AGNICO EAGLE

MELIADINE GOLD PROJECT

Water Management Plan

APRIL 2015

VERSION 1

6513-MPS-11

EXECUTIVE SUMMARY (INUKTITUT)

ᐊᓅᑯᒃᑯᑦ ᑕᓯᕐᔪᐊᕐᒥᑦ ᒨᔪᒧᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᓕᕆᓂᐊᖅᓯᓕᐊᔪᑦ (ᐱᓕᕆᐊᖅ), 25 ᑭᓛᒥᑕᒥᒃ ᐅᐊᓐᓇᖓᓂᑦ ᐅᖓᓯᒃᑎᒋᔪᖅ ᑲᖏᕐᓲᓂᕐᒥᑦ, ᐊᒻᒪ 80 ᑭᓛᒥᑕᒥᒃ ᓂᒋᖅᐸᓯᐊᓂᑦ ᐱᖓᓐᓇᖅᐸᓯᐊᓂᑦ ᐅᖓᓯᒃᑎᒋᔪᖅ ᐃᖠᓗᓕᒫᕐᔪᐊᓐᒥᑦ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ. ᐅᔭᕋᓐᓂᐊᕐᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ ᐅᒃᑯᐃᖓᓗᒍ ᒪᓂᖅᑲᒥᑦ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᓐᓂᐊᕐᓂᖃᕐᓂᐊᖅᑐᑦ ᐱᕙᓪᓕᐊᓂᕐᒧᑦ ᑎᓇᒐᓂᐊᖅ-ᒥᑦ ᒨᔪ, ᒪᕐᕉᒃ ᐅᒃᑯᐃᖓᔪᑦ (ᑎᓇᒐᓂᐊᖅ Pit 1 ᐊᒻᒪ ᑎᓇᒐᓂᐊᖅ Pit 2) ᐊᒻᒪ ᐊᑕᐅᓯᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᓐᓂᐊᕐᓂᖅ.

Type A ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯᒧᑦ ᑐᒃᓯᕋᐅᑎ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᖅ ᒪᓕᒃᑯᕆᑦ ᓄᓇᕗᒻᒥ ᓄᓇᑖᕐᓂᕐᒧᑦ ᐊᖏᖅᑲᑎᒌᒍᑎ, ᓄᓇᕗᒻᒥ ᐃᒪᕐᓄᑦ ᐊᒻᒪ ᓄᓇᐅᑉ ᖃᓐᓂᖕᓄᑦ ᐱᔪᓐᓇᐅᑎᖃᖅᑐᓄᑦ ᐱᕐᑯᓯᖅ, ᐊᒻᒪ ᓄᓇᕗᒻᒥ ᐃᒪᐃᑦ ᒥᒃᓵᓄᑦ ᒪᓕᒐᐃᑦ, ᑭᓯᐊᓂ ᐃᑯᒪᒋᐸᓗᒍᑦᑕᐅᖅ ᓇᓗᓇᐃᔭᖅᓯᒪᔪᖅ ᒪᓕᒃᑕᐅᔭᕆᐊᖃᖅᑐᖅ ᑲᑎᒪᔩᓂᙵᓖᖅᑐᖅ *ᒪᓕᒃᑕᐅᔫᒃᓴᖅ 4-ᒥᑦ – ᑕᑕᑎᓇᓂᖅ ᐊᒻᒪ ᑐᓂᐅᑎᒋᓂᖅ ᓚᐃᓴᓐᓯ ᐊᒻᒪ ᐃᓚᒋᔭᐅᔪᖅ ᑐᑭᓯᐅᒪᔾᔪᑎ ᒪᓕᒃᑕᐅᔭᕆᐊᓕᒃ ᐅᔭᕋᓐᓂᐊᕐᓂᕐᒧᑦ ᐊᒻᒪ ᓯᖃᓪᓕᑎᕆᓂᕐᒧᑦ* (SIG-MM3 ᒪᓕᒃᑕᐅᔭᕆᐊᓕᒃ). ᑖᓐᓇ ᑎᑎᖅᑲᖅ ᑕᑯᒃᓴᐅᑎᑦᑎᔪᖅ ᐃᒪᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᐸᕐᓇᐅᑎᒥᑦ (ᐸᕐᓇᐅᑎ) ᐊᒻᒪ ᐃᓚᓕᐅᑎᑦᑎᐸᓗᓂ ᑎᑎᖅᑲᓂᒃ Type A ᐃᒪᕐᒧᑦ ᓚᐃᓴᓐᓯᒥᒃ ᑐᒃᓯᕋᐅᑎᒥᒃ. ᑖᓐᓇ ᐸᕐᓇᐅᑎ ᕿᒥᕐᕈᔭᐅᓂᐊᖅᑐᖅ ᐊᒻᒪ ᐅᐸᓗᒥᒨᓕᖓᓕᖅᑐᖅᑕᐅᖃᑦᑕᖅᓯᓂ ᐊᕐᕿᒍᑕᓖᒃᑯᑦ, ᐱᔭᓇᐊᖃᕐᓂᖓᑐᑦ, ᐊᔾᔨᒋᓕᖁᐸᓗᒋᑦ ᐊᐅᓚᕐᓂᕐᒧᑦ ᐊᒻᒪ/ᐅᕙᓘᓐᓃᑦ ᐊᑐᖅᑕᐅᖃᑦᑕᖅᑐᓄᑦ.

ᓯᑕᒪᐅᓕᖓᔪᖅ ᐱᕙᓪᓕᐊᓂᖓ ᑎᓇᒐᓂᐊᑉ: ᓯᑕᒪᐃᑦ ᐅᑭᐅᑦ ᐅᖓᑎᐊᕐᔪᐊᓄᑦ ᓴᓇᔭᐅᓂᖓ (Q4 ᐅᑭᐅᖅ -5-ᒥᑦ ᐅᑭᐅᖅ -1-ᒧᑦ), 8-ᓄᑦ ᐅᑭᐅᓄᑦ ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᐊᐅᓚᕐᓗᓂ (ᐅᑭᐅᖅ 1-ᒥᑦ ᐅᑭᐅᖅ 8-ᒧᑦ), ᐱᖓᓱᑦ ᐅᑭᐅᓂᒃ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓗᒍ (ᐅᑭᐅᖅ 9-ᒥᑦ ᐅᑭᐅᖅ 11-ᒧᑦ), ᐊᒻᒪ ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍ (ᐅᑭᐅᖅ 11-ᒥᑦ ᐅᖓᑖᓄᑦ). 12.1 ᒥᓕᔭᓐ ᑕᓐᓂᒃ ᐅᔭᖅᑲᓂᒃ ᐱᓂᐊᖅᑐᑦ. ᐅᔭᖅᑲᐃᑦ ᐱᔭᐅᔪᑦ ᓯᖃᓪᓕᖅᑎᖅᑕᐅᓂᐊᖅᑐᑦ 8-ᓄᑦ ᐅᑭᐅᓪᓗᐊᓄᑦ ᐅᔭᕋᓐᓂᐊᕐᓂᐅᑉ ᐊᐅᓚᕐᓂᕆᔭᖓᓂᑦ 3,000 ᑕᓐᓂᒃ ᐅᑉᓗᑕᒫᑦ (tpd) ᐅᑭᐅᖅ 1-ᒥᑦ ᐅᑭᐅᖅ 3-ᒧᑦ ᐊᒻᒪ 5,000 tpd-ᓂᒃ ᐅᑭᐅᖅ 4-ᒥᑦ ᐅᑭᐅᖅ 8-ᒧᑦ.

ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᒥᒃᓵᓂᒋᐊᖅᑎᓐᓂᕐᒧᑦ ᐊᒃᑐᖅᓯᓂᐅᔪᓐᓇᖅᑐᑦ ᖃᐅᔨᓂᖏᓐᓄᑦ ᐊᒻᒪ ᖃᓄᐃᓂᓇᔭᖓᓄᑦ ᐃᒪᐅᑉ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᑉ ᐃᓂᖓᓂᑦ. ᐃᒪᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑐᑦ (ᐃᒪᕐᒥᒃ ᐸᐸᑎᓂᕐᒧᑦ ᓱᑉᓗᐃᑦ ᐊᒻᒪ ᓴᙱᑦᑎᑦᑎᔪᑏᑦ ᓱᑉᓗᐃᑦ) ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᓄᖅᑲᖓᑎᓐᓂᕐᒧᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐃᒪᕐᒥᒃ ᐱᔭᐅᔪᒥᒃ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐅᔭᕋᓐᓂᐊᕐᓂᕐᒧᑦ. ᐊᖏᔫᖑᔪᖅ ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑐᖅ ᐃᓚᐅᔪᑦ: ᐊᕐᕕᓂᑖᑦ ᐃᒪᕐᒥᒃ ᑲᑎᑦᑎᕖᑦ, ᑕᓪᓕᒪᐃᑦ ᐃᒪᕐᒥᒃ ᐸᐸᑦᑎᕖᑦ, ᐱᖓᓱᑦ ᐃᒪᕐᒥᒃ ᓴᙱᑎᑎᔪᑦ, 8 ᐃᒪᕐᒥᒃ ᓴᙱᑦᑎᓂᕐᒧᑦ ᓱᑉᓗᐃᑦ, ᐃᒪᓕᓇᕝ (WTP), ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᓯᑎᔪᑦ ᐱᔭᐅᔪᑦ (TSS) ᐲᔭᐃᕝ.

ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᓴᓇᔭᐅᑎᓪᓗᒍ ᐊᒻᒪ ᐊᐅᓚᖅᑎᓪᓗᒍ, ᐃᒪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᓄᓇᐅᑉ ᖄᖓᓂᙵᓛᖅᑐᑦ ᓄᖅᑲᖅᑎᑕᐅᓂᐊᖅᑐᑦ, ᓴᖑᑎᑕᐅᓗᑎᒃ ᐊᒻᒪ ᑲᑎᑕᐅᓗᑎᒃ ᖃᐸᓯᐊᕐᔪᖓᓂᑦ ᑲᑎᑦᑎᕕᖓᓂᑦ. ᑲᑎᑕᐅᔪᑦ ᐃᒪᖅ ᐅᔭᕋᓐᓂᐊᕐᕕᐅᑉ ᐃᓂᐊᓂᑦ ᑯᕕᑎᑕᐅᕋᑕᓕᕐᓂᐊᖅᑐᖅ ᐊᒻᒪ ᑐᖅᑯᖅᑕᐅᓗᓂ ᑲᑎᖅᓯᐃᕕᖓᒧᑦ (CP1), ᐃᒪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᐱᓕᕆᐊᖑᓗᓂ WTP-ᒧᑦ ᑯᕕᑎᑕᐅᕙᖅᑎᓐᓇᒍ ᓯᓚᒧᑦ ᐅᕙᓘᓐᓃᑦ ᐊᑐᖅᑕᐅᕙᖅᑎᓐᓇᒍ ᐃᒪᓕᓇᕕᖓᒥᑦ. ᐃᒪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐅᔭᕋᓐᓂᐊᖅᑐᓕᓇᓂᕐᒧᑦ ᑲᑎᑕᐅᓂᐊᖅᑐᖅ

ᐱᓕᕆᐊᖑᓗᓂᓗ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ TSS-ᓂᒃ ᐲᔭᐃᕙᖕᒥᑦ. ᐃᓚᖏᑦ ᐱᓕᕆᐊᖑᓯᒪᔪᑦ ᐃᒪᖅ ᓄᓇᐅᑉ ᐃᓗᐊᓂᖖᒑᖅᑐᖅ ᐊᑐᖅᑕᐅᑳᓂᕐᓗᓂ ᓄᓇᐅᑉ ᐃᓗᐊᓂᑦ ᐊᐅᕀᕐᓂᕐᒧᑦ.

ᐅᔭᕋᓐᓂᐊᖅᑐᓕᕆᓂᖅ ᐱᐊᓂᒃᐸᑦ, ᐅᒃᑯᐃᖓᔪᑦ ᓄᓇ ᐃᒻᒥᖅᑕᐅᓂᐊᖅᑐᑦ ᑕᓯᕐᔪᐊᕐᒥᑦ ᐅᑭᐅᓄᑦ ᐱᖓᓱᓄᑦ ᑯᕙᕚᓕᐊᓂᖃᕐᓗᓂ 0.44 m^3/s-ᒥᑦ. ᐊᑯᓂᐅᔪᖅ ᑕᑭᓂᖓᑕ, ᐅᒃᑯᐊᖅᓯᒪᓕᖅᑎᓪᓗᒍᒥᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᕆᔭᖓ ᑲᑎᖅᓯᐃᕙᖕᓂᑦ ᐊᒪᓗ ᐃᒥᖅᑐᖅᑕᐅᓯᒪᔪᓂᑦ ᐅᒃᑯᐃᖓᔪᓂᑦ ᓄᓇᒥᑦ ᑕᓯᕐᓂᑦ ᓂᕆᐅᕆᔭᐅᔪᖅ ᓈᒻᒪᖕᓂᐊᕐᓂᖓ ᓴᐸᑯᑕᐅᓂᖓᓄᑦ ᓯᓚᒧᑦ.

ᐅᔭᕋᓐᓂᐊᕐᕕᒃ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᑎᓪᓗᒍ, ᐃᒪᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᑦ ᐃᓂᐅᔾᒥᑦ ᐃᓂᖏᓐᓃᓐᓂᐊᖅᑐᑦ ᑭᓯᐊᓂ ᐅᒃᑯᐊᖅᐸᓪᓕᐊᓂᖅ ᐱᐊᓂᒃᐸᑦ ᐊᒪᓗ ᖃᐅᔾᔨᐊᖃᑦᑕᕐᓂᖅ ᓇᓗᓇᐃᖅᓯᒃᐸᑦ ᐃᒪᐅᑉ ᖃᓄᐃᓐᓂᖓ ᓈᒻᒪᖕᓂᖓᓂᒃ ᐱᓕᕆᐊᖑᙱᓪᓗᓂ ᑯᕙᔭᐅᓂᕐᒧᑦ ᓯᓚᒧᑦ.

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the Project), 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 Type A Water Licence Application has been prepared in accordance with the *Nunavut Land Claims Agreement, Nunavut Waters and Nunavut Surface Rights Tribunal Act*, and the Nunavut Water Regulations, but also takes into account the detailed guidance provided by the Board in *Guide 4 – Completing and Submitting a Water Licence Application for a New Licence* and the *Supplemental Information Guide for Mining and Milling* (SIG-MM3 Guide). This document presents Water Management Plan (Plan) and forms a component of the documentation series produced for the Type A Water Licence Application. This Plan will be updated, as required, to reflect all changes in operations and/or technology.

There are four phases to the development of Tiriganiaq: just over 4 years construction (Q4 Year -5 to Year -1), 8 years mine operation (Year 1 to Year 8), 3 years closure (Year 9 to Year 11), and post-closure (Year 11 forwards). Approximately 12.1 million tonnes (Mt) of ore will be produced. The produced ore will be milled over approximately 8 years of mine life at a rate of 3,000 tonnes per day (tpd) in Year 1 to Year 3 and 5,000 tpd in Year 4 to Year 8.

The water management objectives are to minimize potential impacts to the quantity and quality of surface water at the mine site. Water management structures (water retention dikes/berms and diversion channels) 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: six water collection ponds, five water retention dikes, three water diversion berms, eight water diversion channels, a Water Treatment Plant (WTP), and an underground total suspended solid (TSS) removal plant.

During mine construction and operation, contact water originating from affected areas on surface will be intercepted, diverted and collected within the various collection ponds. The collected water on the mine site will be eventually pumped and stored in the Collection Pond (CP1), where the contact water will be treated by the WTP prior to discharge to the outside environment or used as make-up water by the process plant. Contact water from underground mine will be collected in the sumps and treated by the underground TSS removal plant. Some of treated water from underground will be reused for underground operation.

The long-term, post-closure water quality in the ponds and in the flooded open pit lakes will meet Metal Mining Effluent Regulations limits and Canadian Council of Ministers of the Environment water quality guidelines for the protection of aquatic life (CCME-WQG) or the Site Specific Water Quality Objectives developed for the proposed mine site for aluminum, fluoride, and iron. Arsenic concentrations in the collection ponds (CP4) could slightly exceed the Site Specific Water Quality Objectives post-closure, a criteria which is conservatively protective of the receiving aquatic environment. However, the exceedances are much less than the mixing capacity in the receiving environment. These arsenic concentrations (Golder, 2013) are within the tolerance levels that have been deemed non deleterious by Environment Canada for the Project.

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 the discharge to the outside environment without treatment.

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List of Tables in Text

Appendix A ● FIGURES

Document Control

Version	Date	Section	Page	Revision	Author
1	April 2015			The Water Management Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval	Tetra Tech EBA Inc. and Golder Associates Ltd.

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
CCME	Canadian Council of Ministers of the Environment
CP	Collection Pond
DFO	Department of Fisheries and Oceans Canada
FEIS	Final Environmental Impact Statement
IDF	Inflow Design Flood
IQ	Inuit Qaujimajatuqangit
LSA	Local Study Area
MMER	Metal Mining Effluent Regulations
NLCA	Nunavut Land Claims Agreement
NWB	Nunavut Water Board
NWR	Nunavut Water Regulations
NWNSRTA	Nunavut Waters and Nunavut Surface Rights Tribunal Act
PGA	Peak Ground Acceleration
Project	Meliadine Gold Project
SD	Support Document
SSWQO	Site Specific Water Quality Objectives
STP	Sewage Treatment Plant
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WRSF	Waste Rock Storage Facility
WSER	Wastewater System Effluent Regulations
WTP	Water Treatment Plant

UNITS

%	percent
°C	degrees Celsius
°C/m	degrees Celsius per metre
ha	hectare
mg/L	milligram per litre
km	kilometer(s)
km^2	kilo square meter(s)
m	metre
m/day	metre per day
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)
t	tonne
tpd	tonnes per day
Mt	million tonne(s)

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 proposed 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).

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 proposed mine will produce approximately 12.1 million tonnes (Mt) of ore, 31.8 Mt of waste rock, 7.4 Mt of overburden waste, and 12.1 Mt of tailings. There are four phases to the development of Tiriganiaq: just over 4 years construction (Q4 Year -5 to Year -1), 8 years mine operation (Year 1 to Year 8), 3 years closure (Year 9 to Year 11), and post-closure (Year 11 forwards).

Mining facilities include a plant site and accommodation buildings, three ore stockpiles, a temporary overburden stockpile, a tailings storage facility (TSF), three waste rock storage facilities (WRSFs), a water management system that includes collection ponds, water diversion channels, and retention dikes/berms, and a Water Treatment Plant (WTP). The general mine site location for the Project and a site layout plan are shown in Figures 1.1 and 1.2, respectively, as attached in Appendix A.

1.1 Concordance

The Project is subject to the land and resource management processes established by the Nunavut Land Claims Agreement (NLCA) and other Federal laws and regulations. Agnico Eagle is required in accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA) and Nunavut Water Regulations (NWR) to submit to the Nunavut Water Board (NWB) a Type A Water Licence Application for a Mining and Milling Undertaking (Application), to use water and to deposit waste in development of the Project.

The Type A Water Licence Application has been prepared in accordance with the NLCA, the NWNSRTA, and the NWR, but also takes into account the detailed guidance provided by the Board in *Guide 4 – Completing and Submitting a Water Licence Application for a New Licence* and the *Supplemental Information Guide for Mining and Milling* (SIG-MM3 Guide). Concordance has been assessed for the requirements of the NWB Guidelines and SIG-MM3 Guide and commitments made during the Nunavut Impact Review Board Part 5 Review of the Final Environmental Impact Statement (FEIS).

1.2 Water Management Plan Summary

This document presents the Water Management Plan (Plan) to support the Type A Water Licence Application. The purpose of the Plan is to provide consolidated information on water management, water management infrastructure required, water balance model, water quality predictions, and water quality monitoring plan. The Plan is divided into the following components:

- Introductory section (Section 1);
- A brief summary of the physical setting at the mine site (Section 2);
- A description of the mine development plan (Section 3);
- A description of water management at the mine site during construction and operation (Section 4);
- A summary of the sizing of major water management infrastructure (Section 5);
- A description of water management at the mine site during mine closure (Section 6);
- A presentation of the mine site water balance model and its results (Section 7);
- A presentation of the mine site water quality model and its results (Section 8); and
- A description of the water quality monitoring program (Section 9).

This plan will be updated as required to reflect any changes in operation or economic feasibility occurs, and to incorporate new information and latest technology, where appropriate.

1.3 Linkages to Other Management Plans

Documents within the application package for the Type A Water Licence, which support this Plan include the:

- Environmental Management and Protection Plan;
- The Mine Plan;
- Ore Storage Management Plan;
- Mine Waste Management Plan;
- Preliminary Closure and Reclamation Plan;
- Roads Management Plan;
- Landfill and Waste Management Plan;
- Landfarm Management Plan; and
- Aquatic Effects Monitoring Program.

1.4 Overall Schedule and General Activities

The pre-development phase is anticipated to start in the last quarter of Year -5 and construction will take just over 4 years to complete (Q4 Year-5 to Year -1). The mine construction period will primarily focus on site preparation and the construction of infrastructure, with some mining activities (advancement of underground mine ramp) of the Tiriganiaq underground mine. The first year of operation (Year 1) will commence after commissioning is completed in the last quarter of construction (Year -1). The operation phase will span approximately 8 years (Year 1 to Year 8). Mining activities are expected to end in Year 7 and ore processing is expected to end in Year 8. Closure will occur within three years (Year 9 to Year 11) after the completion of mining and will include removal of the non-essential site infrastructure and flooding of the mined-out open pits. Post-closure phase will commence as closure is completed in Year 11 and will continue until it is shown that the site and water quality meets the regulatory closure objectives. Table 1.1 summarizes the overview of the timeline and general activities.

Table 1.1 Overview of Timeline and General Activities

Phase	Year	General Activities
Construction	Last Quarter (Q4) of Yr -5 to Yr -2	• Constructing site infrastructure • Developing ramp to underground mine
	Yr -1	• Constructing site infrastructure • Developing ramp to underground mine • Process commissioning begins in the last quarter of Year -1
Operations	Yr 1	• Mining Tiriganiaq underground • Ore processing (3,000 tonne per day (tpd))
	Yr 2 to Yr 3*	• Mining Tiriganiaq underground/ Tiriganiaq Pit 1 • Ore processing (3,000 tpd)
	Yr 4 to Yr 7	• Mining Tiriganiaq underground/ Tiriganiaq Pit 1/ Tiriganiaq Pit 2 • Ore processing (5,000 tpd)
	Yr 8	• Ore processing (5,000 tpd) • Mined-out open pits flooding
Closure	Yr 9 to Yr 11	• Removal non-essential site infrastructure • Mined-out open pits flooding
Post-Closure	Yr 11 forwards	• Site and surrounding environment monitoring

* Process plant will be expanded in Year 3 to reach the processing capacity of 5,000 tpd

1.5 Use of Inuit Qaujimajatuqangit in the Water Management Planning

Inuit Qaujimajatuqangit (IQ) is the most successful and oldest monitoring practice in Nunavut, where the resource users do the observing or monitoring. Information collected through IQ can contribute to mine design and planning, as well as monitoring activities. Agnico Eagle is committed to including IQ and public concerns raised through IQ in the design of management and monitoring plans for the Project, where practical. Agnico Eagle will continue active engagement with communities and Inuit organizations as the Project proceeds through permitting, and if approved, construction, operations and closure. Additional IQ collected through consultation and engagement will be included in updates to the design and implementation of environmental programs.

Section 1.5 of the Main Application Document summarizes IQ and public concerns. A list of public concerns can also be found in the Public Engagement and Consultation Baseline Report, submitted in support of this Type A Water Licence Application.

This Plan considered IQ (including traditional ecological knowledge, traditional land use) and concerns regarding Project effects on traditional resources and traditional land use sites through the following Project design and mitigation measures:

- The importance of clean water and the health of vegetation, fish, birds, caribou and other wildlife was emphasized by the Elders and other people in the communities who rely on these resources for traditional use. Accordingly, the water management objectives and design were developed to minimize potential impacts to the quantity and quality of water at the mine site and on the aquatic ecosystem as follows:
  - surface contact water, underground water, and non-contact water will be kept separate;
  - the water management design was developed to limited the amount of contact water, where practicable;
  - non-contact water will be diverted away from the mine site; and
  - all contact water originating from affected areas will be diverted, collected, monitored, and treated prior to discharge to the outside environment; and
  - water quality objectives will be met at the edge of the mixing zone in Meliadine Lake to avoid a significant adverse effect on opportunities for traditional and non-traditional use of fish, and health of aquatic life, and human health.
- IQ indicated that the rivers and Meliadine Lake are important fish harvesting sites, and Elders expressed concerns regarding potential adverse effects from the Project on fish populations in waterbodies of the Meliadine watershed. Accordingly, the freshwater intake pipe will be fitted with a stainless steel screen and rockfill causeway to prevent fish from becoming entrained. In addition, dikes and berms will be constructed to protect contact water from potentially contaminating fish habitat and to divert natural water away from possible sources of contamination. Water quality monitoring will be conducted during construction, operation and decommissioning phases to ensure that water quality trends are similar to baseline conditions and so that adaptive management can be conducted should differing trends be observed.

SECTION 2 • PHYSICAL SETTING

2.1 Site Conditions

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

In general, the local overburden stratigraphy in the project area consists of a thin layer of topsoil overlying a layer of silty gravelly sand. Cobbles and boulders are present throughout the entire site and 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).

Low-lying areas are poorly drained as a result of a low slope in the landscape, and intermittent streams connect numerous shallow ponds and lakes. The following subsections summarized the physical setting at the mine site.

2.2 Climate

The Project is located in the Kivalliq Region of Nunavut, near the northern border of the southern Arctic terrestrial ecozone, and within the Arctic tundra climate region. Within this region daylight reaches a minimum of 4 hours per day during the winter to a maximum of 20 hours per day during the summer. The climate is extreme with long cold winters and short cool summers. Temperatures are cool, with a mean temperature of 12°C in July and -31°C in January. The mean annual air temperature at the Project site is approximately -10.4 °C (Golder, 2012a).

The recorded prevailing winds are from north and north-northwest. The wind blows from the north and north-northwest direction more than 30% of the time, and the least frequent wind direction is west-southwest, with a frequency of 2.1%. The calm frequency is 2.8% of the time. The mean values for wind speed show that the north-northwest together with north and northwest winds have the highest speeds and tend to be the strongest.

Mean annual precipitation at the mine site, based on the hydrological year from 1 October to 30 September, is estimated to be 411.7 mm after accounting for rainfall and snowfall undercatch. Approximately 51% of precipitation occurs as rain (207.1 mm) and 49% occurs as snow (199.1 mm).

Table 2.1 presents the annual precipitation, evaporation, and temperature characteristics. Detailed climate characteristics at the mine site are described in the FEIS of Support Document (SD) 7-1 Aquatic Baseline Synthesis Report. Table 2.2 presents the estimated extreme values of annual precipitation for various return periods at the mine site based on the frequency analysis of annual precipitation data. Table 2.3 summarizes the extreme 24-hour rainfall events derived for the mine site based on intensity-duration-frequency curves established from the regional Rankin Inlet rainfall observations.

Table 2.1 Estimated Mine Site Monthly Climate Characteristics

Month[a]	Monthly Air Temperature (°C)			Monthly Precipitation (mm)			Lake Evaporation (mm)
	Minimum	Average	Maximum	Rainfall[b]	Snowfall[c]	Total[d]	
January	-37.2	-30.9	-19.8	0.0	12.9	11.1	0
February	-35.3	-30.1	-24	0.0	13.1	11.1	0
March	-30.8	-25.1	-18.8	0.0	18.6	16.1	0
April	-20.2	-15.7	-10.4	1.4	28.8	26.4	0
May	-10.8	-5.9	-1.2	7.7	19.2	25.2	0
June	0.1	4.1	6.7	26.4	7.1	37.0	60.4
July	6.9	10.5	14.9	43.7	0.2	51.2	124.4
August	7.7	9.7	11.2	63.7	0.3	74.6	95.6
September	1.3	3.8	6.8	45.2	5.7	57.8	42.7
October	-9.9	-4.6	1.7	15.5	36.9	50.0	0
November	-23.6	-17.2	-10.2	0.3	33.3	28.5	0
December	-33.3	-25.9	-19.4	0.0	18.9	15.8	0
Annual	-37.2	-10.4	14.9	203.9	195.0	404.8	323.1

[a] Climate characteristics obtained from SD-7-1 Aquatics Synthesis Baseline of the FEIS.
[b] Rainfall was adjusted to account for under catch by 13%.
[c] Snowfall was adjusted to account for under catch by 50%.
[d] Total precipitation was adjusted to account for under catch by 32%.

Table 2.2 Estimated Mine Site Extreme Annual Precipitation

Type of Year[a]	Return Period (years)	Annual Rainfall (mm)[b]	Annual Snowfall (mm)[c]	Annual Total Precipitation (mm)[d]
Wet	100	324	489	594
	50	310	414	573
	25	289	331	541
	10	271	278	513
	5	249	233	479
Median	2	207	179	412
Dry	5	165	151	345
	10	144	143	310
	25	126	138	280
	50	106	134	247
	100	93	133	225

[a] Precipitation extreme obtained from SD 7-1 Aquatics Synthesis Baseline of the FEIS .
[b] Rainfall was adjusted to account for under catch by 13%.
[c] Snowfall was adjusted to account for under catch by 50%.
[d] Total precipitation was adjusted to account for under catch by 32%.

Table 2.3 Estimated Mine Site Extreme 24-hour Rainfall Events

Return Period (Years)	24-hour Precipitation (mm)
2	33
5	44
10	50
25	57
50	61
100	65

2.3 Permafrost

The mine site is located in an area of continuous permafrost, as shown on Figure 2.1 as attached in Appendix A.

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).

Published data regarding permafrost were used to recreate the permafrost map of Canada shown in Figure 2.1. 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 will vary based 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 (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, 2012c).

2.4 Taliks

Taliks (areas of unfrozen ground) are to be expected where lake depths are greater than about 1.0 to 2.3 m. Formation of an open-talik, which penetrates through the permafrost, would be expected for lakes that exceed a critical depth and size. It is anticipated that an open-talik exists below Lake B7 based on the depth and geometry of this lake (Golder, 2012b). The salinity of groundwater also influences the temperature at which the groundwater will freeze. The test results on two deep groundwater samples collected below the base of the permafrost for baseline study indicated salinity level leads to a freezing point depression of about 3.2 °C (FEIS Volume 7, Appendix 7.2-A).

2.5 Climate Change

Long-term climate trends were assessed as part of the Project based on two selected stations (Baker Lake and Rankin Inlet stations), and the assessment included estimating changes in air temperature and precipitation from observed historical values for two typical time horizons: 2041 to 2070 (the 2050s) and 2071 to 2100 (the 2080s) (FEIS Volume 5, Section 5.4). The average projected climate trend deviations from the observed historical values from Baker Lake station are provided in Table 2.4. Conclusions on trend deviation for air temperature and precipitations are as follows:

- The climate in the Project region is projected to be warmer for the 2050s and 2080s time horizons when compared to the observed historical values.
- Precipitation shows a larger amount compared to historical values; however, the majority of projections are within the annual recorded precipitation values.

The climate change assessment for the Project indicates that a warming climate can increase the thickness of the active layer. Overall, warming could cause thawing of ice-rich permafrost, potentially resulting in thaw lakes and subsidence of the land surface (FEIS Volume 5, Section 5.4).

Table 2.4 Average Projected Climate Trend Deviations from Observed Historical Values

Station and Period			Air Temperature (°C)	Precipitation (mm equiv.)
Baker Lake	**2050s**	Annual	+3 to 3.5	+30 to 50
		Spring	+3 to 3.5	+5 to 10
		Summer	+2 to 2.5	+10 to 15
		Fall	+3 to 3.5	+15 to 20
		Winter	+4.5 to 5	+0 to 5
	2080s	Annual	+4.5 to 5	+35 to 55
		Spring	+4 to 4.5	+5 to 10
		Summer	+2 to 2.5	+10 to 15
		Fall	+5 to 5.5	+15 to 20
		Winter	+7 to 7.5	+5 to 10

Data in this table obtained from FEIS Volume 5, Section 5.4.

2.6 Hydrology

Hydrology characteristics near the mine site are detailed in FEIS Volume 7, Section 7.3, and are summarized herein.

2.6.1 General Settings

The mine site of the Project 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 in length, and has over 200 islands. Unlike most lakes, it has 2 outflows that drain into Hudson Bay through 2 separate river systems. It has a drainage area of 560 km^2 upstream of its 2 outflows. Most drainage occurs via the Meliadine River, which originates at the south west 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 1460 km^2.

Watersheds near the mine site comprise an extensive network of waterbodies, and interconnecting streams. The hydrology of these watersheds is dominated by lake storage and evaporation.

Based on bathymetric surveys, the lakes on the peninsula of Meliadine Lake range from 1.3 ha to 90.5 ha in surface area and are shallow. Only four lakes have maximum depths of 4.0 m or greater. The surveyed ponds on the peninsula ranged from 0.1 to 18.8 ha in surface area. They are shallow, with maximum depths of less than 1.0 m in 62% of the surveyed ponds.

2.6.2 Stream Geomorphology

Waterbodies comprise more than 30% of the landscape within the Local Study Area (LSA) and are typically connected by short outlet channels, which have low slopes at the headwaters, but are steep relative to land slopes at the lower end of the watershed. Channels are typically only slightly entrenched, have high bankfull width-to-depth ratios (greater than 12) and moderate sinuosity (S) (greater than 1.2). Most lake outlet channels in the LSA could be described predominantly as C2 channels by the Rosgen Level II classification system (Rosgen 1994).

The beds of larger channels are typically armoured with inerodible boulder and cobble layers. Channels may include flat and steep reaches as governed by the local topography. Channel banks typically consist of vegetated mats of organic material, below which are found organics and fine soils within a matrix of cobble and boulders similar to the bed materials. Mid-channel islands were observed to also consist of a veneer of vegetated organic material resting on a bouldery substrate. Erosion resistance of channel banks is also likely enhanced by frozen conditions during spring snowmelt peak discharges, as has been observed in other northern areas (Scott 1978). However, during unfrozen conditions after spring runoff, these banks may be sensitive to changes in flow regime.

2.6.3 Ice and Winter Flows

Observed ice thicknesses near the mine site have been observer to vary between 1.0 m and 2.3 m prior to the spring melt. With the exception of the main outlet of Meliadine Lake, all lake outlets examined have been completely frozen over the winter, with no measurable flow.

2.6.4 Spring Melt 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 site 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 freeze-up.

2.6.5 Mean Water Balance

A mean annual water balance for natural conditions a typical watershed in the near the mine site (Lake B7) was developed based on a hydrological year basis to provide a basic characterization for mean conditions (Table 2.5). The total evaporative loss from lake and land surface (lake evaporation and land evapotranspiration) equals 106.4 mm, or 34%, of the net precipitation input. When combined with sublimation (61.1 mm), the total loss equals 167.5 mm or 41% of the total precipitation. The surface runoff amount represents 51% of the total precipitation, or 66% of the net precipitation, which is the precipitation remaining after snow sublimation loss.

Table 2.5 Representative Watershed (Lake B7) Mean Annual Water Balance for Natural Conditions

Component	Magnitude (mm)	Comment
Total Precipitation	411.7	Mean annual value, adjusted for undercatch
Rainfall	207.1	Mean annual value, adjusted for undercatch
Snowfall as SWE	204.6	Mean annual value
Spring SWE	107.4	Mean annual value, accounting for 47.5% loss due to sublimation (97.2 mm)
Net Precipitation Input	314.5	Rainfall + spring SWE
Surface Runoff (at Lake B7)	208.1	Mean annual value
Lake Evaporation at 323 mm	78.8	24.4% of Watershed B7 is lake surface
Evapotranspiration at 36.5 mm	27.6	75.6 % of Watershed B7 is land surface
Net Watershed Output	314.5	Surface runoff + lake evaporation + evapotranspiration

Note: SWE = snow water equivalent.

2.7 Groundwater

Groundwater characteristics at the mine site are detailed in FEIS Volume 7, Section 7.2 Hydrogeology and Groundwater, and are briefly summarized herein.

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 out. Within the active layer, the water table is expected to be a subdued replica of topography, and is expected to parallel the topographic surface. Project area groundwater in the active layer flows to local depressions and ponds that drain to larger lakes at velocities estimated to range from about 0.0025 m to 0.02 m/day.

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). When the size of a waterbody is above a critical value, the talik beneath the waterbody will be an open talik, which connects to the deep groundwater flow regime beneath the permafrost. 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 Project site. A review of bathymetric data, ice thickness data, and results of thermal modelling suggests that near the Tiriganiaq deposit, Meliadine Lake, Lake B7 is likely to have open taliks connected to the deep groundwater flow regime (Golder, 2012a). However, no impact is expected to Lake B7 by mine activities.

Tiriganiaq underground mine is planned to extend to approximately 625 below the ground surface and therefore, part of the underground mine will be operated 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. The adopted assumptions on groundwater contribution of underground mine water management is described in Section 4 of this Plan.

Both Tiriganiaq Pit 1 and Tiriganiaq Pit 2 will be mined within the permafrost, therefore, groundwater inflow to the open pits is expected to be negligible and were not considered in the water management plan.

2.7 Seismic Zone

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

SECTION 3 • MINING PLAN

This section describes a summary of the mine development plan and key mine development activities, including mine waste management. The water management during construction and operation is described in Section 4. Section 5 details the infrastructure required for mine site water management and Section 6 summarizes the water management plan during mine closure.

3.1 Mine Development Plan

Tiriganiaq deposits will be mined using traditional open pit and underground mining methods. Two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and one underground mine (Tiriganiaq Underground) will be developed. The following mining development sequence and schedule are planned:

- Tiriganiaq underground mine will be developed and operated from Year -5 to Year 7;
- Tiriganiaq Pit 1 will be mined from Year 2 to Year 7; and
- Tiriganiaq Pit 2 will be mined from Year 4 to Year 7.

Three mine waste streams will be produced at the mine site, including waste rock, tailings, and overburden material. Approximately 31.8 Mt of waste rock and 7.4 Mt of overburden will be generated on site. About 12.1 Mt of tailings will be produced during the 8 years of mill operations.

The mine development will include the following major infrastructure;

- industrial area (camp and process plant);
- ore stockpiles (OP1 to OP3);
- waste rock storage facilities (WRSF1 to WRSF3);
- a tailings storage facility;
- landfarm and landfill;
- haul and access roads; and
- open pits and underground mine workings.

In addition, the mine development will include construction of the following water management facilities;

- six water collection ponds (CP1 to CP6);
- eight water diversion channels (Channels 1 to 8);
- five water retention dikes (D-CP1, D-CP3 to DCP6);
- three water retention berms (Berms 1 to 3);
- a freshwater intake causeway and pump system;
- a Water Treatment Plant (WTP) and associated intake causeway;
- an underground total suspended solids (TSS) removal plant;
- a Sewage Treatment Plant (STP);
- pipeline and associated pump system;
- a potable water treatment plant; and

- a discharge diffuser located in Meliadine Lake.

3.2 Mine Development Sequence and Key Activities

The development sequence for the mine infrastructure and water management infrastructure is summarized in Table 3.1 and presented in Figures 3.1 to 3.15, as attached in Appendix A.

Table 3.1 Mine Development Sequence and Key Activities

Mine Year	Figure	Mine Development Sequence and Key Activities
Last Quarter (Q4) of Yr -5	3.1	• Start to construct the industrial pad • Develop the ramp to Tiriganiaq underground mine • Construct portion of rock pad for OP1 and OP2 stockpiles to store the ore from Tiriganiaq underground ramp development • Install Culvert2
Yr -4	3.2	• Continue construction of the industrial pad and start to construct the associated buildings • Construct D-CP1 to impound CP1 and start to collect contact water within CP1 • Construct discharge diffuser in Meliadine Lake • Build WTP and water intake causeway and start to treat the contact water in CP1 • Construct Channel2 and install Culvert1
Yr -3	3.3	• Complete the industrial pad • Construct freshwater intake causeway in Meliadine Lake • Construct CP2 and start to collect contact water • Construct Berm3 and Channel5 • Construct D-CP5 to impound CP5 and start to collect contact water • Construct and operate the landfill and landfarm
Yr -2	3.4	• Expand the pad footprint of OP1 and OP2 to increase the storage capacity • Start to place waste rock in WRSF1 • Construct Berm1, Channel1, Channel6, Channel7, and Channel8 • Install Culvert3 to Culvert6
Yr -1	3.5	• Complete the construction of the buildings over the industrial pad • Start process commissioning in Q4 of Year -1 • Start to place dry stack tailings into Cell 1 of TSF in Q4 of Year -1
Yr 1	3.6	• Start full capacity of ore processing • Construct Berm2, Channel3, and Channel4 • Construct D-CP3 to form CP3 and start to collect contact water • Construct D-CP4 to form CP4 and start to collect contact water
Yr 2	3.7	• Start to mine Tiriganiaq Pit 1 • Start to place overburden and waste rock from Tiriganiaq Pit 1 in WRSF1
Yr 3	3.8	• Expand process plant to reach the processing capacity of 5,000 tpd • Construct temporary overburden stockpile to store the selected ice-poor overburden that will be used for progressive reclamation of TSF

Table 3.1 Mine Development Sequence and Key Activities

Mine Year	Figure	Mine Development Sequence and Key Activities
Yr 4	3.9	• Increased mill productions to 5,000 tpd • Start to mine Tiriganiaq Pit 2 • Start to place overburden and waste rock form Tiriganiaq Pit 2 in WRSF3 • Construct D-CP6 to form CP6 and start to collect contact water • Start to place dry stack tailings in Cell 2 of TSF • Start to place the low grade ore from the open pits in OP1 stockpile • Construct rock pad for OP3 to store marginal grade ore from the open pits • Stop placing rock and overburden in WRSF1 when WRSF1 reaches design capacity
Yr 5	3.10	• Start to place waste rock form Tiriganiaq Pit 1 in WRSF2 • Place final closure cover on top of tailings surface in Cell 1 of TSF (waste rock cover over final Cell 1 perimeter slope to be placed as progressive reclamation as soon as slope reaches final grade)
Yr 6	3.11	• Start to place dry stack tailings in Cell 3 of TSF • Stop placing overburden waste in WRSF3
Yr 7	3.12	• Place final closure cover on top of tailings surface in Cell 2 of TSF (waste rock cover over final Cell 2 perimeter slope to be placed as for progressive reclamation as soon as slope reaches final grade) • Stop mining of Tiriganiaq Pit 1 and Tiriganiaq Pit 2 when the open pits reach design elevation • Stop Tiriganiaq underground operation when underground mine reaches design elevation • Stop placing waste rock and overburden in WRSF2 when WRSF2 reaches design capacity • Stop placing waste rock in WRSF3 when WRSF3 reaches design capacity
Yr 8	3.13	• Process the ore from the OP1, OP2, and OP3 until all stored ore were processed • Decommission of underground mine surface openings as needed
Closure (Yr 9 to Yr 11)	3.14	• Place final closure cover on top of tailing surface in Cell 3 of TSF in Year 9 (waste rock cover over final Cell 3 perimeter slope to be placed as progressive reclamation - as soon as slope reaches final grade) • Decommission non-essential mine infrastructure and support buildings in Years 9 and 10 • Continue to fill the mined-out open pits with active pumping water from Meliadine Lake until Year 10 • Start monitoring and maintenance in Year 9 (start in Year 8, if possible)
Post-Closure	3.15	• Continue monitoring and maintenance until Year 18

3.3 Summary of Mine Waste Management

This section describes a summary of the mine waste management plan. More detailed information on mine waste management is presented in the Ore Storage Management Plan and Mine Waste

Management Plan. The water management associated with the mine waste management is described in Section 4 of this document. Table 3.2 presents a summary of the total tonnage of mine waste materials and their proposed usage or destination.

Table 3.2 Summary of Mine Waste Tonnage and Destination

Mine Waste Stream	Estimated Quantities		Waste Destination
Overburden	7.4 Mt		Temporary storage in the Overburden Stockpile ~ 0.1 Mt for reclamation of the TSF
			Closure and site reclamation for the TSF
			Co-disposed with waste rock within WRSFs
Waste Rock	31.8 Mt		Dike and road construction
			WRSFs
			Closure and site reclamation for the TSF
Tailings	12.1 Mt	9.7 Mt	As dry stack tailings placed in the TSF
		2.4 Mt	Backfilled to underground mine as cemented paste backfill

3.3.1 Waste Rock Management

Three areas were identified as the WRSFs to store waste rock and overburden material, as shown in Figure 1.2 attached in Appendix A. These selected areas can be described as follows:

- WRSF1: located north of Tiriganiaq Pit 1 with an approximate footprint of 41.4 hectare (ha) and design capacity of 9.4 Mm^3.
- WRSF2: located south of Pond H17 (CP1) with an approximate footprint of 20.2 ha and design capacity of 3.6 Mm^3.
- WRSF3: located north of Tiriganiaq Pit 2, covered Pond H20 basin with an approximate footprint of 22.7 ha and design capacity of 5.0 Mm^3.

A brief summary of each WRSF is presented in the following subsection. Further details on the management of the WRSFs can be found in the Mine Waste Management Plan.

3.3.1.1 Waste Rock Storage Facility 1

The proposed WRSF1 will occupy an area of approximately 41.4 ha and will be located to the north of Tiriganiaq Pit 1. Two small shallow ponds (Ponds A17 and B9) are located within the footprint of WRSF1 and will be covered by the facility as shown in Figure 4.1. The ponds are less than 2 m deep and freeze to the bottom annually during the winter season. They are considered as non-commercial, recreational, or aboriginal fishery.

The WRSF1 will accommodate waste rock produced from Tiriganiaq underground mining and Tiriganiaq Pit 1 and the overburden produced from Tiriganiaq Pit 1. It is anticipated that approximately 10.2 Mt (5.42 Mm^3) of waste rock and 6.5 Mt (4.02 Mm^3) of overburden will be placed in WRSF1. WRSF1 is expected to reach its design capacity by end of Year 4.

3.3.1.2 Waste Rock Storage Facility 2

The proposed WRSF2 is located to the south of Pond H17 (CP1) with an approximate footprint of 20.2 ha. Five small ponds (Ponds A58, H8, H9, H10, and H11) are located within the footprint of WRSF2 as shown in Figure 4.1. Pond A58 will be fully covered and the other four ponds will be partially covered by waste rock. All five ponds are less than 2.0 m deep and freeze to the bottom during the winter. Of the five ponds impacted by WRSF2, only nine spine stickleback were caught in Ponds A58 and H10. These five ponds are not considered as commercial, recreational, or aboriginal fishery.

The WRSF2 will accommodate the majority of waste rock produced from Tiriganiaq Pit 1 from Year 5 to Year 7. The WRSF2 is expected to reach its design capacity by the end of Year 7.

3.3.1.3 Waste Rock Storage Facility 3

The proposed WRSF3 is located to the north of Tiriganiaq Pit 2, covered basin of Pond H20 with an approximate footprint of 22.7 ha as shown in Figure 4.1. The runoff water from WRSF3 will be collected within Pond H19. Maximum water depths for Ponds H19 and H20 are 1.4 m and 1.6 m respectively. No fish species were found in these two ponds.

The WRSF3 will accommodate overburden from pre-stripping of Tiriganiaq Pit 2 and all waste rock produced from Tiriganiaq Pit 2 with some portions of waste rock from Tiriganiaq Pit 1 in Year 4 and Year 5. The WRSF3 is expected to reach its design capacity by end of Year 7.

3.3.2 Tailings Management

An area, located on high ground west of the proposed mill and east of Lake B7 as shown in Figure 1.2, has been identified as the TSF for dry stack tailings. The direct distance from the mill to the TSF ranges from 300 to 900 m. The minimum setback distance from the nearest dry stack tailings pile to the edge of Lake B7 is approximately 200 m. The dry stacked tailings will be dewatered to a solid content of 85% by mass in the mill. Thereafter the tailings will be hauled from the mill to the TSF by truck; end dumped, spread, and compacted.

Approximately 12.1 Mt of tailings will be produced over an eight year period. Approximately 9.7 Mt or 80% of the tailings will be deposited within the TSF and the remaining 2.4 Mt or 20% will be used as underground paste backfill.

The dry stack tailings will be managed using a three cell system within the TSF to limit dust generation, control tailings surface erosion, and to facilitate the progressive reclamation and closure of the TSF. As the tailings reach final elevation, it is proposed that the tailings are progressively encapsulated or capped with either waste rock or a layered combination of waste rock and overburden. Further details on tailing management plan are described in the Mine Waste Management Plan.

3.3.3 Overburden Management

Approximately 7.4 Mt of overburden material will be removed from the surface footprint of the two open pits over the mine life. The produced overburden material will be mainly stored in the WRSFs together with waste rock. An estimated 26,000 tonnes of overburden will be used for site infrastructure construction. About 0.1 Mt of selected ice-poor overburden will be stored in a temporary overburden stockpile for later use as closure cover material for the TSF. The temporary overburden stockpile is located at the east side of the TSF with a footprint of 1.12 ha, as shown in Figure 1.2. Further details on the management of the overburden are described in the Mine Waste Management Plan.

3.3.4 Ore Stockpile Management

Approximately 12.1 Mt of ore will be mined; this will comprise approximately 3.6 Mt from the open pits and approximately 8.5 Mt from underground operations. Three grades of ore (high grade, low grade, and marginal grade) will be produced. The ore will be milled in the process plant during eight years mine operation at a feed rate of 3,000 tpd from Year 1 to Year 3 and 5,000 tpd from Year 4 to Year 8.

Three areas have been identified for ore storage, as shown in Figure 1.2, and can be described as follows:

- Ore Stockpile 1 - near the crusher, will be used to store the high grade ore from the underground mine between Year -5 and Year 3, and the storage of low grade ore from the open pits between Year 4 and Year 7;
- Ore Stockpile 2 - adjacent to Ore Stockpile 1, will be used to store the marginal ore from the underground mine between Year -5 and Year 6; and
- Ore Stockpile 3 - north of Ore Stockpiles 1 and 2, will be used to store the marginal ore from the open pits between Year 4 and Year 7.

Further details on the management of the ore stockpiles are described in the Ore Storage Management Plan.

SECTION 4 • WATER MANAGEMENT DURING CONSTRUCTION AND OPERATION

Water management on site plays a key role in minimizing the impact of the mine activities on the surrounding environment. Five types of water were identified on site listed as follows:

- Contact water: Water that has been in contact with any infrastructure and facilities on site;
- Process water: Water used for processing ore and water in the tailings;
- Underground mine water: water pumped from the underground mine (including groundwater inflow and water used for underground mine operation);
- Non-contact water: Runoff water that has not been in contact with mining infrastructure and facilities on site; and
- Fresh water: Water pumped from Meliadine Lake.

This section describes how the water will be managed on site during construction and operation phases. Section 5 described the design of infrastructure required for water management. Water management strategy during mine closure is described in Section 6.

4.1 Water Management Objectives and Strategies

The goal of water management is to minimize the impact of the mine activities on the aquatic ecosystem surrounding the mining area. The key objectives for water management are:

- Keep the different water types separated as much as possible;
- Reduce contact water (i.e., water in contact with mine development) for management, monitoring, and treatment (if required) to the extent practical;
- Divert non-contact water from undisturbed lands away from the mine site infrastructure to the extent practical; and
- Minimize fresh water usage by recycling and reusing the contact and process water to the extent practical.

To achieve the above water management objectives, the following key strategies were implemented to develop the water management plan:

- Two levels of catchment disturbance have been defined for the area, namely undisturbed and disturbed. Areas that have been disturbed as part of the mine development are considered disturbed catchments, while the areas left unaffected are considered undisturbed catchments.
- For the purpose of mine water management, runoff from undisturbed areas is considered non-contact water, while runoff from disturbed catchment areas is considered contact water. Surface water that is diverted around the mine facilities or groundwater that does not emerge into a mine facility is considered non-contact water. Any non-contact water that mixes with contact water becomes contact water.

- Conveyance and storage of contact water will be controlled by channels and containment structures (i.e., sumps and ponds). Contact water will be diverted and collected in various water collection ponds.
- The collected water will be treated if the water quality does not meet the discharge criteria established in the water licence.
- The treated water will be reused as much as possible to minimize the freshwater requirements. The excess treated water will be discharged into Meliadine Lake through a submerged diffuser.
- Non-contact water will be intercepted and directed away from disturbed areas by means of natural catchment boundaries or man-made diversion structures and will be allowed to flow to the neighbouring waterbodies.

4.2 Water Management Systems

The water management systems, as shown in Figure 1.2, for the water management plan include the following components:

- six water collection ponds (CP1 to CP6);
- five water retention dikes (D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6);
- three water diversion/collection berms (Berm1 to Berm3);
- eight water diversion channels (Channel1 to Channel8);
- six water passage culverts to convey water through a pad and various haul roads (Culvert1 to Culvert6);
- a water treatment plant (WTP) and associated intake causeway;
- an underground TSS removal plant;
- a sewage treatment plant (STP);
- network of surface pumps and pipelines;
- a freshwater intake causeway;
- a potable water treatment plant; and
- a discharge diffuser located in Meliadine Lake (see Appendix E for the design detail).

4.3 Waterbody Inventory

Four watersheds (Watershed A, Watershed B, Watershed H, and Watershed G) will be impacted by mining activities. Table 4.1 presents the waterbodies that are impacted by mining activities within the four watersheds. Watersheds and waterbodies in proximity to the mine site location and waterbodies affected by site infrastructure are shown in Figure 4.1.

Within the water management footprint, bathymetrical data from baseline study of FEIS is available for Ponds H17, H20, A54, B9, and B10. No bathymetrical data for the rest of the ponds presented in Table 4.1 is available, but these ponds are small and shallow (with water depth approximately 1.4 m or less). It was assumed that only Ponds A54, H17, H19, and H20 will be dewatered to facilitate infrastructure construction and mine waste management. Ponds H10, H11, H12, and H13 will be drained due to construction of Channel1. Ponds A12 and A13 will be drained due to the construction of Channel5. The rest of the ponds listed in the Table 4.1 may be dewatered as required, or the water will be displaced by placing fill material or the ice will be removed and deposited to CP1 during winter season. More information on the pond dewatering or draining is presented in Section 4.4.

Table 4.1 Inventory of Waterbodies Impacted by Mining Activities

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m3)	Notes
A	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
	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/D-CP4
	B9	1.40	0.64	-	Covered by WRSF1
	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 OP1
	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
	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

Table 4.1 Inventory of Waterbodies Impacted by Mining Activities

Watershed	Waterbody	Maximum Lake Water Depth, m	Total Area (ha)	Water Volume (m3)	Notes
G	-	-	-	-	Runoff diverted by Channel2. No pond will be impacted
"-" indicates that data not available or not applicable		Ponds to be drained		Ponds to be dewatered	

4.4 Water Management Plan during Construction and Operation

4.4.1 Pond Dewatering and Draining

To facilitate infrastructure construction and mine waste management, four ponds (A54, H17, H20, and H19) will be dewatered under the water management plan. Depending on the time of obtaining the Type A Water Licence, Pond H17 may be dewatered to facilitate Dike D-CP1 construction in the open water season. It is planned that the top 0.5 to 1.0 m of freshwater in Pond H17 will be pumped to Meliadine Lake if it meets discharge criteria. Pond A54 will be dewatered during open water season of Year -4 to facilitate Dike D-CP5 construction. Ponds H19 and H20 will be dewatered in the open water season of Year 3 to form CP6 and facilitate placing waste rock in WRSF3. Table 4.2 summarizes the dewatering plan and estimated volume of water to be dewatered. For the dewatering Ponds A54, H19, and H20, it is assumed that approximately half volume of water in these ponds will be pumped to Meliadine Lake if it meets discharge criteria, and the remaining half volume of water will be pumped to CP1 for treatment.

Table 4.2 Pond Dewatering under Water Management Plan

Pond	A54	H17	H20	H19
Maximum Pond Water Depth (m)	1.3	1.7	1.6	1.4
Existing Pond Surface Area (ha)	5.99	15.4	9.58	2.91
Dewatering Schedule	Sept. to Oct. of Year -4	Dependent on receipt of Type A Water License*	Sept. to Oct. of Year 3	Sept. to Oct. of Year 3
Estimated Total Volume of Water to be Dewatered (m^3)	34,545	82,400	90,307	16,431
*Once obtaining the Type A Water License, Pond H17 will be dewatered if the pond is in open water condition, otherwise, Pond H17 will not be dewatered.				

Channel1 will be constructed through and will drain Ponds H10, H11, H12, and H13. The water in these ponds will flow into CP1 via Channel1.

Channel5 will be constructed through and will drain Ponds A12 and A13. The water in these ponds will flow into CP5 via Channel5

The balance of the water ponds (i.e. excluding the ponds to be dewatered or to be drained by construction of channels) listed in Table 4.1 may be dewatered during the open water season or the pond water may be displaced by the placement of fills. If dewatering is required, the water will be pumped to CP1. The water displaced by the placement of fill material will be diverted to and collected in the adjacent water collection ponds. During winter season, the ice within the ponds will be removed and deposited into CP1 before the construction of site infrastructure.

4.4.1 Key Water Management Activities during Construction and Operation

The construction activities required for the water management plan is presented in Table 3.1 and Table 4.1 provide an inventory of waterbodies impacted by mining activities. These tables should be read in conjunction with the below Table 4.3 which presents the yearly major water management activities during construction and operation. Water management activities during closure are described in Section 6.

Table 4.3 Major Water Management Activities during Construction and Operation

Mine Year	Figure	Major Water Management Activities and Sequence
Q4 of Yr -5	3.1	• Start to re-use the underground water • Dewatering top 0.5 to 1.0 m of fresh water in Pond H17 (depending on the time of obtaining the Type A Water Licence) •
Yr -4	3.2	• Start to pump the water from CP1 to WTP for treatment prior to discharge to the outside environment via the diffuser in Meliadine Lake • Pump the underflow sludge water from the WTP to CP1. To limit recirculation of the sludge within CP1, the discharge will be located away from the WTP intake • Dewater Pond A54 in Q3 of Year -4 and pump the water to CP1
Yr -3	3.3	• Start to supply fresh water from Meliadine Lake to the camp area • Start to treat sewage water and pump the treated sewage water from sewage treatment plant to CP1 • Start to pump the contact water from CP2 to CP1 for treatment • Start to pump the contact water from CP5 to CP1 for treatment • Start to pump the water from the landfarm to CP1 after pre-treatment for oil • Start to store the excess groundwater from the underground mine at surface
Yr -2	3.4	• Start to divert the contact water from industrial pad to CP1 via Channel1
Yr -1	3.5	• Start to pump the treated water from WTP to mill as make-up water • Start to pump the underflow sludge water from WTP to the mill • During the open water season, the mill will be supplemented as much as possible with water from the WTP. For the balance of the year, fresh water will be used for ore processing • Start to pump the excess truck wash water from the wash bay into CP1

Table 4.3 Major Water Management Activities during Construction and Operation

Mine Year	Figure	Major Water Management Activities and Sequence
Yr 1	3.6	• Start to pump the contact water in CP3 to the partially drained Pond H13 where the water will flow through Channel1 into CP1 • Start to pump the contact water in CP4 to the partially drained Pond H13 where the water will flow though Channel1 into CP1
Yr 2	3.7	• Start to pump the contact water collected in Tiriganiaq Pit 1 to CP5
Yr 3	3.8	• Dewater Ponds H19 and H20 in Q3 of Year 3 and pump the water to CP1
Yr 4	3.9	• Start to pump the contact water collected in Tiriganiaq Pit 2 to CP5 • Start to pump the contact water in CP6 to CP1
Yr 5	3.10	• Water management plan similar to Year 4
Yr 6	3.11	• Water management plan similar to Year 4
Yr 7	3.12	• Water management plan similar to Year 4 • Stop pumping water from opens pits when the pits are mined-out at end of year • Stop pumping excess water from underground when underground mine is completed
Yr 8	3.13	• Start to fill the mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2 with active pumping water from Meliadine Lake • Start natural flooding of Tiriganiaq Underground mine with groundwater seepage • Stop pumping water to process plant when the processing is completed

A brief summary of the water management plan during construction and operation is presented as follows:

- Contact water from the major mine infrastructure will be diverted and/or collected in the collection ponds (CP1 to CP6).
- Runoff water in the open pits will be collected by the sumps and then pumped to the designated water collection ponds.
- The collected water in CP2 to CP6 will eventually be pumped to CP1. Water collected in CP1 will be reused by the process plant and the excess water will be treated by the WTP prior to discharge to the outside environment via the diffuser into Meliadine Lake.
- Contact water from underground mine will be collected and pumped to the underground TSS removal plant. The treated water from underground mine will be either reused for underground mining or stored on surface
- Freshwater usage on site will be supplied from Meliadine Lake.
- Natural flooding to 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 working will be allowed to naturally flood by groundwater seepage.

Table 4.4 summarizes the overall contact water management plan for the major mine infrastructure with the initial water collection location and final water destination. The detailed water management plan for major mine infrastructure areas is described in the following subsections.

Table 4.4 Overall Site Surface Contact Water Management Plan

Contact Water Source	Initial Contact Water Collection Location	Final Contact Water Collection Location
Industrial 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 Stockpiles OP1 to OP3	CP1	
Landfill	CP1	
Landfarm (biopile)	Sump within landfarm	To CP1 after pre-treatment of oil
Tiriganiaq Pit 1 Tiriganiaq Pit 2	Open pit sumps	First to CP5 and then to CP1
Tiriganiaq underground	Sump in underground mine	Mainly within underground mine with excess water to be pumped to the ground surface and stored on surface

4.4.2 Water Management for Industrial Area

Pond H14A and a small portion of Pond H13 are within the footprint of the plant site area. During construction and operation, the contact water from the plant site area will naturally flow or be diverted via Channel 2 into ponds H15E, H15, H14, H13, and H12, and eventually collected in CP1, as shown in Figure 3.4. The collected runoff within Pond H15E will naturally flow to Pond H15, then to Pond H14 and eventually into partially drained Pond H13. The water within partially drained Pond H13 will flow (before Year -2) or be diverted via diversion Channel 1 (after Year -2) into Pond H9, where the contact water will flow into CP1. The runoff water from the small catchment area northeast of the plant site pad will flow into CP2 and then be pumped to CP1 for further treatment. A small portion of the industrial pad for the camp is within Watershed G. The runoff water from this portion of industrial pad will be diverted via Channel 2 to Pond H15E. No contact water will flow into lakes/ponds within Watershed G.

4.4.3 Water Management for Tailings Storage Facility Area

The TSF is located within the catchment of Lake B7 with a small portion straddling the catchment of Pond H17 as shown in Figure 4.1. Seepage and runoff water from the TSF during construction and operation phases will be managed via water diversion channels, water retention dikes and berms, and water collection ponds. Portion of Ponds H15G and H15D are within the footprint of TSF. Water sources from the TSF during construction and operation will be managed as follows:

- Seepage water and runoff from the TSF within the catchment of Pond H17 will be diverted to CP1 via Channel 1 (Figure 3.5);
- The seepage water and runoff from the TSF within the catchment of Lake B7 will be diverted and collected in CP3 via Channel 3 (Figure 3.6); and
- The collected water in CP3 will be pumped to the area of the partially drained Pond H13, and then be diverted to CP1 via Channel1, where the contact water will be treated by the WTP prior to discharging to outside environment.

4.4.4 Water Management for Waste Rock Storage Facilities

Three WRSFs will be used to permanently store all waste rock and overburden from mining activities. As shown in Figure 4.1, WRSF1 will straddle three catchment areas (catchment of Pond H17, catchment of Pond A54, and catchment of Lake B7), WRSF2 will straddle two catchment areas (catchment of Pond H17 and catchment of Pond A54), and WRSF3 will be located within the basin of Pond H20. Ponds A17, A58, B9, H20 and portion of Ponds H8, H9, H10, and H11 are within in the footprint of the WRSFs.

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

- Seepage water and runoff from WRSF1 within the catchment of Pond H17 will be diverted to CP1 via Channel1 and Channel8 (Figure 3.6);
- Seepage water and runoff from WRSF1 within the catchment of Pond A54 will be diverted to CP5 via Channel5 and Channel6 (Figure 3.7);
- Seepage water and runoff from WRSF1 within the catchment of Lake B7 will be diverted and collected in CP4 via Channel4 (Figure 3.7);
- Seepage water and runoff from WRSF2 within the catchment of Pond H17 will be diverted to CP1 via Channel1 and Channel7 or directly flow into CP1 (Figure 3.10);
- Seepage water and runoff from WRSF2 within the catchment of Pond A54 will be diverted to CP5 via Channel6 (Figure 3.10);
- Seepage water and runoff from WRSF3 will directly report to CP6 (Pond H19) (Figure 3.10); and
- The collected water in CP4, CP5, and CP6 will be pumped to CP1, where the contact water will be treated by the WTP prior to discharging to outside environment.

4.4.5 Water Management for Ore Stockpile Areas

The ore stockpiles (OP1, OP2, and OP3) are located within the catchment of Pond H17 (CP1), as shown in Figure 4.1. Portion of Pond H12 is within the footprint of OP1. Pond H18 and portions of Ponds H9, H10, and H11 are within the footprint of OP2. No pond is within the footprint of OP3.

Based on the topographic information, contact water from OP1 will flow into drained Pond H12 and then diverted by Channel 1 to CP1. Contact water from OP2 will flow into Pond H9, drained Ponds H10, and H11. The water collected within the drained Ponds H10 and H11 will be diverted via Channel1 into Pond H9, where the water will flow into CP1. Majority of contact water from OP3 will flow into drained Pond H11, then diverted via Channel1 to Pond 9, and then flow into CP1.

4.4.6 Water Management for Overburden Stockpile Area

The temporary overburden stockpile is located within the catchment of Pond H17 (CP1), as shown in Figure 4.1. No pond is within the footprint of the temporary overburden stockpile. Site contact water from the stockpile will flow into Pond H15, and then diverted to CP1 via Channel1.

4.4.7 Water Management for Tiriganiaq Mining Area

The two open pits will affect five ponds (Ponds A10, A11, B10, A39, and A54). Ponds A10, A11, B10, and A39 will be removed by pit excavation. A portion of Pond A54 will form CP5 after construction of D-CP5. The remaining portion of Pond A54 downstream of D-CP5 (approximately 18% of the total pond area) will be drained during Tiriganiaq Pit 2 excavation. No ponds will be affected by the underground mine.

4.4.7.1 Open Pit Water Management

Table 4.4 summarizes the catchment areas for the open pits and proposed depth of the pits below existing ground level. Based on these pit depths, Tiriganiaq pits 1 and 2 are expected to remain within the permafrost regime (the depth of permafrost at the mine site is estimated to be in the order of 360 to 495 m). Therefore, the groundwater inflow into open pits is expected to be negligible and not considered in the water management plan. The major contribution to the pit water will be the precipitation runoff and snow melt.

Table 4.4 Maximum Catchment Area for Open Pits

Pit	Maximum Catchment Area (ha)	Maximum Pit Depth (m)
Tiriganiaq Pit 1	32	145
Tiriganiaq Pit 2	16	95

During mine operation, the contact water for the open pits will be collected within the sumps located at the bottom of the pits. The pumps will be designed and moved as needed to effectively collect and manage pit runoff as pit development occurs. The collected pit runoff within the sump will be pumped to CP5 and then CP1. Water retention dike D-CP5 and Berm3 will be constructed to prevent the flooding of the open pits.

4.4.7.2 Underground Water Management

Groundwater characteristics at the mine site are summarized in Section 2.7. Two groundwater flow regimes are generally present at the mine site:

1) a shallow flow regime located in an active (seasonally thawed) layer near the ground surface. The water table in the active layer is expected to parallel the topographic surface. The flow regime has little to no hydraulic connection with the groundwater regime located below the permafrost; and
2) a deep groundwater flow regime beneath the base of permafrost.

Both Tiriganiaq Open Pits 1 and 2 will be mined within permafrost. Therefore, groundwater inflow to the open pits is anticipated to be negligible, and a groundwater management strategy for the open pits is not required.

The Tiriganiaq underground mine will extend approximately 625 m below the ground surface, and therefore, part of the underground mine will be operated below the base of continuous permafrost. The underground excavations will act as a sink for groundwater flow during mining, with water induced to flow through the bedrock to the underground mine workings once the mine has advanced below the base of the permafrost. Table 4.5 presents the estimated rates of passive groundwater inflow to the underground mine based on the studies presented in the FEIS for the Project (Agnico Eagle 2014). A hydrogeological investigation program is planned for 2015 and 2016, which will provide additional information on potential volumes and quality of the saline groundwater to be managed.

Table 4.5 Estimated Rates of Passive Groundwater Inflow to Underground Mine

Year	Estimated Passive Inflow (m^3/day)*
Yr -5 to First Quarter of Yr -3	0
Second Quarter of Yr-3 to End of Yr-3	420
Yr -2 to Yr 7	526

*based on data provided in Agnico Eagle (2014); to be reassessed based on results from the planned 2015 and 2016 hydrogeological investigation program

Contact water in the underground mine will be collected within underground sumps and treated to remove TSS by the underground TSS removal plant. A proportion of the treated water will be recirculated as make-up water for underground drilling. As presented in Appendix B, Table B.7, underground drilling water requirements are estimated to range from approximately 300 m^3/day in Year -5, to a maximum of 1,500 m^3/day in Year 1. The drilling water will report to the underground sumps for recirculation; however, the need for up to 3% treated water make-up has been assumed to compensate for losses of drilling water due to evaporation or capture within the mined materials.

Excess treated underground water (treated water less make-up to underground drilling) will be pumped to surface for management. The estimated volume of water to be managed is expected to range from a minimum of about 0.11 Mm^3/year to a maximum of 0.18 Mm^3/year depending on the year of mine life. Details of the underground dewatering system are provided in Section 2.3.2 of the Mine Plan, submitted with this Type A Water Licence Application.

Agnico Eagle is considering several options for the long-term management of groundwater reporting to the underground workings at the Project (Appendix F). During Year -5 and Year -4 of construction, a hydrogeological investigation program will be completed to improve estimates of the amount and quality of groundwater that may potentially report to the underground mine. In Year -3 (i.e., 2017), following the completion of the investigation, the long-term groundwater management strategy for the Project will be finalized and submitted to the NWB for approval.

An interim plan is required for the first two years of groundwater inflows (i.e., Year -3 and Year -2) to allow for implementation of the long-term groundwater management strategy. Excess water from the underground mine will be pumped to the surface for storage for Years -3 and -2. Based on the estimated groundwater inflow rates (Table 4.5) and underground drilling water make-up requirements (Appendix B, Table B.7), up to approximately 0.25 Mm^3 of groundwater will require storage on surface. The surface storage option selected will be dependent on the results of the hydrogeological study and the amount of groundwater encountered.

4.4.8 Water Management for Haul Road

A network of haul roads will connect the ore bodies to the WRSFs and the plant site. The majority of the roadways servicing the mining area will be located so that drainage will be directed towards the proposed contact water management infrastructure. Detailed information on road is described in the Roads Management Plan

The approach to water management for these sections of haul road will involve the implementation of local best management practices during construction, operation, and closure. The road will be constructed of non-potential for acid generating and non-leaching waste rock from mining operations. Other best management practices will strive to minimize the amount of runoff originating from the roadways and to prevent the migration of surfacing material from the roadway and crossings. Any areas identified as point sources of runoff originating from the roadway or crossings can be managed locally with silt fences, turbidity curtains, interceptor channels, rock check dams, and/or small sedimentation ponds.

4.4.9 Water Management for Landfarm and Landfill

The Landfarm is located north of CP2, within the catchment of Pond H17, as shown in Figure 4.1. The landfarm will be designed using a liner system to contain any leachate. The runoff water and snow melt within the footprint of the landfarm will be collected in a sump on the southwest side of the facility. The collected water from the sump will be pumped to an oil pre-treatment plant, and then discharged into CP1, where the water will be further treated by the WTP prior to discharge to the outside environment.

The landfill is located at north of WRSF1, within the catchment of Pond H17, as shown in Figure 4.1. Based on the topographical information, runoff and any seepage from the landfill will naturally flow to the partially drained Pond H13, and then diverted to CP1 via Channel1.

Further information on the management of these facilities are described in the Landfarm Management Plan and the Landfill and Waste Management Plan, respectively.

4.4.10 Sludge Management from Water Treatment Plant

Prior to the commissioning of the process plant in the last quarter of Year-1, the underflow sludge water (typically with 2% to 3% of solid content) from the WTP will be discharged into CP1. After commissioning, the sludge water from the WTP will be pumped to the process plant and combined with the tailings stream before dewatering and dry stacking. The maximum predicted annual volume of sludge water from the WTP is approximately 20,000 m^3.

4.4.11 Sludge Management from Underground TSS Removal Plant

The underflow sludge water from underground TSS removal plant will be stored in underground excavation. The maximum predicted annual volume of sludge water from the underground TSS removal plant is approximately 15,000 m^3.

4.4.12 Water Management for Emulsion Plant Area

Fresh water will be trucked to the emulsion plant and used for manufacturing emulsion as well as for washing the explosive trucks. Water within the emulsion plant will be re-used when feasible, and excess used water will be collected and disposed in an appropriate method.

4.5 Freshwater and Sewage Water Management

4.5.1 Freshwater Management

Major freshwater usages on site include potable use, fire suppression, portion of make-up water for the mill, and other operational needs, such as drilling water if contact water from CP1 is not available and water for the truck shop. Fresh water will be sourced from Meliadine Lake through a freshwater intake and pump system.

The freshwater intake is housed within a rockfill causeway located north east of the industrial pad in Meliadine Lake, as shown in Figure 1.2. The intake will consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand. The intake will be connected to the pump house with piping buried under the rockfill causeway. The intake pipe will exit at the bottom of the causeway into Meliadine Lake and will be fitted with a stainless steel screen. The rockfill causeway will act as a secondary screen to prevent fish from becoming entrained. The stainless steel screens design for the water intake will be consistent the Fisheries and Oceans Canada (DFO) "Freshwater Intake End-Of-Pipe Fish Screen Guideline" (DFO 1995). As per the DFO policy intake screens will be cleaned every 2 years.

Fresh water will be pumped through an overland pipeline to an insulated main storage tank located at the plant site. The freshwater pipe will be a high density polyethylene pipe and insulated and heat traced. The water storage tank will have a dimension of 10 m diameter and 10 m height, with a total capacity of 739 m^3. Approximately 62,000 m^3/year of freshwater will be required during construction phase, and approximately 318,000 m^3/year of freshwater will be required during operation phase. Additional approximately 4,000,000 m^3 of freshwater will be required per year to fill the mined-out open pits.

The camp area will have a water treatment plant for potable (domestic) water. 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). In the portable water treatment plant, the freshwater will first go through sand filters and then be pumped through ultraviolet units, and finally be treated with 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. Treated potable water will be piped to areas in the process plant, service complex, and other facilities requiring potable water.

It should be noted that Agnico Eagle is not planning to use any water at the proposed Itivia facilities and fuel storage facility in Rankin Inlet. There will be no warehousing or office facility at this site hence no freshwater facilities are planned for Rankin Inlet facilities.

4.5.2 Sewage Water Management

Sewage will be collected from the camp and change-room facilities and pumped to a sewage treatment plant (STP). The objective of the STP is to treat sewage to an acceptable level for discharge to CP1 via a sewage water discharge pipeline. The STP will be housed in a prefabricated (modular) structure, located at south-east of the service complex, as shown in Figure 1.2. The sewage treatment system will be 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). Biological reactors like Bionest Kodiak units are envisioned to treat camp waste water.

The STP for the camp facilities will be designed to meet appropriate guidelines for wastewater discharge (for example, NWT Water Board 1992). Wastewater System Effluent Regulations (WSER) criteria are not currently applicable to systems located in Nunavut, and is unlikely to apply to the Meliadine effluent quality. Table 4.7 provides the anticipated performance of the system compared to the WSER criteria.

Table 4.7 Anticipated STP Treatment Performance

Parameter	WSER[1] (average concentration in the effluent)	STP Treatment Performance
Carbonaceous Biochemical Oxygen Demand	25 mg/L	10 mg/L
Total Suspended Solid	25 mg/L	10 mg/L
Total Residual Chlorine	0.02 mg/L (if chlorine used in treatment of waste water)	No chlorine to be used in treatment
Un-ionized ammonia	1.25 mg/L (expressed as nitrogen at 15 $^oC \pm 1^oC$	<10 mg/L NH4-N, which represents ~<0.03 mg/L un-ionized ammonia (at 15 ^oC, pH 7)

[1] Waste Water System Effluent Regulations

4.6 Process Water Management

Process water will be required in the process plant for ore processing. Both treated water and sludge water from the WTP and freshwater from Meliadine Lake will be used as process water. When possible, water from the WTP will be the main source of water for the ore process. Additional water needs will be supplied by fresh water. Approximately 460 m^3/day of process water will be required in Year 1 to Year 3 operation and approximately 770 m^3/day of process water will be required in Year 4 to Year 8. The estimated balance between the WTP usage and the freshwater usage is presented Appendix B.

SECTION 5 • INFRASTRUCTURE REQUIRED FOR MINE SITE WATER MANAGEMENT

During the mine construction, operation and closure phases, a network of collection and interceptor channels and sumps will be constructed and maintained to facilitate mine site water management. The following sections provide preliminary infrastructure sizing requirements for each of the mine areas.

5.1 Water Management Control Structures

A list of the water management control structures are presented in Table 5.1, together with the proposed construction schedule. Figures 3.1 to 3.13 show the location of the respective structures at the different development stages of the mine life. Final design details of these structures will be provided to the regulators for approval at least 60 days prior to construction.

Table 5.1: Water Management Control Structures and Construction Schedule

	Infrastructure Name	Approximate Construction Year
Pre-Production Construction	Culvert 2	Year -5 when access road to OP1 is constructed
	D-CP1	Late Year -5 and early Year -4 (before spring freshet of Year -4)
	Channel 2	
	Culvert 1	
	WTP Intake Causeway	
	Submerged Diffuser	
	CP2	Late Year -4 and early Year -3 (before spring freshet of Year -3)
	D-CP5	
	Channel 5	
	Berm 3	
	Freshwater Intake Causeway	
	Channel 1	Late Year -3 and early Year -2 (before spring freshet of Year -2)
	Berm 1	
	Channel 6	
	Channel 7	
	Channel 8	
	Culvert 3	
	Culvert 4	
	Culvert 5	
	Culvert 6	
Sustaining Construction during Mine Operation	CP3	Late Year -1 and early Year 1 (before spring freshet of Year 1)
	CP4	
	Berm 2	
	D-CP3	

Table 5.1: Water Management Control Structures and Construction Schedule

	Infrastructure Name	Approximate Construction Year
	D-CP4	
	Channel 3	
	Channel 4	
	D-CP6	Late Year 3/early Year 4 (before spring freshet Year 4)

5.2 Water Management Structure Design Criteria

The various components of the water management system will be designed to meet the following criteria:

- With the design capacity of the WTP, Dike D-CP1 and CP1 will be 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, plus a 1:1000 return 24-hour extreme rainfall.
- With the design capacity of pumping from CP5 to CP1, Dike D-CP5 and CP5 will be 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.
- Each of the other water management dikes (D-CP3, D-CP4, and D-CP6) and associated ponds (CP3, CP4, and CP6), with the design pumping capacity, will be able to manage the water from its catchment area for 3/7 of a 1:100 wet year spring freshet or a 1:100 return 24-hour extreme rainfall.
- The daily pumping rate for each of the CP2 to CP6, Tiriganiaq Pit 1 sump, and Tiriganiaq Pit 2 sump will be 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).

Channel2 to Channel4 will be designed to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm. Channel1 and Channel5 to Channel8 are internal channels where any water overflowing the channels will remain within the catchment areas of various collection 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 Channel5 can be contained by Berm3. Water overflowing Channel7 and Channel8 can be stored in the lower basin in the drained Pond H13, and Berm1 will protect Portal No 2 from flooding. Water overflowing Channel1 will flow through the flat ground between OP1/OP2 and WRSF2 into CP1.

Hydraulic analyses indicated that many more culverts or larger culverts would be required to pass an extreme intensity flow under a 5-minute 1:100 return rainfall of 9.2 mm for Culvert1. As a result, Culvert1 was designed to pass a flow with lesser intensity, but the excess water can be safely managed by berms or temporarily stored in a lower basin nearby. The excess water that cannot pass through Culvert1 can be temporarily stored in the lower basin in the drained Pond H13, and Berm1 will protect Portal No 2 from flooding. Other culverts are less critical and the excess water that cannot pass through the culverts can be temporarily stored in a lower basin nearby within the water collection pond catchments.

5.3 Water Collection Ponds

Six water collection ponds (CP1 to CP6) will be constructed as part of the water management infrastructure. Table 5.2 presents the locations and the required operational period of the collection ponds. The locations of these water collection ponds are shown on Figures 3.2 to 3.15.

Table 5.2 Location of Collection Pond and Required Operation Periods

Collection Pond	Relative Location	Required Operation Period
CP1	Pond H17	Year -4 to mine closure
CP2	East of industrial pad and south of landfarm	Year -3 to mine closure
CP3	North of Lake B7 and southwest of TSF	Year 1 to mine closure
CP4	Southeast of Lake B7 and south of WRSF1	Year 1 to mine closure
CP5	North of Tiriganiaq Pit 2	Year -3 to mine closure
CP6	Pond H19 and north of WRSF3	Year 4 to mine closure

CP1, CP5, and CP6 will be established within existing shallow ponds. The key information and design parameters for CP1, CP5, and CP6 are summarized in Table 5.3.

Table 5.3 Design Parameters for CP1, CP5 and CP6

Pond	CP1	CP5	CP6
Original Pond Name	H17	A54	H19
Original Pond Elevation (m)	64.13	65.75	63.53
Pond Volume for Water Elevation at Original Pond Elevation (m^3)	144,577	26,138	16,789
Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m)	65.13	65.79	63.64
Pond Volume for Water Elevation at Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	377,058	27,221	19,154
Estimated Maximum Water Elevation during Inflow Design Flood (IDF) (m)	66.11	66.11	63.94
Pond Volume for Water Elevation at Estimated Maximum Water Elevation during IDF (m^3)	658,936	47,482	31,800
Dike for Pond	D-CP1	D-CP5	D-CP6
Design Crest Elevation of Dike Containment Element (liner system) (m)	66.50	66.30	64.30
Pond Volume for Water Elevation at Design Crest Elevation of Dike Containment Element (m^3)	778,502	66,231	49,627

CP2 to CP4 will be established through sub excavation of the original ground to increase the water storage capacity and eliminate or limit the requirement for berm construction. The key design parameters for CP2, CP3 and CP4 are provided in Table 5.4.

Table 5.4 Design Parameter for CP2, CP3 and CP4

Pond	CP2	CP3	CP4
Elevated Pond Bottom Elevation (m)	68.30	62.20	61.00
Excavated Pond Outlet Elevation (m)	70.32	64.15	63.46
Pond Volume for Water Elevation at Pond Outlet Elevation (m^3)	2,455	25,454	30,911
Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m)	69.44	63.49	62.55
Pond Volume for Water Elevation at Projected Maximum Pond Operating Water Elevation under Normal Operating Conditions and Mean Precipitation Years (m^3)	1,390	16,899	19,458
Estimated Maximum Water Elevation during IDF (m)	70.19	64.32	63.55
Pond Volume for Water Elevation at Estimated Maximum Water Elevation during IDF (m^3)	2,307	28,056	32,304
Dike for Pond	No Dike	D-CP3	D-CP4
Design Crest Elevation of Dike containment Element (liner system) (m)	No Dike	65.10	64.40
Pond Volume for Water Elevation at Design Crest Elevation of Dike Containment Element (m^3)	No Dike	42,456	51,337

5.4 Channels

Eight water diversion channels (Channel1 to Channel8) will be constructed as part of the water management infrastructure. The water diversion channels were designed based on the design criteria described in Section 5.2. The key information and design parameters for each channel are presented in Table 5.5.

Table 5.5 Design Parameters for Channel

Item	Channel							
	1	2	3	4	5	6	7	8
Approximate Total Length (m)	463	300	619	710	429	69	214	315
Bottom Width (m)	3	1	1 or 2[a]	1 or 2[a]	3	1	1	1
Side Slopes	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)
Rip-rap Thickness (m)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Minimum Bottom Slope Gradient (%)	0.28	0.30	0.17	0.13	0.17	0.44	0.42	0.38
[a]: 1 m bottom width for first 100 m upstream section, and 2 m bottom wide for the remaining channel section								

5.5 Water Retention Dikes and Berms

Dikes and berms are constructed to protect contact water from potentially contaminating fish habitat, prevent flooding of portals and pits, and divert natural water away from possible sources of contamination. In general terms, “dikes” will retain sustained water during normal operations. “Berms” on the other hand, may retain short-term water under flooding events. At the end of mine closure when the water quality in the corresponding pond meets direct discharge criteria, except for Berm2, each of the other dikes and berms on site 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.

Permafrost is expected to exist beneath the footprint of each dike and berm on the mine site. Each of the water retention dikes (D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6) has been designed as a zoned earth fill dam with a geomembrane liner keyed into the expected permafrost foundation to limit the seepage through the dike and its foundation. Preliminary thermal analysis has been conducted for D-CP1 (Tetra Tech EBA, 2014), which has the highest design water head. The results of the thermal analysis for D-CP1 indicated that the ground temperature at the key trench location of Dike D-CP1 is predicted to be approximately -2.0 to -4.0 °C at the end of the mine operation under the worst case scenario (mean air temperature condition and plus Moderate Green-house Gas Emission global warming scenario followed by two consecutive 1 in 100 return event warm years). The results from the stability analysis of D-CP1 indicated that the calculated minimum factors of safety of D-CP1 meet or exceed the acceptable factors of safety and the design intents have been achieved.

The characteristics of the dikes and berms required for the water management plan are summarized in Table 5.6.

Table 5.6 Design Parameters for Water Retention Dike/Berm

Item	D-CP1	D-CP3	D-CP4	D-CP5	D-CP6	Berm1	Berm2	Berm3
Approximate Maximum Height (m)	4.5	2.0	2.0	2.6	1.8	1.6	2.5	1.8
Maximum Elevation (m)	67.5	66.1	65.4	67.3	65.3	68.5	varies	67.5
Side Slopes	2.5(H):1(V) to 3(H):1(V)	3(H):1(V)	3(H):1(V)	2.5(H):1(V) to 3(H):1(V)	2.5(H):1(V) to 3(H):1(V)	3(H):1(V)	3(H):1(V)	3(H):1(V)
Full Top Width (m)	26	20	20	31	22	2	4	2
Approximate Total Length (m)	530	385	297	211	348	400	493	334
Maximum Head of Water Retained (m)	3.5	0.2	0.1	1.4	0.5	0	0	0

SECTION 6 • WATER MANAGEMENT DURING CLOSURE

Mine closure is integral to the mine design and will be modified during operations. Planning for permanent closure is an active and iterative process. The intent of the process is to develop a final plan using adaptive management. This begins during the mine design phase and continues through to closure implementation. Adaptive management enables the plan to evolve as new information becomes available through analysis, testing, monitoring, and progressive reclamation. The detailed mine closure and reclamation activities are provided in the Preliminary Closure and Reclamation Plan.

Water management during closure and reclamation will involve flooding the mined-out open pits using freshwater from Meliadine Lake, flooding the underground mine working with natural ground 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 outside environment.

The key water management activities during mine closure are summarized in Table 6.1. Figures 6.1 and 6.2 shows the water management plan during mine closure.

Table 6.1 Key Water Management Activities during Mine Closure

Mine Year	Figure	Key Water Management Activities and Sequence
Yr 9 to 11	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 to CP6 • Continue to pump the contact water in CP1 to WTP, if required, for treatment before being discharged to the outside environment • Remove non-essential site infrastructure • Pump the underflow sludge water from WTP 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-CP3, D-CP4, D-CP5, and D- 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 dikes/berms in Year 18

6.1 Open Pits Flooding

Following completion of mining, the open pits will be filled with natural precipitation and water pumped from Meliadine Lake. The maximum pumping rate from Meliadine Lake will be based on the maximum allowable drawdown rate from Meliadine Lake established during the water licence application. The planned pumping period will occur during the open water season from mid-June to end of September for each year. Table 6-2 summarizes the pit volume and expected water elevations at the completion of flooding activities. It will take approximately 3 years to refilling the pits with an assumed pumping rate of 0.44 m^3/s (38,300 m^3/day). Meliadine Lake has a total area of 560 km^2 (including 361 km^2 of land surface area and 199 km^2 lake surface area). The average outflow rates for baseline at the outlet of Meliadine Lake are 16.1 m^3/s for June, 7.7 m^3/s for July, 3.3 m^3/s for August, and 2.5 m^3/s for September (Volume 7 of FEIS). The assumed pumping rate of 0.44 m^3/s from Meliadine Lake during closure will have negligible effect to Meliadine Lake comparing to the average outflow rate at the outlet of Meliadine Lake. The pumping rate will be further evaluated and managed to minimize effects to Meliadine Lake and will ensure the outflow rate at Meliadine Lake outlets does not drop below the 10-year dry condition. In years during which Meliadine Lake discharges are forecast to naturally fall below the 10-year dry condition, no pumping will occur.

The walls of the open pits will have been exposed for a number of years during mine operation, and some weathering may have occurred. As the pits flood, the water will contact the weathered rocks, which may affect the water quality by increasing concentrations of dissolved metals. The water quality model results indicated that water quality in the flooded pit will meet the discharge criteria and no post closure treatment required. The water quality within the flooded pits will be monitored during the filling periods to verify the prediction of the water quality model. The information would be used to develop a strategy to minimize contamination of the regional surface water system. If required, the flooding plan will be adjusted, while minimizing effects to Meliadine Lake.

Table 6.2 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

Passive flooding of the Tiriganiaq underground mine will also occur following 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. Under the predicted seepage rate presented in Table 4.5, it will take approximately 6 years to flood the underground mine.

6.2 Collection Ponds, Dikes and Berms

The water collection ponds, dikes and berms will remain in place to collect the surface runoff water and seepage from the mine site until the water quality meets the discharge criteria. Once the water quality meets the discharge criteria, dikes/berms will be breached to allow the water to naturally flow to the outside environment. 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 completed during the open water season following freshet so as to allow for the deployment of turbidity curtains to control potential releases of sediment.

6.3 Channels and Sumps

Once monitoring results have indicated that contact water conveyed in channels and sumps meets acceptable water quality, the infrastructure will be re-contoured 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 BALANCE

A water balance model was developed to assist in the evaluation of the proposed 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 have been affected by mining activities.

A monthly site-wide water balance was conducted for CP1 to CP6, Tiriganiaq Pit 1, Tiriganiaq Pit 2, water in the underground mine operation, make-up water for the mill, water for the WTP, and fresh water from the mine construction to mine closure under mean precipitation years. The following section presents the parameters and assumptions adopted in the water balance model along with a summary of the water balance results.

7.1 Water Balance Framework

The water balance framework developed for the site-wide water balance model is presented in Appendix B. In order to simulate a range of conditions, the model was run for the proposed mine life and closure conditions.

7.2 Water Balance Assumptions

The water balance input parameters and assumptions are summarized in tables in Appendix B. The water management flow sheets are presented in Appendix C.

The water balance was based on the following:

- snow accumulates throughout the months of November to May, and thaws in June during the annual spring freshet period;
- average precipitation year climate conditions;
- the open pits and water collection ponds (CP2 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 Plan.

7.3 Water Balance Results

The selected results of the site water balance are provided in Appendix D and include both yearly water balance summary tables (mill make-up water, WTP, all water collection ponds, and the open pits) and detailed monthly water balance tables for all water collection ponds and the open pits.

The estimated maximum annual water input/output from each of various water management facilities under mean precipitation conditions are summarized in Table 7.1.

Table 7.1 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 CP2	0.007
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 WTP 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 WTP 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

SECTION 8 • WATER QUALITY

Appendix G provides the mine site water quality predictions for the proposed mine. Included in the report are the main mine components relevant to the water quality predictions including: the mine plan, the open pits, waste rock and overburden storage facilities, the dry stack tailings storage facility, and contact water ponds. The parameters and assumptions adopted in the mass balance model are also included. Appendix G presents the water quality model including model computations, assumptions, results verification, and limitations. Results are presented for operations and post closure.

Water quality predictions for the Project were generated using the GoldSim database management and simulations code (Version 11.1.2) where mine site 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 are used to supplement the input data.

Water quality estimates were generated for the operational and post-closure periods, for each contact water collection pond, for sumps in the two open pits and for the two fully flooded open pit lakes post-closure. The collection ponds (CP2 to CP6) are positioned to receive water from specific mine facilities: the waste rock and overburden piles, the dry stack tailings storage facility (TSF) and the mill area. Collection Pond 1 is the site's main pond to which all other ponds are pumped prior to discharge to Meliadine Lake via a diffuser.

Results of the GoldSim mass balance model are presented in Attachment C of Appendix G. Average monthly dissolved parameter concentrations during open water months are provided. The sensitivity of water quality to an added total suspended solids (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 milligrams per litre TSS, the maximum monthly mean Metal Mining Effluent Regulations (MMER) value. Results of this sensitivity analysis are presented in Attachment D of Appendix G. Given the uncertainties associated with the modelling exercise (i.e., the development stage of the Project, 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.

8.1 Summary of Results

Operations period results are compared against MMER limits for all ponds, although only CP1 water will be discharged in a controlled manner to the receiving environment in Meliadine Lake. Water in all other collection ponds will be pumped to CP1; they will not discharge directly to the receiving environment. Post-closure discharge water quality is compared against CCME guidelines or the Meliadine Site Specific Water Quality Objectives (SSWQO) developed for aluminum, fluoride, and iron (Golder 2013a, 2014).

8.2 Operations

During operations, the quality of most waters including CP1 water is anticipated to meet MMER monthly mean discharge limits, with the possible exception of TSS at all ponds and arsenic, on occasion, at CP3 which receives water from the TSF. Although TSS content was not specifically modelled, experience at other mine sites suggests that TSS in site contact water is likely to require attenuation during operations to meet the MMER effluent criteria of 15 mg/L monthly average. A WTP that removes TSS is planned to be operational in Year -4 of the Project.

Collection Pond 3 arsenic concentration may exceed MMER on occasion if precipitation events generate drainage from the TSF. 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 which 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 MMER monthly average maximum concentration. All other chemical parameters in CP3 and all chemical parameters in CP2, CP4, CP5, and CP6 are predicted to meet MMER limits for chemical constituents.

8.3 Post-Closure

The long-term, post-closure water quality in the Project ponds and in the flooded open pit lakes are anticipated to meet MMER limits and CCME water quality guidelines for the protection of aquatic life (CCME-WQG) or the SSWQOs developed for the Meliadine site for aluminum, fluoride, and iron. Arsenic concentrations in CP4 could slightly exceed the SSWQO post-closure, a criteria that is conservatively protective of the receiving aquatic environment (Golder, 2013a). The exceedances predicted are minor, much less than the mixing capacity in the receiving environment. These arsenic concentrations (Golder, 2013a) are within the tolerance levels that have been deemed non deleterious by Environment Canada for the Project (Environment Canada 2014).

SECTION 9 • WATER QUALITY MONITORING PROGRAM

Water quality monitoring is an important part of the site water management plan to verify the predicted water quality trends and conduct adaptive management should differing trends be observed. This section outlines the water quality monitoring plan, which will be further defined as the project advances.

Water quality monitoring will be initiated at the pre-development stage and will continue during construction, operations, closure, and post-closure. Monitoring will occur at three levels:

- Regulated discharge monitoring occurs at monitoring points specified in licences or regulations. It includes discharge limits that must be achieved to maintain compliance with an authorization (i.e., water licence) or regulation (i.e., Metal Mining Effluent Regulations). Enforcement action may be taken if discharge limits are exceeded for a parameter.
- Verification monitoring is carried out for operational and management purposes by Agnico Eagle. This type of monitoring provides data for decision making and builds confidence in the success of processes being used. The verification monitoring data will be collected, compiled, and managed internally. The monitoring data will not be reported to the Regulators in the annual water licence report, but can be provided upon request by the Regulators
- General monitoring is commonly included in a water licence specifying what is to be monitored according to a schedule. It covers all types of monitoring (i.e., geotechnical, lake levels, etc.). This monitoring is subject to compliance assessment to confirm sampling was carried out using established protocols, included quality assurance/quality control provisions, and addresses identified issues. General monitoring is subject to change as directed by an Inspector, or by the Licensee, subject to approval by the Water Board.

All three types of monitoring will be used at the mine site. The following section presents the conceptual water quality monitoring plan during construction, operations and closure. More detailed information on monitoring programs is described in the Environmental Management and Protection Plan.

9.1 Water Quality Monitoring

Table 9-1 lists the proposed water quality monitoring stations during construction, operation, closure and post-closure phases. The monitoring parameters and frequency is described in the Environmental Management and Protection Plan. Figures 9.1 to 9.3 provides maps showing the location of the water quality monitoring stations for each phase.

Table 9.1 Proposed Water Quality Regulated, General Aquatic and Verification Monitoring for the Meliadine Gold Project during Construction, Operations, and Closure

Monitoring Type	Mine Development Phase	Monitoring Station Number	Station Description	Purpose of Station
Verification	Construction (prior to release), Operation, and Closure	MEL_02	Water treatment plant (pre-treatment) coming from H17 station will be off the pipe and not in the pond	Test quality of water before treatment (required to evaluate treatment efficiency
Regulated	Construction (upon effluent release), Operation, and Closure	MEL_01[a]	Water treatment plant (post-treatment), end of pipe (before offsite release) in the plant before release.	Test quality of final effluent before release
General Aquatic	Construction (upon effluent release), Operation, and Closure	MEL_03	Mixing zone in Meliadine Lake, station 1; and MMER exposure stations for final discharge point within mixing zone	Test mixing of effluent in the receiving environment; sample at varied distances and directions from pipe; MMER exposure for final discharge point
General Aquatic	Construction, Operation, and Closure	MEL_04	Water intake from Meliadine Lake	Quality of intake water
Verification	Operation, Closure	MEL_05	Local Lake, E3[(b)]	Confirm no leakage/runoff from Emulsion Plant
Verification	Construction, Operation, Closure	MEL_06	Local Lake, G2	Possible seepage or dust loadings from site infrastructure
Verification	Construction, Operation, Closure	MEL_07	Pond, H1	Possible seepage or dust loadings from site infrastructure
Verification	Construction, Operation, Closure	MEL_08	Local Lake, B5	Possible seepage or dust loadings from site infrastructure
Verification	Construction, Operation, Closure	MEL_09	CP2	Collection of natural catchment drainage from the outer berm slopes of the Landfarm and industrial pad

Table 9.1 Proposed Water Quality Regulated, General Aquatic and Verification Monitoring for the Meliadine Gold Project during Construction, Operations, and Closure

Monitoring Type	Mine Development Phase	Monitoring Station Number	Station Description	Purpose of Station
Verification	Operation, Closure	MEL_10	CP3	Collection of drainage from dry stacked tailings
Verification	Operation, Closure	MEL_11	CP4	Collection of drainage from WRSF1
Verification	Construction, Operation, Closure	MEL_12	CP5	Collection of drainage from WRSF1 and WRSF2
Verification	Operation, Closure	MEL_13	CP6	Collection of drainage from WRSF3
Verification	Construction, Operation, Closure	MEL_14	Landfill	Located between the landfill and Pond H3 to monitor seepage from the landfill
Verification	Construction, Operation, Closure	Mel-15	Secondary containment area of the tankfarm at Itivia	Test quality before discharge to land

[(a)] *Sampling may not occur during break-up (June)*

CP = contact pond; WRSF = waste rock storage facility;

9.2 Water Licence Type A Monitoring

It is noted that regulated monitoring is expected to start following issuance of the Type A Water Licence and when the volume of water discharged to the environment exceeds MMER regulated thresholds. Regulated monitoring will be carried out at the frequency and for the parameters specified in the MMER and Type A Water Licence for the Project.

Effluent quality criteria are to be applied at the last point of control prior to discharge to the receiving environment and are regulated as part of the Type A Water Licence (i.e., Table 9.1, MEL_01). They represent values that will be protective of aquatic life, protective of traditional drinking water uses, and are in compliance with regulations (i.e., MMER; Government of Canada 2012). The Mine will be operated so that water quality objectives are met at the edge of the mixing zone in Meliadine Lake and the Project does not have a significant adverse effect on opportunities for traditional and non-traditional use of fish, and the health of aquatic life, and human health. Effluent quality criteria are proposed for eight MMER constituents (total suspended solids, pH, total cyanide, arsenic, copper, lead, nickel, and zinc) and total phosphorus. Appendix H describes the screening process for selecting effluent quality criteria.

Parameters for the verification monitoring program have not been explicitly defined. However, it is anticipated that the verification monitoring program will include the following parameters for the evaluation of site-wide water quality during operations: temperature, conductivity, alkalinity, pH, suspended solids, MMER metals, total cyanide, chloride, and petroleum hydrocarbons. Monitoring parameters may vary between locations. During the closure period, parameters included in the CCME aquatic life guidelines may also be included in the verification monitoring program.

The monitoring programs summarized herein are provisional, and both the regulated monitoring program and verification monitoring program, including monitoring parameters, frequency, and reporting, will be further developed through the water licencing process.

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APPENDIX A • FIGURES

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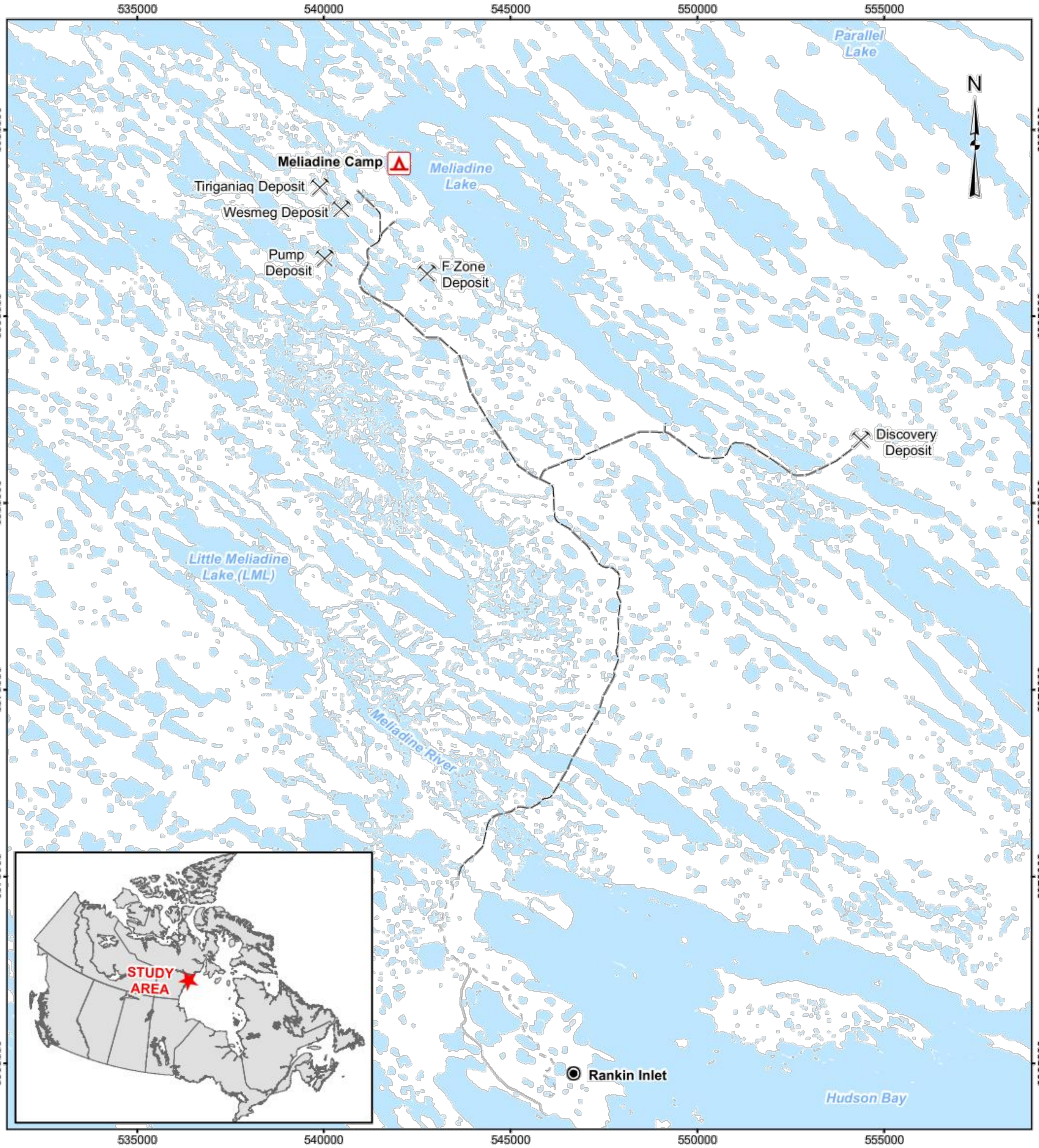

LEGEND

- Camp
- Proposed Mine Site
- All-weather Access Road (AWAR)
- Road - New
- Road - Existing
- Watercourse
- Waterbody

AGNICO EAGLE

AGNICO EAGLE – MELIADINE GOLD PROJECT		
FIGURE 1.1 GENERAL PROJECT LOCATION PLAN		
No. PROJET / PROJECT No.	DATE 09-23-2014	
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APPROUVÉ PAR / APPROVED BY HX		
NO. DESSIN / DRAWING NO. 6500-680-210-200		REVISION A

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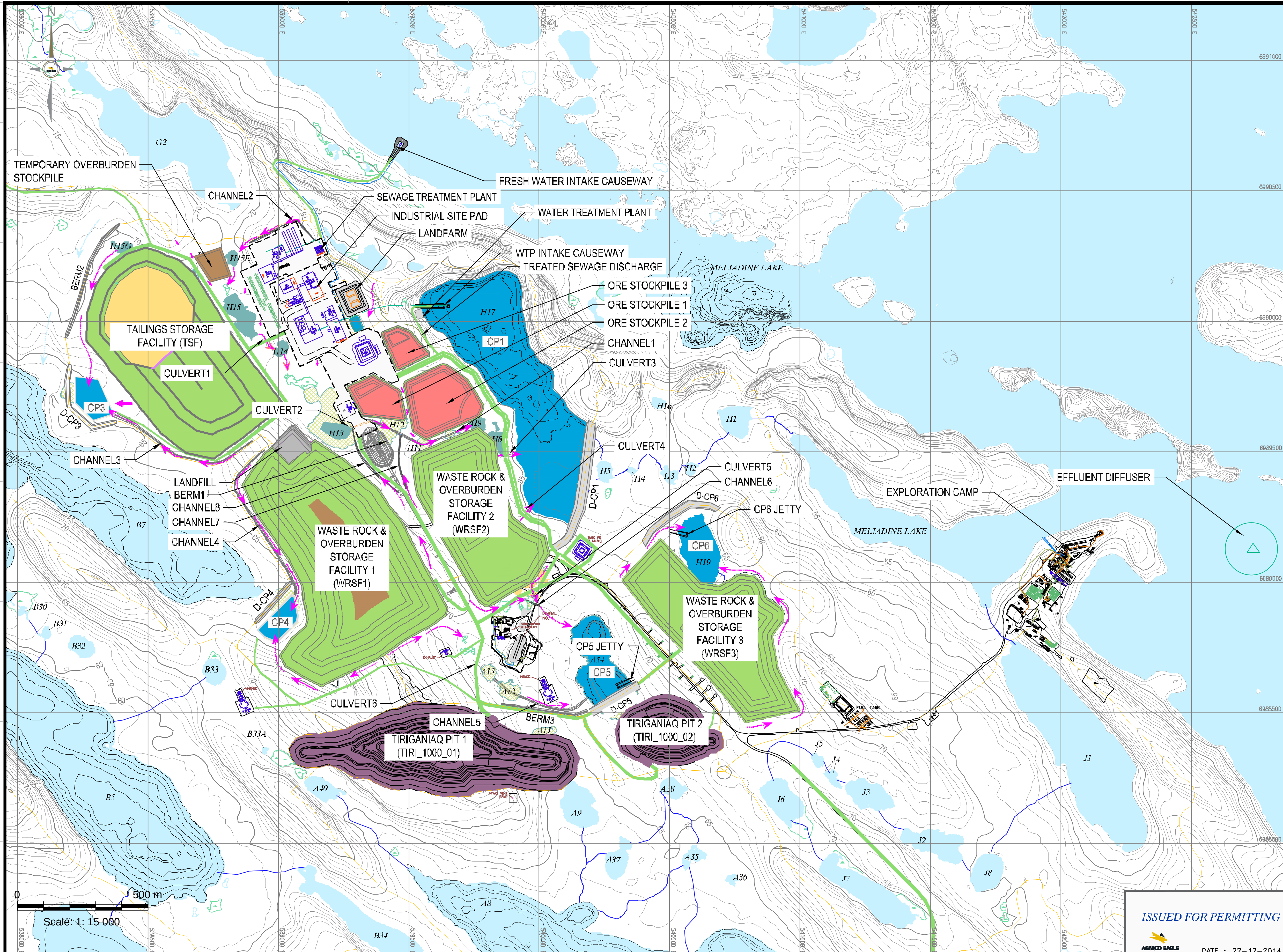

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

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REVISIONS

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VÉRIFIÉ PAR CHECKED BY	NG		22-12-2014
APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MLIADINE GOLD PROJECT
FIGURE 1.2 GENERAL SITE LAYOUT PLAN
(YEAR 7 OPERATOIN)

ISSUED FOR PERMITTING
DATE : 22-12-2014

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
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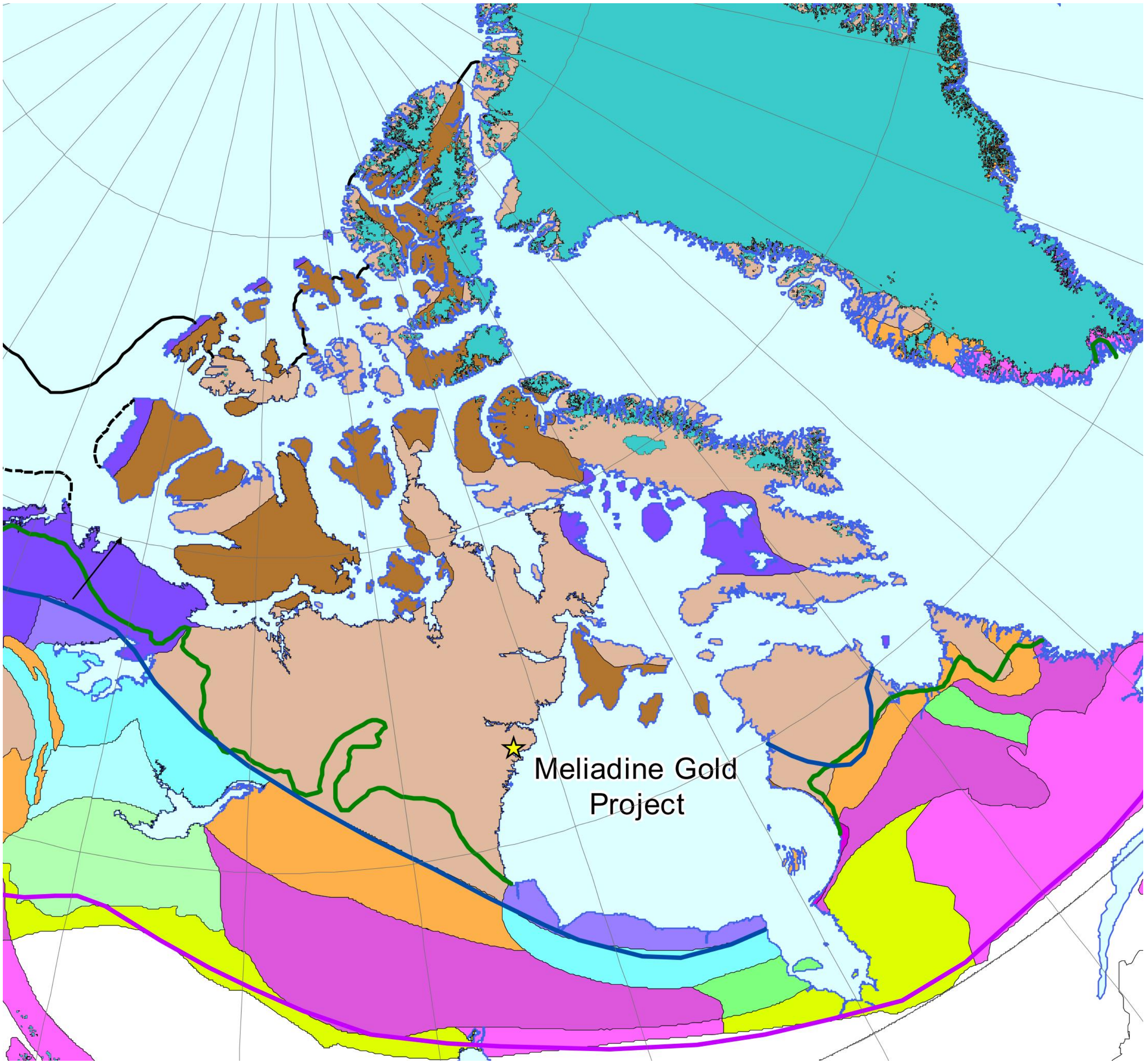

Legend for EASE-Grid Permafrost and Ground Ice Map

Permafrost Extent (percent of area)	Ground Ice Content (visible ice in the upper 10-20 m of the ground; percent by volume				
	Lowlands, highlands, and intra-and intermontane depressions characterized by thick overburden cover (>5-10m)			Mountains, highlands, ridges, and plateaus characterized by thin overburden cover (<5-10 m) and exposed bedrock)	
	High (> 20%)	Medium (10-20%)	Low (0-10%)	High to medium (>10%)	Low (0-10%)
Continuous (90-100%)	Ch	Cm	Cl	Ch	Cl
Discontinuous (50-90%)	Dh	Dm	Dl	Dh	Dl
Sporadic (10-50%)	Sh	Sm	Sl	Sh	Sl
Isolated Patches (0-10%)	Ih	Im	Il	Ih	Il

Variations in the extent of permafrost are shown by the different colors; variations in the amount of ground ice are shown by the different intensities of color. Letter codes assist in determining to which basic permafrost and ground ice class any particular unit belongs. Letter codes are defined in the documentation that accompanies the data files.

Ice caps and glaciers

LEGEND

- MELIADINE GOLD PROJECT
- SOUTHERN BOUNDARY OF CONTINUOUS PERMAFROST - PRESENT
- SOUTHERN BOUNDARY OF DISCONTINUOUS PERMAFROST - PRESENT
- TREELINE
- SEA-ICE EDGE LIMIT
- SUBSEA PERMAFROST LIMIT

REV	DATE	DESCRIPTION	PAR BY

REVISIONS

AGNICO EAGLE

AGNICO EAGLE – MELIADINE GOLD PROJECT

FIGURE 2.1 PERMAFROST MAP OF CANADA

No. PROJET PROJECT No.		DATE	09–23–2014
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APPROUVÉ PAR APPROVED BY	HX		
NO. DESSIN DRAWING NO.	6500–680–210–200	REVISION	A

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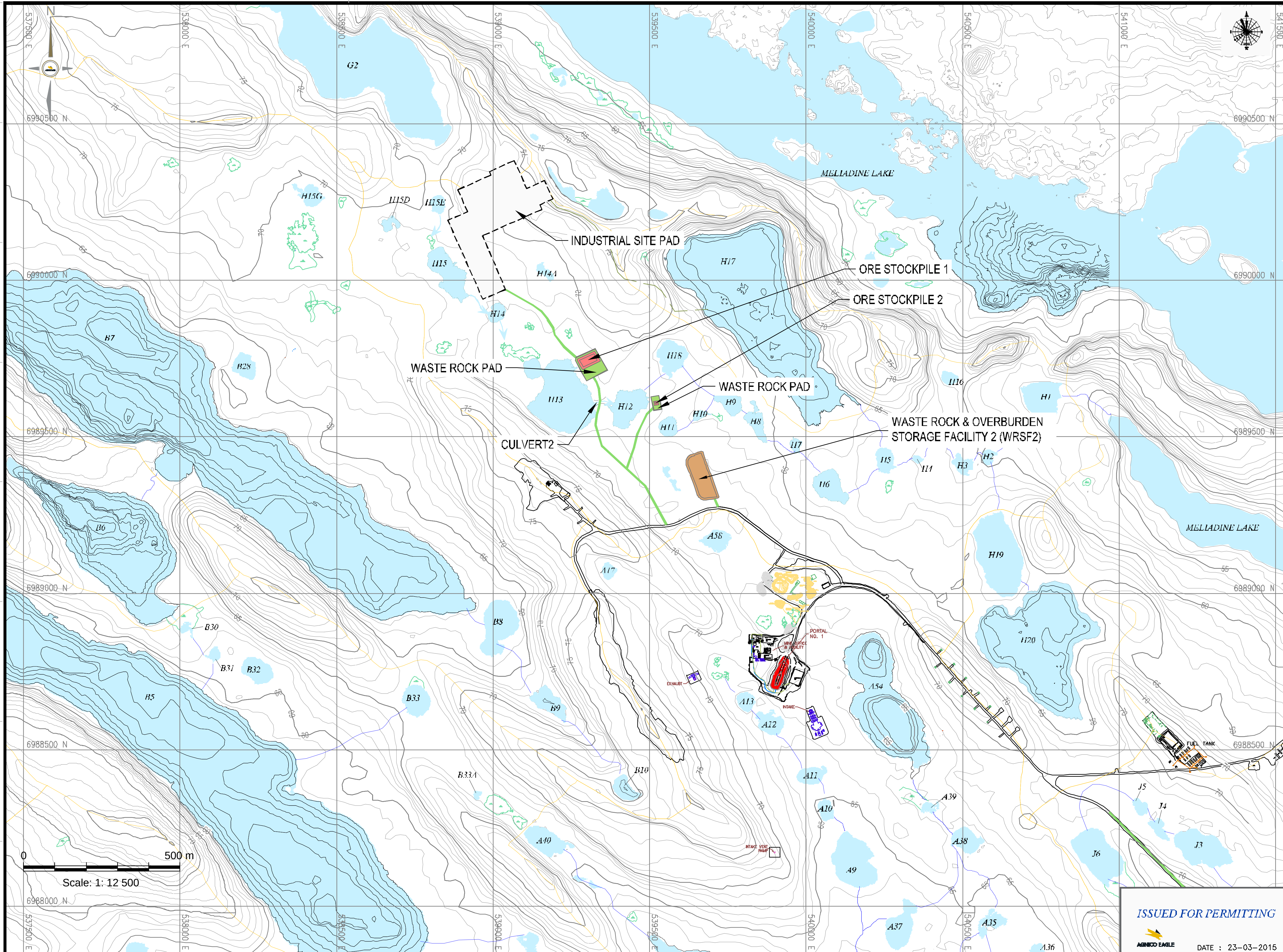

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- NON CONTACT WATERBODY
- OVERBURDEN
- WASTE ROCK
- ORE
- INDUSTRIAL SITE PAD
- STREAM

AGNICO EAGLE

TETRA TECH EBA

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VÉRIFIÉ PAR / CHECKED BY	NG		29-03-2015
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE

AGNICO EAGLE – MELIADINE GOLD PROJECT

FIGURE 3.1 YEARLY SITE LAYOUT PLAN
FOR WATER MANAGEMENT
(LAST QUARTER OF YEAR -5)

ISSUED FOR PERMITTING
DATE : 23-03-2015

ÉCHELLE/SCALE	1:12500	FICHIER/FILE	.DWG
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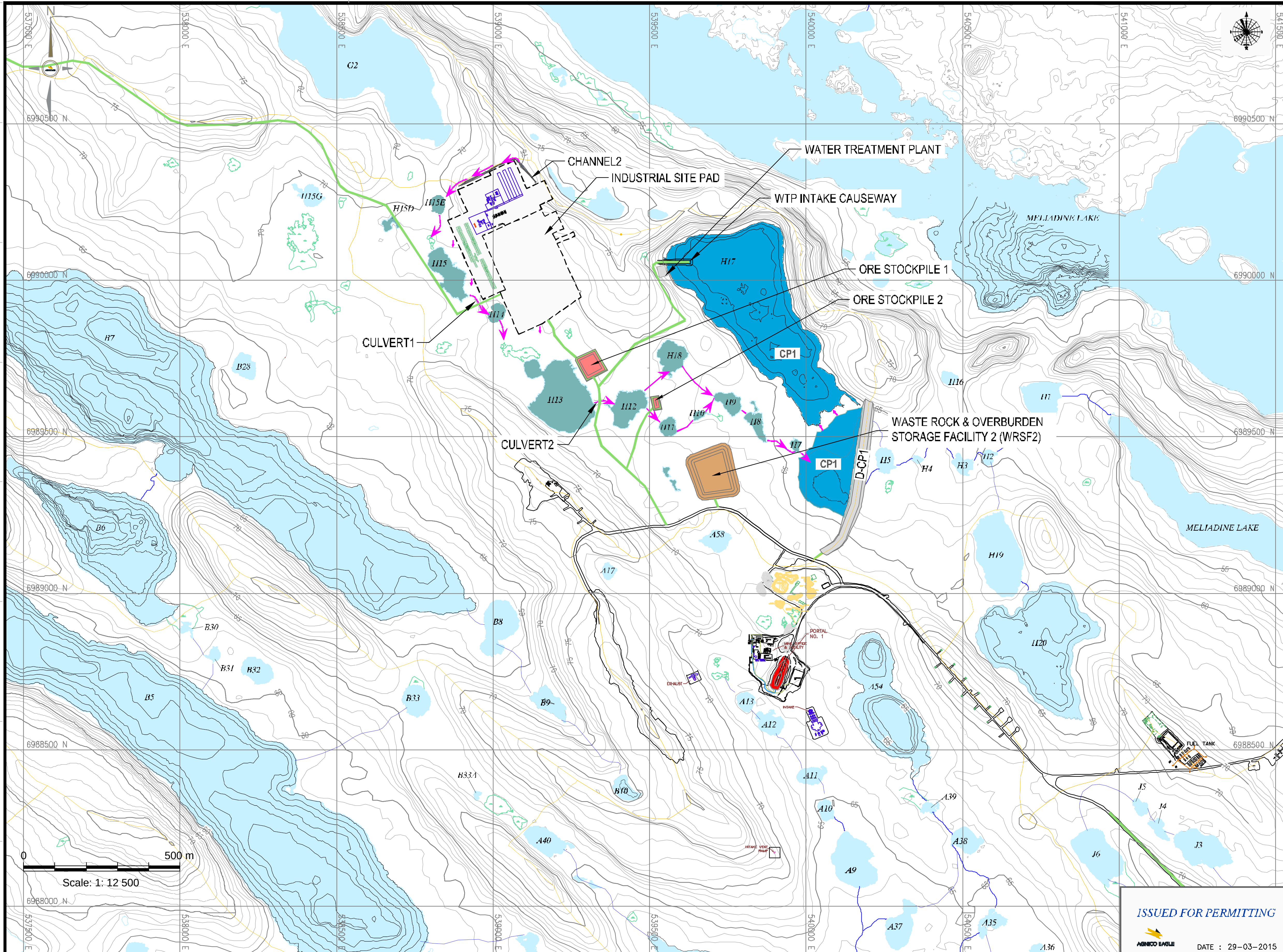

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- OVERBURDEN
- WASTE ROCK
- ORE
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- STREAM

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE

AGNICO EAGLE – MELIADINE GOLD PROJECT

FIGURE 3.2 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR –4)

ÉCHELLE/SCALE 1:12500 | FICHIER FILE .DWG

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ISSUED FOR PERMITTING

DATE : 29–03–2015

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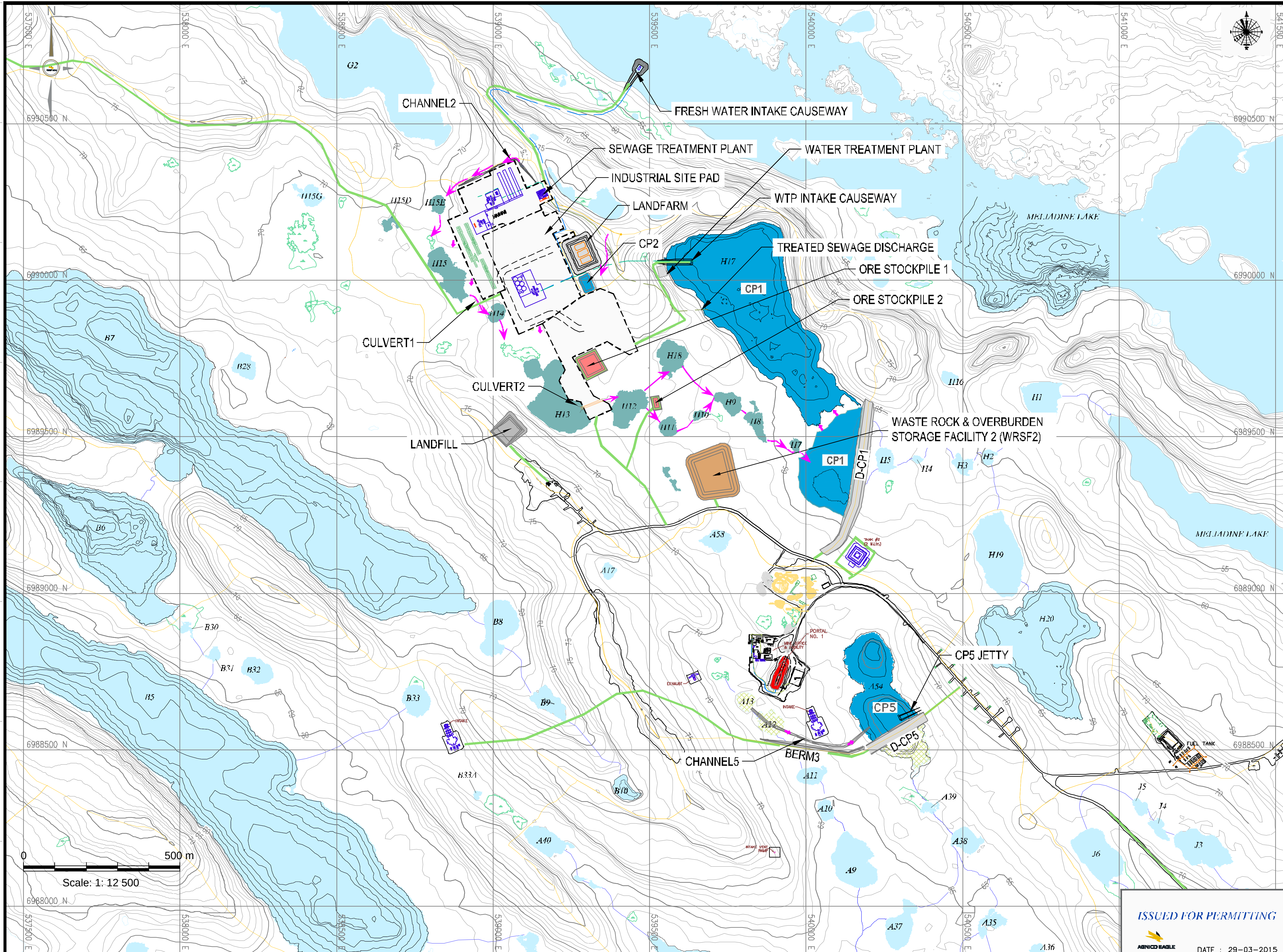

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- OVERBURDEN
- WASTE ROCK
- ORE
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- STREAM

AGNICO EAGLE

TETRA TECH EBA

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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REVISIONS

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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE

AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.3 YEARLY SITE LAYOUT PLAN
FOR WATER MANAGEMENT
(YEAR –3)

ÉCHELLE/ SCALE 1:12500 | FICHIER FILE .DWG

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ISSUED FOR PERMITTING
DATE : 29-03-2015

AE–CART–ANSI B

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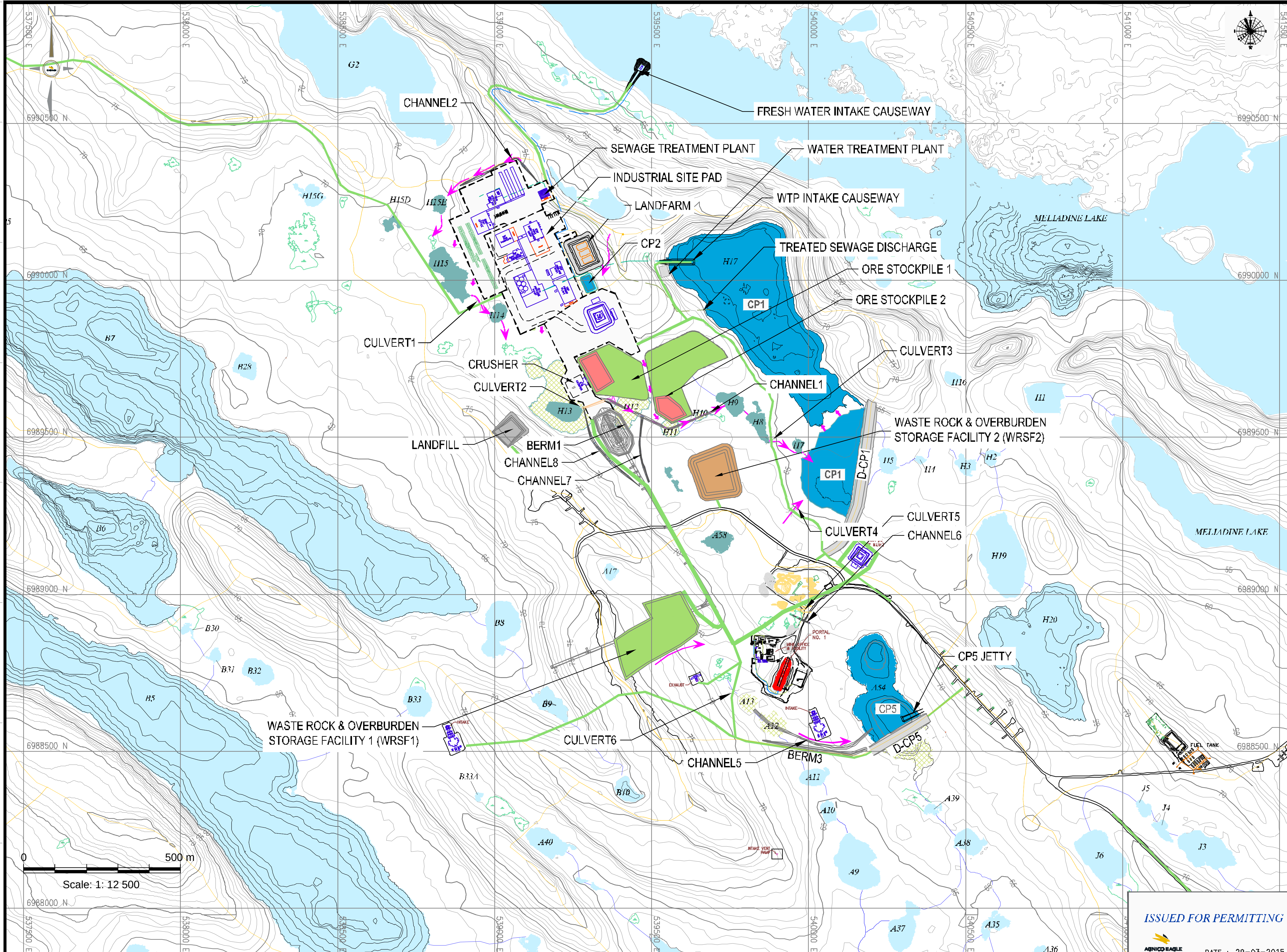

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AGNICO EAGLE

TETRA TECH EBA

ISSUED FOR PERMITTING
DATE : 29-03-2015

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No. PROJET PROJECT NO.			
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TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.4 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR –2)

ÉCHELLE/SCALE 1:12500 FICHIER FILE .DWG

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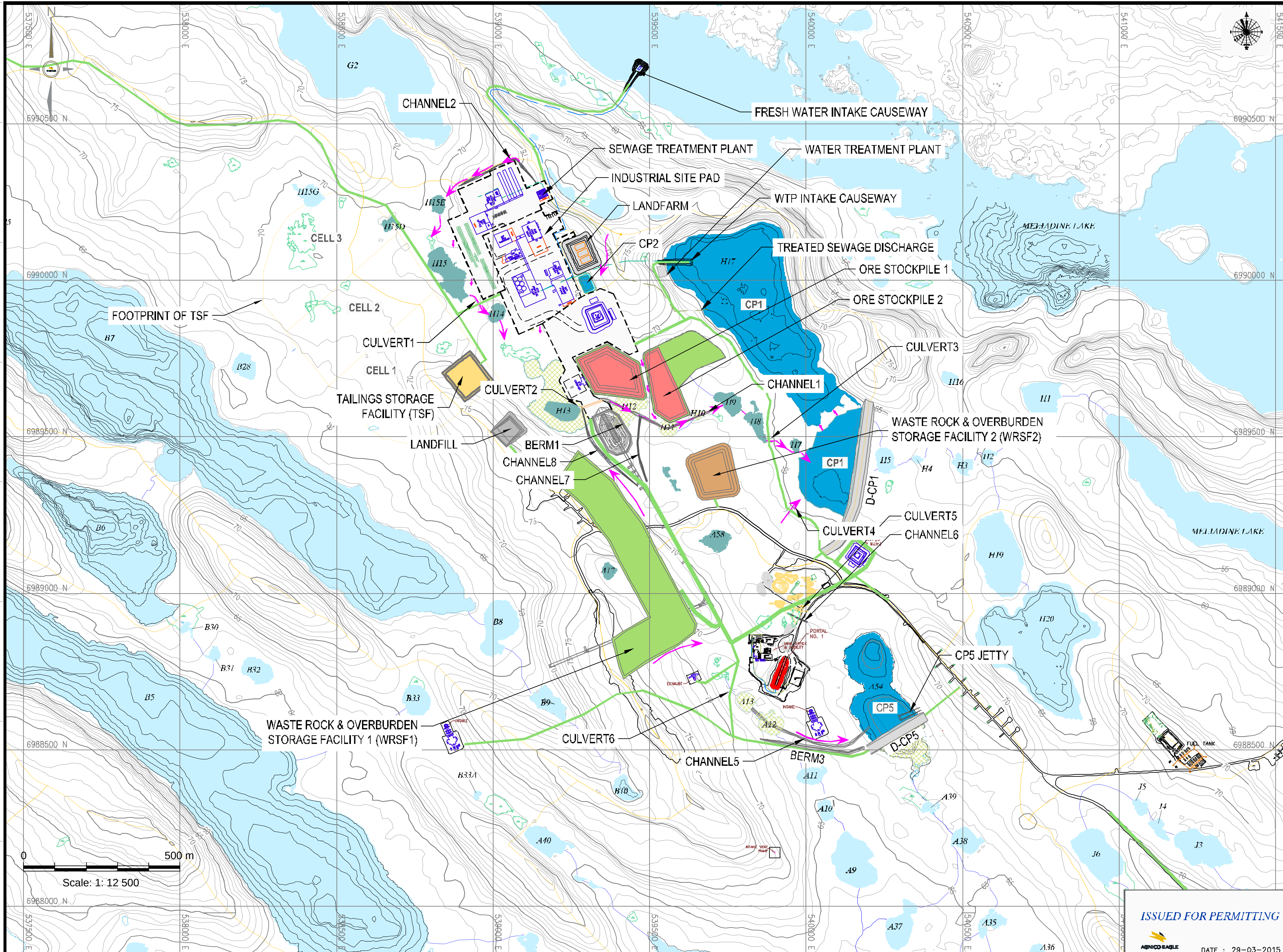

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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No. PROJET PROJECT NO.			
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TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.5 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR –1)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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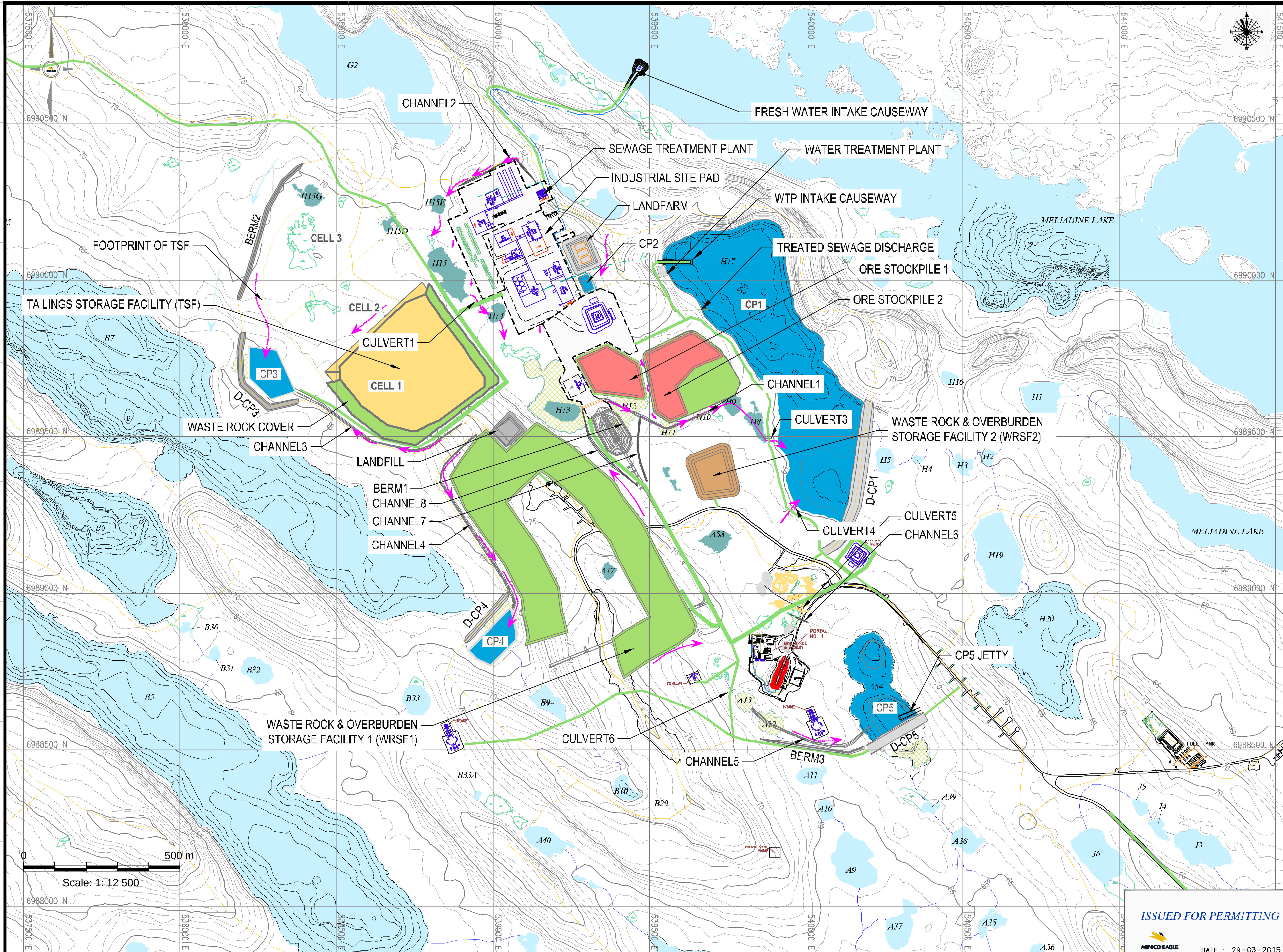

LEGEND
- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- STREAM

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIUGRE 3.6 YEARLY SITE LAYOUT PLAN
FOR WATER MANAGEMENT
(YEAR 1)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.6.dwg

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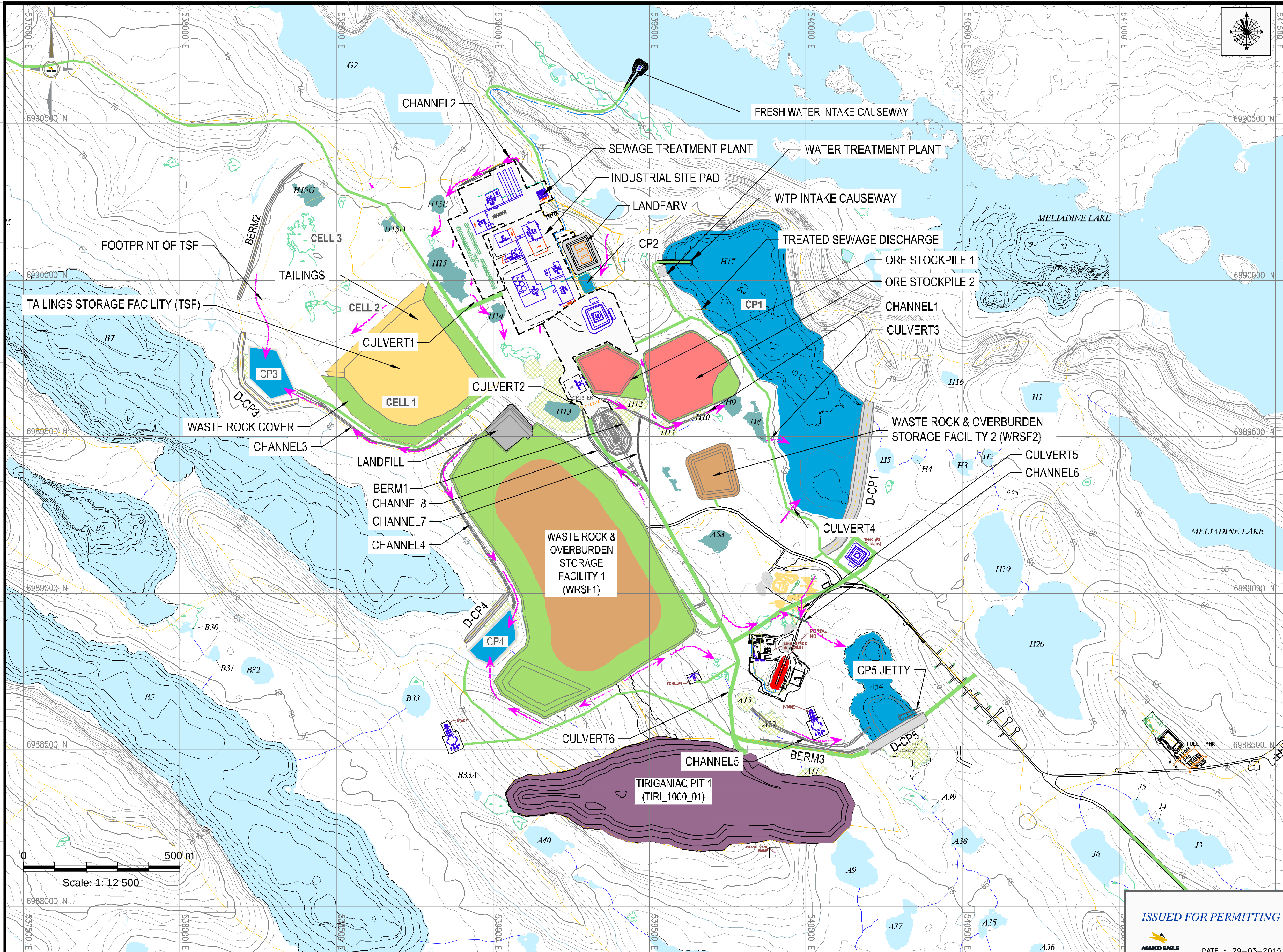

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

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DESSINÉ PAR / DRAWN BY	HX	DATE	29-03-2015
VÉRIFIÉ PAR / CHECKED BY	NG		29-03-2015
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.7 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 2)

ÉCHELLE/SCALE 1:12500 | FICHIER/FILE .DWG

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DATE : 29-03-2015

No. DESSIN/DRAWING NO. 6500-680-210-200-007 | REVISION A | FEUILLE/SHT 7 / 13

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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.7.dwg

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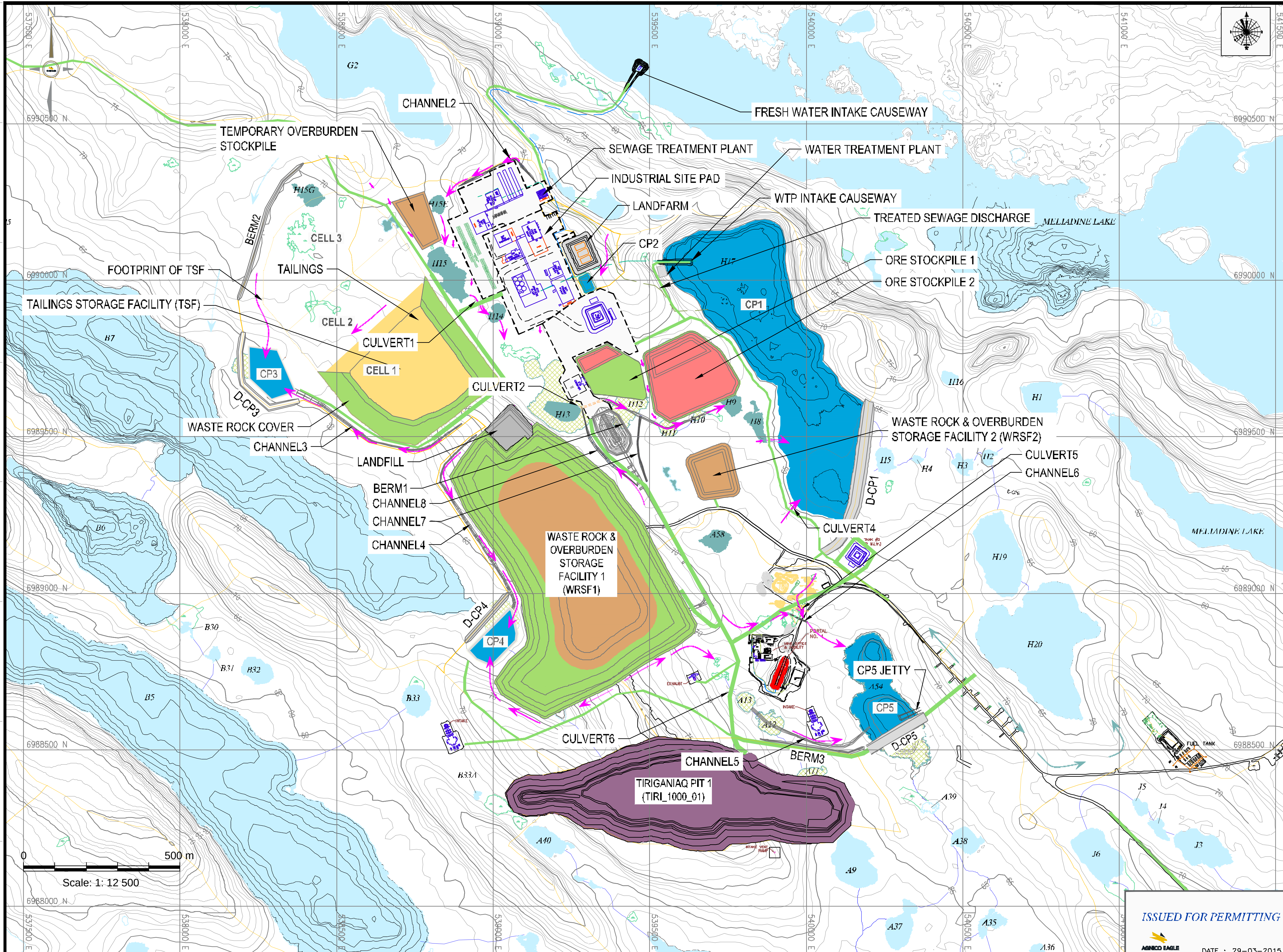

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.8 YEARLY SITE LAYOUT PLAN
FOR WATER MANAGEMENT
(YEAR 3)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG

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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.8.dwg

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DRAWING NO.

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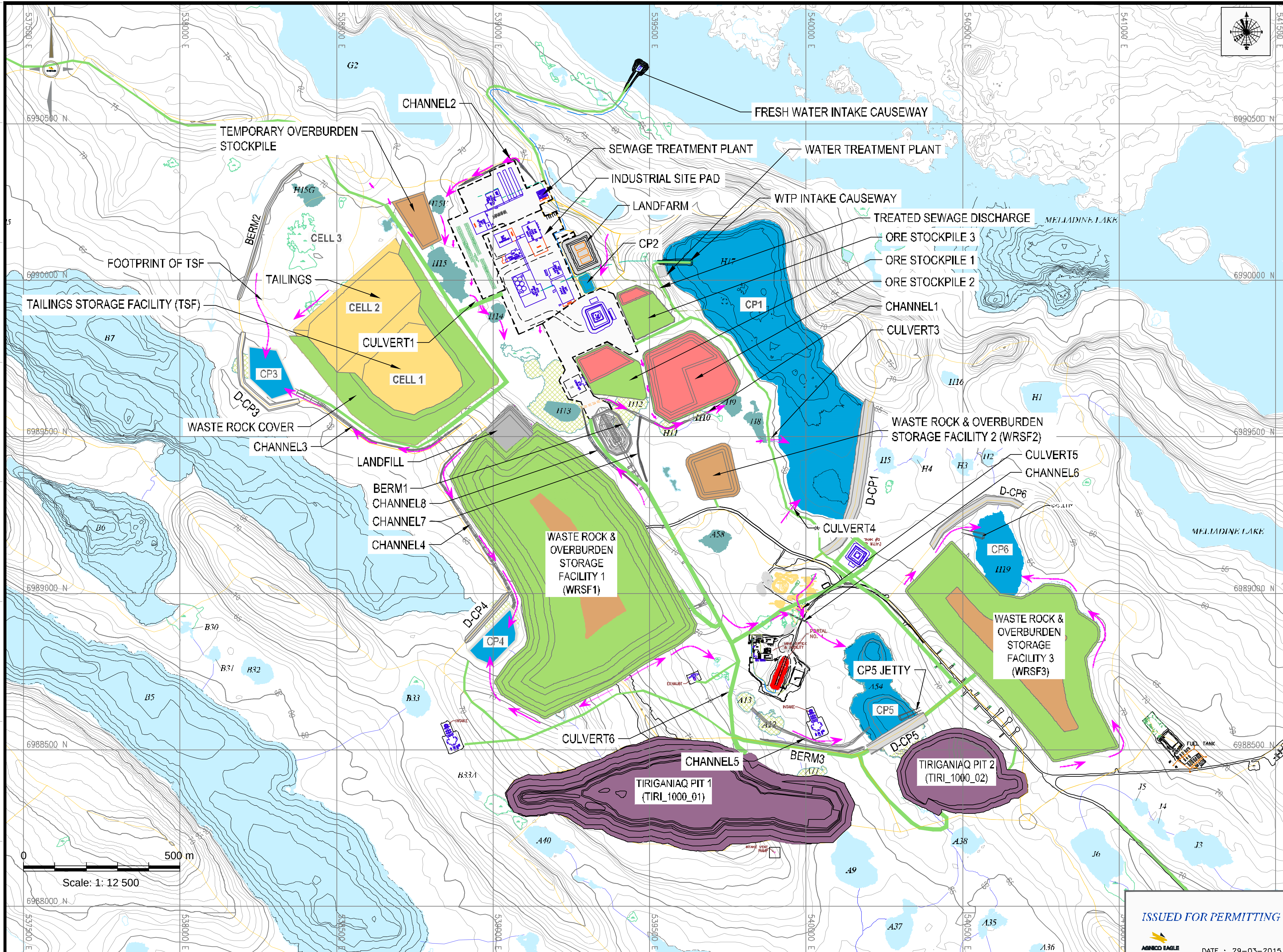

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

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DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.9 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 4)

ÉCHELLE/SCALE 1:12500 FICHIER FILE .DWG

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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.9.dwg

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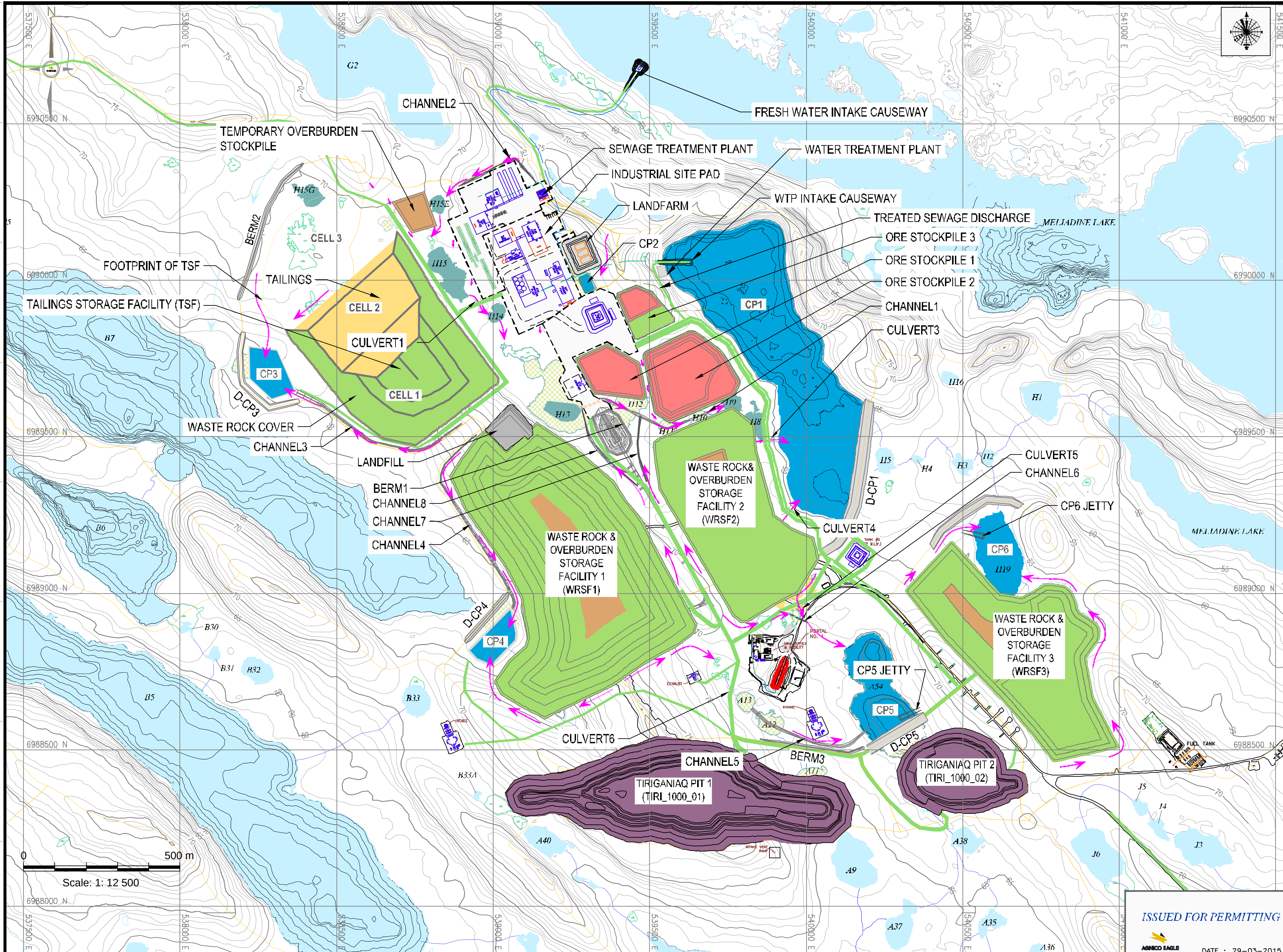

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.10 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 5)

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ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.10.dwg

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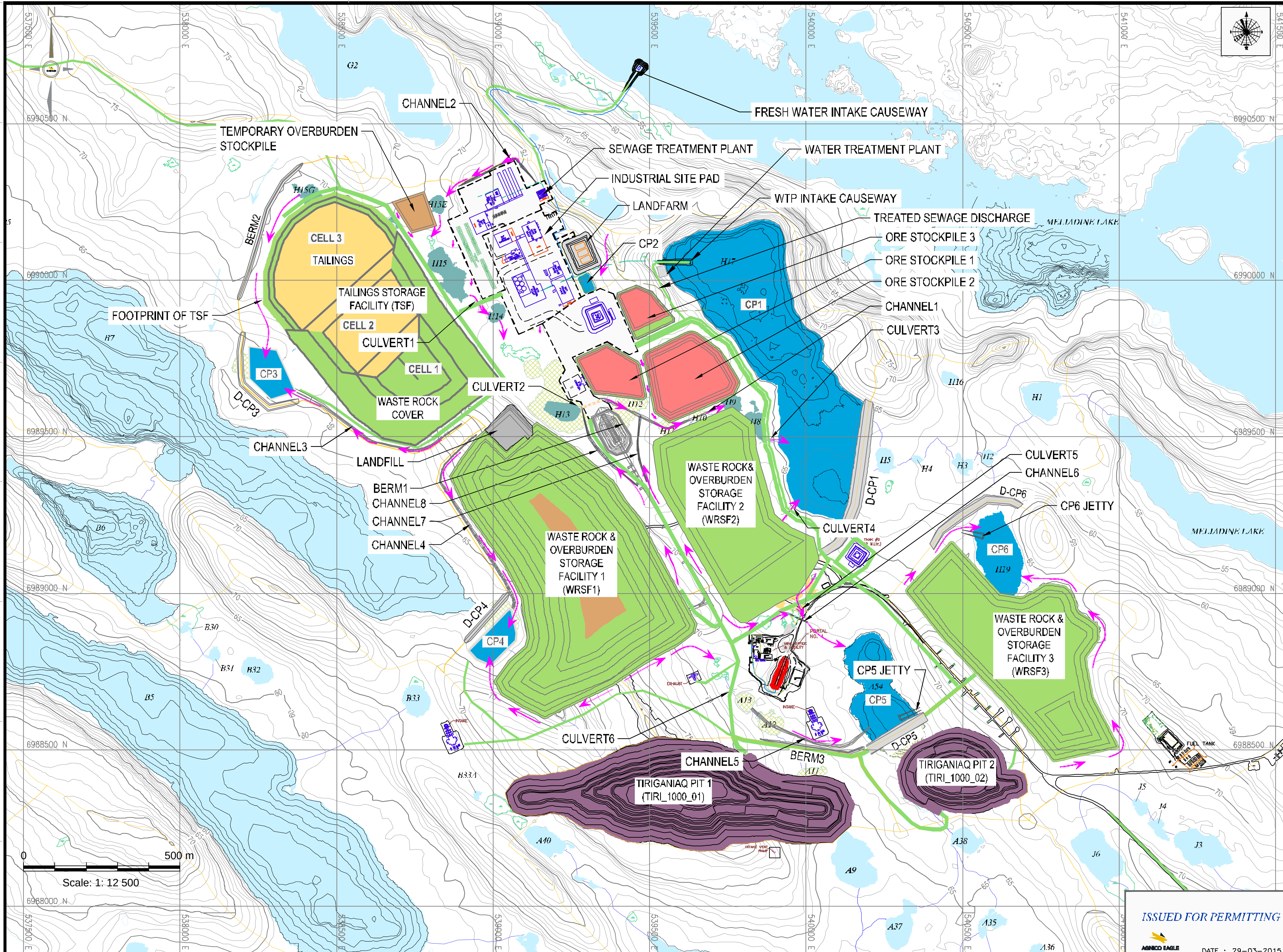

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE

AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.11 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 6)

ISSUED FOR PERMITTING
DATE : 29-03-2015

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.11.dwg

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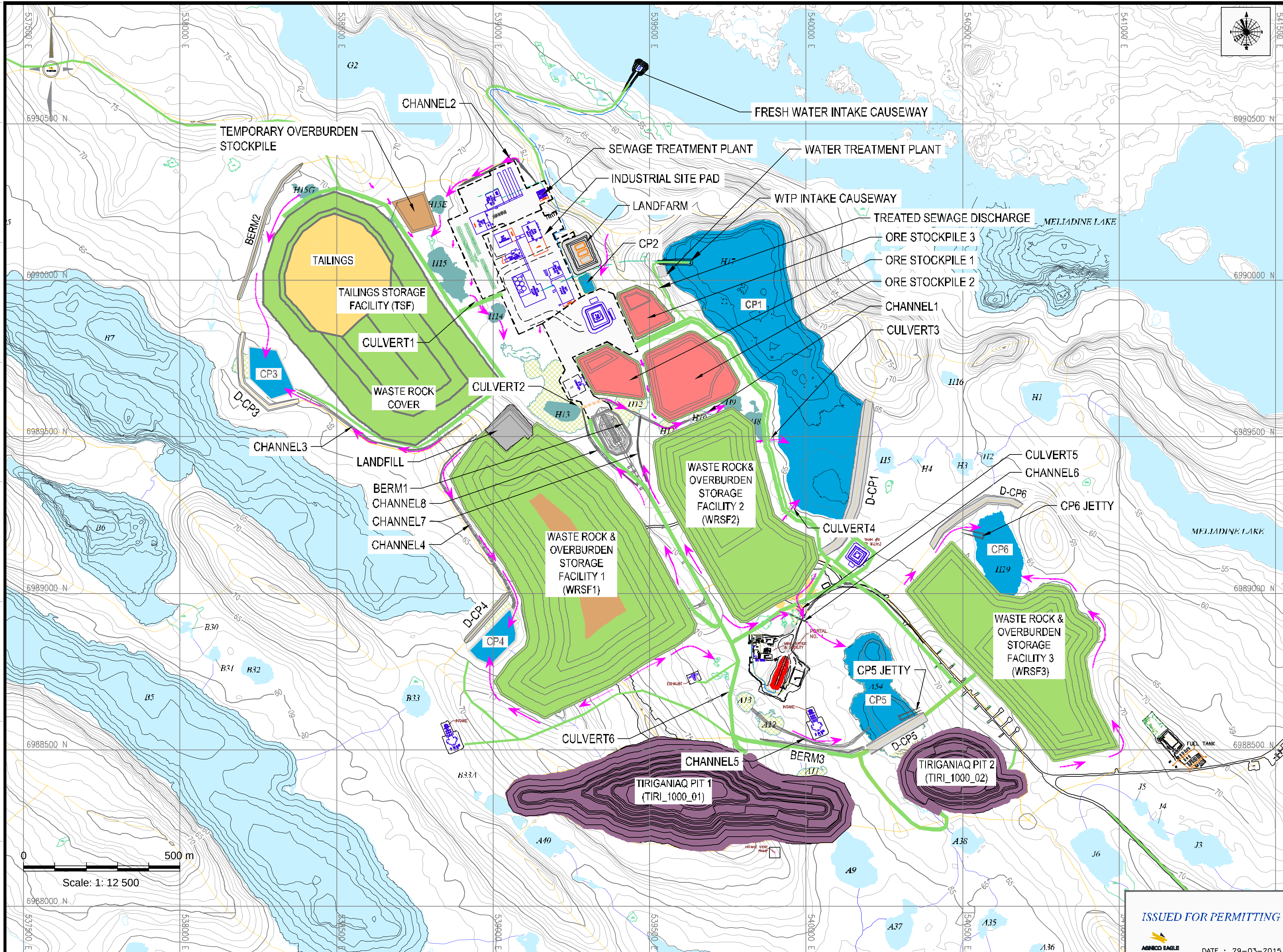

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 3.12 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 7)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG

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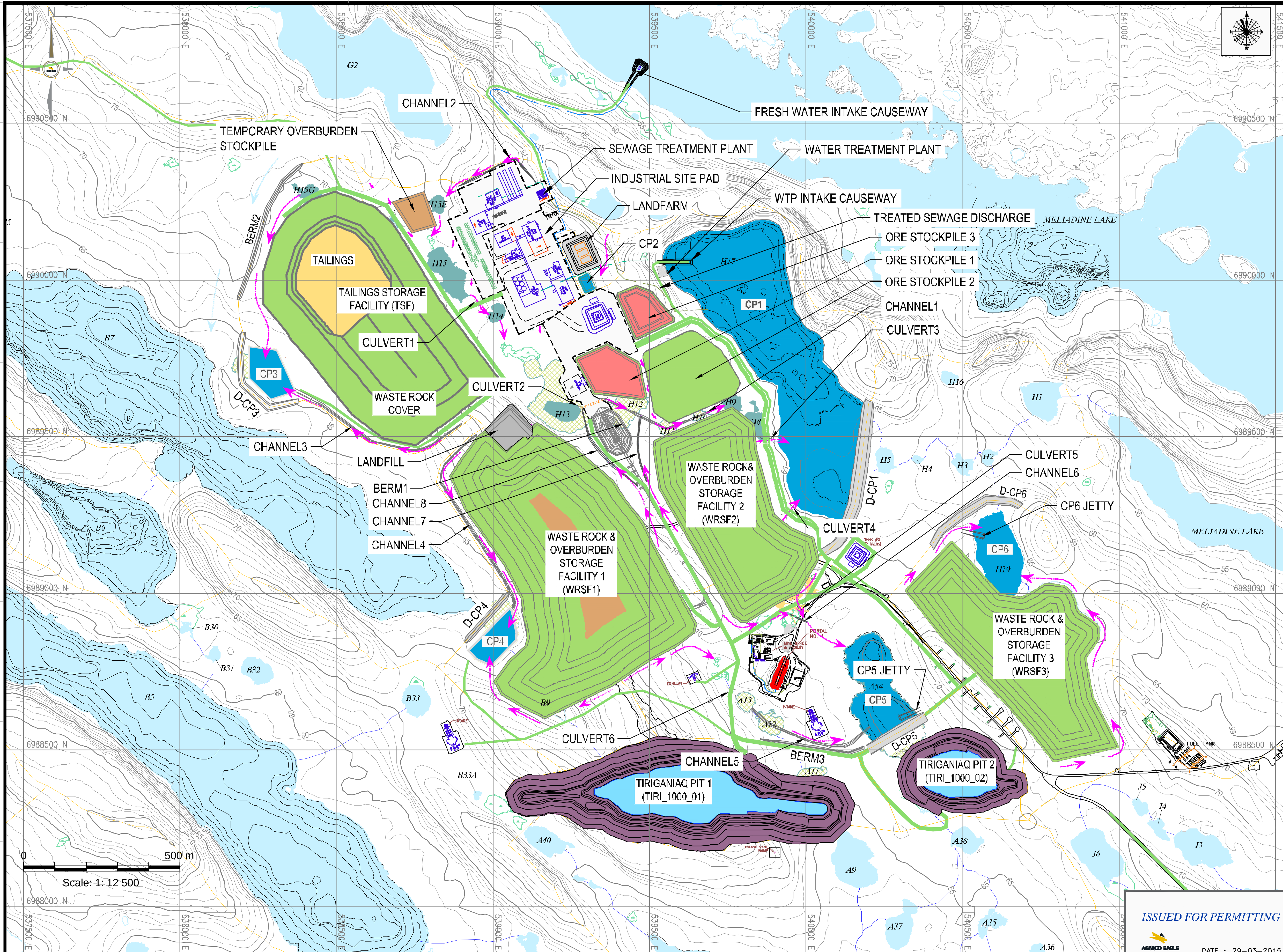

ISSUED FOR PERMITTING

DATE : 29-03-2015

LEGEND

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

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

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DESSINÉ PAR DRAWN BY	HX	DATE	29-03-2015
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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE

AGNICO EAGLE – MELIADINE GOLD PROJECT

FIGURE 3.13 YEARLY SITE LAYOUT PLAN FOR WATER MANAGEMENT (YEAR 8)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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AE-CART-ANSI B

Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 3.13.dwg

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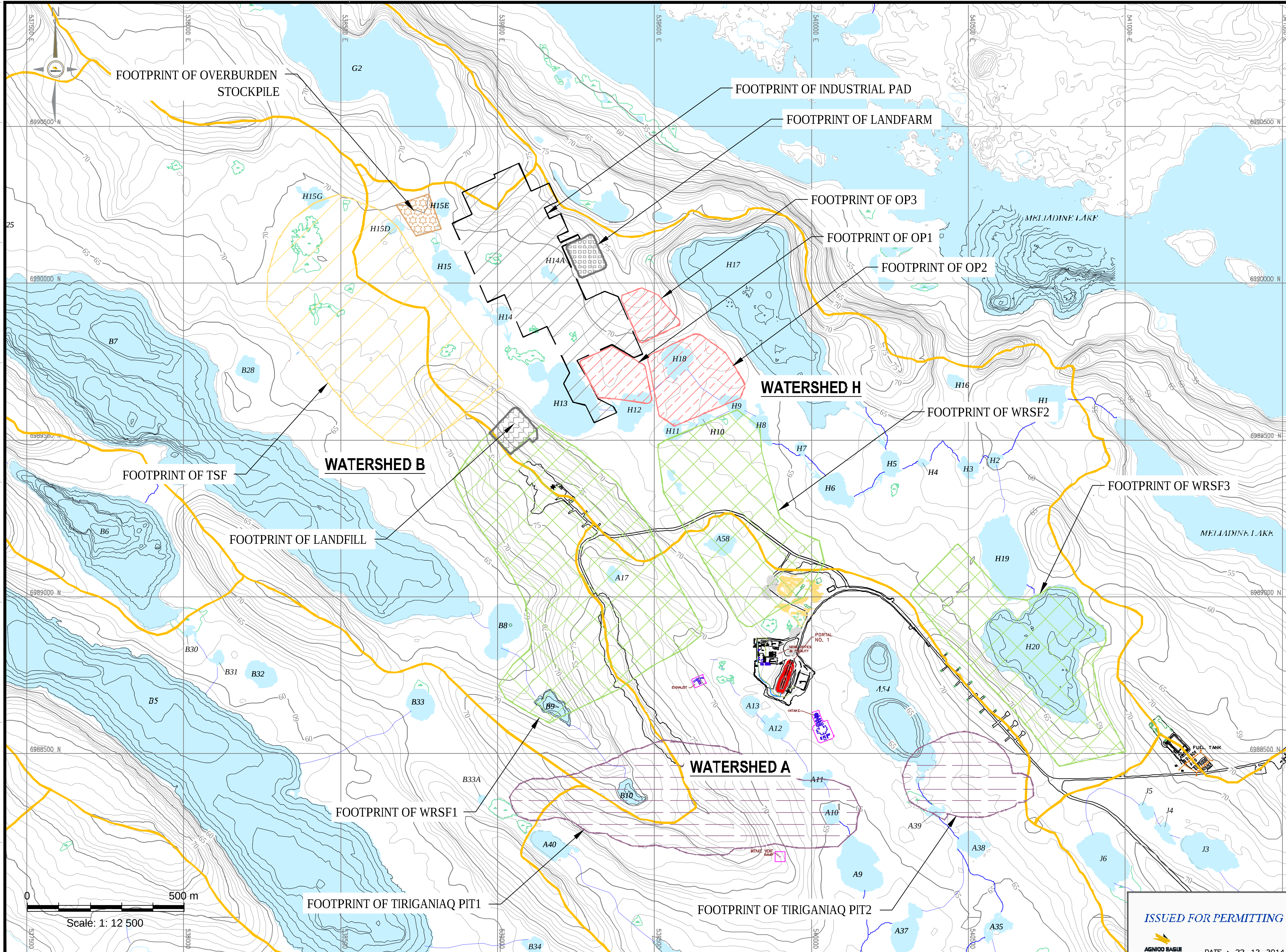
DRAWING NO.

FORMAT ANSI B-11x17



LEGEND

CATCHMENT BOUNDARY
NON CONTACT WATERBODY

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.	6500		
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 4.1 WATERSHED AND WATERBODIES AFFECTED BY SITE INFRASTRUCTURE

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 4.1.dwg-September 5, 2014

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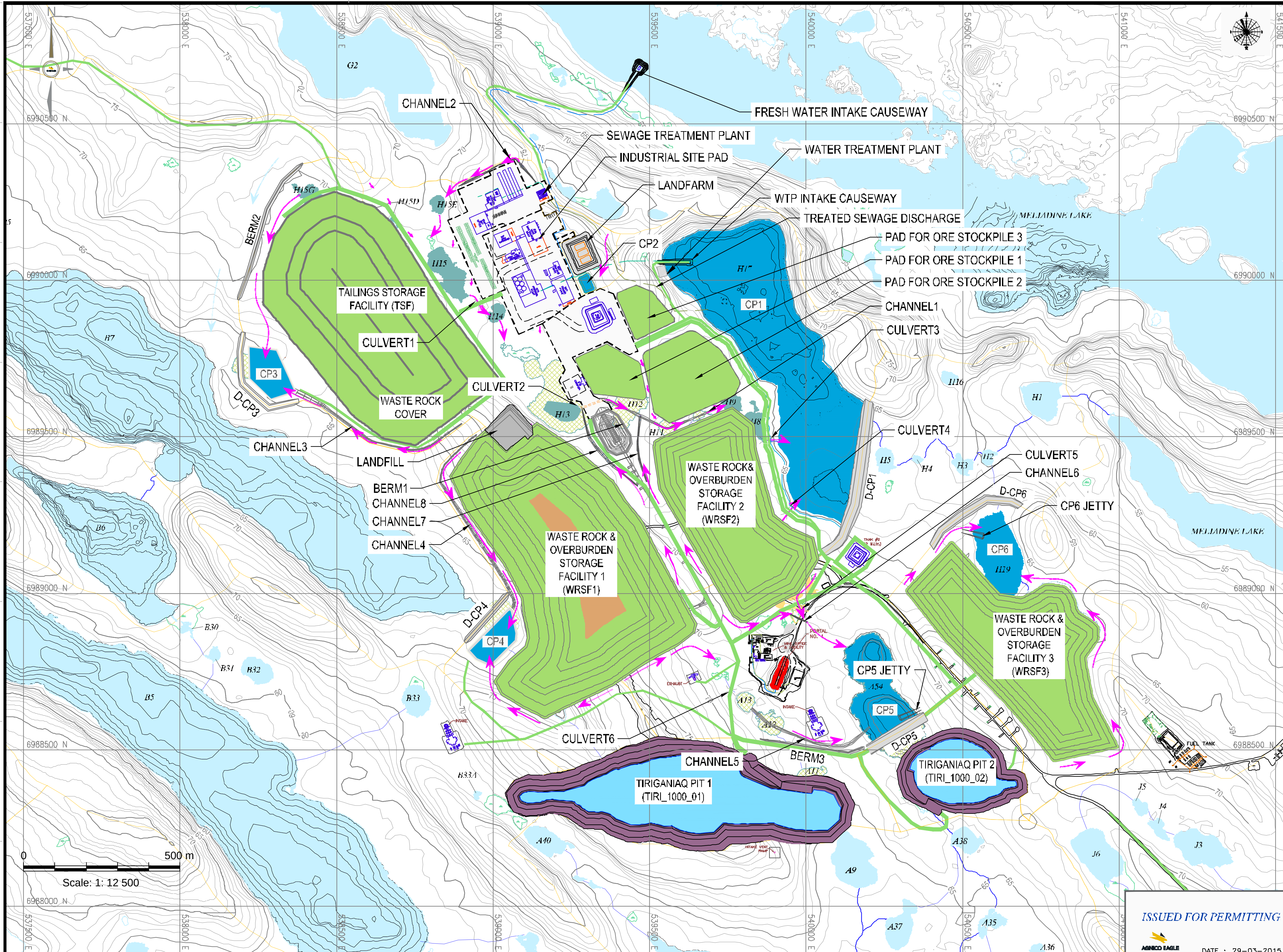

ISSUED FOR PERMITTING
DATE : 29-03-2015

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

AGNICO EAGLE
TETRA TECH EBA

TITRE / TITLE	# DWG

DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

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VÉRIFIÉ PAR CHECKED BY	NG		29-03-2015
APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 6.1 SITE LAYOUT PLAN
FOR WATER MANAGEMENT DRUING CLOSURE
(YEAR 9)

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 6.1.dwg

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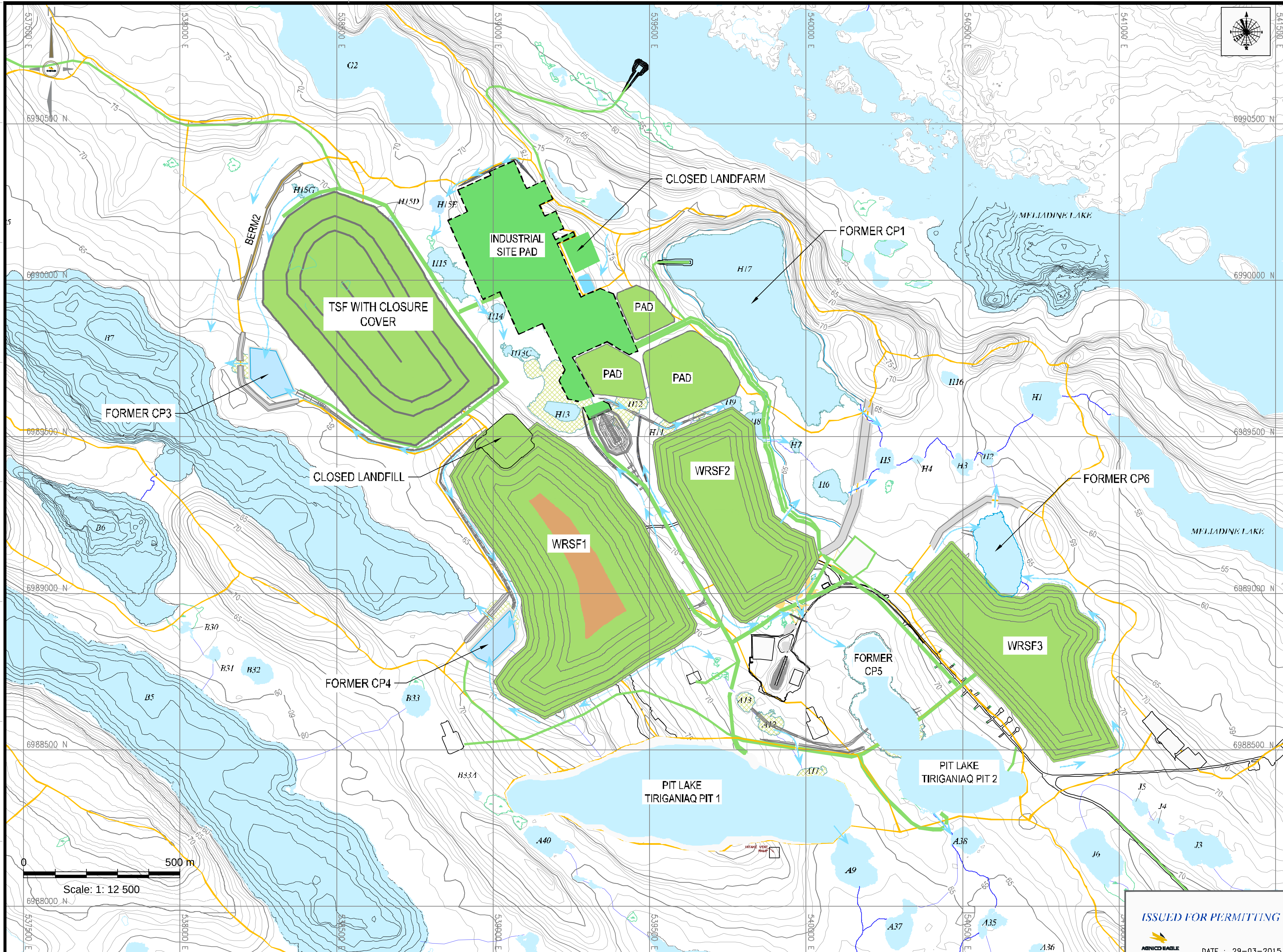
FORMAT ANSI B–11x17



LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- STREAM
- WATERBODY
- DRAINED POND AREA
- WASTE ROCK
- WATER FLOW DIRECTION

AGNICO EAGLE

TETRA TECH EBA

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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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APPROUVÉ PAR APPROVED BY			
No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 6.2 MINE SITE LAYOUT AFTER CLOSURE

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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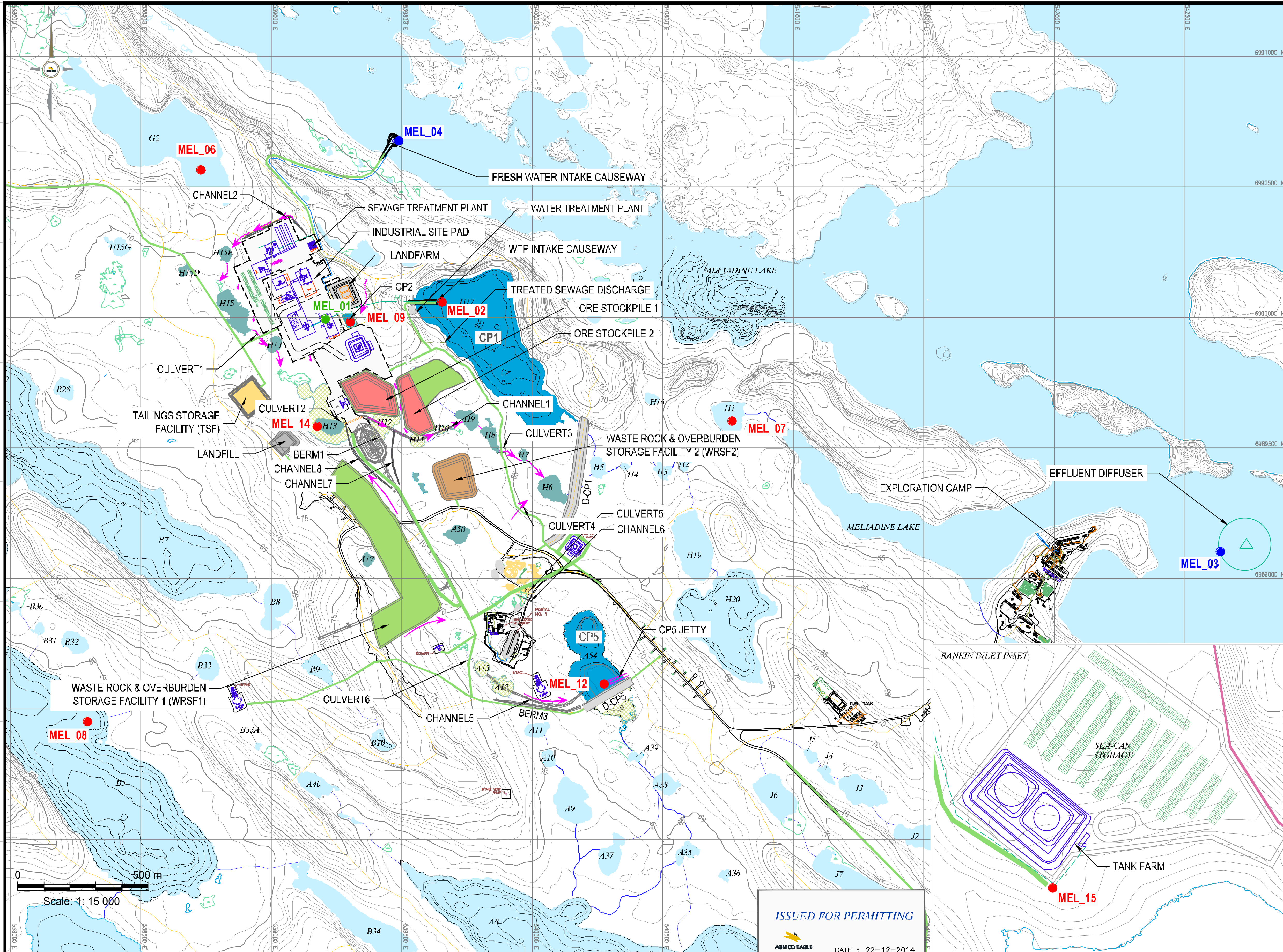

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- REGULATED MONITORING LOCATION
- GENERAL AQUATIC MONITORING LOCATION
- VERIFICATION MONITORING LOCATION

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY

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VÉRIFIÉ PAR / CHECKED BY	NG		22-12-2014
APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 9.1: PROPOSED VERIFICATION MONITORING LOCAITONS DURING CONSTRUCTION

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
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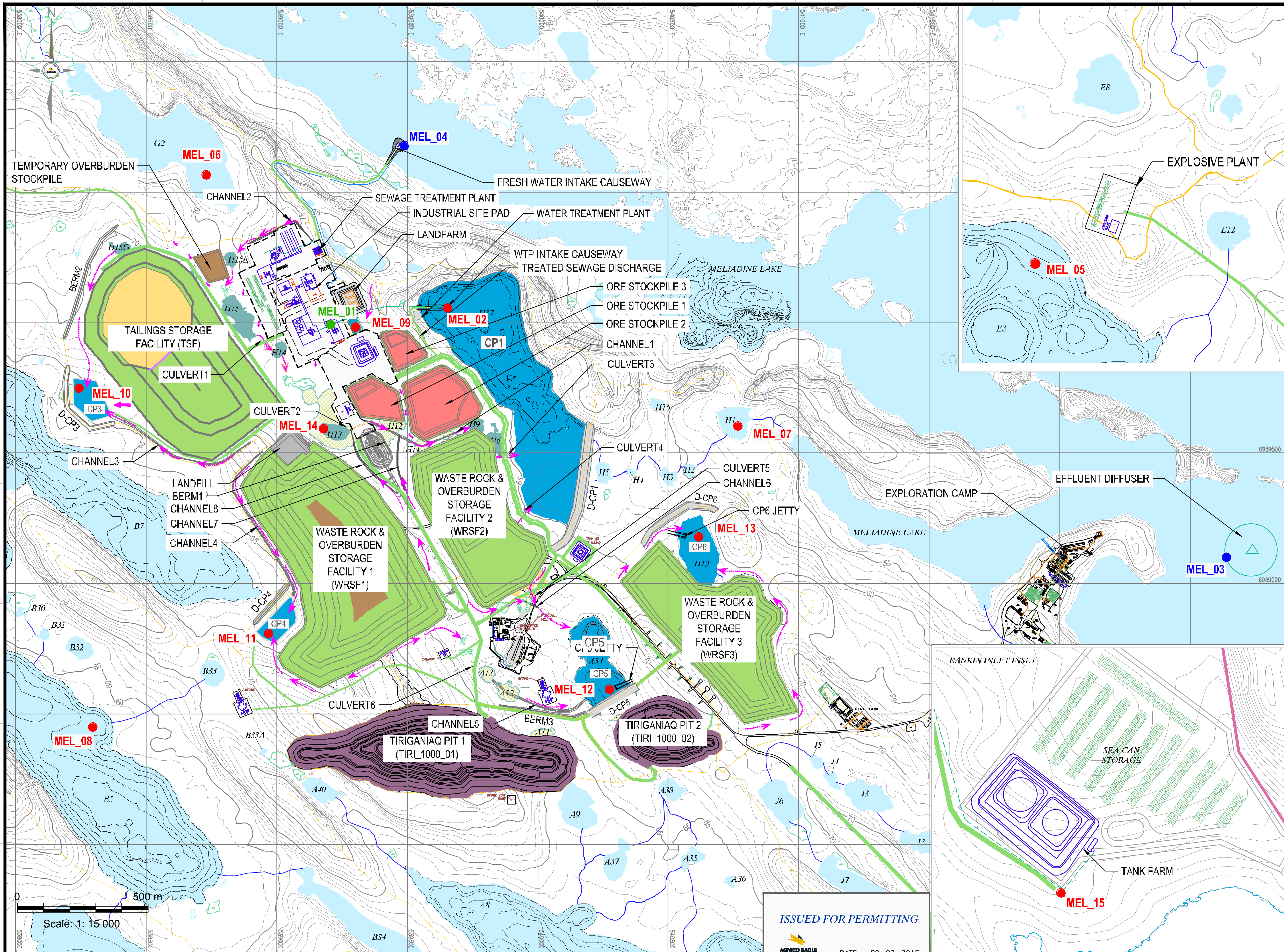
FORMAT ANSI B–11x17



AGNICO EAGLE

TETRA TECH EBA

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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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APPROUVÉ PAR / APPROVED BY			
No. PROJET / PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 9.2: PROPOSED VERIFICATION MONITORING LOCATIONS DURING OPERATIONS

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	6500–680–210–200	REVISION A	FEUILLE/SHT 1 / 1

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NO. DESSIN
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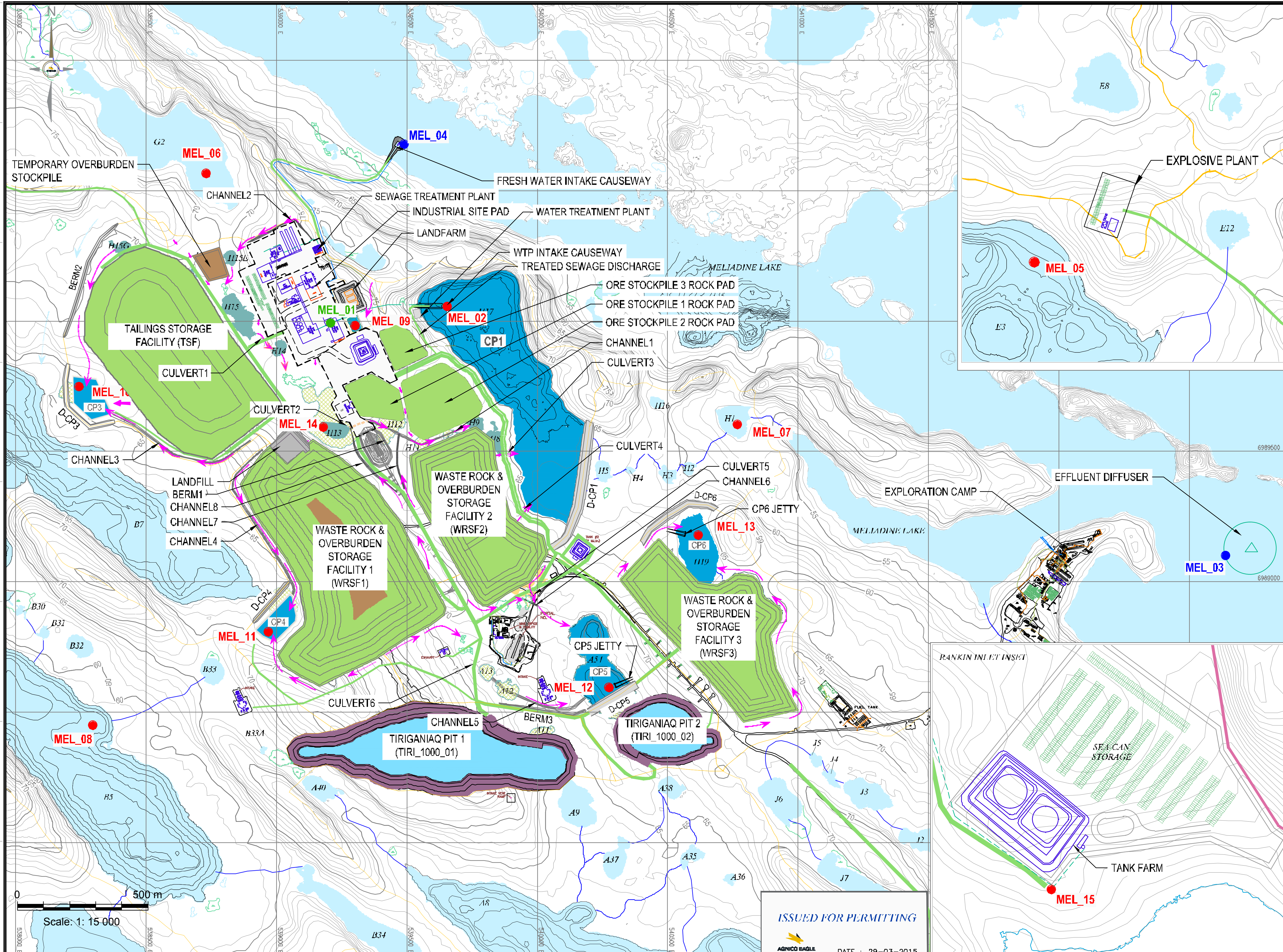

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- CONTACT WATERBODY
- WATER COLLECTION POND
- DRAINED POND AREA
- OVERBURDEN
- WASTE ROCK
- ORE
- TAILINGS
- INDUSTRIAL SITE PAD
- WATER FLOW DIRECTION
- REGULATED MONITORING LOCATION
- GENERAL AQUATIC MONITORING LOCATION
- VERIFICATION MONITORING LOCATION

AGNICO EAGLE

TETRA TECH EBA

TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

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No. PROJET PROJECT NO.			
DATE			

TITRE / TITLE
AGNICO EAGLE – MELIADINE GOLD PROJECT
FIGURE 9.3: PROPOSED VERIFICATION MONITORING LOCATIONS DURING CLOSURE AND POST-CLOSURE

ÉCHELLE/ SCALE	1:15000	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	6500-680-210-200	REVISION	A
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AE-CART-ANSI B

Q:\Edmonton\Engineering\E141\Projects\E14103209_Meladine_Mgmt_Plans\EBA Drawings\Water MP\CAD_Dec_2014\FIGURE 9.3-1.dwg

APPENDIX B • WATER BALANCE INPUTS, ASSUMPTIONS AND SELECTED RESULTS

Table B.1: Various Parameters for Surface Runoff Estimation for a Mean Precipitation Year and 1 in 2 Return Rainfall

Item	Value	Source or Comment
Total adjusted annual precipitation for a mean precipitation year	412 mm	FEIS Volume 1 – Popular Summary
Total adjusted annual rainfall for a mean precipitation year	210 mm	FEIS Volume 1 – Popular Summary
Total adjusted annual water equivalent snowfall for a mean precipitation year	202 mm	FEIS Volume 1 – Popular Summary
Total estimated snow sublimation	99 mm	FEIS Volume 1 – Popular Summary
Estimated snow melt water equivalent in spring freshet	103 mm	Calculated based on values above
Estimated rainfall runoff coefficient for natural on-land surface for a mean precipitation year	0.7 in June 0.5 in July to October	Estimated based on various sources
Monthly rainfall distribution	16% in June, 21.2% in July 30.8% in August, 24.5% in September 7.5% in October	FEIS Volume 1 – Popular Summary
Annual net runoff on natural on-land surface for a mean precipitation year	215 mm (127 mm in June, 22 mm in July, 32 mm in August, 26 mm in September, and 8 mm in October)	Calculated based on values above
Estimated monthly lake surface evaporation	60 mm in June, 125 mm in July 96 mm in August, 42 mm in September	FEIS Volume 1 – Popular Summary
Annual net runoff on lake surface for a mean precipitation year	-10 mm (76 mm in June, -80 mm in July, -31 mm in August, 9 mm in September, and 16 mm in October)	Calculated based on values above
Estimated monthly natural land surface evapotranspiration	6 mm in June, 14 mm in July 11 mm in August, 5 mm in September	FEIS Volume 1 – Popular Summary
Annual net runoff on disturbed land surface for a mean precipitation year	251 mm (133 mm in June, 36 mm in July, 43 mm in August, 31 mm in September, and 8 mm in October)	Calculated based on values above
Average start date for spring freshet	June 11	FEIS Volume 1 – Popular Summary
Average date for spring runoff peak	June 13	FEIS Volume 1 – Popular Summary
24-hour duration rainfall for 1 in 2 years of return period	33 mm	FEIS Volume 1 – Popular Summary
5-minute duration rainfall for 1 in 2 years of return period	3.2 mm	SD 7-1 Aquatics Baseline Synthesis Report
1-hour duration rainfall for 1 in 2 years return period	9.8 mm	SD 7-1 Aquatics Baseline

Table B.2: Various Parameters for Surface Runoff Estimation for a 1 in 100 Extreme Wet Year and Extreme Rainfall

Item	Value	Source or Comment
Total adjusted annual precipitation for a 1 in 100 wet precipitation year	594 mm	FEIS Volume 1 –Popular Summary
Total adjusted annual rainfall for a 1 in 100 wet precipitation year	324 mm	FEIS Volume 1 –Popular Summary)
Total adjusted annual water equivalent snowfall for a 1 in 100 wet precipitation year	270 mm	Calculated based on values above
Total estimated snow sublimation	99 mm	FEIS Volume 1 –Popular Summary)
Estimated snow melt water equivalent in spring freshet for a 1 in 100 wet precipitation year	171 mm	Calculated based on values above
Assumed natural on-land runoff coefficient for the incremental net rainfall between those for a 1 in 100 wet precipitation year and a mean precipitation year	0.8 in June to October	Assumed
Monthly rainfall distribution	16% in June, 21.2% in July 30.8% in August, 24.5% in September 7.5% in October	FEIS Volume 1 –Popular Summary
Annual net runoff on natural on-land surface for a 1 in 100 wet precipitation year	430 mm (213 mm in June, 55 mm in July, 80 mm in August, 63 mm in September, and 19 mm in October)	Calculated based on values above
Estimated monthly lake surface evaporation	60 mm in June, 125 mm in July 96 mm in August, 42 mm in September	FEIS Volume 1 –Popular Summary
Annual net runoff on lake surface for a 1 in 100 wet precipitation year	172 mm (163 mm in June, -56 mm in July, 4 mm in August, 37 mm in September, and 24 mm in October)	Calculated based on values above
Estimated monthly natural land surface evapotranspiration	6 mm in June, 14 mm in July 11 mm in August, 5 mm in September	FEIS Volume 1 –Popular Summary
Annual net runoff on disturbed land surface for a 1 in 100 wet precipitation year	466 mm (219 mm in June, 69 mm in July, 91 mm in August, 68 mm in September, and 19 mm in October)	Calculated based on values above
24-hour duration extreme rainfall with a 1 in 100 years of return period	65 mm	FEIS Volume 1 –Popular Summary
24-hour duration extreme rainfall with a 1 in 1000 years of return period	77 mm	FEIS-SD 7-1 Aquatics Baseline Synthesis Report

24-hour duration PMP (probable maximum precipitation)	259 mm	FEIS-SD 7-1 Aquatics Baseline Synthesis Report
5-minute duration rainfall for 1 in 100 years of return period	9.2 mm	FEIS-SD 7-1 Aquatics Baseline Synthesis Report
1-hour duration rainfall for 1 in 100 years of return period	27.4 mm	FEIS-SD 7-1 Aquatics Baseline Synthesis Report
Runoff coefficient for extreme rainfall	1.0	Assumed

Table B.3: Key Parameters Assumed for Water Balance of WRSFs and Ore Stockpiles

Item	Value	Source
Infiltration	0% (winter); 65% of total net precipitation (June freshet); and 80% of total net precipitation (July to October)	Assumed based on FEIS Volume 1 – Popular Summary
Surface Runoff	Total net precipitation minus infiltration	Assumed based on FEIS Volume 1 – Popular Summary
Net Porosity of Placed Waste Rock or Ore	0.3	Computed based on assumed dry density and specific gravity
Total Water Loss Capacity due to Surface Wetting	3% of total volume of materials placed	Assumed based on FEIS Volume 1 – Popular Summary

Table B.4: Some Parameters Adopted for Mill Make-up Water Calculation

Item	Value	Source or Comments
Ore Feed Moisture Content	3.0%	FEIS Volume 1 –Popular Summary; Percentage by weight
Solids Content for Dry Stack Tailings to be Placed in TSF	85%	Agnico Eagle
Solids Content of Tailings to be Used as a Component for Underground Paste Backfill	85%	Agnico Eagle
Water Loss in Mill	1%	Assumed

Table B.5: Fresh Water Consumption Requirements

Item	Value	Source or Comments
Fresh water for Tiriganiaq Open Pit Drilling	0.3 m^3/h (September of Year -5 to Year 7)	Agnico Eagle
Fresh Water for Road Dust Control and Emergency Ore Stockpile Freeze Control	1 m^3/day (September of Year -5 to Year -2) and 3 m^3/day (Year -1 to Year 7)	Assumed
Fresh Water for Camp	6.1 m^3/h (March of Year -4 to Year 11)	Agnico Eagle
Fresh Water for Truck Shop (m^3/h)	1.1 m^3/h (Year -1 to Year 7)	Agnico Eagle
Fresh Water for Emulsion (m^3/h)	1.6 m^3/h (Year -1 to Year 7)	Agnico Eagle
Fresh Water for Laboratory (m^3/h)	0.02 m^3/h (Year -1 to Year 7)	Agnico Eagle
Fresh Water to Paste Plant	6.6 m^3/h (Year -1 to Year 7)	Agnico Eagle

Table B.6: Groundwater Seepage Rates into Open Pits and Underground Operations

Item	Seepage Rates Adopted (m^3/day)	Source or Comment
Groundwater Seepage into Open Pits	0	Open pits within permafrost
Groundwater Seepage into Tiriganiaq Underground below Permafrost	0 before April 2017 (Year -3)	Underground mine within Permafrost
	420 during period from April to December 2017 (Year -3)	Golder (2013b)
	526 during period of 2018 (Year -2) to 2026 (Year 7)	Golder (2013b)

Table B.7 Assumptions for Underground Mine Water Balance

Property	Value	Source or Comments
Drilling Water for Underground Mine (m^3/day)	263 for Year -5; 574 for Year -4	Agnico Eagle
	830 for Year -3; 1,376 for Year -2	
	1,390 for Year -1; 1,459 for Year 1	
	1,260 for Year 2; 1,083 for Year 3	
	1,158 for Year 4; 1,179 for Year 5	
	941 for Year 6; 753 for Year 7	
Water Loss in Ore and Waste Rock from Underground Mine	3% by weight	Agnico Eagle
Sludge from Underground TSS Removal Plant	2.6% of total feed	Agnico Eagle

Table B.7 Assumptions for Underground Mine Water Balance

Property	Value	Source or Comments
Fresh Water Supply to Underground Saline Water Tank to Reduce Salt Concentration in Drilling Water	2.5 m^3/h (October of Year -1 to Year 7)	Agnico Eagle

Table B.8: Stage-Storage Capacity and Pond Surface Area with Elevations for CP1

Pond Elevation (m)	Pond Surface Area (km^2)	Pond Storage Volume (Mm^3)
62.5	0.000	0.000
63.0	0.030	0.005
63.5	0.115	0.050
64.0	0.174	0.123
64.5	0.221	0.223
65.0	0.258	0.345
65.5	0.282	0.482
66.0	0.294	0.628
66.5	0.302	0.779
67.0	0.306	0.932

Table B.9: Stage-Storage Capacity and Pond Surface Area for CP2 to CP4

Water Collection Pond	CP2	CP3	CP4
Water Storage Capacity at Pond Outlet Elevation (m^3)	2,455	25,454	30,911
Pond Bottom Elevation (m)	68.3	62.2	61.0
Pond Outlet Elevation (m)	70.3	64.1	63.5
Pond Surface Area at Bottom Elevation (m^2)	1,009	12,595	11,488
Pond Surface Area at Outlet Elevation (m^2)	1,903	14,938	15,062

Table B.10: Stage-Storage Capacity and Pond Surface Area with Elevations for CP5 and CP6

Pond Elevation (m)	CP5		CP6	
	Pond Surface Area (km^2)	Pond Storage Volume (Mm^3)	Pond Surface Area (km^2)	Pond Storage Volume (Mm^3)
62.8			0.008	0.002
63.0			0.012	0.005
63.5			0.032	0.016
64.0			0.045	0.035
64.5			0.053	0.060
65.0	0.015	0.003		
65.5	0.033	0.015		
66.0	0.063	0.037		
66.5	0.108	0.085		

Table B.11: Stage-Storage Capacity and Surface Areas with Elevations for Mined-out Tiriganiaq Open Pit 1

Pond Ele. (m)	Pond Volume (Mm^3)	Pond Surface Area (km^2)	Exposed Pit Wall 2D Surface Area (km^2)	Exposed Pit Wall 3D Surface Area (km^2)
-60.0	0.011	0.003	0.255	0.359
-50.0	0.058	0.006	0.252	0.354
-40.0	0.165	0.016	0.243	0.342
-30.0	0.342	0.020	0.238	0.333
-20.0	0.613	0.034	0.224	0.314
-10.0	0.986	0.040	0.218	0.302
0.0	1.498	0.063	0.196	0.271
10.0	2.171	0.072	0.187	0.252
20.0	3.007	0.096	0.163	0.217
30.0	4.012	0.105	0.153	0.196
40.0	5.229	0.138	0.120	0.150
50.0	6.676	0.151	0.108	0.124
60.0	8.444	0.212	0.046	0.051
64.4	9.419	0.235	0.024	0.027

Table B.12: Stage-Storage Capacity and Surface Areas with Elevations for Mined-out Tiriganiaq Open Pit 2

Pond Ele. (m)	Pond Volume (Mm^3)	Pond Surface Area (km^2)	Exposed Pit Wall 2D Surface Area (km^2)	Exposed Pit Wall 3D Surface Area (km^2)
-10.0	0.052	0.007	0.078	0.115
0.0	0.133	0.010	0.075	0.110
10.0	0.281	0.016	0.068	0.101
20.0	0.464	0.020	0.064	0.094
30.0	0.741	0.030	0.055	0.080
40.0	1.064	0.035	0.050	0.071
50.0	1.508	0.047	0.037	0.053
60.0	2.013	0.054	0.031	0.041
65.6	2.421	0.079	0.006	0.006

Table B.13: Maximum Catchment Areas for Various Facilities

Facility	Maximum Catchment Area (km^2)
CP1	1.397
CP2	0.031
CP3	0.383
CP4	0.441
CP5	0.617
CP6	0.434
Landfarm	0.006
Landfill	0.012
Tiriganiaq Pit 1	0.319
Tiriganiaq Pit 2	0.158

Table B.14: Final Footprint Areas of Various Facilities

Facility	Final Footprint Area (km^2)
WRSF1	0.414
WRSF2	0.202
WRSF3	0.227
TSF	0.351
OP1	0.028
OP2	0.062
OP3	0.019
Landfarm	0.011
Landfill	0.012

Table B.15: Required Pumping Rates for Selected Pipelines for Water Management

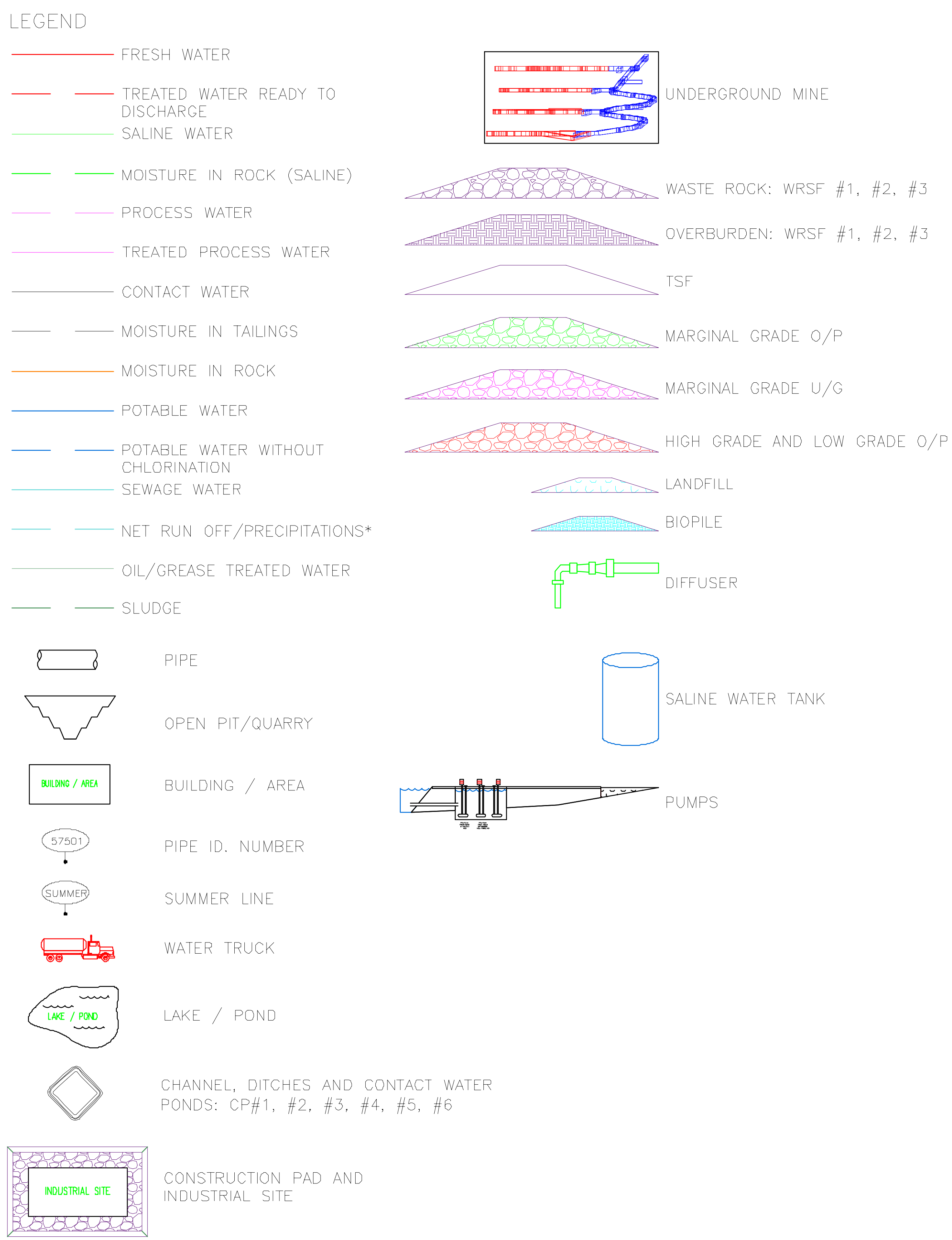
Pipeline ID	Description of Water	Pumping from	Pumping to	Required Minimum Design Pumping Rate (m^3/day)
20205	Underflow Sludge Water from Underground TSS Removal Plant	Underground TSS Removal Plant	Underground Sump	100
20206	Water Pumped from Underground Sump to Underground TSS Removal Plant	Underground Mine Sump	Underground TSS Removal Plant	1,900
20207	Saline Water, after TSS Removal, to Saline Water Tank	Underground TSS Removal Plant	Underground Saline Water Tank	1,900
20208	Excess Salt Water from Underground Saline Water Tank	Underground Saline Water Tank	Short-term storage facility on surface	500
30201	Water Pumped from Tiriganiaq Pit 1 to CP5	Tiriganiaq Pit 1 Sump	CP5	11,100
30202	Water Pumped from Tiriganiaq Pit 2 to CP5	Tiriganiaq Pit 2 Sump	CP5	5,300
61001	Water Pumped from CP3 to Partially Drained Pond H13, then Flowing into CP1	CP3	Partially Drained Pond H13	13,100
65001	Remaining Treated Water Pumped to Outside Environment	WTP	Meliadine Lake	11,600
65002	Sludge Water from WTP to CP1	WTP	CP1	400
66001	Water Pumped from CP5 to CP1	CP5	CP1	37,400

Table B.15: Required Pumping Rates for Selected Pipelines for Water Management

Pipeline ID	Description of Water	Pumping from	Pumping to	Required Minimum Design Pumping Rate (m^3/day)
66002	Water pumped from CP4 to Partially drained Pond H13 , then Flowing into CP1	CP4	Partially Drained Pond H13	15,100
66003	Water Pumped from CP1 to WTP	CP1	WTP	12,000
66004	Water Pumped from CP2 to CP1	CP2	CP1	1,100
66005	Treated Water Pumped from WTP to Mill (Process Plant) as Make-up Water	WTP	Mill (Process plant)	900
66006	Water Pumped from CP6 to CP1	CP6	CP1	14,900
66007	Pre-Treated (Oil) Water from Landfarm/Biopile to CP1	Biopile (Landfarm)	Partially Drained Pond H13or CP1	200
64001	Fresh Water from Meliadine Lake to Fresh Water Tank	Meliadine Lake	Fresh Water Tank	1,400
66008	Fresh Water from Meliadine Lake to Flood Mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2	Meliadine Lake	Mined-out Tiriganiaq Pit 1 and Tiriganiaq Pit 2	38,000 (30,000 for Tiriganiaq Pit 1 and 8,000 for Tiriganiaq Pit 2)

APPENDIX C • WATER MANAGEMENT SCHEMATIC FLOW SHEETS

NO. DESSIN / DRAWING NO 6509-680-200-001_1



PLAN CLÉ / KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

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TITRE / TITLE	# DWG
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AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP	CLIENT
2	2014-08-19	FLOWRATES/BBA PIPE I.D.	SO	FP	
1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-14		SO	FP	
C	2014-07-01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO-EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
LEGENDS

DESSINÉ PAR / DRAWN BY	SERGE OUELLET	DATE 2014-05-2
VÉRIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014-08-1
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014-08-1
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO 6509-680-200-001_1

NO PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6509	0	1 / 9

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FILE NO. 6509-680-200-001-9_R2.dwg

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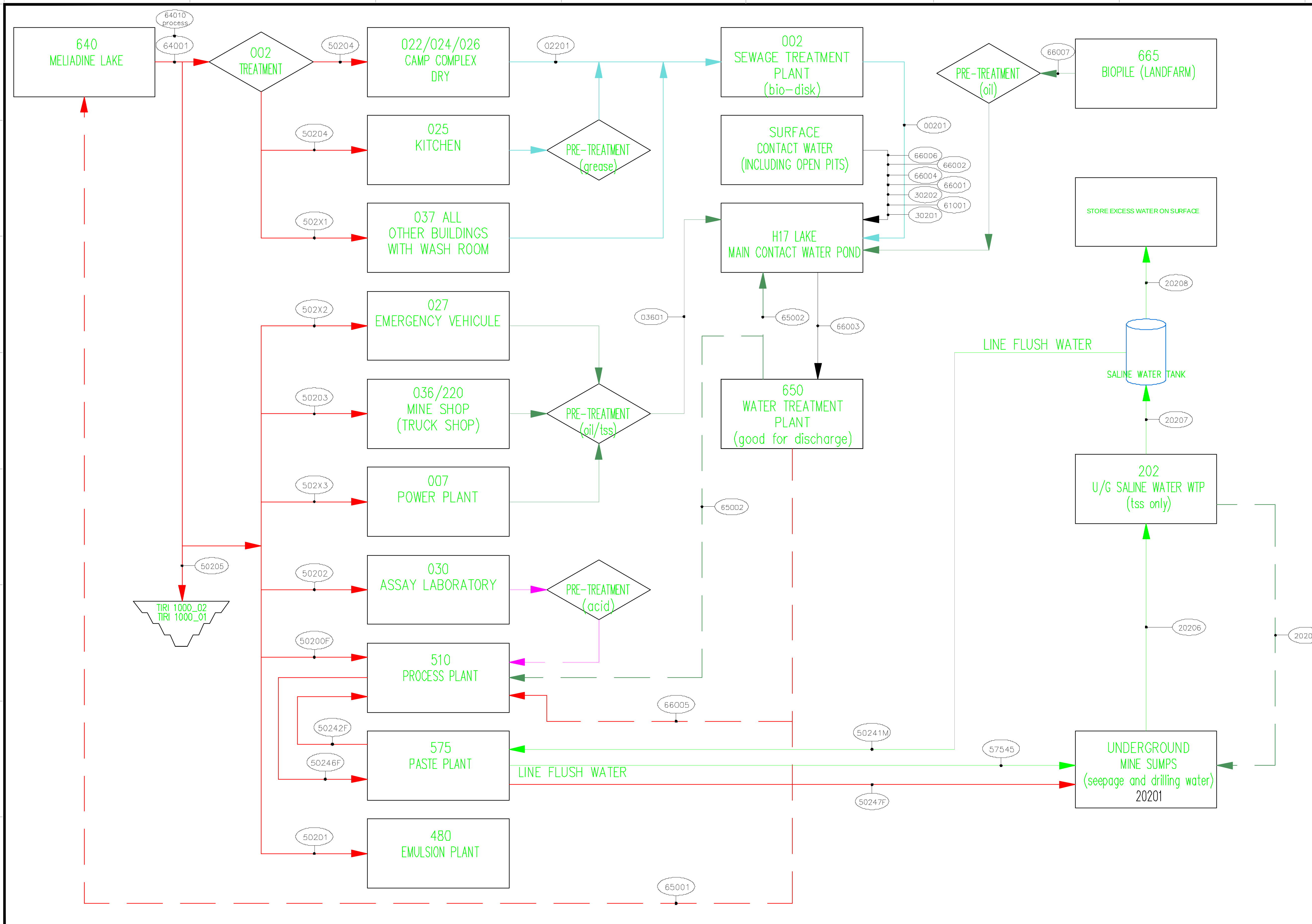

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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
2	2014-08-19	FLOWRATES/EBA PIPE I.D.	SO	FP	
1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-14		SO	FP	
C	2014-07-01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-18	AEM MARKUP	KBB	SO	

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MELIADINE GOLD PROJECT

TITRE / TITLE
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DESSINÉ PAR / DRAWN BY	SERGE OUELLET	DATE 2014-05-23
VÉRIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014-08-19
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014-08-19
ÉCHELLE / SCALE	N/A	DATE

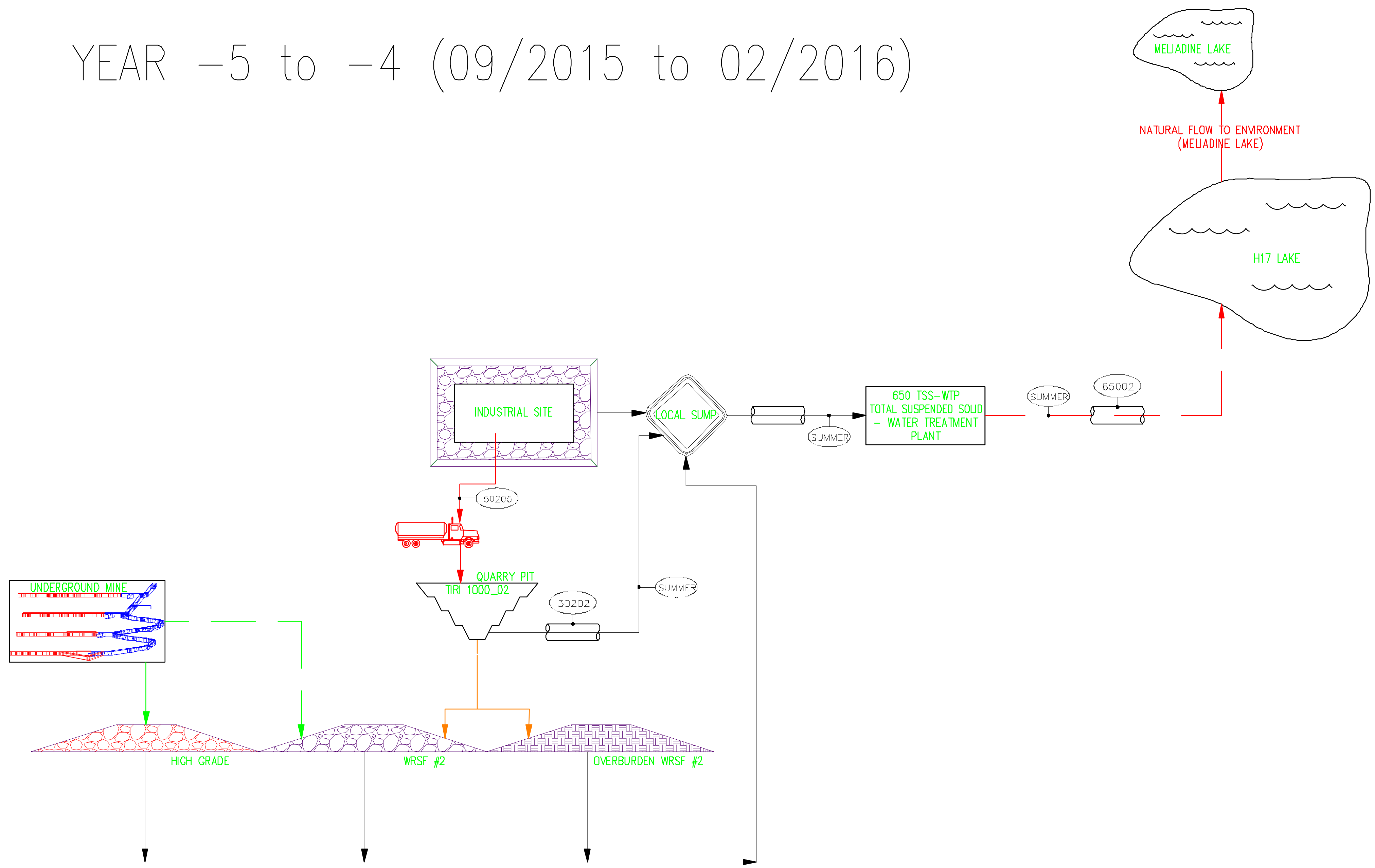
NO. DESSIN / DRAWING NO. 6509-680-200-001_2

NO PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6509	0	2/9

FILE NO. 6509-680-200-001-9_R2.dwg

NO. DESSIN / DRAWING NO 6509-680-200-001_3

YEAR -5 to -4 (09/2015 to 02/2016)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE				
STREAM NO.		30202	50205	65002
WATER	m3/day	5300	7.2	400

NOTES GÉNÉRAL / GENERAL NOTES

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2	2014-08-19	FLOWRATES/EBA PIPE I.D.	SO	FP	
1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-14		SO	FP	
C	2014-07-01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO-EAGLE - MELIADINE DIVISION
680 - WATER MANAGEMENT
200 - FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 1

DESSINE PAR / DRAWN BY	SERGE OUELLET	DATE 2014-05-2
VERIFIE PAR / CHECKED BY	SERGE OUELLET	2014-08-1
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014-08-1
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO 6509-680-200-001_3

NO. PROJET / PROJECT NO. 6509 | REVISION 0 | FEUILLE / SHT 3/9

FILE NO. 6509-680-200-001-9_R2.dwg

NO. DESSIN DRAWING NO 6509-680-200-001_4

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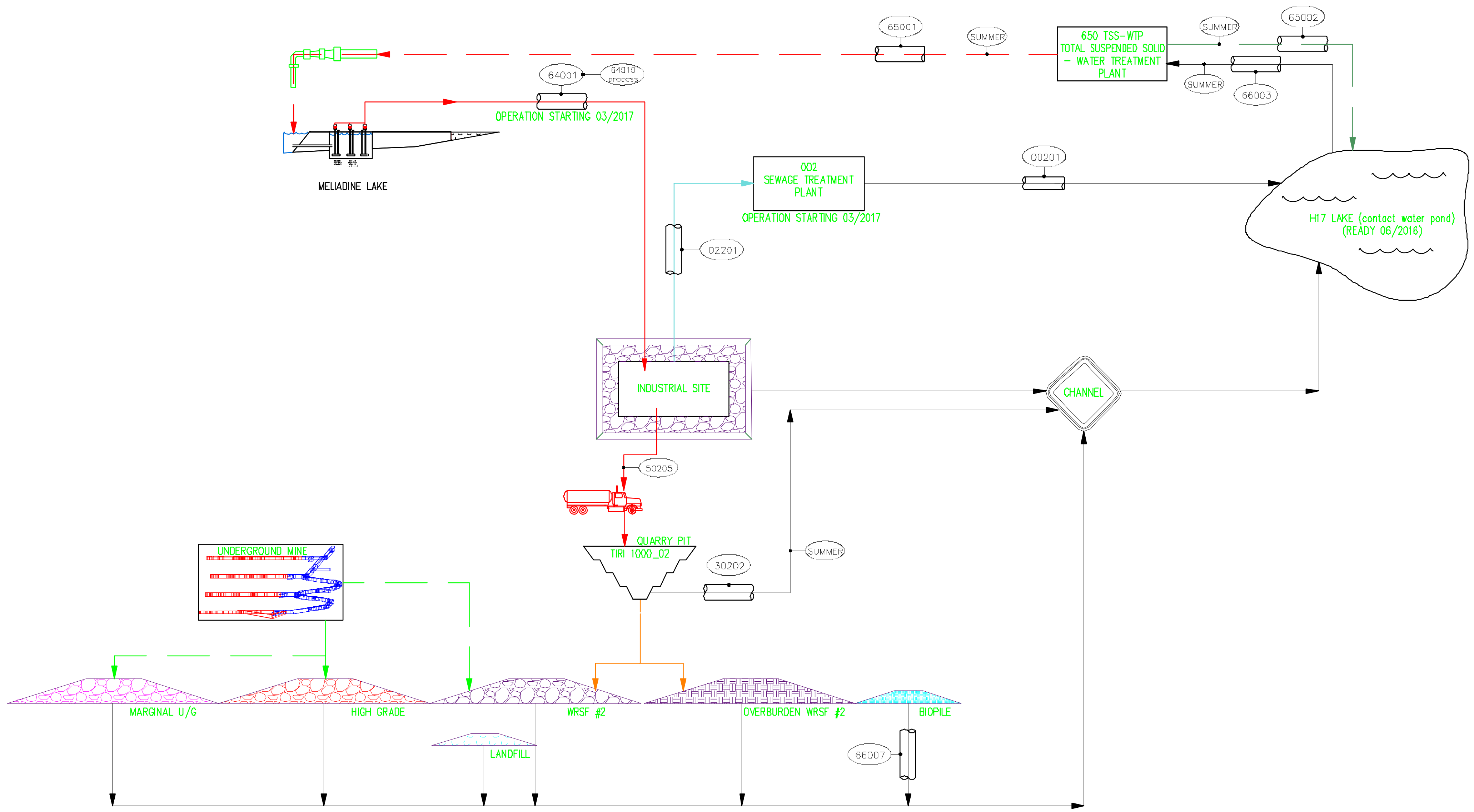
YEARS -4 to -3 (03/2016 to 03/2017)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE										
STREAM NO.		00201	02201	30202	50205	64001	65001	65002	66003	66007
WATER	m3/day	146.4	146.4	5300	7.2	1400	11600	400	12000	200

PLAN CLÉ KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

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AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP	CLIENT
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1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-14		SO	FP	
C	2014-07-01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO-EAGLE - MELIADINE DIVISION
680 - WATER MANAGEMENT
200 - FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 2

DESSINÉ PAR DRAWN BY	SERGE OUELLET	DATE	2014-05-2[illegible]
VÉRIFIÉ PAR CHECKED BY	SERGE OUELLET		2014-06-1[illegible]
APPROUVÉ PAR APPROVED BY	FRANCOIS PETRUCCI		2014-06-1[illegible]
ÉCHELLE SCALE	N/A	DATE	

NO. DESSIN DRAWING NO. 6509-680-200-001_4

NO. PROJET PROJECT NO.	RÉVISION	FEUILLE / SHT
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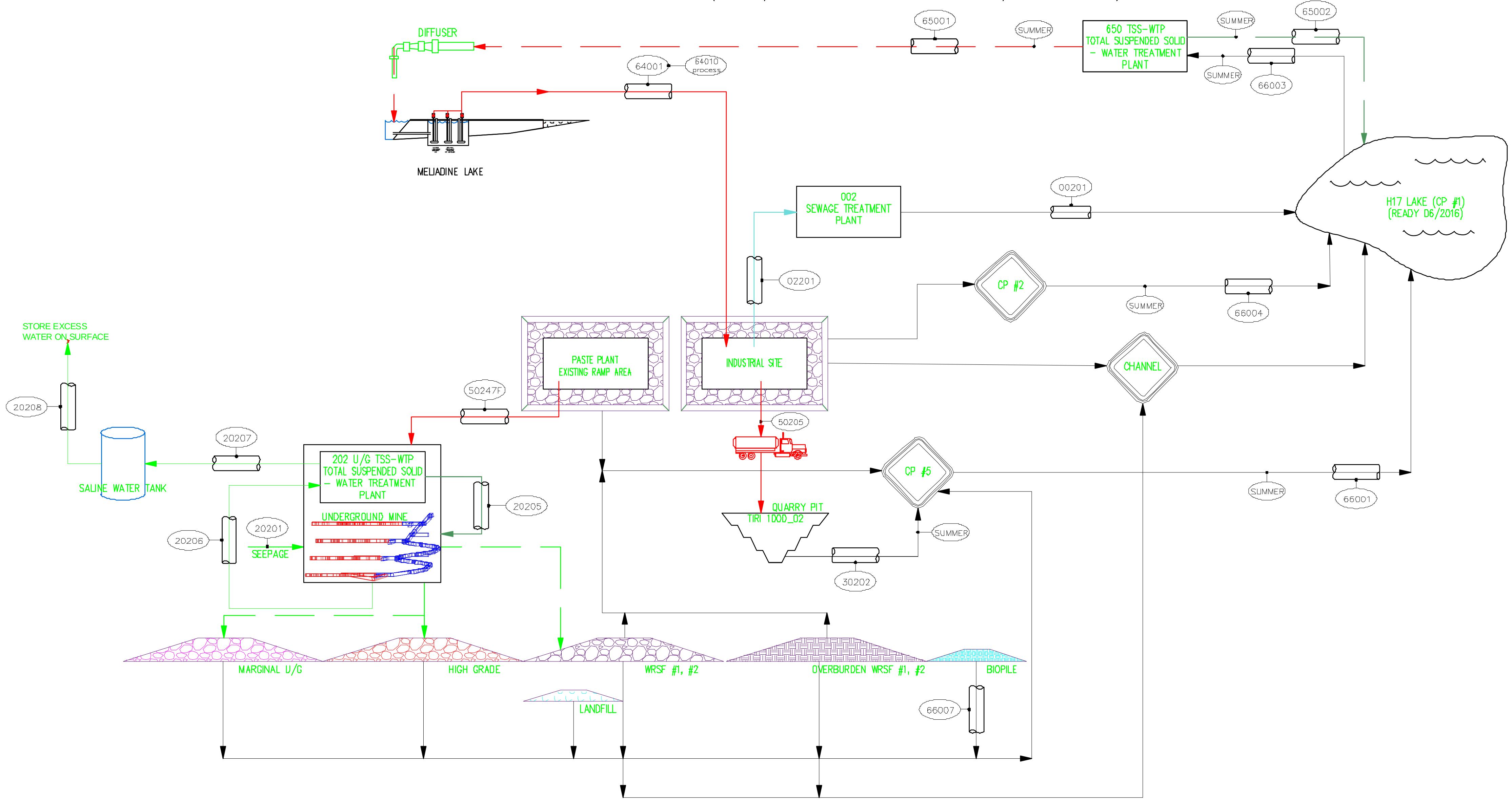
FILE NO. 6509-680-200-001-9_R2.dwg

YEARS –3 to –1 (04/2017 to 09/2019)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE																		
STREAM NO.		00201	02201	20201	20205	20206	20207	20208	30202	50247F	50205	64001	65001	65002	66001	66003	66004	66007
WATER	m3/day	146.4	146.4	525.6	100	1900	1900	500	5300	60	7.2	1400	11600	400	37400	12000	1100	200

PLAN CLÉ / KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
2	2014–08–19	FLOWRATES/EBA PIPE I.D.	SO	FP	
1	2014–07–15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014–07–14		SO	FP	
C	2014–07–01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014–06–18	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

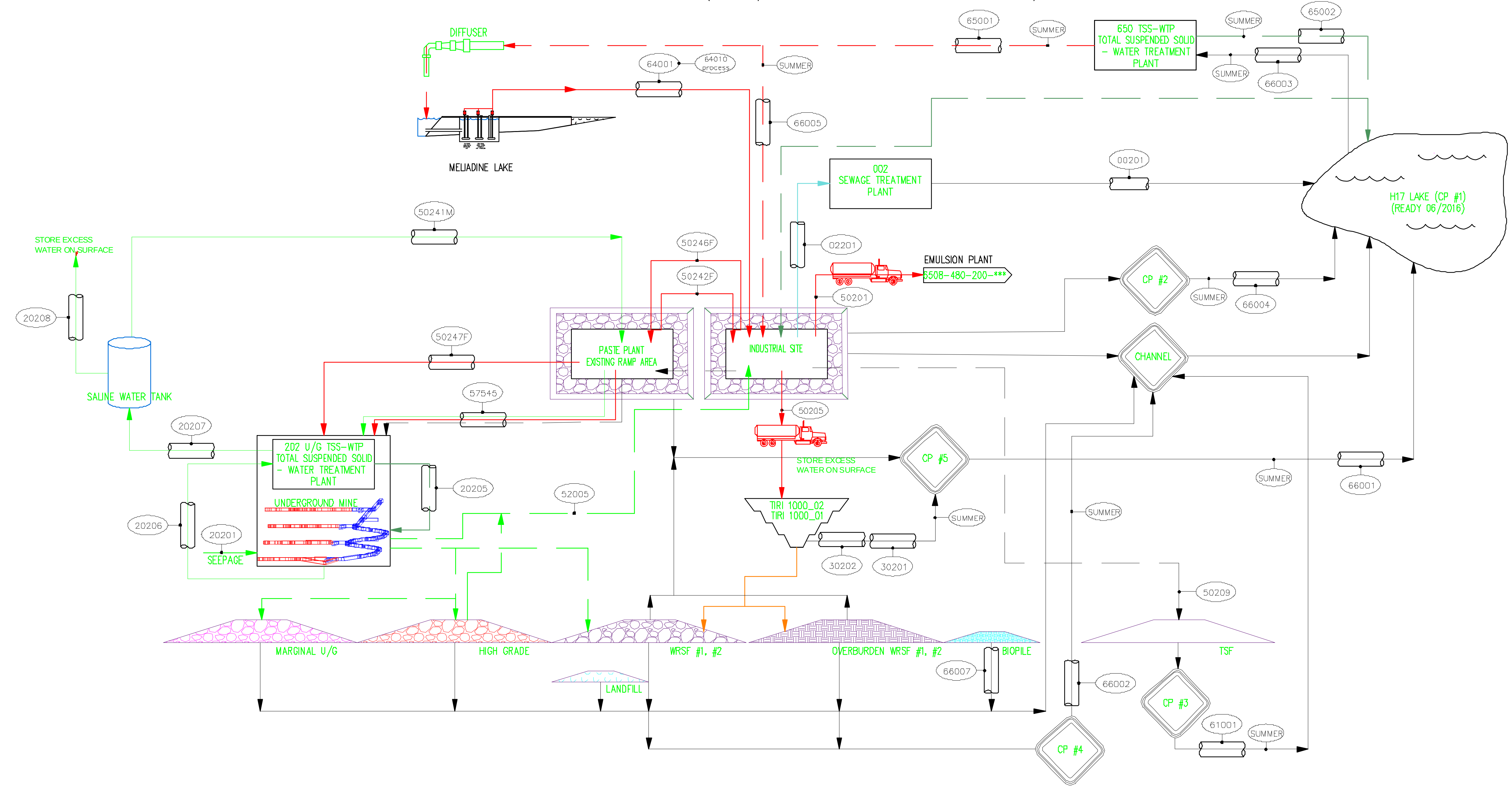
TITRE / TITLE
AGNICO–EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 3

DESSINÉ PAR / DRAWN BY	SERGE OUELLET	DATE 2014–05–28
VERIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014–08–19
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014–08–19
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO. 6509–680–200–001_5

NO PROJET / PROJECT NO.	REVISION	FEUILLE / SHT
6509	0	5/9

YEARS -1 to 3 (10/2019 to 2022)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE

STREAM NO.		00201	02201	20201	20205	20206	20207	20208	30201	30202	50201	50247F	50205	50209	50241M	50242F	50246F	52005	57545	61001
WATER	m3/day	146.4	146.4	525.6	100	1900	1900	500	11100	5300	38.4	60	7.2	960	38	158	158	168	750	13100
STREAM NO.		64001	65001	65002	66001	66002	66003	66004	66005	66007										
WATER	m3/day	1400	11600	400	37400	15100	12000	1100	900	200										

PLAN CLÉ / KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

*: FOR CLARITY, THE NET RUN OFF AND THE PRECIPITATIONS ARE NOT DRAWN BUT MUST BE CONSIDERED WHERE APPLICABLE.

ÉMISSION FINALE NE PAS UTILISER POUR CONSTRUCTION
FINAL ISSUE NOT TO BE USED FOR CONSTRUCTION
DATE: 2014-08-19

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
2	2014-08-19	FLOWRATES/BBA PIPE ID.	SO	FP	
1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-11		SO	FP	
C	2014-07-08	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-18	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO-EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 4

DESSINÉ PAR / DRAWN BY	SERGE OUELLET	2014-05-2[illegible]
VÉRIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014-06-1[illegible]
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014-06-1[illegible]
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO. 6509-680-200-001_6

NO. PROJET / PROJECT NO. 6509 | REVISION 0 | FEUILLE / SHT 6/9

FORMAT ARCHD

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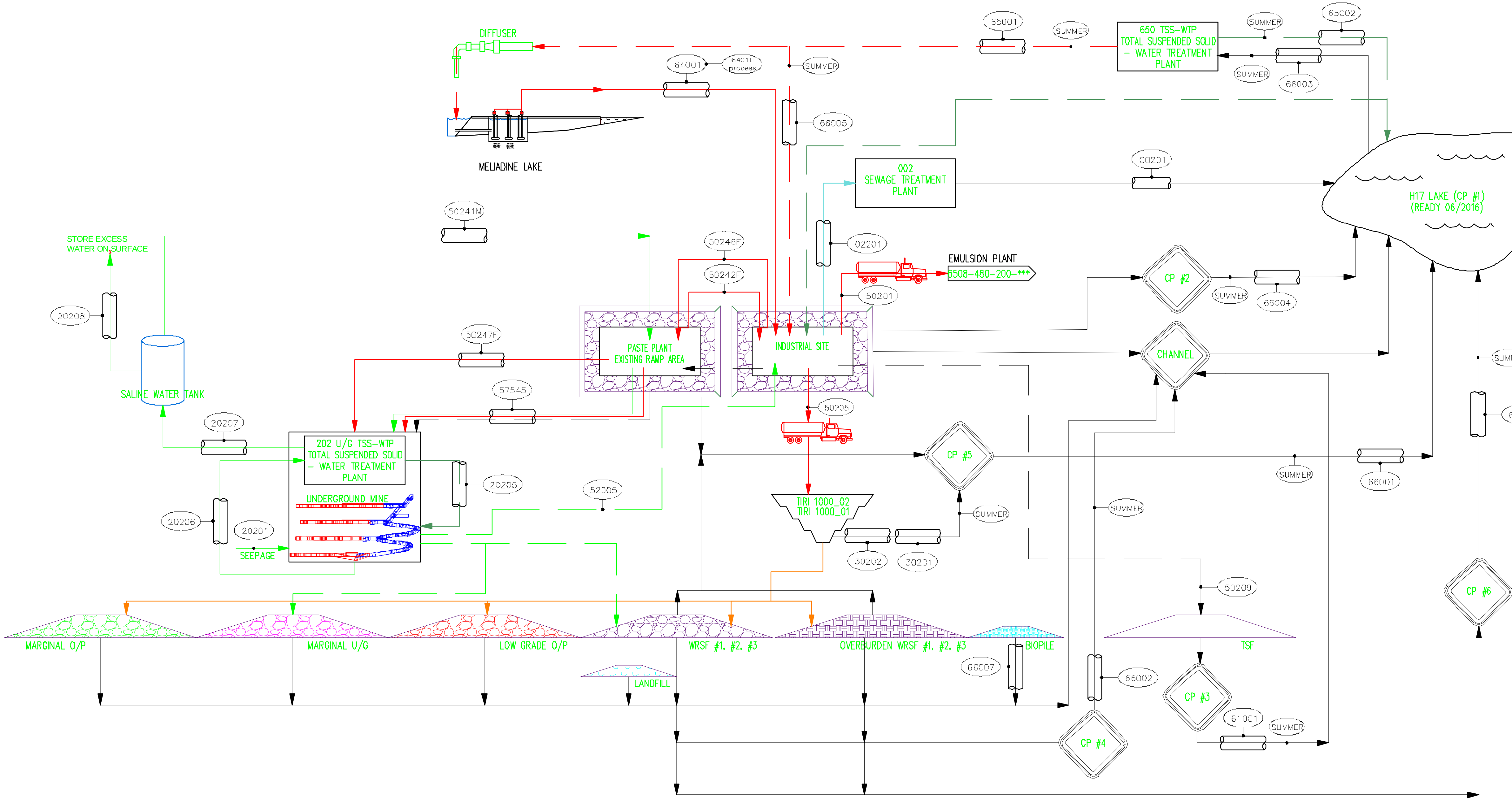
FILE NO. 6509-680-200-001-6_R2.dwg

6509–680–200–001_7

YEARS 4 to 7 (2023 to 2026)



NOTES GÉNÉRAL / GENERAL NOTES

*: FOR CLARITY, THE NET RUN OFF AND THE PRECIPITATIONS ARE NOT DRAWN BUT MUST BE CONSIDERED WHERE APPLICABLE.

ÉMISSION FINALE – NE PAS UTILISER POUR CONSTRUCTION
FINAL ISSUE – NOT TO BE USED FOR CONSTRUCTION
DATE: 2014–08–19

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE

STREAM NO.		00201	02201	20201	20205	20206	20207	20208	30201	30202	50201	50247F	50205	50209	50241M	50242F	50246F	52005	57545	61001
WATER	m3/day	146.4	146.4	525.6	100	1900	1900	500	11100	5300	38.4	60	7.2	960	38	158	158	168	750	13100
STREAM NO.		64001	65001	65002	66001	66002	66003	66004	66005	66006	66007									
WATER	m3/day	1400	11600	400	37400	15100	12000	1100	900	14900	200									

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
2	2014–08–19	FLOWRATES/BBA PIPE I.D.	SO	FP	
1	2014–07–15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014–07–14		SO	FP	
C	2014–07–01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014–06–16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

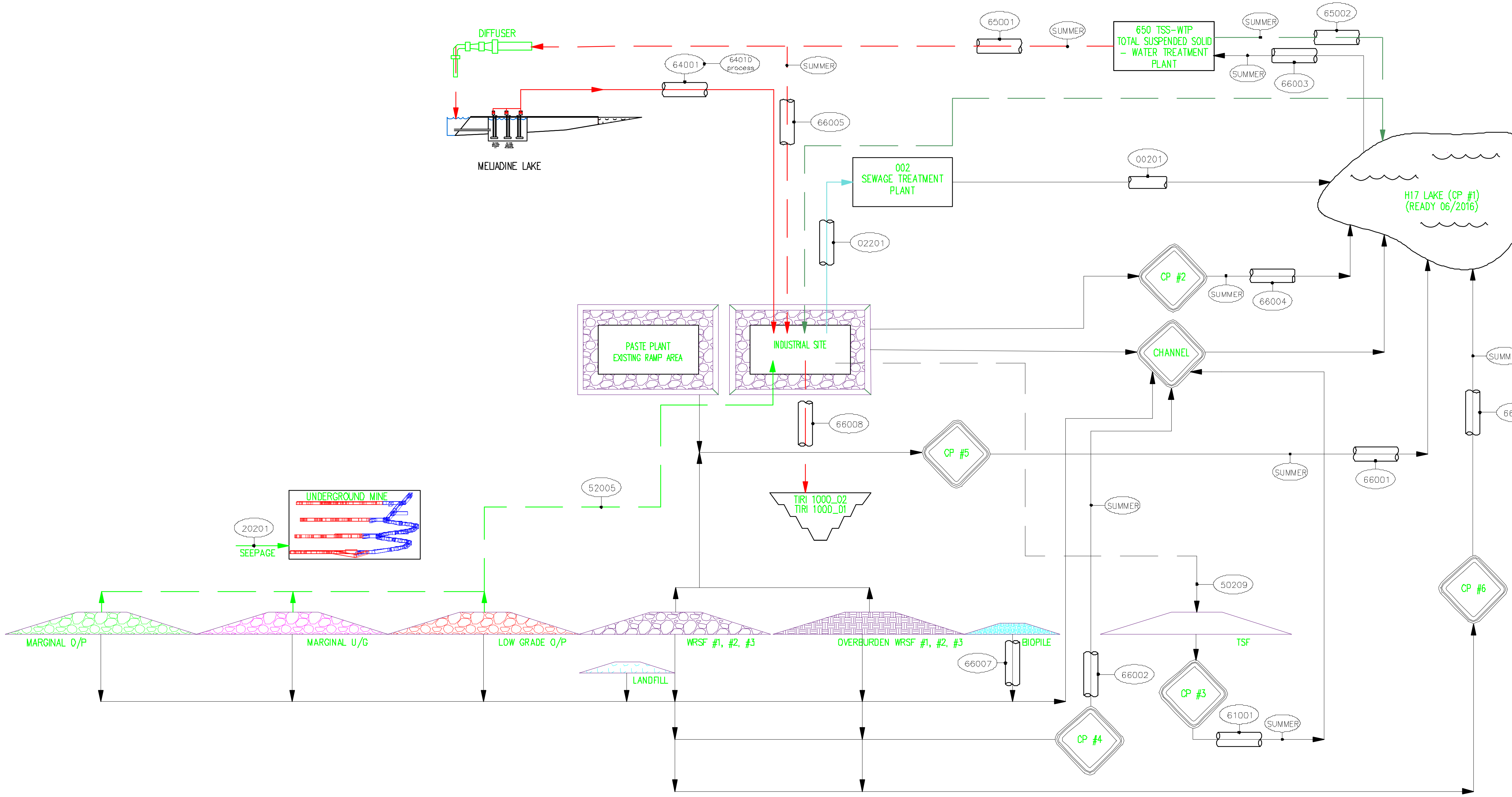
TITRE / TITLE
AGNICO–EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 5

DESSINÉ PAR / DRAWN BY: SERGE OUELLET — DATE: 2014–05–23
VERIFIÉ PAR / CHECKED BY: SERGE OUELLET — 2014–08–19
APPROUVÉ PAR / APPROVED BY: FRANCOIS PETRUCCI — 2014–08–19
ÉCHELLE / SCALE: N/A — DATE:
NO. DESSIN / DRAWING NO.: 6509–680–200–001_7
NO PROJET / PROJECT NO.: 6509 — REVISION: 0 — FEUILLE / SHT: 7/9

NO DESSIN DRAWING NO 6509–680–200–001_8

FORMAT ARCHD

YEAR 8 (2027)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE																		
STREAM NO.		00201	02201	20201	50209	52005	61001	64001	65001	65002	66001	66002	66003	66004	66005	66006	66007	66008
WATER	m3/day	146.4	146.4	525.6	960	168	13100	1400	11600	400	37400	15100	12000	1100	900	14900	200	38000

PLAN CLÉ
KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

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ÉMISSION FINALE
NE PAS UTILISER POUR CONSTRUCTION
FINAL ISSUE
NOT TO BE USED FOR CONSTRUCTION
DATE : 2014–08–19

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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	–

AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP	CLIENT
2	2014–08–19	FLOWRATES/BBA PIPE I.D.	SO	FP	
1	2014–07–15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014–07–14		SO	FP	
C	2014–07–01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014–06–16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO–EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 6

DESSINÉ PAR / DRAWN BY	SERGE OUELLET	DATE 2014–05–2
VÉRIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014–0819
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014–08–1
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO 6509–680–200–001_8

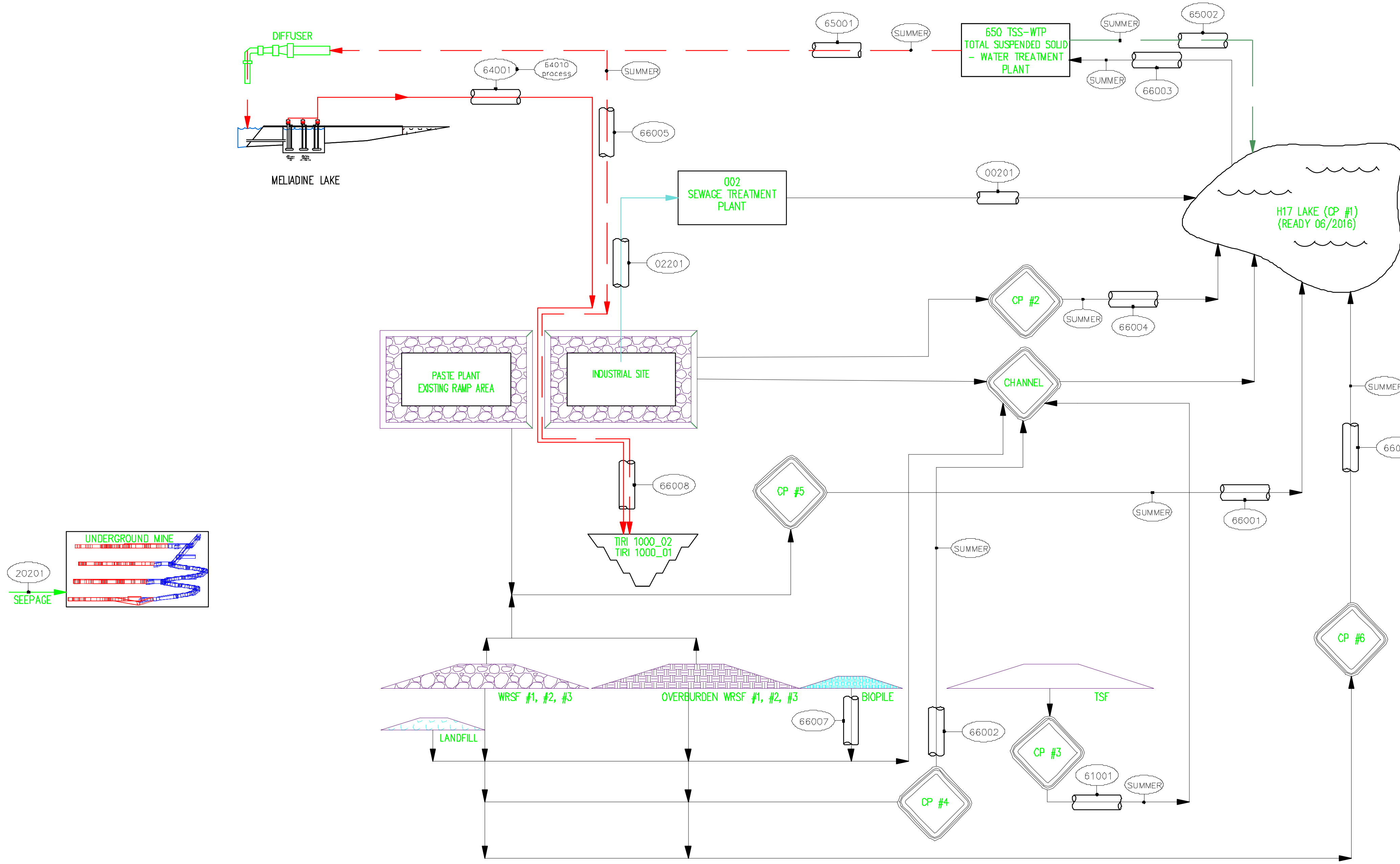
NO PROJET / PROJECT NO. 6509 | REVISION 0 | FEUILLE / SHT 8/9

AE–CART–ARCH D

FILE NO. 6509–680–200–001–9_R2.dwg

NO DESSIN DRAWING NO 6509-680-200-001_9

YEAR 9 to 11 (2028 to 2030: Closure and monitoring)



MAXIMUM ESTIMATED FLOWRATE OVER THE LIFE OF MINE

STREAM NO.		00201	02201	20201	61001	64001	65001	65002	66001	66002	66003	66004	66005	66006	66007	66008
WATER	m3/day	146.4	146.4	525.6	13100	1400	11600	400	37400	15100	12000	1100	900	14900	200	38000

PLAN CLÉ / KEY PLAN

NOTES GÉNÉRAL / GENERAL NOTES

*: FOR CLARITY, THE NET RUN OFF AND THE PRECIPITATIONS ARE NOT DRAWN BUT MUST BE CONSIDERED WHERE APPLICABLE.

ÉMISSION FINALE – NE PAS UTILISER POUR CONSTRUCTION
FINAL ISSUE – NOT TO BE USED FOR CONSTRUCTION
DATE: 2014-08-19

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
	-
	-
	-
	-
	-
	-

AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP	CLIENT
2	2014-08-19	FLOWRATES/BBA PIPE I.D.	SO	FP	
1	2014-07-15	REVISION WITH TETRATECH EBA	SO	FP	
0	2014-07-14		SO	FP	
C	2014-07-01	REVISION WITH TETRATECH EBA	SO	SO	
B	2014-06-16	AEM MARKUP	KBB	SO	

REVISIONS

MELIADINE GOLD PROJECT

TITRE / TITLE
AGNICO-EAGLE – MELIADINE DIVISION
680 – WATER MANAGEMENT
200 – FLOWSHEET
DIAGRAM
WATER MANAGEMENT PLAN
PERIOD 7

DESSINÉ PAR / DRAWN BY	SERGE OUELLET	DATE 2014-05-2
VÉRIFIÉ PAR / CHECKED BY	SERGE OUELLET	2014-08-1
APPROUVÉ PAR / APPROVED BY	FRANCOIS PETRUCCI	2014-08-1
ÉCHELLE / SCALE	N/A	DATE

NO. DESSIN / DRAWING NO 6509-680-200-001_9

NO PROJET / PROJECT NO. 6509 — REVISION 0 — FEUILLE / SHT 9 / 9

FILE NO. 6509-680-200-001-9_R2.dwg

APPENDIX D • SELECTED YEARLY WATER BALANCE DATA

Mine Year	Calendar Year	**Water Retained in Ore (Assumed 3% of Ore Mass)**		**Mill Make-up Water for Ore Processing**		
				Fresh Water	**Reclaim Water**	**Underflow (sludge) Water from WTP to Mill**
		Estimated Water Retained in Ore from Tiriganiaq U/G	Estimated Water Retained in Ore from Open Pits	Fresh Water from Meliadine Lake to Mill for Ore Processing	Treated Water (after TSS Removal) from Water Treatment Plant (WTP) to Mill for Ore Processing	Underflow (sludge) Water from Water Treatment Plant (WTP) to Mill for Ore Processing
		m^3	m^3	m^3	m^3	
Yr -5	2015	0	0	0	0	0
Yr -4	2016	0	0	0	0	0
Yr -3	2017	0	0	0	0	0
Yr -2	2018	0	0	0	0	0
Yr -1	2019	6,071	0	27,127	2,348	520
Yr 1	2020	32,850	0	94,464	50,720	17,134
Yr 2	2021	32,850	0	94,278	49,606	18,434
Yr 3	2022	32,850	0	94,278	47,292	20,748
Yr 4	2023	33,576	20,690	155,742	91,806	20,592
Yr 5	2024	32,935	21,815	157,439	92,758	20,332
Yr 6	2025	29,023	25,727	157,129	92,860	20,540
Yr 7	2026	27,545	27,205	157,129	92,886	20,514
Yr 8	2027	27,225	12,394	111,918	67,072	16,770
Yr 9	2028	0	0	0	0	0

Water Treatment Plant											
		Inflow		Outflow							
				Treated Water					Underflow (Sludge) Water		
Mine Year	Calendar Year	Collected Contact Water to Water Treatment Plant (from Ore Pad Waste Rock/OB piles) (Year -5 only)	Water Pumped from CP1 (Drained Lake H17) to WTP for Treatment	Treated Water Pumped from WTP to Mill as Make-up Water	Treated Water Pumped from WTP to Prepare the Water for Road Dust Control and Emergency Ore Stockpile Freeze Control	Treated Water Pumped from WTP to Mined-out Pits (During Closure)	Treated Water Pumped from WTP to CP1 (Lake H17) (Year -5 only)	Remaining Treated Water Pumped/Flowing to Outside Environment	Sludge to CP1 (Drained Lake H17)	Sludge to Ditches near Overburden WRSF1 only in 2015	Sludge Water from WTP to Mill
		m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	1,963	0	0	0	0	1,912	0	0	51	0
Yr -4	2016	0	470,000	0	0	0	0	457,780	12,220	0	0
Yr -3	2017	0	492,000	0	0	0	0	479,208	12,792	0	0
Yr -2	2018	0	512,000	0	0	0	0	498,688	13,312	0	0
Yr -1	2019	0	501,000	2,348	459	0	0	485,167	12,506	0	520
Yr 1	2020	0	659,000	50,720	459	0	0	590,687	0	0	17,134
Yr 2	2021	0	709,000	49,606	459	0	0	640,501	0	0	18,434
Yr 3	2022	0	798,000	47,292	459	0	0	729,501	0	0	20,748
Yr 4	2023	0	792,000	91,806	459	0	0	679,143	0	0	20,592
Yr 5	2024	0	782,000	92,758	459	0	0	668,451	0	0	20,332
Yr 6	2025	0	790,000	92,860	459	0	0	676,141	0	0	20,540
Yr 7	2026	0	789,000	92,886	459	0	0	675,141	0	0	20,514
Yr 8	2027	0	673,000	67,072	459	0	0	587,971	728	0	16,770
Yr 9	2028	0	693,000	0	459	0	0	674,523	18,018	0	0
Yr 10	2029	0	691,000	0	0	0	0	673,034	17,966	0	0
Yr 11	2030	0	690,000	0	0	0	0	672,060	17,940	0	0

CP1 (Water Collection Pond Including Lake H17 and H6, Final Site Wide Contact Water Collection Pond)																									
		Inflow																						Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground Surface	Net Runoff/Runon Water from Surface Area of Industrial Pad for Camp and Mill Areas	Net Runoff/Runon Water from a Portion of WRSF1 Waste Rock Surface to CP1	Net Runoff/Runon Water from a Portion of WRSF2 Waste Rock Surface to CP1	TSF Tailings Surface Runoff Collected in CP1	TSF Waste Rock Cover Runoff Water Collected in CP1	Seepage Water through Tailings into CP1	Net Runoff/Runon from Landfill to CP1	Net Runoff/Runon Surface Water from Ore Stockpiles (OP1, OP2 and OP3) to CP1	Treated Sewage Water from Sewage Plant (SW) to CP1	Truck Wash Water from Wash Bay/Truckshop to CP1	Pre-Treated (Oil) Water from Landfarm/Biopile to CP1	Treated Water pumped from WTP to CP1 (Year -5 only)	Sludge from Water Treatment Plant to CP1	Water Pumped from CP4 to Partially Drained H13, then Flowing into CP1	Water Pumped from CP3 to Partially Drained H13, then Flowing into CP1	Water Pumped from CP2 to CP1	Water From Open Pit - Tiri_1000_02 to CP1 before YR-3	Water Pumped from CP5 to CP1	Water Pumped from CP6 to CP1	Water Pumped from CP1 to Water Treatment Plant for Treatment	Water Pumped/Flowing to Outside Environment
		m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³	m³
Yr -5	2015	3,848	6,034	0	0	0	0	0	0	0	0	61	0	0	0	1,912	0	0	0	0	0	0	0	0	11,856
Yr -4	2016	2,604	216,383	26,380	33,734	0	0	0	0	0	0	854	0	0	0	0	12,220	0	0	0	12,524	34,545	0	470,000	0
Yr -3	2017	(255)	194,983	35,423	47,324	0	0	0	0	0	1,815	1,187	49,058	0	1,974	0	12,792	0	0	7,205	0	149,695	0	492,000	0
Yr -2	2018	2,523	165,003	67,058	47,324	0	0	0	0	0	1,815	1,674	58,517	0	1,974	0	13,312	0	0	7,205	0	146,169	0	512,000	0
Yr -1	2019	2,706	154,390	60,560	47,324	5,387	0	0	0	0	1,815	3,815	58,517	2,429	1,974	0	12,506	0	0	7,205	0	144,878	0	501,000	0
Yr 1	2020	(3,469)	131,362	53,977	47,324	9,110	0	9,767	3,623	0	1,815	8,454	58,677	9,662	1,974	0	0	87,337	87,568	7,205	0	145,482	0	659,000	0
Yr 2	2021	(4,108)	129,948	51,961	47,324	11,048	0	8,159	5,034	0	3,111	11,696	58,517	9,636	1,974	0	0	60,004	87,568	7,205	0	216,740	0	709,000	0
Yr 3	2022	(3,810)	126,658	57,451	47,324	8,291	0	5,646	7,530	0	3,111	8,881	58,517	9,636	1,974	0	0	53,316	87,568	7,205	0	213,500	106,738	798,000	0
Yr 4	2023	(4,180)	117,092	58,619	47,324	9,848	0	18,028	10,305	0	3,111	11,004	58,517	9,636	1,974	0	0	57,091	80,870	7,205	0	239,708	65,610	792,000	0
Yr 5	2024	(4,304)	99,687	46,207	47,324	19,153	16,183	11,122	16,900	0	3,111	16,021	58,677	9,662	1,974	0	0	62,289	80,870	7,205	0	219,404	70,422	782,000	0
Yr 6	2025	(4,053)	95,418	46,735	47,324	19,621	15,789	13,113	19,892	0	3,111	17,284	58,517	9,636	1,974	0	0	63,000	84,199	7,205	0	219,472	71,273	790,000	0
Yr 7	2026	(4,420)	95,418	46,375	47,324	19,621	18,362	6,199	26,807	0	3,111	16,906	51,684	9,636	1,974	0	0	63,000	84,199	7,205	0	220,133	73,856	789,000	0
Yr 8	2027	(4,442)	95,418	52,027	47,324	19,621	20,643	4,619	28,386	0	3,111	14,815	51,684	0	1,974	0	728	63,000	84,199	7,205	0	105,558	75,909	673,000	0
Yr 9	2028	(5,106)	95,418	70,244	47,324	19,621	20,821	0	34,771	0	3,111	0	51,826	0	1,974	0	18,018	63,000	82,434	7,205	0	105,604	76,223	693,000	0
Yr 10	2029	(4,896)	95,418	70,736	47,324	19,621	20,417	0	34,771	0	3,111	0	51,684	0	1,974	0	17,966	63,000	82,434	7,205	0	105,500	76,223	691,000	0
Yr 11	2030	(5,003)	95,418	69,686	47,324	19,621	20,417	0	34,771	0	3,111	0	51,684	0	1,974	0	17,940	63,000	82,434	4,253	0	105,500	76,223	690,000	0

CP2 (Excavated Pond near LandFarm, Collecting Runoff from the Area Northeast of Industrial Pad Area)						
		Inflow			Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground	Water Pumped from CP2 to CP1	Water Flowing to CP1
		m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0
Yr -4	2016	0	0	0	0	0
Yr -3	2017	0	5,369	1,836	7,205	0
Yr -2	2018	0	5,369	1,836	7,205	0
Yr -1	2019	0	5,369	1,836	7,205	0
Yr 1	2020	0	5,369	1,836	7,205	0
Yr 2	2021	0	5,369	1,836	7,205	0
Yr 3	2022	0	5,369	1,836	7,205	0
Yr 4	2023	0	5,369	1,836	7,205	0
Yr 5	2024	0	5,369	1,836	7,205	0
Yr 6	2025	0	5,369	1,836	7,205	0
Yr 7	2026	0	5,369	1,836	7,205	0
Yr 8	2027	0	5,369	1,836	7,205	0
Yr 9	2028	0	5,369	1,836	7,205	0
Yr 10	2029	0	5,369	1,836	7,205	0
Yr 11	2030	(19)	5,369	1,358	0	4,253

CP3 (Close to Lake B28, Collecting Portion of Contact Water from Dry Stack TSF)									
		Inflow						Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground Surface	TSF Tailings Surface Runoff Collected in CP3	TSF Waste Rock Cover Runoff Water Collected in CP3	Seepage Water through Tailings into CP3	Water Pumped from CP3 to Site Area Ditch, then Flowing into CP1	Water Pumped/Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0	0	0	0
Yr -4	2016	0	0	0	0	0	0	0	0
Yr -3	2017	0	0	0	0	0	0	0	0
Yr -2	2018	0	0	0	0	0	0	0	0
Yr -1	2019	0	0	0	0	0	0	0	0
Yr 1	2020	0	50,894	9,500	22,781	4,393	0	87,568	0
Yr 2	2021	0	50,894	9,302	21,032	6,340	0	87,568	0
Yr 3	2022	0	50,894	9,262	18,902	8,510	0	87,568	0
Yr 4	2023	0	39,842	9,262	19,593	12,172	0	80,870	0
Yr 5	2024	0	39,842	9,166	12,608	19,254	0	80,870	0
Yr 6	2025	0	19,959	9,166	28,713	26,362	0	84,199	0
Yr 7	2026	0	19,959	9,166	17,587	37,487	0	84,199	0
Yr 8	2027	0	19,959	9,166	12,808	42,267	0	84,199	0
Yr 9	2028	0	19,959	9,166	0	53,309	0	82,434	0
Yr 10	2029	0	19,959	9,166	0	53,309	0	82,434	0
Yr 11	2030	0	19,959	9,166	0	53,309	0	82,434	0

CP4 (Close to Lake B8, Collecting Portion of Contact Water from WRSF1)							
		Inflow				Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground	Net Runoff/Runon Water from a Portion of WRSF1 Waste Rock Surface to CP4	Water Pumped/Flowing to Outside Environment	Water Pumped/Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0	0
Yr -4	2016	0	0	0	0	0	0
Yr -3	2017	0	0	0	0	0	0
Yr -2	2018	0	0	0	0	0	0
Yr -1	2019	0	0	0	0	0	0
Yr 1	2020	0	67,388	7,001	12,948	87,337	0
Yr 2	2021	0	26,196	7,001	26,807	60,004	0
Yr 3	2022	0	26,196	7,001	20,119	53,316	0
Yr 4	2023	0	26,196	7,001	23,894	57,091	0
Yr 5	2024	0	26,196	7,001	29,092	62,289	0
Yr 6	2025	0	26,196	7,001	29,803	63,000	0
Yr 7	2026	0	26,196	7,001	29,803	63,000	0
Yr 8	2027	0	26,196	7,001	29,803	63,000	0
Yr 9	2028	0	26,196	7,001	29,803	63,000	0
Yr 10	2029	0	26,196	7,001	29,803	63,000	0
Yr 11	2030	0	26,196	7,001	29,803	63,000	0

CP5 (Water Collection Pond in Drained Lake A54, Collecting Portion of Contact Water from WRSF1 and WRSF2 and Runoff Water Pumped from Two Open Pits)											
		Inflow							Outflow		
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground Surface with Vegetation	Net Runoff/Runon Water from a Portion of WRSF1 Waste Rock Surface to CP5	Net Runoff/Runon Water from Portion of WRSF2 Waste Rock Surface to CP5	Net Runoff/Runon Water from Other Disturbed Ground	Water Pumped from Tiri_1000_01 Open Pit to CP5	Water Pumped from Tiri_1000_02 Open Pit to CP5	Water Pumped to CP1(Collection Pond in Lake H17)	Water Flowing to Mined-out Tiri_1000_02 and Tiri_1000_01 Pits	Water Pumped/Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0	0	0	0	0	0
Yr -4	2016	0	0	0	0	0	0	0	0	0	0
Yr -3	2017	0	98,489	0	0	38,682	0	12,524	149,695	0	0
Yr -2	2018	0	84,810	4,102	0	44,734	0	12,524	146,169	0	0
Yr -1	2019	0	80,423	7,198	0	44,734	0	12,524	144,878	0	0
Yr 1	2020	0	80,423	7,801	0	44,734	0	12,524	145,482	0	0
Yr 2	2021	0	68,238	12,985	0	44,734	78,260	12,524	216,740	0	0
Yr 3	2022	0	68,238	9,745	0	44,734	78,260	12,524	213,500	0	0
Yr 4	2023	0	68,238	11,574	0	44,734	78,260	36,902	239,708	0	0
Yr 5	2024	0	51,934	6,928	4,162	41,217	78,260	36,902	219,404	0	0
Yr 6	2025	0	51,934	7,098	4,061	41,217	78,260	36,902	219,472	0	0
Yr 7	2026	0	51,934	7,098	4,722	41,217	78,260	36,902	220,133	0	0
Yr 8	2027	0	51,934	7,098	5,309	41,217	0	0	105,558	0	0
Yr 9	2028	0	51,934	7,098	5,355	41,217	0	0	105,604	0	0
Yr 10	2029	0	51,934	7,098	5,251	41,217	0	0	105,500	0	0
Yr 11	2030	0	51,934	7,098	5,251	41,217	0	0	105,500	0	0

CP6 (Drained Lake H19, Collecting Contact Water from WRSF3)							
		Inflow				Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Pond Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground	Net Runoff/Runon Water from WRSF3 Waste Rock Surface	Water Pumped from CP6 to CP1	Water Pumped/Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0	0
Yr -4	2016	0	0	0	0	0	0
Yr -3	2017	0	0	0	0	0	0
Yr -2	2018	0	0	0	0	0	0
Yr -1	2019	0	0	0	0	0	0
Yr 1	2020	0	0	0	0	0	0
Yr 2	2021	0	0	0	0	0	0
Yr 3	2022	0	0	0	0	0	0
Yr 4	2023	0	38,329	8,558	18,723	65,610	0
Yr 5	2024	0	38,329	8,558	23,535	70,422	0
Yr 6	2025	0	38,329	8,558	24,386	71,273	0
Yr 7	2026	0	38,329	8,558	26,969	73,856	0
Yr 8	2027	0	38,329	8,558	29,022	75,909	0
Yr 9	2028	0	38,329	8,558	29,336	76,223	0
Yr 10	2029	0	38,329	8,558	29,336	76,223	0
Yr 11	2030	0	38,329	8,558	29,336	76,223	0

Open Pit - Tiri_1000_01 (Pit Operating from YR2021 to YR2026)								
		Inflow					Outflow	
Mine Year	Calendar Year	Net Runoff/Runon Water from Water Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground Surface	Fresh water to Fill Mined-out Pit during Mine Closure	Treated Water Pumped-in to Fill Mined-out Pit during Mine Closure	Water Pumped to CP5 ((Lake A54)	Water Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	0	0	0	0	0	0
Yr -4	2016	0	0	0	0	0	0	0
Yr -3	2017	0	0	0	0	0	0	0
Yr -2	2018	0	0	0	0	0	0	0
Yr -1	2019	0	0	0	0	0	0	0
Yr 1	2020	0	0	0	0	0	0	0
Yr 2	2021	0	11,331	66,929	0	0	78,260	0
Yr 3	2022	0	11,331	66,929	0	0	78,260	0
Yr 4	2023	0	11,331	66,929	0	0	78,260	0
Yr 5	2024	0	11,331	66,929	0	0	78,260	0
Yr 6	2025	0	11,331	66,929	0	0	78,260	0
Yr 7	2026	0	11,331	66,929	0	0	78,260	0
Yr 8	2027	(659)	11,331	61,777	3,068,100	0	0	0
Yr 9	2028	(424)	11,331	40,910	3,068,100	0	0	0
Yr 10	2029	(351)	11,331	27,505	3,068,100	0	0	0
Yr 11	2030	(2,356)	11,331	8,383	0	0	0	0

Open Pit - Tiri_1000_02 (Pit Operating from YR2023 to YR2026)									
Mine Year	Calendar Year	Inflow					Outflow		
		Net Runoff/Runon Water from Water Surface	Net Runoff/Runon Water from Natural Ground with Vegetation	Net Runoff/Runon Water from Other Disturbed Ground Surface	Fresh water to Flood Mined-out Pit during Mine Closure	Treated Water Pumped-in to Flood Mined-out Pit during Mine Closure	Water Pumped to CP5 (Drained Lake A54)	Water Collected and Pumped to WTP (only in YR -5)	Water Flowing to Outside Environment
		m^3	m^3	m^3	m^3	m^3	m^3	m^3	m^3
Yr -5	2015	0	976	987	0	0	0	1,963	0
Yr -4	2016	0	6,173	6,351	0	0	12,524	0	0
Yr -3	2017	0	6,173	6,351	0	0	12,524	0	0
Yr -2	2018	0	6,173	6,351	0	0	12,524	0	0
Yr -1	2019	0	6,173	6,351	0	0	12,524	0	0
Yr 1	2020	0	6,173	6,351	0	0	12,524	0	0
Yr 2	2021	0	6,173	6,351	0	0	12,524	0	0
Yr 3	2022	0	6,173	6,351	0	0	12,524	0	0
Yr 4	2023	0	16,069	20,833	0	0	36,902	0	0
Yr 5	2024	0	16,069	20,833	0	0	36,902	0	0
Yr 6	2025	0	16,069	20,833	0	0	36,902	0	0
Yr 7	2026	0	16,069	20,833	0	0	36,902	0	0
Yr 8	2027	(158)	16,069	19,175	749,000	0	0	0	0
Yr 9	2028	(168)	16,069	12,483	749,000	0	0	0	0
Yr 10	2029	(266)	16,069	8,216	749,000	0	0	0	0
Yr 11	2030	(781)	16,069	2,331	0	0	0	0	0

APPENDIX E • NEAR-FIELD MODELLING AND DIFFUSER DESIGN

March 2015

MELIADINE GOLD PROJECT

Appendix E
Near-Field Modelling and Diffuser Design

Submitted to:
Agnico Eagle Mines Limited
Mines Agnico-Eagle, Division Services Techniques
10200, Route de Preissac
Rouyn-Noranda, Quebec
J0Y 1C0

Report Number: Doc 493-1405283 Ver. 0

REPORT

Golder Associates

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ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
CCME	Canadian Council of Ministers of the Environment
CORMIX	Cornell Expert Mixing System
FEIS	Final Environmental Impact Statement
Golder	Golder Associates Ltd.
MMER	Metal Mining Effluent Regulations
Project	Meliadine Gold Project
TDS	Total Dissolved Solids
TSS	Total Suspended Solids

UNITS

kg/m	kilogram per metre
m	metre
m/s	metre per second
m^3/s	cubic metre per second
mg/L	milligram per litre

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) proposes to construct and operate the Meliadine Gold Project (Project) in Nunavut, approximately 25 kilometres north of Rankin Inlet on Meliadine Lake. Final mine effluent will be released to Meliadine Lake via a diffuser outfall. Agnico Eagle has retained Golder Associates Ltd. (Golder) to update near-field modelling and diffuser design for discharge from the mine into Meliadine Lake as part of a Type-A Water Licence Application.

The objective of this report is to provide analysis of effluent mixing characteristics within Meliadine Lake, and present the diffuser design.

2.0 NEAR-FIELD MODELLING

Near-field modelling was completed as part of the Final Environmental Impact Statement (FEIS) for the Project (Agnico Eagle 2014). Since the FEIS assessment, the expected effluent flow rate and chemistry have changed based on the current mine plan. The model described below has been updated to include these changes. Many of the model boundary conditions and inputs were presented previously in the FEIS (Agnico Eagle 2014).

2.1 Model

The mixing behaviour of mine effluent in the mixing zone (100 metre [m] radius from the outfall) of the diffuser was predicted using the Cornell Expert Mixing System (CORMIX) model (Doneker and Jirka 2007). CORMIX is one of the most extensively used models for predicting plume mixing and dilution of substances in surface waterbodies. This model has been used for conceptual design and analysis of effluent outfalls in other northern Canadian waterbodies. Ambient and effluent water characteristics required to implement the mixing model are presented in Section 2.2. Mixing results from CORMIX are presented in Section 2.3.

Results from CORMIX are generally accurate to within plus or minus 50% with respect to dilutions, concentrations, and effluent plume geometries (Doneker and Jirka 2007). Nevertheless, the model is considered adequate to characterize general central trends of effluent mixing in ambient aquatic environments.

As part of this analysis, a mixing zone with a radius of 100 m was used. This mixing zone is commensurate with the following guidance from the State of Oregon (State of Oregon 2012) and the US Environmental Protection Agency (EPA 1995):

- State of Oregon (2012): mixing zones should have a radius from the outfall of 100 m or less; and
- EPA (1995): mixing zones should have radius from the outfall that is 66 m or less, or have an area that is 5% of less than the lake surface area.

2.2 Input Data

A summary of the input data used in the CORMIX plume delineation model is presented in Table 2.2-1, and discussed in subsequent sections.

Table 2.2-1: Summary of Inputs to Plume Delineation Model

Description		Scenario			Notes
		Open Water, Average Wind	Open Water, Max Wind	Open Water, Stagnant	
Effluent Data					
Temperature	°C	13.5			Average open water temperature.
Total Dissolved Solids	mg/L	2400, 1800, 1200, 600, 300, 35			Varying from maximum allowable to ambient concentration.
Total Suspended Solids	mg/L	15			Maximum allowable concentration from discharge (Government of Canada 2012).
Density	kg/m^3	1001.2, 1000.7, 1000.3, 999.8, 999.6, 999.4			Calculated from temperature, TDS, and TSS (Coles and Wells 2003).
Effluent Flowrate	m^3/s	Maximum = 0.12, Average = 0.047			Estimated maximum and average discharge rates.
Concentration	%	100			Used to evaluate dilution.
Ambient Geometry					
Average Depth	m	9			Open water depth based on bathymetry of Meliadine Lake.
Depth at Discharge	m	9			
Ambient Velocity	m/s	0.18	0.45	0.005	Based on 3% of wind speed.
Wind Speed	m/s	6	15	0	Range of observed wind speed to represent extreme, average, and near stagnant conditions, from Environment Canada climate station Rankin Inlet A (Golder 2014).
Manning's Coefficient	-	0.015			Assumed, typical values for similar waterbodies
Ambient Density Data					
Type	-	Freshwater			-
Temperature	°C	7.5			Average open water temperature.
Total Dissolved Solids	mg/L	35			Median of observations in Meliadine Lake.
Total Suspended Solids	mg/L	3			
Density	kg/m^3	999.9			Calculated from temperature, TDS, and TSS (Coles and Wells 2003).
Discharge Geometry					
Model	-	CORMIX2			-
Nearest Bank	-	Left			-
Distance to Nearest Bank	m	1000			Actual distance approximately 300 m, 1000 m used in model to ensure plume does not interact with shore.
Port Spacing	m	6			Based on preliminary modelling, to ensure plumes do not interact.

Table 2.2-1: Summary of Inputs to Plume Delineation Model (continued)

Description		Scenario			Notes
		Open Water, Average Wind	Open Water, Max Wind	Open Water, Stagnant	
Diffuser Length	m	30			Based on port spacing and number of ports.
Number of Ports	-	6			Based on preliminary modelling.
Vertical Angle	°	45			Common port angle (Doneker and Jirka 2007).
Horizontal Angle	°	Coflow = 0, Crossflow = 90			Used to assess range of plume behavior.
Diffuser Alignment Angle	°	Coflow = 90, Crossflow = 0			
Relative Angle of Ports	°	90			Ports perpendicular to diffuser axis.
Port Diameter	m	0.051 (2 inches)			Used to ensure maximum effluent velocity does not exceed 10 m/s (see Section 2.2.2).
Port Height	m	1			To ensure no interaction with lake bed.

°C = degrees Celsius; m = metre; m/s = metre per second; m^3/s = cubic metre per second; mg/L = milligram per litre; kg/m^3 = kilogram per cubic metre; TDS = total dissolved solids; TSS = total suspended solids

2.2.1 Ambient Conditions

The diffuser is expected to be installed in Meliadine Lake to a depth of at least 9 m; this depth is supported by local bathymetry in the proposed diffuser location (Figure 1). The location of the diffuser was proposed in Golder (2014), based on the following:

- the diffuser location must be at a reasonable distance from Collection Pond 1 for ease of construction and operation of the pipeline conveying mine effluent from that pond to the outfall;
- the location must have a high water depth to promote mixing of the effluent;
- the location must not be within a deep, narrow bowl in the lake, where effluent could be trapped and accumulate; and
- the location must not be within a constrained area, such as a bay within the lake, where the effluent could be trapped and accumulate.

The model assumes the diffuser to be 1000 m from the shore. This distance ensures CORMIX does not model the effluent as a bank attached plume. The actual distance is approximately 300 m to avoid bank attachment in Meliadine Lake.

Effluent mixing will be dependent on ambient currents in Meliadine Lake, which are expected to be driven mainly by wind conditions during the open water period. Wind observations from Environment Canada climate station at Rankin Inlet A were used to determine ambient current velocity (Golder 2014). A lake velocity was calculated using 3% of wind speed for each scenario. The ratio of wind speed to lake currents can vary; however, assuming lake velocities equal to 3% of wind speed is considered reasonable (Wetzel 2001). Both an average and maximum wind speed were used to determine possible lake current velocity, along with a stagnant scenario which considers no wind.

LEGEND

DIFFUSER LOCATION

BATHYMETRIC CONTOURS (5m MAJOR & 1m MINOR)

REFERENCES

BATHYMETRIC CONTOURS BASED ON DATA COLLECTED BY AGNICO EAGLE, DATED 2014.
BASE MAP TAKEN FROM GOOGLE EARTH, AND IS NOT TO SCALE.

CLIENT
AGNICO EAGLE MINES

CONSULTANT
Golder Associates

YYYY-MM-DD	2014-12-03
PREPARED	RP
DESIGN	PB
REVIEW	DRW
APPROVED	-

PROJECT
AGNICO EAGLE MELIADINE GOLD PROJECT
MELIADINE LAKE, NUNAVUT

TITLE
BATHYMETRY OF MELIADINE LAKE IN THE VICINITY OF PROPOSED DIFFUSER

PROJECT No.	SCALE	Rev.	FIGURE
1405283	1:4,000	0	1

Water density affects mixing and is dependent on water temperature and concentrations of total dissolved solids (TDS) and total suspended solids (TSS). Ambient TDS, TSS, and temperature were based on site monitoring data (Golder 2014). An average open water temperature (June to July) and median values of TDS and TSS (35 milligram per litre [mg/L] and 3 mg/L, respectively), were used to calculate ambient density, following the method of Coles and Wells (2003).

2.2.2 Effluent Characteristics

Effluent characteristics are summarized in Table 2.2-1. Maximum and average effluent flow rates were calculated from predicted discharge flows to Meliadine Lake, provided by Agnico Eagle (B. Arseneault, Agnico Eagle, 2014, pers. comm.).

A range of possible effluent TDS was used, along with an average open water effluent TSS concentration, to calculate a range of possible effluent densities, following the method of Coles and Wells (2003). A total of six different possible TDS concentrations were assessed, ranging from baseline Meliadine Lake TDS (35 mg/L) to the estimated maximum effluent concentration (2,400 mg/L).

Prior to treatment in the water treatment plant, effluent will originate from Collection Pond 1, which will be an open waterbody subject to the same climatic elements as any other waterbody on the Meliadine peninsula. Observed water temperatures in the waterbodies of the Meliadine peninsula are assumed to be representative of the range of temperatures expected at Collection Pond 1, and were therefore considered to characterize the mine effluent.

The diffuser port diameter was chosen to avoid exceeding a maximum effluent concentration of 10 metres per second (m/s). This maximum velocity is used to ensure that the effluent plume does not cause lake bed erosion.

2.2.3 Summary of Scenarios

The CORMIX model system assumes steady-state and generally uniform ambient conditions and effluent discharges. As natural systems are expected to vary, several model scenarios were developed to assess a range of possible ambient conditions and changes in effluent. In total, 72 simulations of the CORMIX model were developed from the combinations of the following:

- six possible concentrations of TDS in the effluent:
  - 2400 mg/L, 1800 mg/L, 1200 mg/L, 600 mg/L, 300 mg/L, and 35 mg/L;
- two potential effluent flow rates:
  - maximum (0.12 cubic metre per second [m^3/s]), average (0.047 m^3/s);
- three possible ambient wind conditions:
  - average, maximum, and none; and
- two possible angles of effluent discharge:
  - perpendicular and parallel to lake current.

2.2.4 Sensitivity Analysis

After initial modelling was completed, additional model simulations were performed based on the most limiting scenarios in terms of dilution at 100 m (those with the lowest mixing factor). Additional simulations were completed assuming port heights of 0.5 m and 0 m. It is expected that the diffuser may sink into the lake bed sediments after installation. This sensitivity analysis was completed to understand mixing of the effluent should sinking occur.

2.3 Results

2.3.1 Dilution in the Mixing Zone

A summary of the dilution of effluent at the edge of the mixing zone (100 m) for each scenario modelled are presented in Table 2.3-1. As CORMIX results are considered accurate to within ±50%, the dilution at 100 m is divided by two, to ensure the most conservative results are presented.

Generally, mixing is least under stagnant conditions, where lake velocity is negligibly small (0.0005 m/s). Mixing is greatest under average effluent velocity, and co-flowing conditions. Under stagnant conditions, discharge orientation has a relatively small effect on mixing, compared to non-stagnant conditions. Changes in effluent TDS have a relatively small effect on mixing compared to changes in effluent flow rate, lake velocity, and discharge orientation.

2.3.1.1 Sensitivity Analysis

Additional simulations of the stagnant water, maximum effluent flow rate, co-flowing conditions (simulations 61 to 66) were completed using varied port heights (1 m, 0.5 m, and 0 m). The results of this sensitivity analysis are presented in Table 2.3-2.

The dilution factor was not sensitive to reduction in the port height. The 45° angle of the port directs the plume upwards, reducing the mixing with water below the port. Sinking of the diffuser into soft lake bed sediments is not expected to have a substantial effect on the dilution factor in the plume. However, a port height of approximately 1 m is still recommended to ensure the plume does not erode or disturb lake bed sediments.

2.3.2 Maximum Discharge Concentrations

Using the minimum predicted mixing zone dilution (65 x) and applicable effluent guidelines (Metal Mining Effluent Regulations [MMER; Government of Canada 2012] and Canadian Council of Ministers of the Environment [CCME 1999]), maximum end-of-pipe discharge concentrations can be calculated. These concentration values represent the highest end of pipe discharge concentration that would result in the edge of the mixing zone concentration meeting applicable guidelines. In this case, the edge of the mixing zone is defined as 100 m from the diffuser. The calculated maximum end-of-pipe discharge concentrations for key parameters are presented in Table 2.3-3. Proposed effluent quality criteria for the Meliadine Mine were developed based on these maximum end-of-pipe discharge concentrations, predicted water quality, and MMER limits. The proposed criteria are included in Appendix H of the Water Management Plan.

Table 2.3-1: Summary of Near-Field Dilution

Simulation	Flow Condition	Effluent Flow Rate	Effluent Flow Direction	Effluent TDS	Port Diameter	Effluent Velocity	Dilution at 100 m
	-	-	-	mg/L	m	m/s	x
1	Average	Average	Coflow	2400	0.051	3.8	589
2	Average	Average	Coflow	1800	0.051	3.8	618
3	Average	Average	Coflow	1200	0.051	3.8	618
4	Average	Average	Coflow	600	0.051	3.8	618
5	Average	Average	Coflow	300	0.051	3.8	618
6	Average	Average	Coflow	35	0.051	3.8	618
7	Average	Average	Crossflow	2400	0.051	3.8	562
8	Average	Average	Crossflow	1800	0.051	3.8	581
9	Average	Average	Crossflow	1200	0.051	3.8	582
10	Average	Average	Crossflow	600	0.051	3.8	582
11	Average	Average	Crossflow	300	0.051	3.8	582
12	Average	Average	Crossflow	35	0.051	3.8	582
13	Average	Maximum	Coflow	2400	0.051	9.8	235
14	Average	Maximum	Coflow	1800	0.051	9.8	236
15	Average	Maximum	Coflow	1200	0.051	9.8	243
16	Average	Maximum	Coflow	600	0.051	9.8	250
17	Average	Maximum	Coflow	300	0.051	9.8	250
18	Average	Maximum	Coflow	35	0.051	9.8	238
19	Average	Maximum	Crossflow	2400	0.051	9.8	223
20	Average	Maximum	Crossflow	1800	0.051	9.8	224
21	Average	Maximum	Crossflow	1200	0.051	9.8	228
22	Average	Maximum	Crossflow	600	0.051	9.8	233
23	Average	Maximum	Crossflow	300	0.051	9.8	233
24	Average	Maximum	Crossflow	35	0.051	9.8	226
25	Maximum	Average	Coflow	2400	0.051	3.8	1389
26	Maximum	Average	Coflow	1800	0.051	3.8	1389
27	Maximum	Average	Coflow	1200	0.051	3.8	1389
28	Maximum	Average	Coflow	600	0.051	3.8	1389
29	Maximum	Average	Coflow	300	0.051	3.8	1389
30	Maximum	Average	Coflow	35	0.051	3.8	1389
31	Maximum	Average	Crossflow	2400	0.051	3.8	1355
32	Maximum	Average	Crossflow	1800	0.051	3.8	1355
33	Maximum	Average	Crossflow	1200	0.051	3.8	1355
34	Maximum	Average	Crossflow	600	0.051	3.8	1355

Table 2.3-1: Summary of Near-Field Dilution (continued)

Simulation	Flow Condition	Effluent Flow Rate	Effluent Flow Direction	Effluent TDS	Port Diameter	Effluent Velocity	Dilution at 100 m
	-	-	-	mg/L	m	m/s	x
35	Maximum	Average	Crossflow	300	0.051	3.8	1355
36	Maximum	Average	Crossflow	35	0.051	3.8	1355
37	Maximum	Maximum	Coflow	2400	0.051	9.8	547
38	Maximum	Maximum	Coflow	1800	0.051	9.8	547
39	Maximum	Maximum	Coflow	1200	0.051	9.8	547
40	Maximum	Maximum	Coflow	600	0.051	9.8	547
41	Maximum	Maximum	Coflow	300	0.051	9.8	547
42	Maximum	Maximum	Coflow	35	0.051	9.8	547
43	Maximum	Maximum	Crossflow	2400	0.051	9.8	533
44	Maximum	Maximum	Crossflow	1800	0.051	9.8	533
45	Maximum	Maximum	Crossflow	1200	0.051	9.8	533
46	Maximum	Maximum	Crossflow	600	0.051	9.8	533
47	Maximum	Maximum	Crossflow	300	0.051	9.8	533
48	Maximum	Maximum	Crossflow	35	0.051	9.8	533
49	Stagnant	Average	Coflow	2400	0.051	3.8	70
50	Stagnant	Average	Coflow	1800	0.051	3.8	70
51	Stagnant	Average	Coflow	1200	0.051	3.8	70
52	Stagnant	Average	Coflow	600	0.051	3.8	70
53	Stagnant	Average	Coflow	300	0.051	3.8	70
54	Stagnant	Average	Coflow	35	0.051	3.8	70
55	Stagnant	Average	Crossflow	2400	0.051	3.8	68
56	Stagnant	Average	Crossflow	1800	0.051	3.8	68
57	Stagnant	Average	Crossflow	1200	0.051	3.8	68
58	Stagnant	Average	Crossflow	600	0.051	3.8	68
59	Stagnant	Average	Crossflow	300	0.051	3.8	68
60	Stagnant	Average	Crossflow	35	0.051	3.8	68
61	Stagnant	Maximum	Coflow	2400	0.051	9.8	65
62	Stagnant	Maximum	Coflow	1800	0.051	9.8	65
63	Stagnant	Maximum	Coflow	1200	0.051	9.8	65
64	Stagnant	Maximum	Coflow	600	0.051	9.8	66
65	Stagnant	Maximum	Coflow	300	0.051	9.8	66
66	Stagnant	Maximum	Coflow	35	0.051	9.8	65
67	Stagnant	Maximum	Crossflow	2400	0.051	9.8	67
68	Stagnant	Maximum	Crossflow	1800	0.051	9.8	68
69	Stagnant	Maximum	Crossflow	1200	0.051	9.8	67

Table 2.3-1: Summary of Near-Field Dilution (continued)

Simulation	Flow Condition	Effluent Flow Rate	Effluent Flow Direction	Effluent TDS	Port Diameter	Effluent Velocity	Dilution at 100 m
	-	-	-	mg/L	m	m/s	x
70	Stagnant	Maximum	Crossflow	600	0.051	9.8	67
71	Stagnant	Maximum	Crossflow	300	0.051	9.8	67
72	Stagnant	Maximum	Crossflow	35	0.051	9.8	68

TDS = total dissolved solids; mg/L = milligram per litre; m = metre; m/s = metre per second

Table 2.3-2: Sensitivity Analysis

Simulation	Flow Condition	Effluent Flow Rate	Effluent Flow Direction	Dilution at 100 m	Dilution at 100 m	Dilution at 100 m
				1 m Port Height	0.5 m Port Height	0 m Port Height
	-	-	-	x	x	x
61	Stagnant	Maximum	Coflow	65	65	65
62	Stagnant	Maximum	Coflow	65	65	65
63	Stagnant	Maximum	Coflow	65	65	65
64	Stagnant	Maximum	Coflow	66	66	66
65	Stagnant	Maximum	Coflow	66	66	66
66	Stagnant	Maximum	Coflow	65	65	65

m = metre

Table 2.3-3: Summary of Maximum Discharge Concentrations to Achieve Mixing Zone Objectives

Parameter	Guidelines		Mixing Zone Objective	Meliadine Lake (Average, mg/L)	Maximum Discharge Concentration (mg/L)
	CCME Guidelines[(a)] (mg/L)	MMER Guidelines[(b)] (mg/L)			
Conventional Parameters					
Total Dissolved Solids	500	-	500	35	30,225
Major Ions					
Chloride	120	-	120	6.4	7,384
Fluoride	0.12	-	0.12	0	7.8
Sulphate	500	-	500	2.9	32,312
Nutrients					
Nitrate	13	-	13	0.05	842
Ammonia	3.3	-	3.3	0.05	209
Total Phosphorus	0.03	-	0.03	0.0045	1.7
Cyanide					
Total Cyanide	0.005	1	0.005	0.002	0.2

Table 2.3-3: Summary of Maximum Discharge Concentrations to Achieve Mixing Zone Objectives (continued)

Parameter	Guidelines		Mixing Zone Objective	Meliadine Lake (Average, mg/L)	Maximum Discharge Concentration (mg/L)
	CCME Guidelines[(a)] (mg/L)	MMER Guidelines[(b)] (mg/L)			
Total Metals					
Aluminum	0.1	-	0.1	0.0023	6.4
Arsenic	0.005	0.5	0.005	0.00033	0.3
Cadmium	0.00005	-	0.00005	0.00005	0.00005
Chromium	0.0089	-	0.0089	0.00053	0.54
Copper	0.004	0.3	0.004	0.0011	0.19
Iron	0.3	-	0.3	0.023	18
Molybdenum	0.073	-	0.073	0.00011	4.7
Mercury	0.000026	-	0.000026	0.00002	0.0004
Nickel	0.15	0.5	0.15	0.00067	0.5
Selenium	0.001	-	0.001	0.0001	0.059
Thallium	0.0008	-	0.0008	0.00005	0.049
Zinc	0.03	0.5	0.03	0.005	0.5

Note: mg/L = milligram per litre; m = metre. Maximum discharge concentration based on a minimum dilution factor of 65 times at 100 m from the diffuser.

(a) CCME (1999).

(b) Government of Canada (2012).

3.0 DIFFUSER DESIGN

3.1 Diffuser

The design basis for the diffuser is based on the work outlined in Section 2.0 and is summarized in Table 3.1-1 below.

Table 3.1-1: Diffuser Design Criteria

Description	Value	Unit
Number of diffuser ports	6	-
Port diameter	51	millimetres
Port height from lake bottom[(a)]	1	metres
Port angle of discharge (from horizontal)	45	degrees
Space between ports	6	metres
Overall diffuser length	30	metres
Diffuser pipeline diameter	356	millimetres

[(a)] port height is assuming minimal amount of sinking into the lakebed.

For the purpose of this design, HDPE pipe with a wall thickness of DR11 was assumed for the diffuser pipe. The wall thickness of the diffuser pipe should be the same as that of the pipeline. The diffuser features flanged connections which are rated to 150#. Each individual port is mounted on an HDPE saddle. Figure 2 shows the design of the diffuser.

3.2 Ballast

Because the diffuser is to be constructed of HDPE, a material less dense than water, a ballast system is required to sink it to the bottom of the lake and keep it in place. The diffuser ports are constantly open, so the diffuser itself will remain full of water even if water is not actively being released. As a result of this, the only buoyant force comes from the HDPE pipe itself. The weight per meter of the filled pipe is 97.8 kilogram per metre (kg/m). The weight of the water displaced by the filled pipe is 99.4 kg/m. This results in a buoyant force of 1.6 kg/m of pipe. With a 15% factor of safety, this gives 1.8 kg/m of buoyant force. As the total length of pipe for the diffuser is 31 m, the minimum ballast weight is 57 kilogram (kg).

In the interest of simplicity and having a balanced ballast system, the design calls for four 22.7 kg (50 pounds) pre-cast concrete ballast rings. This gives a total ballast weight of 91 kg, well above the minimum required. Two ring weights will be on either side of the diffuser, spaced 9.5 m apart. Details of the ballast system are seen on the design drawing (Figure 2).

3.3 Constructability

Golder recommends that the diffuser and pipeline be constructed and installed in the summer months while the lake is not frozen. The ballast system is designed such that empty pipe will freely float. As a result, the diffuser and pipe can be constructed on land, towed out into the lake by a boat, and then slowly filled with water for a controlled sink to the bottom of the lake. Pre-cast concrete clamp on weights are recommended for ballast for the pipe, as they are the most economical and simple option. However, constructing the diffuser on the ice can be done, if required, but presents more challenges.

PIPE DIFFUSER PLAN VIEW
SCALE 1:40 mm

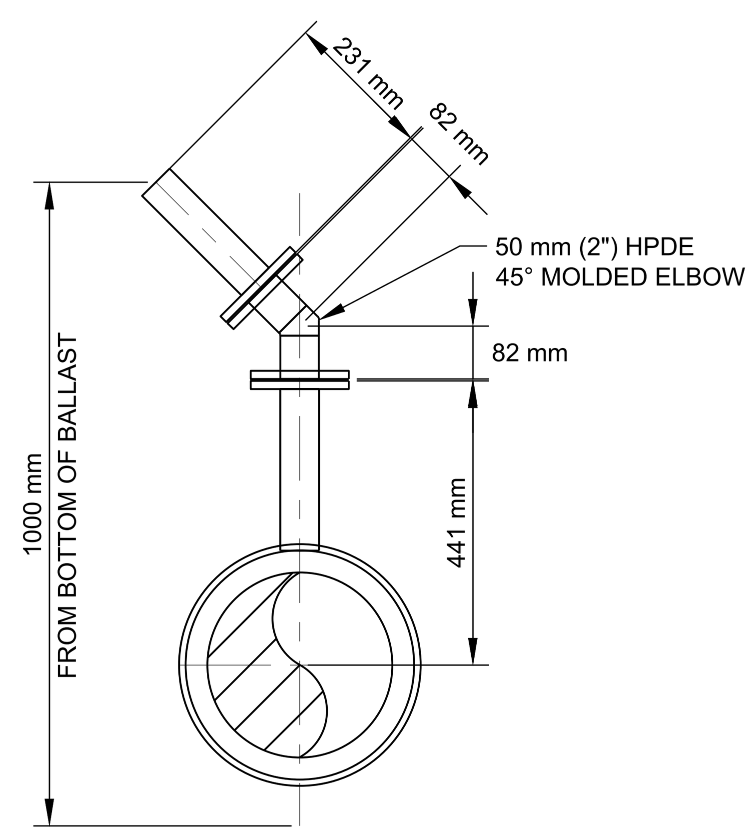
PIPE DIFFUSER ELEVATION VIEW
SCALE 1:40 mm

LEGEND

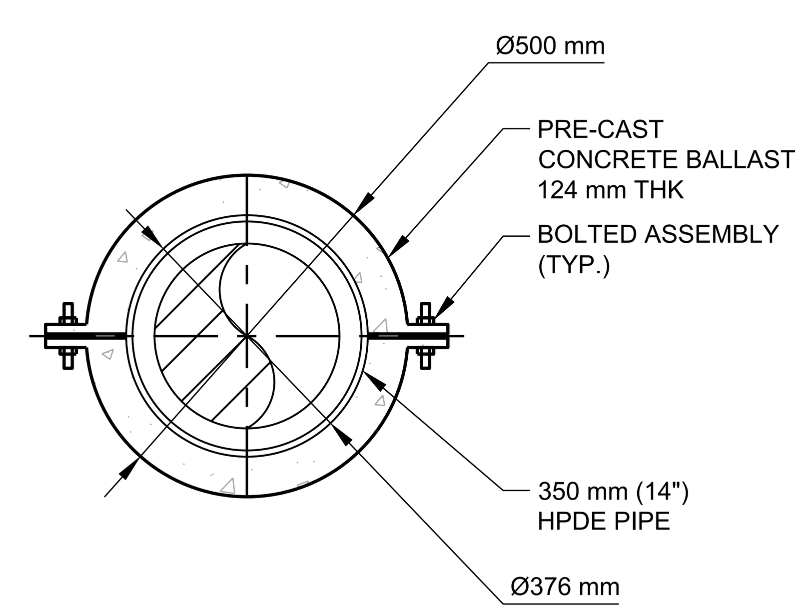
PIPE CENTRELINE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.



SCALE 1:10 mm 1 PIPE DIFFUSER SECTION DETAIL



SCALE 1:10 mm 2 CONCRETE BALLAST SECTION DETAIL

ISSUED FOR PERMITTING

0 2,000 4,000
1:40 MILLIMETRES

0 500 1,000
1:10 MILLIMETRES

Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED
B	2014-12-09	ISSUED FOR CLIENT REVIEW	LYT	PB	DH	DRW
A	2014-12-05	ISSUED FOR INTERNAL REVIEW	LYT	PB	DH	DRW

CLIENT
AGNICO EAGLE MINES LTD.

PROJECT
MELIADINE GOLD

CONSULTANT

GOLDER ASSOCIATES
SUITE 200 - 2920 VIRTUAL WAY
VANCOUVER, BC
CANADA
+1 (604) 296 4200
www.golder.com

TITLE
FIGURE 2: DIFFUSER PIPING DETAIL

PROJECT No.	CONTROL	Rev.	2 of 2	FIGURE
1405283	7000.7600	A		02

Report Signature Page

GOLDER ASSOCIATES LTD.

Paul Beddoes
Environmental Scientist

Daniel Walker
Principal, Senior Water Resources Engineer

David Heikkila
Junior Process Engineer

Janis Drozdiak-Hartnett
Senior Pipeline Engineer

PAB/DW/DH/JDH/vw

https://capws.golder.com/sites/capws2/1114280011meliadine/type a water license/meliadine lake diffuser scope/final diffuser report/1405283_7000_r_01_plumemodelanddiffuserdesign-10dec14.docx

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Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 44 1628 851851
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Ltd.
500 - 4260 Still Creek Drive
Burnaby, British Columbia, V5C 6C6
Canada
T: +1 (604) 296 4200

Golder Associates

APPENDIX F • GROUNDWATER MANAGEMENT ALTERNATIVES

MELIADINE GOLD PROJECT

Appendix F Groundwater Management Alternatives

APRIL 2015

VERSION 1

6513-MPS-11c

TABLE OF CONTENTS

TABLES AND FIGURES

SECTION 1 • INTRODUCTION

Groundwater characteristics at the proposed mine site are summarized in Section 2.5 of the Water Management Plan. Based on the hydrogeological investigations performed to date, estimated passive groundwater inflow rates to the underground mine are provided in Table 1.

Table 1: Estimated Rates of Passive Groundwater Inflow to the Tiriganiaq Underground Mine

Year	Estimated Passive Inflow (m^3/day)[a]
Year -5 to First Quarter of Year -3	0
Second Quarter of Year -3 to End of Year 3	420
Year 4 to Year 7	526

[a] based on data provided in Agnico Eagle (2014); to be re-assessed based on results from the planned 2015 and 2016 hydrogeological investigation program.

A hydrogeological investigation program is planned for 2015 and 2016 (i.e., Year -5 and Year -4) to gather additional information on volumes and quality of the saline groundwater to be managed. A short-term groundwater management plan (i.e, for Year -3 and Year -2) is presented in the Water Management Plan, Section 4.4.7.2. The long-term strategy for the management of groundwater at the Project will be finalized following the hydrogeological investigation and submitted to the Nunavut Water Board for approval in Year -3 (i.e., 2017).

In anticipation of a potential range of results from the planned hydrogeological investigation program, Agnico Eagle is considering several long-term (i.e., for Year -1 to Year 7) groundwater management options based on the potential range of groundwater that could be generated. Further details of these options are provided below.

SECTION 2 • GROUNDWATER MANAGEMENT OPTIONS

The following long-term (i.e., for Year -1 to Year 7) groundwater management options are being considered for the Project based on the potential range of groundwater flows and quality that could be generated. The preferred option will be selected based on the results of the planned hydrogeological investigation program.

The groundwater in the underground mine will be collected within underground sumps. A portion of the water for underground operations (such as drilling and dust control water) will be reused. The excess underground water will be pumped to surface for management.

The results of the hydrogeological investigation program could indicate the volume of inflow will be less than predicted in Table 1, more than predicted or meet current predictions. Dependent on the flow, one or more of the following options could be implemented for the long-term management of groundwater inflows to the underground mine:

- store underground water on-site;
- treat saline groundwater and store/use the brine from the treatment process on-site;
- ocean disposal; and/or
- mix underground with surface contact water prior to release to the receiving environment.

2.1 Store Groundwater on-Site

This option involves storing all excess underground water on surface at the proposed mine site. Depending on the volume and timing of the water, the on-site storage options include an existing pond with hydrology connection severed, lined ponds, bladders, or open pits.

2.2 Treat Saline Groundwater and Store/Use the Brine on-Site

Hatch (2013) investigated groundwater treatment options for the site and concluded that a combination reverse osmosis and mechanical vapour compression evaporator plant would be the most efficient method of treating excess underground water. The treatment plant would have the following two effluent streams:

1) A clean water stream with a salt content below the toxicity for aquatic life. This stream would be discharged to Collection Pond (CP1). The plant would be designed to meet both Canadian federal end-of-pipe discharge criteria (Metal Mining Effluent Regulations – or MMER) and Canadian Surface Water Quality Guidelines (Canadian Council of Ministers of the Environment Guidelines for Aquatic Life [CCME 1999]) at the edge of the mixing zone for the diffuser discharge in Meliadine Lake. The clean water stream could also be used on site for mining/milling processes.

2) Underflow (brine). The brine salt content is expected to exceed the level of toxicity for aquatic life, and would be temporarily stored on-site for return underground following completion of mining.

Based on the potential range of total dissolved solids (TDS) in the underground water discharge, the reverse osmosis plant will have a clean water recovery rate of between 25% and 62% (Hatch 2013). This translates to a brine generation rate of 38% to 75%. Brine would be re-used within the mine whenever possible, with any excess stored on site and returned to the underground at closure.

2.3 Ocean Disposal

The preferred groundwater management option for the Project is to truck excess underground water to Rankin Inlet for ocean disposal. The excess underground water will be treated for TSS and metals, and pumped to a surface tank for temporary storage prior to being trucked to a discharge facility at Itivia Harbour. The discharge facility, located on the shore, would include a heated tank and a pipeline extending to an engineered diffuser located in Itivia Harbour. The underground water would be discharged in a controlled manner through the diffuser to allow for maximum dilution.

A study is currently underway to investigate the potential impacts of ocean disposal, and preliminary study results indicate that the saline groundwater plume resulting from the release of Project underground water in Itivia Harbour would meet both temperature and water quality guidelines with 100 m from the point of discharge (proposed environmental compliance point).

While ocean disposal is Agnico Eagle's preferred option for the management of underground water from the Project, it is recognised that further discussions are required with relevant stakeholders to determine if this approach is feasible under current legislation, specifically the Metal Mining Effluent Regulations (Government of Canada 2012). Agnico Eagle is in communication with Environment Canada to determine the feasibility of this approach. If it is deemed feasible by Environment Canada, Agnico Eagle will submit the appropriate applications for approval, and expects that a screening report and a potential environmental assessment may be required.

2.4 Mix Underground Water with Surface Contact Water Prior to Release to the Receiving Environment

Depending on the volume and quality of the water reporting from underground, it may be possible to blend a certain amount with surface contact water prior to release to the receiving environment, thereby reducing the potential long-term groundwater storage requirements described in Section 1 above. Temporary storage of the underground water would be required on surface so that the blending can proceed in a controlled manner to ensure final discharge criteria for TDS are met. It is anticipated that the blended water would require treatment for total suspended solids (TSS) and metals, if required prior to release to Meliadine Lake. At closure, any underground water stored on surface would be returned underground beginning in Year 8.

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APPENDIX G • MINE SITE WATER QUALITY PREDICTIONS

April 2015

REPORT

Mine Site Water Quality Predictions
Meliadine Gold Project, Nunavut

Submitted to:
Les Mines Agnico Eagle Ltée/ Agnico Eagle Mines Limited
20 Route 395
Cadillac, QC J0Y 1C0

REPORT

Report Number: Doc 498-1405283 Ver 0

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Abbreviation and Acronym List

Agnico Eagle	Agnico Eagle Mines Limited
CP1 to CP6	Collection Pond 1 to Collection Pond 6
CCME	Canadian Council for Ministers of the Environment
CCME-WQG	Canadian Council For Ministers of the Environment Aquatic Life Water Quality Guidelines
Golder	Golder Associates Ltd.
KIA	Kivalliq Inuit Association
km	kilometre
m^3	cubic metres
m^3/day	cubic metres per day
mg/L	milligrams per litre
MMER	Metal Mining Effluent Regulations
Mt	Million tonnes
SSWQO	Site Specific Water Quality Objective
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
USGS	United States Geological Survey
WRSF	Waste Rock Storage Facility

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TABLES

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) is developing the Meliadine Gold Project (the Project), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. The Project is situated on Inuit Owned Land administered by the Kivalliq Inuit Association (KIA), on a peninsula between the east, south, and west basins of Meliadine Lake. The Project is located within the Meliadine Lake watershed of the Wilson Water Management Area (Nunavut Water Regulations Schedule 4).

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 proposed mine will produce approximately 12.1 million tonnes (Mt) of ore, 31.8 Mt of waste rock, 7.4 Mt of overburden waste, and 12.1 Mt of tailings. There are four phases to the development of Tiriganiaq: just over 4 years construction (Q4 Year -5 to Year -1), 8 years mine operation (Year 1 to Year 8), 3 years closure (Year 9 to Year 11), and post-closure (Year 11 forwards). A general location plan of the proposed mine is shown in Figure 1.

Golder Associated Ltd. (Golder) was retained to conduct mine site water quality predictions. The scope of effort includes estimation of mine site water quality for operation and post-closure using the existing water balance model as provided by Agnico Eagle in December 2014.

This report describes the mine site components and mine operation procedures relevant to the water quality predictions (Section 2.0); provides a description of the input values and geochemical controls specified in the model (Section 3.0); summarizes all assumptions made in the modelling process (Section 4.0); and presents a summary of predicted mine contact water quality for contact water ponds during operations and post-closure (Section 5.0).

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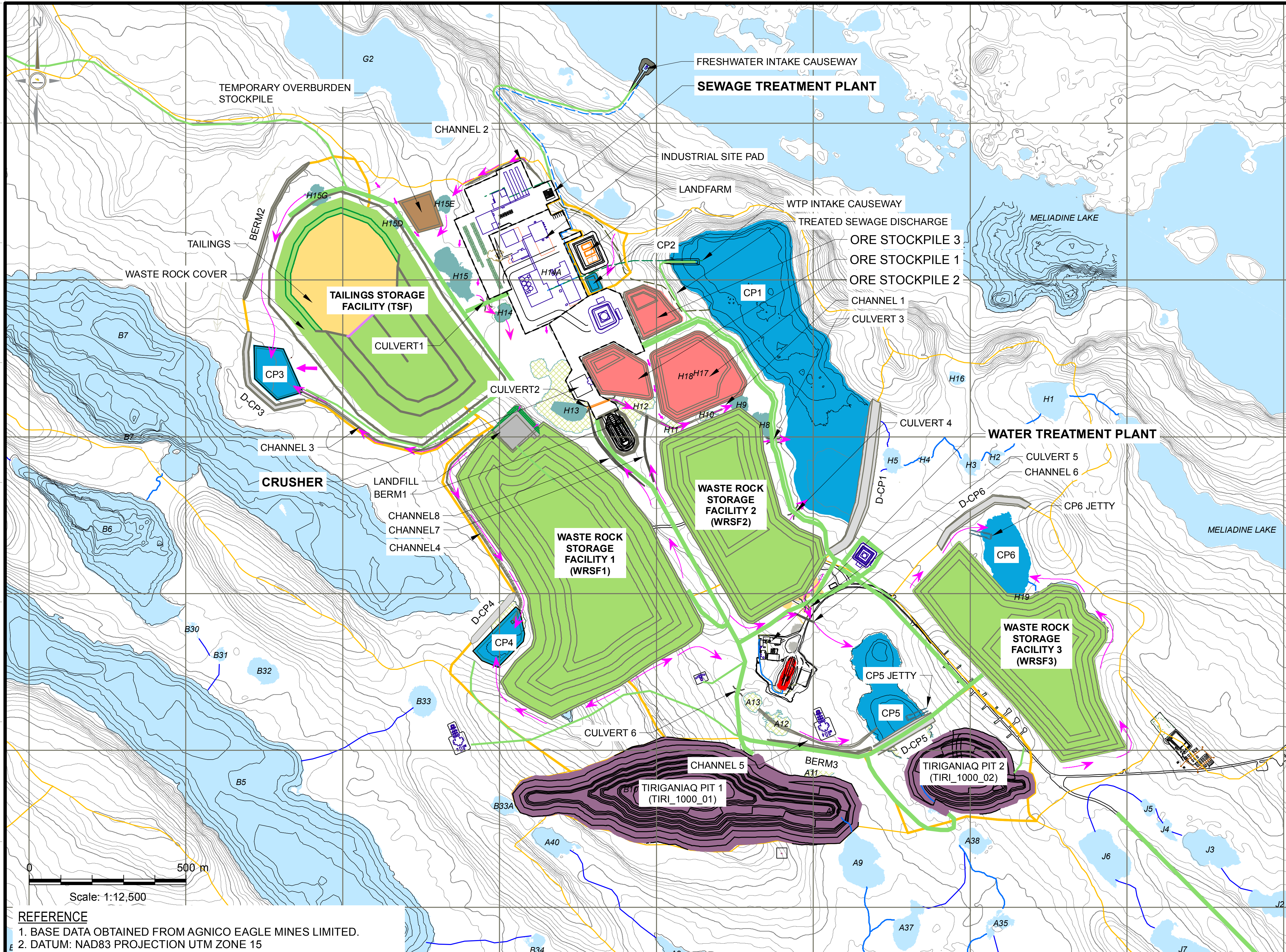

REFERENCE

1. BASE DATA OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. DATUM: NAD83 PROJECTION UTM ZONE 15

LEGEND

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

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TITRE / TITLE	# DWG
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DESSINS EN RÉFÉRENCE/REFERENCE DRAWINGS

REV	DESCRIPTION	DATE	PAR BY
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REVISIONS

DESSINÉ PAR / DRAWN BY	CDB	DATE	05-12-2014
VÉRIFIÉ PAR / CHECKED BY	LY		15-03-2015
APPROUVÉ PAR / APPROVED BY	DRW		15-03-2015
No. PROJET / PROJECT NO.	1405283		
DATE	–		

TITRE / TITLE

AGNICO EAGLE – MELIADINE DIVISION
FIGURE 1 GENERAL SITE PLAN

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2.0 MINE COMPONENTS RELEVANT TO WATER QUALITY PREDICTIONS

The mine components relevant to the mine site water quality predictions are shown on Figures 1 and 2 for operation and post-closure respectively. They include the following:

- two open pits and underground workings from which the Tiriganiaq deposit will be mined (Tiriganiaq Pit 1 and Tiriganiaq Pit 2);
- three Waste Rock and Overburden Storage Facilities (WRSF1, WRSF2, and WRSF3);
- a dry stack Tailings Storage Facility (TSF);
- an industrial site pad and landfarm area;
- three ore stockpiles (OP1,OP2, and OP3);
- Collection Ponds (CP) CP1, CP2, CP3, CP4, CP5, and CP6, which collect mine contact water from all site infrastructures (Table 1). Collection Pond 1 at Lake H17 is the final water collection point prior to discharge to Meliadine Lake via a diffuser; and
- open pit lakes in Tiriganiaq Pit 1 and Tiriganiaq Pit 2 at the end of mine life.

Other infrastructure (roads, pads, berms) are accounted for implicitly in drainages reporting to one of the above water collection points.

A more detailed discussion of key components of the mine site for which assumptions have been made is included in Sections 3 and 4.

Table 1 summarizes the flows received by each collection pond and water collection areas, and lists the individual ponds that constitute each area as defined in the mine water balance received by TetraTech EBA (2014a, 2014b). The water balance and it components are described in Attachment B.

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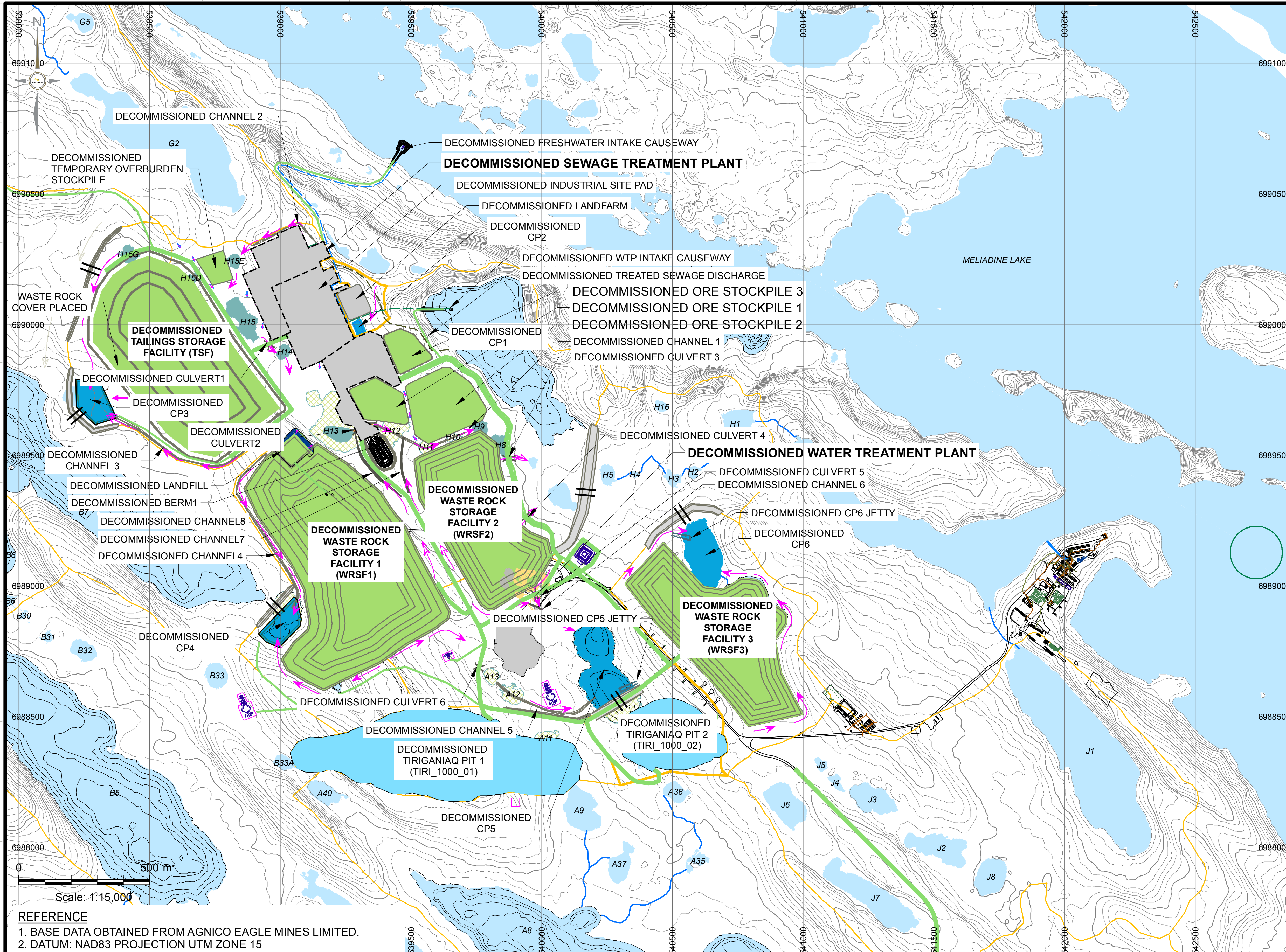

LEGEND

- CATCHMENT BOUNDARY
- SERVICE ROAD
- HAUL ROAD
- NON CONTACT WATERBODY
- DECOMMISSIONED WATER COLLECTION POND
- CONTACT WATERBODY
- DRAINED LAKE AREA
- FLOODED OPEN PIT
- DECOMMISSIONED WASTE ROCK
- DECOMMISSIONED INDUSTRIAL SITE PAD
- STREAM
- BREACHED DIKE/BERM

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REVISIONS

DESSINÉ PAR / DRAWN BY	CDB	DATE	10-12-2014
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No. PROJET / PROJECT NO.	1405283		
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TITRE / TITLE

AGNICO EAGLE – MELIADINE DIVISION
FIGURE 2 POST-CLOSURE
GENERAL ARRANGEMENT PLAN

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
No. DESSIN/ DRAWING NO.	–	REVISION 0	FEUILLE/SHT 1 / 1

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Table 1: Summary of Inflows to Collection Ponds (Attachment B)

Water Collection Points	Inflows Received	Outflow Operation	Outflow Post-closure
CP1	CP2, CP3, CP4, CP5, CP6 Runoff from portions of: Industrial Site Pad WRSF1 and 2 TSF Runoff from ore stockpiles Grey Water from Camp Facilities Non-disturbed area runoff Precipitation on pond surface Treated sewage discharge	Pumped to Meliadine Lake	Natural overflow to Meliadine Lake via the H-basin
CP2	Runoff from Industrial Site Pad and Landfarm Non disturbed area runoff Precipitation on pond surface	CP1	CP1
CP3	Runoff and seepage from TSF Runoff from temporary Overburden Stockpile Non disturbed area runoff Precipitation on pond surface	CP1	Lake B7
CP4	Runoff and seepage from WRSF1 Non disturbed area runoff Precipitation on pond surface	CP1	Lake B7
CP5	Runoff and seepage from portions of WRSF1 and WRSF2 Underground portal area Tiriganiaq open pit 1 and 2 sumps Non disturbed area runoff Precipitation on pond surface	CP1	Part of flooded Tiriganiaq pit. Natural overflow to Lake A38
CP6	Runoff and seepage from WRSF 3 Non disturbed area runoff Precipitation on pond surface	CP1	Natural overflow to Meliadine Lake via the H-basin
Open Pit sumps	Direct precipitation Non disturbed area runoff	CP5	Natural overflow to Lake A9 (Pit 1) and Lake A38 (Pit 2)

CP = collection pond; WRSF = waste rock storage facility; TSF = tailings storage facility

The underground workings at Tiriganiaq are expected to receive groundwater inflow and drilling fluid inflow, both of which are expected to be saline (Golder 2014a). Underground water inflows will not contact surface infrastructures nor be mixed with surface contact waters. As such, neither groundwater nor underground salinity has been accounted for in the water quality model.

Ore generated by the mining activities will be placed in 3 ore stockpiles. The anticipated turn-over of stockpiled ore is expected to be less than 2 years.

3.0 MASS BALANCE INPUT

Inputs to the water quality model are based on information gathered from baseline studies: site water quality data and chemical loading rates derived from laboratory tests on site materials. Where data was not available, data from similar Arctic mine sites (Meadowbank, Diavik, Ekati, Lupin, North Rankin Inlet mines) or conservative assumptions were used.

Table 2 to Table 5 describes the mass balance input parameters used in the water quality model. The composition of each input is tabulated in Attachment A.

Table 2: Summary of Chemical Load Input Parameters

Modelled Flow	Input Type	Source	Value	Reference
Non-Disturbed Area Runoff	Concentration	Average B6-7 stream (1997-2011)	Attachment A, Table A.1	Baseline Water Quality Database (1997-2011)
Initial Concentrations in CP1	Concentration	Average B6-7 stream (1997-2011)	Attachment A, Table A.1	Baseline Water Quality Database (1997-2011)
Waste Rock Stockpiles	Loading rates	Loading rates were calculated for each rock lithology exposed based on laboratory kinetic leaching tests, except gabbro (no kinetic test performed on this rock). A weighted average loading rate was calculated for each WRSF assuming a stock pile lithological composition listed in Table 3 which is based on the July 2, 2014 mine plan from Agnico Eagle.	Attachment A, Table A.2 for loading rates by rock type.	Agnico Eagle (2014c)
		Gabbro constitutes a small proportion of waste and was not subjected to kinetic testing. Loading rate of other waste rock showing similar SFE leaching behaviour (mafic volcanic waste rock column) used to represent gabbro (Figure A.3).	Attachment A, Table A.3 for kinetic test sample contribution to lithological loading rates.	Golder (2014a)
Ore Stockpiles	Loading rates	Loading rates from field leaching cells on ore; average of the first 2 years of data (maximum anticipated storage period).	Attachment A, Table A.2 and Table A.3	Golder (2014a)
Roads and Building Foundation Pads	Concentrations	Average contact water quality off of the existing Pad at Site (2009 – 2010 data; Pad constructed in 2008 from greywacke-siltstone waste rock mined for the development of an underground exploration ramp at Tiriganiaq [Golder 2014a]).	Attachment A, Table A.2	Golder (2014a)

Table 2: Summary of Chemical Load Input Parameters (continued)

Modelled Flow	Input Type	Source	Value	Reference
Open Pit Walls	Loading rates	Same lithological loading rates as waste rock. A weighted average loading rate was calculated based on the proportions of lithological exposures in the final pit outline (Table 3).	Attachment A, Table A.2.	Agnico Eagle (2014b)
Residual Explosives	Concentration/ load of ammonia and nitrate	Fixed concentration in open pit sumps, ore stockpiles and WRSF seepages. Data from Meadowbank Portage open pit, average annual values from 2012. For ore and waste rock, loading rates for ammonia and nitrate calculated by assigning the maximum concentration from the existing pad runoff (Table 10) to the kinetic leaching tests from which a loading rate is calculated.	Attachment A, Table A.1 Attachment A, Table A.2	Agnico Eagle (2014c) Agnico Eagle (2010 and 2009)
Tailings Contact Water Quality	Loading rates	Loading rates calculated from laboratory leaching tests on Tiriganiaq tailings (whole ore). Ore sourced from underground and open pit are differentiated (see Table 5)	Attachment A, Table A.2	Golder (2014a)
Mill Process Water (pore water in mill feed)	Concentrations	Process water quality from metallurgical batch test samples on Tiriganiaq whole ore tailings subjected to cyanide degradation, except: ▪ total cyanide which reflects the expected efficiency of the Meliadine cyanide detoxification plant ▪ ammonia nitrogen from Meadowbank process water reclaim pond, April 2012 data.	Attachment A, Table A.1 CN total: 20 mg/L Ammonia-N: 70.9 mg/L	Golder (2014a) Agnico Eagle (2014c)
Grey Water	Concentrations of ammonia, nitrate, and phosphorous	Assumed fixed concentrations: values taken from Meadowbank Mine Sewage Treatment Plant outflow.	Attachment A, Table A.1	Agnico Eagle (2014d)

The lithology of the rock contributing to chemical loads from each facility where rock is exposed is listed in Table 3. Lithological exposures in the pit walls were estimated by Golder from cross sections through final pit outlines provided by Agnico Eagle. Lithological proportions have been assumed to be constant throughout mine life, while pit wall surface area used for loading rate calculation was provided by Agnico Eagle.

Table 3: Proportion of Rock Types in Exposed Pit Walls, in Waste Rock Storage Facilities, and Ore Stockpiles

Rock Type	WRSF 1	WRSF 2	WRSF 3	Ore Stockpiles	Open Pit 1	Open Pit 2
Overburden	41%	4%	3%	-	-	-
Iron formation	2%	6%	7%	-	-	-
UOTIR	11%	23%	28%	-	21%	48%
Greywacke	34%	49%	37%	50%	34%	52%
Mafic volcanic	11%	18%	25%	-	43%	-
Gabbro	1%	0%	0%	-	3%	-
Lode 1100	-	-	-	25%	-	-
Lode 1000	-	-	-	25%	-	-

Source: Calculated based on *Production Plan* (email from S. Ouellet, November 2014).
WRSF = waste rock storage facility

Rock density values used in the calculation of chemical loads for each material type are summarized in Table 4.

Table 4: Rock Density by Lithology

Lithology	Density (tonnes/m^3)
Greywacke	2.83
Mafic Volcanic	2.84
Ultra Mafic	2.88
Iron Formation	3.06
Gabbro	2.83
Overburden	2.65

Source: Golder (pers. commun, C. Clayton, March 4, 2012).
m^3 = cubic metre

Baseline studies on samples of processed ore from the Tiriganiaq deposit suggest that the chemistry of tailings and process water could differ when ore is sourced from the open pit vs underground. Thus, these two sources were accounted for separately based on Agnico Eagle information on mine waste provenance, listed in Table 5.

Table 5: Proportion of Source Feeds to Mill through Mine Life, Tiriganiaq Ore

Mine Year	Underground Ore	Open Pit Ore
Construction (Years -6 to -1)	100%	0%
1	100%	0%
2	100%	0%
3	100%	0%
4	58%	42%
5	59%	41%
6	52%	48%
7	48%	52%
8	Processing remaining ore in stockpiles	

Source: Calculated based on *Production Plan (2014-11-28).xls* (from S. Ouellet, November 2014).

4.0 WATER QUALITY MODEL

4.1 Model Computations

Mathematical equations relate the contact water flows from precipitation, overland runoff and seepage and runoff from the each infrastructure to the concentration or calculated chemical load from each infrastructure (waste rock, tailings, ore or overburden; described in Section 3.0). The calculations take into account the volume of material (surface area exposed and the depth of contact) and the density of the materials which are adjusted by using leaching factors that aim to represent the true solid-to-water contact that occurs at in the various infrastructures, as follows (Maest and Kuipers 2005; Kempton 2012):

$$ChemicalLoad = \sum_{eachWR}\left[ProportionWR \times LeachRateWR\right] \times SurfaceArea \times \rho \times ActiveZoneThickness \times LeachingRateFactor(s)$$

Where:

ChemicalLoad = calculated loading at given locations

ProportionWR = proportion of given waste rock lithology at the specified location

LeachRateWR = leaching rate of each chemical constituent from the infrastructure, in mg/kg, that contributes to chemical load.

SurfaceArea = surface area of that portion of the facility contributing chemical load or concentration

ρ = density

ActiveZoneThickness = Depth to which annual thaw cycle penetrates (soil and tailings), and depth of rock fracture zone in open pit walls

LeachingRateFactor(s) = adjustment factors that influence the release of chemical mass

The chemical load is multiplied by the volume of water contacting the infrastructure, derived from the water balance (see Attachment B of this report). Runoff on the surface of infrastructures and infiltration through them are modeled separately to reflect the different hydrological processes and chemical loadings that typically occur.

The mathematical equations are mapped in GoldSim (Version 11.1.2) and used to estimate site water quality.

4.2 Modelling Assumptions

Table 6 to Table 9 summarize the modelling assumptions that relate to each infrastructure component of the mine.

Table 6: Waste Rock Storage Facility, Rock Pads, and Ore Stockpiles

Property	Assumptions/Comments	Value	Source
Footprint progression	WRSF1, WRSF2, WRSF3 and ore stockpiles	Maximum surface area at Mining Year 1	Attachment B, this report
Active zone depth	WRSF, overburden, and ore stockpiles	2 m	Attachment B, this report
Physical Properties of Waste rock and ore stockpiles	Porosity of WRSF and ore stockpile Waste rock density	Porosity 0.33 Density: Overburden, in-place:1.62 tonnes/m^3 Waste rock: varies as a function of rock type (Table 4)	Golder (2012) Agnico Eagle (2014c)
Loading rates for mine waste storage areas	Waste rock loading rates applied to areas of exposed rock, while overburden loading rate applied to areas of exposed overburden. Ore loading rates applied to ore stockpile. Infrastructure pads (i.e., plant site and camp areas) are assigned a leachate concentration of the existing rock pad.	Attachment A, Table A.2	Golder (2014a)
Volume of material contributing to mass load	Runoff	Mass load from upper 0.5 m is applied (load-contributing volume is 0.5 x surface area of facility)	Assumed
	Seepage	Mass load from full active depth of 2 m (load-contributing volume is 2 x surface area of facility)	Assumed
Factor applied to loading rates	Grain size factor applied to waste rock seepage and runoff Channelling factor applied to waste rock and overburden for seepage Ore stockpiles: no factors applied to leaching rate because using field cell data (factors are implicit to loading rates)	Grains size factor: 0.1 Channelling factor: 0.1	Kempton (2012)
Site Infrastructure			
Multipurpose Pads	Constructed from Tiriganiaq greywacke-siltstone run of mine waste rock. Assigned leachate concentrations of the existing rock pad. No chemical loading rate factors applied.	Measured concentration of leachate	Assumed
Roads	Constructed from Tiriganiaq greywacke-siltstone run of mine waste rock. Length proportioned to each deposit area as a function of total catchment area. Assigned leachate concentrations of the existing rock pad. No chemical loading rate factors applied.	Width: 3.0 m Length: variable depending on area of catchment. Concentration as measured from Multipurpose Pad	Agnico Eagle (2014c)
WRSF Closure	No cover is placed on WRSF surfaces. No changes to chemical loading rates post closure (same as operation period).		Attachment B, this report

WRSF = waste rock storage facility; m = metre; m^3 = cubic metre

Table 7: Open Pits

Property	Assumptions/Comments	Value	Source
Exposed pit wall area	Maximum surface area of pit (floor and walls) during operation.	Pit 1: 362,151 m^2 Pit 2: 121,900 m^2	Attachment B, this report
Damaged rock zone (active zone)	An active rock thickness is applied to represent the rock zone where fractures allow contact of pit wall runoff with rock.	1 metre	Siskind and Fumanti (1974)
Physical properties of fractured rock	Porosity of rock in place Density of mixed waste rock in open pits (combined per proportions listed in Table 4)	Porosity: 0.005 Density 2.83 t/m^3	Golder (2014a)
Factors applied to leaching rates	Grain size factor to account for blocky pit surface, applied to runoff	Grain size factor: 0.1	Assumed
Post-closure flooding	Flooding of both open pits Once fully flooded, open pit waters naturally overflow to downstream receiving streams.	Flooding water pumped from Meliadine Lake. Period of flooding: 3 years (Years 8, 9, 10)	Attachment B, this report
Post-closure loading rates	During pit flooding a chemical load is transferred to water from the flooded pit surface, assuming the lithological composition presented in Table 3. Chemical loading from the pit walls is assumed to stop once the walls are submerged.	Flooded surface area: variable in time	Attachment B, this report
Flooded pit lake water quality	Post-closure water quality of fully flooded pit represents fully mixed, dissolved concentrations at steady-state conditions during ice-free months. Winter concentrations may be slightly higher because of ice formation. Ice formation is not accounted for in the model.	Calculated in model	Assumed

m^2 = square metre; t/m^3 = tonnes per cubic metre

Table 8: Tailings Storage Facility

Property	Assumptions/Comments	Value	Source
Tailings Footprint	Increase in surface area of tailings and perimeter berm of waste rock	Annual increase up to full footprint in Year 6	Attachment B, this report
Tailings Reactive Zone	Active thickness participating in chemical exchange with surface runoff. Full volume of waste rock berms is active.	0.2 m	Assumed
Tailings Properties	Porosity In place (dry stack) dry bulk density	Porosity: 0.3 Settled dry bulk density: 2.9 t/m^3	Attachment B, this report
Factors Affecting Loading Rates	Operation: channelling factor on runoff Closure: same factors as WRSFs	Channelling factor: 0.5	Assumed
Process Water Content	Proportional combination of process water chemistry except for cyanide (see Table 2), from tailings sourced from underground and open pit ores (Table 5). Full chemical load of process water transferred to runoff water volume over depth of runoff. Accumulation of chemicals in process water from continual recycling is not considered.	Deposited tailings water content: 15%	EBA (2014)
Cyanide and detoxification products	Cyanide destruction will occur prior to deposition (dry stack) of the filtered tailings. The anticipated cyanide treatment level defined by Agnico Eagle is accounted for implicitly in the water quality of the process water. No degradation of cyanide or accumulation of cyanide degradation by-products are assumed.	Attachment A, Table A.1	Agnico Eagle (2014c)
TSF Closure	Progressive capping of TSF with overburden and waste rock waste rock cover assumed to effectively and entirely host the active thaw depth. Waste rock loading rate post-closure. Tailings do not contribute chemical load post-closure.	TSF cap: 0.5 m of overburden 2.5 m of waste rock on surface 3.7 to 4.2 m of waste rock only on the slopes	Attachment B, this report

TSF = tailings storage facility; m = metre; t/m^3 = tonnes per cubic metre

Table 9: Water Collection Ponds

Property	Assumptions/Comments	Source
Water Quality	Reported values at all CPs represent raw, untreated water assuming fully mixed conditions. Suspended solids content (TSS): model results represent dissolved constituent concentrations; the effect of TSS was evaluated (Section 4.2.1). Seasonality: Modelling results presented for ice-free months when flow out of the ponds is likely to occur.	Model Calculation
Geochemical Controls	pH of 8, assigned based on leaching test results on rock, ore, and overburden. Solubility controls are imposed on dissolved iron and aluminum concentrations per geochemical modelling (Section 4.2.1).	Golder (2014a)
CP Discharge During Operation and Post-closure	Operation: All pond waters are pumped to CP1 and CP1 is pumped to Meliadine lake after treatment (as necessary). No overflow or discharge occurs from any pond. Post-closure: water retention berms are breached and ponds no longer hold water. Water flows through the CP basin area to the downstream receiving water body (See Table 1).	Attachment B, this report

CP = collection Pond

4.2.1 Geochemical Controls on Pond Water Quality

Geochemical modelling was carried out on the modelled water quality of all collections ponds (CP1 to CP6) to define the likely upper concentration limit for parameters controlled by solubility.

The United States Geological Survey (USGS) mass transfer and speciation modelling code PHREEQC (Version 2.15.0) (Parkhurst and Appelo 1999) was used for this purpose. PHREEQC calculates aqueous speciation and solubility indices of solutions using the thermodynamic equations of mineral phases, assuming equilibrium conditions between mineral and soluble phases. The user specifies credible mineral phases that are allowed to precipitate (in this case, aluminum and iron oxides and oxyhydroxides and carbonate minerals). PHREEQC returns parameter concentrations remaining after precipitation of the specified mineral phases and the solubility indices (to evaluate if mineral phases are supersaturated or undersaturated) for all mineral phases in the PHREEQC database. This code is widely used and accepted by the scientific and regulatory community.

Interim GoldSim water quality results from each collection pond were used as input to PHREEQC. The water quality with the highest parameter concentrations were used for this purpose. Waters were assigned the following:

- pH 8 and water temperature of 10^{o}C in initial solutions; pH was allowed to equilibrate;
- Redox conditions representative of fully oxidized water (Eh of 400 mV), as expected in open ponds equilibrated with atmospheric oxygen and carbon dioxide. Eh was allowed to equilibrate; and
- The above-mentioned mineral phases were allowed to precipitate when oversaturated, and arsenic was allowed to adsorb onto hydrous ferric oxide when it was supersaturated (adsorption module of PHREEQC, based on Dzomback and Morel 1990).

The PHREEQC results were used to identify parameters subject to solubility control and their upper concentration limits. The highest concentrations resulting from equilibrium with plausible mineral phases were retained as upper concentration limits. Geochemical modelling results including precipitate was assumed to be permanently removed from the mass balance are included in Attachment B, Table B-1. The returned concentrations for iron and aluminum were hardwired into the GoldSim model as upper concentration limits for these parameters in their respective collection ponds. The GoldSim model was then re-run with these upper concentration limits to produce the results presented in Attachment C. Although the concentration of arsenic was predicted to decrease as a results of adsorption on iron oxyhydroxide phases present in the water in the PHREEQC mode, this was not carried through to the mass balance model conducted in GoldSim. In the GoldSim model, no upper limit for arsenic was imposed: arsenic concentrations in ponds may be lower than the predicted results shown in Attachment C.

Pond water quality predictions represent dissolved constituents prior to any treatment. The effect of suspended solids (TSS) on total constituent concentration was evaluated as part of the sensitivity analysis, outside of the GoldSim water quality model. The effect of 15 milligrams per litre (mg/L) TSS (the Metal Mining Effluent Regulations [MMER] monthly mean limit) on total parameter concentrations was evaluated at ponds that discharge to the receiving environment: in CP1 during operation and in CP1, CP3, CP4, and CP6 post-closure. The relative proportions of constituents assumed to be associated with TSS were determined based on average solid phase concentration of either Tiriganiaq waste rock, ore or tailings (the higher of the values was used in combination with the overall analyses results to estimate proportions). Total suspended solids composition per milligram (mg) of TSS was assigned the on a parameter by parameter basis, and 15 mg of this composition was added to the dissolved constituent per unit of water discharged. Results of this sensitivity analysis are presented in Attachment D.

4.3 Model Results Verification

The following quality control measures were incorporated in the modelling effort to verify that the water quality predictions were reasonable:

Comparison to existing Meliadine contact water quality data: The GoldSim model results for maximum and average concentrations at each CP were compared to existing data on mine waste contact water quality, including: laboratory kinetic leaching test data on Tiriganiaq mine wastes (humidity cell tests and large leaching columns), field kinetic leaching test cells and site water quality, including the Tiriganiaq area Pad contact water quality (pad constructed in 2008 of Tiriganiaq greywacke rock). Table 10 presents the maximum concentrations recorded for each contact water quality points, for parameters of environmental interest at Meliadine. Using the chemical scaling factors described in Table 6 to Table 8, the interim GoldSim model results were compared to data in Table 10 to confirm their reasonableness against existing data. The value of the scaling factors where then adjusted to produce concentrations that were within the order of magnitude of the existing contact water quality for each infrastructure (i.e., Tiriganiaq Tailings leachate water quality was used to calibrate results for CP3 water quality; Tiriganiaq ore data for the ore stockpiles; Waste Rock for CP6 and CP4; Vault pit sump for Meliadine pit sumps).

Comparison to, and use of, data from similar mine site: Water quality model results were compared to monitoring data from the Meadowbank mine which has a similar geological setting, some similar lithologies, and similar arsenic content in rock and tailings: open pit sump water, metallurgical process water, grey water, open pit sump water quality. A summary of parameters of interest for Meadowbank's Vault pit sump water is included in Table 10. This open pit is entirely in permafrost where contact waters include direct precipitation and overland runoff.

Table 10: Contact Water Quality Data for Parameters of Environmental Interest (maximum dissolved constituent concentration, mg/L)

	Tiriganiaq Waste Rock		Tiriganiaq Ore	Tiriganiaq Tailings	Rock Pad (Tiriganiaq greywacke waste rock)	Meadowbank Vault Pit Sump[a]
	Kinetic Test leachate	Field Cell Leachate	Field Cell Leachate	Kinetic Test Leachate	Contact Water Quality[b]	Water Quality
Al	0.31	0.03	0.02	0.15	2.1	0.006
As	0.14	0.015	1.2	0.85	0.05	0.013
Ca	31	120	437	126	72	n.a.
Fe	0.05	<0.1	<0.1	0.5	3.3	0.22
SO_4	150	53	466	280	28	150
NH_3-N	n.a.	0.8	16	n.a.	11.6	0.33
NO_3-N	n.a.	2.8	190	n.a.	9.6	46

[a] 2014 biannual monitoring data from Vault pit sump (Agnico Eagle 2014a).

[b] total concentration reported, dissolved concentration not analyzed.

n.a. = not analyzed

4.4 Model Limitations

The level of precision and accuracy of the water quality and mass loading predictions is defined by the precision and accuracy of the input parameters and the conformity of the assumptions to engineering designs. Some limitations to the accuracy of the water quality model include:

Changes to Project or Site Conditions: The project description and site conditions as identified at the feasibility level of the Project are the basis for this model. The data and approach used to estimate water quality are believed to be reasonable based on the current level of engineering design and knowledge about the site. Changes in the Project, mine or waste management, or site conditions will necessarily result in changes to water quality predictions.

Operating Conditions: The actual concentration of cyanide and cyanide by-products (ammonia, nitrate, cyanate, and thiocyanate) in process water will be defined by the metallurgical process, the cyanide detoxification plant, and the degree of process water recycling achieved during operation. These factors will affect parameter concentrations in the water fraction (assumed 5%) discharged with tailings that can be transferred to runoff and to a CP. Similarly, explosives by-products (ammonia and nitrate) in ore stockpiles, the open pit and the WRSFs will depend on the efficiency of explosives management and climate (presence of water) at the mine during operation. Ammonia and nitrate concentrations derived from explosives can be highly variable as observed at other mine sites in the Arctic (i.e., Diavik, Ekati, Meadowbank). The concentrations of arsenic, cyanide products, and thiosalts at CP3 and CP1 will depend on the ability to achieve dry stack tailings. If tailings are discharged at a higher water content than intended and more tailing process water is collected in CP3, the concentration of these parameters is likely to be higher than predicted.

Hydrology of Rock Storage Areas: It was assumed that all the water infiltrating though the stockpile reports to the toe of pile within the same time step. This is not observed at the Meadowbank mine: there is no drainage reporting at the base of the piles after 5 years of operation. The field capacity of the rock pile will cause most of the infiltrated water to be retained within the pile, for a period during operation, thereby reducing the amount of seepage. Full or partial freezing of the pile and its pore water has the potential to further reduce the amount of seepage out of the pile. This smaller water volume transfer from any or all ponds to CP1 would cause the CP1 water quality to differ from that predicted.

System Complexity: Care was taken to incorporate the known processes as they are understood during the feasibility stage of project development. Notwithstanding this, it is expected that some aspects of the site will different from what was modelled. To this end, the mine waste and water management system is designed to contain mine contact water and to allow verification and control of water quality prior to a controlled discharge to Meliadine Lake. Once the proposed mine site is operational, monitoring of water quality will serve to verify the model results and adjust management plans if required.

Given the above uncertainties, the predicted concentrations consist of order-of-magnitude estimates rather than definitive concentrations and the model exercise is intended to guide decision making.

4.4.1 Parameters not Modelled

Only constituents that were present above detection limit in static and kinetic leaching tests (Golder 2014a) are modelled. Mercury was not modelled because all static leaching tests were below the analytical detection limits (which is lower than the Canadian Council of Ministers of the Environment [CCME] aquatic life water quality guidelines [CCME-WQG, verified in November 2014]). Thallium and silver were not modelled because most test results were below analytical detection limits with few exceptions. When detected, thallium and silver were below CCME-aquatic life criteria.

Cyanide degradation products (cyanate, thiocyanate, and thiosalts) are not modelled; their concentration in process water and in CP3 will depend on the efficiency of the cyanide detoxification process, yet to be tested. Given that there will be no process water pond and thus, no substantial bacterial activity to affect process water quality, natural degradation products of cyanide (such as nitrite and nitrate) were not considered.

Saline underground inflows are not considered in the model. It is assumed that these waters will be managed separately from other site contact waters. Underground saline water mixing with surface waters would likely result in increased concentrations of major ions in water, particularly: chloride, calcium, magnesium, sodium, and sulphate.

Total suspended solids were not modelled but an evaluation of the effect of TSS in water to be discharged was completed as described in Section 4.2.1. Results of this assessment are presented in Sections 5.2 and 5.3.

5.0 PREDICTED WATER QUALITY

Water quality results for each CP, the sumps in open pits 1 and 2, and the flooded pit lakes post-closure are presented in Tables C-1 to C-8 in Attachment C and in summary Tables 11 and 12. Predictions represent monthly mean dissolved constituent concentrations during operation and steady-state, summer time mean values 4 years after mining has ceased and pits are fully flooded (post-closure period). Given the uncertainties associated with some of the input data and the use of an average climate year water balance, predictions are considered order-of-magnitude estimates.

5.1 Comparative Water Quality Guidelines

Predicted aqueous concentrations for the operational period are measured against the MMER criteria for all CPs although only CP1 will be released to the receiving environment. The CCME-WQG are not applicable to CP water quality during operation because these waters will be captured and pumped to the main collection pond (CP1) and treated for TSS before discharge in a controlled manner to Meliadine Lake. Water in the other collection ponds will not discharge directly to the receiving environment during operation.

Predicted post-closure water quality is compared to CCME-WQG and to the Site Specific Water Quality Objectives (SSWQOs) for aluminum, arsenic, fluoride, and aluminum developed for the Project. The SSWQO were developed by Agnico Eagle (Golder 2013, 2014b) to assess whether the waste rock consisted of a deleterious substance according to Environment Canada (2013). The outcome of that assessment was that the Meliadine waste rock is not a deleterious substance (EC 2014).

Results are shaded and bolded where concentrations are predicted to exceed the MMER criteria during operation and bolded where they exceed CCME-WQG or SSWQOs for the above stated parameters.

The predictions being order-of-magnitude estimates, concentrations that are of the same order of magnitude as the water license discharge limits should be viewed as potential for being above or below the criteria.

5.2 Operation Phase Model Results

A summary of the predicted water quality for parameters of interest to the site (dissolved concentrations) is presented in Table 11.

Table 11: Summary of Predicted Water Quality for Parameters of Environmental Interest, Operation Period

Collection Pond		CP1 Main Pond		CP3 at TSF		CP4 at WRSF1		CP5 at WRSF2		CP6 at WRSF3	
Statistic		**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**
As	mg/L	0.36	0.10	2.6	0.6	0.29	0.12	0.11	0.04	0.06	0.03
SO_4	mg/L	87	35	387	110	254	106	57	25	27	15
CN total	mg/L	0.11	0.01	0.79	0.09	0	0	0	0	0	0
NH_4-N	mg/L	7.8	4.7	4.9	1.9	36	15	11	6.2	8.5	4.2
NO_3-N	mg/L	9.7	5.7	4.2	1.3	31	13	0.3	0.2	7.3	3.6

CP = collection pond; WRSF = waste rock storage facility; mg/L = milligram per litre

The pH of most contact water streams is expected to be circum-neutral given the low sulphide content and ample carbonate mineral buffering capacity of mine wastes. The TSF pond water is expected to be slightly alkaline with a pH of around 8.

Collection Pond 1 receives all site waters. It is the final contact water collection point prior to discharge to Meliadine Lake via a diffuser. All parameter concentrations are predicted to meet MMER criteria in CP1 with the possible exception of TSS. Although TSS was not specifically modelled, experience at other mine sites suggests that TSS in site contact water may require treatment or attenuation in a settling pond during operation to meet the MMER effluent criteria of 15 mg/L monthly average and 30 mg/L maximum grab sample content. A TSS treatment plant is planned to be operational at Year -4 of the Project.

Dissolved constituent concentrations in most of the other collection ponds also meet MMER monthly mean discharge limits with the possible exception of arsenic, on occasion at CP3. Arsenic concentration in CP3 water may exceed MMER on occasion if precipitation events occur and if runoff is generated. Collection Pond 3 receives contact water from the TSF. Arsenic concentrations may exceed the MMER monthly average or maximum allowable concentration largely because of residual process water assumed to remain in the filtered tailings. Arsenic mobilisation to CP3 can be minimized by effective drying of tailings prior to placement into the TSF. Water from CP3 will be pumped to CP1 where it will mix with other site waters before treatment and discharge. All other parameters in this pond and all parameters in the other ponds meet MMER limits for chemical constituents.

A sensitivity analysis of the effect of 15 mg/L TSS on total parameter concentration shows that total parameter concentrations would be higher than dissolved concentrations but all would still meet MMER at CP1 (Attachment D, Table D-1).

5.3 Post-Closure Phase Model Results

A summary of the predicted water quality for parameters of interest post-closure (dissolved concentrations) is presented in Table 12.

Table 12: Summary of Predicted Water Quality for Parameters of Environmental Interest, Post-Closure Period

Collection Pond		CP1 Main Pond (Lake H17)		CP3 TSF		CP4 WRSF1		CP6 WRSF3		Flooded Pit Lake (Pit 1)		Flooded Pit Lake (Pit 2)	
Statistic		**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**
As	mg/L	0.0057	0.004	0.10	0.09	0.12	0.11	0.032	0.027	0.007	0.004	0.007	0.005
SO_4	mg/L	5.7	4.7	9	9	49	45	13	11	3.0	1.9	4.4	3.0
CN	mg/L	0	0	0	0	0	0	0	0	0	0	0	0
NH_3-N	mg/L	0.89	0.47	3.2	2.8	17	15	4.4	3.6	0.98	0.64	0.84	0.59
NO_3-N	mg/L	0.98	0.46	2.7	2.4	15	13	3.8	3.1	0.84	0.55	0.7	0.5

CP = collection pond; WRSF = waste rock storage facility; mg/L = milligram per litre

The long-term, post-closure water quality in the ponds and in the flooded open pit lakes meet CCME-WQG or SSWQOs in most water collection areas, except for possible concentrations of phosphorous from sewage discharge to CP1 during operation. Arsenic in CP4 (WRSF1 contact water pond) could slightly exceed the SSWQO developed for the site, a criteria which is conservatively protective of the receiving aquatic environment (Golder 2013, 2014b). The exceedances predicted are minor, much less than the mixing capacity in the receiving environment. These arsenic concentrations are within the tolerance levels that have been deemed non deleterious by Environment Canada for the Project (Golder 2013; EC 2014).

The water quality in fully flooded open pit lakes post-closure is predicted to meet CCME-WQG during summer months until the end of the modelling period. This is expected because the open pits are flooded quickly post-mining using water from Meliadine Lake and because only a small surface of pit wall remains exposed post-closure.

Collection ponds CP1 through CP6 will be maintained operational in closure until monitoring demonstrates that water quality is acceptable for direct release to the environment based on the criteria that will be established through the water licensing process. At that time, collection pond berms will be breached and channels will be removed.

The presence of 15 mg/L TSS is predicted to increase total parameter concentrations to higher levels than dissolved concentrations in each ponds. For some parameters (Al, As, Cr, Cu, Fe, Pb), the increase resulted in marginal exceedances to CCME or the applicable SSWQO criteria in some ponds. The actual increase in total vs dissolved concentrations will depend on the composition of the particulates and TSS levels, which will be more accurately evaluated during operation. The sensitivity analysis highlights the potential for guideline exceedances post-closure if TSS is not controlled. The effect of TSS on pit lake total parameter concentrations was not evaluated because these waters are expected to have very low steady-state TSS concentrations post-closure due to the extended residence time of water in the pits.

5.4 Model Uncertainties

The concentration of explosives by-products (ammonia and nitrate) in site contact water is sensitive to the management of blasting agents during their use; the actual concentration of these parameters are likely to vary in time from the predicted values; they will depend on the amount of water in contact with the rock and residues, on explosives type utilized and on explosives management practices during operation.

With recycling of process water, parameter concentrations in the process water could accumulate and their concentration could increase to levels higher than shown in Attachment A, Table A.1. The amount of increase will depend on the water balance at the mill and the level of recycling realized. Process water parameter concentration increase in time has not been considered in the model.

The concentrations of arsenic, cyanide products, and thiosalts at CP3 and CP1 will depend on the ability to achieve dry stack tailings. If tailings are discharged at a higher water content than intended and more tailing process water is collected in CP3, the concentration of these and other tailings process water-derived parameters is likely to be higher than predicted.

Groundwater will be managed separately from other mine contact waters; no mixing of the saline groundwater with surface waters is expected. Should the management of underground water differ and some proportion of it mix with site surface waters, this would likely increase the concentration of salinity-derived elements in the receiving pond, particularly: chloride, sodium, calcium, magnesium, and sulphate.

The turbidity and suspended particulates content of future mine contact water will affect total constituent concentrations. Agnico Eagle will have the controls in place to maintain TSS concentrations in discharge to meet appropriate effluent limits.

The extent to which the dissolution of solids particles in infrastructure materials will occur and the subsequent release of chemical constituents into drainage waters will affect water quality, will depend on the volume of water infiltrating into the stockpile, the contact surface between water and the materials exposed, the dissolution kinetics and the internal characteristics of the piles themselves (e.g., temperature, degree of saturation, presence of ice). This will depend largely on climate, particularly the amount of precipitation and evaporation, and the ambient air temperature. In wet years for example, larger volumes of water may enter waste rock piles and result in the mobilization of greater volumes of mineral dissolution products than in drier years. Likewise, the presence of permafrost and/or ice within the rock voids may inhibit water movement and the mobilization of dissolution products in drainage reporting from the facility.

Given the complex interplay of climate, geochemical processes and pile characteristics, simplifying and conservative assumptions were made in the modelling process. The water quality predictions presented are a reflection of these assumptions. Should some of the mine design elements or management plans change, this would likely result in different contact water qualities.

The purpose of modelling is to help guide decision making and understanding of the potential water quality for the site. While it is believed that the modelling approach and resulting water quality predictions presented herein are justified and appropriate for evaluating potential impacts associated with the Project, actual contact water quality during pre-development, construction, operations, closure, and post-closure will be different than predictions, because of climate, design differences, additional (different) baseline information and daily variations in contact water flows. Monitoring of drainage will take place to verify water quality results and implement adaptive management where or if necessary.

6.0 CLOSURE

We trust the information provided herein is sufficient for your present needs. Should you have any questions or concerns, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

Valérie Bertrand, M.A.Sc., P.Geol. (NT/NU)
Associate, Geochemist

Reviewed by:

Ken De Vos, M.A.Sc. P.Geol. (NT/NU)
Principal, Geochemist

VJB/sg

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ATTACHMENT A

Water Quality Input Parameters

Table A.1
Water Quality Input Parameters
Meliadine Gold Project

		Non-disturbed Area Runoff and Long-term Overburden Contact Water Quality	Grey Water (sewage)	Explosives Contribution to Open Pits and Waste Rock	Disturbed Ground Runoff	Tailings Process Water Quality	
Source Data		Average of samples from B6-7 Stream (Baseline Water Quality Database 1997-2011)	From AEM, Meadowbank Data, Nov 2014	From AEM, Meadowbank Open Pit Data, 2012	Waste Rock Pad Leachate (AEM, J. Wittemann, 2010)	Underground Ore Process Water	Open Pit Ore Process Water
Parameter	**Unit**						
pH	--	7.4	--	--	7.5	8.2	8.2
Alkalinity as $CaCO_3$	mg/L	21	--	--	41.5	92	98
HCO3	mg/L	24	--	--	5.0	---	---
Chloride	mg/L	4.2	--	--	47	20	13
Fluoride	mg/L	-	--	--	-	0	0
OH	mg/L	-	--	--	-	---	---
Dissolved Silicon (Si)	mg SiO2/L	-	--	--	-	---	---
Sulphate	mg/L	2.2	--	--	14.5	2200	1200
CN, total	mg/L	-	--	--	-	20	20
Total Ammonia-N	mg N /L	0.019	10	13.04	2.3	70.9	70.9
Nitrate as N	mg N /L	0.0061	15	24.3	2.2	0.13	0.12
Nitrite as N	mg N /L	--	--	--	0.6	<0.06	<0.06
Nitrate + Nitrite	mg N /L	0.0057	--	--	2.9	---	---
TKN	mg/L	0.34	--	--	-	---	---
Dissolved Phosphorus (P)	mg/L	0.0041	5.5	--	-	---	---
Phosphate	mg P /L	0.0006	--	--	-	---	---
Dissolved Aluminum (Al)	mg/L	0.0008	--	--	0.62	0.12	0.13
Dissolved Antimony (Sb)	mg/L	*<0.5*	--	--	0.0014	0.041	0.032
Dissolved Arsenic (As)	mg/L	0.0002	--	--	0.02	9.7	7.6
Dissolved Barium (Ba)	mg/L	0.003	--	--	0.03	0.086	0.071
Dissolved Beryllium (Be)	mg/L	*<1*	--	--	-	<0.0002	<0.0002
Dissolved Bismuth (Bi)	mg/L	*<0.05*	--	--	-	<0.0001	<0.0001
Dissolved Boron (B)	mg/L	0.02	--	--	-	0.027	0.030
Dissolved Cadmium (Cd)	mg/L	*<0.05*	--	--	-	<0.00003	7.0E-05
Dissolved Calcium (Ca)	mg/L	2.4	--	--	28.7	354	202
Dissolved Chromium (Cr)	mg/L	*<4*	--	--	-	<0.005	<0.005
Dissolved Cobalt (Co)	mg/L	*<0.3*	--	--	0.0031	0.077	0.083
Dissolved Copper (Cu)	mg/L	0.00017	--	--	0.0034	0.03	0.09
Dissolved Iron (Fe)	mg/L	0.013	--	--	1.1	3.1	6.8
Dissolved Lead (Pb)	mg/L	0.00008	--	--	0.006	0.0006	0.0009
Dissolved Lithium (Li)	mg/L	*<5*	--	--	-	-	0.003
Dissolved Magnesium (Mg)	mg/L	0.26	--	--	3.4	5.2	3.5
Dissolved Manganese (Mn)	mg/L	0.0013	--	--	0.12	0.011	0.007
Dissolved Mercury (Hg)	mg/L	*<0.02*	--	--	-	---	---
Dissolved Molybdenum (Mo)	mg/L	0.00017	--	--	-	0.051	0.058
Dissolved Nickel (Ni)	mg/L	0.00017	--	--	0.010	0.012	0.007
Dissolved Potassium (K)	mg/L	0.16	--	--	3.6	53.40	52.90
Dissolved Selenium (Se)	mg/L	0.0004	--	--	0.0014	0.01	0.01
Dissolved Silver (Ag)	mg/L	*<0.02*	--	--	0	---	---
Dissolved Sodium (Na)	mg/L	0.38	--	--	8.7	694	560
Dissolved Strontium (Sr)	mg/L	--	--	--	-	0.55	0.43
Dissolved Tellurium (Te)	mg/L	---	--	--	-	---	---
Dissolved Thallium (Tl)	mg/L	*<0.2*	--	--	-	<0.002	<0.002
Dissolved Tin (Sn)	mg/L	*<0.3*	--	--	-	0.0010	0.0008
Dissolved Titanium (Ti)	mg/L	*<10*	--	--	0.016	<0.001	<0.001
Dissolved Tungsten (W)	mg/L	--	--	--	-	0.0075	0.0062
Dissolved Uranium (U)	mg/L	*<0.2*	--	--	0.0004	0.0032	0.0026
Dissolved Vanadium (V)	mg/L	0.00017	--	--	0.0032	0.0019	<0.0003
Dissolved Zinc (Zn)	mg/L	0.0008	--	--	0.036	<0.002	0.0030
Dissolved Zirconium (Zr)	mg/L	---	--	--	-	---	---

Notes:

--' = parameter not analyzed, concentration of 0 mg/L used as model input

Parameters for which all results <Method Detection Limit. Maximum Method Detection Limit shown. Concentration of 0 mg/L input to model

[1] Annual Average concentration from 2012 Meadowbank open pit water quality (S. Robert to Serge Ouellet, Nov 2014)

[2] Meadowbank 2012 data from reclaim pond in April when there is almost only water from the mill (no precipitation, less water from open pits)(S.Robert to Serge Ouellet, Nov 2014)

Table A.2
Chemical Loading Rates for Meliadine Mine Wastes
Meliadine Gold Project

	Material	Overburden (short-term rate)	Tiriganiaq Waste Rock					Tiriganiaq ore stockpile		Tiriganiaq Tailings	
	Rock Type		Greywacke-siltstone	Iron formation	Gabbro	UOTIR	Mafic volcanic	Lode 1000	Lode 1100	Underground	Open pit
Parameter (Unit)	**Unit**										
pH	pH unit	7.8	7.1	7.1	8.1	7.1	7.1	7.5	7.7	7.1	7.1
Alkalinity as $CaCO_3$	mg/kg/wk	17	6.6	10	4.6	7.3	6.5	1.6	2.0	23	89
Chloride	mg/kg/wk	5.3	*0*	*0*	*0*	*0*	*0*	18.4	3.3	*0*	*0*
Fluoride	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.0037	0.0018	*0*	0
Dissolved Silicon (Si)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.042	0.034	*0*	*0*
Sulphate	mg/kg/wk	5.9	2.2	2.1	1.8	2.1	1.9	15	15	54	58
CN, total	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Ammonia-N	mg/kg/wk	*0*	1.1	1.1	1.1	1.1	1.1	0.31	0.0088	*0*	*0*
Nitrate as N	mg/kg/wk	*0*	0.94	0.94	0.94	0.94	0.94	4.26	0.075	*0*	*0*
Nitrite as N	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.019	0.015	*0*	*0*
Dissolved Phosphorus (P)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.0037	0.0037	*0*	*0*
Dissolved Aluminum (Al)	mg/kg/wk	*0*	0.018	0.028	0.011	0.020	0.017	0.00036	0.00061	0.04	0.12
Dissolved Antimony (Sb)	mg/kg/wk	0.00037	0.00038	0.000037	0.00017	0.00031	0.00027	0.000089	0.000031	0.0020	0.0071
Dissolved Arsenic (As)	mg/kg/wk	0.0015	0.0067	0.0006	0.0017	0.0055	0.0046	0.0045	0.0004	0.20	0.58
Dissolved Barium (Ba)	mg/kg/wk	*0*	0.0012	0.0009	0.00032	0.0011	0.00046	0.0013	0.0013	0.0055	0.022
Dissolved Beryllium (Be)	mg/kg/wk	0.000022	*0*	*0*	*0*	*0*	*0*	0.000018	0.000018	*0*	*0*
Dissolved Bismuth (Bi)	mg/kg/wk	0.000039	*0*	*0*	*0*	*0*	*0*	0.000037	0.000037	0.000016	0.000008
Dissolved Boron (B)	mg/kg/wk	0.034	0.00035	0.00050	0.00021	0.00037	0.00038	0.0036	0.0015	0.0017	0.0051
Dissolved Cadmium (Cd)	mg/kg/wk	*0*	0.0000015	*0*	0	0.0000012	0.000000092	0.000028	0.0000037	*0*	0.0000034
Dissolved Calcium (Ca)	mg/kg/wk	7.9	2.2	3.9	1.5	2.5	2.0	11.5	6.4	30	44
Dissolved Chromium (Cr)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.00018	0.00018	*0*	*0*
Dissolved Cobalt (Co)	mg/kg/wk	0.0019	0.00013	0.000010	0.000037	0.00011	0.000052	0.00037	0.00007	0.0005	0.0017
Dissolved Copper (Cu)	mg/kg/wk	*0*	0.000062	*0*	0.000058	0.000050	0.000071	0.00015	0.00009	0.0010	0.0015
Dissolved Iron (Fe)	mg/kg/wk	0.92	0.0015	*0*	*0*	0.0012	0.0014	0.0037	0.0037	0.061	0.227
Dissolved Lead (Pb)	mg/kg/wk	*0*	0.000011	0.000010	0.0000068	0.000011	0.000010	0.000079	0.000020	0.00010	0.00042
Dissolved Lithium (Li)	mg/kg/wk	0.004	0.00006	*0*	0.000097	0.000049	0.000073	0.0016	0.0005	0.00055	0.0033
Dissolved Magnesium (Mg)	mg/kg/wk	1.4	0.56	0.42	0.55	0.54	0.7	3.6	1.5	1.3	5.5
Dissolved Manganese (Mn)	mg/kg/wk	0.046	0.0036	0.0039	0.0012	0.0036	0.004	0.016	0.0065	0.017	0.015
Dissolved Mercury (Hg)	mg/kg/wk	*0*	*0*	*0*	0	*0*	*0*	*0*	*0*	*0*	*0*
Dissolved Molybdenum (Mo)	mg/kg/wk	0.0022	0.00017	0.000030	0.000051	0.00014	0.000051	0.00059	0.00026	0.0017	0.0043
Dissolved Nickel (Ni)	mg/kg/wk	*0*	0.00013	*0*	0.00008	0.00010	0.000072	0.0012	0.00012	0.0007	0.0008
Dissolved Potassium (K)	mg/kg/wk	2.4	0.31	0.19	0.077	0.29	0.085	1.6	0.44	2.9	15
Dissolved Selenium (Se)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.0009	0.00008	0.0039	0.0032
Dissolved Silver (Ag)	mg/kg/wk	0.00003	*0*	*0*	*0*	*0*	*0*	0.0000041	0.0000038	*0*	*0*
Dissolved Sodium (Na)	mg/kg/wk	1.3	0.063	0.006	0.035	0.053	0.045	5.9	0.53	1.4	5.0
Dissolved Strontium (Sr)	mg/kg/wk	0.052	0.014	0.034	0.0074	0.018	0.009	0.076	0.051	0.062	0.14
Dissolved Tellurium (Te)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.000037	0.000037	*0*	*0*
Dissolved Thallium (Tl)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.0000018	0.0000018	*0*	*0*
Dissolved Tin (Sn)	mg/kg/wk	*0*	0.000081	0.0002	*0*	0.00010	0.00009	0.000037	0.000037	0.00099	0.00036
Dissolved Titanium (Ti)	mg/kg/wk	0.0022	0.000046	*0*	0.000038675	0.000038	0.000029	0.00018	0.00018	0.00013	0.00014
Dissolved Tungsten (W)	mg/kg/wk	0.000098	0.000007	0.000015	0.000007735	0.000009	0.000006	0.000037	0.000037	0.00012	0.00028
Dissolved Uranium (U)	mg/kg/wk	0.00018	0.00013	0.000064	0.000005	0.00012	0.00001	0.00006	0.00006	0.00022	0.00088
Dissolved Vanadium (V)	mg/kg/wk	0.0021	0.000042	*0*	0.000022	0.000034	0.000047	0.000038	0.000038	0.00014	0.00020
Dissolved Zinc (Zn)	mg/kg/wk	0.0005	0.00012	*0*	*0*	0.00010	0.00003	0.00020	0.00020	0.00072	0.0011
Dissolved Zirconium (Zr)	mg/kg/wk	*0*	*0*	*0*	*0*	*0*	*0*	0.000037	0.000037	*0*	*0*

Notes:

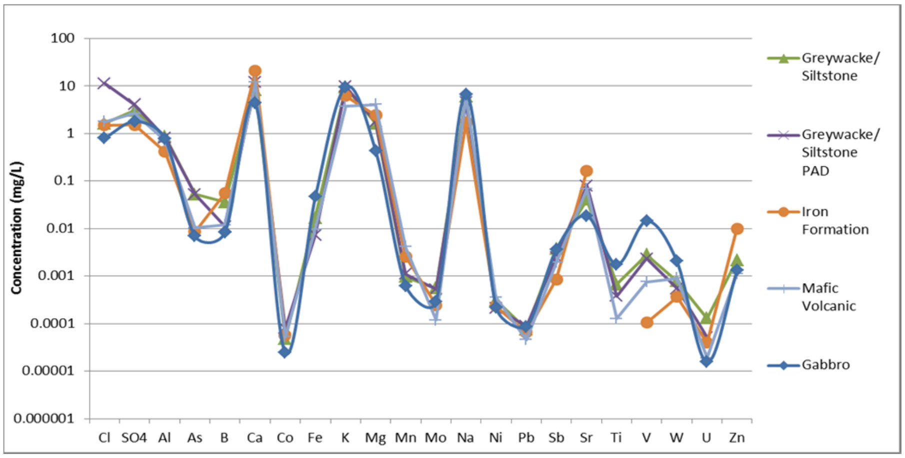
Parameter not analyzed or where all results < Analytical Method Detection Limit, loading rate set to 0 mg/kg/wk

Source: Golder, 2014a except ammonia and nitrate load in Waste Rock (source AEM, 2009 and 2010)

Table A.3
Kinetic Test Sample Contribution to Loading Rate Calculations by Rock Type
Meliadine Gold Project

Deposit	Lithology	Kinetic Test Sample ID	Sample Contribution to Loading Rate by Rock Type
Tiriganiaq	Greywacke/Siltstone	M03-508-01 M06-623-01 M06-625-01 M97-95-02 M98-194-01 M99-403-03 M04-533-01	average, weighted at 25%
		Column 1 Tiri GW OP E	22%
		Column 2 Tiri GW OP W	22%
		Column 3 Tiri GW UG (All)	31%
		WR1	0%
		WR2	0%
	Iron Formation	M04-526-01	75%
		M96-74-01	25%
	Mafic Volcanic	M99-409-05 GT08-04-02 M05-536A-01 M97-141-01	average, weighted at 25%
		Column 4 Tiri MV UG (All)	75%
	UOTIR	average GW	81%
		average IF	19%
	Gabbro	Column 4 Tiri MV UG (All)	100%
	Ore	Field Cell Load 1000	50%
		Field Cell Load 1100	50%

Notes:
GW = greywacke-siltstone; MV = mafic volcanic; IF = iron formation; UOTIR = upper oxyde iron formation
Source: Golder, 2014a



Source: Golder, 2014a

Figure A.3: Comparative short-term leachate quality data for gabbro and other rock Tiriganiaq Waste Rock

ATTACHMENT B

Geochemical Modelling of Predicted Water Quality Solutions

Table B.1 Evaluation of Solubility Limits on Predicted Water Quality
Meliadine Gold Project

Leachate	pH	pe	Alkalinity	Nitrate	Nitrite	Ammonia	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Cadmium	Chloride	Cobalt	Chromium	Copper	Fluoride	Iron
	s.u.	*s.u.*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Input																			
CP1	8.0	6.8	101	6.6	0.16	1.5	0.24	0.12	0.20	0.02	0.23	74	0.01	47	0.07	0.90	0.002	0.007	2.0
CP2	8.0	6.8	41	2.2	0.60	2.3	0.62	0.002	0.02	0.03	0.002	29	0.0001	47	0.003	0.006	0.003	0	1.1
CP3	8.0	6.8	418	0.26	0.07	0.28	0.67	0.08	2.8	0.10	0.09	278	0.005	7.7	0.04	0.36	0.009	0	1.4
CP4	8.0	6.8	421	0.34	0.09	0.36	0.54	0.12	0.37	0.03	0.20	175	0.01	89	0.09	0.82	0.002	0	14
CP5	8.0	6.8	85	1.0	0.28	1.1	0.36	0.11	0.06	0.02	0.21	38	0.01	33	0.07	0.83	0.002	0	2.3
CP6	8.0	6.8	96	0.40	0.11	0.43	0.32	0.15	0.07	0.02	0.29	33	0.01	13	0.09	1.2	0.001	0	0.51
Equilibriated Solution																			
CP1	8.2	6.7	53	2.0	6.3	0.0	0.004	0.12	0.07	0.01	0.18	61	0.01	47	0.07	0.90	0.002	0.007	0.0001
CP2	8.0	5.4	32	0.0013	3.52	1.56	0.003	0.002	0.0003	0.03	0.00	29	0.0001	47	0.003	0.0	0.0001	0	0.00014
CP3	8.1	5.4	43	0.0002	0.4	0.16	0.003	0.08	2.7	0.01	0.06	129	0.005	8	0.04	0.36	0.009	0	0.0001
CP4	8.3	5.1	71	0.0002	0.60	0.19	0.005	0.12	0.00002	0.01	0.002	46	0.01	89	0.09	0.75	0.0002	0	0.00010
CP5	8.3	5.1	65	0.0004	1.7	0.68	0.005	0.11	0.0000003	0.02	0.16	32	0.01	33	0.07	0.82	0.002	0	0.0001
CP6	8.3	5.0	72	0.0002	0.72	0.22	0.005	0.15	0.03	0.02	0.28	24	0.01	13	0.09	1.2	0.001	0	0.00009
Solubility limits imposed in GoldSim																			
CP1	8.0	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	0.01
CP2	8.0	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	0.1
CP3	8.0	-	-	-	-	-	0.1	-	-	-	-	200	-	-	-	-	-	-	0.1
CP4	8.0	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	0.1
CP5	8.0	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	0.1
CP6	8.0	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	0.1

	Mercury	Potassium	Lithium	Magnesium	Manganese	Molybdenun	Sodium	Nickel	Phosphorou	Lead	Selenium	Silver	Sulfate	Strontium	Tin	Vanadium	Thallium	Zinc
	mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L-P*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Input																		
CP1	0.005	11	1.1	13	0.16	0.007	35	0.004	0.47	0.001	0.002	0.005	150	0.35	0.07	0.005	0.05	0.18
CP2	0.00003	12	0.008	3.4	0.10	0.0000006	8.7	0.01	0.00002	0.006	0.001	0.00003	14	0	0.0005	0.003	0.0003	0.04
CP3	0.002	63	0.47	26	0.15	0.02	27	0.006	0.001	0.003	0.0002	0.002	496	0.76	0.03	0.002	0.02	0.03
CP4	0.004	42	1.1	34	0.80	0.04	197	0.004	0.003	0.001	0.0003	0.005	521	1.1	0.06	0.03	0.04	1.4
CP5	0.004	7.1	1.0	6.4	0.15	0.005	29	0.005	0.003	0.003	0.0006	0.004	70	0.15	0.06	0.006	0.04	0.19
CP6	0.006	3.9	1.5	7.1	0.07	0.002	6.3	0.003	0.004	0.001	0.0004	0.006	31	0.16	0.09	0.002	0.06	0.04
Equilibriated Solution																		
CP1	0.005	11	1.1	13	0.16	0.007	35	0.004	0.471	0.001	0.002	0.005	150	0.35	0.07	0.002	0.05	0.18
CP2	0.00003	12	0.008	3.4	0.10	0.0000006	8.7	0.008	0.00002	0.0002	0.0008	0.00003	14	0	0.0005	0.0001	0.0003	0.02
CP3	0.002	63	0.47	26	0.15	0.02	27	0.006	0.001	0.002	0.0002	0.002	496	0.76	0.03	0.002	0.02	0.03
CP4	0.004	42	1.1	32	0.45	0.04	197	0.003	0.0002	0.0002	0.00003	0.005	521	1.06	0.06	0.0000024	0.04	0.99
CP5	0.004	7.1	1.0	6.4	0.15	0.005	29	0.005	0.0001	0.003	0.00004	0.004	70	0.15	0.06	0	0.04	0.19
CP6	0.006	3.9	1.5	7.1	0.07	0.002	6.3	0.003	0.004	0.001	0.0004	0.006	31	0.16	0.09	0.001	0.06	0.04
Solubility limits imposed in GoldSim																		
CP1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CP6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

ATTACHMENT C

Predictive Water Quality Modelling Results

Table C.1. CP 1 - Main Collection Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)											1							0.5								
	Model	Mine	Date		TDS	Total Alkalinity	Cl	F	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L	mg/L as $CaCO_3$	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																										
CP1 Main Pond	**113**	**1**	**2020**	**June**	85	31.2	12	6.42E-05	8.52E-04	15	5.85E-04	2.0	3	0.09	0.6	0.09	7.65E-04	0.035	7.50E-03	9.81E-06	1.74E-05	0.03	9.28E-07	15	4.15E-06	1.39E-03
CP1 Main Pond	**114**	**1**	**2020**	**July**	162	57	17	1.94E-04	2.51E-03	36	2.86E-03	2.8	3	0.10	0.5	0.05	1.91E-03	0.09	0.010	2.76E-05	4.92E-05	0.06	2.73E-06	31	1.24E-05	3.13E-03
CP1 Main Pond	**115**	**1**	**2020**	**August**	277	96	26	3.71E-04	4.79E-03	67	5.57E-03	3.9	4	0.13	0.4	0.10	3.55E-03	0.18	0.015	5.23E-05	9.32E-05	0.10	5.21E-06	56	2.36E-05	5.65E-03
CP1 Main Pond	**116**	**1**	**2020**	**September**	259	90	25	3.62E-04	4.42E-03	62	9.36E-03	3.7	4	0.13	0.4	0.10	3.28E-03	0.16	0.015	4.84E-05	8.62E-05	0.09	4.82E-06	52	2.23E-05	5.28E-03
CP1 Main Pond	**117**	**1**	**2020**	**October**	66	19	10	4.10E-04	2.90E-05	14	0.09	2.7	3	0.10	1.0	0.10	3.86E-04	0.049	7.19E-03	1.32E-06	1.73E-06	0.02	9.94E-08	8	1.15E-05	9.37E-04
CP1 Main Pond	**125**	**2**	**2021**	**June**	100	37	12	7.15E-05	9.61E-04	16	4.51E-04	3.4	5	0.08	0.5	0.09	1.04E-03	0.035	7.27E-03	1.52E-05	2.71E-05	0.04	1.64E-06	17	4.65E-06	1.86E-03
CP1 Main Pond	**126**	**2**	**2021**	**July**	204	77	19	2.08E-04	2.73E-03	40	2.30E-03	4.8	6.5	0.09	0.4	0.05	2.66E-03	0.09	0.011	4.22E-05	7.50E-05	0.08	4.65E-06	38	1.34E-05	4.45E-03
CP1 Main Pond	**127**	**2**	**2021**	**August**	357	135	31	3.94E-04	5.17E-03	74	4.53E-03	6.8	8.6	0.12	0.3	0.10	4.97E-03	0.17	0.016	7.94E-05	1.41E-04	0.14	8.82E-06	69	2.53E-05	8.15E-03
CP1 Main Pond	**128**	**2**	**2021**	**September**	331	125	30	3.80E-04	4.72E-03	68	8.55E-03	6.3	7.9	0.13	0.3	0.10	4.55E-03	0.16	0.016	7.26E-05	1.29E-04	0.13	8.07E-06	63	2.37E-05	7.54E-03
CP1 Main Pond	**129**	**2**	**2021**	**October**	65	17	10	3.59E-04	1.90E-05	13	0.08	3.8	5.6	0.10	0.9	0.10	3.59E-04	0.04	6.88E-03	1.23E-06	1.64E-06	0.02	9.20E-08	8	1.00E-05	8.89E-04
CP1 Main Pond	**137**	**3**	**2022**	**June**	101	38	13	6.45E-05	8.68E-04	16	3.87E-04	3.6	5.5	0.09	0.5	0.09	1.04E-03	0.033	7.58E-03	1.55E-05	2.76E-05	0.04	1.63E-06	17	4.20E-06	1.92E-03
CP1 Main Pond	**138**	**3**	**2022**	**July**	206	79	20	1.90E-04	2.50E-03	38	2.01E-03	5.0	6.8	0.10	0.5	0.05	2.66E-03	0.08	0.011	4.35E-05	7.73E-05	0.08	4.68E-06	38	1.22E-05	4.60E-03
CP1 Main Pond	**139**	**3**	**2022**	**August**	346	133	31	3.46E-04	4.55E-03	68	3.79E-03	6.9	8.6	0.12	0.4	0.10	4.77E-03	0.15	0.016	7.90E-05	1.40E-04	0.14	8.56E-06	66	2.23E-05	8.10E-03
CP1 Main Pond	**140**	**3**	**2022**	**September**	329	127	30	3.42E-04	4.29E-03	64	7.15E-03	6.5	8.1	0.13	0.3	0.10	4.50E-03	0.14	0.016	7.44E-05	1.32E-04	0.13	8.07E-06	62	2.14E-05	7.69E-03
CP1 Main Pond	**141**	**3**	**2022**	**October**	63	17	10	3.04E-04	1.88E-05	11	0.07	3.8	5.7	0.10	1.0	0.10	3.37E-04	0.04	6.86E-03	1.21E-06	1.68E-06	0.02	8.56E-08	8	8.50E-06	8.49E-04
CP1 Main Pond	**149**	**4**	**2023**	**June**	107	41	12	6.59E-05	8.78E-04	17	5.26E-04	3.6	5.5	0.09	0.4	0.10	1.38E-03	0.062	8.54E-03	1.39E-05	2.47E-05	0.04	1.87E-06	18	4.27E-06	1.85E-03
CP1 Main Pond	**150**	**4**	**2023**	**July**	220	86	18	1.90E-04	2.46E-03	42	2.64E-03	4.9	6.8	0.09	0.4	0.05	3.51E-03	0.16	0.014	3.79E-05	6.74E-05	0.07	5.22E-06	41	1.21E-05	4.33E-03
CP1 Main Pond	**151**	**4**	**2023**	**August**	392	155	29	3.67E-04	4.74E-03	79	5.30E-03	7.1	9.0	0.12	0.3	0.10	6.70E-03	0.31	0.022	7.28E-05	1.29E-04	0.13	1.02E-05	75	2.33E-05	8.03E-03
CP1 Main Pond	**152**	**4**	**2023**	**September**	360	142	28	3.57E-04	4.31E-03	72	9.66E-03	6.6	8.3	0.12	0.3	0.10	6.08E-03	0.28	0.021	6.63E-05	1.18E-04	0.12	9.26E-06	68	2.18E-05	7.38E-03
CP1 Main Pond	**153**	**4**	**2023**	**October**	65	17	10	4.41E-04	2.00E-05	12	0.09	3.9	5.8	0.10	0.9	0.10	3.79E-04	0.05	6.90E-03	1.27E-06	1.62E-06	0.02	2.21E-07	8	1.18E-05	9.53E-04
CP1 Main Pond	**161**	**5**	**2024**	**June**	98	38	11	8.18E-05	1.11E-03	15	3.34E-04	3.7	5.7	0.08	0.4	0.09	1.20E-03	0.044	7.42E-03	1.43E-05	2.54E-05	0.04	2.06E-06	16	5.35E-06	1.78E-03
CP1 Main Pond	**162**	**5**	**2024**	**July**	206	83	18	2.38E-04	3.18E-03	36	1.72E-03	5.3	7.2	0.08	0.4	0.06	3.15E-03	0.12	0.012	3.99E-05	7.10E-05	0.08	5.86E-06	37	1.54E-05	4.33E-03
CP1 Main Pond	**163**	**5**	**2024**	**August**	358	145	29	4.45E-04	5.94E-03	66	3.34E-03	7.6	9.6	0.11	0.3	0.10	5.81E-03	0.21	0.019	7.42E-05	1.32E-04	0.13	1.10E-05	66	2.89E-05	7.83E-03
CP1 Main Pond	**164**	**5**	**2024**	**September**	339	137	28	4.33E-04	5.59E-03	62	6.09E-03	7.2	9.0	0.11	0.3	0.10	5.45E-03	0.20	0.018	6.99E-05	1.24E-04	0.12	1.03E-05	63	2.75E-05	7.41E-03
CP1 Main Pond	**165**	**5**	**2024**	**October**	56	16	9	2.83E-04	2.79E-05	9	0.06	3.8	5.8	0.09	0.9	0.10	2.98E-04	0.03	6.09E-03	1.15E-06	1.62E-06	0.01	1.64E-07	7	7.59E-06	7.67E-04
CP1 Main Pond	**173**	**6**	**2025**	**June**	109	41	11	8.67E-05	1.16E-03	18	5.86E-04	3.7	5.6	0.07	0.4	0.09	1.53E-03	0.071	8.24E-03	1.43E-05	2.55E-05	0.04	2.22E-06	19	5.63E-06	1.86E-03
CP1 Main Pond	**174**	**6**	**2025**	**July**	224	88	17	2.40E-04	3.14E-03	44	2.81E-03	5.2	7.1	0.08	0.4	0.05	3.82E-03	0.18	0.014	3.78E-05	6.72E-05	0.07	5.95E-06	40	1.54E-05	4.31E-03
CP1 Main Pond	**175**	**6**	**2025**	**August**	421	167	29	4.82E-04	6.28E-03	87	5.92E-03	7.7	9.6	0.11	0.3	0.10	7.58E-03	0.36	0.024	7.53E-05	1.34E-04	0.13	1.20E-05	80	3.08E-05	8.35E-03
CP1 Main Pond	**176**	**6**	**2025**	**September**	385	152	28	4.64E-04	5.69E-03	78	0.01	7.1	8.9	0.11	0.3	0.10	6.83E-03	0.32	0.023	6.82E-05	1.21E-04	0.12	1.08E-05	73	2.86E-05	7.65E-03
CP1 Main Pond	**177**	**6**	**2025**	**October**	61	15	9	4.98E-04	3.38E-12	12	0.11	3.9	5.8	0.09	0.9	0.09	3.57E-04	0.049	6.26E-03	1.03E-06	1.11E-06	0.01	2.18E-07	7	1.31E-05	9.30E-04
CP1 Main Pond	**185**	**7**	**2026**	**June**	99	38	11	8.84E-05	1.20E-03	15	3.35E-04	3.7	5.6	0.07	0.4	0.09	1.27E-03	0.048	7.45E-03	1.45E-05	2.59E-05	0.04	2.18E-06	16	5.79E-06	1.81E-03
CP1 Main Pond	**186**	**7**	**2026**	**July**	203	82	17	2.46E-04	3.29E-03	35	1.63E-03	5.2	7.1	0.08	0.4	0.05	3.19E-03	0.12	0.012	3.88E-05	6.90E-05	0.07	5.92E-06	36	1.59E-05	4.23E-03
CP1 Main Pond	**187**	**7**	**2026**	**August**	373	152	29	4.87E-04	6.51E-03	68	3.39E-03	7.8	9.7	0.11	0.3	0.10	6.25E-03	0.24	0.020	7.65E-05	1.36E-04	0.13	1.18E-05	69	3.16E-05	8.10E-03
CP1 Main Pond	**188**	**7**	**2026**	**September**	341	139	28	4.56E-04	5.89E-03	62	6.40E-03	7.2	8.9	0.11	0.3	0.10	5.64E-03	0.21	0.019	6.92E-05	1.23E-04	0.12	1.06E-05	63	2.90E-05	7.41E-03
CP1 Main Pond	**189**	**7**	**2026**	**October**	54	15	9	2.86E-04	3.50E-12	8	0.06	3.6	5.6	0.09	0.8	0.10	2.75E-04	0.03	6.12E-03	8.02E-07	1.00E-06	0.01	1.31E-07	6	7.50E-06	7.55E-04
CP1 Main Pond	**197**	**8**	**2027**	**June**	95	38	12	3.01E-05	3.98E-04	14	2.84E-04	2.2	2.5	0.09	0.5	0.09	1.15E-03	0.041	7.66E-03	1.64E-05	2.91E-05	0.04	1.52E-06	16	1.94E-06	2.02E-03
CP1 Main Pond	**198**	**8**	**2027**	**July**	198	81	20	8.68E-05	1.11E-03	33	1.41E-03	3.9	4.0	0.10	0.5	0.10	2.89E-03	0.10	0.012	4.45E-05	7.89E-05	0.09	4.20E-06	36	5.48E-06	4.77E-03
CP1 Main Pond	**199**	**8**	**2027**	**August**	365	150	33	1.42E-04	1.77E-03	64	2.94E-03	6.6	6.2	0.13	0.3	0.10	5.65E-03	0.21	0.019	8.80E-05	1.56E-04	0.16	8.18E-06	68	8.83E-06	9.18E-03
CP1 Main Pond	**200**	**8**	**2027**	**September**	335	137	32	3.13E-05	6.98E-05	57	5.51E-03	6.0	5.6	0.15	0.3	0.10	5.10E-03	0.18	0.019	7.87E-05	1.39E-04	0.14	6.68E-06	62	1.02E-06	8.44E-03
CP1 Main Pond	**201**	**8**	**2027**	**October**	55	16	11	2.34E-04	0	8	0.05	2.2	2.8	0.12	0.9	0.10	3.01E-04	0.03	7.44E-03	8.08E-07	1.08E-06	0.01	1.07E-07	8	6.14E-06	8.52E-04
CP1 Main Pond	**209**	**9**	**2028**	**June**	87	35	14	0	0	10	0	2.2	2.4	0.11	0.4	0.10	8.42E-04	0.012	7.55E-03	1.63E-05	2.88E-05	0.04	1.23E-06	14	0	2.04E-03
CP1 Main Pond	**210**	**9**	**2028**	**July**	163	69	20	0	0	21	0	3.8	3.8	0.11	0.4	0.10	1.93E-03	0.025	9.45E-03	4.21E-05	7.46E-05	0.08	3.26E-06	28	0	4.45E-03
CP1 Main Pond	**211**	**9**	**2028**	**August**	283	121	32	0	0	39	0	6.2	5.7	0.14	0.3	0.10	3.60E-03	0.046	0.014	8.10E-05	1.44E-04	0.14	6.32E-06	50	0	8.20E-03
CP1 Main Pond	**212**	**9**	**2028**	**September**	271	116	32	0	0	37	0	5.9	5.5	0.15	0.3	0.10	3.43E-03	0.044	0.014	7.66E-05	1.36E-04	0.14	5.98E-06	48	0	7.82E-03
CP1 Main Pond	**213**	**9**	**2028**	**October**	48	16	11	0	0	4	0	2.0	2.8	0.12	0.9	0.10	2.10E-04	4.49E-03	7.21E-03	5.60E-07	9.53E-07	0.01	3.44E-15	7	0	6.51E-04
CP1 Main Pond	**221**	**10**	**2029**	**June**	87	35	14	0	0	10	0	2.2	2.4	0.11	0.4	0.10	8.43E-04	0.012	7.56E-03	1.63E-05	2.89E-05	0.04	1.23E-06	14	0	2.04E-03
CP1 Main Pond	**222**	**10**	**2029**	**July**	163	69	20	0	0	21	0	3.8	3.8	0.11	0.4	0.10	1.93E-03	0.025	9.48E-03	4.22E-05	7.48E-05	0.08	3.27E-06	28	0	4.46E-03
CP1 Main Pond	**223**	**10**	**2029**	**August**	284	121	32	0	0	39	0	6.2	5.8	0.14	0.3	0.10	3.61E-03	0.046	0.014	8.12E-05	1.44E-04	0.15	6.33E-06	51	0	8.23E-03
CP1 Main Pond	**224**	**10**	**2029**	**September**	271	115	32	0	0	37	0	5.9	5.5	0.15	0.3	0.10	3.42E-03	0.044	0.014	7.65E-05	1.36E-04	0.14	5.97E-06	48	0	7.81E-03
CP1 Main Pond	**225**	**10**	**2029**	**October**	48	16	11	0	0	4	0	2.0	2.8	0.12	0.9	0.10	2.10E-04	4.47E-03	7.19E-03	5.62E-07	9.55E-07	0.01	3.45E-15	7	0	6.49E-04
CP1 Main Pond	**233**	**11**	**2030**	**June**	87	35	14	0	0	10	0	2.2	2.4	0.11	0.4	0.10	8.43E-04	0.012	7.49E-03	1.64E-05	2.90E-05	0.04	1.24E-06	14	0	2.04E-03
CP1 Main Pond	**234**	**11**	**2030**	**July**	162	68	20	0	0	21	0	3.8	3.7	0.11	0.4	0.10	1.91E-03	0.025	9.38E-03	4.19E-05	7.42E-05	0.08	3.24E-06	28	0	4.42E-03
CP1 Main Pond	**235**	**11**	**2030**	**August**	284	122	32	0	0	39	0	6.3	5.8	0.14	0.3	0.10	3.62E-03	0.047	0.014	8.16E-05	1.45E-04	0.15	6.36E-06	51	0	8.25E-03
CP1 Main Pond	**236**	**11**	**2030**	**September**	272	116	31	0	0	37	0	6.0	5.5	0.14	0.3	0.10	3.44E-03	0.044	0.013	7.70E-05	1.37E-04	0.14	6.01E-06	48	0	7.85E-03
CP1 Main Pond	**237**	**11**	**2030**	**October**	47	16	11	0	0	4	0	2.0	2.8	0.12	0.9	0.10	2.07E-04	4.42E-03	7.11E-03	5.58E-07	9.49E-07	0.01	3.43E-15	7	0	6.41E-04
				MAXIMUM	421	167	33	4.98E-04	6.51E-03	87	0.11	7.8	9.7	0.2	1.0	0.10	7.58E-03	0.36	0.024	8.80E-05	1.56E-04	0.16	1.20E-05	80	3.16E-05	9.18E-03
				AVERAGE	200	79	20	1.97E-04	1.88E-03	35	0.01	4.7	5.7	0.1	0.5	0.09	2.77E-03	0.10	1.2E-02	4.06E-05	7.20E-05	0.08	4.53E-06	36	1.06E-05	4.50E-03

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)			120	2.8					13	60	0.004 to 0.01	0.1		0.025				1.50	0.000012		0.001	
		TDS	Total Alkalinity	Cl	F[2]	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	Be	Bi	B	Cd[5]	Ca	Cr[4]	Co
	Month	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	MINIMUM	51	25	11	0	0	4.16	0	0.36	0.34	0.09	0.004	0.09	1.50E-04	0.003	0.007	0	0	0.01	0	6	0	4.49E-04
	MAXIMUM	66	28	16	0	0	5.70	0	0.89	0.98	0.17	**0.14**	0.10	2.78E-04	0.0057	0.01	0	0	0.02	0	10	0	8.33E-04
	AVERAGE	57	27	13	0	0	4.71	0	0.47	0.46	0.11	0.03	0.09	1.82E-04	0.004	0.009	0	0	0.02	0	7	0	5.45E-04

Notes:

1 CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

2 Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

3 MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

4 CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

5 CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

6 CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

7 CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Created By: MIB
Checked by: VJB

Table C.1. CP 1 - Main Collection Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2						0.5												0.5
	Model	Mine	Date		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Na	Sr	Te	Tl	Sn	Ti	W	U	V	Zn
LOCATION	Month	Year	Year	Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																									
CP1 Main Pond	113	1	2020	June	7.09E-04	1.00E-02	9.67E-04	1.84E-03	1.8	0.04	0	1.36E-03	1.75E-03	2.2	3.88E-04	2.7	0.04	8.17E-07	7.00E-08	1.83E-04	3.94E-03	6.33E-05	2.09E-04	1.46E-03	8.75E-03
CP1 Main Pond	114	1	2020	July	1.06E-03	1.00E-02	1.09E-03	5.17E-03	3.9	0.09	0	3.66E-03	2.17E-03	5.1	4.17E-04	4.4	0.11	2.41E-06	2.63E-07	5.18E-04	6.00E-03	1.79E-04	4.90E-04	3.18E-03	0.01
CP1 Main Pond	115	1	2020	August	1.65E-03	1.00E-02	1.45E-03	9.80E-03	6.9	0.15	0	6.88E-03	3.08E-03	9.2	5.20E-04	7.0	0.21	4.59E-06	5.07E-07	9.91E-04	9.41E-03	3.40E-04	8.94E-04	5.67E-03	0.01
CP1 Main Pond	116	1	2020	September	1.58E-03	1.00E-02	1.44E-03	9.05E-03	6.4	0.14	0	6.35E-03	3.02E-03	8.6	5.12E-04	6.8	0.19	4.24E-06	6.79E-07	9.03E-04	8.96E-03	3.14E-04	8.31E-04	5.30E-03	0.01
CP1 Main Pond	117	1	2020	October	7.34E-04	1.00E-02	1.07E-03	1.57E-04	0.8	0.02	0	4.11E-04	1.85E-03	1.0	4.29E-04	5.2	5.04E-03	2.78E-08	4.53E-06	1.09E-05	3.30E-03	3.84E-05	9.19E-05	6.85E-04	8.79E-03
CP1 Main Pond	125	2	2021	June	6.77E-04	1.00E-02	8.84E-04	2.85E-03	2.4	0.05	0	1.94E-03	1.65E-03	2.8	3.36E-04	2.8	0.06	9.22E-07	6.85E-08	2.26E-04	4.26E-03	9.01E-05	2.92E-04	1.94E-03	8.21E-03
CP1 Main Pond	126	2	2021	July	1.04E-03	1.00E-02	9.92E-04	7.88E-03	5.8	0.12	0	5.23E-03	2.12E-03	6.8	3.63E-04	4.9	0.16	2.62E-06	2.46E-07	6.23E-04	7.20E-03	2.49E-04	7.17E-04	4.54E-03	9.70E-03
CP1 Main Pond	127	2	2021	August	1.67E-03	1.00E-02	1.34E-03	0.015	11	0.22	0	9.81E-03	3.10E-03	12.5	4.55E-04	8.2	0.31	4.96E-06	4.74E-07	1.18E-03	0.012	4.71E-04	1.32E-03	8.26E-03	0.01
CP1 Main Pond	128	2	2021	September	1.60E-03	1.00E-02	1.39E-03	0.014	9.8	0.20	0	8.96E-03	3.11E-03	11.5	4.57E-04	7.9	0.28	4.53E-06	6.53E-07	1.07E-03	0.011	4.30E-04	1.22E-03	7.63E-03	0.01
CP1 Main Pond	129	2	2021	October	7.02E-04	1.00E-02	1.06E-03	1.50E-04	0.8	0.02	0	3.64E-04	1.83E-03	1.0	3.93E-04	4.7	4.56E-03	1.83E-08	3.97E-06	8.34E-06	3.27E-03	3.38E-05	8.94E-05	6.68E-04	8.64E-03
CP1 Main Pond	137	3	2022	June	6.99E-04	1.00E-02	9.55E-04	2.90E-03	2.5	0.05	0	1.95E-03	1.76E-03	2.8	3.49E-04	2.9	0.06	8.33E-07	6.09E-08	2.12E-04	4.49E-03	8.97E-05	2.97E-04	2.01E-03	8.69E-03
CP1 Main Pond	138	3	2022	July	1.05E-03	1.00E-02	1.06E-03	8.12E-03	5.9	0.12	0	5.31E-03	2.22E-03	6.9	3.74E-04	5.1	0.16	2.40E-06	2.20E-07	5.92E-04	7.55E-03	2.51E-04	7.34E-04	4.72E-03	0.01
CP1 Main Pond	139	3	2022	August	1.60E-03	1.00E-02	1.39E-03	0.015	10	0.22	0	9.61E-03	3.13E-03	12.2	4.58E-04	8.1	0.30	4.37E-06	4.07E-07	1.08E-03	0.012	4.57E-04	1.30E-03	8.26E-03	0.01
CP1 Main Pond	140	3	2022	September	1.56E-03	1.00E-02	1.41E-03	0.014	9.9	0.21	0	9.05E-03	3.11E-03	11.5	4.58E-04	7.9	0.28	4.11E-06	5.62E-07	1.01E-03	0.012	4.30E-04	1.23E-03	7.83E-03	0.01
CP1 Main Pond	141	3	2022	October	6.87E-04	1.00E-02	1.06E-03	1.57E-04	0.8	0.02	0	3.37E-04	1.83E-03	1.0	3.88E-04	4.3	4.35E-03	1.80E-08	3.36E-06	7.91E-06	3.30E-03	2.95E-05	8.84E-05	6.73E-04	8.70E-03
CP1 Main Pond	149	4	2023	June	7.45E-04	1.00E-02	9.37E-04	2.78E-03	2.7	0.05	0	2.00E-03	1.72E-03	3.4	3.36E-04	3.0	0.06	8.42E-07	6.83E-08	2.14E-04	4.17E-03	9.63E-05	3.31E-04	1.84E-03	8.18E-03
CP1 Main Pond	150	4	2023	July	1.19E-03	1.00E-02	1.08E-03	7.58E-03	6.3	0.11	0	5.30E-03	2.22E-03	8.4	3.59E-04	5.3	0.17	2.36E-06	2.50E-07	5.84E-04	6.82E-03	2.62E-04	8.11E-04	4.19E-03	9.62E-03
CP1 Main Pond	151	4	2023	August	1.95E-03	1.00E-02	1.46E-03	0.015	12	0.21	0	0.01	3.25E-03	15.7	4.44E-04	9.0	0.33	4.54E-06	4.91E-07	1.14E-03	0.011	5.05E-04	1.53E-03	7.70E-03	0.01
CP1 Main Pond	152	4	2023	September	1.84E-03	1.00E-02	1.46E-03	0.013	11	0.19	0	9.22E-03	3.17E-03	14.3	4.42E-04	8.5	0.30	4.13E-06	6.89E-07	1.03E-03	0.011	4.58E-04	1.40E-03	7.08E-03	0.01
CP1 Main Pond	153	4	2023	October	8.40E-04	1.00E-02	1.06E-03	1.54E-04	0.8	0.02	0	4.13E-04	1.82E-03	1.0	3.95E-04	4.9	4.86E-03	1.92E-08	4.67E-06	9.13E-06	3.22E-03	3.67E-05	9.16E-05	6.60E-04	8.43E-03
CP1 Main Pond	161	5	2024	June	6.38E-04	1.00E-02	8.27E-04	2.76E-03	2.6	0.05	0	1.90E-03	1.54E-03	3.0	3.05E-04	2.7	0.06	1.06E-06	6.98E-08	1.92E-04	3.95E-03	8.93E-05	3.14E-04	1.81E-03	7.56E-03
CP1 Main Pond	162	5	2024	July	1.01E-03	1.00E-02	9.44E-04	7.70E-03	6.3	0.11	0	5.17E-03	2.00E-03	7.6	3.34E-04	4.9	0.17	3.05E-06	2.38E-07	5.40E-04	6.72E-03	2.49E-04	7.93E-04	4.28E-03	8.96E-03
CP1 Main Pond	163	5	2024	August	1.60E-03	1.00E-02	1.27E-03	0.014	11	0.21	0	9.59E-03	2.91E-03	13.8	4.20E-04	8.2	0.32	5.70E-06	4.51E-07	1.01E-03	0.011	4.65E-04	1.45E-03	7.69E-03	0.01
CP1 Main Pond	164	5	2024	September	1.55E-03	1.00E-02	1.28E-03	0.013	11	0.19	0	9.01E-03	2.89E-03	13.0	4.21E-04	7.9	0.30	5.36E-06	5.72E-07	9.47E-04	0.010	4.37E-04	1.37E-03	7.28E-03	0.01
CP1 Main Pond	165	5	2024	October	6.85E-04	1.00E-02	9.43E-04	1.59E-04	0.7	0.02	0	3.19E-04	1.61E-03	0.9	3.45E-04	3.7	4.13E-03	2.68E-08	2.98E-06	7.57E-06	2.94E-03	2.51E-05	7.97E-05	6.01E-04	7.77E-03
CP1 Main Pond	173	6	2025	June	7.09E-04	1.00E-02	8.25E-04	2.91E-03	2.8	0.05	0	2.11E-03	1.55E-03	3.7	2.89E-04	2.9	0.07	1.11E-06	8.48E-08	2.35E-04	3.91E-03	1.04E-04	3.54E-04	1.81E-03	7.48E-03
CP1 Main Pond	174	6	2025	July	1.18E-03	1.00E-02	9.61E-04	7.64E-03	6.6	0.11	0	5.43E-03	2.05E-03	8.8	3.17E-04	5.3	0.18	3.01E-06	2.91E-07	6.19E-04	6.45E-03	2.72E-04	8.54E-04	4.09E-03	8.84E-03
CP1 Main Pond	175	6	2025	August	2.06E-03	1.00E-02	1.38E-03	0.015	13	0.21	0	0.01	3.21E-03	17.3	4.14E-04	9.5	0.36	6.03E-06	5.97E-07	1.25E-03	0.011	5.44E-04	1.68E-03	7.85E-03	0.01
CP1 Main Pond	176	6	2025	September	1.95E-03	1.00E-02	1.41E-03	0.014	12	0.20	0	9.76E-03	3.16E-03	15.6	4.16E-04	9.0	0.32	5.46E-06	8.33E-07	1.12E-03	0.010	4.91E-04	1.52E-03	7.19E-03	0.01
CP1 Main Pond	177	6	2025	October	8.34E-04	1.00E-02	9.70E-04	9.56E-05	0.7	0.02	0	3.94E-04	1.67E-03	0.9	3.59E-04	5.1	3.74E-03	3.24E-15	5.25E-06	4.75E-06	2.98E-03	3.83E-05	8.16E-05	5.79E-04	7.90E-03
CP1 Main Pond	185	7	2026	June	6.34E-04	1.00E-02	8.13E-04	2.83E-03	2.6	0.05	0	1.95E-03	1.52E-03	3.2	2.90E-04	2.7	0.06	1.15E-06	7.42E-08	1.91E-04	3.93E-03	9.23E-05	3.25E-04	1.82E-03	7.46E-03
CP1 Main Pond	186	7	2026	July	9.91E-04	1.00E-02	9.26E-04	7.54E-03	6.2	0.11	0	5.08E-03	1.96E-03	7.6	3.19E-04	4.9	0.17	3.16E-06	2.39E-07	5.12E-04	6.54E-03	2.46E-04	7.90E-04	4.15E-03	8.76E-03
CP1 Main Pond	187	7	2026	August	1.66E-03	1.00E-02	1.30E-03	0.015	12	0.21	0	9.99E-03	2.98E-03	14.8	4.15E-04	8.6	0.33	6.25E-06	4.81E-07	1.02E-03	0.011	4.86E-04	1.53E-03	7.90E-03	0.01
CP1 Main Pond	188	7	2026	September	1.59E-03	1.00E-02	1.34E-03	0.013	11	0.19	0	9.01E-03	2.97E-03	13.4	4.16E-04	8.1	0.30	5.65E-06	6.01E-07	9.16E-04	0.011	4.38E-04	1.39E-03	7.23E-03	0.01
CP1 Main Pond	189	7	2026	October	7.14E-04	1.00E-02	9.76E-04	9.31E-05	0.7	0.02	0	2.73E-04	1.66E-03	0.8	3.39E-04	3.7	2.62E-03	3.35E-15	3.00E-06	2.69E-06	3.00E-03	2.26E-05	7.55E-05	5.81E-04	7.95E-03
CP1 Main Pond	197	8	2027	June	6.62E-04	1.00E-02	9.42E-04	3.17E-03	2.5	0.05	0	2.09E-03	1.69E-03	3.3	3.05E-04	3.0	0.06	3.82E-07	3.33E-08	1.52E-04	4.58E-03	9.65E-05	3.22E-04	2.08E-03	8.64E-03
CP1 Main Pond	198	8	2027	July	9.68E-04	1.00E-02	1.06E-03	8.59E-03	5.9	0.12	0	5.54E-03	2.08E-03	7.9	3.20E-04	5.2	0.17	1.06E-06	1.23E-07	4.16E-04	7.67E-03	2.61E-04	7.78E-04	4.82E-03	0.01
CP1 Main Pond	199	8	2027	August	1.59E-03	1.00E-02	1.52E-03	0.017	11	0.23	0	0.011	3.13E-03	15.4	4.07E-04	9.1	0.33	1.70E-06	2.31E-07	8.29E-04	0.013	5.18E-04	1.51E-03	9.24E-03	0.01
CP1 Main Pond	200	8	2027	September	1.60E-03	1.00E-02	1.70E-03	0.015	10	0.22	0	9.83E-03	3.35E-03	13.9	4.15E-04	8.6	0.29	6.70E-08	2.79E-07	7.38E-04	0.013	4.65E-04	1.37E-03	8.50E-03	0.01
CP1 Main Pond	201	8	2027	October	8.17E-04	1.00E-02	1.25E-03	1.03E-04	0.8	0.02	0	2.49E-04	2.11E-03	1.0	3.79E-04	3.7	2.49E-03	3.15E-23	2.46E-06	2.20E-06	3.78E-03	1.92E-05	9.25E-05	7.22E-04	9.82E-03
CP1 Main Pond	209	9	2028	June	6.62E-04	1.00E-02	1.11E-03	3.03E-03	2.4	0.06	0	1.86E-03	1.94E-03	2.7	3.32E-04	3.0	0.05	0	0	1.04E-04	5.07E-03	8.13E-05	2.93E-04	2.17E-03	9.69E-03
CP1 Main Pond	210	9	2028	July	7.96E-04	1.00E-02	1.18E-03	7.83E-03	5.1	0.12	0	4.72E-03	2.19E-03	6.0	3.40E-04	4.6	0.14	0	0	2.76E-04	7.88E-03	2.11E-04	6.53E-04	4.70E-03	0.01
CP1 Main Pond	211	9	2028	August	1.12E-03	1.00E-02	1.51E-03	0.015	9.4	0.22	0	9.05E-03	2.96E-03	11.1	4.08E-04	7.3	0.27	0	0	5.34E-04	0.013	4.06E-04	1.21E-03	8.64E-03	0.01
CP1 Main Pond	212	9	2028	September	1.12E-03	1.00E-02	1.56E-03	0.014	8.9	0.21	0	8.56E-03	3.01E-03	10.5	4.12E-04	7.1	0.25	0	0	5.06E-04	0.012	3.84E-04	1.15E-03	8.23E-03	0.01
CP1 Main Pond	213	9	2028	October	6.64E-04	1.00E-02	1.24E-03	9.86E-05	0.8	0.02	0	1.15E-04	2.07E-03	0.8	3.53E-04	2.2	1.28E-03	0	0	2.91E-13	3.76E-03	2.41E-06	8.49E-05	7.15E-04	9.76E-03
CP1 Main Pond	221	10	2029	June	6.64E-04	1.00E-02	1.11E-03	3.03E-03	2.4	0.06	0	1.86E-03	1.95E-03	2.7	3.33E-04	3.0	0.05	0	0	1.04E-04	5.08E-03	8.14E-05	2.93E-04	2.18E-03	9.71E-03
CP1 Main Pond	222	10	2029	July	7.98E-04	1.00E-02	1.18E-03	7.85E-03	5.1	0.12	0	4.74E-03	2.20E-03	6.0	3.41E-04	4.6	0.14	0	0	2.76E-04	7.90E-03	2.11E-04	6.55E-04	4.71E-03	0.01
CP1 Main Pond	223	10	2029	August	1.13E-03	1.00E-02	1.52E-03	0.015	9.4	0.22	0	9.07E-03	2.97E-03	11.1	4.09E-04	7.4	0.27	0	0	5.35E-04	0.013	4.07E-04	1.21E-03	8.66E-03	0.01
CP1 Main Pond	224	10	2029	September	1.13E-03	1.00E-02	1.57E-03	0.014	8.9	0.21	0	8.54E-03	3.02E-03	10.5	4.13E-04	7.1	0.25	0	0	5.05E-04	0.012	3.83E-04	1.15E-03	8.22E-03	0.01
CP1 Main Pond	225	10	2029	October	6.62E-04	1.00E-02	1.23E-03	9.89E-05	0.8	0.02	0	1.15E-04	2.07E-03	0.8	3.52E-04	2.2	1.29E-03	0	0	2.92E-13	3.75E-03	2.42E-06	8.47E-05	7.13E-04	9.74E-03
CP1 Main Pond	233	11	2030	June	6.57E-04	1.00E-02	1.10E-03	3.04E-03	2.4	0.06	0	1.87E-03	1.92E-03	2.7	3.31E-04	2.9	0.05	0	0	1.05E-04	5.05E-03	8.16E-05	2.93E-04	2.17E-03	9.63E-03
CP1 Main Pond	234	11	2030	July	7.89E-04	1.00E-02	1.16E-03	7.78E-03	5.1	0.12	0	4.70E-03	2.17E-03	6.0	3.38E-04	4.5	0.14	0	0	2.74E-04	7.83E-03	2.09E-04	6.49E-04	4.67E-03	0.01
CP1 Main Pond	235	11	2030	August	1.12E-03	1.00E-02	1.50E-03	0.015	9.4	0.22	0	9.11E-03	2.95E-03	11.1	4.05E-04	7.4	0.27	0	0	5.38E-04	0.013	4.09E-04	1.22E-03	8.69E-03	0.01
CP1 Main Pond	236	11	2030	September	1.12E-03	1.00E-02	1.54E-03	0.014	9.0	0.21	0	8.60E-03	2.98E-03	10.6	4.09E-04	7.1	0.25	0	0	5.08E-04	0.012	3.86E-04	1.16E-03	8.26E-03	0.01
CP1 Main Pond	237	11	2030	October	6.55E-04	1.00E-02	1.22E-03	9.82E-05	0.8	0.02	0	1.15E-04	2.04E-03	0.8	3.51E-04	2.2	1.28E-03	0	0	2.90E-13	3.70E-03	2.40E-06	8.36E-05	7.05E-04	9.63E-03
				MAXIMUM	2.06E-03	1.00E-02	1.70E-03	0.017	13	0.2	0	0.011	3.35E-03	17.3	5.20E-04	9.5	0.36	6.25E-06	5.25E-06	1.25E-03	0.013	5.44E-04	1.68E-03	9.24E-03	0.015
				AVERAGE	1.09E-03	1.00E-02	1.20E-03	7.74E-03	5.8	0.12	0	5.10E-03	2.37E-03	7.2	3.82E-04	5.5	0.16	1.80E-06	7.48E-07	4.83E-04	7.58E-03	2.44E-04	7.43E-04	4.51E-03	0.011

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)	0.002	1.06	0.001				0.000026	0.07	0.04		0.001				0.0008				0.02		0.03
	Cu[5]	Fe[2]	Pb[5]	Li	Mg	Mn	Hg	Mo	Ni[5]	K	Se	Na	Sr	Te	Tl	Sn	Ti	W	U	V	Zn
Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	6.03E-04	0.01	0.001	0	0.74	0.02	0	1.23E-04	0.002	0.68	5.39E-04	1.65	0	0	0	0	0.002	0	5.98E-05	6.03E-04	0.006
MAXIMUM	9.63E-04	0.01	0.002	0	1.14	0.03	0	1.72E-04	0.003	1.12	6.15E-04	2.71	0	0	0	0	0.004	0	1.11E-04	9.63E-04	0.01
AVERAGE	7.05E-04	0.01	0.001	0	0.86	0.02	0	1.60E-04	0.002	0.81	5.87E-04	1.94	0	0	0	0	0.003	0	7.27E-05	7.05E-04	0.007

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Created By: MIB
Checked by: VJB

Table C.2. CP 2 - Plant Site Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)									1							0.5						
	Model	Mine	Date		Total Alkalinity	Cl	F	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L as CaCO3	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																						
CP2 Plant Site	113	1	2020	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	114	1	2020	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	115	1	2020	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	116	1	2020	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	117	1	2020	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	125	2	2021	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	126	2	2021	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	127	2	2021	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	128	2	2021	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	129	2	2021	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	137	3	2022	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	138	3	2022	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	139	3	2022	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	140	3	2022	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	141	3	2022	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	149	4	2023	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	150	4	2023	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	151	4	2023	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	152	4	2023	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	153	4	2023	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	161	5	2024	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	162	5	2024	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	163	5	2024	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	164	5	2024	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	165	5	2024	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	173	6	2025	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	174	6	2025	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	175	6	2025	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	176	6	2025	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	177	6	2025	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	185	7	2026	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	186	7	2026	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	187	7	2026	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	188	7	2026	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	189	7	2026	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	197	8	2027	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	198	8	2027	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	199	8	2027	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	200	8	2027	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	201	8	2027	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	209	9	2028	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	210	9	2028	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	211	9	2028	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	212	9	2028	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	213	9	2028	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	221	10	2029	June	41.43	47	0	14.5	0	2.3	2.2	0.6	1.33E-05	0.10	9.97E-04	0.020	0.03	5.52E-05	0	29	0	2.99E-03
CP2 Plant Site	222	10	2029	July	27.64	18	0	6.2	0	0.8	0.7	0.2	2.77E-03	0.10	3.24E-04	6.63E-03	0.01	0.01	0	11	0	9.72E-04
CP2 Plant Site	223	10	2029	August	26.78	16	0	5.7	0	0.7	0.6	0.2	2.94E-03	0.10	2.82E-04	5.81E-03	0.01	0.01	0	10	0	8.46E-04
CP2 Plant Site	224	10	2029	September	26.31	15	0	5.4	0	0.6	0.6	0.2	3.04E-03	0.10	2.59E-04	5.35E-03	0.01	0.01	0	9	0	7.77E-04
CP2 Plant Site	225	10	2029	October	25.67	14	0	5.0	0	0.5	0.5	0.1	3.17E-03	0.10	2.28E-04	4.73E-03	9.38E-03	0.01	0	8	0	6.83E-04
CP2 Plant Site	233	11	2030	June	34.49	39	0	12.0	0	1.9	1.8	0.5	1.50E-05	0.10	8.29E-04	0.017	0.02	6.21E-05	0	24	0	2.49E-03
CP2 Plant Site	234	11	2030	July	13.44	8	0	2.8	0	0.3	0.3	0.1	1.54E-03	0.08	1.34E-04	2.76E-03	5.25E-03	6.39E-03	0	5	0	4.01E-04
CP2 Plant Site	235	11	2030	August	19.15	11	0	3.8	0	0.4	0.4	0.1	2.30E-03	0.10	1.78E-04	3.69E-03	7.19E-03	9.53E-03	0	6	0	5.34E-04
CP2 Plant Site	236	11	2030	September	20.58	11	0	4.0	0	0.4	0.4	0.1	2.53E-03	0.08	1.84E-04	3.82E-03	7.55E-03	0.01	0	7	0	5.52E-04
				MAXIMUM	41	47	0	14.5	0	2.3	2.2	0.6	3.17E-03	0.10	9.97E-04	0.020	0.03	0.01	0	29	0	2.99E-03
				AVERAGE	29	22	0	7.2	0	0.9	0.9	0.2	2.33E-03	0.10	4.07E-04	8.28E-03	0.01	9.67E-03	0	13	0	1.22E-03

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)			120	2.8				13	60	0.004 to 0.01	0.1		0.025		1.5	0.000012		0.001	
		Total Alkalinity	Cl	F[2]	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	B	Cd[5]	Ca	Cr[4]	Co
	Month	mg/L as CaCO3	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	MINIMUM	21	11	0	4.0	0	0.4	0.4	0.1	0.003	0.08	0.0002	0.004	0.008	0.01	0	7	0	5.43E-04
	MAXIMUM	21	11	0	4.0	0	0.4	0.4	0.1	0.003	0.08	0.0002	0.004	0.008	0.01	0	7	0	5.43E-04
	AVERAGE	21	11	0	4.0	0	0.4	0.4	0.1	0.003	0.08	0.0002	0.004	0.008	0.01	0	7	0	5.43E-04

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.2. CP 2 - Plant Site Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2					0.5							0.5
	Model	Mine	Date		Cu	Fe	Pb	Mg	Mn	Hg	Mo	Ni	K	Se	Na	Ti	U	V	Zn
LOCATION	Month	Year	Year	Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																			
CP2 Plant Site	**113**	**1**	**2020**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**114**	**1**	**2020**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**115**	**1**	**2020**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**116**	**1**	**2020**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**117**	**1**	**2020**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**125**	**2**	**2021**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**126**	**2**	**2021**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**127**	**2**	**2021**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**128**	**2**	**2021**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**129**	**2**	**2021**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**137**	**3**	**2022**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**138**	**3**	**2022**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**139**	**3**	**2022**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**140**	**3**	**2022**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**141**	**3**	**2022**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**149**	**4**	**2023**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**150**	**4**	**2023**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**151**	**4**	**2023**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**152**	**4**	**2023**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**153**	**4**	**2023**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**161**	**5**	**2024**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**162**	**5**	**2024**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**163**	**5**	**2024**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**164**	**5**	**2024**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**165**	**5**	**2024**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**173**	**6**	**2025**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**174**	**6**	**2025**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**175**	**6**	**2025**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**176**	**6**	**2025**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**177**	**6**	**2025**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**185**	**7**	**2026**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**186**	**7**	**2026**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**187**	**7**	**2026**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**188**	**7**	**2026**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**189**	**7**	**2026**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**197**	**8**	**2027**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**198**	**8**	**2027**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**199**	**8**	**2027**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**200**	**8**	**2027**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**201**	**8**	**2027**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**209**	**9**	**2028**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**210**	**9**	**2028**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**211**	**9**	**2028**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**212**	**9**	**2028**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**213**	**9**	**2028**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**221**	**10**	**2029**	**June**	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	5.52E-07	9.97E-03	3.6	9.98E-04	8.7	0.02	3.99E-04	2.99E-03	0.036
CP2 Plant Site	**222**	**10**	**2029**	**July**	1.09E-03	1.00E-01	2.00E-03	1.3	0.03	0	1.15E-04	3.35E-03	1.3	6.15E-04	3.1	5.18E-03	1.30E-04	1.09E-03	0.012
CP2 Plant Site	**223**	**10**	**2029**	**August**	9.68E-04	1.00E-01	1.75E-03	1.1	0.03	0	1.22E-04	2.94E-03	1.1	5.91E-04	2.7	4.51E-03	1.13E-04	9.68E-04	0.011
CP2 Plant Site	**224**	**10**	**2029**	**September**	9.03E-04	1.00E-01	1.62E-03	1.1	0.03	0	1.26E-04	2.72E-03	1.1	5.78E-04	2.5	4.15E-03	1.04E-04	9.03E-04	9.94E-03
CP2 Plant Site	**225**	**10**	**2029**	**October**	8.15E-04	1.00E-01	1.43E-03	1.0	0.02	0	1.31E-04	2.41E-03	0.9	5.60E-04	2.3	3.64E-03	9.11E-05	8.15E-04	8.84E-03
CP2 Plant Site	**233**	**11**	**2030**	**June**	2.49E-03	1.00E-01	4.98E-03	2.8	0.08	0	6.21E-07	8.29E-03	3.0	8.31E-04	7.2	0.01	3.32E-04	2.49E-03	0.030
CP2 Plant Site	**234**	**11**	**2030**	**July**	4.65E-04	1.00E-01	8.32E-04	0.6	0.01	0	6.39E-05	1.40E-03	0.5	2.95E-04	1.3	2.14E-03	5.34E-05	4.65E-04	5.12E-03
CP2 Plant Site	**235**	**11**	**2030**	**August**	6.29E-04	1.00E-01	1.11E-03	0.8	0.02	0	9.53E-05	1.87E-03	0.7	4.19E-04	1.8	2.85E-03	7.12E-05	6.29E-04	6.87E-03
CP2 Plant Site	**236**	**11**	**2030**	**September**	6.57E-04	1.00E-01	1.16E-03	0.8	0.02	0	1.05E-04	1.94E-03	0.8	4.49E-04	1.8	2.94E-03	7.36E-05	6.57E-04	7.14E-03
				MAXIMUM	2.99E-03	1.00E-01	5.98E-03	3.4	0.10	0	1.31E-04	9.97E-03	3.6	9.98E-04	8.7	1.6E-02	3.99E-04	2.99E-03	0.036
				AVERAGE	1.32E-03	1.00E-01	2.49E-03	1.5	0.04	0	9.67E-05	4.17E-03	1.6	6.52E-04	3.8	6.52E-03	1.63E-04	1.32E-03	0.015

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)	0.002	1.06	0.001			0.000026	0.07	0.04		0.001			0.02		0.03
	Cu[5]	Fe[2]	Pb[5]	Mg	Mn	Hg	Mo	Ni[5]	K	Se	Na	Ti	U	V	Zn
Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	6.50E-04	0.10	0.001	0.78	0.02	0	1.07E-04	0.002	0.8	4.51E-04	1.8	0.003	7.24E-05	6.50E-04	0.007
MAXIMUM	6.50E-04	0.10	0.001	0.78	0.02	0	1.07E-04	0.002	0.8	4.51E-04	1.8	0.003	7.24E-05	6.50E-04	0.007
AVERAGE	6.50E-04	0.10	0.001	0.78	0.02	0	1.07E-04	0.002	0.8	4.51E-04	1.8	0.003	7.24E-05	6.50E-04	0.007

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.3. CP 3 - Pond at Base of TSF
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)											1							0.5								
	Model	Mine	Date		TDS	Total Alkalinity	Cl	F	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																										
CP3 TSF	113	1	2020	June	124	35	7.4	1.32E-05	0	45	2.93E-03	0.3	0.3	0.06	2.49E-03	0.10	1.67E-03	0.16	9.36E-03	2.75E-07	4.69E-07	0.01	6.62E-08	28	3.66E-07	7.52E-04
CP3 TSF	114	1	2020	July	697	151	8.8	2.16E-04	0	317	0.05	0.9	0.6	0.08	2.04E-03	0.10	0.01	**1.15**	0.04	2.28E-06	3.73E-06	0.02	5.37E-07	180	6.00E-06	3.79E-03
CP3 TSF	115	1	2020	August	509	113	8.1	1.37E-04	0	228	0.03	0.7	0.5	0.07	2.21E-03	0.10	8.43E-03	**0.83**	0.03	1.60E-06	2.63E-06	0.02	3.77E-07	130	3.80E-06	2.77E-03
CP3 TSF	116	1	2020	September	426	96	8.0	2.42E-04	0	189	0.05	0.7	0.5	0.07	2.36E-03	0.10	6.94E-03	**0.69**	0.02	1.48E-06	2.27E-06	0.02	3.37E-07	107	6.74E-06	2.41E-03
CP3 TSF	117	1	2020	October	135	20	7.8	2.57E-03	0	66	0.57	2.3	0.2	0.06	2.54E-03	0.07	1.27E-03	0.28	7.48E-03	2.85E-06	1.43E-06	0.01	4.28E-07	14	7.13E-05	2.49E-03
CP3 TSF	125	2	2021	June	117	34	7.3	1.22E-05	0	42	2.70E-03	0.3	0.3	0.06	2.49E-03	0.09	1.56E-03	0.15	8.98E-03	3.89E-07	6.73E-07	0.01	9.43E-08	26	3.38E-07	7.24E-04
CP3 TSF	126	2	2021	July	652	143	8.8	2.00E-04	0	294	0.04	1.0	0.8	0.08	2.04E-03	0.10	0.01	**1.07**	0.03	3.17E-06	5.33E-06	0.02	7.56E-07	167	5.54E-06	3.63E-03
CP3 TSF	127	2	2021	August	476	107	8.2	1.26E-04	0	211	0.03	0.8	0.6	0.07	2.22E-03	0.10	7.87E-03	**0.77**	0.03	2.23E-06	3.77E-06	0.02	5.33E-07	121	3.51E-06	2.66E-03
CP3 TSF	128	2	2021	September	399	91	8.0	2.24E-04	0	175	0.05	0.8	0.5	0.06	2.36E-03	0.10	6.47E-03	**0.64**	0.02	1.99E-06	3.21E-06	0.02	4.65E-07	100	6.22E-06	2.31E-03
CP3 TSF	129	2	2021	October	127	19	7.7	2.37E-03	0	61	0.53	2.1	0.2	0.06	2.54E-03	0.06	1.18E-03	0.26	7.21E-03	2.64E-06	1.32E-06	0.01	3.95E-07	14	6.59E-05	2.32E-03
CP3 TSF	137	3	2022	June	109	33	7.4	1.09E-05	0	38	2.43E-03	0.3	0.3	0.06	2.49E-03	0.09	1.43E-03	0.13	8.60E-03	5.16E-07	9.00E-07	0.01	1.26E-07	24	3.03E-07	6.99E-04
CP3 TSF	138	3	2022	July	596	133	9.1	1.79E-04	0	265	0.04	1.2	1.0	0.08	2.04E-03	0.10	9.96E-03	**0.96**	0.03	4.15E-06	7.10E-06	0.02	1.00E-06	152	4.98E-06	3.44E-03
CP3 TSF	139	3	2022	August	436	100	8.3	1.14E-04	0	191	0.03	0.9	0.7	0.07	2.22E-03	0.10	7.16E-03	**0.69**	0.02	2.92E-06	5.02E-06	0.02	7.06E-07	110	3.15E-06	2.52E-03
CP3 TSF	140	3	2022	September	366	85	8.1	2.01E-04	0	158	0.04	0.9	0.6	0.06	2.36E-03	0.10	5.90E-03	**0.57**	0.02	2.56E-06	4.26E-06	0.02	6.08E-07	91	5.59E-06	2.19E-03
CP3 TSF	141	3	2022	October	117	19	7.6	2.13E-03	0	55	0.47	1.9	0.2	0.06	2.54E-03	0.06	1.07E-03	0.23	6.98E-03	2.37E-06	1.18E-06	0.01	3.55E-07	13	5.92E-05	2.11E-03
CP3 TSF	149	4	2023	June	151	54	7.5	1.30E-05	0	44	2.75E-03	0.4	0.4	0.07	2.13E-03	0.10	3.19E-03	0.26	0.01	8.03E-07	1.41E-06	0.01	1.23E-06	31	3.44E-07	1.16E-03
CP3 TSF	150	4	2023	July	875	289	9.5	2.05E-04	0	297	0.04	1.6	1.3	0.08	1.68E-03	0.10	0.02	**1.86**	0.07	6.16E-06	1.06E-05	0.03	8.84E-06	197	5.43E-06	6.43E-03
CP3 TSF	151	4	2023	August	647	215	8.7	1.32E-04	0	217	0.03	1.2	1.0	0.07	1.85E-03	0.10	0.02	**1.36**	0.05	4.43E-06	7.67E-06	0.03	6.45E-06	145	3.50E-06	4.75E-03
CP3 TSF	152	4	2023	September	542	180	8.4	2.36E-04	0	182	0.05	1.2	0.9	0.07	2.00E-03	0.10	0.01	**1.13**	0.04	3.87E-06	6.54E-06	0.02	5.37E-06	120	6.27E-06	4.07E-03
CP3 TSF	153	4	2023	October	113	18	7.7	2.54E-03	0	51	0.54	2.2	0.2	0.06	2.18E-03	0.07	1.11E-03	0.24	7.09E-03	2.70E-06	1.35E-06	9.79E-03	1.03E-06	12	6.74E-05	2.46E-03
CP3 TSF	161	5	2024	June	112	42	7.6	8.33E-06	0	30	1.77E-03	0.5	0.5	0.07	2.12E-03	0.10	2.13E-03	0.17	0.01	1.26E-06	2.22E-06	0.01	9.58E-07	22	2.21E-07	9.35E-04
CP3 TSF	162	5	2024	July	599	202	10	1.31E-04	0	196	0.03	2.3	1.9	0.08	1.67E-03	0.10	0.01	**1.19**	0.05	9.53E-06	1.67E-05	0.03	6.94E-06	133	3.49E-06	4.83E-03
CP3 TSF	163	5	2024	August	445	151	9.3	8.47E-05	0	144	0.02	1.7	1.4	0.07	1.85E-03	0.10	0.01	**0.87**	0.04	6.86E-06	1.20E-05	0.03	5.04E-06	98	2.25E-06	3.58E-03
CP3 TSF	164	5	2024	September	376	128	8.9	1.52E-04	0	120	0.03	1.5	1.2	0.07	1.99E-03	0.10	8.80E-03	**0.72**	0.03	5.88E-06	1.02E-05	0.02	4.22E-06	82	4.03E-06	3.08E-03
CP3 TSF	165	5	2024	October	84	17	7.5	1.63E-03	0	34	0.35	1.5	0.2	0.06	2.17E-03	0.07	7.53E-04	0.16	6.32E-03	1.73E-06	8.67E-07	9.50E-03	6.51E-07	9	4.34E-05	1.70E-03
CP3 TSF	173	6	2025	June	205	71	6.5	1.89E-05	0	62	3.98E-03	0.6	0.5	0.06	1.05E-03	0.10	4.92E-03	0.40	0.02	1.71E-06	3.00E-06	0.01	2.13E-06	44	4.97E-07	1.66E-03
CP3 TSF	174	6	2025	July	1112	399	9.1	2.66E-04	0	387	0.06	2.7	2.2	0.07	7.44E-04	0.10	0.03	**2.56**	0.10	1.16E-05	2.03E-05	0.04	1.37E-05	200	7.03E-06	9.01E-03
CP3 TSF	175	6	2025	August	901	307	8.3	1.80E-04	0	296	0.04	2.1	1.7	0.07	8.60E-04	0.10	0.02	**1.96**	0.07	8.76E-06	1.53E-05	0.03	1.04E-05	200	4.74E-06	6.92E-03
CP3 TSF	176	6	2025	September	775	263	8.1	3.32E-04	0	255	0.07	2.0	1.5	0.07	9.56E-04	0.10	0.02	**1.68**	0.06	7.82E-06	1.34E-05	0.03	8.98E-06	171	8.76E-06	6.09E-03
CP3 TSF	177	6	2025	October	139	14	6.8	3.74E-03	0	70	0.79	3.0	0.2	0.06	1.09E-03	0.07	1.55E-03	0.35	7.17E-03	3.94E-06	1.97E-06	5.65E-03	1.63E-06	15	9.86E-05	3.47E-03
CP3 TSF	185	7	2026	June	144	52	6.7	1.16E-05	0	40	2.44E-03	0.7	0.6	0.06	1.05E-03	0.10	3.32E-03	0.26	0.01	2.41E-06	4.25E-06	0.01	1.73E-06	30	3.05E-07	1.31E-03
CP3 TSF	186	7	2026	July	792	281	10	1.64E-04	0	245	0.03	3.6	3.0	0.07	7.44E-04	0.10	0.02	**1.65**	0.07	1.63E-05	2.87E-05	0.04	1.12E-05	172	4.30E-06	6.83E-03
CP3 TSF	187	7	2026	August	609	217	9.1	1.11E-04	0	188	0.02	2.8	2.3	0.07	8.60E-04	0.10	0.02	**1.26**	0.05	1.23E-05	2.17E-05	0.03	8.52E-06	132	2.90E-06	5.25E-03
CP3 TSF	188	7	2026	September	526	186	8.8	2.04E-04	0	162	0.04	2.5	2.0	0.07	9.56E-04	0.10	0.01	**1.08**	0.04	1.08E-05	1.89E-05	0.03	7.35E-06	113	5.36E-06	4.63E-03
CP3 TSF	189	7	2026	October	93	12	6.5	2.30E-03	0	43	0.48	2.0	0.2	0.06	1.09E-03	0.07	9.83E-04	0.21	5.94E-03	2.42E-06	1.21E-06	5.21E-03	1.05E-06	10	6.04E-05	2.25E-03
CP3 TSF	197	8	2027	June	117	43	6.8	8.44E-06	0	31	1.77E-03	0.8	0.7	0.06	1.05E-03	0.10	2.54E-03	0.19	0.01	2.71E-06	4.79E-06	0.01	1.49E-06	24	2.22E-07	1.15E-03
CP3 TSF	198	8	2027	July	616	223	11	1.19E-04	0	184	0.03	4.0	3.3	0.07	7.44E-04	0.10	0.02	**1.21**	0.05	1.84E-05	3.24E-05	0.04	9.75E-06	132	3.13E-06	5.75E-03
CP3 TSF	199	8	2027	August	475	172	9.5	8.05E-05	0	141	0.02	3.0	2.6	0.07	8.60E-04	0.10	0.01	**0.92**	0.04	1.38E-05	2.44E-05	0.03	7.40E-06	102	2.11E-06	4.43E-03
CP3 TSF	200	8	2027	September	412	149	9.1	1.49E-04	0	122	0.03	2.7	2.3	0.07	9.56E-04	0.10	0.01	**0.79**	0.03	1.21E-05	2.13E-05	0.03	6.39E-06	87	3.91E-06	3.91E-03
CP3 TSF	201	8	2027	October	75	12	6.4	1.67E-03	0	32	0.35	1.5	0.2	0.06	1.09E-03	0.07	7.45E-04	0.15	5.43E-03	1.76E-06	8.80E-07	5.03E-03	7.67E-07	9	4.40E-05	1.73E-03
CP3 TSF	209	9	2028	June	43	18	7.1	0	0	5	0	0.9	0.8	0.07	1.08E-03	0.09	4.43E-04	7.40E-03	4.88E-03	3.48E-06	6.17E-06	0.01	8.55E-07	7	0	6.98E-04
CP3 TSF	210	9	2028	July	146	66	12	0	0	20	0	4.9	4.2	0.07	7.61E-04	0.10	2.38E-03	0.04	9.20E-03	2.35E-05	4.17E-05	0.04	5.78E-06	25	0	2.86E-03
CP3 TSF	211	9	2028	August	116	52	11	0	0	16	0	3.8	3.2	0.07	8.79E-04	0.10	1.81E-03	0.03	7.88E-03	1.77E-05	3.14E-05	0.03	4.35E-06	20	0	2.23E-03
CP3 TSF	212	9	2028	September	105	47	10	0	0	14	0	3.3	2.9	0.07	9.77E-04	0.10	1.59E-03	0.03	7.43E-03	1.54E-05	2.74E-05	0.03	3.79E-06	18	0	1.98E-03
CP3 TSF	213	9	2028	October	25	10	6.2	0	0	2	0	0.3	0.2	0.06	1.11E-03	0.07	1.08E-04	2.22E-03	4.14E-03	1.11E-14	1.96E-14	4.62E-03	2.72E-15	4	0	3.24E-04
CP3 TSF	221	10	2029	June	43	18	7.1	0	0	5	0	0.9	0.8	0.07	1.08E-03	0.09	4.43E-04	7.40E-03	4.88E-03	3.48E-06	6.17E-06	0.01	8.55E-07	7	0	6.98E-04
CP3 TSF	222	10	2029	July	146	66	12	0	0	20	0	4.9	4.2	0.07	7.61E-04	0.10	2.38E-03	0.04	9.20E-03	2.35E-05	4.17E-05	0.04	5.78E-06	25	0	2.86E-03
CP3 TSF	223	10	2029	August	116	52	11	0	0	16	0	3.8	3.2	0.07	8.79E-04	0.10	1.81E-03	0.03	7.88E-03	1.77E-05	3.14E-05	0.03	4.35E-06	20	0	2.23E-03
CP3 TSF	224	10	2029	September	105	47	10	0	0	14	0	3.3	2.9	0.07	9.77E-04	0.10	1.59E-03	0.03	7.43E-03	1.54E-05	2.74E-05	0.03	3.79E-06	18	0	1.98E-03
CP3 TSF	225	10	2029	October	25	10	6.2	0	0	2	0	0.3	0.2	0.06	1.11E-03	0.07	1.08E-04	2.22E-03	4.14E-03	1.11E-14	1.96E-14	4.62E-03	2.72E-15	4	0	3.24E-04
CP3 TSF	233	11	2030	June	43	18	7.1	0	0	5	0	0.9	0.8	0.07	1.08E-03	0.09	4.43E-04	7.40E-03	4.88E-03	3.48E-06	6.17E-06	0.01	8.55E-07	7	0	6.98E-04
CP3 TSF	234	11	2030	July	146	66	12	0	0	20	0	4.9	4.2	0.07	7.61E-04	0.10	2.38E-03	0.04	9.20E-03	2.35E-05	4.17E-05	0.04	5.78E-06	25	0	2.86E-03
CP3 TSF	235	11	2030	August	116	52	11	0	0	16	0	3.8	3.2	0.07	8.79E-04	0.10	1.81E-03	0.03	7.88E-03	1.77E-05	3.14E-05	0.03	4.35E-06	20	0	2.23E-03
CP3 TSF	236	11	2030	September	105	47	10	0	0	14	0	3.3	2.9	0.07	9.77E-04	0.10	1.59E-03	0.01	7.43E-03	1.54E-05	2.74E-05	0.03	3.79E-06	18	0	1.98E-03
CP3 TSF	237	11	2030	October	25	10	6.2	0	0	2	0	0.3	0.2	0.06	1.11E-03	0.07	1.08E-04	2.22E-03	4.14E-03	1.11E-14	1.96E-14	4.62E-03	2.72E-15	4	0	3.24E-04
				MAXIMUM	1112	399	12	3.74E-03	0	387	0.79	4.9	4.2	0.1	2.54E-03	0.10	3.1E-02	**2.6**	0.10	2.35E-05	4.17E-05	0.04	1.37E-05	200	9.86E-05	9.01E-03
				AVERAGE	319	99	8.5	4.23E-04	0	110	0.09	1.9	1.3	0.1	1.51E-03	0.09	6.74E-03	**0.6**	0.02	6.95E-06	1.17E-05	0.02	3.35E-06	69	1.14E-05	2.85E-03

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)																					
			120	2.8					13	60	0.004 to 0.01	0.1		0.025				1.5	0.000012		0.001	
		TDS	Total Alkalinity	Cl	F[2]	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	Be	Bi	B	Cd[5]	Ca	Cr[4]	Co
	Month	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	MINIMUM	45	21	4.5	0	0	5	0	1.6	1.4	0.04	9.74E-04	0.07	6.66E-04	0.012	0.005	7.75E-06	1.32E-05	0.02	1.82E-06	7	0	4.20E-04
	MAXIMUM	71	34	4.7	0	0	9	0	3.2	2.7	0.04	0.001	0.10	1.29E-03	0.023	0.006	1.52E-05	2.59E-05	0.03	3.73E-06	11	0	6.15E-04
	AVERAGE	66	31	4.7	0	0	9	0	2.8	2.4	0.04	0.001	0.09	1.15E-03	0.020	0.006	1.34E-05	2.27E-05	0.03	3.27E-06	10	0	5.91E-04

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Created By: MIB
Checked by: VJB

Table C.3. CP 3 - Pond at Base of TSF
Water Quality Prediction
Meliadine Gold Project

LOCATION	Model Month	Mine Year	Date Year	Month	Cu mg/L	Fe mg/L	Pb mg/L	Li mg/L	Mg mg/L	Mn mg/L	Hg mg/L	Mo mg/L	Ni mg/L	K mg/L	Se mg/L	Ag mg/L	Na mg/L	Sr mg/L	Tl mg/L	Sn mg/L	Ti mg/L	W mg/L	U mg/L	V mg/L	Zn mg/L
Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2						0.5												0.5
Operations Water Quality (Years 1 to 11)																									
CP3 TSF	113	1	2020	June	1.16E-03	1.00E-01	7.40E-04	4.74E-04	1.6	0.02	0	1.45E-03	1.64E-03	2.7	3.65E-04	3.55E-07	2.3	0.05	1.46E-07	7.67E-04	1.76E-03	9.50E-05	2.17E-04	5.44E-04	4.74E-03
CP3 TSF	114	1	2020	July	6.05E-03	1.00E-01	1.40E-03	3.50E-03	8.3	0.12	0	0.01	5.19E-03	17.3	3.68E-04	2.78E-06	11	0.36	2.40E-06	5.64E-03	3.05E-03	7.09E-04	1.36E-03	1.48E-03	9.27E-03
CP3 TSF	115	1	2020	August	4.44E-03	1.00E-01	1.15E-03	2.51E-03	6.1	0.09	0	7.25E-03	3.98E-03	12.5	3.64E-04	1.97E-06	8.0	0.26	1.52E-06	4.05E-03	2.55E-03	5.07E-04	9.82E-04	1.16E-03	7.62E-03
CP3 TSF	116	1	2020	September	3.72E-03	1.00E-01	1.04E-03	2.05E-03	5.1	0.07	0	6.00E-03	3.43E-03	10.3	3.85E-04	1.65E-06	7.7	0.21	2.69E-06	3.30E-03	2.32E-03	4.24E-04	8.11E-04	1.02E-03	6.87E-03
CP3 TSF	117	1	2020	October	1.23E-03	1.00E-01	6.63E-04	1.12E-12	0.6	0.01	0	1.56E-03	1.44E-03	2.0	6.50E-04	1.11E-15	21	0.02	2.85E-05	2.85E-05	1.60E-03	2.14E-04	1.30E-04	4.57E-04	4.11E-03
CP3 TSF	125	2	2021	June	1.10E-03	1.00E-01	7.18E-04	4.64E-04	1.5	0.02	0	1.37E-03	1.57E-03	2.6	3.62E-04	5.12E-07	2.2	0.05	1.35E-07	7.11E-04	1.72E-03	8.85E-05	2.06E-04	5.39E-04	4.60E-03
CP3 TSF	126	2	2021	July	5.63E-03	1.00E-01	1.34E-03	3.45E-03	7.9	0.11	0	9.46E-03	4.89E-03	16.2	3.63E-04	4.01E-06	10	0.34	2.22E-06	5.24E-03	3.04E-03	6.61E-04	1.28E-03	1.51E-03	8.87E-03
CP3 TSF	127	2	2021	August	4.14E-03	1.00E-01	1.11E-03	2.47E-03	5.8	0.08	0	6.81E-03	3.76E-03	11.7	3.60E-04	2.84E-06	7.5	0.24	1.41E-06	3.76E-03	2.53E-03	4.74E-04	9.30E-04	1.18E-03	7.32E-03
CP3 TSF	128	2	2021	September	3.47E-03	1.00E-01	1.00E-03	2.02E-03	4.8	0.07	0	5.64E-03	3.25E-03	9.7	3.80E-04	2.38E-06	7.2	0.20	2.49E-06	3.06E-03	2.30E-03	3.95E-04	7.68E-04	1.03E-03	6.61E-03
CP3 TSF	129	2	2021	October	1.16E-03	1.00E-01	6.47E-04	1.12E-12	0.6	0.01	0	1.45E-03	1.39E-03	1.9	6.26E-04	1.60E-15	19	0.01	2.64E-05	2.64E-05	1.56E-03	1.98E-04	1.22E-04	4.45E-04	4.02E-03
CP3 TSF	137	3	2022	June	1.03E-03	1.00E-01	7.11E-04	4.49E-04	1.4	0.02	0	1.26E-03	1.53E-03	2.4	3.61E-04	6.88E-07	2.1	0.04	1.21E-07	6.43E-04	1.73E-03	8.06E-05	1.94E-04	5.42E-04	4.56E-03
CP3 TSF	138	3	2022	July	5.12E-03	1.00E-01	1.28E-03	3.35E-03	7.5	0.11	0	8.68E-03	4.56E-03	14.8	3.61E-04	5.39E-06	9.5	0.31	1.99E-06	4.73E-03	3.07E-03	6.02E-04	1.19E-03	1.53E-03	8.53E-03
CP3 TSF	139	3	2022	August	3.77E-03	1.00E-01	1.07E-03	2.40E-03	5.5	0.08	0	6.25E-03	3.52E-03	10.7	3.58E-04	3.81E-06	6.9	0.22	1.26E-06	3.40E-03	2.56E-03	4.31E-04	8.64E-04	1.19E-03	7.07E-03
CP3 TSF	140	3	2022	September	3.17E-03	1.00E-01	9.72E-04	1.96E-03	4.6	0.07	0	5.18E-03	3.05E-03	8.9	3.77E-04	3.19E-06	6.7	0.18	2.24E-06	2.77E-03	2.33E-03	3.60E-04	7.15E-04	1.05E-03	6.41E-03
CP3 TSF	141	3	2022	October	1.08E-03	1.00E-01	6.45E-04	1.10E-12	0.6	0.01	0	1.31E-03	1.35E-03	1.7	5.99E-04	2.15E-15	18	0.01	2.37E-05	2.37E-05	1.56E-03	1.78E-04	1.13E-04	4.40E-04	4.01E-03
CP3 TSF	149	4	2023	June	1.30E-03	1.00E-01	8.67E-04	1.39E-03	2.9	0.03	0	2.22E-03	1.70E-03	6.3	3.33E-04	1.08E-06	3.4	0.07	1.38E-07	5.43E-04	1.92E-03	1.41E-04	4.25E-04	6.15E-04	5.01E-03
CP3 TSF	150	4	2023	July	6.77E-03	1.00E-01	2.05E-03	9.88E-03	17.4	0.11	0	0.02	5.16E-03	41.9	3.31E-04	8.11E-06	18	0.53	2.17E-06	3.84E-03	3.48E-03	1.01E-03	2.76E-03	1.93E-03	9.90E-03
CP3 TSF	151	4	2023	August	5.04E-03	1.00E-01	1.65E-03	7.21E-03	12.9	0.09	0	0.01	4.04E-03	30.7	3.30E-04	5.85E-06	13	0.38	1.40E-06	2.81E-03	2.91E-03	7.37E-04	2.03E-03	1.50E-03	8.22E-03
CP3 TSF	152	4	2023	September	4.28E-03	1.00E-01	1.47E-03	5.95E-03	10.7	0.07	0	9.27E-03	3.51E-03	25.4	3.51E-04	4.94E-06	12	0.32	2.51E-06	2.31E-03	2.67E-03	6.15E-04	1.68E-03	1.32E-03	7.44E-03
CP3 TSF	153	4	2023	October	1.88E-03	1.00E-01	7.01E-04	3.40E-05	0.6	0.01	0	1.54E-03	1.42E-03	1.9	6.04E-04	3.39E-15	18	0.01	2.70E-05	2.47E-05	1.71E-03	1.88E-04	1.22E-04	4.40E-04	4.31E-03
CP3 TSF	161	5	2024	June	9.88E-04	1.00E-01	8.05E-04	1.02E-03	2.2	0.02	0	1.54E-03	1.53E-03	4.3	3.32E-04	1.70E-06	2.6	0.05	8.85E-08	3.69E-04	1.94E-03	9.48E-05	3.05E-04	6.19E-04	4.80E-03
CP3 TSF	162	5	2024	July	4.57E-03	1.00E-01	1.62E-03	7.35E-03	12.4	0.10	0	0.01	3.93E-03	27.6	3.23E-04	1.28E-05	12	0.37	1.40E-06	2.62E-03	3.60E-03	6.79E-04	1.92E-03	1.98E-03	8.42E-03
CP3 TSF	163	5	2024	August	3.43E-03	1.00E-01	1.34E-03	5.35E-03	9.1	0.07	0	7.66E-03	3.13E-03	20.3	3.24E-04	9.23E-06	9.1	0.27	9.00E-07	1.91E-03	3.00E-03	4.95E-04	1.41E-03	1.54E-03	7.12E-03
CP3 TSF	164	5	2024	September	2.94E-03	1.00E-01	1.21E-03	4.43E-03	7.6	0.06	0	6.39E-03	2.77E-03	16.8	3.41E-04	7.80E-06	8.2	0.22	1.61E-06	1.58E-03	2.74E-03	4.14E-04	1.17E-03	1.35E-03	6.55E-03
CP3 TSF	165	5	2024	October	1.34E-03	1.00E-01	6.93E-04	2.13E-05	0.6	0.01	0	1.02E-03	1.32E-03	1.4	5.07E-04	5.35E-15	12	8.69E-03	1.73E-05	1.59E-05	1.71E-03	1.21E-04	9.34E-05	4.29E-04	4.29E-03
CP3 TSF	173	6	2025	June	1.68E-03	1.00E-01	9.33E-04	2.28E-03	4.2	0.03	0	3.36E-03	1.90E-03	9.7	2.20E-04	2.30E-06	4.5	0.11	1.99E-07	7.57E-04	2.04E-03	2.18E-04	6.49E-04	7.16E-04	5.08E-03
CP3 TSF	174	6	2025	July	8.80E-03	1.00E-01	2.43E-03	0.01	24.7	0.15	0	0.02	6.19E-03	59.3	2.24E-04	1.55E-05	24	0.73	2.81E-06	4.81E-03	4.02E-03	1.39E-03	3.91E-03	2.68E-03	0.011
CP3 TSF	175	6	2025	August	6.79E-03	1.00E-01	2.00E-03	0.01	18.9	0.12	0	0.02	4.96E-03	45.4	2.21E-04	1.17E-05	19	0.56	1.90E-06	3.67E-03	3.41E-03	1.06E-03	2.99E-03	2.11E-03	9.13E-03
CP3 TSF	176	6	2025	September	5.93E-03	1.00E-01	1.79E-03	9.49E-03	16.2	0.10	0	0.01	4.39E-03	38.7	2.46E-04	1.02E-05	17	0.48	3.50E-06	3.12E-03	3.16E-03	9.16E-04	2.56E-03	1.87E-03	8.37E-03
CP3 TSF	177	6	2025	October	2.66E-03	1.00E-01	6.87E-04	5.68E-05	0.6	0.01	0	2.19E-03	1.48E-03	2.5	6.15E-04	7.31E-15	26	0.02	3.94E-05	3.57E-05	1.71E-03	2.71E-04	1.57E-04	4.05E-04	4.11E-03
CP3 TSF	185	7	2026	June	1.20E-03	1.00E-01	8.40E-04	1.74E-03	3.1	0.03	0	2.32E-03	1.62E-03	6.6	2.19E-04	3.27E-06	3.3	0.08	1.22E-07	4.78E-04	2.06E-03	1.46E-04	4.67E-04	7.22E-04	4.75E-03
CP3 TSF	186	7	2026	July	5.76E-03	1.00E-01	1.85E-03	0.01	17.8	0.13	0	0.01	4.47E-03	39.9	2.13E-04	2.20E-05	16	0.51	1.72E-06	3.05E-03	4.20E-03	9.37E-04	2.76E-03	2.75E-03	8.80E-03
CP3 TSF	187	7	2026	August	4.47E-03	1.00E-01	1.55E-03	8.52E-03	13.7	0.10	0	0.01	3.64E-03	30.6	2.14E-04	1.66E-05	13	0.39	1.16E-06	2.33E-03	3.54E-03	7.14E-04	2.12E-03	2.16E-03	7.56E-03
CP3 TSF	188	7	2026	September	3.92E-03	1.00E-01	1.41E-03	7.28E-03	11.7	0.09	0	9.58E-03	3.27E-03	26.1	2.32E-04	1.45E-05	12	0.33	2.15E-06	1.98E-03	3.28E-03	6.16E-04	1.81E-03	1.92E-03	7.03E-03
CP3 TSF	189	7	2026	October	1.83E-03	1.00E-01	6.76E-04	3.77E-05	0.5	0.01	0	1.36E-03	1.33E-03	1.7	4.62E-04	1.04E-14	16	0.01	2.42E-05	2.16E-05	1.71E-03	1.65E-04	1.12E-04	3.87E-04	4.08E-03
CP3 TSF	197	8	2027	June	9.88E-04	1.00E-01	7.95E-04	1.45E-03	2.6	0.03	0	1.83E-03	1.51E-03	5.1	2.18E-04	3.69E-06	2.8	0.06	8.87E-08	3.70E-04	2.07E-03	1.12E-04	3.78E-04	7.24E-04	4.61E-03
CP3 TSF	198	8	2027	July	4.39E-03	1.00E-01	1.56E-03	9.41E-03	14.4	0.11	0	0.01	3.72E-03	30.3	2.09E-04	2.49E-05	13	0.41	1.25E-06	2.37E-03	4.28E-03	7.23E-04	2.20E-03	2.78E-03	7.87E-03
CP3 TSF	199	8	2027	August	3.42E-03	1.00E-01	1.33E-03	7.15E-03	11.1	0.09	0	8.78E-03	3.07E-03	23.2	2.11E-04	1.87E-05	9.8	0.31	8.46E-07	1.80E-03	3.60E-03	5.51E-04	1.68E-03	2.18E-03	6.85E-03
CP3 TSF	200	8	2027	September	3.01E-03	1.00E-01	1.22E-03	6.13E-03	9.5	0.08	0	7.55E-03	2.78E-03	19.8	2.27E-04	1.63E-05	9.0	0.27	1.56E-06	1.54E-03	3.34E-03	4.75E-04	1.45E-03	1.94E-03	6.43E-03
CP3 TSF	201	8	2027	October	1.43E-03	1.00E-01	6.71E-04	2.74E-05	0.5	0.01	0	1.01E-03	1.27E-03	1.4	3.96E-04	1.17E-14	12	8.59E-03	1.76E-05	1.58E-05	1.70E-03	1.20E-04	9.30E-05	3.80E-04	4.07E-03
CP3 TSF	209	9	2028	June	4.20E-04	1.00E-01	6.86E-04	6.80E-04	1.1	0.02	0	5.05E-04	1.21E-03	1.0	2.22E-04	4.74E-06	1.3	0.02	0	7.83E-05	2.13E-03	2.20E-05	1.36E-04	7.32E-04	4.30E-03
CP3 TSF	210	9	2028	July	7.15E-04	1.00E-01	8.00E-04	4.59E-03	5.2	0.08	0	3.14E-03	1.73E-03	4.4	2.01E-04	3.21E-05	2.7	0.13	0	5.30E-04	4.50E-03	1.49E-04	6.74E-04	2.82E-03	5.48E-03
CP3 TSF	211	9	2028	August	6.22E-04	1.00E-01	7.50E-04	3.46E-03	4.0	0.07	0	2.38E-03	1.55E-03	3.4	2.07E-04	2.42E-05	2.3	0.10	0	3.99E-04	3.76E-03	1.12E-04	5.17E-04	2.21E-03	5.04E-03
CP3 TSF	212	9	2028	September	5.91E-04	1.00E-01	7.37E-04	3.02E-03	3.6	0.06	0	2.08E-03	1.49E-03	3.0	2.15E-04	2.10E-05	2.1	0.09	0	3.48E-04	3.49E-03	9.75E-05	4.56E-04	1.98E-03	4.91E-03
CP3 TSF	213	9	2028	October	3.70E-04	1.00E-01	6.71E-04	2.16E-12	0.4	0.01	0	4.62E-05	1.13E-03	0.4	2.25E-04	1.51E-14	1.0	6.17E-11	0	2.49E-13	1.73E-03	6.99E-14	4.32E-05	3.70E-04	4.12E-03
CP3 TSF	221	10	2029	June	4.20E-04	1.00E-01	6.86E-04	6.80E-04	1.1	0.02	0	5.05E-04	1.21E-03	1.0	2.22E-04	4.74E-06	1.3	0.02	0	7.83E-05	2.13E-03	2.20E-05	1.36E-04	7.32E-04	4.30E-03
CP3 TSF	222	10	2029	July	7.15E-04	1.00E-01	8.00E-04	4.59E-03	5.2	0.08	0	3.14E-03	1.73E-03	4.4	2.01E-04	3.21E-05	2.7	0.13	0	5.30E-04	4.50E-03	1.49E-04	6.74E-04	2.82E-03	5.48E-03
CP3 TSF	223	10	2029	August	6.22E-04	1.00E-01	7.50E-04	3.46E-03	4.0	0.07	0	2.38E-03	1.55E-03	3.4	2.07E-04	2.42E-05	2.3	0.10	0	3.99E-04	3.76E-03	1.12E-04	5.17E-04	2.21E-03	5.04E-03
CP3 TSF	224	10	2029	September	5.91E-04	1.00E-01	7.37E-04	3.02E-03	3.6	0.06	0	2.08E-03	1.49E-03	3.0	2.15E-04	2.10E-05	2.1	0.09	0	3.48E-04	3.49E-03	9.75E-05	4.56E-04	1.98E-03	4.91E-03
CP3 TSF	225	10	2029	October	3.70E-04	1.00E-01	6.71E-04	2.16E-12	0.4	0.01	0	4.62E-05	1.13E-03	0.4	2.25E-04	1.51E-14	1.0	6.17E-11	0	2.49E-13	1.73E-03	6.99E-14	4.32E-05	3.70E-04	4.12E-03
CP3 TSF	233	11	2030	June	4.20E-04	1.00E-01	6.86E-04	6.80E-04	1.1	0.02	0	5.05E-04	1.21E-03	1.0	2.22E-04	4.74E-06	1.3	0.02	0	7.83E-05	2.13E-03	2.20E-05	1.36E-04	7.32E-04	4.30E-03
CP3 TSF	234	11	2030	July	7.15E-04	1.00E-01	8.00E-04	4.59E-03	5.2	0.08	0	3.14E-03	1.73E-03	4.4	2.01E-04	3.21E-05	2.7	0.13	0	5.30E-04	4.50E-03	1.49E-04	6.74E-04	2.82E-03	5.48E-03
CP3 TSF	235	11	2030	August	6.22E-04	1.00E-01	7.50E-04	3.46E-03	4.0	0.07	0	2.38E-03	1.55E-03	3.4	2.07E-04	2.42E-05	2.3	0.10	0	3.99E-04	3.76E-03	1.12E-04	5.17E-04	2.21E-03	5.04E-03
CP3 TSF	236	11	2030	September	5.91E-04	1.00E-01	7.37E-04	3.02E-03	3.6	0.06	0	2.08E-03	1.49E-03	3.0	2.15E-04	2.10E-05	2.1	0.09	0	3.48E-04	3.49E-03	9.75E-05	4.56E-04	1.98E-03	4.91E-03
CP3 TSF	237	11	2030	October	3.70E-04	1.00E-01	6.71E-04	2.16E-12	0.4	0.01	0	4.62E-05	1.13E-03	0.4	2.25E-04	1.51E-14	1.0	6.17E-11	0	2.49E-13	1.73E-03	6.99E-14	4.32E-05	3.70E-04	4.12E-03
				MAXIMUM	8.80E-03	1.00E-01	2.43E-03	1.5E-02	25	0.15	0	0.02	6.19E-03	59	6.50E-04	3.21E-05	26	0.73	3.94E-05	5.64E-03	4.50E-03	1.39E-03	3.91E-03	2.82E-03	0.011
				AVERAGE	2.60E-03	1.00E-01	1.05E-03	3.52E-03	6.0	0.06	0	5.30E-03	2.55E-03	12.3	3.16E-04	8.85E-06	8.6	0.18	4.55E-06	1.54E-03	2.73E-03	3.54E-04	9.20E-04	1.34E-03	6.03E-03

Long Term Water Quality (Years 16+)

	Month	Cu[5] mg/L	Fe[2] mg/L	Pb[5] mg/L	Li mg/L	Mg mg/L	Mn mg/L	Hg mg/L	Mo mg/L	Ni[5] mg/L	K mg/L	Se mg/L	Ag mg/L	Na mg/L	Sr mg/L	Tl mg/L	Sn mg/L	Ti mg/L	W mg/L	U mg/L	V mg/L	Zn mg/L
CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)		0.002	1.06	0.001				0.000026	0.07	0.04		0.001	1.00E-04			0.0008				0.02		0.03
	MINIMUM	3.53E-04	0.10	4.55E-04	2.36E-04	1.38	0.02	0	1.03E-03	8.91E-04	0.8	1.74E-04	1.01E-05	1.23	0.03	0	1.66E-04	0.002	4.71E-05	2.25E-04	3.91E-04	0.003
	MAXIMUM	4.62E-04	0.10	4.87E-04	4.54E-04	2.49	0.02	0	0.002	1.07E-03	1.3	1.83E-04	1.98E-05	1.73	0.05	0	3.42E-04	0.003	9.11E-05	4.02E-04	5.19E-04	0.004
	AVERAGE	4.36E-04	0.10	4.79E-04	4.15E-04	2.24	0.02	0	0.002	1.03E-03	1.2	1.76E-04	1.74E-05	1.62	0.05	0	3.00E-04	0.003	8.23E-05	3.80E-04	4.99E-04	0.004

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Created By: MIB
Checked by: VJB

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)											1							0.5								
	Model	Mine	Date		TDS	Total Alkalinity	Cl	F	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																										
CP4 WRSF1	113	1	2020	June	96	46	12	0	0	12	0	1.5	1.3	0.04	3.20E-03	0.07	9.33E-04	0.01	6.04E-03	2.18E-05	3.86E-05	0.0	1.57E-06	15	0	2.22E-03
CP4 WRSF1	114	1	2020	July	569	253	54	0	0	81	0	11	9.8	0.06	2.95E-03	0.10	7.67E-03	0.09	0.02	1.92E-04	3.40E-04	0.3	1.39E-05	102	0	0.02
CP4 WRSF1	115	1	2020	August	396	177	38	0	0	56	0	7.8	6.7	0.05	3.06E-03	0.10	5.21E-03	0.06	0.01	1.30E-04	2.30E-04	0.2	9.38E-06	70	0	0.01
CP4 WRSF1	116	1	2020	September	329	148	32	0	0	46	0	6.4	5.5	0.05	3.18E-03	0.10	4.25E-03	0.05	0.01	1.06E-04	1.87E-04	0.2	7.64E-06	58	0	9.96E-03
CP4 WRSF1	117	1	2020	October	36	20	7	0	0	3	0	0.2	0.2	0.04	3.35E-03	0.05	7.31E-05	1.65E-03	4.89E-03	7.01E-14	1.24E-13	0.0	5.07E-15	4	0	2.19E-04
CP4 WRSF1	125	2	2021	June	225	99	24	0	0	31	0	4.4	3.7	0.06	1.83E-03	0.10	2.88E-03	0.04	8.77E-03	7.01E-05	1.24E-04	0.1	5.07E-06	40	0	6.77E-03
CP4 WRSF1	126	2	2021	July	1580	693	142	0	0	231	0	33	28	0.08	1.52E-03	0.10	0.02	0.26	0.04	5.58E-04	9.89E-04	0.9	4.04E-05	289	0	0.05
CP4 WRSF1	127	2	2021	August	1138	499	103	0	0	165	0	24	20	0.08	1.67E-03	0.10	0.02	0.19	0.03	3.99E-04	7.07E-04	0.6	2.88E-05	207	0	0.04
CP4 WRSF1	128	2	2021	September	978	430	89	0	0	142	0	20	17	0.07	1.82E-03	0.10	0.01	0.16	0.03	3.41E-04	6.05E-04	0.5	2.47E-05	178	0	0.03
CP4 WRSF1	129	2	2021	October	36	17	8	0	0	3	0	0.3	0.3	0.08	2.26E-03	0.08	1.27E-04	2.66E-03	5.63E-03	2.67E-13	4.74E-13	9.39E-03	1.93E-14	5	0	3.80E-04
CP4 WRSF1	137	3	2022	June	258	114	27	0	0	36	0	5.0	4.3	0.07	2.10E-03	0.10	3.31E-03	0.04	0.01	8.07E-05	1.43E-04	0.1	5.84E-06	46	0	7.80E-03
CP4 WRSF1	138	3	2022	July	1738	762	156	0	0	254	0	36	31	0.09	1.67E-03	0.10	0.02	0.29	0.04	6.14E-04	1.09E-03	1.0	4.44E-05	318	0	0.06
CP4 WRSF1	139	3	2022	August	1224	537	111	0	0	178	0	25	22	0.08	1.80E-03	0.10	0.02	0.20	0.03	4.29E-04	7.61E-04	0.7	3.10E-05	223	0	0.04
CP4 WRSF1	140	3	2022	September	1081	475	99	0	0	157	0	22	19	0.08	2.01E-03	0.10	0.02	0.18	0.03	3.77E-04	6.68E-04	0.6	2.73E-05	197	0	0.04
CP4 WRSF1	141	3	2022	October	42	19	10	0	0	3	0	0.3	0.3	0.09	2.59E-03	0.09	1.45E-04	3.05E-03	6.44E-03	2.11E-13	3.74E-13	0.0	1.52E-14	6	0	4.35E-04
CP4 WRSF1	149	4	2023	June	244	108	26	0	0	34	0	4.7	4.1	0.07	1.98E-03	0.10	3.12E-03	0.04	9.51E-03	7.61E-05	1.35E-04	0.1	5.50E-06	43	0	7.35E-03
CP4 WRSF1	150	4	2023	July	1595	699	143	0	0	233	0	33	28	0.08	1.54E-03	0.10	0.02	0.27	0.04	5.63E-04	9.99E-04	0.9	4.07E-05	291	0	0.05
CP4 WRSF1	151	4	2023	August	1146	503	104	0	0	167	0	24	20	0.08	1.68E-03	0.10	0.02	0.19	0.03	4.02E-04	7.12E-04	0.6	2.91E-05	209	0	0.04
CP4 WRSF1	152	4	2023	September	988	434	90	0	0	143	0	20	18	0.07	1.84E-03	0.10	0.01	0.16	0.03	3.45E-04	6.11E-04	0.5	2.49E-05	180	0	0.03
CP4 WRSF1	153	4	2023	October	38	18	9	0	0	3	0	0.3	0.3	0.08	2.36E-03	0.08	1.32E-04	2.77E-03	5.85E-03	2.78E-13	4.93E-13	9.77E-03	2.01E-14	5	0	3.96E-04
CP4 WRSF1	161	5	2024	June	217	96	23	0	0	30	0	4.2	3.6	0.06	1.77E-03	0.10	2.79E-03	0.03	8.50E-03	6.79E-05	1.20E-04	0.1	4.91E-06	39	0	6.56E-03
CP4 WRSF1	162	5	2024	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	163	5	2024	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	164	5	2024	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	165	5	2024	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	173	6	2025	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	174	6	2025	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	175	6	2025	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	176	6	2025	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	177	6	2025	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	185	7	2026	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	186	7	2026	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	187	7	2026	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	188	7	2026	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	189	7	2026	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	197	8	2027	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	198	8	2027	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	199	8	2027	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	200	8	2027	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	201	8	2027	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	209	9	2028	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	210	9	2028	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	211	9	2028	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	212	9	2028	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	213	9	2028	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	221	10	2029	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	222	10	2029	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	223	10	2029	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	224	10	2029	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	225	10	2029	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
CP4 WRSF1	233	11	2030	June	213	94	23	0	0	30	0	4.1	3.6	0.06	1.73E-03	0.10	2.73E-03	0.03	8.33E-03	6.66E-05	1.18E-04	0.1	4.81E-06	38	0	6.43E-03
CP4 WRSF1	234	11	2030	July	1520	667	136	0	0	222	0	32	27	0.08	1.46E-03	0.10	0.02	0.25	0.04	5.37E-04	9.52E-04	0.8	3.88E-05	278	0	0.05
CP4 WRSF1	235	11	2030	August	1104	485	100	0	0	161	0	23	20	0.07	1.62E-03	0.10	0.02	0.18	0.03	3.87E-04	6.87E-04	0.6	2.80E-05	201	0	0.04
CP4 WRSF1	236	11	2030	September	940	413	86	0	0	136	0	19	17	0.07	1.75E-03	0.10	0.01	0.16	0.02	3.28E-04	5.81E-04	0.5	2.37E-05	171	0	0.03
CP4 WRSF1	237	11	2030	October	31	15	7	0	0	3	0	0.3	0.2	0.07	1.95E-03	0.07	1.09E-04	2.30E-03	4.85E-03	2.30E-13	4.08E-13	8.10E-03	1.67E-14	4	0	3.28E-04
				MAXIMUM	1738	762	156	0	0	254	0	36	31	0.09	3.35E-03	0.10	0.024	0.29	0.04	6.14E-04	1.09E-03	1.0	4.44E-05	318	0	0.06
				AVERAGE	735	323	68	0	0	106	0	15	13	0.1	1.89E-03	0.09	0.010	0.12	0.02	2.53E-04	4.49E-04	0.4	1.83E-05	133	0	0.02

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)			120	2.8					13	60	0.004 to 0.01	0.1		0.025				1.5	0.000012		0.001	
		TDS	Total Alkalinity	Cl	F[2]	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	Be	Bi	B	Cd[5]	Ca	Cr[4]	Co
	Month	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	MINIMUM	206	94	10	0	0	28	0	9.4	8.1	0.06	0.002	0.10	0.004	**0.07**	0.01	1.53E-04	2.60E-04	0.2	1.13E-05	33	0	0.002
	MAXIMUM	343	159	14	0	0	49	0	17.3	14.8	0.07	0.002	0.10	0.007	**0.12**	0.022	2.69E-04	4.58E-04	0.4	2.10E-05	55	0	0.004
	AVERAGE	322	148	13	0	0	45	0	15.5	13.3	0.07	0.002	0.10	0.006	**0.11**	0.020	2.43E-04	4.13E-04	0.4	1.88E-05	51	0	0.004

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.4. CP 4 - WRSF1 Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2						0.5												0.5
	Model	Mine	Date		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn
LOCATION	Month	Year	Year	Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																									
CP4 WRSF1	113	1	2020	June	4.36E-04	1.00E-01	5.18E-04	4.04E-03	2.6	0.06	0	2.53E-03	9.93E-04	3	4.08E-04	2.97E-05	2.2	0.07	0	1.27E-04	3.40E-03	1.08E-04	3.18E-04	2.46E-03	3.89E-03
CP4 WRSF1	114	1	2020	July	1.18E-03	1.00E-01	8.24E-04	0.04	19.8	0.46	0	0.02	2.31E-03	24	4.14E-04	2.61E-04	12.3	0.61	0	1.11E-03	0.02	9.48E-04	2.59E-03	0.02	9.76E-03
CP4 WRSF1	115	1	2020	August	8.99E-04	1.00E-01	6.90E-04	0.02	13.5	0.31	0	0.01	1.80E-03	16	4.10E-04	1.77E-04	8.6	0.41	0	7.54E-04	0.01	6.42E-04	1.76E-03	0.01	7.49E-03
CP4 WRSF1	116	1	2020	September	7.89E-04	1.00E-01	6.34E-04	0.02	11.1	0.26	0	0.01	1.59E-03	13	4.16E-04	1.44E-04	7.1	0.34	0	6.14E-04	0.01	5.23E-04	1.44E-03	0.01	6.59E-03
CP4 WRSF1	117	1	2020	October	3.58E-04	9.10E-02	5.06E-04	1.30E-11	0.5	8.37E-03	0	1.39E-04	8.70E-04	0.4	4.24E-04	9.56E-14	0.9	2.22E-10	0	4.08E-13	1.17E-03	3.47E-13	2.92E-05	3.58E-04	3.31E-03
CP4 WRSF1	125	2	2021	June	6.69E-04	1.00E-01	7.28E-04	0.01	7.5	0.18	0	7.80E-03	1.56E-03	9	2.99E-04	9.56E-05	5.2	0.22	0	4.08E-04	8.91E-03	3.47E-04	9.75E-04	7.19E-03	6.20E-03
CP4 WRSF1	126	2	2021	July	2.65E-03	1.00E-01	1.26E-03	0.10	56.6	1.32	0	0.06	4.78E-03	70	2.99E-04	7.61E-04	33.7	1.8	0	3.25E-03	0.06	2.76E-03	7.47E-03	0.05	0.02
CP4 WRSF1	127	2	2021	August	1.99E-03	1.00E-01	1.06E-03	0.07	40.6	0.95	0	0.04	3.70E-03	50	3.00E-04	5.44E-04	24.4	1.3	0	2.32E-03	0.04	1.97E-03	5.35E-03	0.04	0.02
CP4 WRSF1	128	2	2021	September	1.76E-03	1.00E-01	1.00E-03	0.06	34.7	0.81	0	0.04	3.32E-03	43	3.12E-04	4.65E-04	21.0	1.1	0	1.98E-03	0.04	1.69E-03	4.58E-03	0.03	0.01
CP4 WRSF1	129	2	2021	October	4.74E-04	1.00E-01	8.07E-04	4.96E-11	0.6	0.01	0	9.39E-05	1.36E-03	0.5	3.64E-04	3.65E-13	1.3	8.48E-10	0	1.55E-12	2.03E-03	1.32E-12	5.07E-05	4.74E-04	5.02E-03
CP4 WRSF1	137	3	2022	June	7.70E-04	1.00E-01	8.38E-04	0.01	8.6	0.20	0	8.98E-03	1.80E-03	11	3.44E-04	1.10E-04	5.9	0.26	0	4.69E-04	0.01	4.00E-04	1.12E-03	8.27E-03	7.13E-03
CP4 WRSF1	138	3	2022	July	2.91E-03	1.00E-01	1.38E-03	0.11	62.2	1.45	0	0.07	5.26E-03	77	3.29E-04	8.37E-04	37.1	1.9	0	3.57E-03	0.07	3.04E-03	8.22E-03	0.06	0.02
CP4 WRSF1	139	3	2022	August	2.14E-03	1.00E-01	1.15E-03	0.08	43.7	1.02	0	0.05	3.98E-03	54	3.23E-04	5.86E-04	26.2	1.4	0	2.50E-03	0.05	2.13E-03	5.76E-03	0.04	0.02
CP4 WRSF1	140	3	2022	September	1.95E-03	1.00E-01	1.11E-03	0.07	38.4	0.90	0	0.04	3.67E-03	47	3.45E-04	5.14E-04	23.2	1.2	0	2.19E-03	0.04	1.87E-03	5.06E-03	0.04	0.02
CP4 WRSF1	141	3	2022	October	5.43E-04	1.00E-01	9.23E-04	3.91E-11	0.7	0.02	0	1.07E-04	1.56E-03	0.6	4.17E-04	2.87E-13	1.5	6.68E-10	0	1.22E-12	2.32E-03	1.04E-12	5.80E-05	5.43E-04	5.75E-03
CP4 WRSF1	149	4	2023	June	7.25E-04	1.00E-01	7.90E-04	0.01	8.2	0.19	0	8.46E-03	1.70E-03	10	3.24E-04	1.04E-04	5.6	0.24	0	4.42E-04	9.66E-03	3.76E-04	1.06E-03	7.79E-03	6.72E-03
CP4 WRSF1	150	4	2023	July	2.67E-03	1.00E-01	1.27E-03	0.10	57.1	1.33	0	0.06	4.82E-03	70	3.02E-04	7.68E-04	34.0	1.8	0	3.28E-03	0.06	2.79E-03	7.54E-03	0.06	0.02
CP4 WRSF1	151	4	2023	August	2.01E-03	1.00E-01	1.07E-03	0.07	40.9	0.95	0	0.04	3.73E-03	50	3.03E-04	5.48E-04	24.5	1.3	0	2.34E-03	0.04	1.99E-03	5.39E-03	0.04	0.02
CP4 WRSF1	152	4	2023	September	1.78E-03	1.00E-01	1.01E-03	0.06	35.1	0.82	0	0.04	3.35E-03	43	3.15E-04	4.70E-04	21.2	1.1	0	2.00E-03	0.04	1.71E-03	4.63E-03	0.03	0.01
CP4 WRSF1	153	4	2023	October	4.93E-04	1.00E-01	8.39E-04	5.16E-11	0.6	0.01	0	9.77E-05	1.42E-03	0.6	3.79E-04	3.79E-13	1.4	8.81E-10	0	1.62E-12	2.11E-03	1.38E-12	5.27E-05	4.93E-04	5.22E-03
CP4 WRSF1	161	5	2024	June	6.48E-04	1.00E-01	7.05E-04	0.01	7.3	0.17	0	7.56E-03	1.51E-03	9	2.89E-04	9.26E-05	5.0	0.22	0	3.95E-04	8.63E-03	3.36E-04	9.44E-04	6.96E-03	6.00E-03
CP4 WRSF1	162	5	2024	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	163	5	2024	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	164	5	2024	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	165	5	2024	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	173	6	2025	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	174	6	2025	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	175	6	2025	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	176	6	2025	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	177	6	2025	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	185	7	2026	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	186	7	2026	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	187	7	2026	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	188	7	2026	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	189	7	2026	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	197	8	2027	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	198	8	2027	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	199	8	2027	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	200	8	2027	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	201	8	2027	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	209	9	2028	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	210	9	2028	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	211	9	2028	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	212	9	2028	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	213	9	2028	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	221	10	2029	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	222	10	2029	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	223	10	2029	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	224	10	2029	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	225	10	2029	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
CP4 WRSF1	233	11	2030	June	6.35E-04	1.00E-01	6.91E-04	0.01	7.1	0.17	0	7.41E-03	1.48E-03	9	2.83E-04	9.08E-05	4.9	0.21	0	3.87E-04	8.46E-03	3.30E-04	9.25E-04	6.82E-03	5.88E-03
CP4 WRSF1	234	11	2030	July	2.55E-03	1.00E-01	1.21E-03	0.10	54.4	1.27	0	0.06	4.60E-03	67	2.88E-04	7.32E-04	32.4	1.7	0	3.12E-03	0.06	2.66E-03	7.19E-03	0.05	0.02
CP4 WRSF1	235	11	2030	August	1.93E-03	1.00E-01	1.03E-03	0.07	39.4	0.92	0	0.04	3.59E-03	48	2.91E-04	5.28E-04	23.7	1.2	0	2.25E-03	0.04	1.92E-03	5.19E-03	0.04	0.02
CP4 WRSF1	236	11	2030	September	1.69E-03	1.00E-01	9.63E-04	0.06	33.4	0.78	0	0.04	3.19E-03	41	3.00E-04	4.47E-04	20.2	1.0	0	1.91E-03	0.04	1.62E-03	4.40E-03	0.03	0.01
CP4 WRSF1	237	11	2030	October	4.09E-04	1.00E-01	6.95E-04	4.28E-11	0.5	0.01	0	8.10E-05	1.17E-03	0.5	3.14E-04	3.14E-13	1.1	7.31E-10	0	1.34E-12	1.75E-03	1.14E-12	4.37E-05	4.09E-04	4.33E-03
				MAXIMUM	2.91E-03	1.00E-01	1.38E-03	0.11	62	1.5	0	0.07	5.26E-03	77	4.24E-04	8.37E-04	37	1.9	0	3.57E-03	0.07	3.04E-03	8.22E-03	0.06	0.02
				AVERAGE	1.41E-03	9.98E-02	9.19E-04	0.05	26	0.6	0	0.03	2.76E-03	32	3.16E-04	3.46E-04	16	0.8	0	1.47E-03	0.03	1.25E-03	3.41E-03	0.02	0.01

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)	0.002	1.06	0.001				0.000026	0.07	0.04		0.001	1.00E-04			0.0008				0.02		0.03
	Cu[5]	Fe[2]	Pb[5]	Li	Mg	Mn	Hg	Mo	Ni[5]	K	Se	Ag	Na	Sr	Tl	Sn	Ti	W	U	V	Zn
Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	9.98E-04	0.10	7.84E-04	0.003	7	0.08	0	0.02	0.002	4.6	2.85E-04	1.99E-04	10	0.16	0	9.10E-04	0.02	7.36E-04	0.002	0.002	0.01
MAXIMUM	1.55E-03	0.10	9.46E-04	0.006	13	0.14	0	0.03	0.003	7.7	2.98E-04	3.50E-04	17	0.28	0	1.69E-03	0.03	0.001	0.004	0.004	0.02
AVERAGE	1.43E-03	0.10	9.13E-04	0.005	12	0.13	0	0.03	0.003	7.3	2.95E-04	3.16E-04	16	0.27	0	1.52E-03	0.03	0.001	0.003	0.003	0.02

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.5. CP 5 - WRSF2 Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[1] (mg/L)									1							0.5								
	Model	Mine	Date		Total Alkalinity	Cl	F	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L as $CaCO_3$	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																								
CP5 WRSF2 Peanut Lake	113	1	2020	June	35.99	18	0	9	0	2.2	3.2	0.2	2.54E-03	0.10	6.71E-04	0.01	0.01	8.08E-06	1.43E-05	0.02	8.39E-07	14	0	1.62E-03
CP5 WRSF2 Peanut Lake	114	1	2020	July	114.97	35	0	36	0	5.8	6.3	0.2	2.11E-03	0.10	3.44E-03	0.05	0.02	6.44E-05	1.14E-04	0.11	6.67E-06	48	0	7.19E-03
CP5 WRSF2 Peanut Lake	115	1	2020	August	88.05	29	0	27	0	4.6	5.2	0.2	2.29E-03	0.10	2.50E-03	0.03	0.02	4.54E-05	8.05E-05	0.08	4.72E-06	36	0	5.28E-03
CP5 WRSF2 Peanut Lake	116	1	2020	September	77.54	26	0	23	0	4.1	4.7	0.2	2.43E-03	0.10	2.12E-03	0.03	0.01	3.78E-05	6.70E-05	0.07	3.93E-06	32	0	4.50E-03
CP5 WRSF2 Peanut Lake	117	1	2020	October	25.13	16	0	5	0	1.8	2.7	0.2	2.62E-03	0.10	2.82E-04	5.79E-03	0.01	2.55E-14	4.53E-14	0.01	2.65E-15	10	0	8.47E-04
CP5 WRSF2 Peanut Lake	125	2	2021	June	39.00	13	0	11	0	6.3	11.1	0.1	1.72E-03	0.10	1.09E-03	0.02	9.03E-03	9.80E-06	1.74E-05	0.02	1.99E-06	15	0	1.61E-03
CP5 WRSF2 Peanut Lake	126	2	2021	July	177.19	30	0	56	0	11	15.2	0.1	1.32E-03	0.10	6.72E-03	0.10	0.02	7.18E-05	1.27E-04	0.12	1.44E-05	68	0	8.19E-03
CP5 WRSF2 Peanut Lake	127	2	2021	August	134.26	24	0	42	0	9.2	13.9	0.1	1.47E-03	0.10	4.97E-03	0.08	0.02	5.23E-05	9.27E-05	0.09	1.06E-05	51	0	6.10E-03
CP5 WRSF2 Peanut Lake	128	2	2021	September	117.57	22	0	36	0	8.6	13.3	0.1	1.61E-03	0.10	4.28E-03	0.07	0.02	4.47E-05	7.92E-05	0.08	9.07E-06	45	0	5.29E-03
CP5 WRSF2 Peanut Lake	129	2	2021	October	17.54	11	0	4	0	5.8	10.7	0.1	1.82E-03	0.10	1.98E-04	4.07E-03	7.41E-03	3.18E-14	5.64E-14	7.54E-03	6.40E-15	7	0	5.95E-04
CP5 WRSF2 Peanut Lake	137	3	2022	June	39.70	14	0	11	0	6.5	11.3	0.1	1.75E-03	0.10	1.11E-03	0.02	9.20E-03	9.96E-06	1.77E-05	0.02	2.02E-06	15	0	1.64E-03
CP5 WRSF2 Peanut Lake	138	3	2022	July	179.30	30	0	57	0	11	15.4	0.1	1.33E-03	0.10	6.80E-03	0.10	0.02	7.27E-05	1.29E-04	0.12	1.46E-05	69	0	8.29E-03
CP5 WRSF2 Peanut Lake	139	3	2022	August	135.51	24	0	42	0	9.3	14.0	0.1	1.49E-03	0.10	5.02E-03	0.08	0.02	5.28E-05	9.36E-05	0.09	1.07E-05	52	0	6.16E-03
CP5 WRSF2 Peanut Lake	140	3	2022	September	119.05	22	0	37	0	8.7	13.4	0.1	1.63E-03	0.10	4.33E-03	0.07	0.02	4.53E-05	8.02E-05	0.08	9.19E-06	45	0	5.36E-03
CP5 WRSF2 Peanut Lake	141	3	2022	October	17.81	11	0	4	0	5.9	10.9	0.1	1.84E-03	0.10	2.01E-04	4.13E-03	7.53E-03	2.23E-14	3.95E-14	7.65E-03	5.77E-15	7	0	6.04E-04
CP5 WRSF2 Peanut Lake	149	4	2023	June	38.19	12	0	11	0	7.1	12.6	0.1	1.74E-03	0.10	1.08E-03	0.02	8.61E-03	8.88E-06	1.57E-05	0.02	2.17E-06	14	0	1.49E-03
CP5 WRSF2 Peanut Lake	150	4	2023	July	173.70	27	0	55	0	11	16.2	0.1	1.32E-03	0.10	6.73E-03	0.11	0.02	6.47E-05	1.15E-04	0.11	1.56E-05	66	0	7.57E-03
CP5 WRSF2 Peanut Lake	151	4	2023	August	131.42	22	0	41	0	9.6	15.1	0.1	1.48E-03	0.10	4.98E-03	0.08	0.02	4.70E-05	8.33E-05	0.08	1.15E-05	50	0	5.63E-03
CP5 WRSF2 Peanut Lake	152	4	2023	September	115.09	20	0	35	0	9.1	14.5	0.1	1.61E-03	0.10	4.28E-03	0.07	0.02	4.02E-05	7.12E-05	0.07	9.82E-06	43	0	4.88E-03
CP5 WRSF2 Peanut Lake	153	4	2023	October	16.77	10	0	4	0	6.6	12.2	0.1	1.82E-03	0.10	1.79E-04	3.68E-03	6.83E-03	2.87E-14	5.09E-14	7.56E-03	6.94E-15	6	0	5.36E-04
CP5 WRSF2 Peanut Lake	161	5	2024	June	33.98	11	0	9	0	7.5	13.6	0.1	1.58E-03	0.10	9.97E-04	0.02	8.47E-03	4.83E-06	8.57E-06	0.01	2.09E-06	13	0	1.14E-03
CP5 WRSF2 Peanut Lake	162	5	2024	July	146.94	20	0	46	0	10	16.2	0.1	1.19E-03	0.10	6.05E-03	0.10	0.02	3.50E-05	6.20E-05	0.06	1.49E-05	54	0	4.96E-03
CP5 WRSF2 Peanut Lake	163	5	2024	August	112.40	17	0	34	0	9.2	15.4	0.1	1.34E-03	0.10	4.51E-03	0.07	0.02	2.55E-05	4.52E-05	0.05	1.10E-05	41	0	3.75E-03
CP5 WRSF2 Peanut Lake	164	5	2024	September	99.08	16	0	30	0	8.8	14.9	0.1	1.47E-03	0.10	3.90E-03	0.06	0.02	2.19E-05	3.88E-05	0.04	9.48E-06	36	0	3.29E-03
CP5 WRSF2 Peanut Lake	165	5	2024	October	15.98	10	0	4	0	7.1	13.3	0.1	1.66E-03	0.10	1.80E-04	3.70E-03	6.74E-03	1.55E-14	2.75E-14	6.88E-03	6.57E-15	6	0	5.41E-04
CP5 WRSF2 Peanut Lake	173	6	2025	June	33.96	11	0	9	0	7.5	13.6	0.1	1.58E-03	0.10	9.96E-04	0.02	8.46E-03	4.83E-06	8.57E-06	0.01	2.09E-06	13	0	1.14E-03
CP5 WRSF2 Peanut Lake	174	6	2025	July	146.94	20	0	46	0	10	16.2	0.1	1.19E-03	0.10	6.05E-03	0.10	0.02	3.50E-05	6.20E-05	0.06	1.49E-05	54	0	4.96E-03
CP5 WRSF2 Peanut Lake	175	6	2025	August	112.40	17	0	34	0	9.2	15.4	0.1	1.34E-03	0.10	4.51E-03	0.07	0.02	2.55E-05	4.52E-05	0.05	1.10E-05	41	0	3.75E-03
CP5 WRSF2 Peanut Lake	176	6	2025	September	99.08	16	0	30	0	8.8	14.9	0.1	1.47E-03	0.10	3.90E-03	0.06	0.02	2.19E-05	3.88E-05	0.04	9.49E-06	36	0	3.29E-03
CP5 WRSF2 Peanut Lake	177	6	2025	October	15.98	10	0	4	0	7.1	13.3	0.1	1.66E-03	0.10	1.80E-04	3.70E-03	6.74E-03	1.55E-14	2.75E-14	6.88E-03	6.57E-15	6	0	5.41E-04
CP5 WRSF2 Peanut Lake	185	7	2026	June	33.85	11	0	9	0	7.4	13.5	0.1	1.58E-03	0.10	9.93E-04	0.02	8.44E-03	4.82E-06	8.54E-06	0.01	2.08E-06	13	0	1.13E-03
CP5 WRSF2 Peanut Lake	186	7	2026	July	146.59	20	0	45	0	10	16.1	0.1	1.19E-03	0.10	6.04E-03	0.10	0.02	3.49E-05	6.18E-05	0.06	1.49E-05	54	0	4.95E-03
CP5 WRSF2 Peanut Lake	187	7	2026	August	112.19	17	0	34	0	9.2	15.3	0.1	1.34E-03	0.10	4.50E-03	0.07	0.02	2.55E-05	4.52E-05	0.05	1.10E-05	41	0	3.75E-03
CP5 WRSF2 Peanut Lake	188	7	2026	September	98.83	16	0	30	0	8.8	14.9	0.1	1.47E-03	0.10	3.89E-03	0.06	0.02	2.19E-05	3.87E-05	0.04	9.46E-06	36	0	3.28E-03
CP5 WRSF2 Peanut Lake	189	7	2026	October	15.86	10	0	3	0	7.1	13.2	0.1	1.65E-03	0.10	1.79E-04	3.67E-03	6.70E-03	1.55E-14	2.75E-14	6.83E-03	6.64E-15	6	0	5.37E-04
CP5 WRSF2 Peanut Lake	197	8	2027	June	38.84	22	0	11	0	1.5	1.4	0.2	2.11E-03	0.10	7.98E-04	0.01	0.01	9.84E-06	1.74E-05	0.02	8.56E-07	17	0	2.01E-03
CP5 WRSF2 Peanut Lake	198	8	2027	July	127.74	42	0	41	0	6.4	5.6	0.3	1.70E-03	0.10	3.81E-03	0.05	0.02	7.61E-05	1.35E-04	0.13	6.62E-06	55	0	8.47E-03
CP5 WRSF2 Peanut Lake	199	8	2027	August	98.63	35	0	31	0	4.8	4.2	0.3	1.88E-03	0.10	2.83E-03	0.04	0.02	5.46E-05	9.68E-05	0.09	4.75E-06	43	0	6.34E-03
CP5 WRSF2 Peanut Lake	200	8	2027	September	87.27	32	0	27	0	4.1	3.6	0.2	2.02E-03	0.10	2.43E-03	0.03	0.02	4.60E-05	8.16E-05	0.08	4.01E-06	37	0	5.48E-03
CP5 WRSF2 Peanut Lake	201	8	2027	October	26.36	19	0	6	0	0.8	0.8	0.2	2.20E-03	0.10	3.64E-04	7.40E-03	0.01	3.15E-14	5.59E-14	9.12E-03	2.75E-15	12	0	1.09E-03
CP5 WRSF2 Peanut Lake	209	9	2028	June	38.83	22	0	11	0	1.5	1.4	0.2	2.11E-03	0.10	7.98E-04	0.01	0.01	9.84E-06	1.74E-05	0.02	8.56E-07	17	0	2.01E-03
CP5 WRSF2 Peanut Lake	210	9	2028	July	127.75	42	0	41	0	6.4	5.6	0.3	1.70E-03	0.10	3.81E-03	0.05	0.02	7.61E-05	1.35E-04	0.13	6.62E-06	55	0	8.47E-03
CP5 WRSF2 Peanut Lake	211	9	2028	August	98.65	35	0	31	0	4.8	4.2	0.3	1.88E-03	0.10	2.83E-03	0.04	0.02	5.46E-05	9.68E-05	0.09	4.75E-06	43	0	6.34E-03
CP5 WRSF2 Peanut Lake	212	9	2028	September	87.28	32	0	27	0	4.1	3.6	0.2	2.02E-03	0.10	2.43E-03	0.03	0.02	4.60E-05	8.16E-05	0.08	4.01E-06	37	0	5.48E-03
CP5 WRSF2 Peanut Lake	213	9	2028	October	26.38	19	0	6	0	0.8	0.8	0.2	2.20E-03	0.10	3.64E-04	7.40E-03	0.01	3.16E-14	5.59E-14	9.13E-03	2.75E-15	12	0	1.09E-03
CP5 WRSF2 Peanut Lake	221	10	2029	June	38.84	22	0	11	0	1.5	1.4	0.2	2.11E-03	0.10	7.98E-04	0.01	0.01	9.84E-06	1.74E-05	0.02	8.56E-07	17	0	2.01E-03
CP5 WRSF2 Peanut Lake	222	10	2029	July	127.84	42	0	41	0	6.4	5.6	0.3	1.70E-03	0.10	3.82E-03	0.05	0.02	7.61E-05	1.35E-04	0.13	6.62E-06	55	0	8.48E-03
CP5 WRSF2 Peanut Lake	223	10	2029	August	98.69	35	0	31	0	4.8	4.2	0.3	1.88E-03	0.10	2.83E-03	0.04	0.02	5.46E-05	9.69E-05	0.09	4.76E-06	43	0	6.34E-03
CP5 WRSF2 Peanut Lake	224	10	2029	September	87.34	32	0	27	0	4.1	3.6	0.2	2.02E-03	0.10	2.43E-03	0.03	0.02	4.61E-05	8.17E-05	0.08	4.01E-06	38	0	5.49E-03
CP5 WRSF2 Peanut Lake	225	10	2029	October	26.44	19	0	6	0	0.8	0.8	0.2	2.21E-03	0.10	3.65E-04	7.42E-03	0.01	3.16E-14	5.61E-14	9.15E-03	2.75E-15	12	0	1.09E-03
CP5 WRSF2 Peanut Lake	233	11	2030	June	38.83	22	0	11	0	1.5	1.4	0.2	2.11E-03	0.10	7.98E-04	0.01	0.01	9.84E-06	1.74E-05	0.02	8.56E-07	17	0	2.01E-03
CP5 WRSF2 Peanut Lake	234	11	2030	July	127.84	42	0	41	0	6.4	5.6	0.3	1.70E-03	0.10	3.82E-03	0.05	0.02	7.61E-05	1.35E-04	0.13	6.62E-06	55	0	8.48E-03
CP5 WRSF2 Peanut Lake	235	11	2030	August	98.69	35	0	31	0	4.8	4.2	0.3	1.88E-03	0.10	2.83E-03	0.04	0.02	5.46E-05	9.69E-05	0.09	4.76E-06	43	0	6.34E-03
CP5 WRSF2 Peanut Lake	236	11	2030	September	87.34	32	0	27	0	4.1	3.6	0.2	2.02E-03	0.10	2.43E-03	0.03	0.02	4.61E-05	8.17E-05	0.08	4.01E-06	38	0	5.49E-03
CP5 WRSF2 Peanut Lake	237	11	2030	October	26.44	19	0	6	0	0.8	0.8	0.2	2.21E-03	0.10	3.65E-04	7.42E-03	0.01	3.16E-14	5.61E-14	9.15E-03	2.75E-15	12	0	1.09E-03
				MAXIMUM	179	42	0	57	0	11	16	0.3	2.62E-03	0.10	6.80E-03	0.11	0.02	7.61E-05	1.35E-04	0.13	1.56E-05	69	0	8.48E-03
				AVERAGE	82	22	0	25	0	6.2	9.2	0.2	1.77E-03	0.10	2.71E-03	0.04	0.01	3.06E-05	5.43E-05	0.06	5.55E-06	33	0	3.96E-03

Note:
[1] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

Table C.5. CP 5 - WRSF2 Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[1] (mg/L)					0.3		0.2					0.5										0.5
	Model	Mine	Date		Cu	Fe	Pb	Li	Mg	Mn	Mo	Ni	K	Se	Na	Sr	Sn	Ti	W	U	V	Zn
LOCATION	Month	Year	Year	Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 1 to 11)																						
CP5 WRSF2 Peanut Lake	113	1	2020	June	1.01E-03	1.00E-01	1.78E-03	1.51E-03	2.0	0.05	1.02E-03	3.03E-03	2.2	5.52E-04	3.2	0.03	6.39E-05	5.41E-03	4.15E-05	2.41E-04	1.75E-03	0.01
CP5 WRSF2 Peanut Lake	114	1	2020	July	1.54E-03	1.00E-01	2.34E-03	0.01	8.7	0.19	7.41E-03	4.35E-03	9.8	5.95E-04	7.3	0.23	5.08E-04	0.01	3.31E-04	1.15E-03	7.50E-03	0.02
CP5 WRSF2 Peanut Lake	115	1	2020	August	1.32E-03	1.00E-01	2.08E-03	8.49E-03	6.4	0.14	5.26E-03	3.78E-03	7.2	5.71E-04	5.8	0.16	3.59E-04	0.01	2.33E-04	8.41E-04	5.52E-03	0.01
CP5 WRSF2 Peanut Lake	116	1	2020	September	1.23E-03	1.00E-01	1.96E-03	7.07E-03	5.5	0.12	4.40E-03	3.54E-03	6.2	5.67E-04	5.2	0.13	2.99E-04	8.91E-03	1.94E-04	7.15E-04	4.73E-03	0.01
CP5 WRSF2 Peanut Lake	117	1	2020	October	9.56E-04	1.00E-01	1.75E-03	4.78E-12	1.1	0.03	1.09E-04	2.93E-03	1.1	5.57E-04	2.7	8.98E-11	2.02E-13	4.52E-03	1.31E-13	1.13E-04	9.56E-04	0.01
CP5 WRSF2 Peanut Lake	125	2	2021	June	7.93E-04	1.00E-01	1.23E-03	1.92E-03	2.7	0.05	1.33E-03	2.22E-03	2.3	3.76E-04	2.5	0.05	1.89E-04	4.20E-03	5.92E-05	3.02E-04	1.67E-03	7.79E-03
CP5 WRSF2 Peanut Lake	126	2	2021	July	1.73E-03	1.00E-01	1.60E-03	0.01	14.8	0.23	9.23E-03	3.81E-03	12.1	3.74E-04	6.9	0.36	1.37E-03	0.01	4.33E-04	1.73E-03	8.17E-03	0.01
CP5 WRSF2 Peanut Lake	127	2	2021	August	1.42E-03	1.00E-01	1.44E-03	0.01	11.1	0.18	6.75E-03	3.25E-03	9.0	3.70E-04	5.4	0.26	1.01E-03	9.12E-03	3.16E-04	1.28E-03	6.11E-03	0.01
CP5 WRSF2 Peanut Lake	128	2	2021	September	1.30E-03	1.00E-01	1.39E-03	8.74E-03	9.6	0.15	5.79E-03	3.03E-03	7.8	3.77E-04	4.9	0.22	8.62E-04	8.18E-03	2.70E-04	1.11E-03	5.31E-03	9.58E-03
CP5 WRSF2 Peanut Lake	129	2	2021	October	6.71E-04	1.00E-01	1.23E-03	6.22E-12	0.8	0.02	7.54E-05	2.06E-03	0.8	3.89E-04	1.9	1.59E-10	6.07E-13	3.17E-03	1.92E-13	7.94E-05	6.71E-04	7.51E-03
CP5 WRSF2 Peanut Lake	137	3	2022	June	8.07E-04	1.00E-01	1.26E-03	1.95E-03	2.7	0.05	1.35E-03	2.26E-03	2.3	3.83E-04	2.6	0.05	1.92E-04	4.27E-03	6.03E-05	3.08E-04	1.70E-03	7.93E-03
CP5 WRSF2 Peanut Lake	138	3	2022	July	1.75E-03	1.00E-01	1.62E-03	0.01	15.0	0.24	9.34E-03	3.85E-03	12.2	3.78E-04	7.0	0.36	1.39E-03	0.01	4.38E-04	1.75E-03	8.27E-03	0.01
CP5 WRSF2 Peanut Lake	139	3	2022	August	1.43E-03	1.00E-01	1.46E-03	0.01	11.2	0.18	6.82E-03	3.28E-03	9.1	3.74E-04	5.5	0.26	1.02E-03	9.20E-03	3.19E-04	1.29E-03	6.16E-03	0.01
CP5 WRSF2 Peanut Lake	140	3	2022	September	1.32E-03	1.00E-01	1.40E-03	8.85E-03	9.7	0.16	5.86E-03	3.07E-03	7.9	3.82E-04	5.0	0.23	8.72E-04	8.29E-03	2.74E-04	1.12E-03	5.37E-03	9.70E-03
CP5 WRSF2 Peanut Lake	141	3	2022	October	6.81E-04	1.00E-01	1.25E-03	4.45E-12	0.8	0.02	7.65E-05	2.09E-03	0.8	3.95E-04	1.9	1.29E-10	5.58E-13	3.22E-03	1.45E-13	8.06E-05	6.81E-04	7.62E-03
CP5 WRSF2 Peanut Lake	149	4	2023	June	7.42E-04	1.00E-01	1.13E-03	1.75E-03	2.6	0.05	1.25E-03	2.05E-03	2.2	3.61E-04	2.3	0.05	1.96E-04	3.82E-03	5.59E-05	3.01E-04	1.53E-03	7.13E-03
CP5 WRSF2 Peanut Lake	150	4	2023	July	1.67E-03	1.00E-01	1.47E-03	0.01	14.4	0.22	8.61E-03	3.63E-03	11.5	3.51E-04	6.3	0.35	1.41E-03	0.01	4.06E-04	1.75E-03	7.44E-03	0.01
CP5 WRSF2 Peanut Lake	151	4	2023	August	1.36E-03	1.00E-01	1.32E-03	9.27E-03	10.7	0.16	6.30E-03	3.07E-03	8.5	3.49E-04	5.0	0.26	1.04E-03	8.26E-03	2.96E-04	1.30E-03	5.55E-03	9.25E-03
CP5 WRSF2 Peanut Lake	152	4	2023	September	1.25E-03	1.00E-01	1.26E-03	7.92E-03	9.3	0.14	5.40E-03	2.86E-03	7.4	3.57E-04	4.5	0.22	8.86E-04	7.41E-03	2.53E-04	1.12E-03	4.82E-03	8.77E-03
CP5 WRSF2 Peanut Lake	153	4	2023	October	6.12E-04	1.00E-01	1.11E-03	5.65E-12	0.7	0.02	7.56E-05	1.86E-03	0.7	3.70E-04	1.7	1.56E-10	6.25E-13	2.86E-03	1.80E-13	7.15E-05	6.12E-04	6.81E-03
CP5 WRSF2 Peanut Lake	161	5	2024	June	7.36E-04	1.00E-01	1.13E-03	1.01E-03	2.3	0.04	8.26E-04	2.05E-03	1.7	3.45E-04	2.1	0.04	1.92E-04	3.43E-03	3.75E-05	2.64E-04	1.15E-03	7.04E-03
CP5 WRSF2 Peanut Lake	162	5	2024	July	1.64E-03	1.00E-01	1.46E-03	7.32E-03	12.3	0.16	5.52E-03	3.58E-03	8.1	3.37E-04	4.6	0.28	1.37E-03	7.48E-03	2.70E-04	1.46E-03	4.61E-03	9.85E-03
CP5 WRSF2 Peanut Lake	163	5	2024	August	1.35E-03	1.00E-01	1.32E-03	5.35E-03	9.3	0.12	4.07E-03	3.05E-03	6.1	3.35E-04	3.8	0.20	1.01E-03	6.11E-03	1.98E-04	1.09E-03	3.51E-03	8.75E-03
CP5 WRSF2 Peanut Lake	164	5	2024	September	1.23E-03	1.00E-01	1.27E-03	4.59E-03	8.1	0.10	3.51E-03	2.85E-03	5.4	3.43E-04	3.5	0.17	8.70E-04	5.60E-03	1.70E-04	9.48E-04	3.10E-03	8.37E-03
CP5 WRSF2 Peanut Lake	165	5	2024	October	6.10E-04	1.00E-01	1.12E-03	3.25E-12	0.7	0.02	6.88E-05	1.87E-03	0.7	3.54E-04	1.7	1.22E-10	6.03E-13	2.89E-03	1.19E-13	7.21E-05	6.10E-04	6.83E-03
CP5 WRSF2 Peanut Lake	173	6	2025	June	7.36E-04	1.00E-01	1.13E-03	1.01E-03	2.3	0.04	8.25E-04	2.05E-03	1.7	3.45E-04	2.1	0.04	1.92E-04	3.43E-03	3.75E-05	2.64E-04	1.15E-03	7.04E-03
CP5 WRSF2 Peanut Lake	174	6	2025	July	1.64E-03	1.00E-01	1.46E-03	7.32E-03	12.3	0.16	5.52E-03	3.58E-03	8.1	3.37E-04	4.6	0.28	1.37E-03	7.48E-03	2.70E-04	1.46E-03	4.61E-03	9.85E-03
CP5 WRSF2 Peanut Lake	175	6	2025	August	1.35E-03	1.00E-01	1.32E-03	5.35E-03	9.3	0.12	4.07E-03	3.05E-03	6.1	3.35E-04	3.8	0.20	1.01E-03	6.11E-03	1.98E-04	1.09E-03	3.51E-03	8.75E-03
CP5 WRSF2 Peanut Lake	176	6	2025	September	1.23E-03	1.00E-01	1.27E-03	4.59E-03	8.1	0.10	3.51E-03	2.85E-03	5.4	3.43E-04	3.5	0.17	8.70E-04	5.60E-03	1.70E-04	9.48E-04	3.10E-03	8.37E-03
CP5 WRSF2 Peanut Lake	177	6	2025	October	6.10E-04	1.00E-01	1.12E-03	3.25E-12	0.7	0.02	6.88E-05	1.87E-03	0.7	3.54E-04	1.7	1.22E-10	6.03E-13	2.89E-03	1.19E-13	7.21E-05	6.10E-04	6.83E-03
CP5 WRSF2 Peanut Lake	185	7	2026	June	7.33E-04	1.00E-01	1.12E-03	1.01E-03	2.3	0.04	8.22E-04	2.05E-03	1.7	3.44E-04	2.1	0.04	1.91E-04	3.42E-03	3.73E-05	2.63E-04	1.14E-03	7.02E-03
CP5 WRSF2 Peanut Lake	186	7	2026	July	1.63E-03	1.00E-01	1.46E-03	7.30E-03	12.3	0.16	5.51E-03	3.57E-03	8.1	3.36E-04	4.6	0.28	1.37E-03	7.47E-03	2.69E-04	1.46E-03	4.60E-03	9.83E-03
CP5 WRSF2 Peanut Lake	187	7	2026	August	1.34E-03	1.00E-01	1.31E-03	5.34E-03	9.3	0.12	4.06E-03	3.04E-03	6.1	3.35E-04	3.8	0.20	1.01E-03	6.10E-03	1.98E-04	1.09E-03	3.51E-03	8.73E-03
CP5 WRSF2 Peanut Lake	188	7	2026	September	1.23E-03	1.00E-01	1.27E-03	4.58E-03	8.0	0.10	3.50E-03	2.84E-03	5.3	3.43E-04	3.5	0.17	8.68E-04	5.59E-03	1.70E-04	9.45E-04	3.09E-03	8.35E-03
CP5 WRSF2 Peanut Lake	189	7	2026	October	6.05E-04	1.00E-01	1.11E-03	3.25E-12	0.7	0.02	6.83E-05	1.86E-03	0.7	3.52E-04	1.7	1.23E-10	6.09E-13	2.86E-03	1.20E-13	7.16E-05	6.05E-04	6.78E-03
CP5 WRSF2 Peanut Lake	197	8	2027	June	1.23E-03	1.00E-01	2.24E-03	1.83E-03	2.4	0.06	1.19E-03	3.80E-03	2.6	5.85E-04	3.9	0.03	7.01E-05	6.85E-03	4.98E-05	2.87E-04	2.14E-03	0.01
CP5 WRSF2 Peanut Lake	198	8	2027	July	1.81E-03	1.00E-01	2.86E-03	0.014	9.9	0.23	8.60E-03	5.22E-03	11	6.39E-04	8.6	0.26	5.42E-04	0.02	3.85E-04	1.28E-03	8.85E-03	0.02
CP5 WRSF2 Peanut Lake	199	8	2027	August	1.58E-03	1.00E-01	2.58E-03	0.010	7.5	0.17	6.20E-03	4.64E-03	8.5	6.14E-04	7.0	0.18	3.89E-04	0.01	2.76E-04	9.53E-04	6.64E-03	0.02
CP5 WRSF2 Peanut Lake	200	8	2027	September	1.49E-03	1.00E-01	2.47E-03	8.58E-03	6.5	0.15	5.24E-03	4.39E-03	7.4	6.09E-04	6.3	0.15	3.28E-04	0.01	2.33E-04	8.22E-04	5.75E-03	0.02
CP5 WRSF2 Peanut Lake	201	8	2027	October	1.18E-03	1.00E-01	2.23E-03	5.88E-12	1.4	0.04	9.12E-05	3.73E-03	1.4	5.94E-04	3.4	1.06E-10	2.25E-13	5.82E-03	1.60E-13	1.45E-04	1.18E-03	0.01
CP5 WRSF2 Peanut Lake	209	9	2028	June	1.23E-03	1.00E-01	2.24E-03	1.83E-03	2.4	0.06	1.19E-03	3.80E-03	2.6	5.85E-04	3.9	0.03	7.01E-05	6.85E-03	4.98E-05	2.87E-04	2.14E-03	0.01
CP5 WRSF2 Peanut Lake	210	9	2028	July	1.81E-03	1.00E-01	2.86E-03	0.014	9.9	0.23	8.60E-03	5.22E-03	11	6.40E-04	8.6	0.26	5.42E-04	0.02	3.85E-04	1.28E-03	8.86E-03	0.02
CP5 WRSF2 Peanut Lake	211	9	2028	August	1.58E-03	1.00E-01	2.59E-03	0.010	7.5	0.17	6.20E-03	4.64E-03	8.5	6.14E-04	7.0	0.18	3.89E-04	0.01	2.76E-04	9.53E-04	6.64E-03	0.02
CP5 WRSF2 Peanut Lake	212	9	2028	September	1.49E-03	1.00E-01	2.47E-03	8.58E-03	6.5	0.15	5.24E-03	4.39E-03	7.4	6.09E-04	6.3	0.15	3.28E-04	0.01	2.33E-04	8.22E-04	5.76E-03	0.02
CP5 WRSF2 Peanut Lake	213	9	2028	October	1.18E-03	1.00E-01	2.23E-03	5.88E-12	1.4	0.04	9.13E-05	3.73E-03	1.4	5.95E-04	3.4	1.06E-10	2.25E-13	5.82E-03	1.60E-13	1.46E-04	1.18E-03	0.01
CP5 WRSF2 Peanut Lake	221	10	2029	June	1.23E-03	1.00E-01	2.24E-03	1.83E-03	2.4	0.06	1.19E-03	3.80E-03	2.6	5.85E-04	3.9	0.03	7.01E-05	6.85E-03	4.98E-05	2.87E-04	2.14E-03	0.01
CP5 WRSF2 Peanut Lake	222	10	2029	July	1.81E-03	1.00E-01	2.87E-03	0.014	9.9	0.23	8.60E-03	5.23E-03	11	6.40E-04	8.6	0.26	5.42E-04	0.02	3.85E-04	1.28E-03	8.86E-03	0.02
CP5 WRSF2 Peanut Lake	223	10	2029	August	1.58E-03	1.00E-01	2.59E-03	0.010	7.5	0.17	6.20E-03	4.64E-03	8.5	6.14E-04	7.0	0.18	3.89E-04	0.01	2.76E-04	9.54E-04	6.65E-03	0.02
CP5 WRSF2 Peanut Lake	224	10	2029	September	1.49E-03	1.00E-01	2.47E-03	8.59E-03	6.5	0.15	5.25E-03	4.39E-03	7.4	6.10E-04	6.4	0.15	3.28E-04	0.01	2.33E-04	8.22E-04	5.76E-03	0.02
CP5 WRSF2 Peanut Lake	225	10	2029	October	1.19E-03	1.00E-01	2.23E-03	5.90E-12	1.4	0.04	9.15E-05	3.74E-03	1.4	5.96E-04	3.4	1.06E-10	2.25E-13	5.84E-03	1.60E-13	1.46E-04	1.19E-03	0.01
CP5 WRSF2 Peanut Lake	233	11	2030	June	1.23E-03	1.00E-01	2.24E-03	1.83E-03	2.4	0.06	1.19E-03	3.80E-03	2.6	5.85E-04	3.9	0.03	7.01E-05	6.85E-03	4.98E-05	2.87E-04	2.14E-03	0.01
CP5 WRSF2 Peanut Lake	234	11	2030	July	1.81E-03	1.00E-01	2.87E-03	0.014	9.9	0.23	8.60E-03	5.23E-03	11	6.40E-04	8.6	0.26	5.42E-04	0.02	3.85E-04	1.28E-03	8.86E-03	0.02
CP5 WRSF2 Peanut Lake	235	11	2030	August	1.58E-03	1.00E-01	2.59E-03	0.010	7.5	0.17	6.20E-03	4.64E-03	8.5	6.14E-04	7.0	0.18	3.89E-04	0.01	2.76E-04	9.54E-04	6.65E-03	0.02
CP5 WRSF2 Peanut Lake	236	11	2030	September	1.49E-03	1.00E-01	2.47E-03	8.59E-03	6.5	0.15	5.25E-03	4.39E-03	7.4	6.10E-04	6.4	0.15	3.28E-04	0.01	2.33E-04	8.22E-04	5.76E-03	0.02
CP5 WRSF2 Peanut Lake	237	11	2030	October	1.19E-03	1.00E-01	2.23E-03	5.90E-12	1.4	0.04	9.15E-05	3.74E-03	1.4	5.96E-04	3.4	1.06E-10	2.25E-13	5.84E-03	1.60E-13	1.46E-04	1.19E-03	0.01
				MAXIMUM	1.81E-03	1.00E-01	2.87E-03	0.014	15.0	0.24	9.34E-03	5.23E-03	12	6.40E-04	8.6	0.36	1.41E-03	0.02	4.38E-04	1.75E-03	8.86E-03	0.019
				AVERAGE	1.26E-03	1.00E-01	1.79E-03	5.91E-03	6.3	0.11	3.89E-03	3.41E-03	5.7	4.68E-04	4.6	0.14	4.96E-04	7.80E-03	1.78E-04	7.65E-04	4.03E-03	0.012

Note:
[1] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

Table C.6. CP 6 - WRSF3 Pond
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)											1							0.5								
	Model	Mine	Date		TDS	Total Alkalinity	Cl	F	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L	mg/L as $CaCO_3$	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 4 to 11)																										
CP6 WRSF3	149	4	2023	June	53	26	9	0	0	5	0	1.0	0.9	0.08	2.66E-03	0.10	4.16E-04	7.75E-03	6.79E-03	5.89E-07	1.04E-06	0.01	8.16E-07	8	0	5.11E-04
CP6 WRSF3	150	4	2023	July	183	88	13	0	0	24	0	7.5	6.4	0.11	2.48E-03	0.10	3.16E-03	0.06	0.02	6.11E-06	1.08E-05	0.02	8.46E-06	30	0	1.82E-03
CP6 WRSF3	151	4	2023	August	149	73	11	0	0	20	0	5.8	5.0	0.10	2.58E-03	0.10	2.47E-03	0.04	0.01	4.74E-06	8.41E-06	0.02	6.57E-06	24	0	1.46E-03
CP6 WRSF3	152	4	2023	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	153	4	2023	October	42	20	9	0	0	3	0	0.3	0.3	0.08	2.84E-03	0.08	1.32E-04	2.81E-03	6.26E-03	1.52E-15	2.69E-15	0.01	2.11E-15	5	0	3.97E-04
CP6 WRSF3	161	5	2024	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.88E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	162	5	2024	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	163	5	2024	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	164	5	2024	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	165	5	2024	October	42	20	9	0	0	3	0	0.3	0.3	0.08	2.84E-03	0.08	1.32E-04	2.81E-03	6.26E-03	1.52E-15	2.69E-15	0.01	2.11E-15	5	0	3.97E-04
CP6 WRSF3	173	6	2025	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.88E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	174	6	2025	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	175	6	2025	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	176	6	2025	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	177	6	2025	October	40	19	9	0	0	3	0	0.3	0.3	0.08	2.74E-03	0.08	1.28E-04	2.71E-03	6.04E-03	2.61E-15	4.63E-15	0.01	3.62E-15	5	0	3.83E-04
CP6 WRSF3	185	7	2026	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.88E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	186	7	2026	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	187	7	2026	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	188	7	2026	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	189	7	2026	October	36	17	8	0	0	3	0	0.3	0.3	0.07	2.47E-03	0.07	1.15E-04	2.44E-03	5.43E-03	2.35E-15	4.17E-15	0.01	3.25E-15	5	0	3.45E-04
CP6 WRSF3	197	8	2027	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.87E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	198	8	2027	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	199	8	2027	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	200	8	2027	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	201	8	2027	October	34	16	7	0	0	3	0	0.3	0.2	0.06	2.32E-03	0.07	1.08E-04	2.29E-03	5.10E-03	2.21E-15	3.91E-15	9.60E-03	3.05E-15	4	0	3.24E-04
CP6 WRSF3	209	9	2028	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.87E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	210	9	2028	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	211	9	2028	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	212	9	2028	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	213	9	2028	October	34	16	7	0	0	3	0	0.3	0.2	0.06	2.32E-03	0.07	1.08E-04	2.29E-03	5.10E-03	2.21E-15	3.91E-15	9.60E-03	3.05E-15	4	0	3.24E-04
CP6 WRSF3	221	10	2029	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.87E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	222	10	2029	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	223	10	2029	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	224	10	2029	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	225	10	2029	October	34	16	7	0	0	3	0	0.3	0.2	0.06	2.32E-03	0.07	1.08E-04	2.29E-03	5.10E-03	2.21E-15	3.91E-15	9.60E-03	3.05E-15	4	0	3.24E-04
CP6 WRSF3	233	11	2030	June	53	26	8	0	0	6	0	1.2	1.0	0.07	2.44E-03	0.10	4.87E-04	8.96E-03	6.51E-03	7.58E-07	1.34E-06	0.01	1.05E-06	8	0	5.14E-04
CP6 WRSF3	234	11	2030	July	202	98	13	0	0	27	0	8.5	7.3	0.11	2.38E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
CP6 WRSF3	235	11	2030	August	153	74	11	0	0	20	0	6.1	5.2	0.10	2.55E-03	0.10	2.56E-03	0.05	0.01	4.93E-06	8.74E-06	0.02	6.83E-06	25	0	1.49E-03
CP6 WRSF3	236	11	2030	September	132	65	11	0	0	17	0	5.0	4.3	0.09	2.67E-03	0.10	2.11E-03	0.04	0.01	4.04E-06	7.16E-06	0.02	5.59E-06	21	0	1.27E-03
CP6 WRSF3	237	11	2030	October	34	16	7	0	0	3	0	0.3	0.2	0.06	2.32E-03	0.07	1.08E-04	2.29E-03	5.10E-03	2.21E-15	3.91E-15	9.60E-03	3.05E-15	4	0	3.24E-04
				MAXIMUM	202	98	13	0	0	27	0	8.5	7.3	0.11	2.84E-03	0.10	3.60E-03	0.06	0.02	7.04E-06	1.25E-05	0.02	9.75E-06	34	0	1.99E-03
				AVERAGE	115	56	10	0	0	15	0	4.2	3.6	0.09	2.52E-03	0.09	1.76E-03	0.03	0.01	3.32E-06	5.89E-06	0.02	4.60E-06	18	0	1.12E-03

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)			120	2.8					13	60	0.004 to 0.01	0.1		0.025				1.50	1.20E-05		1.00E-03	
	TDS	Total Alkalinity	Cl	F[2]	Si	SO_4	CN_Total	NH4 (as N)	NO_3	NO_2	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	Be	Bi	B	Cd[5]	Ca	Cr[4]	Co
	mg/L	mg/L as CaCO3	mg/L	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	47	26	3	0	0	6	0	1.6	1.4	0.01	0.002	0.05	6.61E-04	0.01	0.004	1.46E-06	2.48E-06	0.01	1.89E-06	7	0	2.25E-04
MAXIMUM	99	53	4	0	0	13	0	4.4	3.8	0.01	0.002	0.10	1.80E-03	__0.032__	0.007	3.62E-06	6.16E-06	0.02	5.25E-06	15	0	5.37E-04
AVERAGE	84	45	3	0	0	11	0	3.6	3.1	0.01	0.002	0.09	1.48E-03	__0.027__	0.006	3.16E-06	5.36E-06	0.02	4.29E-06	13	0	4.55E-04

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2						0.5													0.5
	Model	Mine	Date		Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Ag	Na	Sr	Te	Tl	Sn	Ti	W	U	V	Zn
LOCATION	Month	Year	Year	Month	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality (Years 4 to 11)																										
CP6 WRSF3	**149**	**4**	**2023**	**June**	5.49E-04	0.10	8.43E-04	1.55E-04	1.2	0.02	0	2.74E-04	1.48E-03	0.8	4.09E-04	8.03E-07	1.5	0.01	0	0	8.43E-05	2.17E-03	9.47E-06	1.21E-04	5.89E-04	5.29E-03
CP6 WRSF3	**150**	**4**	**2023**	**July**	1.18E-03	0.10	1.28E-03	1.61E-03	6.4	0.07	0	1.80E-03	2.76E-03	3.6	4.49E-04	8.33E-06	2.6	0.14	0	0	8.74E-04	3.96E-03	9.82E-05	7.87E-04	1.59E-03	8.11E-03
CP6 WRSF3	**151**	**4**	**2023**	**August**	9.85E-04	0.10	1.09E-03	1.25E-03	5.1	0.05	0	1.42E-03	2.32E-03	2.8	4.32E-04	6.47E-06	2.2	0.11	0	0	6.79E-04	3.31E-03	7.62E-05	6.17E-04	1.30E-03	6.97E-03
CP6 WRSF3	**152**	**4**	**2023**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.30E-04	1.16E-03	6.41E-03
CP6 WRSF3	**153**	**4**	**2023**	**October**	5.15E-04	0.10	8.52E-04	4.01E-13	0.6	0.01	0	1.18E-04	1.44E-03	0.6	4.31E-04	2.07E-15	1.4	3.50E-11	0	0	2.18E-13	2.12E-03	2.44E-14	5.30E-05	5.15E-04	5.34E-03
CP6 WRSF3	**161**	**5**	**2024**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**162**	**5**	**2024**	**July**	1.23E-03	0.10	1.25E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**163**	**5**	**2024**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.73E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**164**	**5**	**2024**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.30E-04	1.16E-03	6.41E-03
CP6 WRSF3	**165**	**5**	**2024**	**October**	5.15E-04	0.10	8.52E-04	4.01E-13	0.6	0.01	0	1.18E-04	1.44E-03	0.6	4.31E-04	2.07E-15	1.4	3.50E-11	0	0	2.18E-13	2.12E-03	2.44E-14	5.30E-05	5.15E-04	5.34E-03
CP6 WRSF3	**173**	**6**	**2025**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**174**	**6**	**2025**	**July**	1.23E-03	0.10	1.25E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**175**	**6**	**2025**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.73E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**176**	**6**	**2025**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.30E-04	1.16E-03	6.41E-03
CP6 WRSF3	**177**	**6**	**2025**	**October**	4.97E-04	0.10	8.22E-04	6.90E-13	0.6	0.01	0	1.14E-04	1.39E-03	0.6	4.15E-04	3.56E-15	1.4	6.02E-11	0	0	3.74E-13	2.04E-03	4.20E-14	5.11E-05	4.97E-04	5.16E-03
CP6 WRSF3	**185**	**7**	**2026**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**186**	**7**	**2026**	**July**	1.23E-03	0.10	1.24E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**187**	**7**	**2026**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.72E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**188**	**7**	**2026**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.30E-04	1.16E-03	6.41E-03
CP6 WRSF3	**189**	**7**	**2026**	**October**	4.47E-04	0.10	7.39E-04	6.20E-13	0.5	0.01	0	1.02E-04	1.25E-03	0.5	3.74E-04	3.20E-15	1.2	5.42E-11	0	0	3.36E-13	1.84E-03	3.78E-14	4.60E-05	4.47E-04	4.64E-03
CP6 WRSF3	**197**	**8**	**2027**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**198**	**8**	**2027**	**July**	1.23E-03	0.10	1.24E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**199**	**8**	**2027**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.72E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**200**	**8**	**2027**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.29E-04	1.16E-03	6.41E-03
CP6 WRSF3	**201**	**8**	**2027**	**October**	4.20E-04	0.10	6.94E-04	5.82E-13	0.5	0.01	0	9.60E-05	1.17E-03	0.5	3.51E-04	3.01E-15	1.2	5.08E-11	0	0	3.16E-13	1.73E-03	3.54E-14	4.31E-05	4.20E-04	4.35E-03
CP6 WRSF3	**209**	**9**	**2028**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**210**	**9**	**2028**	**July**	1.23E-03	0.10	1.24E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**211**	**9**	**2028**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.72E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**212**	**9**	**2028**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.29E-04	1.16E-03	6.41E-03
CP6 WRSF3	**213**	**9**	**2028**	**October**	4.20E-04	0.10	6.94E-04	5.82E-13	0.5	0.01	0	9.60E-05	1.17E-03	0.5	3.51E-04	3.01E-15	1.2	5.08E-11	0	0	3.16E-13	1.73E-03	3.54E-14	4.31E-05	4.20E-04	4.35E-03
CP6 WRSF3	**221**	**10**	**2029**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**222**	**10**	**2029**	**July**	1.23E-03	0.10	1.24E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**223**	**10**	**2029**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.72E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**224**	**10**	**2029**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.29E-04	1.16E-03	6.41E-03
CP6 WRSF3	**225**	**10**	**2029**	**October**	4.20E-04	0.10	6.94E-04	5.82E-13	0.5	0.01	0	9.60E-05	1.17E-03	0.5	3.51E-04	3.01E-15	1.2	5.08E-11	0	0	3.16E-13	1.73E-03	3.54E-14	4.31E-05	4.20E-04	4.35E-03
CP6 WRSF3	**233**	**11**	**2030**	**June**	5.22E-04	0.10	7.77E-04	2.00E-04	1.3	0.02	0	3.12E-04	1.39E-03	0.9	3.76E-04	1.03E-06	1.4	0.02	0	0	1.08E-04	2.02E-03	1.22E-05	1.36E-04	5.73E-04	4.89E-03
CP6 WRSF3	**234**	**11**	**2030**	**July**	1.23E-03	0.10	1.24E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.31E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	7.94E-03
CP6 WRSF3	**235**	**11**	**2030**	**August**	9.94E-04	0.10	1.09E-03	1.30E-03	5.2	0.06	0	1.48E-03	2.32E-03	2.9	4.28E-04	6.72E-06	2.2	0.11	0	0	7.06E-04	3.31E-03	7.92E-05	6.38E-04	1.32E-03	6.93E-03
CP6 WRSF3	**236**	**11**	**2030**	**September**	8.89E-04	0.10	1.01E-03	1.07E-03	4.4	0.05	0	1.23E-03	2.10E-03	2.5	4.28E-04	5.51E-06	2.0	0.09	0	0	5.78E-04	2.99E-03	6.49E-05	5.29E-04	1.16E-03	6.41E-03
CP6 WRSF3	**237**	**11**	**2030**	**October**	4.20E-04	0.10	6.94E-04	5.82E-13	0.5	0.01	0	9.60E-05	1.17E-03	0.5	3.51E-04	3.01E-15	1.2	5.08E-11	0	0	3.16E-13	1.73E-03	3.54E-14	4.31E-05	4.20E-04	4.35E-03
				MAXIMUM	1.23E-03	0.10	1.3E-03	1.86E-03	7.2	0.07	0	2.05E-03	2.80E-03	3.9	4.49E-04	9.60E-06	2.7	0.16	0	0	1.01E-03	3.98E-03	1.13E-04	8.93E-04	1.70E-03	8.11E-03
				AVERAGE	8.17E-04	0.10	9.77E-04	8.77E-04	3.7	0.04	0	1.03E-03	1.98E-03	2.1	4.10E-04	4.53E-06	1.9	0.08	0	0	4.75E-04	2.84E-03	5.34E-05	4.45E-04	1.04E-03	6.20E-03

Long Term Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)	2.00E-03	1.06	1.00E-03				2.60E-05	0.07	0.04		1.00E-03	1.00E-04				8.00E-04				0.02		0.03
	Cu[5]	Fe[2]	Pb[5]	Li	Mg	Mn	Hg	Mo	Ni[5]	K	Se	Ag	Na	Sr	Te	Tl	Sn	Ti	W	U	V	Zn
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	2.55E-04	0.03	1.66E-04	1.38E-04	1.4	0.01	0	4.76E-04	4.31E-04	0.64	2.49E-04	1.90E-06	0.5	0.03	0	0	1.96E-04	4.79E-04	2.22E-05	1.66E-04	2.31E-04	0.001
MAXIMUM	4.78E-04	0.05	2.36E-04	3.54E-04	3.5	0.03	0	1.01E-03	7.91E-04	1.51	2.74E-04	4.71E-06	0.8	0.08	0	0	5.42E-04	8.26E-04	5.46E-05	4.39E-04	3.98E-04	0.002
AVERAGE	4.13E-04	0.05	2.14E-04	3.10E-04	2.9	0.02	0	9.53E-04	6.84E-04	1.27	2.65E-04	4.10E-06	0.8	0.06	0	0	4.44E-04	7.81E-04	4.96E-05	3.69E-04	3.58E-04	0.002

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.7. Tiriganiaq Open Pit 1 Sump and Flooded Pit Lake
Water Quality Prediction
Meliadine Gold Project

Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)									1						0.5								
	Model	Mine	Date		Total Alkalinity	Cl	F	SO_4	CN_Total	NH4 (as N)	NO_3	P_dissolved	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co
LOCATION	Month	Year	Year	Month	mg/L as CaCO3	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality in Open Pit Sump (Years 4 to 8)																							
Pit 1 sump	**149**	**4**	**2023**	**June**	30	0.7	0	8	0	13	25	6.53E-04	0.01	1.31E-03	0.02	3.57E-03	0	0	4.14E-03	3.15E-06	8.9	0	3.09E-04
Pit 1 sump	**150**	**4**	**2023**	**July**	174	0.5	0	53	0	13	25	4.44E-04	0.01	8.51E-03	0.15	0.02	0	0	0.01	2.05E-05	55.9	0	2.00E-03
Pit 1 sump	**151**	**4**	**2023**	**August**	134	0.5	0	41	0	13	25	5.21E-04	0.01	6.52E-03	0.11	0.02	0	0	9.39E-03	1.57E-05	42.9	0	1.54E-03
Pit 1 sump	**152**	**4**	**2023**	**September**	119	0.6	0	36	0	13	25	5.85E-04	0.01	5.74E-03	0.10	0.01	0	0	8.71E-03	1.38E-05	37.9	0	1.35E-03
Pit 1 sump	**153**	**4**	**2023**	**October**	3	0.7	0	0	0	13	25	6.79E-04	1.4E-04	4.19E-12	3.81E-05	5.47E-04	0	0	2.82E-03	1.01E-14	0.4	0	9.87E-13
Pit 1 sump	**161**	**5**	**2024**	**June**	30	0.7	0	8	0	13	25	6.53E-04	0.01	1.31E-03	0.02	3.57E-03	0	0	4.14E-03	3.15E-06	8.9	0	3.09E-04
Pit 1 sump	**162**	**5**	**2024**	**July**	174	0.5	0	53	0	13	25	4.44E-04	0.01	8.51E-03	0.15	0.02	0	0	0.01	2.05E-05	55.9	0	2.00E-03
Pit 1 sump	**163**	**5**	**2024**	**August**	134	0.5	0	41	0	13	25	5.21E-04	0.01	6.52E-03	0.11	0.02	0	0	9.28E-03	1.57E-05	42.9	0	1.53E-03
Pit 1 sump	**164**	**5**	**2024**	**September**	119	0.6	0	36	0	13	25	5.85E-04	0.01	5.74E-03	0.10	0.01	0	0	8.71E-03	1.38E-05	37.9	0	1.35E-03
Pit 1 sump	**165**	**5**	**2024**	**October**	3	0.7	0	0	0	13	25	6.79E-04	1.4E-04	4.19E-12	3.81E-05	5.47E-04	0	0	2.82E-03	1.01E-14	0.4	0	9.87E-13
Pit 1 sump	**173**	**6**	**2025**	**June**	30	0.7	0	8	0	13	25	6.53E-04	0.01	1.31E-03	0.02	3.57E-03	0	0	4.14E-03	3.15E-06	8.9	0	3.09E-04
Pit 1 sump	**174**	**6**	**2025**	**July**	174	0.5	0	53	0	13	25	4.44E-04	0.01	8.51E-03	0.15	0.02	0	0	0.01	2.05E-05	55.9	0	2.00E-03
Pit 1 sump	**175**	**6**	**2025**	**August**	134	0.5	0	41	0	13	25	5.21E-04	0.01	6.52E-03	0.11	0.02	0	0	9.28E-03	1.57E-05	42.9	0	1.53E-03
Pit 1 sump	**176**	**6**	**2025**	**September**	119	0.6	0	36	0	13	25	5.85E-04	0.01	5.74E-03	0.10	0.01	0	0	8.71E-03	1.38E-05	37.9	0	1.35E-03
Pit 1 sump	**177**	**6**	**2025**	**October**	3	0.7	0	0	0	13	25	6.79E-04	1.4E-04	4.19E-12	3.81E-05	5.47E-04	0	0	2.82E-03	1.01E-14	0.4	0	9.87E-13
Pit 1 sump	**185**	**7**	**2026**	**June**	30	0.7	0	8	0	13	25	6.53E-04	0.01	1.31E-03	0.02	3.57E-03	0	0	4.14E-03	3.15E-06	8.9	0	3.09E-04
Pit 1 sump	**186**	**7**	**2026**	**July**	174	0.5	0	53	0	13	25	4.44E-04	0.01	8.51E-03	0.15	0.02	0	0	0.01	2.05E-05	55.9	0	2.00E-03
Pit 1 sump	**187**	**7**	**2026**	**August**	134	0.5	0	41	0	13	25	5.21E-04	0.01	6.52E-03	0.11	0.02	0	0	9.28E-03	1.57E-05	42.9	0	1.53E-03
Pit 1 sump	**188**	**7**	**2026**	**September**	119	0.6	0	36	0	13	25	5.85E-04	0.01	5.74E-03	0.10	0.01	0	0	8.71E-03	1.38E-05	37.9	0	1.35E-03
Pit 1 sump	**189**	**7**	**2026**	**October**	3	0.7	0	0	0	13	25	6.79E-04	1.4E-04	4.19E-12	3.81E-05	5.47E-04	0	0	2.82E-03	1.01E-14	0.4	0	9.87E-13
Pit 1 sump	**197**	**8**	**2027**	**June**	3	0.1	0	1	0	13	25	5.65E-05	0.01	1.13E-04	1.99E-03	3.09E-04	0	0	3.59E-04	2.73E-07	0.77	0	2.67E-05
				MAXIMUM	174	0.7	0	53	0	13	25	6.79E-04	0.01	8.51E-03	0.15	0.02	0	0	0.01	2.05E-05	55.9	0	2.00E-03
				AVERAGE	88	0.6	0	26	0	13	25	5.51E-04	0.01	4.21E-03	0.07	0.01	0	0	6.90E-03	1.01E-05	27.8	0	9.92E-04

Fully Flooded Open Pit Post-Closure Water Quality (Years 16+)

CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)		120	2.8				13	0.004 to 0.01	0.1		0.025				1.5	1.20E-05		1.00E-03	
	Total Alkalinity	Cl	F[2]	SO_4	CN_Total	NH4 (as N)	NO_3	P_dissolved[7]	Al[6]	Sb	As[2]	Ba	Be	Bi	B	Cd[5]	Ca	Cr[4]	Co
	mg/L as CaCO3	mg/L	mg/L	mg/L	Total (mg/L)	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	2.7	0.3	0	0.78	0	0.28	0.24	7.7E-05	0.009	1.1E-04	0.002	4.4E-04	1.1E-06	1.9E-06	0.002	2.7E-07	0.89	0	4.7E-05
MAXIMUM	11	2.0	0	3.0	0	0.98	0.84	4.1E-04	0.010	3.9E-04	0.007	0.002	7.4E-06	1.3E-05	0.01	9.9E-07	3.61	0	2.3E-04
AVERAGE	6.9	1.2	0	1.9	0	0.64	0.55	2.5E-04	0.010	2.5E-04	0.004	1.3E-03	4.3E-06	7.3E-06	0.008	6.4E-07	2.29	0	1.4E-04

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Table C.7. Tiriganiaq Open Pit 1 Sump and Flooded Pit Lake
Water Quality Prediction
Meliadine Gold Project

LOCATION	Model Month	Mine Year	Date Year	Month	Cu	Fe	Pb	Li	Mg	Mn	Mo	Ni	K	Se	Na	Sr	Sn	Ti	W	U	V	Zn
Metal Mine Effluent Regulation (MMER) monthly mean concentration[3] (mg/L)					0.3		0.2					0.5										0.5
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Operations Water Quality in Open Pit Sump (Years 4 to 8)																						
Pit 1 sump	**149**	**4**	**2023**	**June**	2.78E-04	5.92E-03	5.40E-05	2.56E-04	2.5	0.02	4.69E-04	3.74E-04	0.8	6.84E-05	0.25	0.05	3.43E-04	1.47E-04	2.78E-05	2.31E-04	1.93E-04	4.01E-04
Pit 1 sump	**150**	**4**	**2023**	**July**	1.65E-03	1.00E-02	2.74E-04	1.66E-03	16.0	0.10	2.89E-03	2.27E-03	5.2	4.65E-05	1.30	0.30	2.23E-03	9.51E-04	1.80E-04	1.50E-03	1.10E-03	1.83E-03
Pit 1 sump	**151**	**4**	**2023**	**August**	1.27E-03	1.00E-02	2.14E-04	1.28E-03	12.3	0.08	2.23E-03	1.75E-03	4.0	5.46E-05	1.01	0.23	1.71E-03	7.35E-04	1.38E-04	1.15E-03	8.55E-04	1.44E-03
Pit 1 sump	**152**	**4**	**2023**	**September**	1.12E-03	1.00E-02	1.91E-04	1.12E-03	10.8	0.07	1.96E-03	1.55E-03	3.5	6.14E-05	0.90	0.20	1.50E-03	6.42E-04	1.22E-04	1.01E-03	7.53E-04	1.30E-03
Pit 1 sump	**153**	**4**	**2023**	**October**	2.82E-05	2.15E-03	1.37E-05	8.17E-13	0.0	2.15E-04	2.82E-05	2.82E-05	0.0	7.12E-05	0.06	1.47E-10	1.10E-12	4.68E-13	8.87E-14	7.39E-13	2.82E-05	1.37E-04
Pit 1 sump	**161**	**5**	**2024**	**June**	2.78E-04	5.94E-03	5.40E-05	2.56E-04	2.5	0.02	4.70E-04	3.74E-04	0.8	6.84E-05	0.25	0.05	3.43E-04	1.47E-04	2.78E-05	2.31E-04	1.94E-04	4.01E-04
Pit 1 sump	**162**	**5**	**2024**	**July**	1.65E-03	1.00E-02	2.74E-04	1.66E-03	16.0	0.10	2.89E-03	2.27E-03	5.2	4.65E-05	1.30	0.30	2.23E-03	9.51E-04	1.80E-04	1.50E-03	1.10E-03	1.83E-03
Pit 1 sump	**163**	**5**	**2024**	**August**	1.27E-03	1.00E-02	2.14E-04	1.27E-03	12.3	0.08	2.22E-03	1.75E-03	4.0	5.46E-05	1.01	0.23	1.71E-03	7.28E-04	1.38E-04	1.15E-03	8.49E-04	1.44E-03
Pit 1 sump	**164**	**5**	**2024**	**September**	1.12E-03	1.00E-02	1.91E-04	1.12E-03	10.8	0.07	1.96E-03	1.55E-03	3.5	6.14E-05	0.90	0.20	1.50E-03	6.42E-04	1.22E-04	1.01E-03	7.53E-04	1.30E-03
Pit 1 sump	**165**	**5**	**2024**	**October**	2.82E-05	2.15E-03	1.37E-05	8.17E-13	0.0	2.15E-04	2.82E-05	2.82E-05	0.0	7.12E-05	0.06	1.47E-10	1.10E-12	4.68E-13	8.87E-14	7.39E-13	2.82E-05	1.37E-04
Pit 1 sump	**173**	**6**	**2025**	**June**	2.78E-04	5.94E-03	5.40E-05	2.56E-04	2.5	0.02	4.70E-04	3.74E-04	0.8	6.84E-05	0.25	0.05	3.43E-04	1.47E-04	2.78E-05	2.31E-04	1.94E-04	4.01E-04
Pit 1 sump	**174**	**6**	**2025**	**July**	1.65E-03	1.00E-02	2.74E-04	1.66E-03	16.0	0.10	2.89E-03	2.27E-03	5.2	4.65E-05	1.30	0.30	2.23E-03	9.51E-04	1.80E-04	1.50E-03	1.10E-03	1.83E-03
Pit 1 sump	**175**	**6**	**2025**	**August**	1.27E-03	1.00E-02	2.14E-04	1.27E-03	12.3	0.08	2.22E-03	1.75E-03	4.0	5.46E-05	1.01	0.23	1.71E-03	7.28E-04	1.38E-04	1.15E-03	8.49E-04	1.44E-03
Pit 1 sump	**176**	**6**	**2025**	**September**	1.12E-03	1.00E-02	1.91E-04	1.12E-03	10.8	0.07	1.96E-03	1.55E-03	3.5	6.14E-05	0.90	0.20	1.50E-03	6.42E-04	1.22E-04	1.01E-03	7.53E-04	1.30E-03
Pit 1 sump	**177**	**6**	**2025**	**October**	2.82E-05	2.15E-03	1.37E-05	8.17E-13	0.0	2.15E-04	2.82E-05	2.82E-05	0.0	7.12E-05	0.06	1.47E-10	1.10E-12	4.68E-13	8.87E-14	7.39E-13	2.82E-05	1.37E-04
Pit 1 sump	**185**	**7**	**2026**	**June**	2.78E-04	5.94E-03	5.40E-05	2.56E-04	2.5	0.02	4.70E-04	3.74E-04	0.8	6.84E-05	0.25	0.05	3.43E-04	1.47E-04	2.78E-05	2.31E-04	1.94E-04	4.01E-04
Pit 1 sump	**186**	**7**	**2026**	**July**	1.65E-03	1.00E-02	2.74E-04	1.66E-03	16.0	0.10	2.89E-03	2.27E-03	5.2	4.65E-05	1.30	0.30	2.23E-03	9.51E-04	1.80E-04	1.50E-03	1.10E-03	1.83E-03
Pit 1 sump	**187**	**7**	**2026**	**August**	1.27E-03	1.00E-02	2.14E-04	1.27E-03	12.3	0.08	2.22E-03	1.75E-03	4.0	5.46E-05	1.01	0.23	1.71E-03	7.28E-04	1.38E-04	1.15E-03	8.49E-04	1.44E-03
Pit 1 sump	**188**	**7**	**2026**	**September**	1.12E-03	1.00E-02	1.91E-04	1.12E-03	10.8	0.07	1.96E-03	1.55E-03	3.5	6.14E-05	0.90	0.20	1.50E-03	6.42E-04	1.22E-04	1.01E-03	7.53E-04	1.30E-03
Pit 1 sump	**189**	**7**	**2026**	**October**	2.82E-05	2.15E-03	1.37E-05	8.17E-13	0.0	2.15E-04	2.82E-05	2.82E-05	0.0	7.12E-05	0.06	1.47E-10	1.10E-12	4.68E-13	8.87E-14	7.39E-13	2.82E-05	1.37E-04
Pit 1 sump	**197**	**8**	**2027**	**June**	2.41E-05	5.14E-04	4.68E-06	2.22E-05	0.2	1.37E-03	4.07E-05	3.24E-05	0.1	5.92E-06	0.0	3.98E-03	2.97E-05	1.27E-05	2.40E-06	2.00E-05	1.68E-05	3.47E-05
				MAXIMUM	1.65E-03	1.00E-02	2.74E-04	1.66E-03	16	0.10	2.89E-03	2.27E-03	5.2	7.12E-05	1.30	0.30	2.23E-03	9.51E-04	1.80E-04	1.50E-03	1.10E-03	1.83E-03
				AVERAGE	8.30E-04	7.28E-03	1.42E-04	8.22E-04	8.0	0.05	1.44E-03	1.14E-03	2.6	5.78E-05	0.67	0.15	1.10E-03	4.71E-04	8.92E-05	7.42E-04	5.58E-04	9.75E-04

Fully Flooded Open Pit Post-Closure Water Quality (Years 16+)

	Cu[5]	Fe[2]	Pb[5]	Li	Mg	Mn	Mo	Ni[5]	K	Se	Na	Sr	Sn	Ti	W	U	V	Zn
CCME aquatic life (long-term)[1]/ SSWQO[2] (mg/L)	2.00E-03	1.06	1.00E-03				0.07	0.04		1.00E-03						0.02		0.03
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MINIMUM	3.6E-05	0.01	3.1E-05	3.9E-05	0.22	0.002	1.5E-04	7.5E-05	0.10	1.2E-05	0.12	0.004	2.7E-05	1.9E-04	6.9E-06	3.0E-05	3.9E-05	2.3E-04
MAXIMUM	1.7E-04	0.01	2.0E-04	1.9E-04	0.79	0.009	8.7E-04	4.0E-04	0.43	7.2E-05	0.76	0.01	9.0E-05	0.001	3.9E-05	1.4E-04	2.1E-04	0.001
AVERAGE	1.0E-04	0.01	1.2E-04	1.2E-04	0.51	0.005	5.2E-04	2.4E-04	0.27	4.3E-05	0.45	0.009	5.9E-05	7.1E-04	2.3E-05	8.7E-05	1.3E-04	8.7E-04

Notes:

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

[4] CEQG Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.

[5] CEQG Freshwater Aquatic Life Criteria are hardness dependant; assumes a hardness of 30 mg/L.

[6] CEQG Freshwater Aquatic Life Criterion for aluminum is pH dependant; assumes pH>6.5.

[7] CEQG Freshwater Aquatic Life Trigger Ranges are dependent on trophic status; oligotrophic status assumed.

Created By: MIB
Checked by: VJB

ATTACHMENT D

Effect of TSS Addition on Total Constituent Concentrations

Table D.1 Estimated Composition of Suspended Particles in Water
Water Quality Predictions
Meliadine Gold Project

Parameter		Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Li
Unit		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Tiriganiaq tailings	MAXIMUM	<	54000	6900	530	1.1	1.1	27000	0.59	13	270	430	120000	0.10	14000	18
	AVERAGE	<	45000	6000	431	0.99	0.72	25500	0.49	10	200	174	110000	0.10	11950	16
Overburden	MAXIMUM	0.33	79000	53	680	1.1	0.18	27000	0.29	14	270	46	36000	0.10	19000	25
	AVERAGE	0.27	67000	31	600	1.1	0.14	14880	0.22	11	164	24	29200	0.10	17000	18
Tiriganiaq waste rock	MAXIMUM	1.4	99000	8000	3100	3.5	2.4	110000	1.7	55	720	700	310000	0.10	37000	77
	AVERAGE	0.31	75037	255	543	0.89	0.15	29256	0.25	23	140	59	54681	0.10	18130	33
	HIGHEST AVERAGE	0.31	75037	6000	600	1.1	0.72	29256	0.49	23	200	174	110000	0.10	18130	33

Table D.1 Estimated Composition of Suspended Particles in Water
Water Quality Predictions
Meliadine Gold Project

Parameter		Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
Unit		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Tiriganiaq tailings	MAXIMUM	11000	1200	14	14000	83	360	2.7	0.70	2.4	270	1800	0.39	1.4	63	<	150
	AVERAGE	10150	693	8.8	9650	54	253	2.3	0.70	1.6	210	1575	0.33	1.1	54	<	109
Overburden	MAXIMUM	12000	490	4.6	25000	42	19	0.80	1.9	2.0	380	4200	0.42	2.1	91	10	67
	AVERAGE	9590	387	2.3	21100	32	14	0.80	1.0	1.2	333	2100	0.38	1.4	73	8.5	49
Tiriganiaq waste rock	MAXIMUM	41000	3200	8.8	26000	250	410	4.2	3.1	3.4	690	9700	1.2	3.2	280	22	640
	AVERAGE	15922	569	1.3	17003	64	17	0.84	0.73	0.86	261	2400	0.36	1.2	111	7.7	83
	HIGHEST AVERAGE	15922	693	8.8	21100	64	253	2.3	1.0	1.6	333	2400	0.38	1.4	111	8.5	109

Table D.2 Estimated Effect of Suspended Solids on Average Total Parameter Concentrations
Post-Closure
Water Quality Prediction
Meliadine Gold Project

Estimated chemical composition of suspended solids (TSS)			mg/kg	*0.31*	*75037*	*6000*	*600*	*1.1*	*0.72*	*29256*	*0.49*	*23*	*200*	*174*	*110000*	*0.1*	*18130*	*33*
Collection Pond	**Mine Period**	**Concentration**	**Units**	**Ag**	**Al**	**As**	**Ba**	**Be**	**Bi**	**Ca**	**Cd**	**Co**	**Cr**	**Cu**	**Fe**	**Hg**	**K**	**Li**
Metal Mine Effluent Regulation (MMER) allowable monthly mean concentration[3] (mg/L)						**0.5**								**0.3**				
CP 1	**Operation**	AVERAGE (diss)	mg/L	0.000054	0.093	0.10	0.012	0.000041	0.000072	36	0.000005	0.0045	0.00001	0.0011	0.0100	0.0	7.2	0.0077
		AVERAGE (total)	mg/L	0.000059	1.2	0.19	0.021	0.000056	0.000083	37	0.000012	0.0048	0.0030	0.0037	1.7	0.0000015	7.5	0.0082

CCME aquatic life (long-term)[1]/ *SSWQO* [2] (mg/L)					**0.10**	*0.025*			**1.5**		**0.000012**		**0.001**	**0.002**	*1.06*	**0.000026**		
CP 1	**Post-Closure**	AVERAGE (diss)	mg/L	0.0	0.093	0.0039	0.0086	0.0	0.0	7.5	0.0	0.00055	0.0	0.00071	0.0099	0.0	0.81	0.0
		AVERAGE (total)	mg/L	0.0000047	**1.2**	**0.094**	0.018	0.000016	0.000011	7.9	0.0000074	0.00088	**0.0030**	**0.0033**	**1.7**	0.0000015	1.1	0.00049
CP 3	**Post-Closure**	AVERAGE (diss)	mg/L	0.000017	0.094	0.020	0.0057	0.000013	0.000023	10	0.0000033	0.00059	0.0	0.00044	0.100	0.0	1.2	0.00042
		AVERAGE (total)	mg/L	0.000022	**1.2**	**0.11**	0.015	0.000029	0.000033	11	0.000011	0.00093	**0.0030**	**0.0030**	**1.7**	0.0000015	1.5	0.00091
CP 4	**Post-Closure**	AVERAGE (diss)	mg/L	0.00032	0.098	**0.11**	0.020	0.00024	0.00041	51	**0.000019**	0.0039	0.0	0.0014	0.100	0.0	7.3	0.0053
		AVERAGE (total)	mg/L	0.00032	**1.2**	**0.20**	0.029	0.00026	0.00042	52	**0.000026**	0.0042	**0.0030**	**0.0040**	**1.7**	0.0000015	7.6	0.0058
CP 6	**Post-Closure**	AVERAGE (diss)	mg/L	0.0000041	0.087	**0.027**	0.0064	0.0000032	0.0000054	13	0.0000043	0.00046	0.0	0.00041	0.046	0.0	1.3	0.00031
		AVERAGE (total)	mg/L	0.0000088	**1.2**	**0.12**	0.015	0.000019	0.000016	13	0.000012	0.00079	**0.0030**	**0.0030**	**1.7**	0.0000015	1.5	0.00080

Notes:

Average (diss) represents the predicted dissolved concentration of that parameter.

Average (total) represents the calculated total parameter concentration with addition of 15 mg/L Total Suspended Solids (TSS).

MMER criteria apply only to values associated with Mine Operation.

CCME/SSWQ criteria only apply to values associated with Mine Closure/Post Closure.

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

Table D.2 Estimated Effect of Suspended Solids on Average Total Parameter Concentrations
Post-Closure
Water Quality Prediction
Meliadine Gold Project

Collection Pond	Mine Period	Concentration	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
Estimated chemical composition of suspended solids (TSS)			*15922*	*693*	*8.8*	*21100*	*64*	*253*	*2.3*	*1.0*	*1.6*	*333*	*2400*	*0.38*	*1.4*	*111*	*8*	*109*
Metal Mine Effluent Regulation (MMER) allowable monthly mean concentration[3] (mg/L)							**0.5**	**0.2**										**0.5**
CP 1	Operation	AVERAGE (diss)	5.8	0.12	0.0051	5.5	0.0024	0.0012	0.0028	0.00038	0.00048	0.16	0.0076	0.00000075	0.00074	0.0045	0	0.011
		AVERAGE (total)	6.1	0.13	0.0052	5.8	0.0033	0.0050	0.0028	0.00040	0.00051	0.16	0.044	0.0000064	0.00076	0.0062	0.00013	0.012

Collection Pond	Mine Period	Concentration	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
CCME aquatic life (long-term)[1]/ *SSWQO*[2] (mg/L)					**0.073**		**0.038**	**0.001**		**0.0010**				**0.0008**	**0.015**			**0.030**
CP 1	Post-Closure	AVERAGE (diss)	0.86	0.019	0.00016	1.9	0.0020	**0.0012**	0.00018	0.00059	0.0	0.0	0.0029	0.0	0.000073	0.00071	0	0.0073
		AVERAGE (total)	1.1	0.030	0.00029	2.3	0.0029	**0.0050**	0.00022	0.00060	0.000024	0.0050	0.039	0.0000056	0.000094	0.0024	0.00013	0.0090
CP 3	Post-Closure	AVERAGE (diss)	2.2	0.023	0.0018	1.6	0.0010	0.00048	0.0011	0.00018	0.00030	0.046	0.0025	0.0	0.00038	0.00050	0	0.0035
		AVERAGE (total)	2.5	0.033	0.0019	1.9	0.0020	**0.0043**	0.0012	0.00019	0.00032	0.051	0.039	0.0000056	0.00040	0.0022	0.00013	0.0052
CP 4	Post-Closure	AVERAGE (diss)	12	0.13	0.026	16	0.0028	0.00091	0.0064	0.00030	0.0015	0.27	0.026	0.0	0.0033	0.0033	0	0.016
		AVERAGE (total)	12	0.14	0.026	16	0.0037	**0.0047**	0.0065	0.00031	0.0015	0.27	0.062	0.0000056	0.0033	0.0050	0.00013	0.017
CP 6	Post-Closure	AVERAGE (diss)	2.9	0.022	0.00095	0.78	0.00068	0.00021	0.0015	0.00026	0.00044	0.065	0.00078	0.0	0.00037	0.00036	0	0.0016
		AVERAGE (total)	3.1	0.032	0.0011	1.1	0.0016	**0.0040**	0.0015	0.00028	0.00047	0.070	0.037	0.0000056	0.00039	0.0020	0.00013	0.0033

Notes:

Average (diss) represents the dissolved measured concentration of that parameter.

Average (total) represents the calculated total concentration of that parameter based on a TSS of 15 mg/L.

MMER criteria apply only to values associated with Mine Operation.

CCME/SSWQ criteria only apply to values associated with Mine Closure/Post Closure.

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

Table D.3 Estimated Effect of Suspended Solids on Maximum Total Parameter Concentrations
Post-Closure
Water Quality Prediction
Meliadine Gold Project

Collection Pond	Mine Period	Concentration	units	TDS	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Li
Estimated chemical composition of suspended solids (TSS)			mg/kg	-	*0.31*	*75037*	*6000*	*600*	*1.1*	*0.72*	*29256*	*0.49*	*23*	*200*	*174*	*110000*	*0.1*	*18130*	*33*
Metal Mine Effluent Regulation (MMER) allowable monthly mean concentration[3] (mg/L)							0.5								0.3				
CP 1	Operation	MAXIMUM (diss)	mg/L	421	0.00012	0.100	0.36	0.024	0.000088	0.00016	80	0.000012	0.0092	0.00003	0.0021	0.01	0.0	17	0.017
		MAXIMUM (total)	mg/L	425	0.00012	1.2	0.45	0.033	0.00010	0.00017	80	0.000019	0.0095	0.0030	0.0047	1.7	0.0000015	18	0.018

Collection Pond	Mine Period	Concentration	units	TDS	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Hg	K	Li
CCME aquatic life (long-term)[1]/ *SSWQO*[2] (mg/L)						**0.10**	*0.025*			**1.5**		**0.000012**		**0.001**	**0.002**	*1.06*	**0.000026**		
CP 1	Post-Closure	MAXIMUM (diss)	mg/L	66	0	0.098	0.0057	0.011	0.0	0.0	9.8	0.0	0.00083	0.0	0.00096	0.0100	0.0	1.1	0.0
		MAXIMUM (total)	mg/L	71	0.0000047	**1.2**	**0.096**	0.020	0.000016	0.000011	10	0.0000074	0.0012	**0.0030**	**0.0036**	**1.7**	0.0000015	1.4	0.00049
CP 3	Post-Closure	MAXIMUM (diss)	mg/L	71	0.000020	0.100	0.023	0.0061	0.000015	0.000026	11	0.0000037	0.00062	0.0	0.00046	0.100	0.0	1.3	0.00045
		MAXIMUM (total)	mg/L	75	0.000024	**1.2**	**0.11**	0.015	0.000031	0.000037	12	0.000011	0.00095	**0.0030**	**0.0031**	**1.7**	0.0000015	1.6	0.00095
CP 4	Post-Closure	MAXIMUM (diss)	mg/L	343	0.00035	0.100	**0.12**	0.022	0.00027	0.00046	55	**0.000021**	0.0041	0.0	0.0016	0.100	0.0	7.7	0.0058
		MAXIMUM (total)	mg/L	348	0.00035	**1.2**	**0.21**	0.031	0.00029	0.00047	55	**0.000028**	0.0045	**0.0030**	**0.0042**	**1.7**	0.0000015	8.0	0.0063
CP 6	Post-Closure	MAXIMUM (diss)	mg/L	99	0.0000047	0.100	**0.032**	0.0074	0.0000036	0.0000062	15	0.0000052	0.00054	0.0	0.00048	0.048	0.0	1.5	0.00035
		MAXIMUM (total)	mg/L	103	0.0000094	**1.2**	**0.12**	0.016	0.000020	0.000017	16	**0.000013**	0.00087	**0.0030**	**0.0031**	**1.7**	0.0000015	1.8	0.00085

Notes:

Maximum (diss) represents the predicted dissolved concentration of that parameter.

Maximum (total) represents the calculated total parameter concentration with addition of 15 mg/L Total Suspended Solids (TSS).

MMER criteria apply only to values associated with Mine Operation.

CCME/SSWQ criteria only apply to values associated with Mine Closure/Post Closure.

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown).

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

Created By: AJS
Checked by: VJB

Table D.3 Estimated Effect of Suspended Solids on Maximum Total Parameter Concentrations
Post-Closure
Water Quality Prediction
Meliadine Gold Project

Collection Pond	Mine Period	Concentration	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
Estimated chemical composition of suspended solids (TSS)			*15922*	*693*	*8.8*	*21100*	*64*	*253*	*2.3*	*1.0*	*1.6*	*333*	*2400*	*0.38*	*1.4*	*111*	*8*	*109*
Metal Mine Effluent Regulation (MMER) allowable monthly mean concentration[3] (mg/L)							**0.5**	**0.2**										**0.5**
CP 1	Operation	MAXIMUM (diss)	13	0.23	0.011	9.5	0.0034	0.0017	0.0076	0.00052	0.0012	0.36	0.0132	0.0000053	0.0017	0.0092	0	0.015
		MAXIMUM (total)	13	0.25	0.011	9.9	0.0043	0.0055	0.0076	0.00053	0.0013	0.36	0.049	0.000011	0.0017	0.011	0.00013	0.017

Collection Pond	Mine Period	Concentration	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Sn	Sr	Ti	Tl	U	V	Y	Zn
CCME aquatic life (long-term)[1]/ *SSWQO* [2] (mg/L)					**0.073**		**0.038**	**0.001**		**0.0010**				**0.0008**	**0.015**			**0.030**
CP 1	Post-Closure	MAXIMUM (diss)	1.1	0.029	0.00017	2.7	0.0029	**0.0017**	0.00028	0.00061	0.0	0.0	0.0044	0.0	0.00011	0.00096	0	0.011
		MAXIMUM (total)	1.4	0.039	0.00030	3.0	0.0039	**0.0055**	0.00031	0.00063	0.000024	0.0050	0.040	0.0000056	0.00013	0.0026	0.00013	0.012
CP 3	Post-Closure	MAXIMUM (diss)	2.5	0.024	0.0020	1.7	0.0011	0.00049	0.0013	0.00018	0.00034	0.051	0.0027	0.0	0.00040	0.00052	0	0.0036
		MAXIMUM (total)	2.7	0.035	0.0021	2.0	0.0020	**0.0043**	0.0013	0.00020	0.00037	0.056	0.039	0.0000056	0.00042	0.0022	0.00013	0.0052
CP 4	Post-Closure	MAXIMUM (diss)	13	0.14	0.029	17	0.0030	0.00095	0.0071	0.00030	0.0017	0.28	0.028	0.0	0.0036	0.0036	0	0.017
		MAXIMUM (total)	13	0.15	0.029	18	0.0039	**0.0047**	0.0071	0.00031	0.0017	0.29	0.064	0.0000056	0.0036	0.0052	0.00013	0.018
CP 6	Post-Closure	MAXIMUM (diss)	3.5	0.026	0.0010	0.82	0.00079	0.00024	0.0018	0.00027	0.00054	0.079	0.00083	0.0	0.00044	0.00040	0	0.0018
		MAXIMUM (total)	3.7	0.036	0.0011	1.1	0.0017	**0.0040**	0.0018	0.00029	0.00057	0.084	0.037	0.0000056	0.00046	0.0021	0.00013	0.0034

Notes:

Maximum (diss) represents the predicted dissolved concentration of that parameter.

Maximum (total) represents the calculated total parameter concentration with addition of 15 mg/L Total Suspended Solids (TSS).

MMER criteria apply only to values associated with Mine Operation.

CCME/SSWQ criteria only apply to values associated with Mine Closure/Post Closure.

[1] CEQG (2002) freshwater guidelines. Exceedances to freshwater CEQG's shown in bold type.

[2] Site Specific Water Quality Objective developed for Meliadine for arsenic, fluoride and iron, as well as aluminum (not shown)

[3] MMER 2006 update. Maximum authorized monthly mean concentration. Exceedances of MMER's shown as shaded cells.

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solutions@golder.com
www.golder.com

Golder Associates Ltd.
32 Steacie Drive
Kanata, Ontario, K2K 2A9
Canada
T: +1 (613) 592 9600

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APPENDIX H • EFFLUENT QUALITY CRITERIA

March 2015

REPORT

MELIADINE GOLD PROJECT

Appendix H
Effluent Quality Criteria

Submitted to:
Agnico Eagle Mines Limited
Mines Agnico-Eagle, Division Services Techniques
10200, Route de Preissac
Rouyn-Noranda, Quebec
J0Y 1C0

Project Number: Doc 503-1405283 Ver. A

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Table of Contents

TABLES

FIGURES

1.0 INTRODUCTION

The Meliadine Gold Mine Project (Project) is located in the Kivalliq District of Nunavut near the western shore of Hudson Bay, in Northern Canada (Figure 1-1). The Tiriganiaq is the gold deposit that will be developed by using a traditional open-pit mining method and underground mining. Two open pits (Tiriganiaq Pit 1 and Tiriganiaq Pit 2) and one underground mine (Tiriganiaq Underground). The Tiriganiaq is divided into four phases: 5 years construction (Year -5 to Year -1), 8 years mine operation (Year 1 to Year 8), 3 years interim closure (Year 9 to Year 11), and post-closure (Year 11 forwards).

1.1 Objective

The purpose of this document is to provide a standalone document with a summary of information on recommended effluent quality criteria (EQC) with a basis for limits that should be applied at the last point of control prior to discharge to Meliadine Lake.

2.0 WATER MANAGEMENT SUMMARY

The water management objectives for the Project are to minimize potential impacts to the quantity and quality of surface water at the site. The strategy involves the following:

- minimize the amount of contact water for management, monitoring, and treatment (if required) to the extent practical;
- divert non-contact water from undisturbed lands away from the Project site infrastructure to the extent practical; and
- limit fresh water make-up quantities to the extent practical.

To achieve the objectives and strategy for mine water management for the Project, main components of the water management infrastructure associated with mine development (illustrated on Figure 2-1), is as follows:

- six water collection ponds (CP1 to CP6);
- five water retention dikes (D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6);
- three water diversion/collection berms (Berm1 to Berm3),
- eight water collection channels (Channel1 to Channel8),
- six water passage culverts (Culvert1 to Culvert6) to convey water within the proposed mine site;
- freshwater pumping station and intake causeway on Meliadine Lake; and
- water treatment plant to remove total suspended solids prior to release to Meliadine Lake.

Treated water will be released to Meliadine Lake via a diffuser (Appendix E of the Water Management Plan). Treated water will be released during the open-water period, mid-June to September, between Year -4 to Year 11, as outlined in the Water Management Plan. Highest discharge in operations will occur in Year 3, and highest discharge during closure will occur in Year 10 (Table 2-1).

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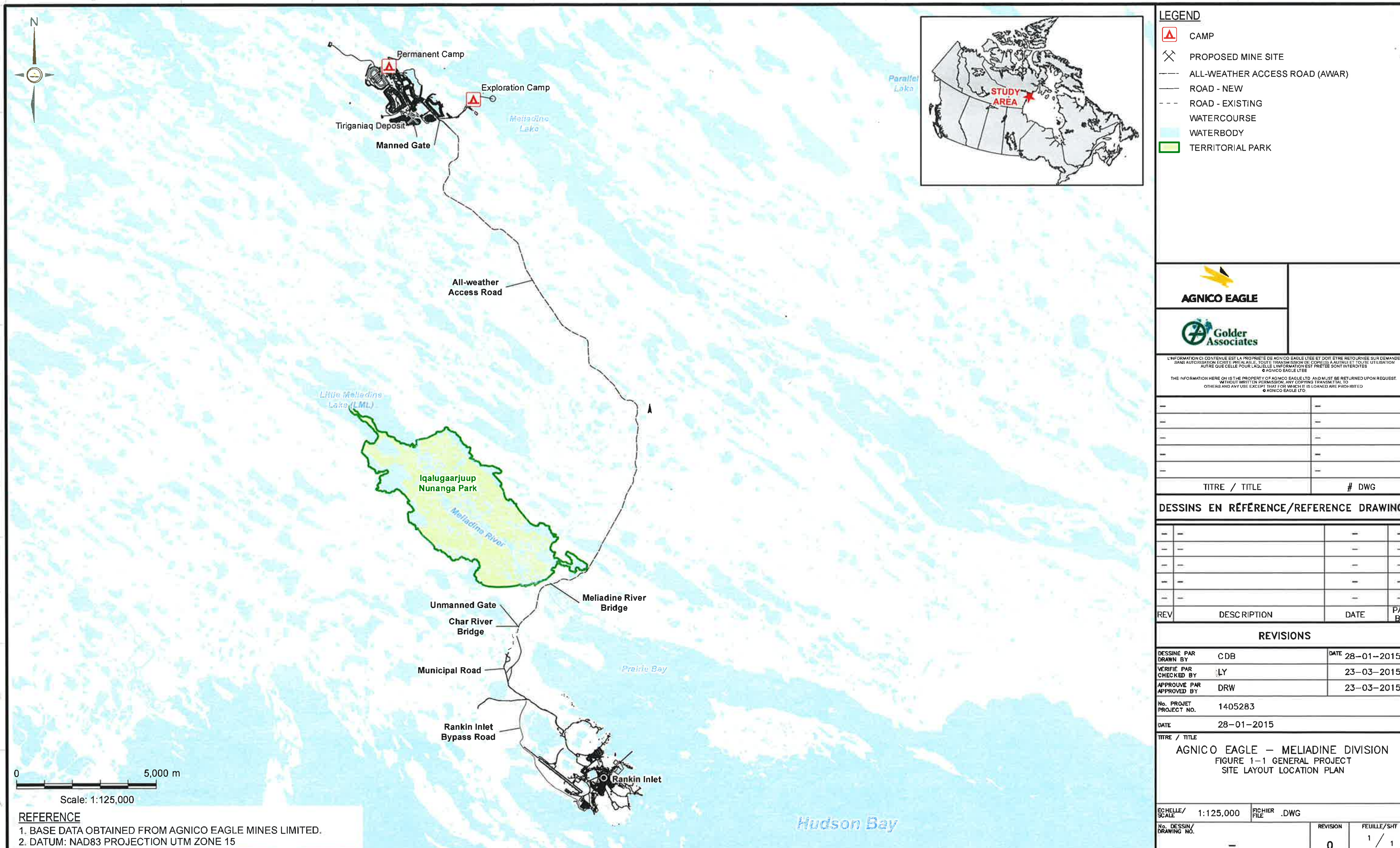

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APPROUVÉ PAR APPROVED BY	DRW		23–03–2015
No. PROJET PROJECT NO.	1405283		
DATE	28–01–2015		

TITRE / TITLE

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FIGURE 1–1 GENERAL PROJECT
SITE LAYOUT LOCATION PLAN

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LEGEND

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

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No. PROJET / PROJECT NO.	1405283		
DATE	28-01-2015		

TITRE / TITLE

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FIGURE 2-1 WATER MANAGEMENT INFRASTRUCTURE

ÉCHELLE/ SCALE	1:12500	FICHIER FILE	.DWG
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REFERENCE

1. BASE DATA OBTAINED FROM AGNICO EAGLE MINES LIMITED.
2. DATUM: NAD83 PROJECTION UTM ZONE 15

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Table 2-1: Total Annual Discharge Volume to Meliadine Lake

Phase	Mine Year	Calendar Year	Total Annual Release to Meliadine Lake (m^3)
Construction	-5	2015	0
	-4	2016	457,780
	-3	2017	479,208
	-2	2018	498,688
	-1	2019	485,167
Operation	1	2020	590,687
	2	2021	640,501
	3	2022	729,501
	4	2023	679,143
	5	2024	668,451
	6	2025	676,141
	7	2026	675,141
	8	2027	587,971
Closure	9	2028	674,523
	10	2029	673,034
	11	2030	672,060

Source: Water Management Plan, Appendix B

3.0 EFFLUENT QUALITY CRITERIA AND WATER QUALITY OBJECTIVE

Effluent quality criteria are to be applied at the last point of control prior to discharge to the receiving environment. They represent values that will be protective of aquatic life, protective of traditional drinking water uses, and are in compliance with regulations (i.e., *Metal Mining Effluent Regulations* [MMER]; Government of Canada 2012). The Mine will be operated so that water quality objectives are met at the edge of the mixing zone in Meliadine Lake and the Project does not have a significant adverse effect on opportunities for traditional and non-traditional use of fish, and health of aquatic life, and human health. Water quality objectives at the edge of the mixing zone come from a combination of site-specific water quality objectives (SSWQO) developed for fluoride, arsenic, and iron, generic aquatic life guidelines (CCME 1999), and drinking water guidelines (Health Canada 2012) (Table 3-1). For additional context, all SSWQO and guideline values have been included in Table 3-1, but only the SSWQOs for fluoride, arsenic, and iron, and the lowest of either the aquatic life or drinking water quality guideline for all other parameters will be applied at the edge of the mixing zone in Meliadine Lake.

Predicted quality of effluent to be released to Meliadine Lake was included in the Final Environmental Impact Statement (FEIS) (Agnico Eagle 2014) and then updated for the Tiriganiaq (Table 3-1). In the FEIS, cadmium at the edge of the mixing zone was predicted to be equal to the aquatic life guideline and the average measured concentration in Meliadine Lake. The revised end-of-pipe predictions are lower than those in the FEIS and thus it is assumed that concentrations at the edge of the mixing zone will also be lower.

Table 3-1: Predicted End-of-Pipe Effluent and Edge of Mixing Zone Water Quality in Meliadine Lake

Constituent	Objective – End-of-Pipe		End-of-Pipe Predictions		Objective – Edge of Mixing Zone			Meliadine Lake[h]			Edge of Mixing Zone Predictions
	MMER Monthly Mean[a]	MMER Maximum Grab[a]	FEIS[b]	Tiriganiaq[c]	SSWQO[d]	Aquatic Life[e]	Drinking Water[f]	Minimum	Median	Maximum	FEIS[b]
Conventional Constituents											
Total Dissolved Solids	-	-	4,685	425	-	-	500	21	35	91	68
Total Suspended Solids	15	30	0	15	-	8	-	1	1.5	8	3.1
pH	6 to 9.5	6 - 9.5	-	-	-	6.5 to 9.0	6.5 to 8.5	6.7	7.4	8.0	-
Major Ions											
Chloride	-	-	1,142	33	-	120	250	2.7	6.4	25.2	14
Fluoride	-	-	1.2	0.0005	2.8	0.12	1.5	0.03	0.03	0.03	0.0084
Sodium	-	-	295	9.5	-	-	200	1.7	3.2	7.5	5.3
Sulphate	-	-	4,974	87		-	500	1.5	2.9	8.9	38
Nutrients											
Total Ammonia as Nitrogen	-	-	70	7.8	-	7	-	0.002	0.025	0.052	0.54
Nitrate Ion	-	-	29	9.7	-	13	45	0.013	0.11	0.22	0.25
Phosphorus (total)	-	-	0.06	1.0	-	0.03	-	0.0028	0.0055	0.033	0.0049/0.03[i]
Cyanides											
Total cyanide	1	2	1	0.11	-	-	0.2	0.000001	0.001	0.003	0.009
Free cyanide	-	-	0.05	-	-	0.005	-	-	-	-	0.00035
Metals											
Aluminum	-	-	0.98	1.2	-	0.1	0.1	0.00015	0.0025	0.1	0.0091/0.1[i]
Antimony	-	-	0.059	0.0076	-	-	0.006	0.00002	0.0001	0.0003	0.00051
Arsenic	0.5	1	0.5	0.45	0.025	0.005	0.01	0.0001	0.0003	0.0009	0.0038
Barium	-	-	9.9	0.033	-	-	1	0.00003	0.0071	0.0177	0.077

Table 3-1: Predicted End-of-Pipe Effluent and Edge of Mixing Zone Water Quality in Meliadine Lake (continued)

Constituent	Objective – End-of-Pipe		End-of-Pipe Predictions		Objective – Edge of Mixing Zone			Meliadine Lake[h]			Edge of Mixing Zone Predictions
	MMER Monthly Mean[a]	MMER Maximum Grab[a]	FEIS[b]	Tiriganiaq[c]	SSWQO[d]	Aquatic Life[e]	Drinking Water[f]	Minimum	Median	Maximum	FEIS[b]
Cadmium	-	-	0.0001	0.000019	-	0.00005[g]	0.005	0.00001	0.00003	0.0048	**0.00005**
Chromium	-	-	0.1	0.003	-	0.0089	0.05	0.00003	0.0002	0.00215	0.0011
Copper	0.3	0.6	0.13	0.0047	-	0.002	1	0.0005	0.00111	0.0031	0.002
Iron	-	-	2.8	1.7	1.06	0.3	0.3	0.0005	0.0235	0.085	0.042
Lead	0.2	0.4	0.0092	0.0055	-	0.001	0.01	0.00003	0.00003	0.00071	0.00015
Manganese	-	-	0.48	0.25	-	-	0.05	0.00005	0.00283	0.00769	0.0055
Mercury	-	-	0.00008	0.0000015	-	0.000026	0.001	0.00001	0.00001	0.00003	0.00002
Molybdenum	-	-	0.73	0.011	-	0.073	-	0.00003	0.00011	0.0015	0.0052
Nickel	0.5	1	0.29	0.0043	-	0.029	-	0.00005	0.0006	0.01	0.0027
Selenium	-	-	0.0091	0.00053	-	0.001	0.01	0.00005	0.00005	0.0005	0.00016
Silver	-	-	0.0001	0.00012	-	0.0001	-	0.00001	0.00005	0.00055	0.0001
Thallium	-	-	0.0076	0.000011	-	0.0008	-	0.00001	0.00002	0.0001	0.0001
Uranium	-	-	0.15	0.0013	-	0.015	0.02	0.00002	0.00003	0.0001	0.0011
Zinc	0.5	1	0.26	0.017	-	0.03	5	0.0004	0.0015	0.0372	0.0067

Note: Units are mg/L.

"-" no value; MMER = Metal Mine Effluent Regulations; FEIS = final environmental impact statement for the Project; SSWQO = site-specific water quality objective.

[a] Government of Canada (2012).

[b] Table 7.4-20 from FEIS (Agnico Eagle 2014); maximum predicted values, dissolved constituent concentrations.

[c] Maximum predicted values, total parameter concentrations assuming 15 mg/L Suspended Solids of mine waste composition (Water Management Plan, Appendix G, Attachment C Table C-1 for major ions, nutrients and cyanides (no change in concentration with added TSS) and Attachment D Table D-3 for metals).

[d] Golder (2013).

[e] CCME (1999).

[f] Health Canada (2012).

[g] Hardness of 23 mg/L $CaCO_3$.

[h] Data from FEIS (Table 7.4-20; Agnico Eagle 2014) plus 2013 (Azimuth 2013).

[i] Appendix E of the Water Management Plan.

Not all constituents in the final effluent need limits, so the first task is to identify those constituents for which limits should be developed. A multi-step process was developed to identify constituents of potential concern that may require defined monitoring limits. The steps included in the screening process were as follows:

1) Are end-of-pipe limits already established through the MMER?

- There are eight constituents (i.e., pH, TSS, total cyanide, arsenic, copper, lead, nickel, and zinc) that have an MMER limit (Table 3-2).

2) Are the updated predicted end-of-pipe concentrations higher than the edge of mixing zone water quality objectives (WQO) for Meliadine Lake?

- Based on the updated end-of-pipe predictions, maximum end-of-pipe concentrations for ammonia, phosphorus, aluminum, antimony, arsenic, copper, iron, lead, manganese, and silver are predicted to be higher than the Meliadine Lake WQOs.

3) For those constituents with end of pipe concentrations above the edge of mixing zone WQO, are the predicted concentrations at the edge of the mixing zone higher than the WQOs?

- Concentrations at the edge of the mixing zone are predicted to be less than or equal to WQOs for all constituents.
- Predicted end-of-pipe concentrations for total phosphorus (1.0 mg/L, Table 3-1) are close to the maximum discharge concentrations (1.7 mg/L; Appendix G of the Water Management Plan) calculated based on a minimum dilution of 65 times. For this reason, achievable EQCs for total phosphorus are proposed.

Based on this review, EQCs, with average and maximum limits, are proposed for eight MMER constituents plus total phosphorus (Table 3-2).

Table 3-2: Proposed Effluent Quality Criteria Limits for the Project

Constituent	Screening Questions			Propose an EQC?	EQC Limit (mg/L)	
	Is there an MMER[a] Limit?	Is the EOP > WQO?	Is the edge of mixing zone > WQO?		Average Monthly	Maximum Grab
Conventional Constituent						
Total Dissolved Solids	-	no	no	no	-	-
Total Suspended Solids	yes	yes	no	yes	15	30
pH	yes	no		yes	6 - 9.5	6 - 9.5
Major Ions						
Chloride	-	no	no	no	-	-
Fluoride	-	no	no	no	-	-
Sodium	-	no	no	no	-	-
Sulphate	-	no	no	no	-	-
Nutrients						
Total Ammonia as Nitrogen	-	yes	no	no	-	-
Nitrate	-	no	no	no	-	-
Phosphorus (total)	-	yes	no	yes	2	4

Table 3-2: Proposed Effluent Quality Criteria Limits for the Project (continued)

Constituent	Screening Questions			Propose an EQC?	EQC Limit (mg/L)	
	Is there an MMER[a] Limit?	Is the EOP > WQO?	Is the edge of mixing zone > WQO?		Average Monthly	Maximum Grab
Cyanides						
Total cyanide	yes	No	no	yes	1	2
Free cyanide	-			no	-	-
Metals						
Aluminum	-	yes	no	no	-	-
Antimony	-	yes	no	no	-	-
Arsenic	yes	yes	no	yes	0.5	1
Barium	-	no	no	no	-	-
Boron	-	no	no	no	-	-
Cadmium	-	no	no	no	-	-
Chromium	-	no	no	no	-	-
Copper	yes	yes	no	yes	0.3	0.6
Iron	-	yes	no	no	-	-
Lead	yes	yes	no	yes	0.2	0.4
Manganese	-	yes	no	no	-	-
Mercury	-	no	no	no	-	-
Molybdenum	-	no	no	no	-	-
Nickel	yes	no	no	yes	0.5	1
Selenium	-	no	no	no	-	-
Silver	-	yes	no	no	-	-
Thallium	-	no	no	no	-	-
Uranium	-	no	no	no	-	-
Zinc	yes	no	no	yes	0.5	1

Note:

"-" no value; EOP = end of pipe; MMER = Metal Mine Effluent Regulations; WQO = water quality objective; EQC = effluent quality criteria.

[a] Government of Canada (2012).

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GOLDER ASSOCIATES LTD.

Lasha Young MSc.F., PMP
Associate, Project Manager

Valerie Bertrand M.A.Sc., P.Geo (ON,QC,NT-NU)
Associate, Geochemist

LY/VB/vw

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