃᑐᖅᑕᐅᓯᒪᔪᖅ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔾᕋᒃᑕᕆᐊᕐᒥᑦ ᐱᔪᖅ ᑲᑎᑕᐅᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᑐᖅᑯᖅᓯᓯᒪᕝᕕᖕᒧᑦ ᑯᕕᑎᑦᔪᑎᓄᓪᓗ. ᐃᓚᖓ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐱᔪᖅ ᐊᑐᖅᑕᐅᒃᑲᓂᕐᓂᐊᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐊᐅᓃᖅᑎᑦᑎᓂᕐᓄᑦ. ᑕᕆᐅᖃᓗᐊᖅᑐᖅ ᐃᒪᖅ ᑯᕕᑎᑕᐅᓂᐊᖅᑐᖅ ᑐᖅᑯᖅᑕᐅᓗᓂᓗ ᓄᓇᐅᑉ ᖄᖕᒐᓄᑦ ᑕᕆᐅᓕᖕᒧᑦ ᑕᓯᕋᔭᖕᒧᑦ, ᐊᒻᒪᓗ ᐱᓕᕆᐊᖑᓗᓂ SWTP-ᒥᑦ ᐅᕝᕙᓘᓐᓃᑦ SETP-ᒥᑦ ᑯᕕᑎᑕᐅᓂᐊᕐᓗᓂ ᑕᕆᐅᕐᒧᑦ ᐃᒪᕐᒧᑦ.

ᐊᑯᓂᐅᔪᒥᑦ, ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᑐᖅᑯᖅᑕᐅᓯᒪᔪᓂᑦ ᑕᓯᕋᔭᖕᓂᑦ ᐊᒻᒪᓗ ᐃᒻᒥᖅᑐᖅᑕᐅᓯᒪᔪᑦ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖕᒐᔪᒥᑦ ᑕᓯᕐᓄᑦ ᑎᑭᐅᑎᓯᒪᓂᐊᖅᑐᑦ ᓴᕕᖕᓂᒃ ᐊᒻᒪᓗ ᓯᑎᔪᓂᒃ ᐅᔾᕋᕐᓂᒃ ᐅᔾᕋᒃᑕᕆᐊᕐᒥᑦ ᑯᕕᑦᑎᓂᕐᒧᑦ ᒪᓕᒐᕋᓛᓂᒃ (MDMER), ᑲᓇᑕᒥᑦ ᒥᓂᔅᑕᐅᑏᑦ ᑲᑎᒪᔩᑦ ᐊᕙᑎᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖕᒐᓄᑦ ᒪᓕᒃᑕᐅᔾᔭᖕᒋᑦ (CCME-WQG)-ᒥᑦ ᒥᐊᓂᕆᓂᐊᕐᓗᒋᑦ ᐃᒪᕐᒥᐅᑕᐃᑦ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᐃᓂᐅᔪᒥᑦ ᐱᔾᔪᑎᖃᖅᑐᒥᒃ ᐃᒪᕐᒧᑦ ᐱᓕᕆᐊᒃᓴᐃᑦ (SSWQO) ᐱᙳᖅᑎᑕᐅᓯᒪᔪᑦ ᐅᔾᕋᒃᑕᕆᐊᕐᒧᑦ.

ᐅᔾᕋᒃᑕᕆᐊᖅ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᕐᑯᐆᑦ ᐃᓂᐅᔫᒥᓂᐊᖅᑐᑦ ᑭᓯᐊᓂ ᐅᔾᕋᒃᑕᕆᐊᖅ ᐅᒃᑯᐊᖅᑕᐅᕙᓪᓕᐊᓂᖕᒐ ᐱᐊᓂᒃᐸᑕ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖃᑦᑕᕐᓂᒃᑯᑦ ᖃᐅᔨᓐᓇᖅᓯᒃᐸᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖕᒐ ᓈᒻᒪᓕᕐᓂᖕᒐᓄᑦ ᐊᕙᑎᒧᑦ ᑯᕕᑎᓐᓂᐊᕐᓗᒍ ᐱᓕᕆᐊᖑᙱᓪᓗᓂ.

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AGNICO EAGLE

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DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
6	March 2019	All	All	Update is to fulfill annual review requirement (NWB)	Environment Department
		1	4	Update to Mine Development Plan information	
		3.1	8-12	Updated Version 6 changes	
		3.2	11-12	Updated existing water management control structures	
		3.3	12-14	Revised structure design semantics; corrections to culvert design; updated CP3, CP4 design parameters and naming convention; removed incorrect artifact pertaining to culvert 1 flow handling	
		3.6	15	Addition of SP3; updates to SP2 design	
		3.8, 3.9	17-21	Included as-built parameter values; updated berm and dike naming convention, thermistor information	
		3.11	21-22	Updated freshwater intake design information; updates to SWTP system; RO management; EWTP monitoring; removed incorrect information pertaining to Freshwater intake	
		4.1, 4.2	25-31	Updated management of saline discharge to sea; revised information proposed in initial design	
		4.6	35	Updated key management activities schedule to include discharge to sea; updated regarding underground inflow management; revised haul road management; revised wash bay management; updated process water quantities	
		6.3	37	Updated impacted waterbodies status	
		7	40	Revised semantics regarding flow paths	
				Included additional information regarding July 23rd exceedance	
		Figure 1.2		Updated Layout to most recent General Mine Site Plan	
		Figure 6.1, 6.2		Specified plan layouts are from feasibility level study	
		Figure 7.1a		Updated Layout with monitoring stations to most recent General Mine Site Plan	
7	August 2019	3.9.4	20	Updated EWTP trigger limit to account for variance introduced by TSS-turbidity correlation strength	
		4.1	26	Updated Key Activities (Table 10) to reflect changes to H19/H20 dewatering schedule	
		4.1.1	27-28	Revised H19/H20 dewatering plan with requirements for advancement in dewatering schedule; Updated dewatering schedule (Table 11)	

8	November 2019	3.5	15-16	Updated Saline Pond section to include current existence of SP2 and plans for construction of SP4.
		Figure 3.2	55	Figure changed from planned location of SP2 to planned location of SP4.
9	March 2020	All	All	Update is to fulfill annual review requirement (NWB)
		Exec. Summary		Updated to include SETP, excess saline contact water management
		3.1	9	Updated existing water management systems (saline ponds, SETP, discharge to sea)
		3.2	12	Updated Table 2 and Table 3
		3.3	13	Updated to include CP4 as existing structure and modified CP6 construction date
		3.4	15	Update to Section
		3.5	15	Updated to Section
		3.6	16-17	Updated Table 7
		3.9	19-21	Update to SWTP and EWTP systems, addition of SETP
		3.11	22	Updated management of saline water discharge to sea
		3.12	23	Update to Section
		4.1	26-30	Updated Table 10 and Section
		4.2	31	Updated process water management
		4.3	32-33	Updated Meliadine Lake diffuser effluent flow rates and EWTP sludge disposal options
		5	33-34	Update to Section
		7	40	Update to Section. Removed information already presented in annual report (i.e., MEL-14 and MEL-SR results).
		Figure 1.1		Updated Layout to most recent General Mine Site Location Plan
		Figure 1.2		Updated Layout to most recent General Mine Site Plan

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
AWAR	All Weather Access Road
CCME-WQG	Canadian Council of Ministers of the Environment Water Quality Guidelines
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CP	Containment Pond
ECCC	Environment and Climate Change Canada
EMPP	Environmental Management and Protection Plan
EWTP	Effluent Water Treatment Plant
GWMP	Groundwater Management Plan
IDF	Inflow Design Flood
Licence	Type A Water Licence 2AM-MEL1631
MDMER	Metal and Diamond Mining Effluent Regulations
NWB	Nunavut Water Board
Mine	Meliadine Gold Project
SD	Support Document
SSWQO	Site Specific Water Quality Objectives
STP	Sewage Treatment Plant
SWTP	Saline Water Treatment Plant
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WMP	Water Management Plan
WRSF	Waste Rock Storage Facility
WTP	Water Treatment plant

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per metre
mg/L	milligram per litre
km	kilometer(s)
km^2	kilo square meter(s)
m	metre
mm	millimetre
m^3	cubic metre(s)
m^3/day	cubic metre per day
m^3/s	cubic metre per second
m^3/hour	cubic metre per hour
m^3/year	cubic metre per year
Mm^3/year	million cubic metre (s) per year
Mm^3	million cubic metre(s)
masl	metres above sea level
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 Article 12.5.12 on February 26, 2019 (NIRB, 2019) and Type A Water Licence No. 2AM-MEL1631 (the Licence), issued by the Nunavut Water Board (NWB) on April 1, 2016 (NWB, 2016). This report presents an updated version of the Water Management Plan (WMP). The purpose of this update is to incorporate changes related to water management at the Mine, and comments received from Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) and Environment and Climate Change Canada (ECCC) towards previous versions of the Water Management Plan. Additionally, this update includes all changes related to the approval for discharge to sea that was received with the amended Project Certificate on February 26, 2019.

1.1 Water Management Objectives

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the Mine and surrounding waterbodies. The purpose of the WMP is to provide information to applicable mine departments (Environment, Engineering, Mine, Energy and Infrastructure, etc.) for sound water management practices, proposed and existing infrastructure, the water balance model, water quality predictions, and for the water quality monitoring plan for the Mine.

Water management structures (culverts, sumps, pipelines, water diversion channels and water retention dikes/berms) are utilized to contain and manage contact water 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 Water Management Plan

Revisions of the WMP 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 WMP 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 (m asl) and a maximum relief of 20 meters.

The local overburden consists of a thin layer of topsoil overlying silty gravelly sandy glacial till. Cobbles and boulders are present throughout the region at various depths. 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, 2009).

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 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 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 to -7.5 °C in the areas away from lakes and streams. The geothermal gradient ranges from 0.012 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 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.

2.2 Mine Development Plan

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

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 million tonnes (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 will include a plant site and accommodation buildings, two 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 1.2.

SECTION 3 • WATER MANAGEMENT CONTROLS AND STRUCTURES

A network of berms, dikes, containment ponds, channels, culverts and sumps are in place and maintained to facilitate water management. Design Reports and As-Built Reports have been submitted and approved for the water management structures discussed in this section, as applicable. This section is included to summarize design and as-built information.

3.1 Water Management Systems

The water management systems, as shown in Figure 1.2 and Figure 3.1, include the following components:

- Five water containment ponds (CP1, CP3, CP4, CP5, and CP6) and their associated dikes or thermal berms (D-CP1, Berm-CP3, Berm-CP4, D-CP5, and D-CP6)
- Three P-Area containment ponds (P1, P2, and P3) and four containment berms (DP1-A, DP1-B, DP2-A, and DP3-A)
- Four surface Saline Ponds (SP1, SP2, SP3, and SP4)
- Three diversion berms (Berm 1, Berm 2, and Berm 3)
- Eight water diversion channels (Channel 1 to Channel 8)
- Sixteen water passage culverts to convey water (Culverts 1 to 8, 10, 11, 13, 14 to 16, 18, 19 and 20)
- Five evaporators
- A reverse osmosis (RO) treatment plant
- An effluent water treatment plant (EWTP)
- A saline water treatment plant (SWTP)
- A saline effluent treatment plant (SETP)
- A sewage treatment plant (STP)
- A potable water treatment plant (WTP)
- A network of surface pumps and pipelines
- A freshwater intake
- Two jetties and pumping infrastructure (CP1 and CP5)
- An effluent diffuser located in Meliadine Lake
- An effluent diffuser located in Melvin Bay

The status of construction and planned construction dates of the above are listed in Table 1.

Surface contact water is intercepted, diverted and contained within various containment ponds prior to evaporation or treatment. Water collected in CP3 and CP4 is discharged upstream of Culvert 2 where it flows to CP1. Water collected in CP5 is either treated by an RO treatment plant prior to discharging to CP1 or discharged to CP1 directly, depending on the in situ CP5 water quality. Water collected in CP6 (constructed started Q1 2020) will be discharged directly to CP6. Water collected in the P-area is temporarily stored and then actively evaporated. At CP1, the water is treated for total suspended solids (TSS) at the EWTP and discharged through the diffuser located in Meliadine Lake. Water treated through the RO treatment plant at CP5 is moved to CP1 prior to treatment through the EWTP.

Contact water from the Underground Mine is collected in underground sumps, transported to a clarification system, and subsequently recirculated for use in various underground operations. Excess underground contact water is stored in temporarily inactive underground developments, and on surface in Saline Pond 1 (SP1) and Saline Pond 2 (SP2). Saline Pond 2 will be replaced by Saline Pond 4 (SP4) by Q2 2020 (Section 3.5). Underground contact water that is not used for operations is treated at the Salt Water Treatment Plant (SWTP) or Saline Effluent Treatment Plant (SETP) for discharge (Section 3.9).

As part of the strategy to manage excess groundwater infiltration of saline water within the underground portion of the mine, Agnico Eagle received approval from the Nunavut Impact Review Board to discharge saline water to sea (Melvin Bay, Rankin Inlet) with the amended Project Certificate on February 26, 2019. An overview of management around discharge to sea is found in Section 3.11. Further details are found in Appendix A.

During the mine closure, the water management infrastructure will remain in place until closure activities are completed and monitoring demonstrates that water quality is acceptable for discharge to the environment without treatment.

A list of the water management control structures are presented in Table 1 with each respective construction status. Figure 1.2 shows the location of the respective structures over the development stages (Year – 5 to Year 8) of the mine life. Final design details of these structures will be provided to the Regulators for approval at least 30 days prior to construction, as per the Licence.

Table 1: Water Management Control Structures

Mine Phase	Infrastructure Name	Construction Status
Pre-Production Construction (Y-5 to Y 1)	Channel 1	Constructed
	Channel 2	Constructed
	Channel 3	Constructed
	Channel 4	Constructed
	Channel 5	Constructed
	Channel 6	TBD*
	Channel 7	Constructed
	Channel 8	Constructed
	Culvert 1	Constructed
	Culvert 2	Constructed
	Culvert 3	Constructed

	Culvert 4	Constructed
	Culvert 5	TBD*
	Culvert 6	TBD
	Culvert 7	Constructed
	Culvert 8	Constructed
	Culvert 10	Constructed
	Culvert 11	Constructed
	Culvert 13	Constructed
	Culvert 14	TBD
	Culvert 15	Constructed
	Culvert 16	Constructed
	Culvert 18	Constructed
	Culvert 19	TBD
	Culvert 20	Constructed
	CP1	Constructed
	CP3	Constructed
	CP4	Constructed
	CP5	Constructed
	D-CP1	Constructed
	Berm-CP3	Constructed
	Berm-CP4	Constructed
	D-CP5	Constructed
	CP1 Jetty	Constructed
	CP5 Jetty	Constructed
	Saline Pond (SP1)	Constructed
	Saline Pond 2 (SP2)	Constructed
	Saline Pond 3 (SP3)	Constructed
	Berm 1	Constructed
	Berm 2	Constructed
	Berm 3	Constructed
	Freshwater Intake Causeway & Pump Station	Constructed
	Submerged Diffuser	Constructed
	WTP Intake	Constructed
Sustaining Construction during Mine Operation (Y1 to Y8)	CP6 and Berm-CP6	Q2 2020

* Construction tentative based on future water management strategies

3.2 Water Management Structures Design Criteria

The water management systems meet the following criteria:

- Water quality will meet regulatory criteria of the Licence (described in Appendix E).
- Design capacity of the EWTP is sufficient to ensure that D-CP1 and CP1 is able to manage the surface contact water from the entire site for a 1:100 wet year spring freshet, or a 1:2 mean year spring freshet in combination with a 1:1000 return 24-hour extreme rainfall.
- D-CP5 and CP5 is able to manage the water from its catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall. This design is based on an allowable 3-day delay in initiation of pumping during a 7-day, 1:100 year freshet. Design capacity of pumping from CP5 to CP1 is sufficient to ensure that remaining freshet inflows to CP5 are managed via pumping to CP1.
- Storage capacity of each of the other water management ponds (CP3, CP4, and CP6,) is able to manage the water from their respective catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:1000 return 24-hour extreme rainfall.
- The daily pumping rate for each of the ponds (CP3 to CP6) is designed to have sufficient pumping capacity to handle the runoff water, which would result from one day (24.4 mm) of a 1:100 return wet spring freshet plus a 1:2 return one-hour rainfall (9.8 mm).

Channel 2 to Channel 4 are in place to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. Channel 1 and Channel 5 to Channel 8 in place or designed as internal channels where any water overflowing the channels will remain within the catchment areas of various containment ponds. Hydraulic analyses indicated that very wide channels are required to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. As a result, these channels were designed to have a reasonable bottom width to pass a flow with lesser intensity, but the water overflowing the channels can be safely managed by berms or temporarily stored in a lower basin nearby. For example, water overflowing Channel 5 can be contained by Berm 3. Water overflowing Channel 7 and Channel 8 can be stored in the lower basin in the drained Pond H13, and Berm 1 combined with a mass till backfill protects the Portal No.2 entrance from flooding. Furthermore, the MULTI-PLATE at Portal No. 2 is protected by compacted, engineered structural fill. Water overflowing Channel 1 will flow through the flat ground between Ore Pad 2 (OP2) and future WRSF2 into CP1. Table 2 presents the design parameters for CP1, CP5 and CP6.

Table 2: As-Built Parameters for CP1 and CP5

Pond	CP1	CP5
Pond Volume at Maximum Operating Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	742,075	46,674
Maximum Operating Water Elevation (m)	66.2	66.0

Pond	CP1	CP5
Maximum Water Elevation during IDF (m)	66.6	66.3
Estimated Pond Volume for Water Elevation at Maximum Operating Water Elevation during IDF (m^3)	855,245	70,000
Dike for Pond	D-CP1	D-CP5
As-Built Crest Elevation of Dike Containment Element (liner system) (m)	67.37	66.72

CP3, CP4 and CP6 are established through excavation of the original ground to increase water storage capacity and help ensure water levels do not reach the thermal protection berms. The key design parameters for CP3, CP4 and CP6 are provided in Table 3 and are discussed in further detail within Tetra Tech (2018a) and Tetra Tech (2020).

Table 3: Design Parameters for CP3 and CP4

Pond	CP3	CP4	CP6
Elevated Pond Bottom Elevation (m)	56.0	56.0	54.0
Estimated Maximum Water Elevation during IDF (m)	63.0	63.0	60.0
Pond Volume for Water Elevation at Estimated Maximum Water Elevation during IDF (m^3)	28,800	35,093	32,757
Pond Surface Area at Estimated Maximum Water Elevation during IDF (m^2)	6,583	8,805	8,602
Thermal Berm for Pond	Berm-CP3	Berm-CP4	Berm-CP6

3.3 Water Containment ponds

Four water containment ponds (CP1, CP3, CP4 and CP5) have been constructed to date as part of the water management infrastructure. One more water containment pond, CP6, will be constructed in 2020. Table 4 presents the locations and the required operational period of the containment ponds. The locations of the five water containment ponds are shown on Figure 1.2.

Table 4: Location of Containment Pond and Required Operation Periods

Containment Pond	**Relative Location**	**Required Operation Period**
CP1	Pond H17 and H6	Year 2017 to Mine closure
CP3	North of Lake B7 and southwest of TSF	Year 2019 to Mine closure
CP4	Southeast of Lake B7 and south of WRSF1	Year 2019 to Mine closure

CP5	North of Tiriganiaq Pit 2	Year 2017 to Mine closure
CP6	Pond H19 and north of WRSF3	Year 2020 to Mine closure

3.4 P-Area Containment Ponds

The P-area consists of three storage ponds, four water containment berms and five evaporators. This area contains surface runoff and is part of the surface water management system dedicated to saline water. The total storage capacity of the P-Area ponds is 46,041 m^3. P1 is divided by a berm, producing P1-A (6,131.8 m^3) as the southern section of P1, and P1-B (14,649 m^3) as the northern section. P2 is adjacent and located south of P1-A. P3 was constructed east of the existing south access road, with the primary purpose of collecting seepage originating from the P2 confining berm and its abutments. A pumping station is in place to collect and pump any collected water from P3 to P1.

P1, P2 and P3 are contained by berms DP1-A, DP1-B, DP2-A, and DP3-A. Five evaporators have been installed on DP1-B. Table 5 summarizes the as-built capacities for the P-Area ponds and Figure 3.1 illustrates the P-Area plan view. Comparison of P-Area capacity in relation to stored water volumes is found in Table 2 of the Groundwater Management Plan (Appendix A).

In Q2 of 2019, SP3 was installed within the southwestern portion of P3. SP3 is lined with a polyethylene geomembrane to prevent any seepage into or out of the containment structure, and acts as the final effluent storage pond for saline water that is to be discharged to sea (Section 3.11). After construction of SP3, the usable P3 containment volume was decreased by approximately 84%, due to a reduced footprint from the portion occupied by SP3, and a reduced water elevation to preserve the integrity of the SP3 liner.

In 2019, inputs to the P-Area were limited in an effort to begin the de-commissioning process of the containment structures. Winter construction of SP3 within the P3 footprint required the removal of ice which was deposited into P2 due to its sufficient storage and water of similar quality to P3. No additional saline water inputs were made to the P-Area throughout 2019. All subsequent inflows to the P-Area were primarily the result of direct precipitation and surface run-off from up-gradient areas. Evaporators were used throughout the open water season to reduce the volume of water in the P-Area cells as well as the additional inflows received via precipitation. Agnico Eagle is exploring alternatives to active evaporation for P-Area water management over 2020.

A contaminated snow cell used to store snow containing hydrocarbons (i.e. snow on which spills occur) is located in northwest corner of P1. Upon snowmelt an oil-water separator is used to treat the water which is then discharged to P1. The contaminated snow cell was constructed in 2017 (Agnico Eagle, 2017a) and is currently in place as a contingency measure for contaminated snow storage over the winter (Freshet Management Plan in Appendix B).

The snow cell is lined with a polyethylene liner to avoid seepage of melting snow into the surrounding environment. The cell is designed to contain a volume of 1500 m^3 of snow and to contain 930 m^3 of water at a water surface elevation of 69.5 m.

Table 5: As-Built Capacity for P-Area Ponds

Pond	P1	P2	P3
As-built Capacity (m^3)	20,781	6,828	2,912*
Maximum Design Water Elevation (m)	68.5	67.5	66.22*
Total P-Area Capacity (m^3)	30,521		

*Former as-built volume reduced from 18,432 m^3 due to construction of SP3 within the P3 footprint.

Water monitoring protocols for the P-Area have been implemented to include water quality and transfer data, such as locations and flow volumes for water pumped to and from the containment ponds. This is discussed further in Appendix E.

3.5 Saline Ponds

Saline Pond 1 (SP1) was constructed in Q3 2016 to accommodate excess saline water from the Underground Mine. SP1 is located east of P3 and north of CP5 (Figure 1.2). Table 6 summarizes the Saline Pond capacity for storage and maximum designed operating water levels. The maximum saline water capacity is the volume that can be stored in SP1 prior to winter freeze. Approximately 7,500 m^3 capacity should be available to accommodate precipitation that may accumulate throughout winter and at freshet.

Saline Pond 2 (SP2) was constructed in Q2 2019 as a temporary saline water storage pond on site, with the purpose of further accommodating excess saline water from the Underground Mine until treatment and discharge to sea performance is sufficient to dewater surface saline storage (Section 3.11; Appendix A). SP2 was constructed in bedrock within the footprint of Tiriganiaq Pit 2. SP2 was constructed to have a maximum storage volume of 78,000 m^3, of which 10,000 m^3 is reserved for precipitation accumulation over winter and runoff at freshet. SP2 is scheduled for decommissioning in Q2 2020 to allow the mining of Tiriganiaq Pit 2. SP2 is to be replaced by Saline Pond 4 (SP4) which is scheduled to be commissioned in March of 2020. The addition of SP4 has two purposes. First, to replace SP2 and allow the mining of Tiriganiaq Pit 2, and second, to supply additional storage for saline water on site. The additional storage is required due to continued groundwater infiltration to the underground workings and finite existing surface storage capacity. Following the completion of SP4, the water contained within SP2 will be transferred to SP4. SP2 will be decommissioned following this transfer of water.

SP4 will be temporary in nature and will be constructed in bedrock within the footprint of Tiriganiaq Pit 1 (Figure 3.2). Based on the design, a total of 249,708 m^3 of overburden and 305,393 m^3 of waste rock is expected to be removed from Tiriganiaq Pit 1 for the construction of SP4. A portion of the waste rock removed will be used immediately for a perimeter safety berm and overburden protective cover. The residual waste rock will be stockpiled temporarily between the footprints of Tiriganiaq Pit 1 and Tiriganiaq Pit 2, south-east of SP4. All of the overburden removed was placed within the south portion of WRSF1.

Groundwater will be pumped to SP4 where it will remain in storage until it is treated at the SWTP (desalination; Section 3.9.3) or at the SETP for discharge to sea (Section 3.11; Appendix A). Inputs to SP4 will be similar in chemical nature to SP1, mainly originating from the underground water storage system. SP4 is designed to have a minimum storage volume of 233,000 m^3; allowing for 1.5 m of freeboard in bedrock. October to June precipitation runoff volumes to SP4 are preliminarily estimated to be 19,300 m^3 for a mean climate year and 31,700 m^3 for a 1:100 wet climate year. These values include June precipitation occurring during the snowmelt period. To ensure the capability to store runoff from a 1:100 wet climate year freshet, stored volume in SP4 prior to freshet will be maintained with a reserve of 31,700 m^3. Freshet runoff volumes and maximum allowable volumes to be stored prior to freshet are subject to change based on as-built dimensions and will be finalized following the completion of SP4 construction.

Table 6: Storage Capacities for Saline Pond 1, Saline Pond 2 and Saline Pond 4

Item	Saline Pond 1	Saline Pond 2	Saline Pond 4
Maximum Design Water Elevation (m)	62.9	62.5	56.0
Maximum Water Capacity (m^3)	32,686*	78,8628§	233,122†

* Tetra Tech (2017)
§ Maximum storage in bedrock to allow 0.3 m freeboard
† Minimum volume based on design to included 1.5 m freeboard

Saline pond water capacity in relation to stored volumes can be found in Table 2 of the Groundwater Management Plan (Appendix A).

3.6 Water Diversion Channels, Dikes and Berms

3.6.1 Water Diversion Channels

Seven water diversion channels (Channels 1 to 5, 7, 8) have been constructed and form part of the water management infrastructure. Construction of Channel 6 is tentative based on future water management strategies downstream of WRSF2. The as-built and design parameters for the water diversion channels are presented in Table 7.

Table 7: As-Built and Design Parameters for Channels

Item	Channel							
	1 (As-Built)	**2 (As-Built)**	**3 (As Built)**	**4 (As Built)**	**5 (As-Built)**	**6**	**7 (As-Built)**	**8 (As-Built)**
Approximate Total Length (m)	528	269.5	656	930	429†	69	240	114
Bottom Width (m)	3	1.257	1.2 to 2.4 or 0.8 to 3.3*	1.0 to 1.7 or 0.8 to 4.5*	2.3 to 2.9	1	2.0	2.4
Side Slopes	3(H):1(V)**	1.82(H):1(V)	1.8(H):1.0(V) to 3.5(H):1.0(V)	1.8(H):1.0 (V) to 5.0(H):1.0 (V)	1.9(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)
Rip-rap Thickness (m)	0.3 to 0.5	0.277	0.3†	0.37	0.2	0.3	0.59	0.3
Minimum Bottom Slope Gradient (%)	0.2	0.30†	5.3 (upper) 0.4 (lower)	2.1 to 5.3 (upper) 0.1 to 4.2 (lower)	0.17†	0.44	0.8 (Avg.)	1.4 (Avg.)

* 1 m bottom width for first 100 m upstream section, and 2 m bottom wide for the remaining channel section

** Except from Sta. 0+050 to 0+130: 2(H):1(V)

† As-built parameter values not available; value displayed is from design

3.6.2 Water Retention Dikes and Berms

In general terms, "dikes" were constructed with impervious liner systems and "berms" are constructed with entirely till cores. At the end of Mine closure, when the water quality in the corresponding pond meets direct discharge criteria, each of the dikes and berms on site (except for Berm 2) will be breached to restore the original natural drainage paths. Berm 2 will remain in place to prevent non-contact water from flowing into the TSF.

Water retention dikes D-CP1 and D-CP5 have been designed as a zoned earth fill dams with a geomembrane liner keyed into the permafrost foundation to limit the seepage through the dike and its foundation. The characteristics of the dikes and berms required for the WMP are summarized in Table 8.

3.6.2.1 Thermal Monitoring

Horizontal Ground Temperature Cables (GTCs) are installed along the key trenches of D-CP1 and D-CP5 at a depth of approximately 3 m below the original ground level. These installations are in place to verify that the foundations remain frozen and dike integrity is not compromised. D-CP1 and D-CP5 also contain vertical GTCs installed to an approximate depth of 15 m below the crest of each dike.

Thermal Berms CP3, CP4 and CP6 will similarly contain vertical GTSs installed to a minimum of 7 m below original ground elevation. Thermal records collected from these sensors provide temporal analysis of vertical temperature profiles to assess whether the structures are performing as designed.

D-CP1 and D-CP5 readings are obtained, recorded, and assessed weekly during open water season and monthly after freeze-up. Data loggers are set to record temperatures in the dikes every 12-hours. Reading frequency at the thermal berms is generally monthly during the first year following construction and quarterly thereafter. The measured readings are analyzed by an Agnico Eagle geotechnical engineer and are reported in the annual geotechnical inspection report.

In addition to thermal monitoring, visual geotechnical inspections of water management structures are currently performed, as described in Section 3.12 below.

Table 8: As-Built and Design Parameters for Water Retention Dike/Berm

Item	D-CP1	Berm-CP3	Berm-CP4	D-CP5	Berm-CP6	DP1-A	DP1-B	DP2-A	DP3-A	Berm1	Berm2	Berm3
Approximate Maximum Height (m)	6.6	4.9	5.0	3.3	6.0	3.7	3.4	4.0	3.4	2.6	1.5	2.76
Maximum Elevation (m)	68.5	69.9	69.1	67.3	68.0	70.5	70.7	69.5	69.0	69.0	varies	67.37
Maximum Head of Water Retained (m)	3.6	0.0	0.0	1.4	0.0	68.5	68.7	67.5	67.0	0	0	0

3.7 Evaporators

Five evaporators are installed on jetties constructed at DP1-B. The evaporator system is designed for vaporizing water contained at the P-Area. The evaporators are installed to accommodate the quantity of excess saline water before saline water treatment options and disposal plans have been finalized at the Mine. Based on data collected during 2016, the efficiency of one evaporator was estimated to be 22 m^3/hr. Agnico Eagle is assessing alternatives to active evaporation for P-Area water management over 2020, to support potential decommissioning of the P-Area.

3.8 Freshwater Intake

Freshwater usage at the Mine includes potable uses, fire suppression, make-up water for the mill, and other operational requirements, such as drilling water, dust suppression, batch plant use, and use at the washbay. The main freshwater intake is located northeast of the industrial pad in Meliadine Lake, as shown on Figure 1.2. The intakes consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand. Both intake pipes are fitted with a screen of an appropriate mesh size to ensure that fish will not be entrained and shall withdraw water at a rate such that fish do not become impinged on the screen (NWB, 2016).

3.9 Water Treatment

Contact water will be treated (if necessary) to meet Licence requirements prior to being discharged to the environment. TSS mitigation techniques (i.e., attenuation ponds, silt screens, etc.), oil separation treatment, the STP, the SWTP, the SETP, the RO Plant, and the EWTP are used accordingly at various locations at the Mine prior to water being transferred to containment ponds and/or as effluent discharge to Meliadine Lake or Melvin Bay. Water quality criteria is discussed in Section 7 and Appendix E.

3.9.1 Freshwater Treatment Plant (WTP)

Freshwater from Meliadine Lake will be treated in the WTP before being directed to the camp areas for potable (domestic) water uses. The design flow rate for freshwater for the main camp and accommodations is 216 m^3/day. In the WTP, freshwater will be pumped through cartridge filters, then pumped through ultraviolet units, and finally treated with sodium hypochlorite (chlorine). The treated water will be stored within a potable water tank. Potable water will be monitored according to the Nunavut Health Regulations for total and residual chlorine and microbiological parameters. Operation and maintenance details for the WTP can be reviewed in the Process and Control Narrative (H2O Innovation, 2016).

3.9.2 Sewage Treatment Plant (STP)

Wastewater from the accommodation complex and from satellite sewage tanks will be treated in the STP before being directed to CP1. Operation and maintenance details for the STP can be reviewed in the Operational & Maintenance Manual – Sewage Treatment Plant (Agnico Eagle, 2017b).

3.9.3 Saline Water Treatment Plant (SWTP)

The SWTP is used to treat saline water stored in the Underground Mine and Saline Ponds. The SWTP removes excessive total suspended solids (TSS), calcium chloride ($CaCl_2$), sodium chloride (NaCl), metals, phosphorous (P), and nitrogen compounds from the influent saline water. The influent and effluent from the SWTP are monitored every 12 hours (night shift and day shift) for pH and TDS, and bi-weekly for chloride (Cl), ammonia (NH_4), nitrite (NO_2), nitrate (NO_3), TDS, TSS, total phosphorus (P), total cyanide (Cn), total metals and total mercury (Hg).

Effluent from the SWTP is intended to be discharged to CP1. In February 2019, the discharge point was moved, temporarily directing effluent to CP5. Over the open water season of 2020, the discharge point will be reverted back to CP1.

The SWTP consists of two parallel units. Each unit can be operated to produce brine or solid by-product. The SWTP will operate in solid-mode over the duration of 2020. Solid-mode of one unit within the SWTP is designed with an operational rate of 60 m^3/day at an expected operational availability of 95%. Further specifications of the SWTP can be found within the SWTP Design Report (Agnico Eagle 2018) and the SWTP As-Built Report (Agnico Eagle 2019a).

EWTP effluent discharge to Meliadine Lake was performed in 2019 in accordance with the conditions outlined in Part F, Item 3 of the Water Licence. Discharge to Meliadine Lake, including the treated groundwater, will remain within the permitted discharge criteria defined in the License, be non-acutely lethal, and meet the Canadian federal end-of-pipe discharge criteria (per the amended MDMER; GC 2017). Additionally, SSWQOs for EWTP effluent (including treated groundwater) will be met at the edge of the mixing zone in Meliadine Lake. Further details regarding the EWTP are provided in Section 3.9.4 and Section 4.3.

SWTP effluent and CP1 water quality will continue to be monitored according to the SWTP Design Report to identify future exceedances and potential impacts to CP1.

Discussion on realized SWTP treatment rates over 2020 in relation to the groundwater management strategy can be found in the Groundwater Management Plan (Appendix A).

3.9.4 Effluent Water Treatment Plant (EWTP)

Based on the maximum flow rate of the Actiflo® system model ACP-600R, the EWTP currently has a maximum capacity of 520 m^3/h (nominal flow). In Q2 2020, the system will undergo upgrades to improve treatment capacity to 1,167 m^3/h, which is within the range of the predicted discharge rates to Meliadine Lake over the Life of Mine. Further information regarding EWTP operation can be found in the EWTP As-Built (Tetra Tech 2018b).

Forecasted monthly averages requiring treatment at the EWTP are provided in Table 13. The volume of water requiring treatment and discharge over 2020 is expected to be 1,610,000 m^3 under mean climate year precipitation and subsequently decreasing to 791,784 m^3 the following year (2021). Anticipated volume requiring treatment and discharge over 2020 is expected to be greater than normal due to residual volumes from the 2019 open water season.

Trigger limits are in place at the EWTP as a component of TSS and TDS exceedance mitigation during periods of discharge. These trigger limits are based on rating curves developed with simple linear regressions to predict TSS concentration as a function of turbidity and TDS as a function of specific conductivity. The regressions are developed with *in situ* specific conductivity and turbidity readings paired with corresponding MEL-14 sample lab results as a means to produce a relationship (rating curve) between field readings and corresponding lab results. Rating curves are then be applied to continuous *in situ* specific conductivity and turbidity readings taken from internal probes within the EWTP prior to discharge to approximate TDS and TSS, respectively.

Agnico will continue to gather calibration/confirmatory paired samples in the future to actively increase the number of data points and strengthen the turbidity-TSS and conductivity-TDS correlations. Thus, the rating curves used will be maintained internally and available for review upon request.

3.9.5 Saline Effluent Treatment Plant (SETP)

Prior to discharge of saline effluent to sea at Melvin Bay (Section 3.11; Appendix A), excess saline contact water stored on site is treated at the SETP for ammonia and total suspended solids. The main feed source to the SETP will be from the saline ponds (SP1 and SP4). Treated saline water will meet MDMER end-of-pipe discharge criteria. Initial treatment will include a clarification unit for TSS removal. Next, break-point chlorination treatment will be applied to remove elevated ammonia levels, which are inferred to be the result of the use of explosives and washing of development faces/muck underground. Excess free chlorine will be removed with activated carbon filters. Following treatment, saline water will pumped to Saline Pond 3 (SP3) for final settling and storage. The SETP will be designed for 2020 to treat 1,600 m^3/day of saline water for TSS and ammonia. Further information on the SETP design can be found in Agnico Eagle (2019b).

Prior to haulage of saline water from the Meliadine Site to Itivia for discharge to sea over the open water season, Agnico Eagle will measure pH, turbidity, specific conductivity, and temperature of the effluent as a means to continually advise discharge operations and help ensure discharge parameters are met. Samples will be analyzed for the full suite and Group 3 (MDMER) parameters as listed in the Water License and the Water Quality and Flow Monitoring Management Plan (Appendix E).

3.9.6 Oil Separators

An oil separation treatment system was installed in 2018 at the Maintenance Shop to collect and separate oil from water used for washing mining equipment. A second oil-water separator is installed at Landfarm A. In the event of water accumulation at Landfarm A due to rainfall or snowmelt, the ponded water will be pumped through the oil-water separator to remove PHC residue and will be analyzed for BTEX, lead, and oil and grease prior to discharge to CP1 or used on the windrows to increase moisture content, as required. Water accumulating in the landfarm will not be discharged directly to the receiving environment.

3.10 Meliadine Lake Discharge Diffuser

The discharge diffuser is the final surface contact water effluent discharge location for the Mine. The overall purpose of the diffuser is to discharge water from CP1 (at sampling station MEL-14) to Meliadine Lake while providing minimal environmental impacts to the Lake. The effluent mixing will be dependent on ambient currents in Meliadine Lake, driven by wind during the open water period. The diffuser modelling was initially conducted by Golder Associates Ltd. (Golder, 2015) and updated design progress was reported by Tetra Tech EBA (Tetra Tech EBA, 2016).

3.11 Saline Water Discharge to Sea

Based on the current standing of saline water stored on site, the rate at which the SWTP can treat saline water (Section 3.9.3), and the forecasted inflows (Appendix A), it was anticipated that a second discharge location was required for long-term groundwater management. Following an application to the NIRB in 2018, Agnico Eagle received approval for discharge of saline water to a marine environment (Melvin Bay, Rankin Inlet) along with an amended Mine Project Certificate from the NIRB on February 26, 2019. Detailed information regarding treatment and discharge criteria are provided in the Groundwater Management Plan (Appendix A).

3.12 Water Management Structure Monitoring

Pursuant to Part E, Item 15 of the Licence, Agnico Eagle will carry out weekly inspections of all Water management structures during periods of flow and monthly thereafter. The records will be maintained for review upon request of an Inspector. More frequent inspections may be required at the request of an Inspector. Inspections will focus on structures and conditions in Sections 3.12.1 to 3.12.5 to follow. The associated inspection template can be found in Appendix G.

3.12.1 Culvert and Water Crossing Inspections

Culverts listed in Section 3.1, as well as culverts and water crossings along the AWAR, Bypass Road, and at the Itivia site will be inspected for the following conditions. These inspections also satisfy the monitoring procedures outlined in the Sediment and Erosion Management Plan (Appendix D):

- Damage to the inlet or outlet of the culvert which may impede flow capacity;
- Bed erosion upstream and downstream of watercourse crossing structures;
- Scour under bridge abutments and abutment foundations;
- Erosion along cutslopes and fillslopes of embankments (rill and gully erosion);
- Blockages within the culvert including snow, ice, debris; and
- Snow cover or snow piles which would prevent routing of water towards the inlet of the culvert (only applicable prior to freshet).

In the case that any of the above conditions are observed, corrective actions will be taken to optimize culvert/water crossing function and integrity.

3.12.2 Containment Pond Inspections

Water containment ponds discussed in Section 3.3 and P-Area containment ponds discussed in Section 3.4 will be inspected for the following conditions:

- Laboratory water quality results as a trigger to implement mitigation actions;
- Unplanned inputs via surface runoff which are not part of the water management system; and
- Water level elevation above the operating manual maximum (OMM).

In the case that any of the above conditions are observed, corrective actions will be taken to prevent unaccounted for losses of available water capacity or potential compromise to dike integrity.

3.12.3 Dike and Thermal Berm Inspections

Dikes and thermal berms discussed in Section 3.6.2 are inspected in order to track natural (expected) movement of the structure. Pertaining to dikes, a 'master" sketch of all the issues that were documented in the past is maintained as a means to spot any changes/new issues. Inspections focus on the upstream slope, the crest, the downstream slope, and downstream toe and observations include the following:

- New areas of movement/deterioration not previously documented;
- Changes to previously documented areas of movement/deterioration;
- Seepage through the downstream slope;
- Water presence in downstream channel/sump; and
- Areas of movement/deterioration of downstream channel/sump (where present).

Any issues or potential problems identified will be addressed accordingly by the Geotechnical Engineer in order to mitigate risks and maintain dike integrity.

3.12.4 Water Diversion Channel and Berm Inspections

In addition to the water management structures requiring inspections under the Water Licence, Agnico Eagle will carry out inspections of all channels on site listed within Section 3.6.1 and Table 1 for the following conditions:

- Obstructions to flow (ice, debris);
- Inflows not part of the water management system;
- Structural failure of channel banks;
- Seepage through water diversion berms resulting in water movement to areas not planned within the water management system; and

- Erosion of diversion berms (i.e., undercutting, slope failure).

In the case that any of the above conditions are observed, corrective actions as directed by the Geotechnical Engineer will be taken if there is potential for compromise effectiveness of the channel function or potential for unplanned impact to water quality or quantity in associated containment ponds.

SECTION 4 • WATER MANAGEMENT STRATEGY

There are three major sources of inflow water considered in the Mine water management system; freshwater pumped from Meliadine Lake, natural run off from precipitation and natural groundwater inflow to the Underground Mine.

A brief summary of the water management strategy for the Mine is presented as follows:

- Contact water from key mine infrastructure will be diverted and/or collected in the containment ponds (CP1, CP3, CP4, CP5, CP6, the Saline Ponds and the P-Area).
- The collected water in CP3 to CP6 will be pumped to CP1. Water collected in CP1 may be reused by the process plant and the excess water will be treated by the EWTP prior to discharge via the diffuser into Meliadine Lake.
- Contact water from the Underground Mine will be contained in underground sumps and the water storage stope and reused for mining operations. Excess water volumes will be stored in temporarily inactive underground developments, the Saline Ponds, treated by the SWTP to be transported to CP1, or will be treated at the SETP and discharged to Melvin Bay.
- Runoff water in the open pits will be collected in sumps and then pumped to the designated water containment ponds (CP5).
- Natural flooding of the open pits at end of mining will be supplemented by using freshwater from Meliadine Lake.
- Upon the completion of underground mining, the Underground Mine workings will be allowed to naturally flood by groundwater seepage.

Appendix B presents the Freshet Action Plan, which includes the Freshet Action Procedure and the Snow Management Procedure for the Mine. Table 9 summarizes the overall contact water management plan for the key infrastructure and presents the initial water collection locations and final water destinations. The plans for water management at key areas are described in following sections.

Table 9: Overall Site Surface Contact Water Management Plan

Contact Water Source	Initial Contact Water Collection Location	Final Contact Water Collection Location
Industrial Site Pad Area (camp/process plant area)	CP1	CP1
WRSF1 Area	CP1, CP4 and CP5	
WRSF2 Area	CP1 and CP5	
WRSF3 Area	CP6	
Dry Stack TSF Area	CP1 and CP3	
Ore Stockpile OP2	CP1	
Landfill	CP1	
Landfarm (biopile)	Sump within Landfarm	To CP1 after oil separation
Tiriganiaq Pit 1 Tiriganiaq Pit 2	Open pit sumps	First to CP5 and then to CP1
Tiriganiaq underground	Sumps in underground mine	Sumps in underground mine, surface saline water storage ponds (saline ponds), SWTP to CP1 and/or discharge to sea

The following sections describe the strategy for water management at different areas for the Mine.

4.1 Key Water Management Activities

The activities required for the WMP are summarized in Table 10. Water management activities during closure are described in Section 6.

Table 10: Key Water Management Activities

Mine Year	Major Water Management Activities and Sequence
Q4 of Yr -5 (2015)	• Started to re-use the underground water • Dewatered top 0.5 to 1.0 m of fresh water in Pond H17 • Constructed Channel 2
Yr -4 (2016)	• Dewatered H17 into Meliadine Lake. • Started construction of D-CP1 to impound CP1 • Started construction of D-CP5 to impound CP5 • Dewatered Pond A54 in Q3 of Year -4 and pumped the water to CP1 • Constructed Saline Pond 1 (SP1) for additional underground saline water storage • Constructed and operated P-Area Containment Ponds

Mine Year	Major Water Management Activities and Sequence
	• Started to store the excess groundwater from the underground mine at surface. • Implemented and tested evaporators at P-Area to reduce water volumes stored at surface. • Constructed trenches down gradient from DP1-B and DP3-A to be able to pump collected water and pump back to P1 and P3, respectively. • Constructed Channel 5 • Installed Culverts 3 and 4
Yr -3 (2017)	• Completed construction of D-CP1, jetty and Pumping station CP1 • Completed construction of D-CP5, jetty and Pumping station CP5 • Started construction Channel 1 • Constructed Berm 3 • Constructed freshwater intake in Meliadine Lake and installed pumping station • Constructed Lv75 water stope for additional underground saline water storage • Installed Culvert 13 • Started to treat sewage from Sewage Treatment Plant (STP) and pump the treated sewage from STP to CP1. • Started to pump the contact water from CP5 to CP1 for treatment (solids removal) • Started to pump water collected in trenches, down gradient from D-CP1, D-CP5, DP1 and DP3 to the associated containment pond • Started to pump the water from the Type A Landfarm to CP1 after oil/water separator treatment • Started to pump water from washbay to underground for storage until a biological treatment unit for hydrocarbon reduction/removal arrives at the site
Yr -2 (2018)	• Completed construction of Channel 1 • Started construction Channel 3, Berm CP3 and Pond CP3 • Installed Culverts 1, 2, 15 and 16 • Constructed Berm 2 • Started to pump the water from CP1 to EWTP for treatment prior to discharge via the diffuser to Meliadine Lake. • Pumped the solids sludge from EWTP to CP1. To limit recirculation of the sludge within CP1, the discharge of the sludge was located away from the EWTP intake. • Started diversion of the contact water from industrial pad to CP1 via Channel 1 • Constructed and commissioned (in Q4) SWTP to discharge to CP1.
Yr -1 (2019)	• Constructed Saline Pond 2 within footprint of Tiriganiaq Pit 2 and began storing excess saline water • Installed culverts 7, 8, 10, 11 and 20 • Constructed Channels 7 and 8 and Berm 1 • Completed construction of Channel 3, Berm CP3 and Pond CP3 and started to collect contact water • Constructed Channel 4, Pond CP4 and Berm CP4 and started to collect contact water • Start to pump the contact water in Ponds CP3 and CP4 to the partially drained Pond H13 where the water will flow through Channel 1 into CP1

Mine Year	Major Water Management Activities and Sequence
	• Constructed, commissioned and started discharge of saline water through the discharge to sea diffuser system • Partially dewatered Ponds H19 and H20 in Q3 of Year -1 by pumping water to the EWTP for discharge to Meliadine Lake • Started construction of Saline Pond 4 (SP4) within footprint of Tiriganiaq Pit 1
Yr 1 (2020)	• Complete construction of Saline Pond 4 (SP4) • Construct Pond CP6 and Berm CP6 • Transfer water from Saline Pond 2 to Saline Pond 4 • Start to pump contact water in CP6 to CP1 • Start to pump contact water collected in Tiriganiaq Pit 2 to CP5 • Assess feasibility of pumping EWTP sludge to process plant filter press to be added to TSF
Yr 2 (2021)	• Start to pump contact water collected in Tiriganiaq Pit 1 to CP5 • If feasible, begin pumping EWTP sludge to process plant filter press to be added to TSF
Yr 3 (2022)	• Stop pumping water from Tiriganiaq Pit 2 to CP5 when mined out • Tiriganiaq Pit 2 to serve as temporary saline water storage, if needed
Yr 4 (2023)	• Water management plan similar to Year 3
Yr 5 (2024)	• Water management plan similar to Year 3
Yr 6 (2025)	• Water management plan similar to Year 3
Yr 7 (2026)	• Stop pumping water from Tiriganiaq Pit 1 to CP5 when mined out
Yr 8 (2027)	• Start to fill the mined-out Tiriganiaq Pits 1 and 2 with active pumping from Meliadine Lake • Stop pumping excess water from underground when underground mine is completed • Start natural flooding of Tiriganiaq Underground mine with groundwater seepage • Stop pumping water to process plant when the processing is completed

4.1.1 Pond Dewatering and Displacement

The initial dewatering at Lake H17 and Lake A54 was conducted in 2016 prior to constructing CP1 and CP5, respectively. The water from these ponds was pumped to Meliadine Lake through a temporarily installed diffuser.

Preparation for construction of CP4 facility required dewatering of the two shallow ponds B8 and B9 into CP1. Preparation for CP3 did not require dewatering as B28 contained insufficient volumes to dewater.

In Q3 2019, partial dewatering of Ponds H19 and H20 to the EWTP took place, following the advanced timeline for the construction of CP6 and WRSF3. Specifically, H19 was partially dewatered to facilitate construction of Berm-CP6, while H20 was partially dewatered to allow the placement of waste rock and overburden within the drained lake basin. Detailed information regarding the CP6 design and subsurface thermal analysis can be found in the CP6 and Berm Design Report (Tetra Tech, 2020).

Table 11 summarizes the pond dimensions, dewatering date, and estimated dewatered volumes.

Table 11: Estimated Pond Dewatering Schedule

Pond	B8	B9	H20	H19
Maximum Pond Water Depth (m)	-	1.4	1.6	1.4
Existing Pond Surface Area (ha)	-	0.63	9.58	2.91
Dewatering Schedule	Q4 2018	Q4 2018	Q3 2019	Q3 2019
Estimated Total Volume of Water Dewatered (m^3)	2,993	6,840	90,307	16,431

4.1.2 Underground Water Management

The Underground Mine will extend approximately 650 m below the ground surface and part of the underground workings will be operated below the base of continuous permafrost. The underground excavations act as a sink for groundwater flow during mining, with water induced to flow through the bedrock to the Underground Mine workings below the base of the permafrost.

The underground water management system is designed to prevent water from affecting the workings or production. The system contains a series of sumps (generally one at the access of each level) designed to capture groundwater inflows and runoff from mining operations (i.e., drilling), a clarification system, and a pumping system to redistribute the clarified water. Excess underground water is pumped to surface to be managed in the saline ponds. Temporarily inactive underground developments (similar to the water stope) are used for additional storage of excess underground water. Further details on the underground water management system is provided in Appendix A.

Beginning December 2018, the SWTP began treating groundwater to reduce stored saline water on site (See Section 3 for details). Furthermore, as part of the strategy to manage excess groundwater infiltration of saline water within the underground portion of the mine, Agnico Eagle received approval for marine discharge of saline water with the amended Project Certificate on February 26, 2019 (See Section 3.11 and Appendix A for details).

Combined (mine-wide) inflow values to the Underground Mine are currently estimated by manually measuring and summating all visible inflows across the mine. Recorded measurements are logged in a database from which daily estimated inflow rates can be produced.

Table 12 presents the predicted groundwater inflow rates estimated for passive groundwater inflow to the Underground Mine. Details pertaining to model inputs and assumptions are found in Appendix A. Values presented in Table 12 do not include grouting efforts or ventilation loss.

Table 12: Predicted Groundwater Inflow to the Underground Mine (2017 to 2032)

Year	Quarter	Predicted Groundwater Inflow (m^3/day)
2020	Q1	410
2020	Q2	410
2020	Q3	420
2020	Q4	420
2021	Q1	420
2021	Q2	430
2021	Q3	440
2021	Q4	460
2022	Q12	480
2022	Q34	510
2023	-	530
2024	-	540
2025	-	580
2026	-	570
2027	-	530
2028	-	510
2029	-	490
2030	-	480
2031	-	470
2032	-	460
203	-	450

4.1.3 Water Management for Haul Road

A network of roads provide access to infrastructure at the Mine. The majority of the roadways servicing the mining area are located so that drainage is directed by berms, channels and culverts towards CP1, CP3, CP4, CP5, and CP6. As shown in Appendix C, water diverted to CP3, CP4, CP5 and CP6 will eventually be transferred to CP1. Detailed information about water management on roads is described in the Roads Management Plan (Agnico Eagle, 2019c).

4.1.4 Water Management for Landfarm and Landfill

Any water that accumulates at the onsite Landfarm is pumped through an oil/water separator prior to discharge into CP1. Additional details for Landfarm water management are described in the Landfarm Management Plan (Agnico Eagle, 2015a).

Leachate from the Landfill is anticipated to be non-hazardous and non-toxic due to the controls put in place on the materials accepted for deposition in the Landfill. Annual Landfill operations involves clearing of snow prior to spring melt. In the event there is leachate from the Landfill due to periods of heavy rainfall or spring freshet, the runoff will be collected, controlled and treated, if necessary (Agnico Eagle, 2015b), and sent to CP1.

4.1.5 Water Management for Emulsion Plant Area

Freshwater is trucked to the emulsion plant and used for manufacturing emulsion as well as for washing vehicles. Water within the emulsion plant is re-used when feasible, and excess water is collected and disposed of on site (i.e., STP) or stored and shipped south as hazmat.

4.1.6 Water Management for the Wash Bay

Water used in the Wash Bay is re-used when feasible and excess water is recycled through a biological treatment system designed to reduce or remove hydrocarbons. Waste from the treatment process is removed in the form of solids and disposed of appropriately (Landfarm or hazmat).

4.2 Freshwater and Sewage Management

Additional freshwater usage and sewage management is described in the following sections.

4.2.1 Freshwater Management

Major freshwater usages on site include potable use, fire suppression, make-up water for the mill, and other operational needs, such as drilling. Freshwater is sourced from Meliadine Lake through a freshwater intake and pump system. For dust suppression, water is sourced from any ponded water located along the All Weather Access Road (AWAR) or small ponds proximal to the road.

Freshwater is pumped through an overland pipeline to an insulated main storage tank located at the plant site. Under the Licence, 318,000 m^3/year of freshwater is permitted during operation phase. Additionally, approximately 4,000,000 m^3 of freshwater is permitted per year to fill the mined-out open pits during the mine closure. These quantities are inclusive of water needs for dust suppression.

The design flow rate for the potable water for the main camp and accommodations (kitchen, laundry) is 136 m^3 per day (based on a 680-people camp capacity and a nominal consumption of 200 L/day/person). There is an onsite Potable Water Treatment System (Section 3.9.1). Treated potable water is piped to areas in the service complex and other facilities requiring potable water.

4.2.2 Sewage Management

Sewage collected from the camp and MSB facilities is pumped to the STP. The objective of the STP is to treat sewage to an acceptable level for discharge to CP1 via a treated sewage water discharge pipeline. The STP is housed in a prefabricated (modular) structure, located at south-east of the service complex at the Industrial Pad, as shown in Figure 1.2. The sewage treatment system is designed based on a flow rate of 200 L per day per worker for a peak load of 680 people, for an average daily flow rate of 136 m^3 (5.67 m^3/h).

The STP for the camp facilities is designed to meet appropriate guidelines for wastewater discharge (Agnico Eagle, 2017c). Details regarding STP specifications and operation can be found in the Operation & Maintenance Manual Sewage Treatment Plant (Agnico Eagle, 2017c).

4.2.3 Process Water Management

Process water is required in the mill for ore processing and is primarily sourced from Meliadine Lake through the freshwater intake system. However, contact water from CP1 is currently being evaluated for reclaim purposes in order to minimize the amount of freshwater use at the mill. The permitted freshwater usage value of 318,000 m^3/d will be in sufficient to provide make-up water at the mill over life of mine. Agnico Eagle is currently investigating strategies to reclaim water (i.e., from CP1) and assessing mill water usage over life of mine. A Licence amendment to accommodate required mill water usage will be requested accordingly.

4.3 Meliadine Lake Diffuser Effluent Flow Rates

The EWTP is currently configured to discharge effluent to Meliadine lake via a diffuser at a rate of 11,688 m^3/day (a water treatment rate of 12,000 m^3/day minus 312 m^3/day of sludge returned back to CP1). The pump does not operate continuously. The amount of effluent requiring discharge over each month per year (Table 13) is based on the overall water balance for a mean climate year (Tetra Tech EBA, 2016). In Q2 of 2020, the EWTP, pumping stations, and diffuser system may be upgraded to the full design capacity of 28,000 m^3/day minus 728 m^3/day of sludge returned to CP1 (Tetra Tech, 2017). This treatment and subsequent discharge rate was assessed in the initial design of the Meliadine Lake diffusor and falls within the acceptable range for capacity in the receiving environment. Feasibility assessment and engineering is occurring of Q1 of 2020, and installation/commissioning would occur over Q2 2020.

As a mitigation to water quality impacts at CP1 during closure, AEM is investigating EWTP sludge disposal options. Over 2020, the potential long-term EWTP sludge disposal option of TSF deposition will be assessed. This option would generally include further thickening of sludge from the Actiflo® unit via a Multflo® unit at the EWTP (Tetra Tech, 2017). This thickened sludge would then be transferred to the filter press at the mill to be filtered with tailings from the mill process and deposited within the TSF. Over 2020, assessments on operational requirements (i.e., piping, pumping) and sludge characteristics (i.e., particle size distribution, geochemistry) are planned. Information gathered will be applied to assess operational feasibility and potential geotechnical risks at the TSF.

Table 13 shows the estimated total volume of effluent released per month per year.

Table 12: Estimated Effluent Flow Rates over Mine Operating Life

Year	Effluent Released Over the Course of the Month under Mean Climate conditions (m^3)				
	June	July	August	September	October
Year 1: 2020	450,000*	450,000*	450,000*	215,000*	45,000*
Year 2: 2021	175,320	350,640	128,568	105,192	35,064
Year 3: 2022	175,320	350,640	128,568	93,504	35,064
Year 4: 2023	175,320	350,640	128,568	93,504	35,064
Year 5: 2024	175,320	350,640	128,568	93,504	35,064
Year 6: 2025	175,320	280,512	105,192	81,816	35,064
Year 7: 2026	175,320	292,200	116,880	93,504	35,064
Year 8: 2027	175,320	292,200	116,880	93,504	35,064
Year 9: 2028	175,320	280,512	116,880	93,504	35,064
Year 10: 2029	-	-	-	-	-
Year 11: 2030	-	-	-	-	-

* Volumes are predicted based on current water level in CP1. 2020 volumes are expected to be greater due to residual volumes not discharged over 2019 (See section 3.9.4).

SECTION 5 • WATER BALANCE

5.1 Global Water Balance

A water balance model was developed to assist in the evaluation of the water management infrastructure and estimation of the pumping requirements over the life of the Mine and under closure conditions. The model includes a water balance conducted on both a monthly and yearly basis. The model focuses specifically on contact water management infrastructure and areas that are affected by mining activities.

A monthly site-wide water balance was conducted for CP1, CP3, CP4, CP5, CP6, Tiriganiaq Pit 1, Tiriganiaq Pit 2, water in the underground mine operation, make-up water for the mill, water for the WTPs, and freshwater during mine construction period to mine closure under mean precipitation years.

The following sections present the parameters and assumptions adopted in the water balance model. A water balance model update was submitted in January 2019 with Version 5 of the WMP. The next updated version will be submitted in 2021 as per Part E item 12 of the Water License.

5.2 Water Balance Framework

The water balance framework developed for the site-wide water balance model was presented in Version 1 of the WMP (Agnico Eagle, 2015a). To simulate a range of conditions, the model was run for the proposed mine life and closure conditions.

5.3 Water Balance Assumptions

The water balance was based on the following:

- Snow accumulates throughout the months of October to May, and thaws in June during the annual spring freshet period;
- Average precipitation year climate conditions;
- The open pits and water containment ponds (CP3 to CP6) are not to be used for long-term storage of water during operations;
- The water collection sumps and ponds are empty in the autumn prior to the spring freshet each year; and
- Other water management assumptions described in Section 4 of this WMP.

A general water management flow sheet illustration is presented in Appendix C.

5.4 Water Balance Results

The estimated maximum annual water input/output from each of the various water management facilities under mean precipitation conditions are summarized in Table 14. Results were also provided for 1:100 year wet and dry conditions, with corresponding basis and assumptions, in a separate technical memorandum (Tetra Tech EBA, 2015).

Table 13: Estimated Maximum Annual Volumes from Mine Site Water Balance

Item	Maximum Annual Water Volume (Mm^3)
Contact Water from CP1	0.800
Contact Water from CP3	0.088
Contact Water from CP4	0.087
Contact Water from CP5	0.240
Contact Water from CP6	0.076
Water Pumped from CP1 to EWTP for Treatment	0.798
Fresh Water Pumped from Meliadine Lake during Construction	0.062
Fresh Water Pumped from Meliadine Lake during Operation	0.318
Treated Water from EWTP to be Discharged to Outside Environment	0.730
Underground Water Pumped to Underground TSS Removal Plant	0.696
Excess Water from Underground Mine to be Stored on Surface	0.155
Fresh Water Pumped from Meliadine Lake to Fill Mined-out Tiriganiaq Pit 1	3.068
Fresh Water Pumped from Meliadine Lake to Fill Mined-out Tiriganiaq Pit 2	0.749

5.5 Waterbody Inventory

Table 15 presents the three watersheds (Watershed A, Watershed B and Watershed H) and various waterbodies that are impacted by the Mine activities. Watersheds and waterbodies in proximity to the Mine location and waterbodies affected by Mine infrastructure are shown on Figure 5.1.

Table 14: Inventory of Waterbodies Impacted by Mining Activities

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m^3)	Notes
A	A9	N/A	0.18	-	Flow regimes impacted by the development of Tiriganiaq Pit 1
	A10	0.67	0.26	-	Ponds removed by development of Tiriganiaq Pit 1
	A11	0.45	0.40	-	
	A12	0.87	0.47	-	Pond drained due to construction of Channel 5
	A13	0.30	0.26	-	
	A17	0.30	0.16	-	Covered by WRSF 1
	A38	N/A	0.05	-	Flow regimes impacted by the development of Tiriganiaq Pit 2
	A39	0.48	0.12	-	Ponds removed by development of Tiriganiaq Pit 2
	A54	1.3	5.99	34,545	Dewatered for CP5
	A58	0.50	0.43	-	Covered by WRSF 2
B	B8	0.8	1.43	-	As part of CP4/Berm-CP4
	B9	1.40	0.64	-	Dewatered for CP4
	B10	0.8	0.33	-	Ponds removed by development of Tiriganiaq Pit 1
	B28	N/A	0.45	-	As part of CP3/D-CP3
H	H6	0.58	0.75	-	As part of CP1
	H7	0.67	0.11	-	
	H8	0.59	0.38	-	Partially covered by WRSF2 and haul road
	H9	0.40	0.42	-	Partially covered by WRSF2 and OP2
	H10	0.11	0.10	-	Partially covered by WRSF2 and OP2, drained due to construction of Channel1
	H11	0.27	0.28	-	
	H12	0.81	0.97	-	Drained due to construction of Channel1 and partially covered by OP2
	H13	1.04	3.49	-	Drained due to construction of Channel1 and partially covered by industrial pad
	H14A	0.37	0.15	-	Covered by industrial pad
	H15D	0.30	0.15	-	Partially covered by TSF
	H15G	0.40	0.38	-	
	H17	1.70	15.8	195,700	Dewatered for CP1
	H17A	1.50	0.13	1,365	Dewatered for Meliadine esker
	H17B	1.50	0.69	10,350	Dewatered for Meliadine esker
	H17C	1.50	0.23	3,450	Dewatered for Meliadine esker
	H18	0.67	0.74	-	Covered by OP2
	H19	1.40	2.91	16,431	Dewatered for CP6
	H20	1.60	9.58	90,307	Covered by WRSF3

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m^3)	Notes
"-" indicates that data not available or not applicable		[ ] Ponds to be drained		[ ] Ponds to be dewatered	

SECTION 6 • WATER MANAGEMENT DURING CLOSURE

The detailed Mine closure and reclamation activities are provided in the Preliminary Closure and Reclamation Plan (Agnico Eagle, 2015d). An Interim Closure and Reclamation Plan was submitted in December 2019 as per the Water License requirement part J item 1. The Interim Closure and Reclamation Plan is currently pending approval. Until the Interim Closure and Reclamation Plan is approved, the Preliminary Closure and Reclamation Plan (Agnico Eagle, 2015d) remains the acting plan.

Water management during closure and reclamation will involve flooding the open pits using precipitation and freshwater from Meliadine Lake, flooding the Underground Mine workings with groundwater inflows (groundwater seepage), and maintaining contact water management systems on site until monitoring results demonstrate that water quality are acceptable for discharge of all contact water to the environment without further treatment. Once water quality meets the discharge criteria, the water management systems will be decommissioned to allow the water to naturally flow to the environment.

The key water management activities during Mine closure are summarized in Table 16. Figures 6.1 and 6.2 illustrate the WMP during and after Mine closure, respectively. Additional details for the activities are described in the following sections.

Table 15: Key Water Management Activities during Mine Closure

Mine Year	Figure	Key Water Management Activities and Sequence
Yr 9 to 11 (2028 to 2030)	6.1	• Finish flooding the mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2 by Q4 of Year 10 • Continue to collect and manage the contact water in CP1, CP3, CP4, CP5 and CP6 • Continue to pump the contact water in CP1 to EWTP, if required, for treatment before being discharged to the outside environment • Remove non-essential site infrastructure • Pump the underflow sludge water from EWTP to CP1 • Continue natural flooding of Tiriganiaq Underground Mine with groundwater seepage • Remove Meliadine Lake pumping system
Post-Closure	6.2	• Treat the contact water until water quality meet direct discharge criteria and then decommission the water management system • Continue natural flooding of Tiriganiaq Underground (progressive reclamation since Year 8) • Breach water retention dikes D-CP1, D-CP5, and thermal berms CP3, CP4, and CP6 once water quality monitoring results meet discharge criteria to allow water to naturally flow to outside environment • Remove culverts and breach remaining water retention berms in Year 18 (pending the demonstration of acceptable water quality)

6.1 Open Pits Flooding

When flooding the open pits for closure, the maximum pumping rate from Meliadine Lake shall not exceed 4,000,000 m^3/year during closure of the Mine, as stated in Part E Item 2 of the Licence. The planned pumping period will occur during the open water season from mid-June to end of September for each year. Table 17 summarizes the pit volume and expected water elevations at the completion of flooding activities. It will take approximately three years to fill the pits with an assumed pumping rate of 0.44 m^3/s (38,300 m^3/day). The assumed pumping rate of 0.44 m^3/s from Meliadine Lake during closure will have negligible effect to Meliadine Lake when compared to the average outflow rate at the outlet of Meliadine Lake. The pumping rate will be evaluated further to validate that any possible negative effects to Meliadine Lake do not occur.

Table 16: Pit and Underground Flooding

Pit	Volume (Mm^3)	Final Water Elevation (masl)	Water Source
Tiriganiaq Pit 1	9.20	64.14	Freshwater from Meliadine Lake
Tiriganiaq Pit 2	2.25	64.38	Freshwater from Meliadine Lake
Tiriganiaq Underground	1.4	Groundwater level	Groundwater seepage

The water quality model results indicated that water quality in the flooded pits will meet the discharge criteria and post closure treatment will not be required. The water quality within the pits will be monitored during flooding to verify the prediction of the water quality model. The information will be used to develop a strategy to minimize contamination of the regional surface water system.

6.2 Underground Mine Flooding

Passive flooding of the Tiriganiaq Underground Mine will occur following the completion of mining. The estimated total flooding volume of the underground workings is 1,372,000 m^3. Seepage water into the Underground Mine will be the main water source for flooding. At the predicted seepage rate it is estimated to take 6 years to flood the Underground Mine.

6.3 Containment Ponds, Dikes and Berms

The containment ponds, dikes and berms will remain in place to collect the surface runoff water and seepage from the Mine until the water quality meets discharge criteria. Once the water quality meets discharge criteria, dikes/berms will be breached to allow runoff to follow natural (topographically induced) flow paths. Dikes/berms breaching will involve the removal of a portion of the dikes to a minimum depth of 1 m below average water level or back to original ground levels. Consideration will be given to breach staging, with the above water portions of the dike/berm in the breach area removed during winter periods, when there will be little surface water flow, thereby minimizing the potential release of sediments to the neighbouring waterbodies. The remainder of the breach would be conducted during the open water season following freshet. Turbidity curtains would be deployed to minimize any potential sediment release to surface water.

6.4 Channels and Sumps

Once monitoring results have indicated that contact water conveyed in channels and sumps meets acceptable water quality, the infrastructure will be graded and/or surface treated according to site-specific conditions to minimize wind-blown dust and erosion from surface runoff, if required. This closure activity is intended to enhance site area development for re-colonization by native plants and wildlife habitat.

SECTION 7 • WATER QUALITY

Water quality monitoring is an important part of the Water Management Plan to verify the predicted water quality trends, conduct adaptive management should differing trends be observed, and to ensure all water quality limits at discharge points are met (i.e., effluent to Meliadine Lake and Melvin Bay). Water quality results and water transfers (i.e., origin, destination, rate) at the Mine are monitored and documented pursuant the Licence.

Water quality monitoring was initiated at the pre-development stage, continued through construction into operations, and will continue into closure and post-closure. Monitoring occurs at three levels:

1. Regulated discharge monitoring that occurs at monitoring points specified in the Licence or MDMER regulations.
2. Verification monitoring that is undertaken for operational and water management purposes by Agnico Eagle.
3. General monitoring that is commonly included in the Licence, specifying what is to be monitored according to a schedule. This monitoring is subject to compliance assessment to confirm sampling was carried out using established protocols, included quality assurance/quality control provisions, and addressing identified issues. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the NWB.

Appendix E details the Water Quality and Flow Monitoring Plan, which will be further defined as the Mine advances. Figure 7.1a and Figure 7.1b depict Monitoring Program Stations on Site and at Itivia.

Water quality predictions for the Mine were generated using the GoldSim database management and simulations code (Version 11.1.2) where Mine contact water flows derived from the Meliadine water balance are combined with chemistry data from materials exposed in mine infrastructure (tailings storage facility, waste rock piles, etc.), and site baseline information. Where site-specific information is not available, data collected at other mine sites in the north were used to supplement input data.

Water quality estimates were generated for the operational and post-closure periods for effluent to Meliadine Lake, each contact water containment pond (CP1, CP3, CP4, CP5, and CP6), for sumps in the two open pits and for the two fully flooded open pit lakes post-closure. These results were submitted with the 2015 Water Management Plan.

The sensitivity of water quality to an added TSS load was evaluated outside of the GoldSim mass balance model. Total parameter concentrations were evaluated at ponds that discharge to the receiving environment (i.e., CP1 during operations, and CP1, CP3, CP4, and CP6 post-closure) based on an addition of 15 mg/L TSS. Given the uncertainties associated with the modelling exercise (i.e., the development stage of the Mine, laboratory-based input values, assumptions where data do not exist and consideration of an average climate year), the predicted concentrations are considered to be order-of-magnitude estimates. The estimates are sensitive to the assumptions and design elements considered.

As per Part E Item 12 of the Licence, an updated water quality forecast will be submitted with the WMP in 2021. Similar to the water balance (Section 5), a 2019 model update was provided in January 2019 with Version 5 of the WMP.

7.1 Summary of Regulatory Guidelines

Water quality results are compared to MDMER criteria and effluent quality limits listed in the Licence. Water quality pertaining to MEL-14 will be compliant to Part F, Item 3 of the Licence prior to discharging to Meliadine Lake. All surface runoff and/or discharge from drainage management systems associated with the Mine, including laydown areas and All-Weather Access Road, where flow may directly or indirectly enter a Water body, shall not exceed the Effluent quality limits listed in Part D, Item 18 of the Licence. Furthermore, all waters from natural water body dewatering activities shall be directed to Meliadine Lake and shall not exceed the Effluent quality limits listed in Part D, Item 12.

Post-closure discharge water quality will be compared to Canadian Council of Ministers of the Environment Water Quality Guidelines (CCME-WQG) guidelines or the Meliadine SSWQO developed for aluminum, fluoride, and iron (Golder 2013a, 2013b, 2014). The Meliadine SSWQO criteria was developed as a conservative protection to the aquatic receiving environment and was developed by Golder (2013a, 2014) to assess whether waste rock consisted of a deleterious substance according to Environment Canada (2013). The outcome of the assessment was that Meliadine waste rock is not a deleterious substance (Environment Canada 2014).

7.2 Operations

According to model predictions, CP3 arsenic concentration may exceed MDMER on occasion if precipitation events or the freshet flows generate drainage from the TSF (Golder, 2012c). The main source of arsenic in CP3 is predicted to be from residual process water that is assumed to be present in the filtered tailings. Arsenic transfer from process water to CP3 water will be minimized by effective dewatering of the tailings prior to placement into the TSF, and from freezing of the tailings in the TSF. Frozen tailings will act to limit infiltration and seepage. Water from CP3 will be pumped to CP1 where it will mix with other site waters before discharge. Dissolved arsenic concentration in CP1 is predicted to meet the MDMER monthly average maximum concentration. All other chemical parameters in CP3 and all chemical parameters in CP1, CP4, CP5, and CP6 are predicted to meet MDMER limits for chemical constituents.

7.3 Post-Closure

Long-term, post-closure water quality in the containment ponds (CP1, CP3, CP4, CP5, and CP6) and in the flooded open pit lakes are anticipated to meet MDMER limits and CCME-WQG for the protection of aquatic life or the SSWQO developed for the Mine for aluminum, fluoride, and iron. Arsenic concentrations in CP3 could slightly exceed the SSWQO post-closure, a criteria that is conservatively protective of the receiving aquatic environment (Golder, 2013a). If arsenic levels exceed post-closure SSWQOs then water arsenic treatment will be implemented accordingly until arsenic levels decrease below the SSWQO concentration.

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FIGURES

Figure 1.1 General Mine Site Location Plan

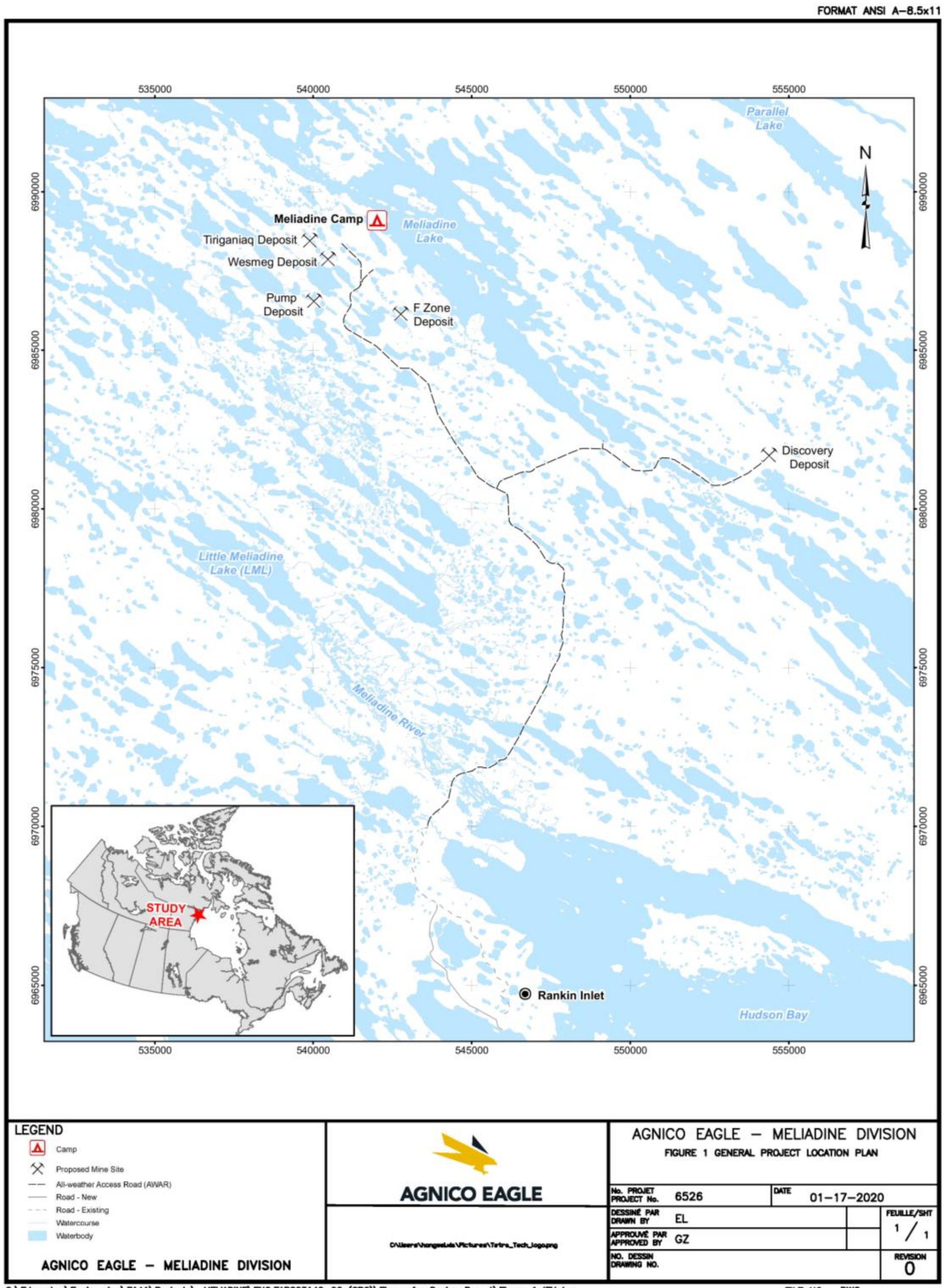

Figure 1.2 General Mine Site Plan Layout

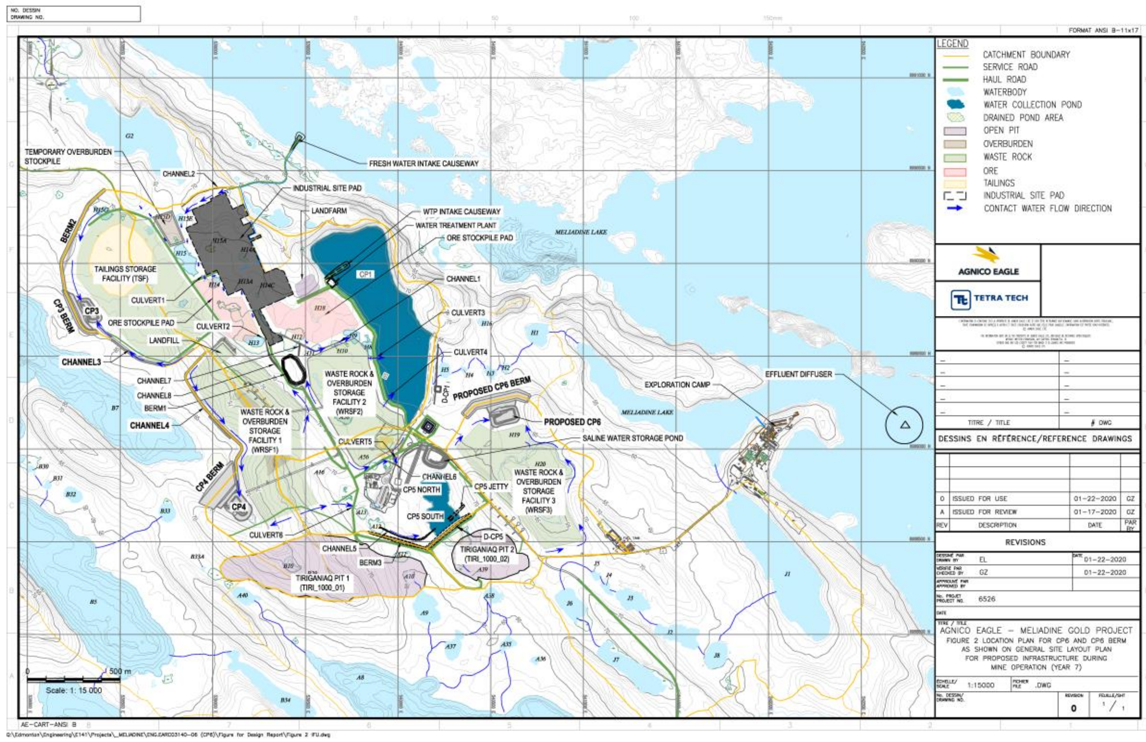

Figure 3.1 P-Area Plan View

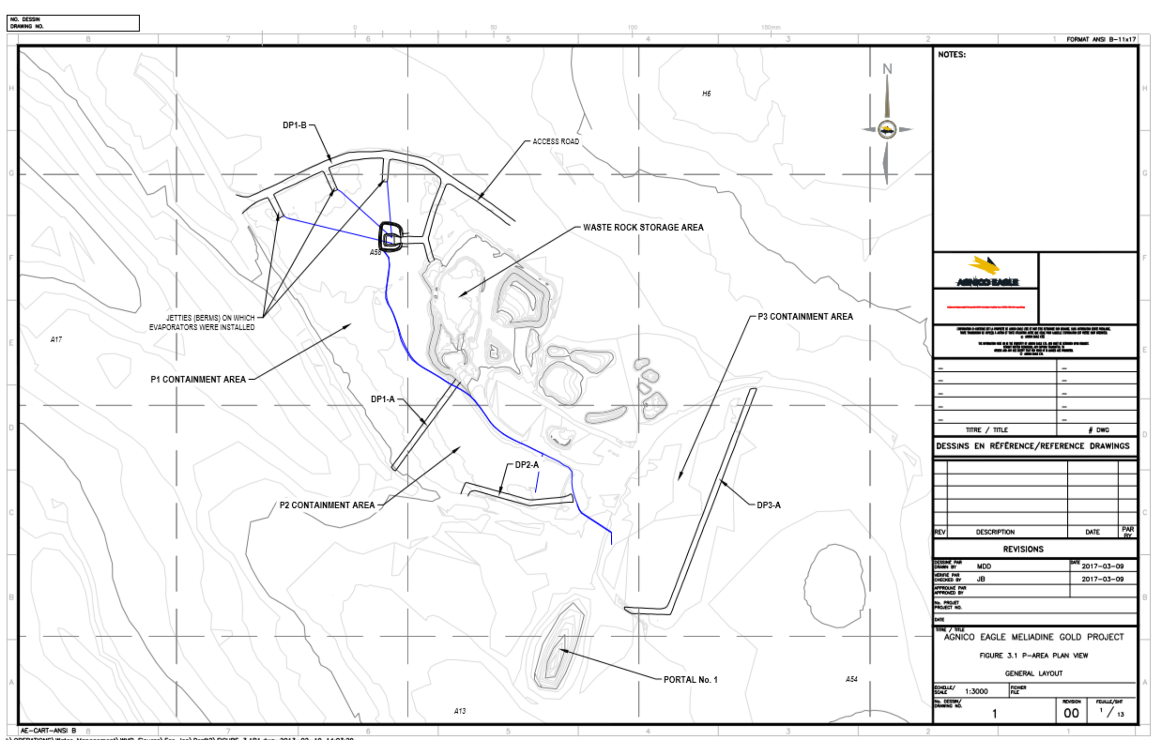

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Figure 3.2 Location and design of Saline Pond 4 (SP4) within Tiriganiaq Pit 1

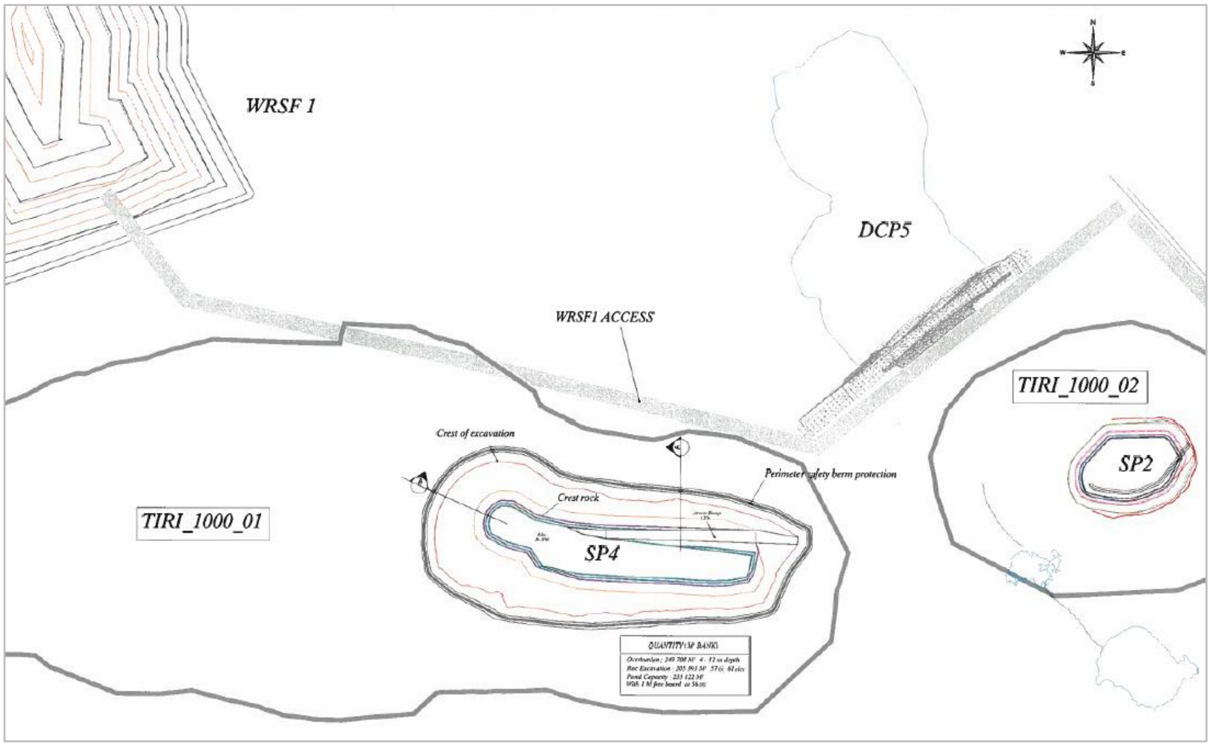

Figure 5.1 Watersheds and Waterbodies in Proximity of Mine Site

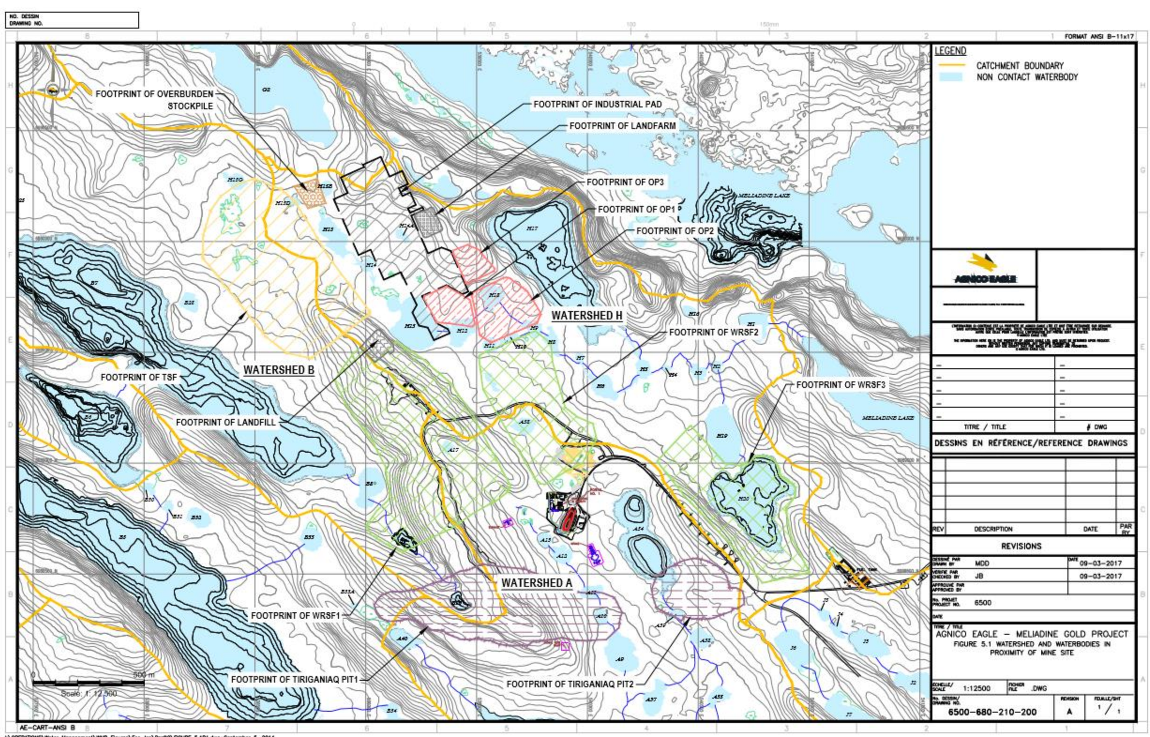

Figure 6.1 Mine Site Layout for Water Management During Closure from Feasibility Level Study. (TetraTech, 2014).

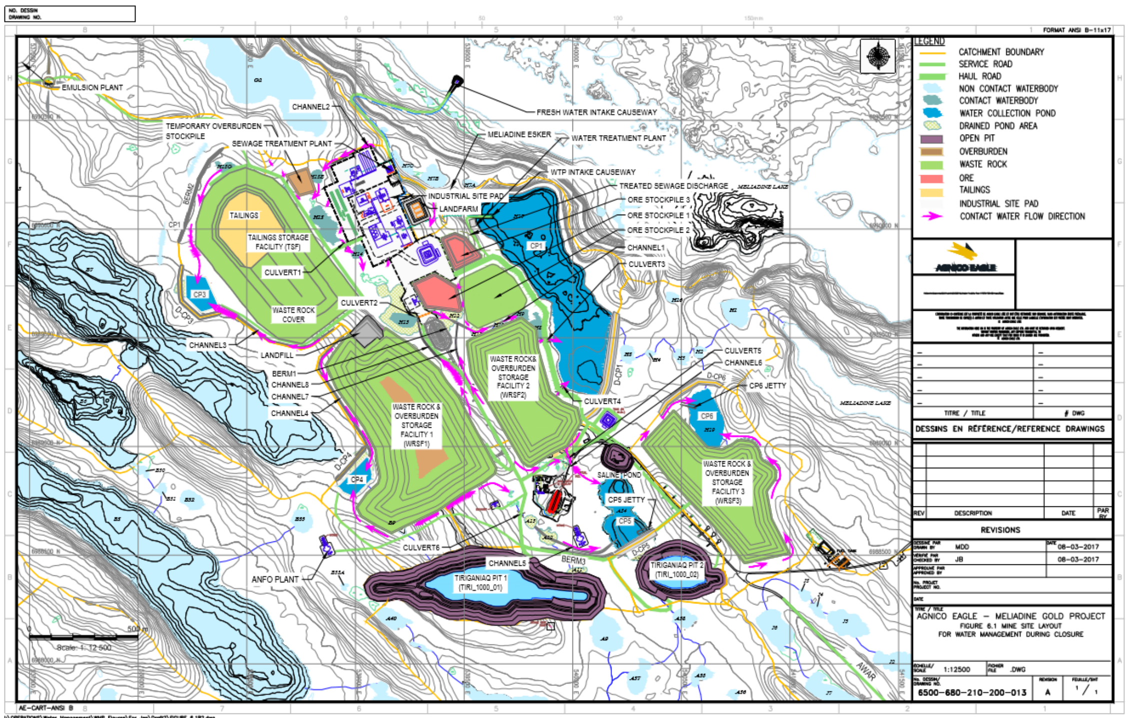

Figure 6.2 Mine Site Layout After Closure from Feasibility Level Study. (TetraTech, 2014).

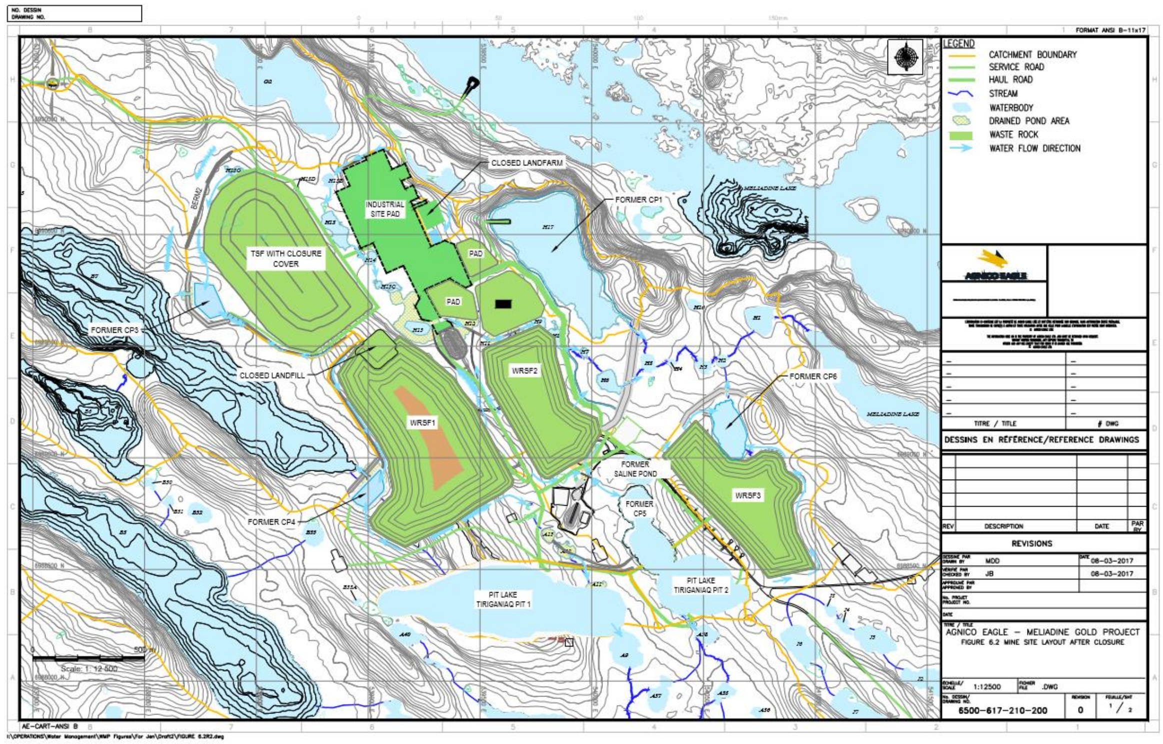

Figure 7.1a Water Quality Monitoring Locations on Site

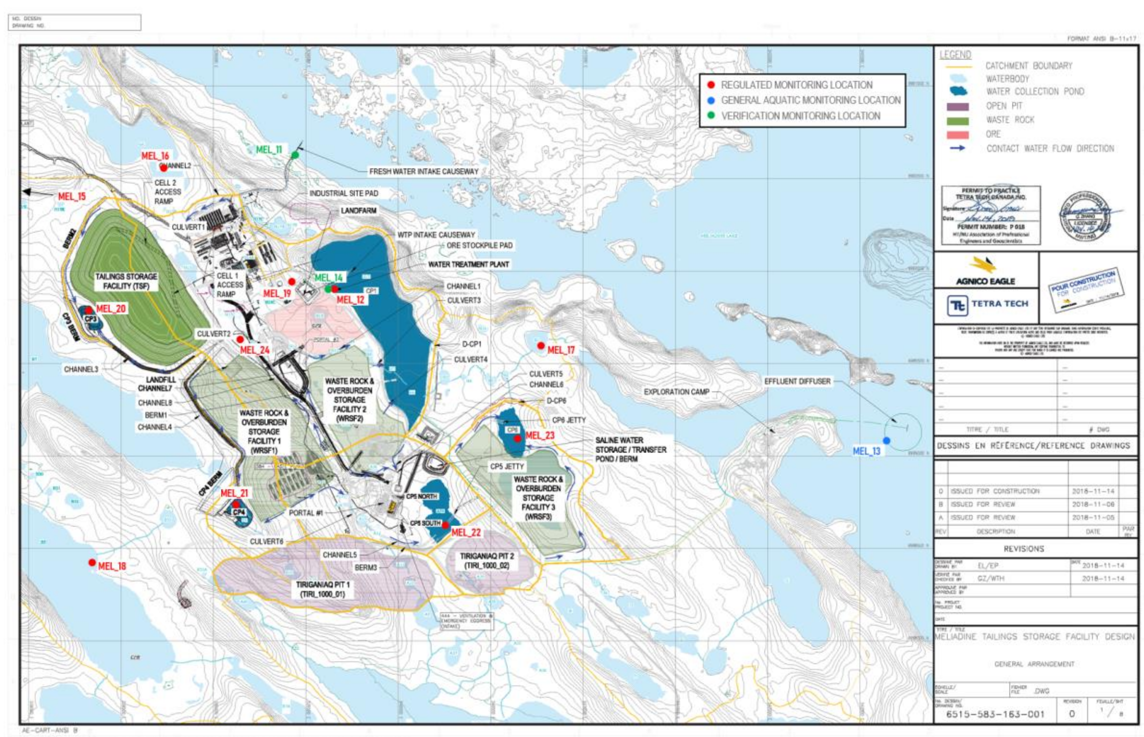

Figure 7.1b Water Quality Monitoring Locations at Itivia

Note – MEL-12 is located to the Northwest along the Bypass road but could not be effectively included in this map due to its distance from Itivia.

APPENDIX A • MELIADINE GROUNDWATER MANAGEMENT PLAN

MELIADINE GOLD MINE

Groundwater Management Plan

APRIL 2020
VERSION 5

EXECUTIVE SUMMARY

This document presents the Groundwater Management Plan (GWMP) for the collection, treatment, storage and discharge of saline groundwater in accordance with Agnico Eagle's Type A Water Licence 2AM-MEL1631, Part E, Item 14.

The Groundwater Management Strategy is composed of short-, medium- and long-term management strategies. Presently most of the short-term management strategies have been implemented on site and Agnico Eagle is currently working on increasing the trucking discharge to sea flow rate to 1,600 m^3/day in collaboration with NIRB and NWB. The next step will be to evaluate the construction of the waterline from the site to the Melvin Bay in order to increase the discharge rate, recover storage capacity on site and improve the robustness of the groundwater water management.

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Mine (the Mine), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut.

The Mine Plan proposes 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. Based on the current Mine Plan, the Mine will produce approximately 15.4 million tonnes (Mt) of ore, 31.4 Mt of waste rock, 7.0 Mt of overburden waste, and 15.4 Mt of tailings. There are four phases to the development of the Mine; just over 3.5 years of construction (2015 to 2019), 8.5 years of Mine operation (Q2 of 2019 to 2027) , 3 years of closure (2028 to 2030), and post-closure (2030 and forwards).

Tiriganiaq Underground Mine is planned to extend to approximately 625 m below the ground surface; therefore, part of the Underground Mine will operate below the base of the continuous permafrost. The underground excavations will act as a sink for groundwater flow during operation, with water induced to flow through the bedrock to the Underground Mine workings once the Mine has advanced below the base of the permafrost. Currently, groundwater inflow mitigations are being carried out, including grouting efforts and avoiding mining areas expected to produce high inflow rates. The range of mitigated groundwater inflow rates to the Underground Mine over 2019 was reported to be up to 394 m^3/day. Non-contact groundwater quality data from samples taken over 2017 - 2019 from diamond drillholes (DDHs) show a mean TDS concentration of 56,000 mg/L.

Saline water generated from the Underground Mine is currently stored in underground sumps and in non-active development, as well as on surface in the saline ponds. A second containment pond, Saline Pond 2 (SP2), was commissioned in Q2 2019, however will be decommissioned and replaced by Saline Pond 4 (SP4) in March 2020. Saline groundwater stored on site is currently pumped to the Saline Water Treatment Plan (SWTP) for desalination treatment, or treated at the Saline Effluent Treatment Plant (SETP) for discharge to sea at Melvin Bay as per the Nunavut Impact Review Board (NIRB) Project Certification 006 Amendment 001, issued in February 2019. Over 2019, SWTP performance did not achieve design criteria and availability was less than expected. Thus, resulting in a greater than predicted accumulation of saline water inventory on site.

ᓇᐃᓈᖅᓯᒪᔪᖅ

ᑖᓐᓇ ᑎᑎᖅᑲᖅ ᐱᔾᔪᑎᖃᖅᑐᖅ ᓄᓇᒥᑦ ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᒥᒃ ᑲᑎᖅᓱᐃᓂᕐᒧᑦ, ᐱᓕᕆᐊᕆᓗᒍ, ᑐᖅᑯᕐᓗᒍ ᐊᒻᒪᓗ ᑯᕕᑎᓪᓗᒍ ᑕᕆᐅᓕᒃ ᓄᓇᒥᑦ ᐃᒪᖅ ᒪᓕᒡᓗᒋᑦ ᐊᓪᓃᑯᒃᑯᑦ Type A ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯᖓᑦ 2AM-MEL1631, ᐊᕕᒃᓯᒪᓂᖓ E, ᑎᑎᕋᖅᓯᒪᔪᖅ 14.

ᓄᓇᒥᑦ ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᖅᑑᕆᓂᖅ ᓇᐃᑦᑑᔪᒃᑯᑦ, ᕿᑎᐊᒎᖓᔪᒃᑯᑦ ᐊᒻᒪᓗ ᐊᑯᓂᐅᔪᒥᑦ ᐊᐅᓚᑦᑎᓂᕐᓄᑦ ᖃᓄᖅᑑᕈᑎᐅᔪᑦ. ᒫᓐᓇᐅᔪᖅ ᑕᒪᓗᒃᑖᖅᑲᔭᖅ ᓇᐃᑦᑑᔪᒃᑯᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᖅᑑᕈᑏᑦ ᐊᑐᓕᖅᑕᐅᓯᒪᓕᖅᑐᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᐊᒻᒪᓗ ᐊᓪᓃᑯᒃᑯᑦ ᐊᒥᓲᖑᕆᐊᖅᐸᓪᓕᐊᔭᕐᒥᑦ ᓄᓇᒃᑰᕈᑎᒃᑯᑦ ᐊᓯᖅᑕᐅᓂᖓ ᑯᕕᑎᑕᐅᓂᐊᖅᑐᑦ ᑕᕆᐅᕐᒧᑦ 1,600 m³ ᐊᕐᕆᑎᒋᔪᒥᑦ ᐅᐸᓗᑕᒦᖅ ᐱᓕᕆᖃᑎᒋᐸᓗᕆᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐊᒻᒪᓗ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔨᒃᑯᑦ. ᐱᓕᕆᐊᖑᕆᐊᕐᓂᐊᖅᑐᑦ ᕿᒥᕐᕈᔭᐅᓗᓂ ᐃᒪᕐᒧᑦ ᓱᐸᓗᓕᓕᐅᖅᐸᓪᓕᐊᓂᖅ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᓪᓚᖅᑐᖅ ᐃᑎᕕᐊᓄᑦ ᐊᕐᕆᓂᖅᓴᒥᒃ ᑯᕕᑦᑎᓂᐊᕐᓗᓂ, ᑐᖅᑯᖅᓯᓯᒪᔪᖕᓇᖅᓯᑎᒃᑲᓂᕐᓗᒍ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᐊᒻᒪᓗ ᐱᐅᓯᕆᐊᕐᓗᕆᑦ ᐱᓗᓇᖕᓂᖓ ᓄᓇᒥᑦ ᐃᒪᕐᒥᑦ ᐊᐅᓚᑦᑎᓂᐅᔪᖅ.

ᐊᓪᓃᑯ ᐃᓅ ᐅᔭᕋᒃᑕᕆᐊᒃᑯᑦ (ᐊᓪᓃᑯᒃᑯᑦ) ᑕᓯᕐᔪᐊᕐᒥᑦ ᐅᔭᕋᒃᑕᕆᐊᓕᐅᖅᐸᓪᓕᐊᔪᑦ (ᐅᔭᕋᒃᑕᕆᐊᖅ), 25 ᑮᓚᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᔪᖅ ᐅᐊᖕᓇᖓᓂᑦ ᑲᖏᖅᖠᓂᐅᑉ, ᐊᒻᒪᓗ 80 ᑮᓚᒥᑕᓂᒃ ᐅᖓᓯᒃᑎᒋᐸᓗᓂ ᓂᕆᐊᓂᑦ ᐱᖓᓐᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒫᕐᔫᑉ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ.

ᐅᔭᕋᒃᑕᕆᐊᕐᒧᑦ ᐸᕐᓇᐅᑎ ᐅᔭᕋᒃᑕᕆᐊᓕᕆᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᒪᔪᓂᒃ ᐱᑕᖃᖅᑐᖅ ᐱᕙᓪᓕᐊᔭᐅᓂᖓᓄᑦ ᑎᕆᒐᓂᐊᖅ ᒎᑕᓕᒃ, ᒪᕿᓐᓂᒃ ᓄᓇᒥᑦ ᐅᒃᑯᐃᖓᔪᖃᖅᓗᓂ (ᑎᕆᒐᓂᐊᖅ ᓄᓇᒥᑦ ᐃᓗᑦᑐᖅᓯᒪᔪᖅ 1 ᐊᒻᒪᓗ ᑎᕆᒐᓂᐊᖅ ᓄᓇᒥᑦ ᐃᓗᑦᑐᖅᓯᒪᔪᖅ 2) ᐊᒻᒪᓗ ᐊᑕᐅᓯᖅ ᓄᓇᒥᑦ ᐃᓗᑦᑐᖅᓯᒪᔪᖅ ᐅᔭᕋᒃᑕᕆᐊᖅ. ᐊᑐᖅᓱᕆᑦ ᒫᓐᓇᐅᔪᖅ ᐅᔭᕋᒃᑕᕆᐊᕐᒧᑦ ᐸᕐᓇᐅᑎ, ᐅᔭᕋᒃᑕᕆᐊᖅ 15.4 ᒥᓕᔭᓐ ᑕᓐᓗᐊᓂᒃ (Mt) ᐅᔭᕋᒃᑕᖅᑕᐅᓂᐊᖅᑐᖅ, 31.4 Mt-ᓂᒃ ᐊᒃᑕᒎᖅᑕᐅᔪᓂᒃ ᐅᔭᖅᑲᓂᒃ, 7.0 Mt-ᓂᒃ ᐅᖓᑕᐅᑦᑎᔪᑦ ᐊᒃᑕᑯᓂᒃ, ᐊᒻᒪᓗ 15.4 Mt-ᓂᒃ ᕿᒪᒃᑎᑦᑐᓂᑦ. ᓯᑕᒪᐅᓕᖓᔪᖅ ᐱᕙᓪᓕᐊᔭᐅᓂᖓ ᐅᔭᕋᒃᑕᕆᐊᖅ; ᐅᖓᑎᐊᕐᔪᐊᓄᑦ 3.5 ᐅᑭᐅᓄᑦ ᓴᓇᔭᐅᓗᓂ (2015-ᒥᑦ 2019-ᒧᑦ), 8.5 ᐅᑭᐅᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᖅ ᐊᐅᓪᓛᕐᓗᓂ (Q2 2019-ᒥᑦ ᐊᒻᒪᓗ 2020-ᒧᑦ), ᐱᖓᓱᓄᑦ ᐅᑭᐅᓂᑦ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓗᓂ (2028-ᒥᑦ 2030-ᒧᑦ), ᐊᒻᒪᓗ ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ (2030-ᒥᑦ ᑕᐅᕗᖓ ᐅᖓᑖᓄᑦ).

ᑎᕆᒐᓂᐊᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑦᑕᕐᓂᖅ ᐊᑦᑎᒃᓯᕆᐊᖅᑕᐅᒃᑲᓐᓂᕐᓂᐅᔭᖅᑐᖅ 625 ᒦᑕᓂᒃ ᓄᓇᐅᑉ ᖄᖓᑕ ᐊᑖᓄᑦ; ᑕᐃᒪᓐᓇᒧᑦ, ᐃᓚᖓ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᖅ ᐊᐅᐦᕐᓂᐊᖅᑐᖅ ᑭᓪᓕᕆᔭᐅᔪᖅ ᖁᐊᕐᒍᐃᓐᓇᐅᔭᖅᑑᑉ ᐊᑖᓂᑦ. ᓄᓇᐃᔭᐃᓂᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐃᒻᒥᖅᑐᕐᓂᐊᖅᑐᖅ ᑯᕕᔪᒥᒃ ᐃᒪᕐᒥᒃ ᐊᐅᐦᖅᑎᑦᑎᓂᐅᑎᓪᓗᒍ, ᐃᒪᖅ ᑯᕕᑎᑕᐅᓗᓂ ᐅᔭᕋᕐᒧᑦ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᐱᓕᕆᕝᕕᐅᔪᒥᑦ ᖁᐊᕐᒍᐃᓐᓇᐅᔭᖅᑑᑉ ᐊᑖᓄᑦ ᐅᔭᕋᒃᑕᕆᐊᖅ ᓯᕗᓪᒎᒃᓯᒪᓕᖅᑎᓪᓗᒍ. ᒫᓐᓇᐅᔪᖅ, ᓄᓇᒥᑦ ᐃᒪᕐᒥᑦ ᑯᕕᔪᒥᒃ ᐊᕐᕆᓗᐊᕐᕆᕆᐊᖅᑎᑦᑎᓃᑦ ᐱᓕᕆᐊᖑᔪᑦ, ᐃᓚᐅᐸᓗᓂ ᐅᒃᑯᐃᖓᓂᐅᔪᓂᒃ ᐃᓗᐊᓄᐊᖅᑎᕆᓃᑦ ᐊᒻᒪᓗ ᐅᔭᕋᒃᑦᕕᐅᑦᑕᐃᓕᓗᑎᒃ ᑯᕕᓂᖅᑕᖃᔪᐊᕐᓂᐊᖅᑐᑦ. ᐊᕐᕆᓗᐊᕐᕆᕆᐊᖅᑎᑦᑎᓂᐅᔪᖅ ᓄᓇᒥᑦ ᐃᒪᕐᒥᑦ ᑯᕕᔪᓂᒃ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᖅᑕᐅᔪᒥᑦ 2019-ᒥᑦ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᖅ ᑯᕕᓂᖃᖅᓱᓂ 394 m³-ᓂᒃ ᐅᐸᓗᑖᒃᑯᑦ. ᓄᓇᒥᑦ ᐃᒪᖅ ᐊᑐᖅᑕᐅᓯᒪᙱᑦᑐᖅ ᖃᓄᐃᓐᓂᖓᓄᑦ ᓈᓴᐅᑏᑦ/ᑎᑎᖅᑲᐃᑦ ᐆᒃᑐᕋᐅᑕᐅᓯᒪᔪᑦ 2017 – 2019-ᒥᑦ ᓯᑎᔪᓂᒃ ᐅᔭᕋᓄᑦ ᐃᑰᑕᐃᓂᕐᓂᑦ (DDH) ᑕᑯᒃᓴᐅᑎᑦᑎᔪᖅ ᒥᑭᔪᒥᒃ TDS ᑲᑎᓯᒪᔪᓂᒃ 56,000 mg/L-ᓂᒃ.

ᑕᕆᐅᓕᒃ ᐃᒪᖅ ᐱᔭᐅᔪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᑐᖅᑯᖅᑕᐅᖃᑦᑕᖅᑐᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᑯᕓᕕᐅᔪᓄᑦ ᐊᒻᒪᓗ ᐱᕙᓪᓕᐊᓂᖃᕐᕕᐅᕆᑦᑐᒥᑦ, ᐊᒻᒪᓗ ᓄᓇᐅᑉ ᖁᖓᓂᑦ ᑕᕆᐅᓕᓐᓂᑦ ᑕᓯᕋᔭᓐᓄᑦ. ᑐᓪᓕᐊ ᑐᖅᑯᖅᓯᓯᒪᕓᒃ ᑕᓯᕋᔭᒃ, ᑕᕆᐅᓕᒃ ᑕᓯᕋᔭᒃ 2 (SP2), ᐊᑐᓕᖅᑎᑕᐅᓚᐅᖅᑐᖅ Q2 2019-ᒥᑦ, ᑭᓯᐊᓂ ᐊᑐᕈᓐᓃᖅᑎᑕᐅᓂᐊᖅᑐᖅ ᐊᓯᐊᓂᓪᓗ ᐱᖓᓖᕐᓗᑎᒃ ᑕᕆᐅᓕᒃ ᑕᓯᕋᔭᒃ 4-ᒥᑦ (SP4) ᓇᑦᑎᐊᑦ 2020-ᒥᑦ. ᑕᕆᐅᓕᒃ ᓄᓇᒥᑦ ᐃᒪᖅ ᑐᖅᑯᖅᑕᐅᖃᑦᑕᖅᑐᖅ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᑯᕕᑕᐅᖃᑦᑕᖅᑐᖅ ᑕᕆᐅᓕᖕᒥᑦ ᐃᒪᓕᕆᕝᕕᖓᓄᑦ (SWTP) ᑕᕆᐅᖕᒋᔭᖅᑕᐅᓂᐊᕐᓗᓂ, ᐅᕝᕙᓘᓐᓃᑦ ᑕᕆᐅᕐᒥᑦ ᑯᕕᔪᓂᒃ

ᐃᒪᓕᕆᐜᕝᖑᙳᕐᑕᐅᖃᑦᑕᕐᑐᖅ ᑯᕝᑎᑕᐅᓂᐊᕐᓗᓂ ᐃᑎᕝᐊᓄᑦ ᒪᓕᒃᓗᒋᑦ ᐊᕙᑎᓕᕆᔾᒃᑯᑦ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᖕᒐᑦ 006 ᐋᖅᑭᒋᐊᖅᓯᓂᖅ 001, ᑐᓂᔭᐅᓚᐅᖅᑐᖅ ᐊᕗᓐᓂᕝᒃ 2019-ᒥᑦ. 2019-ᒥᑦ, SWTP ᖄᓄᐃᓕᐅᕐᓂᖕᒐ ᑎᑭᐅᑎᓚᐅᖕᒋᑦᑐᖅ ᐋᖅᑭᐅᒪᓂᖕᒐᓄᑦ ᐊᒻᒪᓗ ᒪᓂᒪᓂᖕᒐ ᒥᑭᓂᖅᓴᐅᑉᓗᓂ ᓂᕆᐅᒋᔭᐅᓚᐅᖅᑐᒥᑦ. ᑕᐃᒪᓐᓇᒧᑦ, ᐊᖕᒋᓂᖅᓴᐅᔪᒥᒃ ᓇᓚᐅᑦᑖᖅᑕᐅᓚᐅᖅᑐᓂᐅᖕᒐᓂᑦ ᑲᑎᑉᐸᓪᓕᐊᔪᓂᒃ ᑕᕆᐅᓕᖕᒥᑦ ᐃᒪᖃᖅᑐᖅ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ.

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DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
1	February 2018	All		In compliance with Agnico Eagle's Type A Water Licence 2AM-MEL1631, Part E, Item 14	Golder Associates Ltd. on behalf of Agnico Eagle Mines Limited
2	June 2018	4		In compliance with ECCC comments from 16 March 2018	Golder Associates Ltd. on behalf of Agnico Eagle Mines Limited
3.	December 2018	All		In compliance with Agnico Eagle's Type A Water Licence 2AM-MEL1631, Part E, Item 11	Agnico Eagle Mines Ltd.
		Exec Summary		Updated dates and quantities	
		2.4		Revised mine development plan bullets	
		3.3		Updated saline GW quality	
		3.4		Updated groundwater management strategies	
		4.1		Updated GW monitoring program quantity and quality data	
		4.4		Expanded table 5 monitoring to include SWTP	
4.	March 2019	All		In compliance with Agnico Eagle's amended No. 006 Project Certificate, Condition No. 25	Agnico Eagle Mines Ltd.
		Exec Summary		Updated to include discharge to sea approval	
		1	1-2	Update to include requirements of No. 006 Project Certificate Condition No. 25	
		2.4	5	Addition of SWTP and discharge to sea	
		3.1	6-7	Section revision	
		3.1.1	7-8	Addition of inflow model assumptions/uncertainties	
		3.2	8-9	Updated with discharge to sea	
		3.3	9-10	Interpretation added and table Aug-18 results corrected	
		3.4	11-15	Addition of discharge to sea and update of SWTP performance	
		3.6	16-18	Addition of mitigation measures under greater than expected inflows	
		4.2	19	Addition of second pumping line from UG	
		4.3	21-23	Addition of discharge to sea related sampling/monitoring	
5.	March 2020	All		In compliance with Agnico Eagle's amended No. 006 Project Certificate, Condition No. 25	Agnico Eagle Mines Ltd.

	Exec Summary		General update to reflect updated Plan
	2.4	15	Update high level mine plan, schedule, addition of SETP and RO
	3.1	16-17	General section update, and updated groundwater inflow rates included
	3.2	18-19	Updated saline water control structures
	3.3	19-20	General section update/revision; moved water quality table to Appendix C
	3.4	20-24	Section update to reflect changes to saline water management strategy
	3.5	24	Section revision/update to include SP4, timeline details
	3.6	-	Former Section 3.6 was updated and moved into other sections
	4.1	25-27	General section revision/update, QAQC portion moved to Water Quality and Flow Monitoring Plan and can be found in QAQC plan

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
ANFO	Ammonium Nitrate/Fuel Oil
CP	Collection Pond
DDH	Diamond Drillhole(s)
EMPP	Environment Management and Protection Plan
EWTP	Effluent Water Treatment Plant
FEIS	Final Environmental Impact Statement
GWMP	Groundwater Management Plan
MDMER	Metal and Diamond Mining Effluent Regulations
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
Mine	Meliadine Gold Mine
QA	Quality Assurance
QC	Quality Control
RO	Reverse Osmosis
SD	Support Document
SSWQO	Site Specific Water Quality Objectives
SWTP	Saltwater Treatment Plant
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
WMP	Water Management Plan

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per metre
ha	hectare(s)
mg/L	milligram(s) per litre
km	kilometer(s)
km^2	kilo square meter(s)
m	metre(s)
m/day	metre(s) per day
mm	millimetre(s)
m^3	cubic metre(s)
m^3/day	cubic metre(s) per day
m^3/s	cubic metre(s) per second
m^3/hour	cubic metre(s) per hour
m^3/year	cubic metre(s) per year
Mm^3/year	million cubic metre(s) per year
Mm^3	million cubic metre(s)
t	tonne(s)
tpd	tonne(s) per day
Mt	million tonne(s)

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Mine (Mine), located approximately 25 kilometres (km) north of Rankin Inlet, 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 Mine Project Certificate (No. 006) issued by the Nunavut Impact Review Board in accordance with the Nunavut Agreement Article 12.5.12 on February 26, 2015 and Nunavut Water Board Type A Water Licence (No. 2AM-MEL1631, 2016) issued by the Nunavut Water Board (NWB) on April 1, 2016.

This document presents the Groundwater Management Plan (GWMP) for the collection, treatment, storage and discharge of saline groundwater in accordance with the Type A Water Licence 2AM-MEL1631 (Licence) and in accordance with Condition No. 25 of the amended Mine Project Certificate. The overall water management plan for the life of the Mine and post-closure is described in the Agnico Eagle Meliadine Gold Mine Water Management Plan (WMP).

1.1 Objectives

The objective of the GWMP is to provide consolidated information on groundwater management for the Meliadine Gold Mine. The GWMP is divided into the following components:

- Introductory section (Section 1);
- A brief summary of the physical setting at the mine site and the mine development plan (Section 2);
- A description of groundwater inflow forecasts and management strategies (Section 3); and
- A description of the groundwater monitoring program (Section 4).

The GWMP will be updated as required to reflect any changes in operations or economic feasibility that occurs, and to incorporate new information and latest technology, where appropriate.

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 Mine 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 metres (m).

The local overburden consists of a thin layer of topsoil overlying silty gravelly sand glacial till. Cobbles and boulders are present throughout the region at various depths. 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 2009).

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.

Late-winter ice thicknesses on freshwater lakes in the mine site area were recorded from 1998 to 2000. The measured data indicated that ice thickness ranges from 1.0 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 typically begins in mid-June and is complete by early July (Golder 2012b).

2.2 Local Hydrology

The Mine is located within the Meliadine Lake watershed. Meliadine Lake has a surface water 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 from 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.

2.3 Hydrogeology

The Mine is located in an area of continuous permafrost. Based on thermal studies and measurements of ground temperatures, the depth of permafrost at the mine site is estimated to be in the order of 360 to 495 m. The depth of the active layer ranges from about 1 m in areas with shallow overburden, up to about 3 m adjacent to the lakes. The depth of the permafrost and active layer varies depending on proximity to the lakes, overburden thickness, vegetation, climate conditions, and slope direction (Golder 2012b). The typical permafrost ground temperatures at the depths of zero annual amplitude are in the range of -5.0 to -7.5 °C in the areas away from lakes and streams. The geothermal gradient ranges from 0.012 to 0.02 °C/m (Golder 2012c).

Groundwater characteristics at the Mine are detailed in Final Environmental Impact Statement (FEIS) Volume 7, Section 7.2 Hydrogeology and Groundwater, and in a hydrogeological assessment completed for the Mine (Golder 2016). The groundwater characteristics for the Mine are briefly summarized below.

Two groundwater flow regimes in areas of continuous permafrost are generally present:

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

From late spring to early autumn, when temperatures are above 0 ˚C, the active layer thaws. Within the active layer, the water table is expected to be a subdued replica of topography, and is expected to parallel the topographic surface. Mine area groundwater in the active layer flows to local depressions and ponds that drain to larger lakes.

Taliks exist beneath waterbodies that have sufficient depth such that they do not freeze to the bottom over the winter. Beneath small waterbodies that do not freeze to the bottom over the winter, a talik bulb that is not connected to the deep groundwater flow regime will form (a closed talik). Elongated waterbodies with terraces (where the depth is within the range of winter ice thickness), a central pool(s) (where the depth is greater than the range of winter ice thickness), and a width of 340 to 460 m or greater are expected to have open taliks extending to the deep groundwater flow regime at the Mine site. A review of bathymetric data, ice thickness data, and results of thermal modelling suggests that Meliadine Lake and Lake B7 are likely to have open taliks connected to the deep groundwater flow regime (Golder 2012a).

Tiriganiaq Underground Mine is planned to extend to approximately 625 m below the ground surface; therefore, part of the underground mine will be operated below the base of the frozen permafrost (top of the cryopeg). The underground excavations will act as a sink for groundwater flow during operation, with water induced to flow through the bedrock to the underground mine workings once the mine has advanced below the base of the frozen permafrost.

Both Tiriganiaq Pit 1 and Tiriganiaq Pit 2 will be mined within the frozen permafrost, therefore, groundwater inflows to the open pits is expected to be negligible.

2.4 Mine Development Plan

The Mine Plan proposes 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. The current mine plan applies the following approach for the development of the Tiriganiaq gold deposit:

- Tiriganiaq Underground Mine will be developed and operated from Year -5 to Year 8 (2015 to 2027);
- Tiriganiaq Pit 1 will be mined from Year 2 to Year 7 (2021 to 2026); and
- Tiriganiaq Pit 2 will be mined from Year 1 to Year 3 (2020-2022).

Mine facilities on surface include a plant site and accommodation buildings, two ore stockpiles, a temporary overburden stockpile, a tailings storage facility, three waste rock storage facilities, a water management system that includes containment ponds, water diversion channels, retention dikes/berms, a final Effluent Water Treatment Plant (EWTP), a Saline Water Treatment Plant (SWTP), a Reverse Osmosis Plant (RO), and a Saline Effluent Treatment Plant (SETP). Details on each treatment plant can be found in the WMP.

SECTION 3 • GROUNDWATER MANAGEMENT STRATEGY

3.1 Groundwater Volumes

In the WMP of the water licence application (Agnico Eagle 2015a) it was stated that supplemental hydrogeological investigations were to be undertaken to provide additional information on potential volumes and quality of the saline groundwater to be managed. These investigations were undertaken in 2015 and 2016 and are summarized in Golder (2016). They included the completion of twenty-four packer tests, two pumping tests, two injection tests, eleven groundwater samples, and seven surface water samples. The work plan for the fieldwork was developed in consultation with two independent technical advisors, Dr. Shaun K. Frape and Dr. Walter A. Illman (both of the University of Waterloo).

The additional hydraulic conductivity measurements resulted in a refined interpretation on the variability of hydraulic conductivity between geological formations and data on the storage properties of the bedrock. Furthermore, piezometer data records and diamond drillhole (DDH) water intersect data was applied to re-calibrate the model in 2019. A summary of predicted groundwater inflows between 2019 and 2033, based on this refined interpretation and re-calibration, are provided in Table 1.

Table 1: Predicted Groundwater Inflow to Underground Mine (2020 to 2032)

Year	Quarter	Predicted Groundwater Inflow (m^3/day)
2019	Q1	380
2019	Q2	400
2019	Q3	430
2019	Q4	420
2020	Q1	410
2020	Q2	410
2020	Q3	420
2020	Q4	420
2021	Q1	420
2021	Q2	430
2021	Q3	440
2021	Q4	460
2022	Q12	480
2022	Q34	510
2023	-	530
2024	-	540
2025	-	580
2026	-	570

2027	-	530
2028	-	510
2029	-	490
2030	-	480
2031	-	470
2032	-	460
2033	-	450

Predicted groundwater inflow rates provided in Table 1 represent unmitigated inflow forecasts; not accounting for inflow mitigations currently being conducted to reduce groundwater inflows to the underground development. Over 2019, inflow mitigation included both grouting (pre-production and in response to inflows) and avoiding mining in areas expected to produce high groundwater inflow rates. As such, the magnitude of inflow forecasts in Table 1 were not sustained throughout 2019, but were rather periodically approached and mitigated.

Combined (mine-wide) groundwater inflow values to the Underground Mine are currently estimated by manually measuring and summating all visible inflows across the mine (Section 4). The mitigated inflows over 2019 was measured up to 394 m^3/day. It is important to note that as mining advances, inflow rates are susceptible to rapid and sustained increase if water bearing structures are intercepted within stopes, where grouting is not possible. As such, and as noted above, mining in areas known to contain highly-pressurized, large-scale water bearing structures is currently being avoided due to limited capacity to manage forecasted inflow rates. The long-term groundwater management strategy (Section 3.4.3) will aim to provide capacity to manage non-mitigated inflows over the life of mine.

3.1.1 Groundwater Inflow Predictions – Assumptions and Uncertainties

Hydraulic conductivities of both the Hanging Wall and Footwall units are assumed to be reduced by an order of magnitude between the top of the basal cryopeg and the bottom of the cryopeg. This assumption reflects that this portion of the permafrost, which will contain unfrozen groundwater due to freezing point depression (salinity and pressure induced), is expected to have reduced hydraulic conductivity relative to the unfrozen bedrock because of the presence of isolated pockets of frozen groundwater within this zone. Linearly decreasing hydraulic conductivity with temperature is assumed within this zone, with a full order of magnitude decrease assumed at the top of the basal cryopeg, and hydraulic conductivity equivalent to the unfrozen rock at the bottom of the cryopeg.

In crystalline rocks, fault zones may act as groundwater flow conduits, barriers, or a combination of the two in different regions of the fault depending on the direction of groundwater flow and the fault zone architecture. These zones, termed Enhanced Permeability Zones (EPZs), were assigned hydraulic conductivity values based on both field measurements and testing conducted at similar faulting in various locations within the Canadian Shield. Furthermore, EPZs were assumed not to be impacted by isolated freezing in the cryopeg and were therefore assigned similar hydraulic conductivity values within and below the cryopeg. The latter assumption along with the assumption that all faults are considered EPZs is considered conservative. For instance, observations made at other gold mines in the Canadian Shield indicate not all faults are EPZs (Golder, 2016).

Based on the geometry of water bodies, it was assumed that Lake B7, Lake D7, and Meliadine Lake possess open taliks connected to the deep groundwater flow regime. It was conservatively assumed that the surface water/groundwater interaction through open taliks is not impeded by lower-permeability lakebed sediments that may exist.

Combined, the assumptions discussed above result in the following sources of uncertainty in the groundwater inflow model:

1. If there is a lack of reduction in hydraulic conductivity between the top of the basal cryopeg and the bottom of the cryopeg, it is likely that greater than expected inflows upon stoping will occur in the cryopeg (300 to 450 m below ground surface).
2. If faults within the model do not act as EPZs, then it is expected that inflows resulting from development near these structures will be less than expected. The degree of deviation from expected inflows and timing will be dependent on the location of the structure in relation to development.
3. If hydraulic conductivity of faults within the cryopeg are impacted by isolated freezing, then lower than expected inflows will be observed when development in the cryopeg progresses near the structures. The degree of deviation from expected inflows and timing will be dependent on the location of impacted EPZs in relation to development.
4. If significant thicknesses of lakebed sediments with relatively low permeability exist within in the flow path connecting surface water to groundwater through open taliks, it is likely that mine-wide inflows will be less than expected due to a reduction in expected recharge to the groundwater flow regime.

3.2 Existing Groundwater Management Control Structures

Contact water in the Underground Mine is contained within underground sumps, in non-active development underground, and in the surface saline ponds. Over 2019 this included Saline Pond 1 (SP1) and Saline Pond 2 (SP2). Saline Pond 3 (SP3) acts as a temporary final storage pond where the SETP effluent is stored prior to discharge to sea. As discussed in the WMP, SP2 will be replaced by Saline Pond 4 (SP4) in March 2020. A proportion of the underground water is recirculated as make-up water for underground drilling. The remaining underground water is stored for desalination treatment by the SWTP (Section 3.4.2), or treatment by the SETP for discharge to sea. Over 2020, excess underground contact water stored in non-active development will be transferred to SP4 to allow advancement of the current mine plan.

In previous years (2016 – 2018) saline water was directed to and stored in the P-Area containment ponds (P1, P2, and P3) for evaporation. In 2019, inputs to the P-Area were limited in an effort to begin the decommissioning process of the containment structures. In 2020, saline water inputs to the P-Area are not planned and the only planned inputs will be the result of precipitation runoff; in order to facilitate the decommissioning of the P-Area in 2020.

Calcium chloride is currently not added to the underground water but has been used in the past to prevent freezing in drill holes when drilling in permafrost with low salinity drill water.

A schematic of the underground dewatering system is provided in Appendix B. Pond capacities for storage of saline water are presented in Table 2.

Table 2: Salt Water Storage Capacity at the Mine for Groundwater and Water Primarily Influenced by Underground Workings

Surface Pond	Capacity (m^3)	Occupied storage capacity (m^3)
Saline Pond 1	32,686	27,227
Saline Pond 2*	78,862*	76,000
Saline Pond 3	7,895	Emptied for winter
Saline Pond 4	233,122**	121,689†
P1	20,781	3,158§
P2	6,828	237§
P3	2,912***	1,821§

Source: Agnico Eagle (2017).

* SP2 to be decommissioning in March 2020 (Section 3.2). Volume stored in SP2 will be transferred to SP4 (Section 3.4.1)

** Based on Design, subject to change based on As-Built

*** Adjusted for volume reduction due to Saline Pond 3 construction (Water Management Plan Section 3.4)

† Accounting for emptying of SP2 and underground storage to SP4 (Section 3.4.1)

§ No saline water additions to P-Area planned for 2020 to support potential decommissioning of P-Area (Section 3.4.1)

Based on forecasted groundwater inflow rates (Table 1) and groundwater management strategies currently in place (Sections 3.4.1 and 3.4.2), it is expected that saline pond storage shown in Table 2 (excluding P-Area ponds) will be at capacity by mid-May 2021. Further information is provided in Section 3.4.2.

3.3 Groundwater Quality

Historically, groundwater investigations suggested that total dissolved solids (TDS) concentrations are relatively consistent below the permafrost at approximately 64,000 mg/L (Golder 2016). Groundwater quality samples have been collected from 2017 through 2019 from diamond drillholes (DDHs) intersecting water bearing structures (Section 4). Results from the 146 samples collected from 2017 to 2019 indicate stable and consistent concentrations for several parameters (Appendix C) and indicate that TDS concentrations are less than predicted at a mean concentration of 56,000 mg/L. The discrepancy between expected and observed TDS levels is potentially due to the difference of sampling depth between pre-development testing and samples collected during development. Pre-development samples were collected below permafrost (>450 m below ground surface), whereas the bulk of samples collected to-date have been collected in the basal cryopeg (280 m to 450 m below ground surface). Samples and trends will continue to be assessed as development progresses below the cryopeg. It should also be noted that mining operations include drill-and-blast excavation for the development of the Underground Mine, which results in certain parameters in groundwater to be influenced by explosives (particularly ammonia and nitrate).

3.4 Groundwater Management Strategy and Associated Control Structures

Based on the groundwater inflow volume, the following options were considered and form part of the short-, medium- and long-term management of groundwater inflows to the Underground Mine:

- Short-term Strategy: Store saline contact water on site (Section 3.4.1)
- Medium-term Strategy: Treat saline groundwater for discharge to receiving environment in Meliadine Lake and Melvin Bay via trucking (Section 3.4.2)
- Long-term Strategy: Treat saline groundwater for discharge to receiving environment in Melvin Bay via waterline (Section 3.4.3).

The short-, medium- and long-term groundwater management strategies are described below.

3.4.1 Short-Term Management Strategy - Groundwater On-site Storage

This alternative was considered as part of the Type A Water Licence Application and has been implemented on site as part of the short-term management of groundwater inflow. It involves storing all excess groundwater in an underground water stope and in dedicated surface saline water ponds at the Mine. As outlined in the WMP, a total of twelve water containment ponds are planned on Site at the Mine surface. These are CP1, CP3, CP4, CP5, CP6, the P-Area (P1, P2, and P3), SP1, SP2 (to be replaced by SP4 in 2020), SP3 and SP4). Ten of these have been constructed and are in use (CP1, CP3, CP4, CP5, P-Area [P1, P2, and P3], SP1, SP2, and SP3). SP2 is scheduled for decommissioning in Q2 2020 to allow the mining of Tiriganiaq Pit 2. SP2 is to be replaced by SP4, which is scheduled to be commissioned in March of 2020. The addition of SP4 has two purposes. First, to replace SP2 and allow the mining of Tiriganiaq Pit 2, and second, to supply additional storage for saline water on site. The additional storage is required due to continued groundwater infiltration to the underground workings and finite existing surface storage capacity. In March of 2020 following the completion of SP4, water contained within SP2 and water currently stored in development underground will be transferred to SP4. SP2 will be decommissioned following this transfer of water. Further information on storage ponds is included in the WMP.

Five saltwater evaporators have been in-use on site since mid-2017 at P1 to reduce saline groundwater volumes stored in surface water ponds. While evaporators have been used with some success, realized groundwater inflows to be managed is greater than the available long-term storage at the Mine, and therefore, discharge to environment has been required and was initiated in 2019 (Section 3.4.2). No additional saline water inputs were made to the P-Area throughout 2019. All subsequent inflows to the P-Area were primarily the result of direct precipitation and surface run-off from up-gradient areas. Throughout 2020, inputs to the P-Area will continue to be kept minimal to facilitate the potential for decommissioning of the P-Area in 2020.

3.4.1.1 Short-Term Mitigation Measures – Increased Storage and Treatment Rate

Upon the occurrence of greater than expected groundwater inflows to the underground mine, Agnico Eagle will utilize contingency saline water storage ponds until inflows can be reduced or treatment/discharge is capable of managing inflows.

As of March 2020, the commissioning of SP4 (and decommissioning of SP2) will introduce an additional 155,000 m^3 of saline water storage on surface. Under the condition that SP4 reaches capacity due to higher than expected inflows, the mine plan as it relates to open pits, can be adapted to provide additional storage (for example mining Tiriganiaq Pit 2 can be stopped to accommodate saline water storage needs and SP4 water can be transferred so that mining of Tiriganiaq Pit 1 is made possible). Furthermore, additional adaptive management measures with regards to saline water at Meliadine are being explored.

It will be the goal of Agnico Eagle to reduce the amount of saline water stored in SP1, SP4 and underground as much as possible during the open water season through discharge to sea in order to maximize storage potential.

3.4.2 Medium-Term Management Strategy

3.4.2.1 Saltwater Treatment Plant (SWTP) - Desalination

Agnico Eagle has constructed and commissioned a Salt Water Treatment Plant (SWTP) consisting of two evaporator crystallizers (SaltMakers) used to treat groundwater. The SWTP removes excessive total suspended solids (TSS), calcium chloride ($CaCl_2$), sodium chloride (NaCl), metals, phosphorous (P), and nitrogen compounds from the influent saline water.

The SWTP consists of two parallel units. Each unit can be operated to produce brine or solid by-product. The SWTP will operate in solid-mode over the duration of 2020 however at a reduced capacity due to design challenges. Further specifications of the SWTP can be found within the SWTP Design Report (Agnico Eagle 2018) and the SWTP As-Built Report (Agnico Eagle 2019a).

Following the commissioning of the SWTP in solid-mode over 2019, the actual operational rate has been less than design. Over Q3 and Q4 of 2019, the combined treatment rate of the two Saltmaker units (120 m^3/day design total) was reported at 46.5 m^3/day. Furthermore, availability has been much lower than expected over this same period. As a result, over Q3 and Q4 over 2019, the SWTP treated a calculated total of 6,045 m^3 (compared to a design calculated total of 20,862 m^3).

SWTP effluent is currently discharged to CP5, which is then transferred to CP1 and subsequently discharged to the receiving environment in Meliadine Lake. EWTP effluent discharge to Meliadine Lake was performed in 2019 in accordance with the conditions outlined in Part F, Item 3 of the Water Licence. Discharge to Meliadine Lake, including the treated groundwater, will remain within the permitted discharge criteria defined in the License, be non-acutely lethal, and meet the Canadian federal end-of-pipe discharge criteria (per the amended MDMER; GC 2019). Additionally, SSWQOs for EWTP effluent (including treated groundwater) will be met at the edge of the mixing zone in Meliadine Lake. Further details regarding the EWTP are provided in Sections 3.9.4 and Section 4.3 of the WMP.

3.4.2.2 Saline Effluent Treatment, Storage and Haulage

The site will be increasing the trucking and volumes of discharge at Melvin Bay. The increased trucking was included in the Roads Management Plan (Agnico Eagle, 2019b). The increased volume for discharge to Melvin Bay will be elevated from 800 m^3/day to 1600 m^3/day.

Saline water will be pumped from underground and stored in SP1 and SP4. Saline water will then be transported to the Saline Effluent Treatment Plant (SETP) for treatment of ammonia and total suspended solids (TSS). Treated saline water will meet MDMER end-of-pipe discharge criteria and be non-acutely and non-chronically toxic as per regulated toxicity testing per the MDMER. Initial treatment will include TSS removal. Next, breakpoint chlorination treatment will be applied to remove elevated ammonia levels, which are inferred to be the result of the use of explosives. Excess free chlorine will be removed with activated carbon filters. Following the activated carbon filters, saline water will be pumped to Saline Pond 3 (SP3) for final settling and storage. The SETP will be designed to treat 1,600 m^3/day of saline water for TSS and ammonia.

Treated saline water stored in SP3 will hauled by tanker trucks to Itivia. Truck loads will be up to 36 m^3 per truck and will be unloaded using a flexible 4” HDPE suction pipe. The truck discharge pump will transfer the treated effluent into the 6’’ discharge HDPE pipeline and through the diffuser. The truck discharge pump will also be used to transfer effluent into the storage tank until the next day before it is pumped into sea, when necessary. Further information on trucking can be found in the Roads Management Plan (Agnico Eagle 2019b).

Based on forecasted groundwater inflow values provided in Table 1 and the medium-term strategy described here, it is expected that saline water storage capacity (Table 2) will be at capacity by mid-May 2021. Thus, short- and medium-term strategies described in this section are not sustainable. This assessment does not incorporate SWTP application due to unreliability of the treatment plant.

3.4.2.3 Pumping and Diffusion Plan 2020

The flow rate to be discharged to Melvin Bay will not exceed 1,600 m^3/day with a TDS of 39,600 mg/L. The discharge facility includes a 778 m pipeline extending to an engineered diffuser located 20 m below surface in Melvin Bay to ensure proper mixing and prevent interference with traditional activities. Pumping will occur during the summer season (June to October) of 2020 and following years until the long-term strategy is approved and constructed. The saline effluent will be discharged in a controlled manner through the diffuser to allow for maximum diffusion and minimum environmental impact to the marine environment. Environmental monitoring is discussed in the Ocean Discharge Monitoring Plan (Agnico Eagle, 2020).

The effluent discharge system will consist of a discharge pump, a 50,000 L storage tank, as well as suction and discharge pipelines. The 50,000 L storage tank will only be used to contain the treated effluent until the next day, if the 1,600 m^3/day discharge limit is attained upon a truck's arrival. The storage tank is installed on a containment area, built on a geomembrane with underlying and overlying granular materials and surrounded by berms.

3.4.2.4 Medium-Term Mitigation Measures – Groundwater Monitoring

Hydraulic Monitoring

As a strategy to support groundwater inflow modelling and monitor groundwater responses to mining, twelve (12) vibrating wire piezometers are currently installed in the rock mass surrounding the Underground Mine. These piezometers are currently and will continue to be applied to assess response of the groundwater pressure (pressure head) to groundwater inflows, and as calibration data for the groundwater inflow model (Section 3.1).

Furthermore, a hydrogeological investigation is currently ongoing as a means to provide additional calibration data/information for the hydrogeological model. The purpose of this data collection is both to increase the understanding of local hydrogeology and to reduce uncertainty of groundwater modelling. The hydrogeological investigation is being carried out over 10 – 15 DDHs and includes: core logging of water bearing structures; hydrogeological testing to characterize aquifer and fracture hydrogeological properties; and installing up to 20 vibrating wire piezometers. The investigation is expected to be completed by end of Q2 2020.

Groundwater Quantity and Quality Monitoring

The groundwater monitoring program (Section 4) allows ongoing comparison of modelled water quantity/quality to realized trends. Details pertaining to the groundwater monitoring program are found in Section 4.

Non-contact groundwater samples as part of the groundwater monitoring program are used to identify trends and improve predictions regarding groundwater inflow chemistry. If non-contact groundwater samples collected indicate that TDS concentrations are more than 20% higher than the estimated 64,000 mg/L (Section 3.3), then water quality predictions for underground will be reviewed and updated, if required.

Similarly, observed groundwater inflow rates are compared to model predictions (Table 1) on a yearly basis. If significant variations from model predictions are observed, the assumptions/inputs behind the model will be reviewed and the model updated, if required. In addition, updates to the groundwater model may be required based on operational changes as the Underground Mine advances.

3.4.3 Long-Term Management Strategy - Treated Groundwater Discharge to Melvin Bay at Itivia Harbour via a Waterline

Based on the current inventory of saline water stored on site (Table 2), plus current and forecasted groundwater inflows (Section 3.1), the proposed long-term strategy of discharging to Melvin Bay via a waterline will be required to ensure we meet all obligations. The long term strategy will be submitted to the appropriate authorities in Q1 2020.

3.5 Discharge Schedule - 2020

The following Table summarizes the 2020 discharge schedule.

Table 3: High Level Mine Water Management Schedule - 2020

Activity	Timeline	Notes
On-site water storage	Ongoing	SP4 replacing SP2 in March 2020
Discharge saline water to the sea (Melvin Bay, Rankin Inlet)	Annually June through October	Typically open water initiates discharge to Melvin Bay
Active Discharge to Meliadine lake	Annually May through October;	—
Operation of Salt Water Treatment Plant	24 hr. a day / 7 days a week, year round	In-service as required
Inactive Discharge	Annually November through May	Water will be stored underground and in surface containment ponds during the winter until the long-term strategy is implemented

SECTION 4 • GROUNDWATER MONITORING PROGRAM

4.1 Water Quality and Quantity Monitoring

Water quantity and quality monitoring is an important part of the groundwater management strategy to verify the predicted water quantity and quality trends and conduct adaptive management should differing trends be observed.

Groundwater monitoring is carried out for operational and water management purposes by Agnico Eagle. This monitoring data will not be reported to the Regulators in the Annual Water License Report, but can be provided upon request by the Regulators.

The groundwater monitoring plan, summarized in Table 4, will be further defined as the Mine advances and will be conducted in agreement with the WMP for the Mine (Agnico Eagle 2019c).

4.1.1 Water Quantity

Combined (mine-wide) groundwater inflow rates to the Underground Mine are currently estimated by manually measuring and summating all visible inflows across the mine. Recorded measurements are logged in a database from which daily estimated inflow rates can be produced. The database is updated accordingly as flow rates at existing inflow locations change (i.e., grouted) and as new inflows are observed. Thus, the database is maintained to represent the current state of mine-wide groundwater infiltration. Groundwater inflow rates are compared to modelled rates (Table 1) on a quarterly basis (Section 3.4.2.3).

Excess underground water volumes transferred from the Underground Mine to storage ponds on surface (SP1 and SP4) are recorded at a flow meter located after the main pumping station from underground to surface. Furthermore, water volumes in SP1 and SP4 are tracked via water elevation surveys applied to volume-elevation curves. Further details pertaining to the underground water management system can be found in Appendix C.

4.1.2 Water Quality

Underground Contact Water

Underground contact water is sampled on a monthly basis at the locations identified in Table 4. All underground contact water sampling locations are analyzed for the following parameters: conventional parameters (specific conductivity, TDS, TSS, pH, hardness, alkalinity, total and dissolved organic carbon, turbidity), oil and grease, major ions, total and free cyanide, radium 226, dissolved and total metals (including mercury), nutrients (nitrate and nitrite, ammonia, Kjeldahl nitrogen, total phosphorus, orthophosphate) and volatile organic compounds (i.e., benzene, xylene, ethylene toluene, F2-F4 petroleum hydrocarbons). The Sump 125 sampling location (sampled 2016 – 2019) will be replaced by the Level 300 sampling location in 2020 due to reconfiguration of the underground water management system (Appendix C).

Non-contact Groundwater

Non-contact groundwater quality is monitored at mine seeps and/or DDH water intersects to verify the quality of formation water flowing into the mine prior to contact. Flushing and sampling techniques used to ensure samples are taken without contamination are described in Section 2.2.3 of the Quality Assurance/Quality Control Plan (Agnico Eagle, 2019d). Samples are collected quarterly at a minimum but actual sampling frequency may be greater depending on rate of progress, frequency of water intersects, and observed trends in groundwater quality with time. DDH intersect water samples are analyzed for the following parameters: conventional parameters (specific conductivity, TDS, TSS, pH, hardness, alkalinity, total and dissolved organic carbon, turbidity), major ions, nutrients (nitrate and nitrite, ammonia, Kjeldahl nitrogen, total phosphorus, orthophosphate), radium 226, dissolved and total metals (including mercury). Results from DDH water intersect sampling over 2017 – 2019 can be found in Appendix D.

Saline Water Treatment Plant (SWTP) Influent and Effluent

Water samples at the SWTP are currently collected every two weeks at both the inlet and outlet of the SWTP. The results of the sample analysis are used by SWTP operators to fine-tune the treatment process and ensure its optimal performance. Samples taken at the outlet of the SWTP are analyzed to provide the quality of treated water produced by the SWTP that is transferred to CP5.

Water samples are analyzed for the following parameters: conventional parameters (pH, hardness, TDS, TSS), chloride, sulphate, nutrients (nitrite and nitrate, ammonia, total phosphorus), total metals (including mercury), total and free cyanide, oil and grease and volatile organic compounds (F2-F4 petroleum hydrocarbons)..

Table 4 presents a summary of the groundwater monitoring plan presented in Section 4.1.

Table 4: Groundwater Monitoring Plan

Monitoring Type	Monitoring Location	Purpose	Frequency
Verification	Underground Seeps	Quantity - Seepage survey to verify underground inflow rates	Updated daily
Verification	SP1 and SP4	Quality – Monitor quality of surface saline storage ponds	Monthly

Monitoring Type	Monitoring Location	Purpose	Frequency
Verification	Level 300 pre-clarification	Quality – Monitor quality of collective saline contact water underground prior to clarification	Monthly
Verification	Underground seeps/DDHs	Quality – Verify quality of groundwater flowing into underground mine	Quarterly
Verification	SWTP Inlet and Outlet	Quality – Monitor quality of saline contact water being pumped from underground and monitor final treated effluent prior to continued transfer to CP5	Every two weeks

Source: Agnico Eagle (2018).

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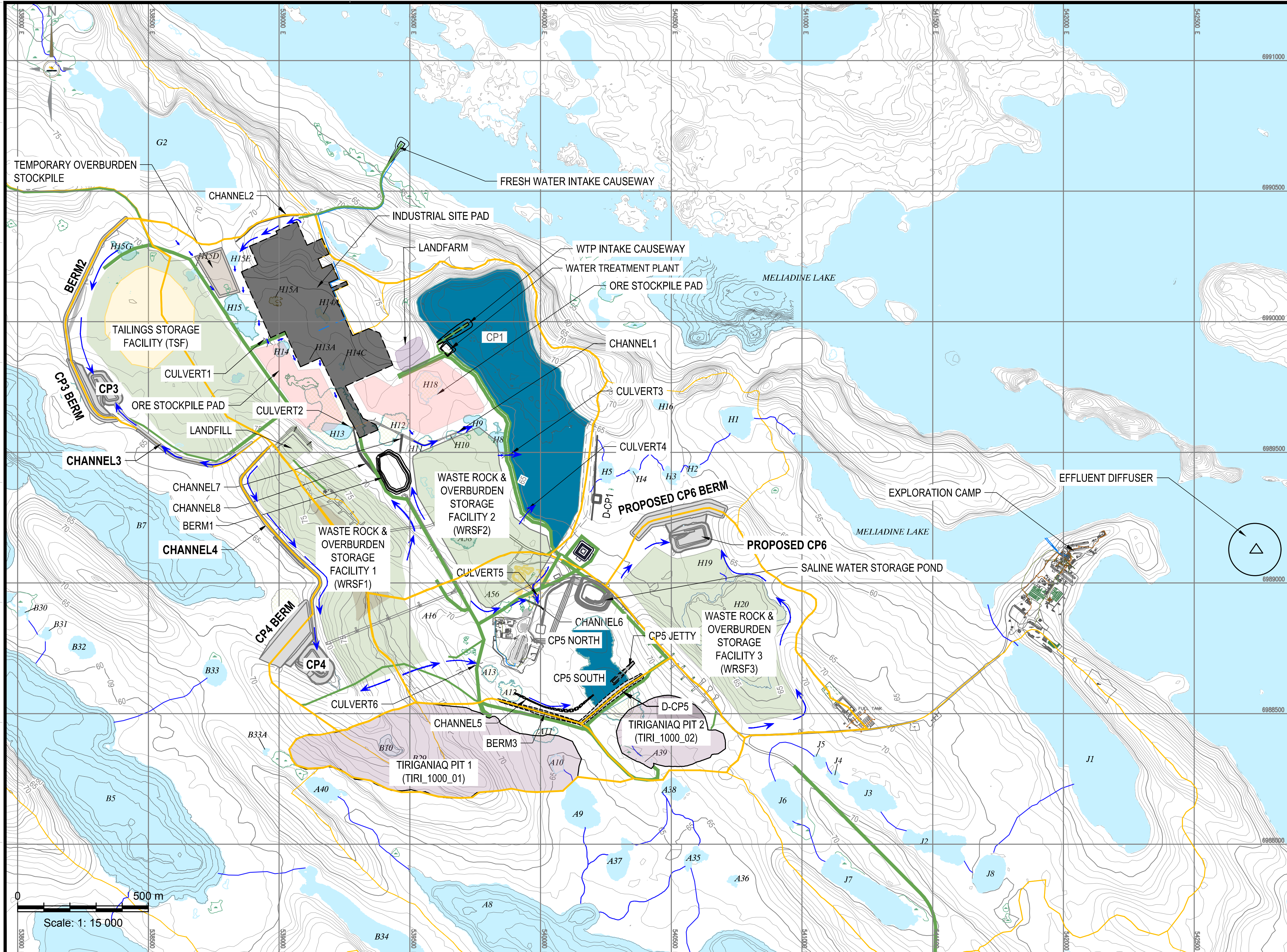
APPENDIX A • SITE LOCATION AND MINE SITE LAYOUT

NO. DESSIN
DRAWING NO.

FORMAT ANSI B–11x17



LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OPEN PIT
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- CONTACT WATER FLOW DIRECTION

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TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY
0	ISSUED FOR USE	01–22–2020	GZ
A	ISSUED FOR REVIEW	01–17–2020	GZ

REVISIONS

DESSINÉ PAR / DRAWN BY	EL	DATE	01–22–2020
VÉRIFIÉ PAR / CHECKED BY	GZ		01–22–2020
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.	6526		
DATE			

TITRE / TITLE

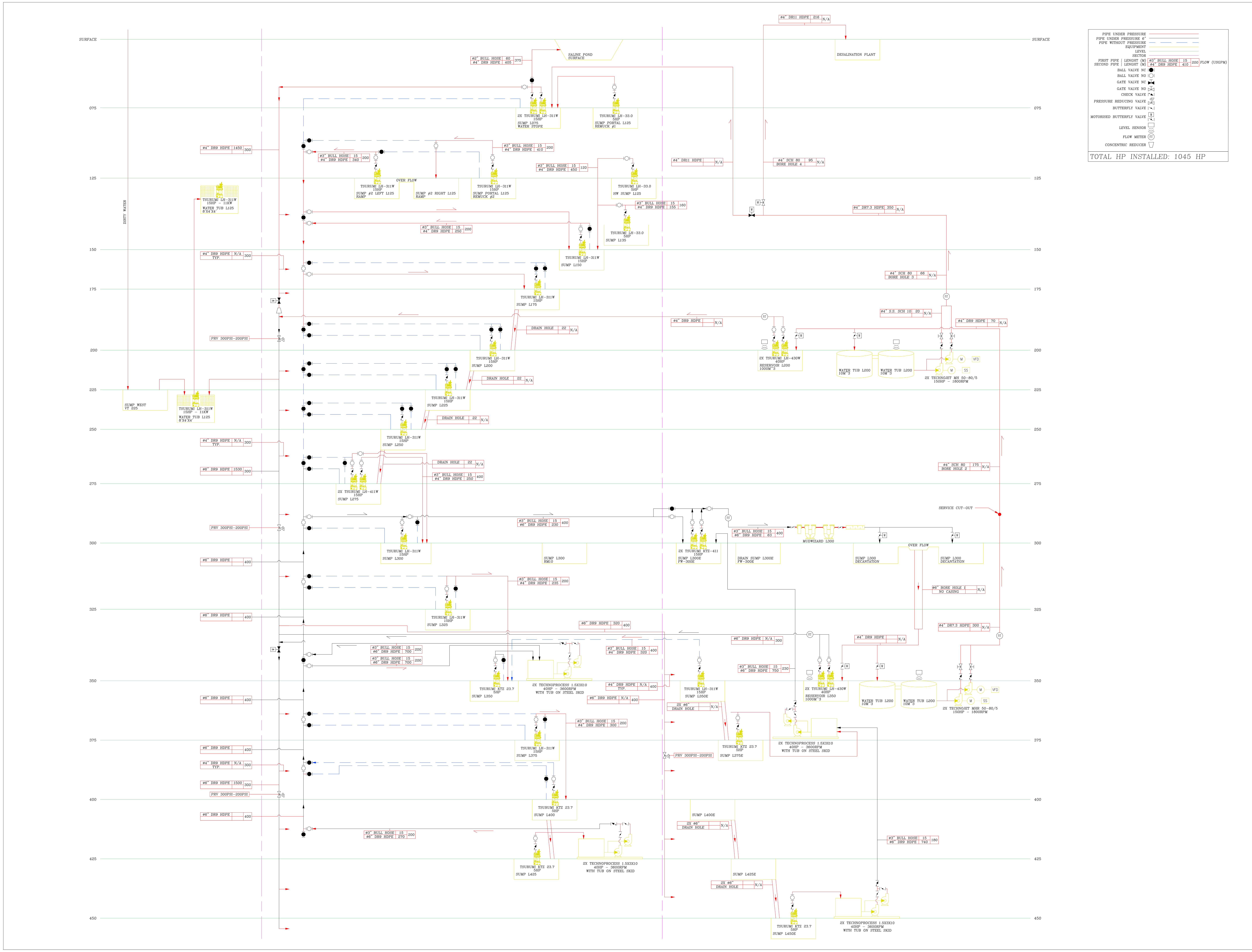
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 2 LOCATION PLAN FOR CP6 AND CP6 BERM AS SHOWN ON GENERAL SITE LAYOUT PLAN FOR PROPOSED INFRASTRUCTURE DURING MINE OPERATION (YEAR 7)

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.		REVISION 0	FEUILLE/SHT 1 / 1

AE–CART–ANSI B

Q:\Edmonton\Engineering\E141\Projects_MELIADINE\ENG.EARC03140–06 (CP6)\Figure for Design Report\Figure 2 IFU.dwg

APPENDIX B • UNDERGROUND WATER MANAGEMENT FLOW SHEET DIAGRAM



NOTE:
- ESTIMATED LENGTH OF PIPING, TO BE CONFIRMED BY COSTUMER.

NE PAS UTILISER POUR CONSTRUCTION (NOT FOR CONSTRUCTION)

POUR APPROBATION (FOR APPROVAL) DATE : 2018-08-02

REV	DATE	DESCRIPTION	INIT.	INIT.
D	2018-11-15	ISSUED FOR COMMENTS	A.L.	A.L.
C	2018-09-26	ISSUED FOR COMMENTS	P.B.	M.B.
B	2018-09-18	ISSUED FOR COMMENTS	P.B.	M.B.
A	2018-08-08	ISSUED FOR COMMENTS	P.B.	A.L.

ÉMISSION/ISSUED FOR

Technosub

CLIENT: AGNICO EAGLE
MELIADINE

PROJET/PROJECT: WATER MANAGEMENT AUDIT
P1806201

TITRE/TITLE:
FLOWSHEET DIAGRAM
MID TERME
NOVEMBER 2018

CONÇU PAR/DESIGNED BY: A. Labbe, P. Eng. INIT.
DESSIN PAR/DRAWN BY: P. Bellerose INIT.
VERIFIÉ PAR/CHECKED BY: A. Labbe, P. Eng. INIT.
APPROUVÉ PAR/APPROVED BY: A. Labbe, P. Eng. INIT.
ÉCHELLE/SCALE: N/A
DATE DE CRÉATION/CREATION DATE: 2018-08-08
DE PROJET/PROJECT #: P1806201
DE DESSIN/DRAWING #: P1806201-0002
REVISION: D

ÉCHELLE DE TRACÉ/PLOT SCALE: 0.037902

APPENDIX C • GROUNDWATER QUALITY SAMPLING RESULTS 2017 - 2019

Table 1 DDH water intersect data collected at the Meliadine underground mine from 2017 – 2019. Monthly values are mean concentrations from water samples collected over the given month.

Representative Months (average per month)		17-Jan	17-Feb	17-Mar	17-Apr	17-May	17-Jun	17-Jul	17-Aug	17-Sep	17-Oct	17-Nov	17-Dec	Mean for 2017
Parameters (total metal)	**Units**													
pH	pH	7.08	6.87	7.11	7.32	7.38	7.27	8.27	7.45	7.33	7.41	7.26	7.18	7.33
Alkalinity	mg/L	57	57.5	51	64.5	68	68	75	68.2	64	64	69	66	64
Conductivity	µmhos/cm	77000	76500	77000	79000	79000	76308	74385	72200	72667	78667	85000	80667	77366
Total Hardness (as $CaCO_3$)	mg/L	13200	13050	12700	18400	12433	12623	12500	12583	11700	12600	14100	12733	13219
Turbidity	NTU	123.8	62	88.0	90.0	51.0	75.0	61.0	47.0	104.3	55.0	30.0	53.0	70.0
Total Dissolved Solids (TDS)	mg/L	54350	54600	54900	57500	57300	55123	57815	57520	54567	57867	62000	55133	56556
Total Suspended Solids (TSS)	mg/L	45.0	43.5	63.0	248.5	102.7	102.2	156.0	86.0	102.0	316.7	30.0	56.0	112.6
Aluminum (Al)	mg/L	0.210	0.06	6.020	1.290	0.510	1.450	0.730	0.970	1.750	2.063	0.150	0.250	1.288
Ammonia Nitrogen (NH_3-NH_4)	mg/L	4.13	7.9	4.50	4.95	5.20	5.51	11.08	4.87	4.70	6.10	4.80	4.70	5.70
Arsenic (As)	mg/L	0.003	0.006	0.010	0.008	0.004	0.016	0.016	0.102	0.013	0.047	0.006	0.009	0.020
Barium (Ba)	mg/L	0.060	0.05	0.100	0.270	0.070	0.090	0.250	0.100	0.070	0.113	0.082	0.094	0.112
Beryllium (Be)	mg/L	0.003	0.002	0.010	0.002	0.002	0.005	0.008	0.010	0.010	0.008	0.005	0.008	0.006
Boron (B)	mg/L	1.60	1.6	5.00	4.90	1.50	2.70	3.97	5.00	2.50	4.17	2.50	4.17	3.30
Total Organic Carbon (TOC)	mg/L	2.23	2.5	2.10	2.95	2.63	3.20	5.30	2.57	2.50	16.27	3.00	2.67	3.99
Dissolved Organic Carbon	mg/L	1.90	2.3	1.70	2.30	2.37	2.70	4.90	2.32	2.10	13.70	2.80	2.33	3.45
Calcium (Ca)	mg/L	1710	1740	1650	3737	1593	1608	1771	1610	1565	1720	1770	1587	1838
Cadmium (Cd)	mg/L	0.000	0.0002	0.001	0.000	0.000	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.001
Chloride (Cl - dissolved)	mg/L	31250	38000	31000	31500	32000	31385	31538	32800	29333	32333	34000	33000	32345
Chromium (Cr)	mg/L	0.025	0.015	0.010	0.020	0.017	0.050	0.075	0.100	0.880	0.083	0.050	0.083	0.117
Copper (Cu)	mg/L	0.010	0.008	0.050	0.010	0.010	0.020	0.040	0.050	0.030	0.042	0.025	0.032	0.027
Cyanide (Cn)	mg/L	0.005	0.015	0.005	0.028	0.005	0.006	0.010	0.005	0.008	0.005	0.025	0.015	0.011
Iron (Fe)	mg/L	4.76	6.74	3.60	8.78	6.19	9.81	6.33	8.24	4.10	10.67	6.46	6.50	6.85
Lead (Pb)	mg/L	0.005	0.006	0.020	0.004	0.003	0.009	0.015	0.020	0.018	0.017	0.010	0.017	0.012

Representative Months (average per month)		18-Jan	18-Feb	18-Mar	18-Apr	18-May	18-Jun	18-Jul	18-Aug	18-Sep	18-Oct	18-Nov	Mean for 2018
Parameters (total metal)	**Units**												
pH	pH	7.35	7.49	7.80	7.26	7.26	7.79	7.08	7.72	6.99	7.02	7.28	7.37
Alkalinity	mg/L	73	73	78	70	62	67	65	85	71	67	57	70
Conductivity	µmhos/cm	81083	82667	81200	83000	69500	83125	83333	83000	78000	69571	81000	79589
Total Hardness (as $CaCO_3$)	mg/L	13164	14367	12680	13550	13100	13538	13450	13925	13500	11131	16500	13537
Turbidity	NTU	74.8	72.9	27.2	49.3	75.5	27.5	52.0	27.5	84.0	69.4	52.0	55.6
Total Dissolved Solids (TDS)	mg/L	53975	52233	55460	51367	56900	58325	55917	60975	56900	49229	57600	55353
Total Suspended Solids (TSS)	mg/L	181.8	108.1	31.0	38.7	37.5	85.4	58.5	50.0	216.0	42.4	46.0	81.4
Aluminum (Al)	mg/L	2.979	1.466	0.270	0.290	0.128	0.798	0.245	0.261	4.145	0.353	0.150	1.008
Ammonia Nitrogen (NH_3-NH_4)	mg/L	5.83	4.71	5.18	4.80	4.30	5.25	4.23	6.93	4.55	5.71	6.55	5.28
Arsenic (As)	mg/L	0.027	0.057	0.009	0.010	0.004	0.024	0.006	0.005	0.011	0.009	0.014	0.016
Barium (Ba)	mg/L	0.109	0.109	0.098	0.072	0.073	0.100	0.058	0.073	0.170	0.110	0.163	0.103
Beryllium (Be)	mg/L	0.010	0.009	0.009	0.007	0.004	0.004	0.006	0.004	0.005	0.009	0.005	0.007
Boron (B)	mg/L	4.79	4.72	4.50	3.33	2.10	2.28	2.92	2.35	2.80	4.64	3.00	3.40
Total Organic Carbon (TOC)	mg/L	2.50	2.42	2.36	2.47	2.20	3.00	1.97	2.40	2.95	2.73	5.30	2.75
Dissolved Organic Carbon	mg/L	2.38	2.27	2.36	2.27	1.90	2.55	1.90	2.40	2.55	2.53	5.00	2.56
Calcium (Ca)	mg/L	1646	1777	1656	1737	1690	1748	1653	1715	2165	1487	2960	1839
Cadmium (Cd)	mg/L	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
Chloride (Cl - dissolved)	mg/L	33833	34444	34800	34333	32500	33875	33333	36250	33500	27143	35000	33546
Chromium (Cr)	mg/L	0.096	0.094	0.090	0.067	0.035	0.043	0.058	0.043	0.052	0.093	0.050	0.066
Copper (Cu)	mg/L	0.048	0.048	0.045	0.028	0.018	0.021	0.029	0.021	0.040	0.046	0.025	0.034
Cyanide (Cn)	mg/L	0.017	0.033	0.021	0.012	0.025	0.005	0.005	0.005	0.005	0.005	–	0.013
Iron (Fe)	mg/L	14.84	12.79	5.50	5.37	6.36	5.94	7.96	5.36	18.80	5.64	6.81	8.67
Lead (Pb)	mg/L	0.020	0.019	0.018	0.013	0.007	0.009	0.012	0.009	0.010	0.019	0.010	0.013

Representative Months (average per month)		19-Jan	19-Feb	19-Mar	19-Apr	19-May	19-Jun	19-Aug	19-Sep	19-Oct	19-Nov	19-Dec	Mean for 2019
Parameters (total metal)	**Units**												
pH	pH	7.03	7.15	7.31	7.62	7.16	7.13	6.93	7.71	7.37	7.08	7.52	7.27
Alkalinity	mg/L	67	74	74	62	64	65	44	93	88	52	74	69
Conductivity	µmhos/cm	85500	77667	84750	79800	81500	79833	80000	65000	66000	69000	81500	77323
Total Hardness (as $CaCO_3$)	mg/L	13750	11683	11925	12540	13650	13333	17700	10745	11000	11200	15150	12971
Turbidity	NTU	115.0	77.7	84.3	61.4	93.0	86.8	75.0	12.5	47.0	62.0	37.0	68.3
Total Dissolved Solids (TDS)	mg/L	63150	53800	60575	57620	61300	61833	60000	46300	48500	49300	58900	56480
Total Suspended Solids (TSS)	mg/L	82.5	47.0	53.0	45.4	52.0	61.2	45.0	72.5	30.0	110.0	52.5	59.2
Aluminum (Al)	mg/L	0.556	0.379	0.194	0.246	0.202	0.409	0.755	0.409	0.150	1.490	0.277	0.460
Ammonia Nitrogen (NH_3-NH_4)	mg/L	4.45	4.17	4.35	4.43	4.75	4.12	4.10	11.85	7.80	3.60	4.20	5.26
Arsenic (As)	mg/L	0.008	0.007	0.006	0.005	0.005	0.009	0.010	0.013	0.005	0.012	0.014	0.008
Barium (Ba)	mg/L	0.078	0.070	0.063	0.060	0.057	0.068	0.112	0.075	0.053	0.050	0.067	0.068
Beryllium (Be)	mg/L	0.008	0.007	0.005	0.005	0.005	0.007	0.010	0.005	0.005	0.005	0.005	0.006
Boron (B)	mg/L	3.75	3.39	2.50	2.50	2.50	3.33	5.00	2.50	2.50	2.50	2.50	3.00
Total Organic Carbon (TOC)	mg/L	2.15	3.00	2.28	1.87	2.40	2.07	3.00	4.85	4.30	1.70	2.25	2.71
Dissolved Organic Carbon	mg/L	2.10	2.93	2.08	1.90	1.85	1.82	2.70	4.50	4.20	1.20	1.95	2.48
Calcium (Ca)	mg/L	1620	1557	1440	1640	1695	1630	3580	1363	1420	1490	1875	1755
Cadmium (Cd)	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Chloride (Cl - dissolved)	mg/L	34500	30667	33750	32200	32500	34000	34000	26000	27000	26000	34500	31374
Chromium (Cr)	mg/L	0.075	0.079	0.050	0.050	0.050	0.067	0.100	0.050	0.050	0.050	0.050	0.061
Copper (Cu)	mg/L	0.038	0.033	0.025	0.025	0.025	0.033	0.050	0.025	0.025	0.025	0.025	0.030
Cyanide (Cn)	mg/L	--	--	--	--	--	--	--	--	--	--	--	-
Iron (Fe)	mg/L	8.87	6.61	6.94	5.47	6.54	6.66	8.27	2.90	3.11	8.55	5.77	6.33
Lead (Pb)	mg/L	0.015	0.013	0.010	0.010	0.010	0.013	0.020	0.010	0.010	0.010	0.010	0.012

Magnesium (Mg)	mg/L	2168	2120	2080	2200	2050	2092	1962	2105	1975	2017	2350	2150	2106	2208	2411	2078	2220	2150	2229	2267	2335	1970	1800	2200	2170	2355	1893	2030	2048	2290	2234	2130	1775	1800	1820	2550	2084
Mercury (Hg)	mg/L	0.00001	0.00001	0.00001	0.000001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Molybdenum (Mo)	mg/L	0.025	0.015	0.010	0.250	0.026	0.047	0.075	0.100	0.170	0.083	0.050	0.083	0.078	0.096	0.094	0.090	0.067	0.035	0.043	0.058	0.043	0.050	0.093	0.061	0.066	0.075	0.067	0.050	0.050	0.050	0.067	0.100	0.050	0.050	0.050	0.050	0.060
Nickel (Ni)	mg/L	0.025	0.015	0.100	0.070	0.017	0.050	0.080	0.100	0.350	0.083	0.050	0.083	0.085	0.096	0.094	0.090	0.067	0.035	0.043	0.058	0.043	0.050	0.093	0.050	0.065	0.075	0.067	0.050	0.050	0.050	0.067	0.100	0.050	0.050	0.050	0.050	0.060
Nitrate (NO_3) as N	mg/L	0.50	2.6	0.10	2.58	0.23	0.89	4.35	0.17	0.34	0.29	0.10	0.21	1.03	2.02	0.38	0.24	0.30	0.30	0.42	0.52	0.61	0.46	2.93	0.10	0.75	0.50	0.37	0.40	0.23	0.50	0.35	0.10	8.68	4.66	0.10	0.10	1.45
Nitrite (NO_2) as N	mg/L	0.05	0.266	0.10	0.13	0.09	0.14	0.39	0.04	0.03	0.03	0.02	0.02	0.11	0.12	0.04	0.04	0.03	0.03	0.04	0.05	0.07	0.04	0.11	0.06	0.06	0.05	0.04	0.04	0.02	0.02	0.03	0.01	0.13	0.17	0.01	0.01	0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	3.78	8.7	4.60	5.20	7.83	7.40	12.00	72.02	4.50	9.00	5.60	4.87	12.13	6.12	4.97	5.90	5.27	4.95	5.54	4.18	7.50	4.60	6.77	6.50	5.66	4.40	4.80	5.08	4.27	6.55	4.33	4.00	14.00	9.60	4.30	3.85	5.93
Phosphorous (P)	mg/L	0.070	0.04	0.040	0.130	0.120	0.080	0.090	0.100	—	0.390	0.080	0.080	0.111	0.075	0.083	0.162	0.073	0.200	0.173	0.118	0.175	0.420	0.154	0.100	0.158	0.150	0.120	0.175	0.100	0.105	0.122	0.210	0.094	0.093	0.110	0.115	0.127
Potassium (K)	mg/L	496	446	407	609	433	463	518	488	763	502	528	465	510	490	532	512	479	474	500	491	539	444	391	680	503	477	429	430	438	482	467	400	427	395	371	530	440
Radium-226 (Ra 226)	mg/L	0.49	0.29	0.30	1.20	1.95	1.80	1.90	2.20	0.29	2.20	2.40	1.67	1.39	1.85	3.68	3.88	2.63	2.05	1.94	1.83	2.45	0.67	0.91	1.80	2.15	2.15	1.26	2.90	2.37	2.00	1.58	2.90	1.13	0.40	0.89	2.05	1.78
Selenium (Se)	mg/L	0.003	0.002	0.010	0.002	0.002	0.005	0.008	0.010	0.007	0.008	0.005	0.008	0.006	0.010	0.009	0.009	0.007	0.004	0.004	0.006	0.016	0.005	0.009	0.005	0.008	0.008	0.008	0.007	0.005	0.005	0.005	0.007	0.010	0.005	0.005	0.005	0.005
Silver (Ag)	mg/L	0.001	0.0003	0.002	0.001	0.000	0.001	0.002	0.000	0.018	0.003	0.001	0.002	0.003	0.002	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001
Sodium (Na)	mg/L	14625	14250	13400	15400	13900	14369	14654	14417	9433	14900	17000	15300	14304	15183	16389	14860	14967	14750	15725	15333	16450	13550	12629	16600	15131	15950	14200	15925	14500	15950	15800	15600	12965	13000	14100	16300	14935
Strontium (Sr)	mg/L	43.1	45.5	38.4	136.0	40.0	39.0	43.5	36.5	23.6	40.0	35.1	35.7	46.4	37.2	37.3	37.1	40.1	47.7	43.9	40.0	41.3	61.9	47.4	83.4	47.0	39.5	42.7	37.5	43.5	38.2	38.4	113.0	33.6	39.1	45.7	40.0	46.5
Sulphate (SO_4 – dissolved)	mg/L	3125	3150	3100	3100	3233	3169	2969	3120	3067	3200	3500	3433	3181	3367	3500	3320	3367	3350	3250	3467	3625	3200	2829	3200	3316	3450	3000	3400	3200	3500	3467	2600	2850	3100	2600	3400	3142
Thallium (Tl)	mg/L	0.001	0.0002	0.001	0.000	0.000	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Uranium (U)	mg/L	0.003	0.002	0.010	0.006	0.002	0.005	0.008	0.010	0.090	0.008	0.005	0.008	0.013	0.010	0.009	0.009	0.007	0.004	0.004	0.006	0.006	0.005	0.009	0.005	0.007	0.008	0.007	0.005	0.005	0.005	0.007	0.010	0.005	0.005	0.005	0.005	0.006
Vanadium (V)	mg/L	0.130	0.08	0.500	0.100	0.080	0.230	0.380	0.500	0.330	0.417	0.250	0.417	0.285	0.479	0.472	0.450	0.333	0.175	0.213	0.292	0.213	0.250	0.464	0.250	0.326	0.375	0.333	0.250	0.250	0.250	0.333	0.500	0.250	0.250	0.250	0.250	0.299
Zinc (Zn)	mg/L	0.125	0.06	0.500	0.120	0.080	0.230	0.380	0.500	0.340	0.417	0.250	0.417	0.285	0.479	0.472	0.450	0.333	0.175	0.259	0.292	0.213	0.250	0.464	0.250	0.331	0.375	0.333	0.250	0.250	0.250	0.333	0.911	0.250	0.250	0.250	0.250	0.337

* One sample result from February 24, 2017 removed from average calculations due to contamination of sample with drill water and resultant unrepresentative results of non-contact groundwater.

APPENDIX B • FRESHET MANAGEMENT PLAN

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Meliadine Division

Freshet Management Plan

MARCH 2020
VERSION 6

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	March 2016	ALL	-	Comprehensive plan
2	March 2017	ALL	-	
3	March 2018	ALL	-	
4	December 2018	ALL	-	
5	March 2019	ALL	All 2 3 5-6 9-10 13 Figure 1 Figure 2 Appendix A	Update to reflect transitional changes to Operations phase Include DCP-1 and DCP-5 in areas of risk during Freshet Update section 2.1.2/2.1.3 noting 5 evaporators and discuss SP3 Update Section 2.8, discuss time of pond construction. Update Section 3.1, discussion of SP3 and update on inspections. Update Section 3.6., 3.7, 4 to reflect changes in freshet management. Updated to include structure names Updated to include SP3 Update to include emulsion pad to inspection list
6	March 2020	ALL	All	Document formatting to match common style
		2	2	Risk areas to include CP6 and TSF
			Figure 1	Include TSF
			4	P-Area volumes, source of inflows
			6-7	Portal sump wording & grammar; include CP6
			7	Itivia wording & grammar
		3	10	Update to P-Area management for 2020
			10	Addition of P-Area emergency pumping strategy
			13	Remove downstream D-CP5 risk mitigation; Add TSF
			13	Addition of temporary water management structure section
		4	15	Update Snow Management information
			Figure 5	Update Site snow management figure
			Figure 6	Update Itivia snow management figure

TABLE OF CONTENTS

SECTION 1 • INTRODUCTION

The purpose of the Freshet Action Plan (Plan) is to provide Agnico Eagle with specific management and mitigation measures to address and manage water associated with the freshet season (Freshet), a response plan, and procedures to prevent and to minimize potential negative impacts to the surrounding environment at the Meliadine Site (Site).

The term freshet refers to spring thaw, which can result in inundation of floodplains. Freshet at Meliadine typically takes place between May 15 and July 30. In some years, Freshet can also happen in early fall, when freezing re-occurs (mid-October) and then thaws. There are areas at the Site that are vulnerable to excess water produced during Freshet; the objective of this document is to identify those areas, and to develop a plan with defined roles and responsibilities to manage excess water produced on site.

The following guiding principles are applicable to the Plan:

- To ensure that mine contact water from runoff or seepage is managed to prevent adverse environmental impacts;
- To ensure the health and safety of Agnico Eagle employees and contractors; and
- To ensure the Site is in compliance with the Nunavut Water Board (NWB) Type A Water Licence No.: 2AM-MEL1631 (Type A Licence).

The Plan identifies areas of risk during Freshet, risk management and the procedures necessary to address potential concerns.

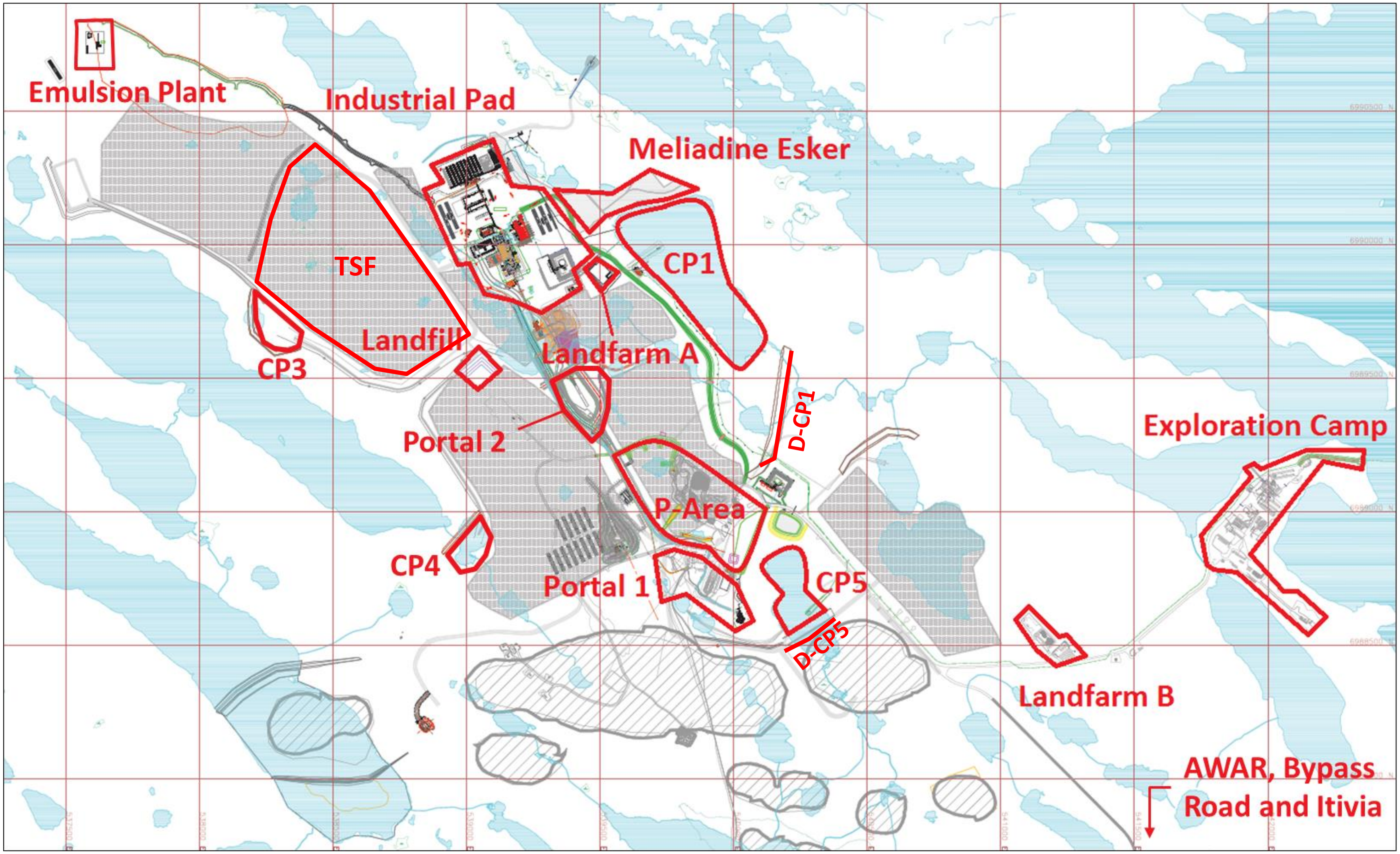
SECTION 2 • AREAS OF RISK DURING FRESHET

The key areas of risk during Freshet at the Site include the following:

- P-Area
- Portal 1 Sump 1 (Sump LV50)
- Portal 2 Sump 1 (Sump LV50)
- Landfarm A and Landfarm B
- Landfill
- All Weather Access Road (AWAR) and Quarries along the road
- Infrastructure Areas; including the Exploration Camp area, Portal 1 & 2 and the Industrial Pad Areas
- Containment Pond 1 (CP1), Containment Pond 3 (CP3), Containment Pond 4 (CP4), Containment Pond 5 (CP5) and Containment Pond 6 (CP6)
- D-CP1 and D-CP5
- Meliadine Esker Quarry
- Bypass Road
- Itivia laydown and fuel handling facility (Itivia)
- Tailings Storage Facility

Identified areas of risk at Site are shown in Figure 1, and are described in the following section.

Figure 1: Site Plan View with Areas of Risk at Site during Freshet



2.1 P-Area

Surface runoff that has come in contact with the southern portion of the future Waste Rock Storage Facility 2 (WRSF2) and surface works in the area of Portal 1 flows preferentially to the P-Area containment.

The P-Area includes three containment areas (Figure 2); P1 Containment Area (P1), P2 Containment Area (P2), and P3 Containment Area (P3) and has a cumulative capacity of 30,521 m^3. Periodic pumping to P1, from P2 and P3, is planned to manage water levels in P2 and P3. In past years active evaporation has been applied. In 2020, alternatives to active evaporation are being assessed by AEM as a means to facilitate potential decommissioning of the P-Area.

2.1.2 P1

P1 has a capacity of 20,781 m^3 and is the largest of the three ponds that make up the P-Area. Water contained in P1 includes direct precipitation, surface runoff in the P1 catchment area and any water accumulated in P2 or P3. Five evaporators are installed at P1. As mentioned above, alternatives to the evaporators are being assessed.

2.1.3 P2

P2 has a capacity of 6,828 m^3 and is located directly adjacent to and down-gradient from P1. In addition to direct precipitation, P2 captures surface runoff from the surrounding catchment area. Water captured in P2 is pumped to P1, as required.

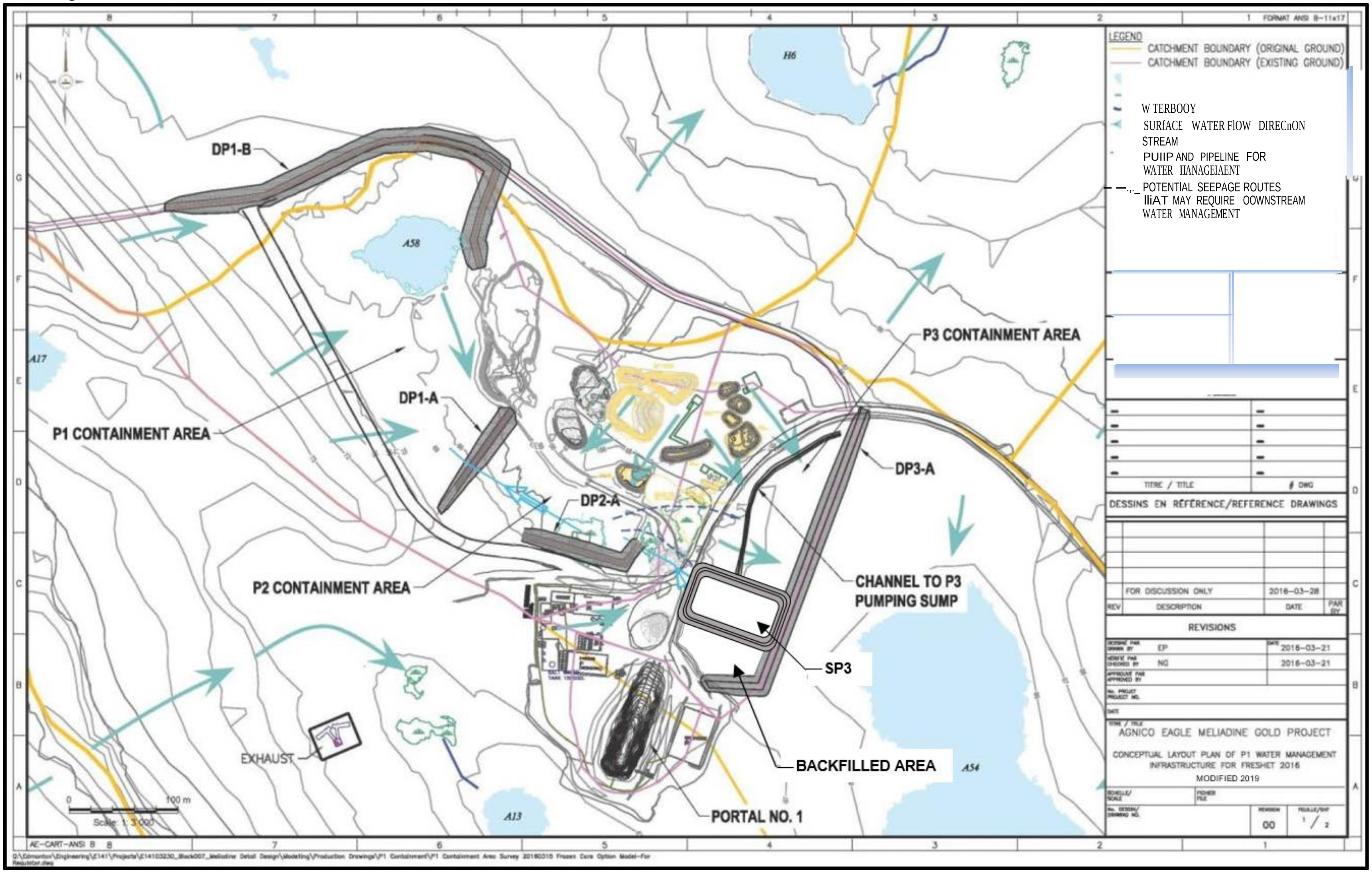
2.1.4 P3

P3 has a capacity of 2,912 m^3 and is down-gradient of P1 and P2. P3 contains surface runoff from the surrounding catchment, including the portal entrance area. Water from P3 is pumped to P1, as required. Furthermore, for the 2020 freshet, a back-up pump from P3 to CP5 is planned to manage greater than expected inflows to the P-Area and to ensure management of P3 water levels and protection of the SP3 liner (Section 3.1).

2.1.5 Saline Pond 3

Saline Pond 3 (SP3) is located south of P3 and has a maximum water storage capacity of 7,985 m^3. The design of the containment structure uses an elevated dike approximately 2 m higher than the adjacent road surface. As such, runoff water in this area does not flow into SP3.

Figure 2: P-Area Plan View



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2.2 Portal 1 Sump 1 (LV50 SUMP)

LV50 is located 50 meters below grade (mbg) and is the first sump located down the Portal 1 ramp. Snowmelt and surface run-off that flows down the portal entrance is directed to sump LV50 where it is then pumped to CP5. The overall capacity for Portal 1 Sump 1 is 29 m^3. Water pumped from Portal 1 Sump 1 to CP5 is measured with a volumetric flow meter and recorded daily.

2.3 Portal 2 Sump 1 (LV50 SUMP)

LV50 is located 50 meters below grade (mbg) and is the first sump located down the Portal 2 ramp. Snowmelt and surface run-off that flows to the portal entrance to sump LV50 is pumped from LV50 to Channel 1. The overall capacity for Portal 2 Sump 1 is 55 m^3. Water pumped from Portal 2 Sump 1 to Channel 1 is measured with a volumetric flow meter and recorded daily.

2.4 Landfarm

The Type A License Landfarm is located adjacent and east of the Industrial Site Pad and is designed to receive soils, rock, snow, and ice contaminated with petroleum hydrocarbons. This includes light hydrocarbons such as diesel and gasoline (Agnico Eagle, 2019). It was assumed that an annual volume of 500 m^3 of contaminated ice and snow would require management and the Landfarm has been designed to account for this volume.

The Landfarm has geotextile liners and is filled with soil. Water that pools, collects or flows from the Landfarm is collected for monitoring and treated before it is discharged to CP1.

2.5 All Weather Access Road (AWAR)

The All-Weather Access Road (AWAR) was built in 2013 to connect the Site to the hamlet of Rankin Inlet. The road is approximately 23.8 km long with twenty-two water crossings; three bridge crossings and nineteen culverts installed (Figure 3).

2.6 Infrastructure Areas

Infrastructure Areas represent buildings, pads and towers installed at the Site and include the Industrial Pad, Exploration Camp, and Emulsion Plant (Figure 1).

2.7 CP1, CP3, CP4, CP5, and CP6

Engineered water containment dikes constructed in 2017 at lakes A54 and H17 were developed as D-CP5 and D-CP1, respectively. The dikes are designed to contain contact water within the footprint of the Site and prevent pollution provisions of the *Fisheries Act*. Both CP1 and CP5 are used for Site contact water and snow and ice collection prior to Freshet. CP1 and CP5 are illustrated in Figure 1 and discussed in Section 3 of this plan.

CP3 and CP4 are containment ponds designed to collect runoff from the Tailings Storage Facility (TSF) area and Waste Rock Storage Facility 1 (WRSF1) area, respectively. CP3 construction was completed in Q4 of 2018 and CP4 construction was completed in Q2 2019. CP3 and CP4 design plans implement engineered thermal protection berms. Maximum operating levels within CP3 and CP4 are such that Berm-CP3 and Berm-CP4 will not be required to retain water (see Water Management Plan).

Construction of CP6 is on-going and the facility will be commissioned prior to Freshet of 2020. CP6 is designed to collect runoff from Waste Rock Storage Facility 3 (WRSF3) where the water will then be pumped to CP1 for containment prior to discharge. CP6 design implements an engineered thermal protection berm. Maximum operating level within CP6 is such that Berm-CP6 will not be required to retain water (see Water Management Plan).

2.8 Bypass road

The Bypass Road is a 5.9 km access road that provides a means to divert site-related traffic around the community of Rankin Inlet. The Bypass Road spans from the northwest margin of Itivia to km 2.9 on the AWAR (Figure 4) and has 19 culverts installed at 13 locations along the road.

2.9 Itivia

Itivia is located in Rankin Inlet and is accessed by the Site from the AWAR and Bypass Road. In combination with the Bypass Road, Itivia is intended to support the Site as a staging point for incoming and outgoing fuel and material handling for barge shipments. Itivia is also the location of the final discharge point for saline effluent generated by the mine. The location of Itivia is shown on Figure 3 and the plan view of the Itivia Site is presented as Figure 6. A culvert is installed to divert runoff around the Itivia Site and to allow passage of run-off from the Itivia laydown area (Figure 6).

2.10 Tailings Storage Facility

The Tailings Storage Facility (TSF) is a dry stack tailings storage facility. The TSF dry stack is located west of the Industrial Pad as shown in Figure 1. The facility stores compacted tailings that are transported from the process plant by haul truck. The tailings are spread and compacted in the facility. The tailings are deposited within a rockfill bermed area. The rockfill berm will ultimately form the cover for the placed tailings. Culvert 1 is in place to allow passage of water through the TSF haul road.

Figure 3: AWAR Map Showing Water Crossing LocationSection

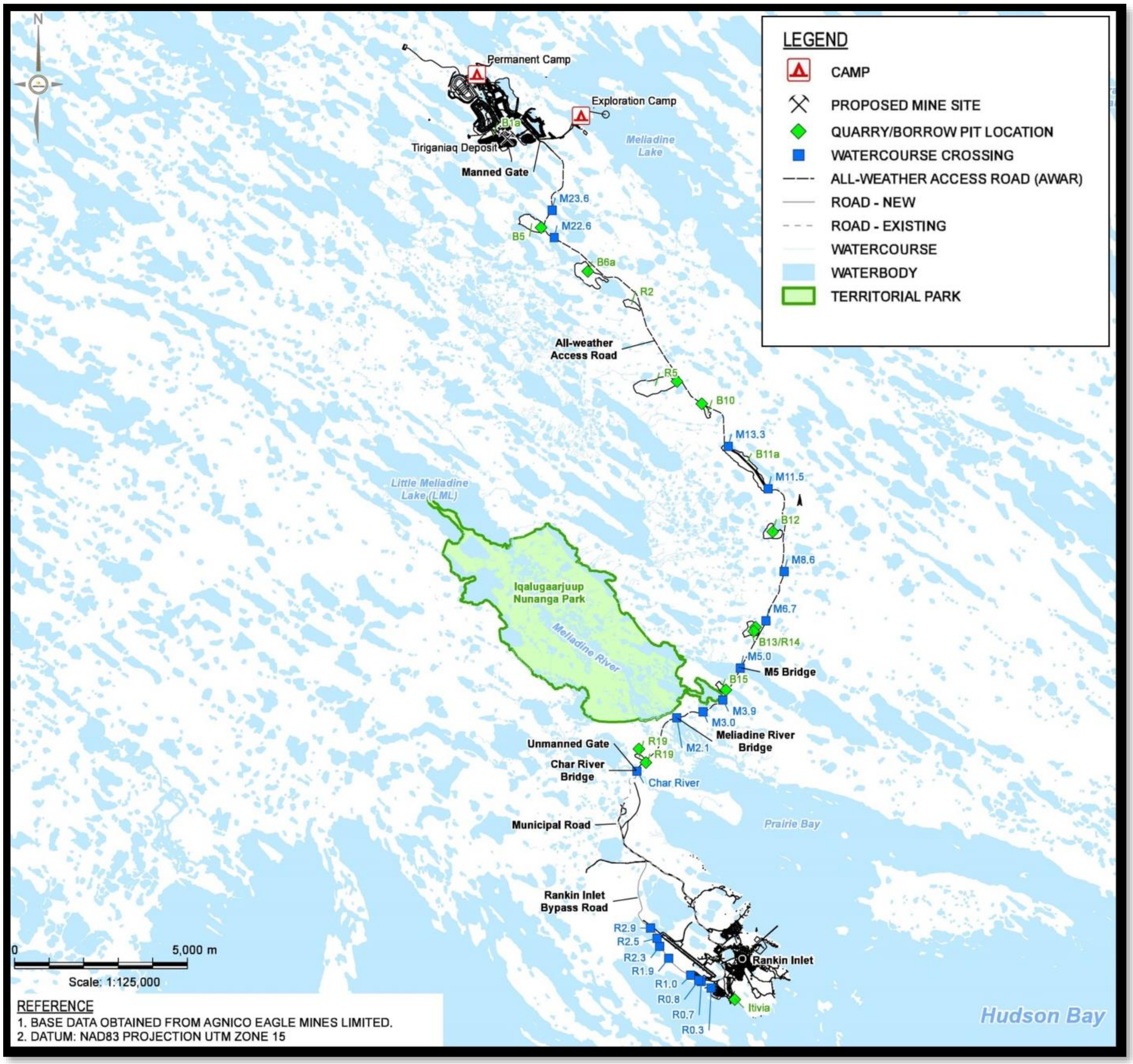

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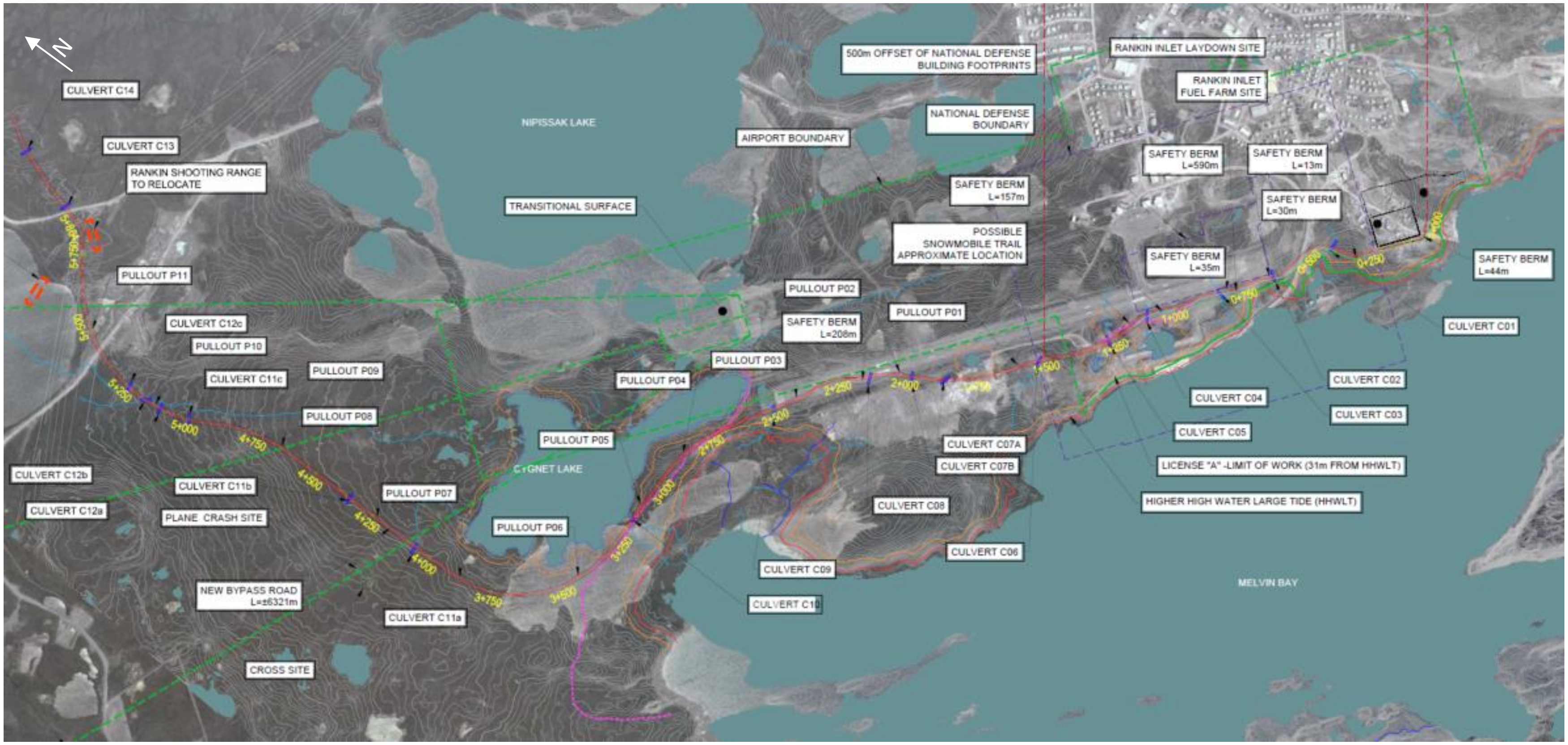
Figure 4: Bypass Road and Culvert Location



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SECTION 3 • FRESHET RISK MANAGEMENT

Managing the risks prior to Freshet is a primary objective at Site. Planning and preparing before Freshet alleviates some of the risk from excess water that may suddenly occur, and helps to ensure compliance with applicable regulations. This is managed by removing water (pumping) at containment pond areas prior to winter freeze (fall) to allow for increased capacity from precipitation, snow and ice removal on roads, road water crossings, culverts, ditches, and select containment ponds after winter freeze and before Freshet (winter and spring).

Risk management practices for the Site areas during Freshet are described below and Appendix A presents the Freshet Action Plan Procedure for preparation prior to, during and after Freshet. Section 4 describes snow management at Site and Appendix B presents the Snow Management procedure.

3.1 P-Area Risk Management

The following management practices are maintained at the P-Area during Freshet and are described in more detail in Appendix A:

- Water levels will be monitored. The water level will not exceed the maximum design elevation in any of the three containment ponds (P1, P2 or P3). P3 water levels will be kept as minimal as possible to keep water from affecting the base of Saline Pond 3 (SP3), which is located immediately adjacent to (southwest of) P3, prior to Freshet (see Water Management Plan for details). To ensure maintenance of P3 water levels under scenarios of pump failure or greater than expected runoff volumes, installation of a back-up pump from P3 to CP5 is planned.
- Runoff water contained in the downstream sumps of DP1-B and DP3-A will be pumped into P1-B and P3, respectively.
- Agnico Eagle will conduct weekly freshet structural inspections of the dikes and note any observed seepage. Inspections will also include monitoring the base of SP3 for settling, slumping and cracking.
- Active evaporation from use of the evaporators may be used to contribute to managing the quantity of water contained at P-Area. However, alternatives to active evaporation as a means to manage P-Area water are being explored by AEM.
- Weekly water sampling during Freshet.

In the event that emergency removal of water contained within one or more cells comprising the P-Area is necessary, the most recent water quality data available will be used to determine an appropriate location for the water to be pumped to. The receiving location will also be assessed for sufficient capacity to receive the P-Area water.

3.2 Portal 1 Sump 1 Risk Management

If CP5 becomes filled to capacity and LV50 sump needs to be pumped, the water from LV50 will flow down gradient to the Underground Water Stope.

3.3 Landfarm Risk Management

If there is any excess water collected at the Landfarm during Freshet and treatment is not immediately possible, the excess volume will be transferred to the contaminated snow cell located in the Northwest extent of P1. If the snow cell is at capacity and the Landfarm contains excess water, the water will be sampled and, pending acceptable results, the water will be moved to CP1. If results do not allow transfer to CP1, water will be stored in totes until treatment is possible.

In the event that the water sample results do not allow transfer to CP1, potential treatment methods are as follows:

- Oil/water Separator
- CI Agent E-VAC Waste Water Filter System
- Carbon Filter System

If a suitable treatment cannot be completed, the water will be shipped south in totes or bladders for disposal in a certified disposal facility.

3.4 AWAR, Bypass Road and CP3/CP4 access road Risk Management

The following management practices are maintained to ensure the integrity of the AWAR, Bypass Road and CP3/CP4 access roads before and during Freshet and are described in further detail in Appendix A:

- Large culverts will be heated/steamed as necessary to allow the free flow of Freshet water.
- Prior to Freshet, water crossings and culverts will have snow removed from ice surface on the up and downstream side of the crossing to allow free flow of water.
- Visual inspections of AWAR and Bypass Road will be undertaken as to the structural integrity of the abutments and road integrity by the E&I Supervisor.
- Weekly (minimum) written inspections throughout Freshet and daily during excessive rainfall response including TSS transport, culvert/crossing function, flow rates, and integrity of roads will be completed by the Environment Department in conjunction with the E&I Department.

If erosion or ground surface scouring are observed, the E&I Department will be notified for repairs. TSS barriers, silt fences, straw logs or other sediment control methods will be implemented as required.

3.5 Infrastructure Areas

Risk management practices for the main Infrastructure Areas at the Site during Freshet are described in the following sections.

3.5.1 Camp Pads and Surroundings

Risk management practices are maintained at the Exploration Camp, Main Camp and surrounding camp areas as follows:

- Clearing off ice and debris from culverts prior to and during Freshet;

- Visual inspections for excessive water pooling. If pooled water is observed to flow into a water body, a water sample will be collected and monitored for TSS. Follow-up samples will be collected on a weekly basis thereafter;
- Visual inspections for snowmelt runoff. If runoff is observed to flow into a water body, a water sample will be collected and monitored for TSS. Follow-up samples will be collected on a weekly basis thereafter;
- Visual inspections to ensure flow through culverts and along channels is not impeded; and
- TSS transport will also be monitored at the culvert beside the garage that flows straight to Meliadine Lake. This area will be monitored for TSS, and preventative measures (install straw wattles and/or booms) will be installed to prevent deleterious substances from entering Meliadine Lake.

3.5.2 Industrial Pad and Access Road

The following management practices are maintained to ensure the integrity of the industrial pad and access road:

- This area will be monitored for turbidity and preventative measures (install straw wattles and/or booms) will be implemented to prevent deleterious substances from entering Meliadine Lake.

3.6 CP1, CP3, CP4, CP5, CP6, and Quarries

Risk management practices for CP1, CP3, CP4, CP5, CP6, and the Meliadine Esker and Quarries include discharging/pumping the water prior to winter freeze to be treated and/or discharged as per the Type A Water Licence and the Water Management Plan. If water is observed to be flowing or ponding, it will be sampled to ensure deleterious substances and TSS is not released to surrounding water bodies (Part I, Item 11 of the Type A Water Licence). Inspections of CP1, CP3, CP4, CP5, CP6, and associated water management structures or thermal protection berms, will be conducted following Part E Item 15 of the Type A Water Licence and Section 3.12 of the Water Management Plan.

3.7 Itivia

The following management practices are maintained to ensure the integrity of Itivia and the Bypass Road:

- The culvert installed between the Itivia laydown and the existing laydown areas (Figure 4) will be cleared of snow and ice prior to Freshet and will be monitored closely for TSS transport;
- Rip rap was installed around the culvert to control erosion and a decantation sump will be maintained downstream to collect suspended sediment;
- Two rock check dams were installed in 2019 upstream of the culvert to mitigate TSS transport through the Itivia site (Figure 6; Tetra Tech 2019);
- The upstream and downstream extents of the culvert area will be monitored for turbidity and preventative measures (install straw wattles and/or booms) will be implemented to prevent deleterious substances from entering Hudson’s Bay; and

- Weekly water sampling at locations of runoff.

3.8 Tailings Storage Facility

The following management practices are maintained to ensure the integrity of the Tailings Storage Facility (TSF) and its associated structures:

- Culvert 1 (access road to TSF) will be cleared of snow and ice prior to Freshet and will be monitored closely for TSS transport;
- Snow that has accumulated on the TSF deposition surface will be removed prior to Freshet to reduce snowmelt runoff and pooling (Section 4);
- Daily visual inspections for ponding and areas of elevated sediment transport;
- Weekly inspections carried out to identify areas of concern including issues of seepage, cracking, and ponding on the TSF and associated structures.

3.9 Temporary Water Management Structures

Based on anticipated areas of ponding and/or impediment to flow on Site, or in reaction to unexpected ponding and/or impediment to flow on Site, temporary water management structures may be implemented to protect infrastructure by encouraging water movement through the water management system. Temporary water management structures will be constructed as needed and decommissioned when the event invoking the requirement (i.e., ponding) comes to an end. Such structures will be built in such a way that they maintain the overall flow direction of waters on site and do not affect the discharge to the receiving environment. No temporary measures would be placed outside the project footprint, nor alter the way water enters into the receiving environment. Temporary water management structures may include:

- Trenching in snow and/or ice;
- Excavation into ice to allow the immediate installation of pumps, avoiding the necessity to wait for ice to thaw; or
- Trenching/spillways across roads on Site at areas of ponding where pumping rates are unable to match accumulation rates.

SECTION 4 • SNOW MANAGEMENT

Proper snow management during the winter contributes to risk mitigation from excess water during Freshet and prevents possible environmental impacts. *The Snow Management Procedure* (Procedure Number MEL-ENV-0017) (Appendix B) presents the plan to efficiently manage snow at the Site.

Snow that is removed from the Main Camp, Industrial Pad, Ore Pad, 6 Million Liter Fuel Farm, Portal 2 Pad, and Crusher Pad will be transported to a snow dump in the north end of CP1. Snow removed from the Tailing Storage Facility (TSF) will be transported to the north end of the TSF depositional footprint which is currently not occupied by tailings. Snow removed from the Paste Plant, Batch Plant, and surrounding laydowns will be transported immediately north of the Batch Plant and maintained as a level snow pad. Snow removed from the 3 Million Liter Fuel Farm, Portal 1 Pad, Vent Raise, SWTP/SETP Pad, and associated laydowns will be transported to CP5 and maintained as a level snow pad.

Snow and ice from the other areas at the Site are removed from roadways with a snow blower or plow and/or transported to CP1 or CP5, depending on the catchment of origin. Snow removal outside of the designated zones is generally maintained as a clean, level snow pad. Figure 5 illustrates the locations for snow collection during the winter and prior to Freshet. Figure 6 illustrates the snow management and storage areas for Itivia.

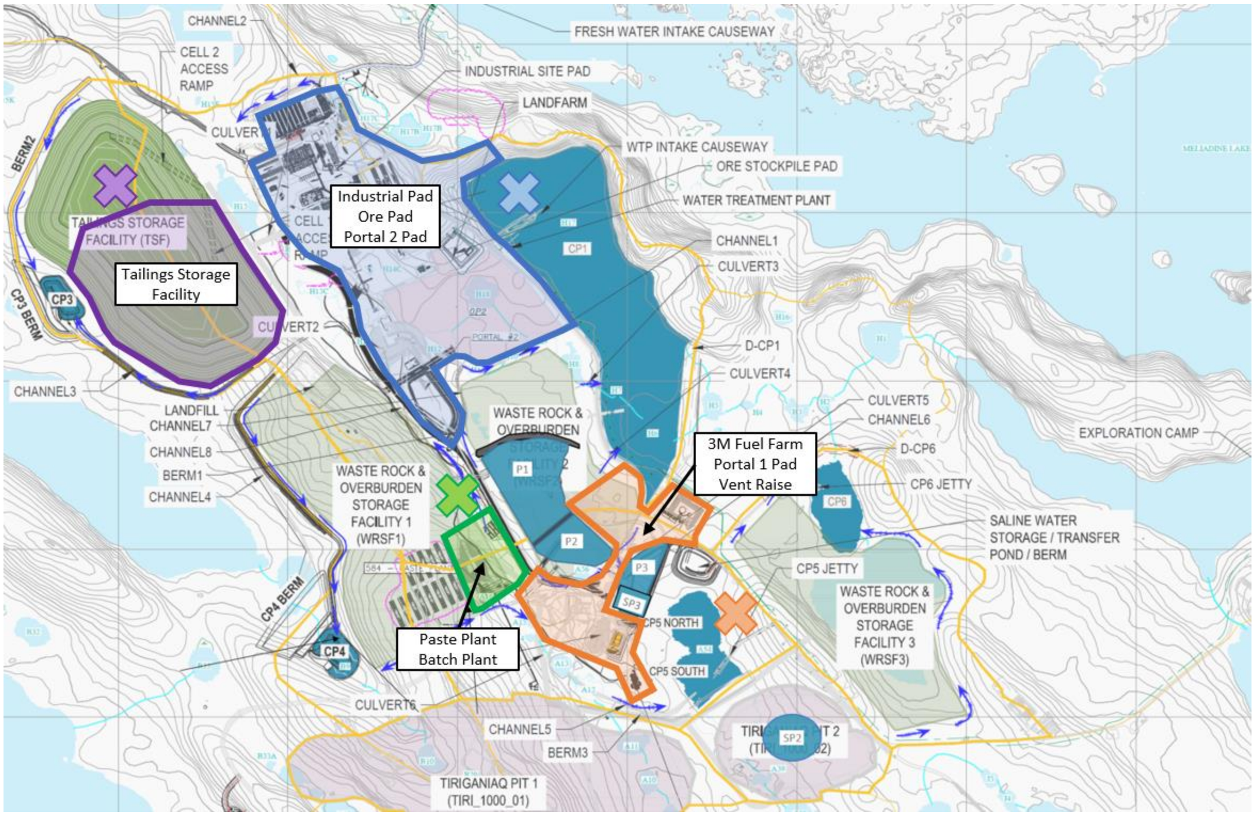

Figure 5: Snow Management Plan on Site. The locations identified by “x” are snow deposition areas for respective snow clearing areas (coloured polygon areas). Each snow clearing area and “x” are colour coded to identify where snow cleared from each area is deposited.

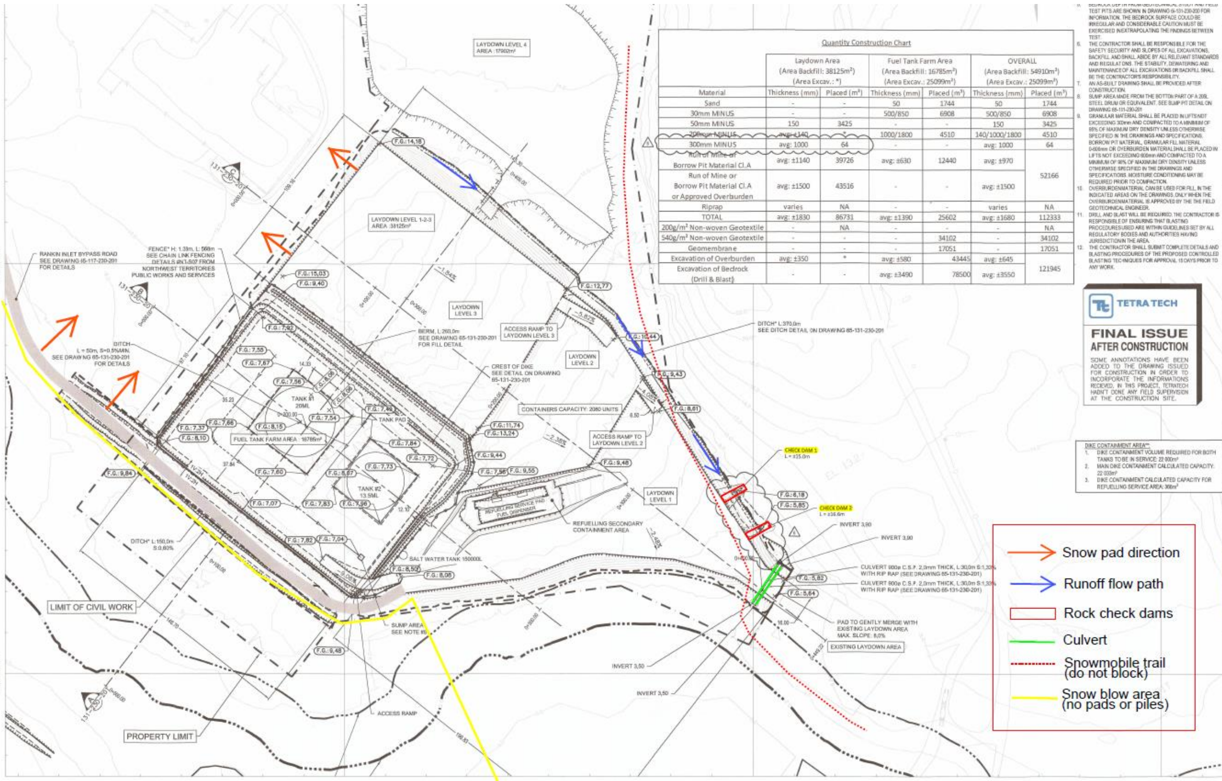

Figure 6: Itivia Snow Management Areas

AGNICO EAGLE

SECTION 5 • REFERENCES

Agnico Eagle. 2019. Meliadine Gold Project: Landfarm Management Plan. Version 3. March 2019. 6513-MPS-15.

Tetra Tech. 2019. Construction summary (as-built) report for Rankin Inlet Itivia site fuel storage and containment facility Meliadine project, Nunavut. Amendment#01 to 6515-E-132-005-132-REP-015. September 2019.

APPENDIX A: FRESHET ACTION PLAN PROCEDURE

	DOCUMENT ID: MEL-ENV-Freshet Management Plan Procedure
People concerned: Agnico Eagle employees, contractors, visitors on the Meliadine site	**Effective Date: March 28, 2018**

This procedure corresponds to the required minimum standard. Each and everyone also have to comply with the rules and regulations of the Nunavut Government in terms of health and safety at work.

Rev #	Date	Description	Initiator
1	2018-03-28	Change to Intelex Format	Matt Gillman
2	2018-12-14	Updated for 2019 Season	Matt Gillman
3	2019-03-12	Updated for 2019 Season, updated snow procedure spreadsheet to include D-CP5 and SP2	Matt Gillman
4	2020-03-17	Updated for 2020 Season, updated snow procedure to reflect current infrastructure, updated inspection frequencies	John Baechler Matt Gillman

Objective:

- To provide a plan to prevent potential environmental incidents at the Meliadine Site (Site) caused by the freshet season (Freshet) by recognizing specific areas for risk at the Site, possible actions to be undertaken and the departmental responsibilities to address the required actions.

Definitions (If applicable):

Tool/Equipment Required	PPE Required
• N/A	• N/A

Procedure					
Winter and Spring – Preparation Prior to Freshet[1]					***Risks/ Impacts***
Area for Risk		**Action**	**Responsible Department**	**Approximate Dates**	
P-Area	P1, P2 & P3	• Snow must not be stockpiled in any of the P-Area containment ponds	Environment to coordinate with Energy & Infrastructure, Engineering and Construction	All times	
AWAR, Bypass Road & CP3/CP4 Service Roads	Culverts	• Weekly Inspections	Environment	April - May	
	Culverts; Major Crossings; Overall Roads	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts (including the culvert at Itivia) and at major water crossings • Effort is to be made to ensure road surface material is not removed during snow clearing. • Ensure snow is not stockpiled along roadside • Repairs (mark culvert locations, add armouring around downstream culverts and bridges, replace pipe as needed, and document maintenance and repairs) • Monitor signs of erosion (especially downstream at culverts 14.9 and 16 Km on AWAR) • Notify the Environmental Department about any areas for concern[2, 3]	Energy & Infrastructure	Winter Freeze to May (start of thaw)	
Industrial Pad & Emulsion Pad	Culverts	• Inspection as needed and weekly from April - May	Environment		
	Culverts; Channels and ditches; Access Road	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repair any erosion • Notify the Environmental Department about any areas for concern[2, 3]	Energy & Infrastructure		
Quarries		• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Re-grade disturbed areas to provide appropriate drainage	Construction Environment (for Sampling)	Winter Freeze to May (start of thaw)	

Tailings Storage Facility	• Culvert 1 (access road to TSF) will be cleared of snow and ice prior to freshet and will be monitored closely for TSS transport; • Snow that has accumulated on the TSF deposition surface will be removed prior to freshet to reduce snowmelt runoff and pooling (Section 4);	Energy & Infrastructure	Winter Freeze to May	

Note:
[1] See the *Snow Management Procedure* (Procedure No.: MEL-ENV-0017) for additional information for snow removal at the Site.
[2] The Environmental Department will assess the area of concern and action will be undertaken to comply with the Nunavut Water Board (NWB) Water Licence No.: 2AM-MEL1631 (Licence)(i.e. collect field parameters or water samples for analysis of total suspended solids, turbidity, or any deleterious substance).
[3] Areas of concern are defined as high water areas on roads, near the up gradient opening of a culvert, flowing water with sediment, spills, wildlife, etc.

Spring and Summer – During Freshet or During Heavy Rainfall				Risks/ Impacts
Area for Risk	**Action**	**Responsible Department**	**Approximate Dates**	
P-Area				
P1, P2, and P3	• Weekly visual inspection at minimum (daily as needed) • Daily monitor and record water levels • Weekly written inspection • Water sampling	Environment	May - October	
	• If water levels or structural integrity of berms are observed to be compromised, immediate action is required. Notify Supervisor	Engineering		
	• P2 and P3 water volume should be kept as minimal as possible. Pumping of this water should occur regularly (daily) • Measure and record pumping volumes daily and report to Environment weekly	Energy & Infrastructure		
Evaporators	• Commission after sub-zero temperatures no longer occur • Operate as efficient as possible	Energy & Infrastructure		
DP1 and DP3 Trenches /Seep	• Install pump and flow meter at trench to collect seep • Pump water to respective containment area (P1 or P3) • Measure and record pumping volumes daily and report to Environment weekly	Energy & Infrastructure		
AWAR, Itivia, Bypass Road, CP3/CP4 Access Roads				
Culverts	• Inspections for free flow water through culverts and major crossings, pooling water on road, and integrity of road and abutments (Weekly (minumum) or after heavy rainfall between May and October and daily during peak flow) • Sample as required[2]	Environment	May - October	
AWAR Major Crossings	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs and erosion/sediment control implementation • Notify the Environmental Department about any areas for concern [2, 3]	Energy & Infrastructure Environment (for Sampling)		
Overall Roads and Itivia				
Quarries	• Repairs and erosion/sediment control implementation • Re-grade disturbed areas to provide appropriate drainage	Construction Environment (for Sampling)		

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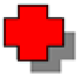
	• Notify the Environmental Department about any areas for concern [2, 3]		
Spring and Summer – During Freshet or During Heavy Rainfall			
Main Camp Pad/Industrial Pad			
Culverts	• Weekly inspections (at minimum; daily as needed) for free flow water through culverts and major crossings, pooling water on road, and integrity of road and abutments	Construction Environment (for Sampling)	May - October
Channels and Ditches Access Road	• Snow and ice clearing[1], including ice and snow that may impede free water flow through culverts and at major water crossings • Repairs and erosion/sediment control implementation • Notify the Environmental Department about any areas for concern [2, 3]	Construction Environment (for Sampling)	May - October
Infrastructure Pads			
Exploration Camp and Laydown	• Weekly visual inspection at minimum (daily as needed) • Water sampling as required • Installation of TSS mitigations as needed	Environment	May - June
Landfarm Structure	• Daily inspection of the landfarm retaining wall • Daily visual inspection for seepage • Collect a seepage water sample for hydrocarbon analysis. If seepage is present it should be immediately sampled and the seep be controlled. Whether by creating a sump and pumping back the water or by other methods.	Environment	
Landfarm	• Visually monitor excess water in containment area • Monitor seep (weekly) and collect water sample • Sample water according to the Licence	Environment	Mid-June and September
	• If excess water is present and cannot be treated immediately, sample in preparation for discharge to CP1		10 days prior to pumping
	• Once sample results have received, and if water is acceptable to be pumped to CP1 meets, water can be pumped to CP1 at a low flow to avoid erosion • Measure and record pumped volume	Energy & Infrastructure	Mid-June and September
Core Box Cemetery and Culvert	• Install straw wattles for sediment control on the other side of the road	Energy & Infrastructure	May
	• Weekly (at minimum; daily as needed) monitoring of TSS and turbidity and possible contaminant runoff	Environment	May - June
Emulsion Plant Pad	• Weekly Inspections • Water sampling of runoff as required for ammonia, nitrates, turbidity and TSS	Environment	May - June
	• Daily visual inspection for pooling water and water run off form pad to tundra, if noticed immediately contact environment department	Dyno Nobel	

Tailings Storage Facility	• Daily visual inspection for ponding and areas of elevated sediment transport; • Weekly inspections carried out to identify areas of concern including issues of seepage, cracking, and ponding on the TSF and associated structures.	Environment & Engineering	May - June	

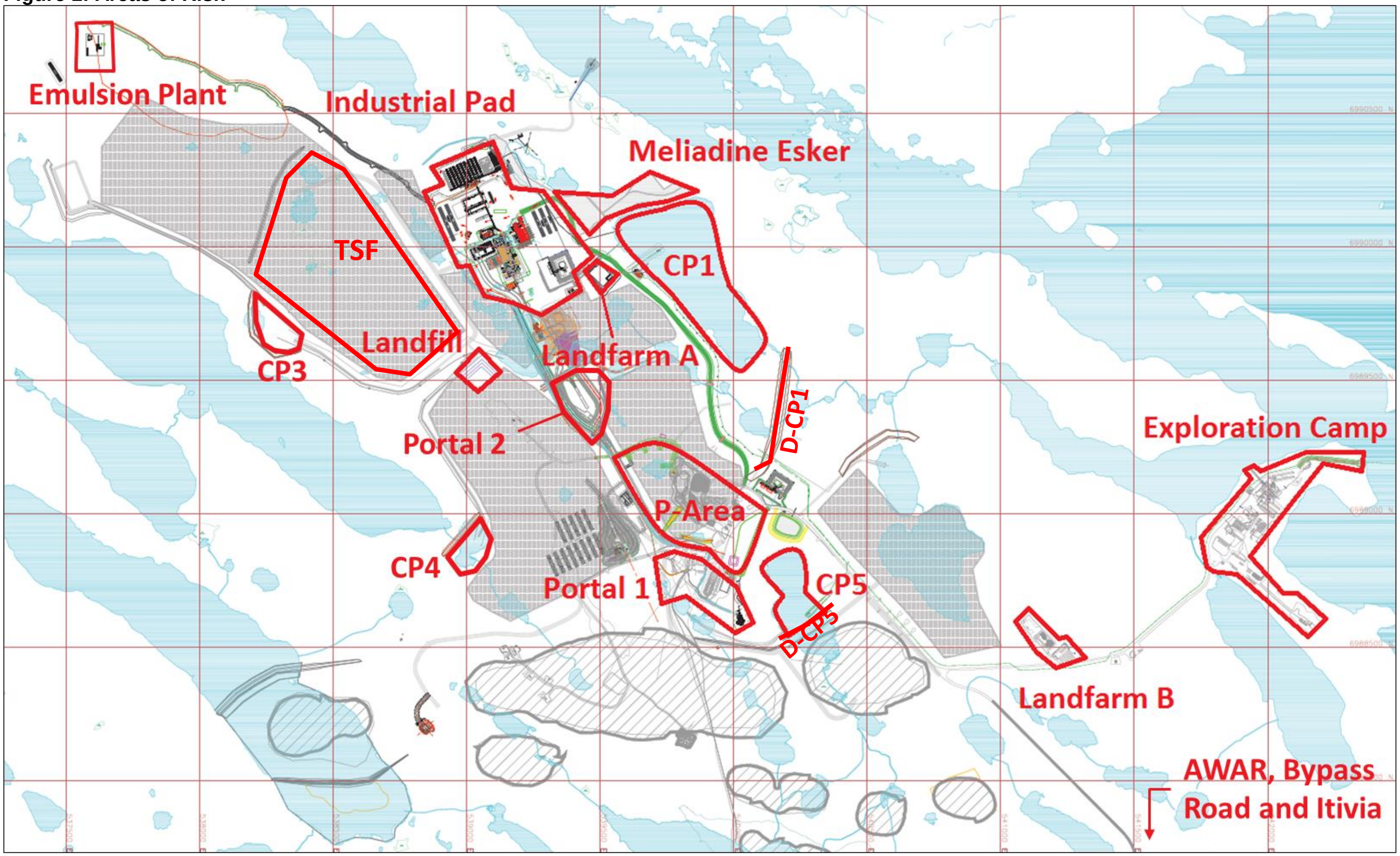
Note:

[1] See the *Snow Management Procedure* (Procedure No.: MEL-ENV-0017) for additional information for snow removal at the Site.
[2] The Environmental Department will assess the area of concern and action will be undertaken to comply with the Nunavut Water Board (NWB) Water Licence No.: 2AM-MEL1631 (Licence)(i.e. collect field parameters or water samples for analysis of total suspended solids, turbidity, or any deleterious substance).
[3] Areas of concern are defined as high water areas on roads, near the up gradient opening of a culvert, flowing water with sediment, spills, wildlife, etc.

Fall – Preparation Prior to Winter Freeze					Risks/ Impacts
Area for Risk		Action	Responsible Department	Approximate Dates	
LV50		• Survey water level and calculate water volume and provide to Environment, and/or • Measure and record flow meter volume prior to pumping and after pumping and provide to Environment • Remove pumps and prepare equipment for maintenance and winter storage	Mining	Prior to pumping to P2 (Late September)	   
		• Pump to P2		Late September/Early October	
Lv75/Water Stope		• Pump to SP1, SP2 (pending approval), or SWTP		June - September	
P-Area	P2 and P3	• Pump water to P1 for active evaporation	Energy & Infrastructure	June - September	
	P1, P2 & P3	• Remove pumps and prepare equipment for maintenance and winter storage		At beginning of winter freeze	
	Evaporators	• Decommission for winter and prepare equipment for maintenance and winter storage		Prior to any sub-zero temperatures	
A8		• Move pump house/pump closer to Site		Late September	
CP1		• Water sampling	Environment	June - September	
		• Pump water to discharge at Meliadine Lake	Process Plant		
		• Remove pumps and prepare equipment for maintenance and winter storage		Late September/Early October	
Downstream D-CP1		• Pump water to CP1	Energy & Infrastructure	June - September	
		• Remove pumps and prepare equipment for maintenance and winter storage		Late September/Early October	
CP5/D-CP5		• Restrict vehicle access on D-CP5 to prevent instrument damage • Pump water to CP1/SWTP		Late September	
Downstream D-CP5		• Pump water to CP5		June - September	

	• Remove pumps and prepare equipment for maintenance and winter storage		Late September/Early October	
Saline Ponds	• Remove pumps and prepare equipment for maintenance and winter storage		First week of October	
Tailings Storage Facility	• Daily visual inspections for ponding and areas of elevated sediment transport; • Weekly inspections carried out to identify areas of concern including issues of seepage, cracking, and ponding on the TSF and associated structures.	Environment & Engineering	June - September	

Figure 1: Areas of Risk



Related Documentation (If applicable):
• 2018 Freshet Management Plan • MEL-ENV-0017 - Snow Management Procedure

References (If applicable):
• N/A

Authorization (Print Name)		
Approved:	______________________ Name JOHSC Worker Rep.	Date: ____________
Approved:	______________________ Name Department Superintendent / Delegate	Date: ____________
Approved:	______________________ Name Health & Safety Superintendent / Delegate	Date: ____________

APPENDIX B: SNOW MANAGEMENT PROCEDURE

This document is void 24 hours after printing

	DOCUMENT ID: MEL-ENV-PRO Snow Management
People concerned: Meliadine employees and contractors	**Effective Date: 21 December 2019**

This procedure corresponds to the required minimum standard. Each and every person must comply with the rules and regulations of the Nunavut Government in terms of health and safety at work.

Rev #	Date	Description	Initiator
1	2018-03-28	Change to Intelex Format	Matt Gillman
2	2018-09-30	Updated for next season	John Baechler Matt Gillman
3	2018-10-11	Updated to include changes to snow management methods at Itivia, bypass road, CP3 and CP4 access roads, and Itivia Gas Boy.	Dan Gorton John Baechler
4	2019-12-17	Revised definitions, updated snow dump/pad location descriptions (table) and figure, removed P-Area snow dump, incorporated dust mitigation with TSF snow removal, updated Itivia snow managent figure with flow paths and check dams.	John Baechler

Objective:

The overall purpose of the snow management procedure (SMP) is to provide an outline for snow management that will assist with preventing adverse environmental impacts to the Meliadine Project (Site) and to mitigate risks from excess water during the freshet season (Freshet).

Definitions

Snow pad – A snow storage area where snow is flattened and compacted to promote sublimation, control runoff, reduce the formation of snowdrifts, and reduce the negative impact of snow melt.

Snow pile – A stockpile of snow that has not been further manipulated into a snow pad.

Negative impact of snow melt– High velocity runoff resulting in the transport of fine sediments or deleterious substances.

Tool/Equipment Required	PPE Required
• Snow blower • Shovel and haul truck • Grader	• Standard site PPE

Specific Training Requirements
• Equipment operator training

Procedure
Snow Removal at Meliadine Site 1. Prior to starting any snow removal, supervisors and equipment operators must discuss a removal plan based on the criteria outlined in this procedure. 2. If uncertain, supervisors or equipment operators must receive authorization from the Environment Department prior to moving snow to a non-designated area. 3. If snow is contaminated with a deleterious substance, snow removal should stop immediately to avoid the spread of contamination, and the steps outlined in the Spill Contingency Plan for Spills on Snow and Ice must be followed. 4. Supervisors must determine if the snow receiving location is: • Safe for the equipment operators; • Outside of a 31 m buffer zone around any water body; • A designated snow storage area; • A safety sensitive area. 5. Designated snow storage areas are as follows (see Figure 1 in the Appendices):

Snow Removal Area	Designated Snow Storage Area
Main Camp, Industrial Pad, Ore Pad, 6 Million Fuel Farm, Portal 2 Pad, Crusher Pad	Snow to be transported and dumped into a snow pile in the north end of CP1, not requiring further manipulation into a snow pad.
Tailing Storage Facility	Snow to be transported to the north end of the TSF and formed into wind breaking berms, running east-west, for TSF dust mitigation.
Paste Plant, Batch Plant	Snow to be transported immediately north of the Batch Plant and maintained as a snow pad.
3 Million Fuel Farm, Portal 1 Pad, Vent Raise, SWTP/SETP Pad	Snow to be transported to CP5 and maintained as a snow pad.

6. Snow piles are not authorized on the sides of any roadways, including the East Access Road, West Haul Road, CP3 Road, CP4 Road, All Weather Access Road (AWAR), Exploration Camp Road, or Bypass Road. Snow removed from roadways must be blown, or maintained as a snow pad next to the road.
7. The Fuel Farms, Gas Boy, Landfarm, and Itivia Diesel Tanks are safety sensitive areas. The valves and piping/hosing must be protected and available for inspection at all times. Snow must not be removed with a snow plow or heavy equipment.
8. Snow accumulated in Channels 1, 2, 3, 4, and 5 must be left to melt at freshet, as the use of snow removal or plow equipment can damage the synthetic channel liners.
9. A level snow pad may be created over the tundra provided that:
   - Clean snow is used for the pad construction;
   - The surface is cleaned after use;
   - Is not obstructing existing culverts, structures, or roadways.
10. Snow piles areas are not authorized at the Exploration Camp. Snow must be maintained as a snow pad to reduce the formation of snowdrifts and the negative impact of snowmelt at freshet (Figure 2).
11. Snow between the Main Camp dormitory wings must be removed to mitigate drifting against

the wings, which creates confined space under the camp and wildlife habitats (Figure 3).

12. Snow removed by Contractors at their designated worksite will be stockpiled at the worksite and subsequently removed by the Site Services department.

Snow Removal at Itivia Site

1. Snow piles are not authorized at the Itivia Laydown. Snow at the Laydown must be maintained as a snow pad. The existing ATV/snowmobile trail must not be blocked by snow removal (Figure 4).
2. Snow along the bypass road must be removed by blowing. Sand will not be used along the Bypass road as the blown snow must be clean and free of debris.
3. Snow removal from the Itivia Diesel Tank Farm secondary contaminant area must not be done using heavy equipment as to not damage the installed synthetic liner.
4. Snow accumulated in the Gas Boy secondary containment is to be removed using suitable equipment, to maintain capacity for fuel spill mitigation. Diesel contaminated snow will be disposed of appropriately at the snow cell or landfarm.

Appendix:

Figure 1: Authorized Snow Removal and Snow Storage Areas

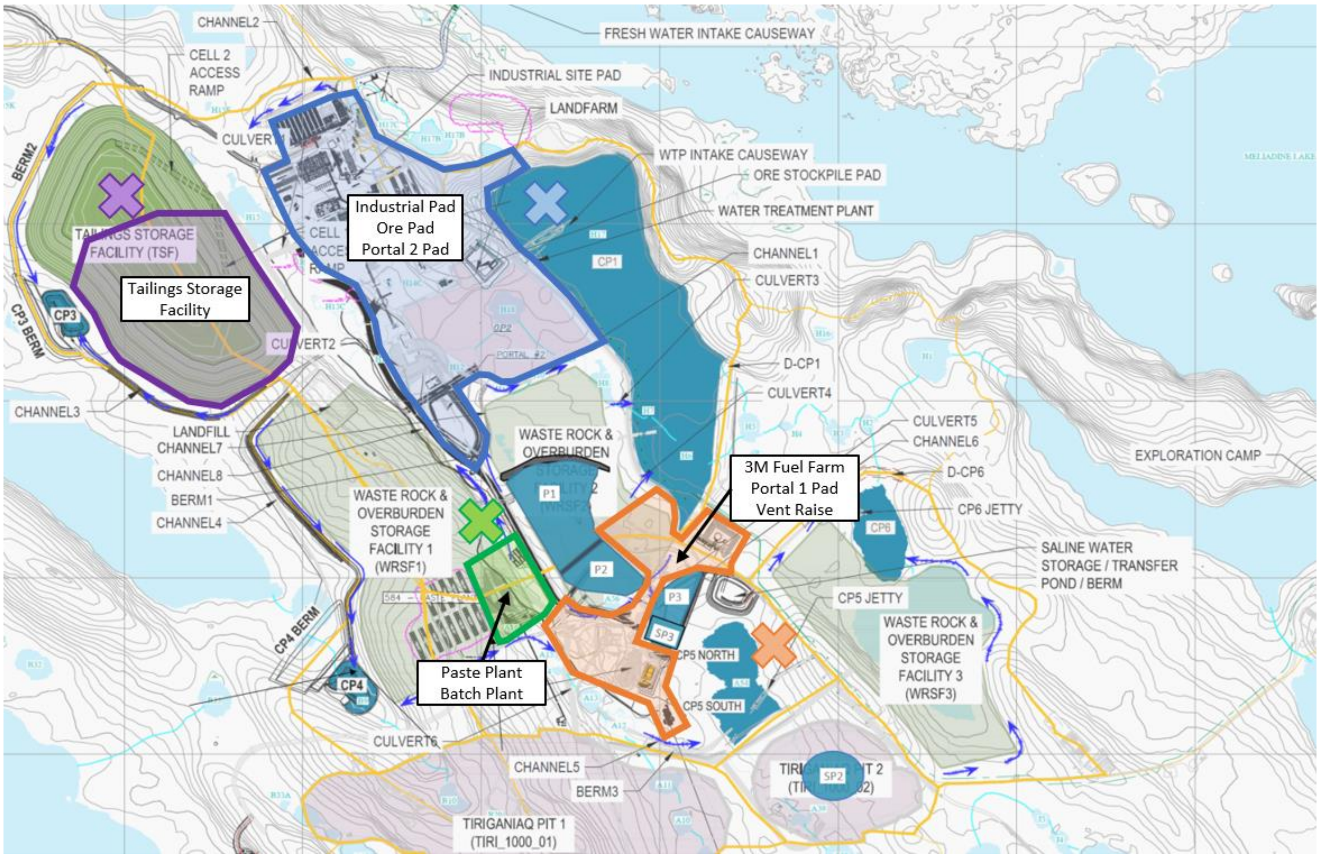


Figure 2: Exploration Camp Snow Pad Area and No Plow Zone Example

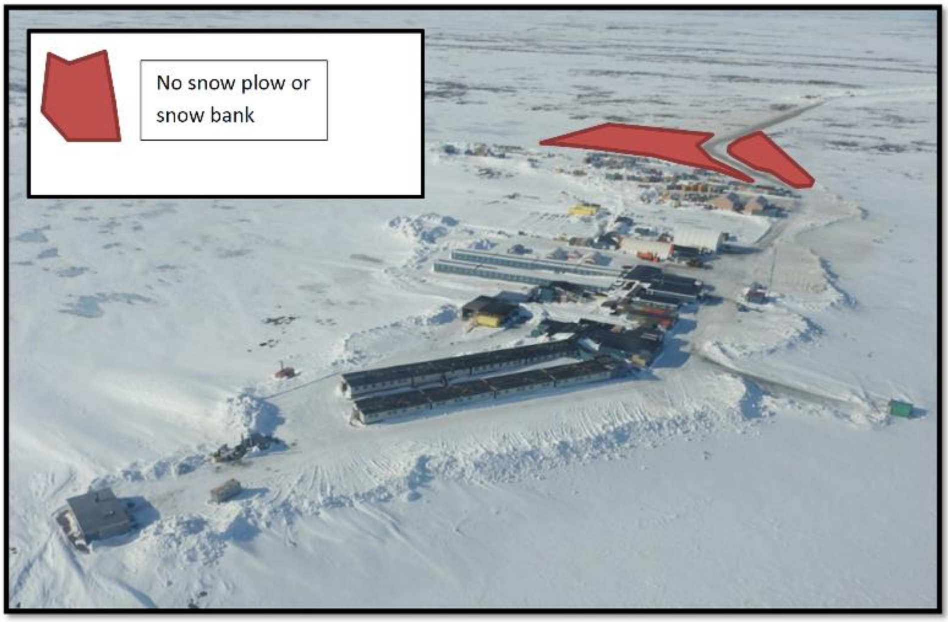
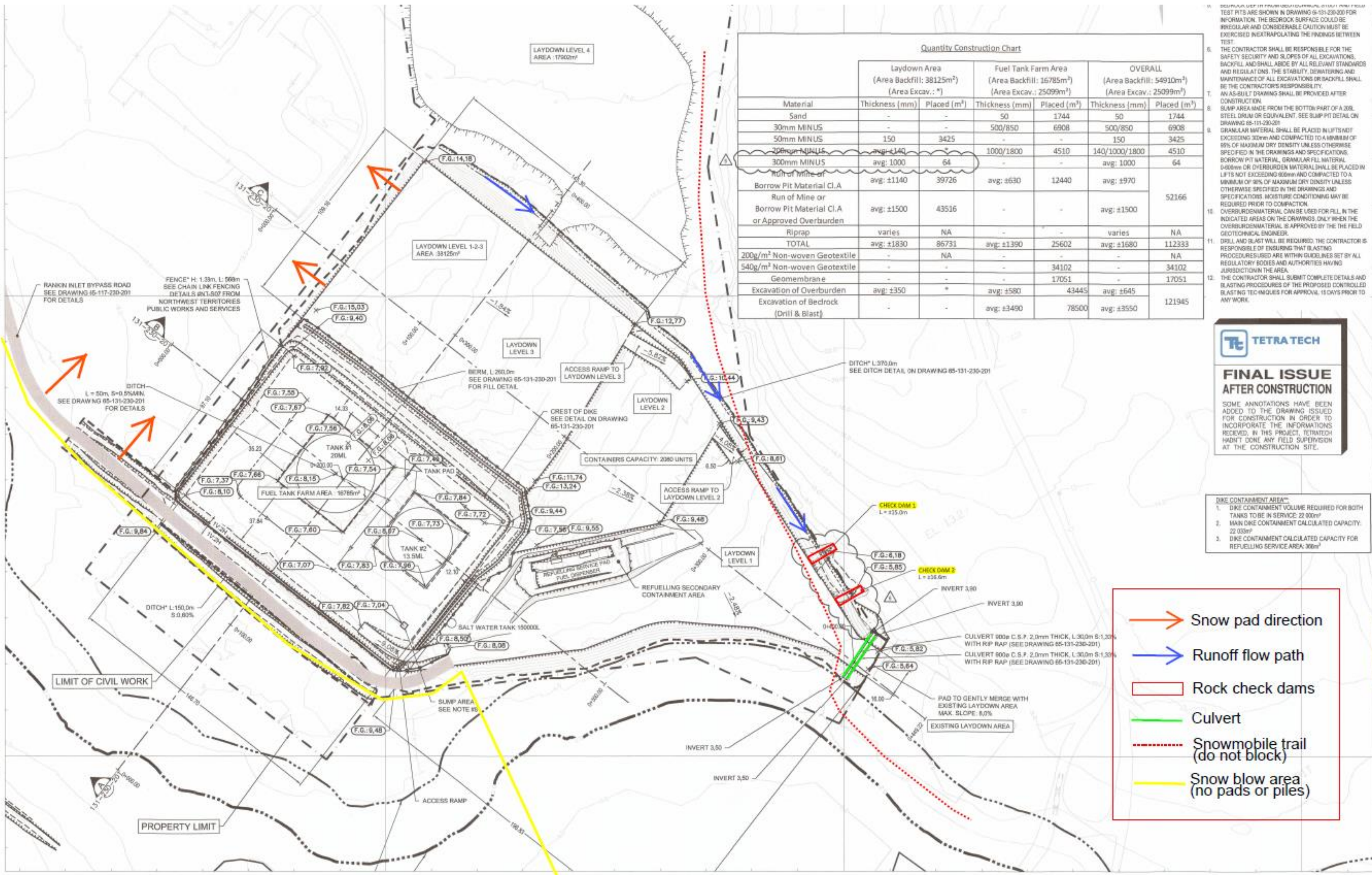


Figure 3: Snow removal from between camp accommodation trailers

Figure 4: Itivia Snow Pad Area and ATV Access Trail

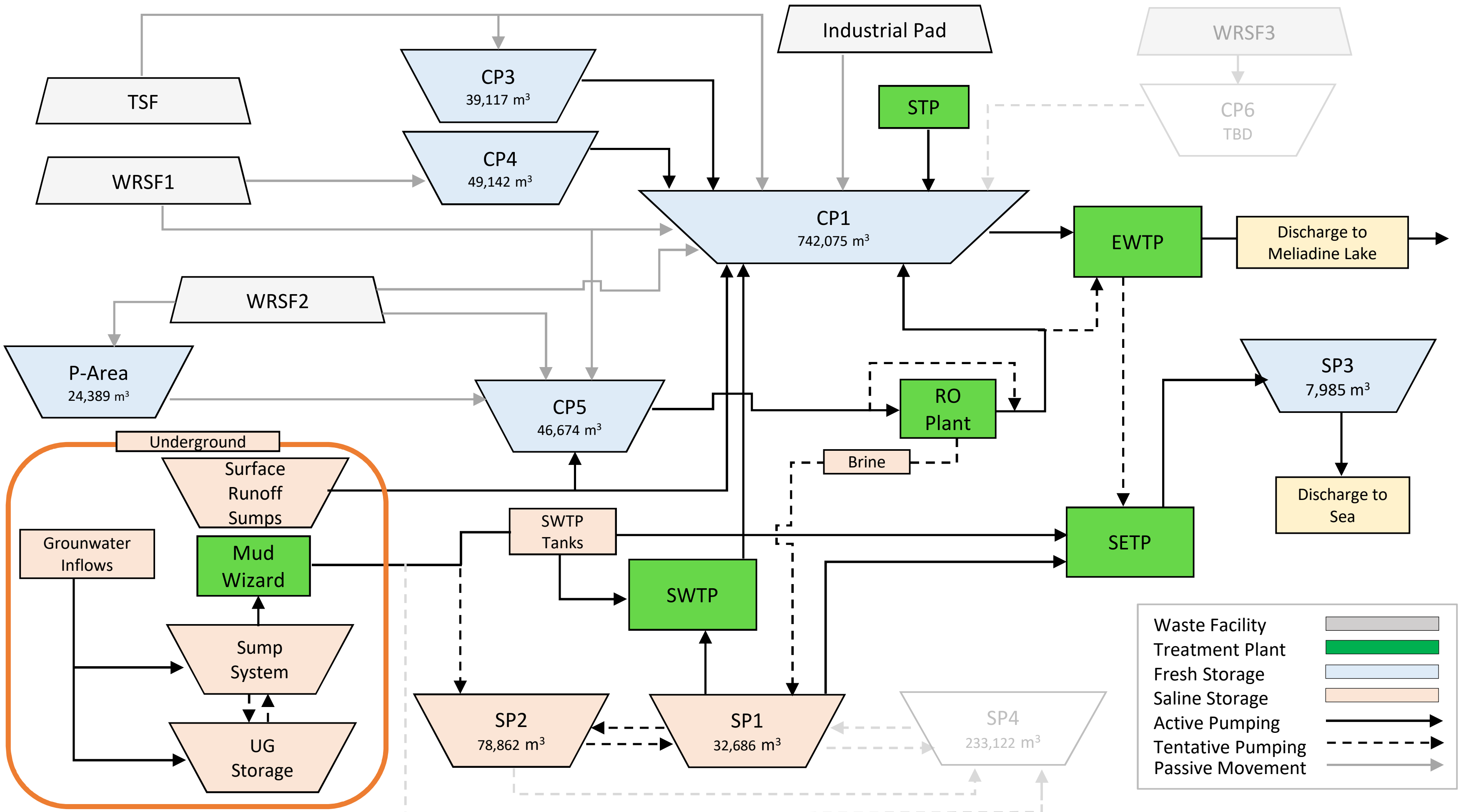


Quantity Construction Chart

Material	Laydown Area (Area Backfill: 38125m²) (Area Excav.: *) Thickness (mm)	Laydown Area Placed (m³)	Fuel Tank Farm Area (Area Backfill: 16785m²) (Area Excav.: 25099m²) Thickness (mm)	Fuel Tank Farm Area Placed (m³)	OVERALL (Area Backfill: 54910m²) (Area Excav.: 25099m²) Thickness (mm)	OVERALL Placed (m³)
Sand	-	-	50	1744	50	1744
30mm MINUS	-	-	500/850	6908	500/850	6908
50mm MINUS	150	3425	-	-	150	3425
200mm MINUS	avg: ±140	*	1000/1800	4510	140/1000/1800	4510
300mm MINUS	avg: 1000	64	-	-	avg: 1000	64
Run of Mine or Borrow Pit Material Cl.A	avg: ±1140	39726	avg: ±630	12440	avg: ±970	52166
Run of Mine or Borrow Pit Material Cl.A or Approved Overburden	avg: ±1500	43516	-	-	avg: ±1500	
Riprap	varies	NA	-	-	varies	NA
TOTAL	avg: ±1830	86731	avg: ±1390	25602	avg: ±1680	112333
200g/m² Non-woven Geotextile	-	NA	-	-	-	NA
540g/m² Non-woven Geotextile	-	-	-	34102	-	34102
Geomembrane	-	-	-	17051	-	17051
Excavation of Overburden	avg: ±350	*	avg: ±580	43445	avg: ±645	121945
Excavation of Bedrock (Drill & Blast)	-	-	avg: ±3490	78500	avg: ±3550	

Authorization (Print Name)	
Approved: ______________________________ Name JOHSC Worker Rep.	Date: ____________
Approved: ______________________________ Name Department Superintendent / Delegate	Date: ____________
Approved: ______________________________ Name Health & Safety Superintendent / Delegate	Date: ____________

APPENDIX C • WATER MANAGEMENT SCHEMATIC FLOW SHEET



TSF
CP3
39,117 m³
Industrial Pad
WRSF3
STP
CP6
TBD
WRSF1
CP4
49,142 m³
CP1
742,075 m³
EWTP
Discharge to Meliadine Lake
WRSF2
P-Area
24,389 m³
CP5
46,674 m³
RO Plant
SP3
7,985 m³
Underground
Surface Runoff Sumps
Brine
Discharge to Sea
SWTP Tanks
Grounwater Inflows
Mud Wizard
SETP
SWTP
Sump System
UG Storage
SP2
78,862 m³
SP1
32,686 m³
SP4
233,122 m³
Waste Facility
Treatment Plant
Fresh Storage
Saline Storage
Active Pumping
Tentative Pumping
Passive Movement

APPENDIX D • SEDIMENT AND EROSION MANAGEMENT PLAN

AGNICO EAGLE

Meliadine Division

Sediment and Erosion Management Plan

MARCH 2020
VERSION 2

EXECUTIVE SUMMARY

This document presents the Sediment and Erosion management plan (the Plan) at the Meliadine Gold Project. The purpose of this Plan is to provide consolidated information on the management and monitoring of potential areas subjected to erosion. This is accomplished by reviewing the potential effects of total suspended solids (TSS) and turbidity, the Federal guidelines and the license requirements, followed by the periods and types of activities subjected to erosion, and the specific monitoring and mitigating measures.

General findings on the effects of TSS on fish and fish habitat have been listed, such as sublethal and lethal effects on fish and their eggs. Federal TSS Guidelines have been cited, distinguishing the short-term and long-term exposure thresholds. Turbidity guidelines are also discussed in the present document. The Plan presents the monitoring and mitigating actions related to three (3) specific periods of activity: Periods of construction near water – during construction and operation; periods of freshet or significant runoff events – during construction, operation and closure; periods of potential impact to waterbodies – during operation. The proposed monitoring and mitigating measures are discussed for those periods of activity.

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ᑎᑎᖅᑲᖅ ᐱᔾᔪᑎᖃᖅᑐᑦ ᐃᒪᐅᑉ ᐊᓗᐊᓄᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᓱᕋᒃᐸᓪᓕᐊᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᒥᑦ (ᐸᕐᓇᐅᑎ) ᑕᓯᕐᔪᐊᖅ ᒨᓗᒧᑦ ᐱᓕᕆᕐᒥᑦ. ᐱᔾᔪᑎᖓ ᐸᕐᓇᐅᑎᐅᑉ ᑲᑎᑎᓯᒪᔪᓂᒃ ᑐᑭᓯᐅᒪᔾᔪᑎᓂᒃ ᑐᓂᓯᓂᐊᕐᓗᓂ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓯᐊᖃᑦᑕᕐᓂᕐᒧᑦ ᓱᕋᒃᐸᓪᓕᐊᓂᖃᕈᓐᓇᖅᑐᓂᒃ ᐃᓂᐅᔪᓂᒃ. ᑕᒪᓐᓇ ᐱᐊᓂᒃᑕᐅᖃᑦᑕᖅᑐᖅ ᕿᒥᕐᕈᐸᓗᑎᑦ ᖃᓄᐃᙵᓕᖅᑎᑦᑎᓂᐅᔪᓐᓇᖅᑐᑦ ᑲᑎᓗᒃᑖᖅᓱᑎᑦ ᑕᓖᓂᖅᓴᖅᑐᑦ ᓯᑎᔪᐃᑦ (TSS) ᐊᒻᒪᓗ ᑕᕝᕙᐅᖃᓗᐊᕐᓂᖅ, ᑲᓇᑕᒥᑦ ᒪᓕᒃᑕᐅᔪᕆᐊᑦ ᐊᒻᒪᓗ ᓚᐃᓴᙵᓯᒧᑦ ᐱᔭᕆᐊᖃᖅᑐᑦ. ᑭᖑᓂᐊᒍᑦ ᐅᐸᓗᐃᑦ ᐊᒻᒪᓗ ᖃᓄᐃᑦᑑᓂᖏᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᑦ ᓱᕋᒃᐸᓪᓕᐊᓂᕐᒧᑦ ᐱᔪᑦ, ᐊᒻᒪᓗ ᓱᓇᒥᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᖏᕈᐊᖏᕆᐊᖅᑎᑦᑎᓂᕐᓄᑦ.

ᖃᐅᔾᔭᐅᔪᑦ ᖃᓄᐃᙵᓕᖅᑎᑦᑎᓂᖏᓐᓄᑦ TSS ᐃᖃᓗᙵᓄᑦ ᐃᓂᖏᓐᓄᒡᓗ ᑎᑎᕋᖅᑕᐅᓚᐅᖅᑐᑦ, ᐅᓗᕆᐊᓇᓗᐊᖏᑦᑐᑦ ᐊᒻᒪᓗ ᐅᓗᕆᐊᓇᖅᑐᑦ ᖃᓄᐃᙵᓕᖅᑎᑦᑎᓃᑦ ᐃᖃᓗᙵᓄᑦ ᐊᒻᒪᓗ ᒪᓂᖏᓐᓄᑦ. ᑲᓇᑕᒥᑦ TSS-ᒧᑦ ᒪᓕᒃᑕᐅᔪᕆᐊᑦ ᐅᖃᓕᒫᖅᑕᐅᓯᒪᔪᑦ, ᓇᓗᓇᐃᖅᓱᑎᑦ ᓇᐃᑦᑐᒥᑦ ᐊᒻᒪᓗ ᐊᑯᓂᐅᔪᒥᑦ ᑕᑯᒃᓴᐅᓂᕐᒧᑦ ᑎᑭᐅᑎᓃᑦ. ᑕᓇᐅᖃᕐᓂᕐᒧᑦ ᒪᓕᒃᑕᐅᔪᕆᐊᑦ ᐅᖃᐅᓯᐅᙱᔪᑦ ᑕᕝᕙᓂ ᑎᑎᖅᑲᒥᑦ. ᐸᕐᓇᐅᑎ ᑐᓂᓯᔪᖅ ᖃᐅᔨᓯᐊᖃᑦᑕᕐᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐊᖏᕈᐊᖏᕆᐊᖅᑎᑦᑎᓂᕐᒨᖓᔪᓂᒃ ᐱᖓᓱᓄᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓄᑦ: ᓴᓇᕙᓪᓕᐊᓂᕐᒥᑦ ᐃᒪᐅᑉ ᖃᓂᑕᖓᓂᑦ - ᓴᓇᕙᓪᓕᐊᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᐊᐅᓛᖅᑎᑦᑎᓂᕐᒥᑦ; ᐊᐅᒃᐸᓪᓕᐊᓂᐅᑎᓪᓗᒍ ᐅᕝᕙᓘᓐᓃᑦ ᑰᓐᓂᖃᓗᐊᕐᓂᐅᔪᓂᑦ - ᓴᓇᕙᓪᓕᐊᑎᓪᓗᒋᑦ, ᐊᐅᓛᖅᑎᑦᑎᓂᕐᒥᑦ ᐊᒻᒪᓗ ᐅᒃᑯᐊᖅᐸᓪᓕᐅᓂᕐᒥᑦ; ᐊᒃᑐᖅᑕᐅᓂᖃᑐᐃᓐᓇᓇᐊᖃᕐᓂᖏᓐᓂᒃ ᐃᒪᖃᕐᓂᐅᔪᑦ - ᐊᐅᓛᖅᑎᑦᑎᓂᖃᖅᑎᓪᓗᒋᑦ. ᖃᐅᔨᓯᐊᖃᑦᑕᕐᓂᐅᔪᖅ ᐊᒻᒪᓗ ᐊᖏᕈᐊᖏᕆᐊᖅᑎᑦᑎᓂᕐᒨᖓᔪᑦ ᐅᖃᐅᓯᐅᔪᑦ ᖃᓄᐃᓕᐅᕐᓂᐅᔪᓂᑦ.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	March 2019	All		Comprehensive plan
2	March 2020	2.3 3.3	5 7	Updated to include TSS guidelines for MEL-14 Monitoring Program Station Updated mitigation measures to include check dams

TABLE OF CONTENTS

Acronyms

Agnico Eagle	Agnico Eagle Mines Limited – Meliadine Division
CCME	Canadian Council of Ministers of the Environment
DFO	Fisheries and Oceans Canada
NIRB	Nunavut Impact Review Board
NTU	Nephelometric Turbidity Units
NWB	Nunavut Water Board
Plan	Sediment and Erosion Management Plan
TSS	Total Suspended Solids

UNITS

h	hour
km	kilometre
km^2	square kilometre
mg/L	milligram per litre

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (Project), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1’23.8’’ N, 92°13’6.42"W), on Inuit owned lands. The Project is located within the Meliadine Lake watershed of the Wilson Water Management Area (Nunavut Water Regulations Schedule 4).

As presented in Table 1.1, there are four phases to the development of the Tiriganiaq deposit: 3.5 years construction (Q4 Year -5 to Q2 Year -1), 8.5 years mine operation (Q2 Year -1 to Year 8), 3 years closure (Year 9 to Year 11), and post-closure (Year 11 forwards).

Table 1.1 Overview of Timeline and General Activities

Phase	Year	General Activities
Construction	Year -5 to year -1	• Construct site infrastructure • Develop the underground mine ramp • Stockpile ore
Operations	Year -1 to 8	• Mining operations • Stockpile ore • Dry stack tailing deposition
Closure	Year 9 to 11	• Decommission of underground mine surface opening • Cover on top of tailings • Decommission non-essential mine infrastructure • Fill open pits with active pumping
Post-Closure	Year 11 forwards	• Site and surrounding environment monitoring

This document presents the Sediment and Erosion Management Plan (the Plan). The purpose of this Plan is to provide consolidated information on the management and monitoring of potential areas subjected to erosion. This is accomplished by presenting first a review of the potential effects of total suspended solids (TSS) and turbidity, the Federal guidelines and the license requirements, followed by the periods and type of activities subjected to erosion, and the specific monitoring and mitigating measures.

As per Nunavut Impact Review Board (NIRB) Meliadine Project Certificate No.006 Condition 28, the Sediment and Erosion Management Plan should be developed to prevent or minimize the effects of destabilization and erosion that may occur due to Project activities. The plan should also detail sediment control plans to prevent and/or mitigate sediment loading into surface water within the Project area.

The objectives of the plan are:

- To prevent the release of sediment into streams and waterbodies during construction activities;
- To reduce and mitigate erosion and the release of sediment during operations activities;
- To specify erosion and sediment control measures that, if implemented and maintained, will help Agnico Eagle maintain compliance with the Federal Fisheries Act, specifically with Section 36(3) of the Act, which prohibits the deposition of deleterious substances into waterbodies frequented by fish; and
- To provide references to approvals, relevant standards, control plans and procedures for training, communications, investigation and corrective action, and audits that are required under the Project Agreement.

SECTION 2 • TOTAL SUSPENDED SOLIDS/TURBIDITY EFFECTS, FEDERAL GUIDELINES AND LICENSE REQUIREMENTS

2.1 Effects of Total Suspended Sediments on Fish Habitat

Suspended sediments, and associated effects on water clarity, have the potential to affect fish and fish habitat in a variety of ways, including but not limited to:

- Smothering of deposited eggs or siltation of spawning habitats;
- Smothering of benthic invertebrate communities;
- Decreased primary productivity caused by reduced light penetration;
- Reduced visibility, which may decrease feeding efficiency and/or increase predator avoidance; and
- Clogging and abrasion of gills.

Moreover, the general findings for effects of TSS on fish and fish habitat indicate the following:

- Effects of TSS depend on both the concentration of TSS and duration of exposure;
- Effects of TSS can also be influenced by the size and shape of suspended particles;
- Lethal concentration of TSS on fish over acute exposure ranges from hundreds to hundreds of thousands of mg/L;
- Sublethal effects on fish (reduced growth, changes in blood chemistry, histological changes) associated with chronic exposures tend to be exhibited at TSS concentrations ranging from the tens to hundreds of mg/L;
- There is considerable uncertainty about potential effects of low TSS concentrations over long time periods;
- Overall, the most sensitive group of aquatic organisms to TSS appears to be salmonids, and guidelines are developed to protect this group;
- Adult salmonids are generally more sensitive to short durations of high concentrations of suspended sediments than juvenile salmonids; and
- Low suspended sediment levels are known to cause egg mortality (40 %) to rainbow trout at long durations (7 mg/L at 48 days). Guidelines for long-term exposure reflect these findings.

More details are located in the report from Fisheries and Oceans Canada (DFO) on the effects of sediments on fish and their habitat (Fisheries and Oceans Canada, 1999).

2.2 Federal Guidelines

2.2.1 TSS Guidelines

The Canadian Council of Ministers of the Environment (CCME) specifies separate guidelines for TSS for clear and high flow periods. The guidelines are derived primarily from Caux *et al*. (1997), with application intended mainly for British Columbia streams. In the case of the application to the Meliadine Project lakes, the clear flow guidelines would be most relevant; even during freshet. The lakes would not expect to see large natural fluctuations in TSS except in localized areas for short periods.

The guidelines put forth by the CCME recognize that the severity of effects of suspended sediments is a function of both the concentration of suspended sediments and the duration of exposure. Guidelines are intended to protect the most sensitive taxonomic group and the most sensitive life history stages.

Table 2.1 Existing Federal TSS Guidelines (after Agnico Eagle, 2018)

Source	Short-Term Exposure	Long-Term Exposure
CCME (1999)	Anthropogenic activities should not increase suspended sediment concentrations by more than 25 mg/L over background levels during any short-term exposure period (e.g., 24-h).	For longer term exposure (e.g., 30 days or more), average suspended sediment concentrations should not be increased by more than 5 mg/L over background levels.
MDMER (2002)	Maximum authorized concentration in a composite effluent sample = 22.5 mg/L. Maximum authorized concentration in a grab sample of effluent = 30 mg/L.	Maximum authorized monthly mean effluent concentration = 15 mg/L.

2.2.2 Turbidity Guidelines

Turbidity guidelines put forth by the CCME (1999) are based on extrapolation from the TSS guidance above, adjusted by a factor of about 3:1 (a typical average ratio for TSS: turbidity). In the case of turbidity for clear water, CCME (1999) recommends a maximum increase of 8 Nephelometric Turbidity Units (NTU) from background levels for a short-term exposure (e.g., 24-hour period), and a maximum average increase of 2 NTU from background levels for a longer term exposure (e.g., 30-day period).

CCME (1999) notes that in some cases short-term resuspension of sediments and nutrients in the water column can augment primary productivity, and in other cases, changes in light penetration may be inconsequential if a system is limited by other factors such as nutrients. The Caux *et al*. (1997) study considered effects of suspended sediment not only on fish but also on algae and zooplankton. In summary, the recommendations put forth by Caux *et al*. (1997) are based mainly on the most sensitive taxonomic group, which is salmonids.

However, research has shown that widespread, chronic turbidity can result in reduced light penetration and subsequent reductions of primary productivity (Fisheries and Oceans Canada, 1999; Canadian Council of Ministers of the Environment, 1999; Lloyd, Koenings, & Laperriere, 1987). Consequently, water clarity is of concern at broader spatial scales and longer time frames. It should be noted that DFO's report on effects of sediment on fish and their habitat (DFO, 1999) endorses the guidelines for TSS put forth by the CCME (1999), but does not recommend following guidelines for turbidity. Rather, turbidity may be used as a surrogate for suspended sediment only when the relationship between the two parameters is established for a particular waterbody.

2.3 License Requirements for the Protection of Fish and Fish Habitat at Meliadine

The Nunavut Water Board (NWB) Type A Water License for the Meliadine Project includes:

All surface runoff and/or discharge from drainage management systems, at the Monitoring Program Stations MEL-SR-1 to MEL-SR-TBD referred to in Part I, Item 11, during the Construction/Operation of any facilities and infrastructure associated with this project, including laydown areas and All Weather Access Road, where flow may directly or indirectly enter a Water body, shall not exceed the Surface Runoff and Discharge from Drainage Management Systems quality limits in Table 2.3.

Table 2.3 Surface Runoff and Discharge from Drainage Management Systems Quality Limits

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Total Suspended Solids (TSS) (mg/L)	50.0	100.0
Oil and Grease	No Visible Sheen	No Visible Sheen
pH	Between 6.0 and 9.5	Between 6.0 and 9.5

Additionally, the discharge of effluent from the Final Discharge Point at Monitoring Program Station MEL-14 directed to Meliadine Lake through the Meliadine Lake Diffuser shall not exceed the following TSS concentrations, in accordance with the requirements of the Type A Water License (Part F, Item 3) and MDMER (see Table 2.1 above):

- Maximum monthly mean effluent concentration: 15 mg/L;
- Maximum concentration of any grab sample of effluent: 30 mg/L.

SECTION 3 • SEDIMENT AND EROSION MONITORING AND MITIGATION

3.1 Sediment and Erosion during Specific Periods

The purpose of the Plan is to ensure that Agnico Eagle will successfully monitor signs of sedimentation and erosion and minimize its resulting effects. This plan presents the monitoring and mitigating actions related to three (3) specific periods of activity for Meliadine:

- Periods of construction near water – during construction and operation;
- Periods of freshet or significant runoff events – during construction, operation and closure;
- Periods of potential impact to waterbodies – during operation.

The construction of water management infrastructure could potentially lead to excess TSS. Therefore, erosion control methods must be considered during construction of water management infrastructure. In addition, erosion control must be considered during any dewatering activity.

The freshet season at Meliadine occurs approximately from mid-May until the end of June. In addition, there can be periods of high water flow due to rainfall events from late May – early October. As most site construction has been completed at the Meliadine site there are new areas and infrastructure that have become potentially vulnerable to excess water during the freshet season and in response to rainfall, such as, but not limited to:

- Culverts and other water management infrastructures;
- Newly constructed embankments, such as roads and berms;
- Water channels; and
- Surface runoff.

Water transfer and water discharge during operation can also lead to erosion and sedimentation.

3.2. Erosion and Sediment Monitoring

In order to monitor potential erosion and sedimentation, smaller water management infrastructure such as culverts, cross drains, surface runoff and ditches are inspected up to daily during freshet (minimum of weekly), on a monthly basis thereafter and daily after significant rain events. Larger culverts and bridges are inspected more often if they represent a risk for daily operations, for the receiving environment or for the health and safety of workers. More specifically, the following aspects are monitored during visual inspections:

- Accumulation of debris near the inlet of the crossings, impeding the free flow of water at those locations;
- Bed erosion upstream and downstream of watercourse crossing structures;
- Scour under bridge abutments and abutment foundations; and
- Erosion along cutslopes and fillslopes of embankments (rill and gully erosion), etc.

Newly excavated channels are inspected on a regular basis and after significant rain events. Erosion signs along the channel flow are monitored and documented. Inspections are carried out during the spring when surficial ice moves towards the inlet of the diversion channels to ensure that no ice blockage causes water buildup upstream of the channel, which could lead to subsequent erosion problems. It is important to develop a database to determine if adverse trends are occurring. If adverse trends are observed, then mitigation will be undertaken to prevent a major incident.

The frequency of water and turbidity sampling are in accordance with the requirements of the Type A Water License and MDMER. The frequency will be increased if required during the freshet season or during heavy rainfall events. Procedures for turbidity monitoring include:

- Collection of water at the site of sediment entrance (exposure), and at a reference site (i.e., in the same watercourse/waterbody in an area unaffected by the sedimentation [upstream, at least 50 m away where water does not appear to be impacted]).

- Analyze samples for turbidity using a field turbidity meter and compare the exposure sample to the reference sample.

- If the exposure sample results are higher than the reference then mitigation will be undertaken (i.e. installation of silt fencing, silt barrier booms, etc.) to prevent any impact to watercourses.

If Agnico Eagle is actively working in an area with elevated turbidity – the work will stop until the level of clarity returns to an acceptable level.

Monitoring will be documented with site photographs and inspection forms.

3.3 Mitigation Measures

The following mitigation measures could be used, if required, to reduce risks associated with erosion and sedimentation.

- Riprap or clean non-acid generating/non-metal leaching rockfill could be used to armor shorelines, bridge abutments, culverts inlets and outlets and toe berms;
- Ditches managing high volumes of water could be armored for erosion control and reduce the speed of water flow;
- Sedimentation basins could be constructed at sensitive locations to allow settlement of finer sediments;
- Check dams could be constructed in areas of sustained high levels of TSS to mitigate transport of TSS downstream;
- Ditches, culverts and other water crossing structures should be maintained free of debris to allow free flow of runoff water;
- Installation of erosion control material such as turbidity barriers, silt curtains or straw booms;
- Site-specific erosion issues may arise during the mine operation that require specific local corrective actions;
- In-stream construction during periods when streams are expected to be dry or frozen to the bottom (i.e., during winter or fall). Isolation methods will be used for work below the high water mark for streams with flowing water at the time of construction;

- Materials installed below the high water mark (i.e., riprap) will be cleaned prior to installation to avoid adding deleterious substances to watercourses. Where concrete is installed, it will be allowed to cure fully prior to installation;
- Riparian areas will be maintained whenever possible to minimize erosion and impacts to fish habitat, with vegetation removal limited to the width of the workspace footprint. Disturbed areas along the streambanks will be stabilized and allowed to re-vegetate upon completion of work to minimize future erosion;
- Debris and excess materials resulting from construction will be removed from the work site to prevent them reaching water bodies; and
- When using equipment that creates tracks on the surface, run the equipment slowly to create grooves running perpendicular the slope and not parallel to the slope. This type of texture on slopes can slow the speed of runoff and reduce the amount of erosion and sediment transported downhill. This method must also be combined with an additional method of catching sediment at the base of the slope, such as a silt fence, straw log, etc.

SECTION 4 • REFERENCES

Agnico Eagle Mines Ltd. (2016). Water Management Plan. In Accordance with Water License 2AM-MEL1631. Prepared by Agnico-Eagle Mines Limited - Meliadine Division, Version 2, March 2018.

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APPENDIX E • WATER QUALITY AND FLOW MONITORING PLAN

AGNICO EAGLE

Meliadine Division

Water Quality and Flow Monitoring Plan

MARCH 2020
VERSION 2

EXECUTIVE SUMMARY

The Water Quality and Flow Monitoring Plan (the Plan) has been prepared in accordance with the requirements of the Nunavut Water Board Type A water license 2AM-MEL1631. The Plan is one component of the *Aquatic Effects Management Program* (AEMP) and is closely associated with the *Water Management Plan* and the *Metal and Diamond Mining Effluent Regulations (MDMER)*.

Section 2 of this Plan includes an overview of the monitoring programs and mine development schedule. Section 3 provides specific details (including sampling locations and parameters to be measured) for the compliance monitoring program, along with general guidance for the event monitoring program. An adaptive management program is described for regulated discharge and non-regulated discharges in Section 3. Requirements of the flow monitoring program are described in Section 4, and an overview of the reporting requirements in Section 5. Section 6 provides overview of Quality Assurance / Quality Control practices.

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ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐊᒻᒪᓗ ᑯᐊᔪᒥᒃ ᖃᐅᔨᓴᖃᑦᑕᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ (ᐸᕐᓇᐅᑎ) ᐱᓕᕆᐊᖑᓚᐅᖅᑐᖅ ᒪᓕᒃᑯᒋᑦ ᐱᔭᕆᐊᖃᖅᑎᑕᐅᔪᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔾᒃᑯᓐᓄᑦ Type A ᓚᐃᓴᓐᓯᒧᑦ 2AM-MEL1631. ᐸᕐᓇᐅᑎ ᐃᓚᒋᔭᐅᔪᖅ ᐃᒪᕐᒥᐅᑕᓂᒃ *ᖃᓄᐃᖓᓕᖅᑎᑦᑎᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᑐᕌᖓᔪᖅ (AEMP)* ᐊᒻᒪᓗ ᐊᒃᑐᐊᓂᖃᕐᓂ ᐃᒪᕐᒥᒃ *ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ-ᒥᒃ ᐊᒻᒪᓗ ᓯᑎᔪᓂᒃ ᐅᔭᕋᕐᓂᒃ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᑯᐱᑦᑎᓂᕐᒧᑦ ᒪᓕᒐᖁᓂᒃ (MDMER).*

ᐃᓚᒋᔭᐅᔪᖅ 2 ᐸᕐᓇᐅᑎᒥᑦ ᐃᓚᐅᔪᑦ ᑕᒪᓐᓇᒃᑖᒥᒃ ᕿᒥᕐᕈᓂᖅ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᑐᕌᖓᔪᓂᒃ ᐊᒻᒪᓗ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᒃ ᐱᕚᓪᓕᐊᓂᕐᒧᑦ ᖃᖓᒃᑰᖓᔪᒥᒃ. ᐃᓚᒋᔭᐅᔪᖅ 3 ᑕᑯᒃᓴᐅᑎᑦᑎᔪᖅ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ ᓇᓗᓇᐃᔭᐅᑎᓂᒃ (ᐃᓚᐅᑉᓗᓂ ᐆᒃᑐᕋᐃᓂᕐᒧᑦ ᐃᓂᐅᔪᑦ ᐊᒻᒪᓗ ᑭᓪᓕᒋᔭᐅᔪᑦ ᐆᒃᑐᕋᖅᑕᐅᓂᐊᖅᑐᓂᒃ) ᒪᓕᒃᑕᐅᓂᖓᓄᑦ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᑐᕌᖓᔪᖅ, ᐃᓚᐅᑉᓗᑎᒃ ᒪᓕᒃᑕᐅᔪᒃᓴᖅ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᑐᕌᖓᔪᒥᒃ. ᐊᑐᓕᖅᑎᑦᑎᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᑐᕌᖓᔪᖅ ᐅᖃᐅᓯᐅᓂᖓᑐᑦ ᒪᓕᒐᑎᒍᑦ ᑯᐱᑦᑎᓂᕐᒧᑦ ᐊᒻᒪᓗ ᒪᓕᒐᑎᒎᙱᑦᑐᖅ ᑯᐱᑦᑎᓂᕐᓄᑦ ᐃᓚᒋᔭᐅᔪᖅ 3-ᒥᑦ. ᐱᔭᕆᐊᖃᖅᑐᑦ ᑯᐊᔪᓂᒃ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᕐᒧᑦ ᑐᕌᖓᔪᕐᒧᑦ ᐅᖃᐅᓯᐅᔪᑦ ᐃᓚᒋᔭᐅᔪᖅ 4-ᒥᑦ, ᐊᒻᒪᓗ ᑕᒪᓐᓇᒃᑖᕐᒥᒃ ᕿᒥᕐᕈᓂᕐᒧᑦ ᐅᓂᒃᑳᓕᐅᕆᓂᕐᒧᑦ ᐱᔭᕆᐊᓕᖕᓄᑦ ᐃᓚᒋᔭᐅᔪᖅ 5-ᒥᑦ. ᐃᓚᒋᔭᐅᔪᖅ 6 ᑐᓂᓯᔪᖅ ᑕᒪᐃᓐᓅᖓᔪᒃᑯᑦ ᖃᓄᐃᖏᑦᑐᒃᑯᑦ ᓇᓗᓇᐃᖅᓯᓂᕐᒥᒃ / ᖃᓄᐃᖏᑦᑐᒃᑯᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᖃᑦᑕᖅᑐᓂᒃ.

IMPLEMENTATION SCHEDULE

As required by Water License 2AM-MEL1631, Part B, Item 10, the proposed implementation schedule for this Plan is outlined below.

This Plan will be implemented immediately (December 2018) subject to any modifications proposed by the NWB as a result of the review and approval process.

DISTRIBUTION LIST

Environmental Superintendent
Environmental Coordinators
Environmental Technicians

DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Revision
1	18/12/16	All	All	Comprehensive plan for Meliadine project. First version composed by Meliadine Environment Department.
2	20/03/15	All	All	Updated plan formatting and added information on QA/QC as Section 6. Previous Section 5.3.1 (SWTP sampling) moved to GWMP.

Prepared by:

Agnico Eagle Mines Limited - Meliadine Division

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SECTION 1 • INTRODUCTION

The Water Quality and Flow Monitoring Plan (the Plan) has been prepared in accordance with the requirements of the Nunavut Water Board Type A water license 2AM-MEL1631 (the License). The Plan is one component of the *Aquatic Effects Management Program* (AEMP) and is closely associated with the *Water Management Plan* and the *Metal and Diamond Mining Effluent Regulations (MDMER)*. The implementation and periodic updates to this Plan are the responsibility of the Meliadine Environment Department under the guidance of the Meliadine Environment Superintendent or designate.

The Plan summarizes the monitoring locations, sampling frequency, monitoring parameters, compliance discharge criteria and an adaptive management plan for water quality at the Meliadine Gold Project.

The purpose of this Water Quality and Flow Monitoring Plan is to establish the program that is to be implemented and followed by AEM's Meliadine environmental management team to monitor the performance of the waste and water management systems at the Meliadine Gold Project. The program includes:

- Verifying and validating the predicted water quality values with empirical measurements of the mine site water quality and flows;
- A comparison of measured water quality data to compliance requirements stipulated in the License; and
- A framework for adaptive management that allows the identification and rectification, where necessary, of unexpected trends or non-compliance in water quality and flows.

The Plan provides information on the locations of the monitoring stations at the various stages of mining. These monitoring locations are used to evaluate the performance of the mine waste and water management system.

The objectives of the monitoring program are:

1. To track the chemistry of the contact and non-contact water prior to and during discharge;

2. To assist in identifying if water treatment is required prior to discharge; and

3. To minimize the potential impacts of mining activities on the surrounding environment.

Additional locations outside the footprint of the mine (and outside the scope of this Plan) will be monitored under the *Meliadine Gold Project Aquatic Effects Management Program* (Golder 2016).

SECTION 2 • OVERVIEW OF SITE WATER MANAGEMENT PLAN

Details of overall water management are discussed in the Meliadine Water Management Plan (WMP) (Agnico Eagle, 2020) which is updated annually. A network of berms, dikes, containment ponds, channels, culverts and sumps are in place and maintained to facilitate water management (Section 3 of WMP).

As specified in the WMP, surface contact water is intercepted, diverted and contained within various containment ponds prior to evaporation or treatment. Water collected in CP3 and CP4 is discharged upstream of Culvert 2 where it flows to CP1. Water collected in CP5 is either treated by an RO treatment plant prior to discharging to CP1 or discharged to CP1 directly, depending on the in situ CP5 water quality. Water collected in the P-area is temporarily stored and then actively evaporated. At CP1, the water is treated for total suspended solids (TSS) at the EWTP and discharged through the diffuser located in Meliadine Lake. Water treated through the RO treatment plant at CP5 is moved to CP1 prior to treatment through the EWTP.

Contact water from the Underground Mine is collected in underground sumps, transported to a clarification system, and subsequently recirculated for use in various underground operations. Excess underground contact water is stored in temporarily inactive underground developments, and on surface in Saline Pond 1 (SP1) and Saline Pond 2 (SP2). Saline Pond 2 will be replaced by Saline Pond 4 (SP4) by Q2 2020 (further details found in WMP). Underground contact water that is not used for operations is treated at the Salt Water Treatment Plant (SWTP) or Saline Effluent Treatment Plant (SETP) for discharge.

As part of the strategy to manage excess groundwater infiltration of saline water within the underground portion of the mine, Agnico Eagle received approval from the Nunavut Impact Review Board to discharge saline water to sea (Melvin Bay, Rankin Inlet) with the amended Project Certificate on February 26, 2019.

During the mine closure, the water management infrastructure will remain in place until closure activities are completed and monitoring demonstrates that water quality is acceptable for discharge to the environment without treatment.

SECTION 3 • OVERVIEW OF MONITORING PROGRAMS

This Plan has been divided into two levels of monitoring to characterize the range of impacts between the sources of contact water in the individual mine facilities and the point of discharge or release to the receiving environment. The two levels of monitoring include:

1. Compliance Monitoring (CM); and
2. Event Monitoring (EM).

3.1 Compliance Monitoring Program (CM)

The CM sites are those stipulated in the License; these sites vary from contact water collection ponds, structures such as ditches, culverts prior to discharge to the receiving environment and local lakes surrounding the mine site. The requirements of the License, including water quality limits, will be applied at the applicable mine discharge points identified in the CM program.

The CM program provides a mechanism to assess water quality at specified sites, and to confirm and document compliance of discharge with regulatory requirements. As part of adaptive water management, these internal monitoring stations provide protection to the receiving water environment, provide data to predict pit re-flooding water quality and ensure exceedances of predicted or regulated levels are appropriately managed or mitigated to reduce impacts.

3.2 Event Monitoring Program (EM)

The EM sites result from unexpected events such as spills, accidents, and malfunctions. The response programs for such events are discussed in greater detail in the following four (4) documents:

- Meliadine Spill Contingency Plan (December 2019);
- Meliadine Emergency Response Plan (October 2018);
- Meliadine Freshet Action Plan (March 2020); and
- Meliadine Water Management Plan (March 2020).

Each accidental release will require mobilization of site equipment to stabilize the release, procedures to contain, neutralize, and dispose of the discharge, and recommendations for monitoring the site following the incident.

SECTION 4 • OVERVIEW OF MINE DEVELOPMENT SCHEDULE

The Mine Plan and key mine development activities, including mine waste management are currently used concurrently with the *Water Management Plan*.

The Mine Plan proposes 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 estimated to produce approximately 14.9 million tonnes (Mt) of ore, 31.8 Mt of waste rock, 7.4 Mt of overburden waste, and 14.9 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. Construction began in 2015 and is estimated to be completed in Q2 of 2019 (Q4 Year -5 to Year Q2 -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 will include a plant site and accommodation buildings, two 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.

SECTION 5 • MONITORING PROGRAMS

The monitoring program is presented in three sections; requirements of the compliance monitoring program, an overview of the event monitoring program, and then details of the adaptive management program for monitoring results.

5.1 Compliance Monitoring Program

The CM program monitors the chemistry of four local lake surrounding the mine site (E3, G2, H1 and B5) as well as mine contact water collected and diverted at specified locations prior to release into the receiving water environment. The sampling is conducted in order to confirm and document compliance with regulatory requirements. The nature of water monitored within the CM program include:

- Non-contact water from local lakes;
- Mine contact water collected from drainage of different structures;
- Monitoring points located within the water management system prior to release into the receiving water environment; and
- Effluent released to Meliadine Lake and water within Meliadine Lake at the diffuser.

The CM sampling program has multiple monitoring stations across the project site, with sampling at different stages of the mine life. All of the CM stations, a description of their location, parameters to be monitored and sampling frequency are listed in Table 5.1. Specific details for the monitoring parameter groups are provided in Table 5.2. Agnico Eagle follows 5 groups of parameters as identified in the Type A Water License Schedule I, Table 1. Additionally, Agnico Eagle follows the analytical requirements and authorized limits of deleterious substances as identified in Schedule 3 and Schedule 4 of the MDMER (Government of Canada, 2002).

Figures 3.1 shows the approximate location of each of the sampling sites. The actual location of each sampling site is determined by access and safety considerations and are marked by a stake that defines the exact location of the collection point for sampling events with appropriate attached signage in English, Inuktitut and French.

GPS coordinates for all compliance monitoring stations were confirmed, as required in Part I, Item 6 of the NWB Type A water license.

5.1.1 General Sampling and Analysis Program

Samples are collected in clean laboratory-supplied containers and preserved as directed by the analytical laboratory. During all phases, samples are analyzed offsite at a CALA accredited commercial lab (ALS in Burnaby, BV Labs in Ottawa, AquaTox in Puslinch, H2Lab in Val d'Or, or Nautilus Environmental in Burnaby). Samples sent to commercial laboratories may change as the site matures and additional requirements occur. Sampling procedures are further detailed in Section 6 (Quality

Assurance/Quality Control Procedures) and in the Quality Assurance/Quality Control Plan (Agnico Eagle, 2019).

Table 5.3 summarizes the minimum sample volumes, container, preservation, and holding times for each analyte. This information is from the *USEPA Methods for Chemical Analysis of Water and Waste Water* (*EPA-600/4-79-020, 1983*).

Figure 5.1: Sampling site locations

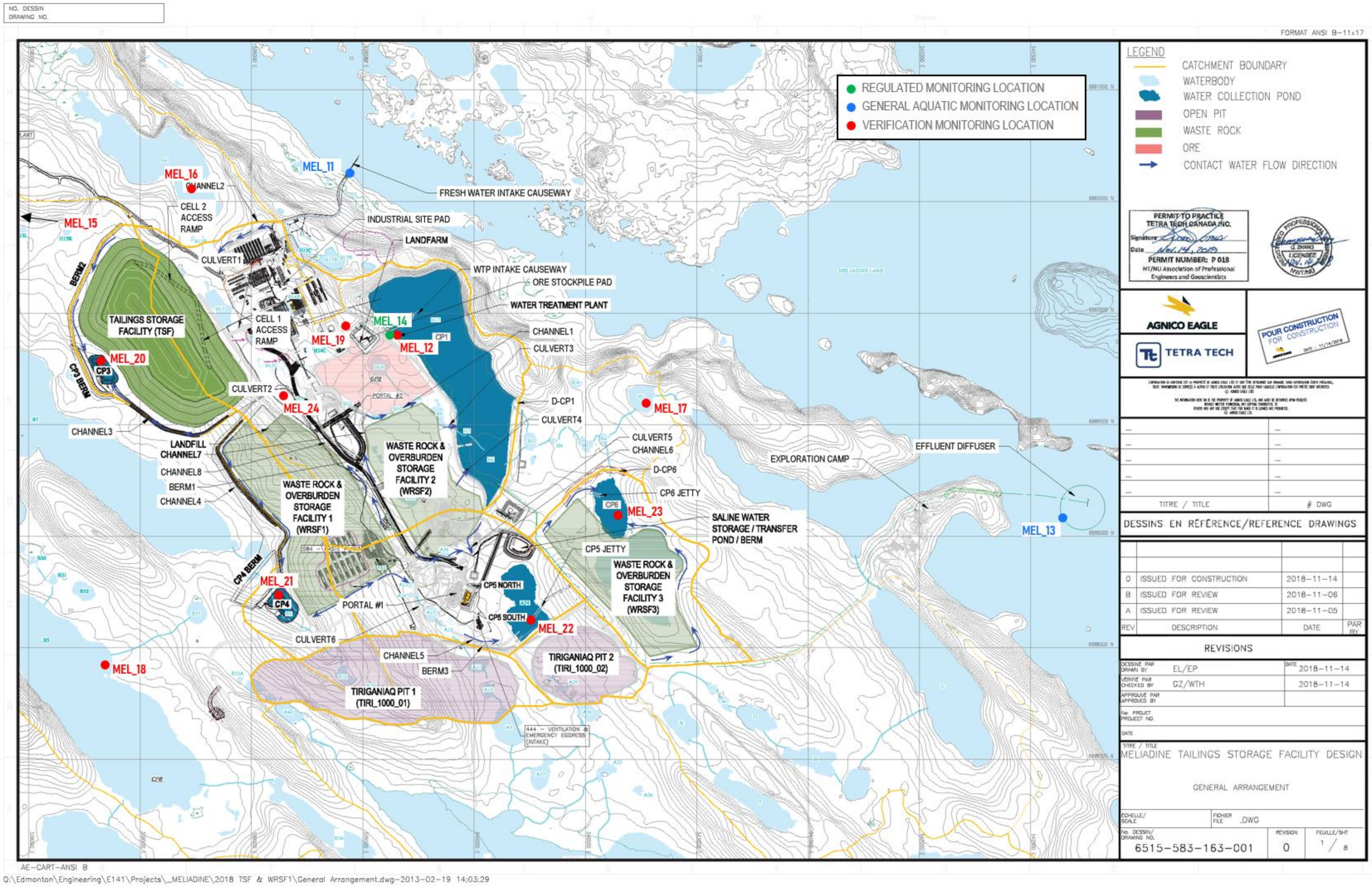


Table 5.1: Monitoring Program

Station	Description	Phase	Monitoring Parameters	Frequency
Mine Site				
MEL-D-1	Dewatering: Water transferred from lakes to Meliadine Lake during dewatering of lakes	Construction	As defined in the Water Management Plan referred to in Part D, Item 12	Prior to discharge and Weekly during discharge
			Volume (m3)	Daily during periods of discharge
MEL-SR-1 to TBD	Surface Runoff – runoff downstream of Construction areas at Meliadine Site and Itivia Site, Seeps in contact with the roads, earthworks and any Runoff and/or discharge from borrow pits and quarries	Construction, and Operation	As defined in the Water Management Plan referred to in Part D, Item 18 and Part I, Item 11	Prior to Construction, Weekly during Construction
			Group 1	Monthly during open water or when water is present upon completion
MEL-11	Water Intake from Meliadine Lake	Construction, Operation, and Closure	Full Suite	Monthly during periods of intake
			Volume (m3)	Daily during periods of intake
MEL-12	Water treatment plant (pre-treatment) coming from CP1, off the pipe and not in the pond	Construction (prior to release), Operations, and Closure	Group 1	Monthly during periods of discharge
MEL-03-01 (and AEMP Stations)	Mixing zone in Meliadine Lake, Station 1; and MDMER exposure stations for final discharge point within mixing zone	Construction (prior to release), Operations, and Closure	Full Suite, Group 3 (MDMER)	Monthly during periods of discharge
MEL-14	Water treatment plant from CP-1 (post-treatment), end of pipe (before offsite release) in the plant before release.	Construction (upon effluent release), Operations, and Closure	Full Suite, Group 3	Prior to discharge and weekly during periods of discharge

			Volume (m3)	Daily during periods of discharge
			Acute Lethality	Monthly during periods of discharge
MEl-15	Local lake E-3	Operations, and Closure	Group 2	Bi-annually during open water
MEL-16	Local Lake G2	Construction, Operations, and Closure	Group 2	Bi-annually during open water
MEL-17	Local Pond H1	Construction, Operations, and Closure	Group 2	Bi-annually during open water
MEL-18	Local Lake B5	Construction, Operations, and Closure	Group 2	Bi-annually during open water
MEL-19	CP-2 Collection of natural catchment drainage from the outer berm slopes of the Landfarm and industrial pad	Construction, Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-20	CP-3 Collection of drainage from dry stacked tailings	Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-21	CP-4 Collection of drainage from WRSF1	Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-22	CP-5 Collection of drainage from WRSF1 and WRSF2	Construction, Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-23	CP-6 Collection of drainage from WRSF3	Construction, Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-24	Seepage from the Landfill between the landfill and Pond H3	Construction, Operations, and Closure	Group 1	Monthly during open water or when Water is present
MEL-25	Secondary containment area at the Itivia Site Fuel Storage and Containment Facility	Construction, Operation, Closure	Group 4, Volume (m3)	Prior to discharge or transfer of Effluent

MEL-26	Melvin Bay end of pipe (before offsite release) for treated saline effluent	Operations, and Closure	MDMER	As per MDMER requirements

Table 5.2: Monitoring Parameters

Group	Parameters
1	pH, turbidity, hardness, alkalinity, chloride, fluoride, sulphate, total dissolved solids (TDS), total suspended solids (TSS), total cyanide, ammonia nitrogen, nitrate, nitrite, phosphorus, orthophosphate, Total Metals (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, and zinc).
2	**Total and Dissolved Metals**: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc. **Nutrients**: ammonia-nitrogen, total Kjeldahl nitrogen, nitrate-nitrogen, nitrite-nitrogen, orthophosphate, total phosphorus, total organic carbon, dissolved organic carbon, and reactive silica. **Conventional Parameters**: bicarbonate alkalinity, chloride, carbonate alkalinity, turbidity, conductivity, hardness, calcium, potassium, magnesium, sodium, sulphate, pH, total alkalinity, TDS, TSS, total cyanide, free cyanide, and weak acid dissociable (WAD) cyanide..
3	**MDMER parameters**: total cyanide, arsenic, copper, lead, nickel, zinc, radium-226, TSS, pH, total ammonia and temperature. **MDMER additional requirements**: Effluent volumes and flow rate of discharge, Acutely Lethality tests (Rainbow Trout and Daphnia magna) and environmental effects monitoring (EEM).
4	Total arsenic, total copper, total lead, total nickel, TSS, ammonia, benzene, toluene, ethylbenzene, xylene, total petroleum hydrocarbons (TPH), and pH
Full Suite	Group 2, Total Petroleum Hydrocarbons, Turbidity. Non Acutely-lethal (Rainbow Trout and Daphnia magna) for discharge only.
Flow	Flow data-logger
Field measurements	Field pH, specific conductivity, dissolved oxygen, and temperature.

Table 5.3: Summary of Sampling Requirements for Each Analyte

Parameters	Matrix Holding Time				Type of Bottle	Preservative	Volume
	Drinking Water	Waste Water	Surface Water	Ground Water (1)			
Microbiology							
Escherichia coli, total coliforms, A.A.H.B	48h	48h	48h	48h	PPS	TS, E	250ml
Enterococcus	48h	48h	48h	48h	PPS	TS, E	250ml
Thermo tolerant coliforms (fecal)	48h	48h	48h	48h	PPS	TS, E	250ml
Inorganic Chemistry							
Absorbance UV, Transmittance UV				24h	P. T. V	N	125ml
Alkalinity, Acidity, Bicarbonates, Carbonates	14d	14d	14d	14d	P, T, V	N	250ml
Ammonia nitrogen (NH_3-NH_4)	28d	28d	28d	28d	P, T, V	AS	125ml
Kjeldahl ammonia (NTK)		28d	28d	28d	P, T, V	AS	125ml
Anions (Cl, F,SO_4)	28d	28d	28d	28d	P, T, V	N	250ml
Color, Free & total Chlorine	48h	48h	48h	48h	P, T, V	N	125ml
Conductivity	28d	28d	28d	28d	P, T, V	N	250ml
Cyanides total/available, Cyanides	14d	14d	14d	14d	P, T, V	NaOH	250ml
BOD_5/Carbonated BOD_5 (2)		48h/4°	48h/4°		P, T, V	N	250ml
COD (chemical oxygen demand)		28d	28d		P, T, V	AS	125ml
Mercury (Hg)	28d	28d	28d	28d	P, T, V	AN	250ml
Total/dissolved metals (filtered on field)	180d	180d	180d	180d	P, T, V	AN	250ml
Dissolved Metals (filtered in the laboratory)	24h	24h	24h	24h	P, T, V	N	250ml
Total suspended solids & Volatile TSS		7d	7d	7d	P. T. V	N	500ml
NH_3 or NH_4		24h	24h	24h	P.T.V	N+AS	2/125ml
Nitrites (NO_2), Nitrates (NO_3), Turbidity	48h	48h	48h	48h	P, T, V	N	250ml
Nitrites-Nitrates (NO_2-NO_3)	28d	28d	28d	28d	P, T, V	AS	250ml
O-Phosphates (O-PO_4)	48h	48h	48h	48h	P, T, V	N	500ml
pH	24h	24h	24h	24h	P, T, V	N	125ml
Total Phosphorus (P-tot)	28d	28d	28d	28d	P, T, V	AS	125ml
Dissolved solids (TDS)		7d	7d	7d	P. T. V	N	250ml
Total solids		7d	7d	7d	P. T. V	N	250ml
Sulphides (H_2S) (3)	28d	28d	28d	28d	P. T. V	AcZn + NaOH	125ml
Thiosulfates	48h	48h	48h	48h	P. T. V	N	125ml
Radioactive & Organic Chemistry							
Fatty resin acids (S-T)	--	28d	28d	--	VA, VT	AS	1L
Congeners PCB (S-T)	28d	28d	28d	28d	VA, VT	N	1L
Chlorobenzene	28d	28d	28d	28d	2 Vial+1 blank	TSS	2/40ml
Total Organic Carbon (TOC)	28d	28d	28d	28d	P, T, V (B)	AC	100ml
Dissolved Organic Carbon (DOC)	48h	48h	48h	48h	P, T, V (B)	N	100ml
Total Inorganic Carbon (CIT)	48h	48h	48h	48h	P, T, V (B)	N	100ml
Phenolic compound (GC-MS)	28d	28d	28d	28d	VA, VT	AS	1L
Glyphosate (S-T)	14d	14d	14d	14d	P.T	N	500ml
PAH	28d	28d	28d	28d	VB	AS	1L
Oil & Greases (total and non-polar)	28d	28d	28d	28d	VA, VT	AS	1L

C10-C50 HP and/or Petroleum Product Identification	28d	28d	28d	28d	VA, VT	AS	1L
Phenol index	28d	28d	28d	28d	VA, VT	AS	500ml
Radium-226	180d	180d	180d	180d	P, T. V	AN	1L
VOC (MAH, CAH, THM, BTEX) (3)	28d	28d	28d	28d	2 Vial+1 blank	TSS	2/40ml

Type of bottle:
P.S.V.T.: plastic bottle, bag or glass bottle with Teflon cap
P, T: Plastic bottle or plastic bottle with Teflon cap
P.T.V.: Plastic bottle or glass bottle with plastic or Teflon cap
PPS: Sterile propyl ethylene bottle
VA: Clear or amber glass with aluminium or Teflon seal
VB: Amber glass (or clear glass covered with aluminium paper) aluminium seal of Teflon
VT: Clear or amber glass bottle with Teflon seal
Preservative:
AC: 0.1ml (100µl) of HCl per 100ml of sample
AcZn: 0.2ml zinc acetate 2N per 100ml of sample and NaOH 10N to pH >9
AN: HNO3 to pH <2
AS: H2SO4 to pH <2
E: 2.5ml EDTA 1.5% (p/v) per 100ml of sample if heavy metals are suspected
ED: 0.1ml diamine ethylene 45 mg/l per 100 ml of sample
EDTA: 1ml EDTA 0.25M per 100ml of sample
N: No preservative
NaOH: NaOH 10N to >12
TS: Sodium thiosulfate final concentration in the sample of 0.1% (p/v)

5.1.2 Compliance Monitoring Stations and Discharge Criteria

Further details of the specific CM stations and discharge criteria stipulated under the License are provided below.

Dewatering Activities

All Waters from dewatering activities at Monitoring Program Stations MEL-D-1 through MEL-D-TBD shall be directed to Meliadine Lake and shall not exceed the quality limits presented in Table 3.4 as stipulated in Part D, Item 12 of the License.

Table 5.4: TSS and pH Criteria at CM Stations MEL-D-1 through MEL-D-TBD

Parameter	Maximum Average Concentration (mg/L)	Maximum Concentration of Any Grab Sample
TSS	15.0	30
pH	6.0 to 9.5	6.0 to 9.5

All surface runoff and/or discharge from drainage management systems, at the Monitoring Program Stations MEL-SR-1 to MEL-SR-TBD during the Construction/Operation of any facilities and infrastructure associated with this project, including laydown areas and All-weather Access Road, where flow may directly or indirectly enter a Water body, shall not exceed the Effluent quality limits presented in Table 5.5, as stipulated in Part D, Item 18 of the License.

Table 5.5: Effluent Criteria at CM Station MEL-SR-1 to MEL-SR-TBD

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Total Suspended Solids (TSS) (mg/L)	50.0	100.0
Oil and Grease	No Visible Sheen	No Visible Sheen
pH	6.0 to 9.5	6.0 to 9.5

Site Water Collection System

Effluent discharged from CP1 at CM station MEL-14 shall be directed to Meliadine Lake through the Meliadine Lake Outfall Diffuser and shall not exceed the effluent quality limits presented in Table 5.6, as stipulated in Part F, Item 3 of the License.

Table 5.6: Effluent Criteria at CM Station MEL-14

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
pH	6.0 to 9.5	6.0 to 9.5
TSS (mg/L)	15	30
TDS (mg/L)	1400	1400
Total (T)-Al (mg/L)	2.0	3.0
T-As (mg/L)	0.3	0.6
T-CN (mg/L)	0.5	1
T-Cu (mg/L)	0.2	0.4
NH_4-N (mg/L)	14	18
T-Ni (mg/L)	0.5	1
T-Pb (mg/L)	0.2	0.4
T-P (mg/L)	2.0	4.0
T-Zn (mg/L)	0.4	0.8
Total Petroleum Hydrocarbons (TPH) (mg/L)	5	5

The Discharge of Effluent from the Final Discharge Point at Monitoring Program Station MEL-14 shall be demonstrated to be non-Acutely Lethal under the following test in accordance with the Schedule I of the License:

a. Acute Lethality of Effluents to Rainbow Trout (as per Environment Canada's Environmental Protection Series Biological Test Method EPS/1/RM/13 July 1990, published by the Department of the Environment, as amended in December 2000, and as may be further amended from time to time.

Saline effluent discharged at CM station MEL-26 shall be directed to Melvin Bay through a submarine Pipeline and Diffuser and shall not exceed the effluent quality limits presented in Table 5.7, as stipulated in MDMER Schedule 4 (GC, 2002).

Table 5.7: Effluent Criteria at CM Station MEL-26

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
Arsenic (mg/L)	0.5	1.00
Copper (mg/L)	0.3	0.60
Cyanide (mg/L)	1.0	2.00
Lead (mg/L)	0.2	0.40
Nickel (mg/L)	0.5	1.00
Zinc (mg/L)	0.5	1.00
Total Suspended Solids (mg/L)	15.00	30.00
Radium 226 (Bq/L)	0.37	1.11

The Discharge of Effluent from the Final Discharge Point at Monitoring Program Station MEL-26 shall be demonstrated to be non-Acutely Lethal in accordance with MDMER Division 2, Item 14.2 (GC, MDMER), in which the testing shall be conducted in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/190.

Itivia Marshalling Area

Surface water runoff from the bulk fuel tank storage areas is collected within the tank's secondary containment enclosures that are equipped with an HDPE liner; these are designed to contain petroleum products released due to spill events. Water collected in the secondary containment enclosures at CM station MEL-25 is discharged to land in a controlled manner according to the Nunavut Water Board Type A water license # 2AM-MEL16331.

All effluent being discharged from the secondary containment enclosures at the Itivia marshalling facility shall not exceed the effluent quality limits presented in Table 5.8, as stipulated in Part F, Item 5 of the water license.

Table 5.8: Effluent Criteria at CM Station MEL-25

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab Sample
pH	6.0 to 9.5	6.0 to 9.5
TSS (mg/L)	15.0	30.0
Benzene (ug/L)	370	370
Toluene (ug/l)	2	2
Ethylbenzene (ug/L)	90	90

Lead (mg/L)	0.1	0.1
Oil and Grease (mg/L)	5.0 and no visible sheen	5.0 and no visible sheen

Receiving Environment

Receiving water quality monitoring is discussed in the Aquatic Effects Management Program (AEMP) (Golder, 2016) and the Ocean Discharge Monitoring Plan (ODMP) (Agnico Eagle, 2020). Within the AEMP and ODMP are numerous monitoring programs: water quality, sediment quality, benthic invertebrate communities, and fish health and fish tissue chemistry. The Meliadine Lake and Melvin Bay monitoring programs were designed around the key aspects of Environmental Effects Monitoring (EEM) requirements under the Metal and Diamond Mining Effluent Regulations.

5.2 Event Monitoring

The Event Monitoring (EM) program addresses the site specific monitoring that is required following any accidental release. A “release” may be caused by:

- Spills, including unidentified seepage (Meliadine Spill Contingency Plan; December 2019); or
- Emergencies (Meliadine Emergency Response Plan; October 2018).

The EM program is designed to verify whether contamination of the surface soil and/or any nearby receiving environment and active zone has occurred as a result of an accidental release of a hazardous material or contaminated water. Verification is done through monitoring of surface runoff and nearby receiving environment during and following remedial activity. It is anticipated that due to the presence of permafrost beneath most of the mine footprint (active layer app 1.5m in depth), there will be minimal impact to groundwater from surface spills or accidental releases.

The EM plan is developed on a site specific basis subsequent to a spill or other incident, and considers the type of product spilled, the potential receptors and the potential for any remaining contamination after clean up. The plan is coordinated by the Environmental Department.

In the event of an accidental release, the water quality of any downstream receptor as well as an upstream reference (background) is sampled to determine severity of impact. Should the spill have happened over snow cover, as much contaminated snow will be removed as possible. Verification sampling would occur in the area after thaw to determine if the clean – up is complete or if further remediation is necessary. The specific parameters monitored as part of the EM program will depend on the nature of the spill, and will be determined for the specific material released.

The EM program for a particular spill will cease upon obtaining satisfactory analytical results from the potentially affected areas or as required by regulators.

5.3 Adaptive Management Program

Results of the water quality monitoring are reviewed by the Meliadine Environment Department. Chemical trends of constituents of interest are tracked for mine site monitoring and for the AEMP program. This allows for early detection of significant changes in water quality within the mine site prior to discharge. If triggers and thresholds, such as in the AEMP program, are exceeded in the receiving environment action plans are then implemented to ensure that environmental protection objectives are met.

An adaptive management program has been designed for the Meliadine Gold Project to evaluate the monitoring data and provide a framework for action, if necessary. The program has two levels - a trigger level to compare the monitoring data against, and an action plan of mitigative measures for identified exceedances.

The adaptive management program is divided into two sections, one for parameters with regulated discharge criteria at specific monitoring locations, as specified in the License and by the Metal Diamond Mining Effluent Regulations (MDMER). The second section is for measured parameters for which no discharge limits have been identified in the License such as those in the AEMP or EEM.

5.3.1 Adaptive Management Program for Regulated Discharge

Action Plan

In the case of an exceedance of a License limit or MDMER discharge limit, an action plan will be implemented. The adaptive management program requires that if one or more of the key monitored parameters exceed the respective limits, a staged sequence of responses will follow. Table 5.9 summarizes the staged adaptive action plan for the CM program for regulated discharge. Figure 5.2 is a logic diagram showing the decision path for evaluating analytical results for regulated discharges.

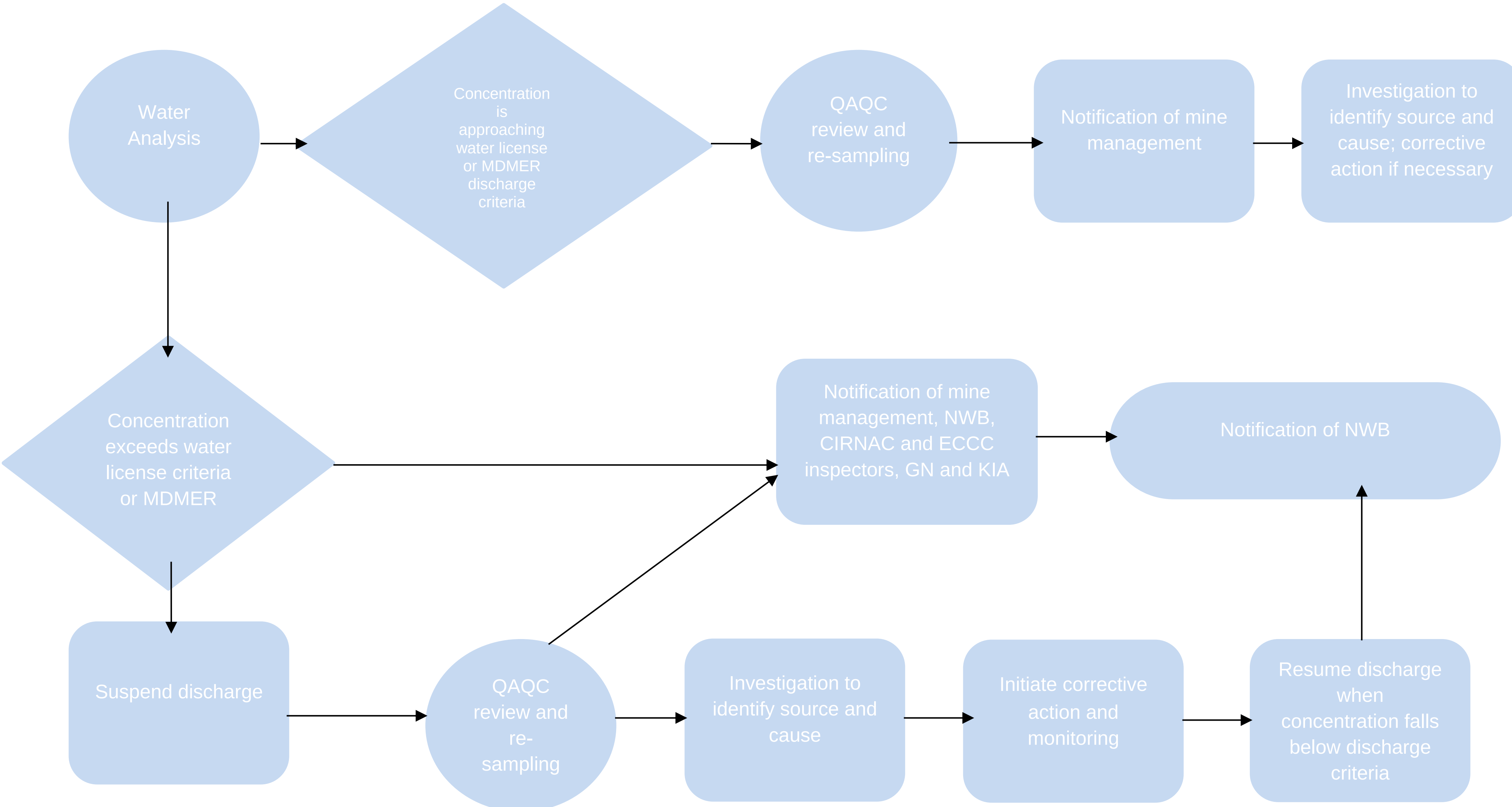
In addition to the mitigative measures listed above, a number of other possible alternatives are available to reduce or treat contaminants. These mitigation measures include:

- Best management practices for sediment and erosion control would be employed to reduce TSS concentrations (i.e., flow control, sedimentation basin construction silt fencing, etc; see Sediment and Erosion Management Plan);
- Addition of a coagulant for the reduction of TSS in pond water;
- Use of geotextile or re-armoring of banks to filter and reduce TSS in pond/ditch water;
- Deployment of absorbent booms and/or barriers within ponds to isolate surface petroleum hydrocarbon films for removal and/or treatment;
- Adjustments to on-site sewage treatment for the reduction of BOD and E. coli concentrations;
- Addition of lime to increase a low pH value or reduce metal concentrations;
- Removal of the offending source rock or the prevention of surface waters coming into contact with the offending source rock in the case of ARD; and/or
- Implementation of the Freshet Action Plan to proactively identify any issues around areas of concern; conduct additional monitoring, and control and contain seepage or movement of TSS on site.

Table 5.9: Action Plan for Regulated Discharge

Example	Action Plan
Exceeds water license discharge criteria or MDMER	1. Suspension of discharge activities; 2. QA/QC review and analysis, and re-sample water at the particular location if necessary; 3. Notification of mine management (General Mine Manager or designate and Environment Superintendent, or designate) and the regulators: Nunavut Water Board, CIRNAC and ECCC inspectors, GN and the Kivalliq Inuit Association; 4. Investigation to identify possible source(s) and cause(s) of the exceedance; 5. Initiation of corrective actions or water treatment, and follow up monitoring; and 6. Resumption of discharge when concentrations are below the discharge criteria

Figure 5.2: Logic Diagram for Regulated Discharge



5.3.2 Adaptive Management Program for Non-Regulated Discharge

Aside from targeted monitoring studies (i.e. "Effects Assessment Studies") such as those following construction, the AEMP is the main program aimed at measuring and assessing potential impacts of contaminants in the receiving aquatic environment that are not regulated under MDMER or NWB. This program combines with the Environmental Effects Monitoring (EEM) required under MDMER.

The program is designed to take an integrated, ecosystem-based approach that links mitigation and monitoring of physical/chemical effects to key ecological receptors in the receiving environment. It addresses key issues identified in the Meliadine EA (i.e., mining-related activities with the potential to affect water quality, fish habitat and fish populations). Monitoring results are intended to inform the "adaptive management" process", supporting the early identification of potential problems and development of mitigation options to address them by comparing results to established threshold and trigger levels.

AEMP Action Level and Significance Threshold

The AEMP Response Framework links monitoring results to management actions, with the purpose of maintaining the assessment endpoints within acceptable ranges. It is a systematic approach for evaluating AEMP results and responding appropriately, such that potential unexpected effects are identified and mitigation is undertaken to reduce or reverse them, thereby preventing the occurrence of a significant adverse effect. This is accomplished by continually evaluating monitoring data and implementing follow-up actions (e.g., confirmation, further study, mitigation) at pre-defined levels of change in measurement endpoints (i.e., Action Levels). For purposes of this Response Framework, the following terms are used: effect, normal range, benchmark, Action Level, and Significance Threshold.

Action Level – Action Levels (Low, Moderate, and High) are pre-defined levels of environmental change that exceeds normal ranges or benchmarks, or results of statistical tests, or a combination of these. For example, exceedance of the normal range and approach of a benchmark by a water quality parameter in the near-field exposure area may be defined as the Low Action Level. A change that falls within the normal range of variability for the study area would not trigger an Action Level.

Significance Threshold – The Significance Threshold, for the purposes of an AEMP Response Framework, is a magnitude of change that would result in significant adverse effects. It is a clear statement of environmental change that must never be reached. The AEMP Response Framework is designed to prevent reaching the significance threshold for all assessment endpoints.

Action Levels

The proposed Action Levels are designed to provide an early warning indication of potential adverse effects to plankton and benthos (i.e., food for fish), to fish health, and to the assurance of normal ecological function (including water quality and sediment quality). The proposed Low Action Levels (Table 8-2 and 8-3) are designed such that changes of sufficient magnitude to trigger a Low Action Level response are reported, documented, investigated, and ultimately addressed (i.e., mitigation measures or operation changes are implemented) before Significance Thresholds would ever be reached; if a Low Action Level is reached, Medium and High Action Levels (with response actions) are developed to provide further adaptive management guidance to the Mine to avoid reaching the Significance Thresholds. The type of management response taken after reaching an Action Level will depend on the type and magnitude of effect observed.

Further details on AEMP action levels and significance thresholds are provided in Golder (2016).

SECTION 6 • QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality Assurance (QA) refers to plans or programs that encompass a wide range of internal and external management and technical practices designed to ensure the collection of data of known quality that matches the intended use of the data. Quality Control (QC) is a specific aspect of QA that refers to the internal techniques used to measure and assess data quality. Specific QA and QC procedures that will be followed during compliance-related sampling are described in Section 6.1 and 6.2 and are further detailed in the Quality Assurance/Quality Control Plan (Agnico Eagle, 2019).

6.1 Quality Assurance

Quality assurance protocols are diligently followed so data are of known, acceptable, and defensible quality. There are three areas of internal and external management, which are described in the following three sections.

6.1.1 Field Staff Training and Operations

To make certain that field data collected are of known, acceptable, and defensible quality, field staff are trained to be proficient in standardized field sampling procedures, data recording, and equipment operations applicable to the monitoring program. All field work will be completed according to specified instructions and established technical procedures for standard sample collection, preservation, handling, storage, and shipping protocols. Thus, minimizing risk of operational errors.

6.1.2 Laboratory

To make sure that high quality data are generated, external CALA accredited laboratories have been selected for sample analysis. Accreditation programs are utilized by the laboratories so that performance evaluation assessments are conducted routinely for laboratory procedures, methods, and internal quality control.

The assay lab at the Mine site is not an accredited laboratory but will be used periodically for “real-time” results for some parameters like pH, total suspended solids, and Weak Acid Dissociable Cyanide. These results are for observational purposes and do not meet the standards of an accredited laboratory.

6.1.3 Office Operations

A data management system is utilized so that an organized consistent system of data control, data analysis, and filing will be applied to the monitoring program. Relevant elements will include, but are not limited to the following:

- All required samples are collected;
- sampling stations are clearly identified, and GPS coordinates collected and stored;
- chain-of-custody and analytical request forms are completed correctly (as per Agnico Eagle 2019);

- proper labelling and documentation procedures are followed, and samples will be delivered to the appropriate locations in a timely manner;
- laboratory data will be promptly reviewed once they are received to validate data quality;
- appropriate logic checks will be completed to ensure the accuracy of the calculations.

6.2 Quality Control

The QC component consists of applicable field and sample handling procedures, and the preparation and submission of two types of QC samples to the various laboratories involved in the program. The QC samples include blanks (e.g., travel, field, equipment) and duplicate/split samples.

Sample bottle preparation, field measurement and sampling handling QC procedures include the following:

- New laboratory supplied containers are used for sample collection. The bottles are either polyethylene plastic or glass, dependent on the specific parameter being analyzed.
- Sample bottles are kept in a clean environment, capped at all times, and stored in clean shipping containers. Samplers keep their hands clean, wear gloves, and refrain from eating or smoking while sampling.
- All bottles are identified with station number and date of collection.
- Where sampling equipment must be reused at multiple sampling locations, sampling equipment is cleaned appropriately between locations.
- Temperature, pH, and specific conductivity are measured in the field using hand held meters such as HACH test kit – 2100 Q Portal Turbidimeter (turbidity), Oakton PCS35 Meter (pH and conductivity), and Eureka Manta II (pH, dissolved oxygen and conductivity). The instruments are calibrated before each sample event to ensure optimal performance and record of the calibration are kept in a Calibration log. Maintenance procedures will be followed as set out by the supplier's operation manual.
- Samples are cooled to between 4 °C and 10˚C as soon as possible after collection, and maintained at approximately 4 °C in a refrigerator until shipping. Care is taken when packaging samples for transport to the laboratory to maintain the appropriate temperature (between 4°C and 10˚C) and minimize the possibility of rupture. Where appropriate, samples are treated with laboratory-provided preservatives to minimize physical, chemical, biological processes that may alter the chemistry of the sample between sample collection and analysis.
- Samples are shipped to the laboratory as soon as reasonably possible to minimize sample hold times. If for any reason, samples do not reach the laboratory within the maximum sample hold time for individual parameters, the results of the specific parameters will be qualified, or the samples will not be analysed for the specific parameters.
- Chain of custody sample submission forms are completed by field sampling staff and submitted with the samples to the laboratory. Furthermore, an electronic copy is emailed to the laboratory upon shipping and a second electronic copy is maintained at the Mine Site for reference.

- Only staff with the appropriate training in the applicable sampling techniques conduct water sampling.

Quality control procedures implemented consist of the preparation and submission of QA/QC samples, such as field blanks, trip blanks, and duplicate water samples. These are defined as follows:

- Field Blank: A sample prepared in the field using laboratory-provided deionized water to fill a set of sample containers, which is then submitted to the laboratory for the same analysis as the field water samples. Field blanks are used to detect potential sample contamination during collection, shipping and analysis.
- Travel Blank: A sample prepared and preserved at the analytical laboratory prior to the sampling trip using laboratory-provided deionized water. The sample remains unopened throughout the duration of the sampling trip. Travel blanks are used to detect potential sample contamination during transport and storage.
- Duplicate Sample: Two samples collected from a sampling location using identical sampling procedures. They are labelled, preserved individually and submitted for identical analyses. Duplicate samples are used to assess variability in water quality at the sampling site. Duplicates are collected and submitted for analyses at approximately 10% of sampling locations. For smaller batches of samples (less than 10), at least one duplicate will be collected and submitted for analysis. Upon receipt of analytical results, the field/trip blank and duplicate analyses are verified for potential contamination and accuracy, respectively. Results are interpreted, and recommended actions are taken if necessary.

SECTION 7 • FLOW VOLUMES

Where applicable, flow volumes within the mine footprint will be measured daily during periods of discharge. Flow volume measurements will be conducted using volumetric flow meters attached to applicable pumps. For applicable permanent pumping arrangements, such as fresh water pumping systems, flows will be measured using permanent in line flow meters. For periodic batch discharges, such as secondary containment sumps, portable flow meters or calculated pump time and capacity methods will be used.

Detailed pump records are maintained including date, pond/sump number, receiving location of pumped water, pump ID, duration of pumping, and total volume pumped. The average flow rates, total discharge per event and total cumulative discharge will be reported annually.

The monitoring locations for water flow volumes, in accordance with Part I, Item 9, and Table 2 of the Water License, include:

- The volume of fresh Water obtained from Meliadine Lake at Monitoring Program Station MEL-11;
- The volume of fresh Water transferred to the Meliadine Lake during lakes' dewatering activities;
- The volume of fresh Water obtained along the road and Meliadine River for dust suppression activities;
- The volume of Effluent discharged from Final Discharge Point at Monitoring Program Station MEL-14;
- The volume of reclaim Water obtained from CP1;
- The volume of Effluent discharged onto tundra at Monitoring Program Station MEL-25 or transferred to CP1 from the Itivia Site Fuel Storage and Containment Facility; and
- The volume of Effluent and Fresh Water transferred to the pits during pits' flooding.

SECTION 8 • REPORTING

Reporting of water quality results is to be conducted on two levels a) monthly and annually with the results of the monitoring program and per MDMER requirements and b) in response to exceedances.

8.1 Annual Reporting

An annual report is to be submitted to the NWB, KIA, Department of Fisheries and Oceans, Crown-Indigenous Relations and Northern Affairs Canada, Nunavut Impact Review Board, Government of Nunavut, and other interested parties by March 31st of the following year. The report is to summarize the following:

- Monitoring results for each sampling station during the year and for the life of mine (construction to end of closure); activities during the year at each station; and any exceedances at stations, the action plan applied to the exceedance, and the results of the action plan;
- Annual seep water chemistry results; including location of the samples, sources of the water collected, and results of chemical analyses of the samples;
- Receiving water monitoring results;
- Spills and any accidental releases; event monitoring activities conducted following containment, remediation, and reclamation; and the results of EM program, any exceedance in EM results, and the action plan following the exceedance;
- Measured flow volumes;
- Effluent flow rates, volumes and calculated chemical loadings following the requirements of MDMER; and
- Results of QA/QC analytical data.

8.2 Exceedance Reporting

Any measured concentration at a CM station exceeding a regulated discharge criterion stipulated in the License or MDMER will be reported to the NWB and Environment Canada and Climate Change upon receipt of the analysis. In addition, results of the action plan will be reported and, where necessary, mitigation options identified within 90 days after receipt of the analyses.

Exceedances in the concentration of a parameter in receiving water will be reported as specified in the AEMP and EEM – MDMER accordingly.

SECTION 9 • REFERENCES

Agnico Eagle. 2019. Meliadine Gold Project Quality Assurance/Quality Control Plan. Version 3. 6513-QQY-01. March 2019.

Agnico Eagle. 2020. Meliadine Gold Project Water Management Plan. Version 9. 6513-MPS-11. March 2020.

Environmental Protection Agency (EPA). 1983. Methods for Chemical Analysis of Water and Wastes. EPA/600/4-79/020. March 1983.

Golder Associates Ltd. 2016. Aquatic Effects Monitoring Program (AEMP) Design Plan. Version 1. June 2016. 6513-REP-03.

Government of Canada. (2002). Metal and Diamond Mining Effluent Regulations. SOR/2002-222. Minister of Justice of Canada. Current to February 26, 2020, last amended on June 25, 2019.