AGNICO EAGLE

MELIADINE GOLD MINE

Adaptive Management Plan for Water Management

FEBRUARY 2021
VERSION 1

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DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
DRAFT	January 2021	All	All	Developed based on a workshop with KivIA, CIRNAC, and ECCC held on January 21, 2020. Draft version of Adaptive Management Plan	Agnico Eagle Mines Limited
V1	February 2021			Updated based on a follow-up workshop with KivIA, CIRNAC, and ECCC held on February 2, 2021. Adaptive Management Plan to complete Commitment 15 with the Nunavut Impact Review Board and Commitment 3 with the Nunavut Water Board Submitted as part of the Saline Effluent Disposal to the Marine Environment Proposal to the NIRB (with copy to the NWB for the public registry)	Agnico Eagle Mines Limited

ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CP	Collection Pond
ECCC	Environment and Climate Change Canada
FEIS	Final Environmental Impact Statement
GWMP	Groundwater Management Plan
KivIA	Kivalliq Inuit Association
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
Mine	Meliadine Gold Mine
SSWQO	Site Specific Water Quality Objectives
TDS	Total Dissolved Solids

UNITS

m^3	cubic metre(s)
m^3/day	cubic metre(s) per day

SECTION 1 • INTRODUCTION

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

Agnico Eagle applied for amendments to the Water Licence and to the Project Certificate to incorporate changes required for mine operation. This document has been prepared to complete Commitment 3 for the Type A Water Licence Amendment and Commitment 15 for the Project Certificate amendment:

- Project Certificate Commitment 15
    - A call will be held with interested parties to review the framework of the Adaptive Management Plan. (KivIA, ECCC, CIRNA). The Adaptive Management Plan will include a decision tree specifying the conditions under which surface water will be diverted into the saline effluent waterlines for marine disposal and the volumes that will be diverted under those conditions. The decision tree will be designed such that discharges to Meliadine Lake are minimized.
    - Agnico Eagle will provide an update on the framework of the Adaptive Management Plan
- Water Licence Amendment Commitment 3:
    - Agnico Eagle to provide an Adaptive Management Plan which includes: the site-specific water quality objectives for chloride; and a decision tree specifying the conditions under which surface water will be diverted into the saline effluent pipeline for marine disposal.

This document presents a framework for the Adaptive Management Plan (AMP) for the following activities:

- Discharge through the waterline (Section 2.1)
- Development of a site-specific water quality objective (Section 2.2)

This AMP will be effective after the waterline and this plan are approved.

The guiding principles that apply to this AMP include:

1. Water discharges to Meliadine Lake will be minimized;

2. Water will be discharged to Meliadine Lake only if there is insufficient residual capacity in the waterline system and stored surface contact water volumes are outside of normal operating levels set in place in consideration of D-CP1 design;
3. Agnico Eagle will proactively assess the feasibility of all potential adaptive management actions.
4. Design criteria of infrastructure will be respected at all times.
5. Operate treatment plants at stable rates to reduce risk of process upset.
6. Discharge rates throughout the year will be modulated based on the water balance.

The primary objective of the AMP is to document specific management actions and mitigation measures to be taken when specified thresholds are exceeded. Mitigation measures may include special studies, operational changes, revised or new water and waste management systems, new or expanded conveyance systems, structures and/or facilities, or implementing mitigation activities to prevent, stabilize or reverse a change in environmental conditions or to otherwise protect the receiving environment.

The Adaptive Management Plan will be reviewed if deemed required to account for the dynamics of mine construction, operations and policy changes, and to adjust the adaptive management strategy as needed.

SECTION 2 • ADAPTIVE MANAGEMENT PLAN

This section presents a summary of the adaptive management considerations for

- Discharge through the waterline (which considers and evaluates)
    - Discharging of Saline Water to the marine environment
    - Diversion of Surface Contact water to the waterline
    - Discharging of Surface Contact water to the freshwater environment
- Development of a site-specific water quality objective

2.1 Discharge through the Waterline

As described in the application (FEIS Addendum [Agnico Eagle 2020b]), the purpose for the Project Certificate addendum is for a change in conveyance of treated groundwater to Melvin Bay from trucks to a waterline (comprised of two parallel lines). This change in conveyance is required to meet operational requirements and the projected increase in groundwater inflow rates to the underground workings as mining progresses. The priority use of the waterline is for discharge of saline water to the marine environment; the adaptive management aspect is related to diversion of surface contact water from discharge in Meliadine Lake (Figure 2) to discharge in Melvin Bay (Figure 3).

Adaptive management actions will be implemented when site conditions divert from Normal Operating Conditions. For purposes of the waterline aspects of AMP, **Normal Operating Conditions** are defined in Table 1 and summarized as:

- Saline water capacity at site is less than 70% (open-water), 0% pre-freeze up, and <15% pre-freshet.
    - The pre-freeze up period starts no earlier than September 15.
- The dual waterline is operational and the capacity is 6,000 to 12,000 m^3/day of saline water and up to 8,000 m^3/day of surface contact water, for a total capacity of 20,000 m^3/day.
    - The regular operational window for the waterline is open-water conditions from approximately late June to mid-October (or until consistent sub-zero temperatures are observed).
- Surface contact water capacity at site is less than 81% (open-water), less than 14% pre-freeze up, and less than 22% pre-freshet.
- End-of-pipe concentrations (CP1) for total dissolved solids (TDS) are less than the maximum average concentration as defined in water licence 2AM-MEL1631.

When conditions divert from “Normal”, management activities will be implemented as described in Section 2.1.1 and Table 2. The management activities will be applied in the order listed in Table 2.

2.1.1 Decision Tree

This draft AMP includes a decision tree to outline a process to determine when surface contact water would be discharged to Meliadine Lake and under what conditions surface contact water would be diverted to the Waterline (once approved) for discharge to Melvin Bay (Tables 1 and 2).

Water quantity thresholds for saline water management, the waterline, and surface contact water for the Normal Operating Conditions have been defined (Table 1). Definitions have also been provided for when conditions are outside of Normal Conditions and which then trigger management activities (as described in Table 2).

The framework to define conditions and to adaptively manage water will be based upon the following:

1) Saline Water Management
2) Waterline Operation
3) Contact Water Management
4) Site Water Quality

1. Saline Water Management

The primary purpose of the waterline is to allow sustainable management of saline water on site. Therefore, status of the saline water balance must be considered in the Adaptive Management Level classifications. Within Table 1, status of saline water management on site is considered with respect to the occupied capacity of the saline ponds, as well as medium-term (2 year) projection from the Saline Water Balance model. These two considerations as defined in Table 1 are based on adaptive management thresholds as defined in the Groundwater Management Plan (Agnico Eagle 2021).

2. Waterline Operation

In addition to the status of surface contact water in CP1, the ability of the waterline to convey CP1 water to Melvin Bay is considered in the classification of Adaptive Management Levels. The ability of the waterline to convey CP1 water is defined within Table 1 by three levels associated with the degree to which the line is operating (two lines, one line, or zero lines). The operation of the waterline is in consideration of maintenance, repairs or season.

3. Collection Pond 1 (CP1) Operating Levels

CP1 operating level thresholds provided in Table 1 are occupied storage capacities in CP1 converted from water elevation thresholds that are defined within the Operation, Maintenance and Surveillance (OMS) Manual for D-CP1. These levels were developed by the design engineer (Tetra Tech 2020a) and are controlled by the Responsible Person (RP) and Engineer of Record (EoR) as part of the Agnico Eagle Corporate Governance Structure, and are subject to change at the discretion of the RP and EoR. The thresholds defined in the OMS, and thus included within Table 1, consider three operating periods: a)

the open-water season; b) prior to annual freeze-up; and, c) prior to the onset of the annual freshet event. These thresholds are set in in order to minimize risk of impacts and consequences to the D-CP1 dike structure and its future performance.

The Adaptive Management Level classification under the open-water period is determined by the occupied storage capacity at any time during the open-water period. The Adaptive Management Level classification under the pre-freshet period is determined by the occupied storage capacity at the point immediately prior to freshet. The freeze up level Adaptive Management Level classification differs from the open-water and prior to freshet classifications, in that it requires calculation using the water balance.

The ability of the operation to meet the freeze up target, as noted in section 2.1, is dependent on the balance of anticipated precipitation and available discharge rates in relation to the current stored volume at any given time over the open-water season. Therefore, the site water balance will be applied to produce a forecast trendline to determine the minimum freeze up level that can be achieved based on the current stored water, the anticipated precipitation, available discharge capacity, and any other relevant inputs/outputs to CP1. The freeze up Adaptive Management Level at any given time over the open-water season will be determined based on where the water balance forecasts the operation is able to draw CP1 down to by freeze up. Similarly, the water balance forecast trendline will be applied to ensure the guiding principle of stable treatment plant operation can be met throughout the year. For example, if actual volumes begin tracking below the water balance trendline then discharge rates from CP1 will be decreased to allow the trendline to be followed to ensure stable treatment plant operation over the season and into freeze up can be achieved.

4. Site Water Quality

The final discharge location for surface contact water will be determined by capacity of the waterline and quality of the water in CP1. If there is capacity in the waterline, all or a portion of water from CP1 may be directed to the waterline. If there is insufficient capacity in the waterline for all or a portion of water from CP1, all or a portion of CP1 water may be discharged to Meliadine Lake. The determination of discharge to Meliadine Lake will depend on the adaptive management level (i.e., normal, caution, at-risk) and if the water (as measured at MEL-14) meets the discharge criteria stipulated in water licence 2AM-MEL1631.

Table 1 Operation Conditions for Saline Water, Waterline, and Contact Water

Category	Condition (Adaptive Management Level) Description	Normal	Caution	At Risk
1. Saline Water	Saline Pond Occupied Capacity open-water	<70%	>70%	>80%
	Saline Pond Occupied Capacity pre-freeze	0%	+5%	+10%
	Saline Pond Occupied Capacity pre-freshet	<15%	+15% (from Normal)	+20% (from Normal)
2. Waterline	Waterline Operation[1]	Both lines operating	One line shutdown	Both lines shutdown[2]
3. Collection Pond 1 (CP1) Operating Level[3]	Occupied storage open-water	<81%	>81%	>94%
	Occupied storage pre-freeze[4]	<14%	>14%	>22%
	Occupied storage pre-freshet	<22%	>22%	>27%
4. CP1 Water Quality	End-of-pipe TDS Concentrations (MEL-14)	Below the MAC	Two consecutive weekly samples equal to or greater than MAC[5]	Three consecutive weekly samples equal to or greater than MAC[5] OR A single exceedance of the MGC (once validated)[5]

MAC = maximum average concentration as defined in Water Licence 2AM-MEL1631 (the average concentration of any four consecutively collected samples taken from the identical sampling location and taken during any given timeframe); MGC = maximum grab concentration

1. In consideration of maintenance, repairs, and season. The regular operational window for the waterline is open-water conditions from approximately late June to mid October (or until consistent sub-zero temperatures are observed).
2. Seasonal shut-down of both lines is regular operating procedure and would not be categorized as high-risk
3. From the OMS. Levels are controlled by the Responsible Person (RP) and the Engineer of Record (EoR).
4. Applicable throughout the open-water season and determined from water balance as the ability to reach freeze-up operating condition (i.e., percentage storage) by freeze up under available discharge capacity. For instance if the water balance suggests levels can be lowered to only the “Caution” condition by freeze up then the status would be “Caution” and discharge conditions would be shifted accordingly.
5. As per standard practice, a result that exceeds the MAC or MGC will be validated through a repeat analysis or a re-sample.

Table 2 Adaptive Management Response to Maintain Normal Operating Conditions

Adaptive Management Level	Management Activity / Response / Action (Listed in Order of Priority Action)	Water Management Scope			
		1) Saline Water	2) Waterline	3) Surface Contact Water	4) Surface Contact Water Quality
Normal	1. Regular monitoring, inspections, maintenance.	√	√	√	√
	2. Confirm if saline water quantity is within forecast.	√	-	-	-
	3. Confirm if contact water quantity is within forecast.	-	-	√	-
	4. Maintain saline and contact water discharge through waterline as required, unless waterline is not available.	√	√	√	-
	5. If waterline is unavailable, but water capacity in CP1 is within normal, consider recirculating back to CP1.	-	-	√	-
Caution	1. Increased monitoring (e.g., priority analysis to confirm TDS in CP1; increase frequency of sampling in CP1), inspections, maintenance as required.	√	√	√	√
	2. Evaluate saline water quantity forecast.	√	-	-	-
	3. Evaluate contact water quantity forecast.	-	-	√	-
	4. Prioritize saline water for discharge through the waterline.	√	√	√	-
	5. If outside normal waterline operational window, evaluate starting discharge of water to Melvin Bay earlier and below the ice.	√	√	√	-
	6. Evaluate temporary discharge of higher flow rate (of both saline and surface contact water) to Melvin Bay.	-	√	-	-
	7. Utilize remaining capacity of waterline (if available) to maximize discharge of surface contact water to waterline.	-	√	√	-
	8. After maximizing discharge of surface contact water to waterline (if available), evaluate CP1 water quality and operate discharge to Meliadine Lake within Water License criteria at rate required to reduce water levels in CP1 to normal.[1]	-	-	√	√
At Risk	1. Increased monitoring, inspections, maintenance as required	√	√	√	√
	2. Evaluate saline water quantity forecast	√	-	-	-
	3. Evaluate contact water quantity forecast	-	-	√	-
	4. Prioritize saline water for discharge through the waterline	√	√	-	-
	5. If outside normal waterline operational window, evaluate starting discharge of water to Melvin Bay earlier and below the ice.	√	√	√	-

Adaptive Management Level	Management Activity / Response / Action (Listed in Order of Priority Action)	Water Management Scope			
		1) Saline Water	2) Waterline	3) Surface Contact Water	4) Surface Contact Water Quality
	6. Evaluate temporary discharge of higher flow rate (of both saline and surface contact water) to Melvin Bay.	√	√	√	-
	7. Evaluate option to extend discharge window to Melvin Bay	-	√	-	-
	8. Utilize remaining capacity of waterline to maximize discharge of surface contact water to waterline	-	√	√	-
	9. After maximizing discharge of surface contact water to waterline (if available), evaluate CP1 water quality and operate discharge to Meliadine Lake within Water License criteria at rate required to reduce water levels in CP1 to normal.	-	√	√	√
	10. If CP1 water quality greater than TDS MAC (in three consecutive weekly end-of-pipe samples), stop discharge to Meliadine Lake.	-	-	-	√
	11. Evaluate possibility of temporary storage of surface contact water in open pits and/or saline ponds.	√	-	√	-
	12. If CP1 quantities are still at risk, evaluate requirement for emergency discharge to Meliadine Lake	-	-	√	√

√ = management activity applies to this aspect of water management; - = management activity does not apply to this aspect of water management

1. Discharge to Meliadine Lake under the "Caution" Level may be required. One example is if CP1 needs to be drawn down in preparation for freeze-up and winterization of the waterline has already begun or is completed.

2.1.2 Volume

Models have been developed to predict future annual quantities of saline water (Golder 2020a) and surface contact water (Golder 2020b; SNC 2020) and to be managed. Results of these models are used to support projections and planning of annual quantity of water that could be discharged through the waterline. The Waterline application assessed a range of discharge rates from 6,000 m^3/day and up to 20,000 m^3/day. While the primary purpose of the waterline is for discharge of saline groundwater, a commitment has been made by Agnico Eagle to divert surface contact water through the waterline as a means to reduce discharges to Meliadine Lake.

The annual quantity of surface contact water that could be diverted to the waterline and discharged to Melvin Bay will be based on:

- The quantity of saline water to be managed and discharged
- The capacity in the line
- Projections (i.e., saline and contact water balance forecast) and planning within a given year to progressively manage the site in anticipation of freshet and open-water precipitation events, and to prepare the saline and surface contact ponds for the freeze-up condition

The lower bound of surface contact water that can be diverted away from discharge to Meliadine Lake and towards Melvin Bay will be based on the annually updated water balance and water management plans. The lower bound limit is defined as:

- One waterline is operational for a total daily discharge up to 12,000 m^3/day total, and up to 50% of that water comprised of surface contact water for a daily total of 6,000 m^3/day of surface contact water.

An upper bound of surface contact water that can be diverted to Melvin Bay is not currently defined. However, the upper bound of surface contact water, and ultimately the end-of-pipe concentration of TDS will fall within the modelled scenarios of 2,200 mg/L to 39,600 mg/L TDS (Tetra Tech 2020c, 2021).

2.2 Site-Specific Water Quality Objective

Agnico Eagle believes that an SSWQO for chloride is not required at this time based on:

- monitoring data collected for treated discharge from CP1 and in Meliadine Lake associated with the 2020 emergency amendment (as reported in Appendix B of the WQ-MOP [Agnico Eagle 2020c])
- water quality forecasts for the treated discharge from CP1 over the life of the mine based on the bounds of the proposed MAC and MGC effluent quality criteria for TDS and updated modelling completed for Meliadine Lake by Tetra Tech (2020b)
- observed performance of the in-lake diffuser during the comprehensive monitoring associated with the emergency amendment (Agnico Eagle 2020a) in 2020 (Golder 2020c)

This is supported by the strong and consistent relationship between TDS and chloride in treated discharge, and because the broad range of toxicity testing completed as part of the site monitoring between 2017 and 2020 indicated no acute toxicity associated with the discharge.

The monitoring associated with the 2020 emergency amendment as per the WQ-MOP showed that the ionic composition of the TDS in the treated discharge remained consistent over the 2020 discharge period (Golder 2020c). Concentrations of calculated TDS in the treated discharge, ranged from 1,030 mg/L to 2,675 mg/L. The proportion of chloride in the TDS remained consistent during the discharge to Meliadine Lake, contributing 49% of the TDS by mass on average, making it the largest ionic constituent of TDS in the discharge and the dominant anion. The secondary components of TDS comprised sodium, calcium, and sulphate (i.e., average of 19%, 12%, and 11%, respectively). The remaining minor contributors of the TDS comprised magnesium, potassium, bicarbonate, silica, and nitrate.

During the discharge associated with the emergency amendment in 2020, calculated TDS at the edge of the mixing zone ranged from 30 to 115 mg/L (Golder 2020c). The relative proportion of chloride in the TDS at the edge of the mixing zone was considerably lower than that in the treated discharge because of dispersion of the discharge in the mixing zone and distance from the diffuser. This variance occurred due to the receiving waters possessing a much lower concentration of chloride (and relative proportion of chloride in the TDS) relative to the treated discharge. As a result, the median chloride proportion at the edge of the mixing zone decreased to appropriately one-third (the proportion further decreased in the mid-field and reference locations, to 27% and 24%, respectively). This chloride composition in the near-field was consistent with the median for data collected between July 2015 and September 2019 from MEL-01, which was estimated at 29% (see Table A-1 in WQ-MOP Rev2a; Appendix A of Golder (2020c).

Based on the verification of the effluent quality criteria and the SSWQO for TDS as per the WQ-MOP Rev4 (Golder 2020c), Agnico Eagle considers that a chloride SSWQO would be redundant with the TDS SSWQO; furthermore, as the monitored TDS concentrations in 2020 at the edge of mixing zone were well below both the TDS SSWQO and the generic CCME long-term guideline for chloride (120 mg/L; CCME 1999), negligible risk is expected due to chloride concentrations in the receiving environment over the life of the mine.

Although there is no imminent need for a chloride SSWQO, Agnico Eagle has agreed to a process to develop an SSWQO for chloride within the Adaptive Management Plan on the basis of monitoring data for the treated discharge and/or at the edge of the mixing zone reaching specific thresholds. This responds to specific concerns from the KivIA that potential for chloride toxicity exists associated with the MAC and MGC effluent quality criteria for TDS and a commitment by Agnico Eagle in response to KIA-WL-TC-1 in the 2020 Water Licence Amendment Technical Comment responses (Agnico Eagle 2020c). The process under the Adaptive Management Plan in which an SSWQO for chloride would be developed is described in Section 2.2.1.

2.2.1 Decision Tree

The decision tree for the consideration of the development of an SSWQO for chloride in Meliadine Lake includes thresholds associated with TDS and chloride monitoring data for the treated discharge and chloride concentrations at the edge of the mixing zone (Table 3).

The screening of chloride concentrations at edge of mixing zone will be compared initially to the generic long-term CCME guideline of 120 mg/L; this threshold for chloride is currently used as a benchmark within the AEMP for the Meliadine Mine. If this generic guideline of 120 mg/L is approached (i.e., measured concentrations at edge of mixing zone are greater than 75% of the guideline) or if the composition of chloride in the treated effluent reaches 60% (based on annual discharge average), then a chloride SSWQO would be developed. The SSWQO derivation will follow the CCME (2007) derivation procedures, which will entail screening of toxicity data for reliability and relevance, normalization of toxicity data to toxicity modifying factors in the receiving environment (e.g., water hardness), fitting of data using a species sensitivity distribution curve, and adoption of the HC5 as the SSWQO. The above approach is consistent with that applied at other Northern mine sites (e.g., Ekati mine, Gahcho Kué Mine, Giant Mine), is science-based, and is in alignment with regulatory systems for benchmark development.

Table 3 Adaptive Thresholds for Development of a Chloride SSWQO

Adaptive Management Level	Threshold	Management Activity / Response Action
Normal	• TDS of the treated discharge remains below the MAC of 3,500 mg/L as calculated TDS • Composition of chloride in the treated discharge remains equal to, or less than 50%, based on routine monitoring results • Chloride concentration at the edge of the mixing zone is below 75% of the generic long-term CCME guideline for chloride	1. Continue regular monitoring frequency of treated discharge (MEL 14) and at the edge of the mixing zone in Meliadine Lake (MEL 13-01, 13-07, and 13-10)
Caution	• Composition of chloride in the treated discharge is greater than 50%, but less than 60%, based on routine monitoring results • Chloride concentration at the edge of the mixing zone is below 75% of the generic long-term CCME guideline for chloride	1. Confirm ionic composition of TDS in treated discharge (MEL 14) 2. Identify other sources of site surface water that can be directed to CP1 to reduce chloride proportionality of the TDS 3. Increase frequency of monitoring of treated discharge 4. Maintain regular monitoring frequency at the edge of the mixing zone in Meliadine Lake (MEL 13-01, 13-07, and 13-10)
At Risk	• Composition of chloride in the treated effluent is 60%, based on annual average monitoring results for the discharge OR • Chloride concentration at the edge of the mixing zone greater than 75% of the generic long-term CCME guideline for chloride (based on annual discharge average)	1. Establish a chloride SSWQO

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APPENDIX A • FIGURES

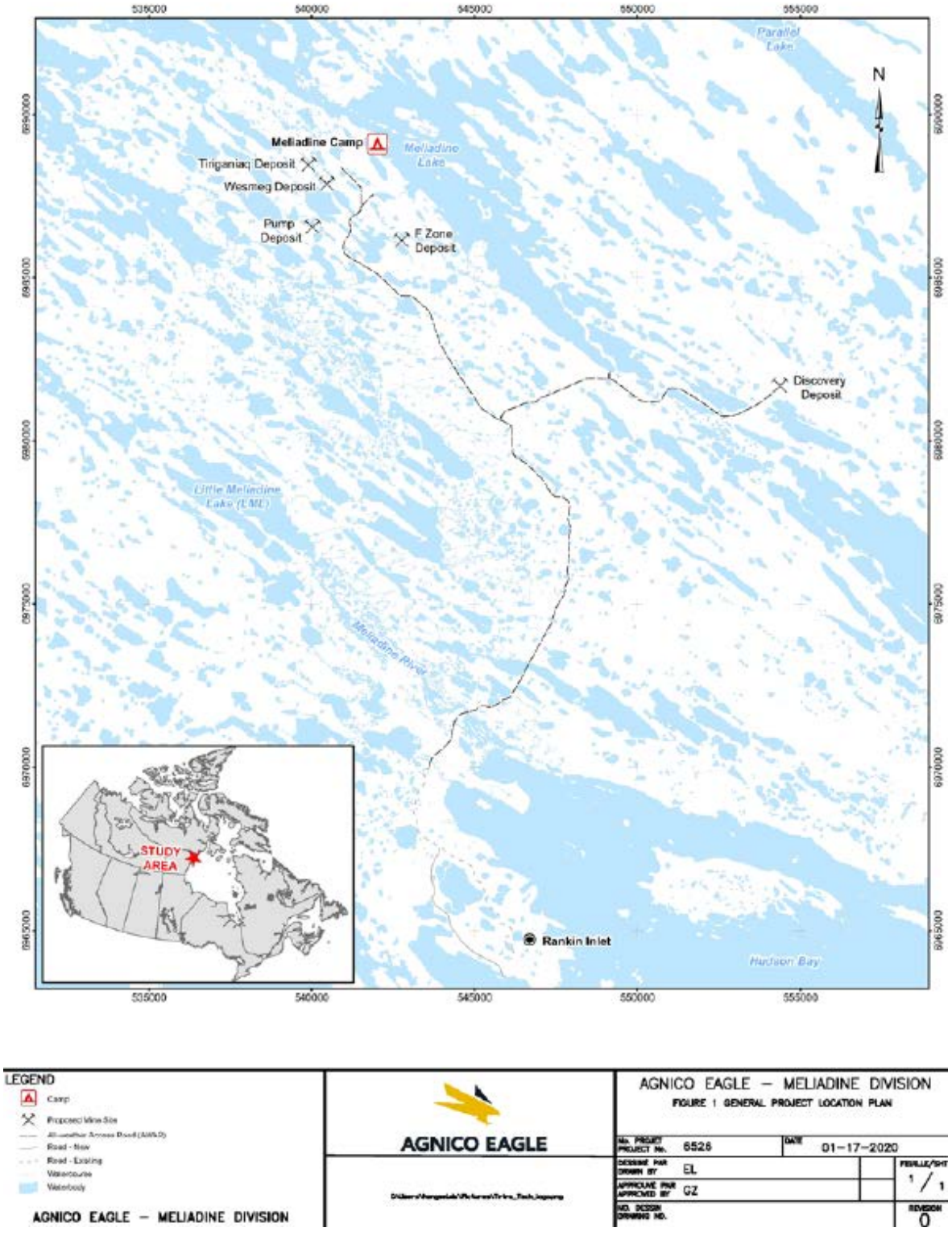

Figure 1 General Project Location

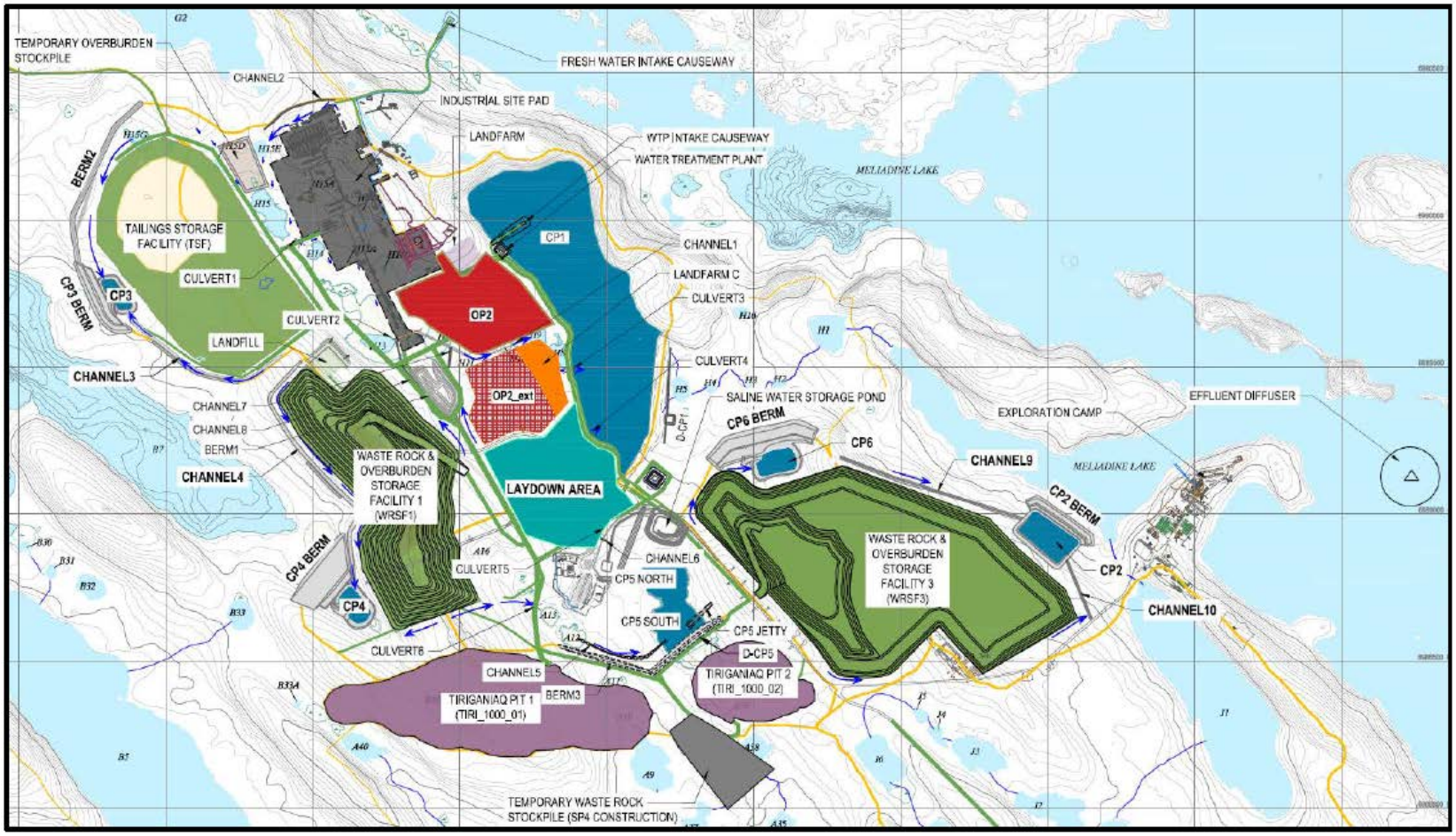

Figure 2 General Mine Site Location

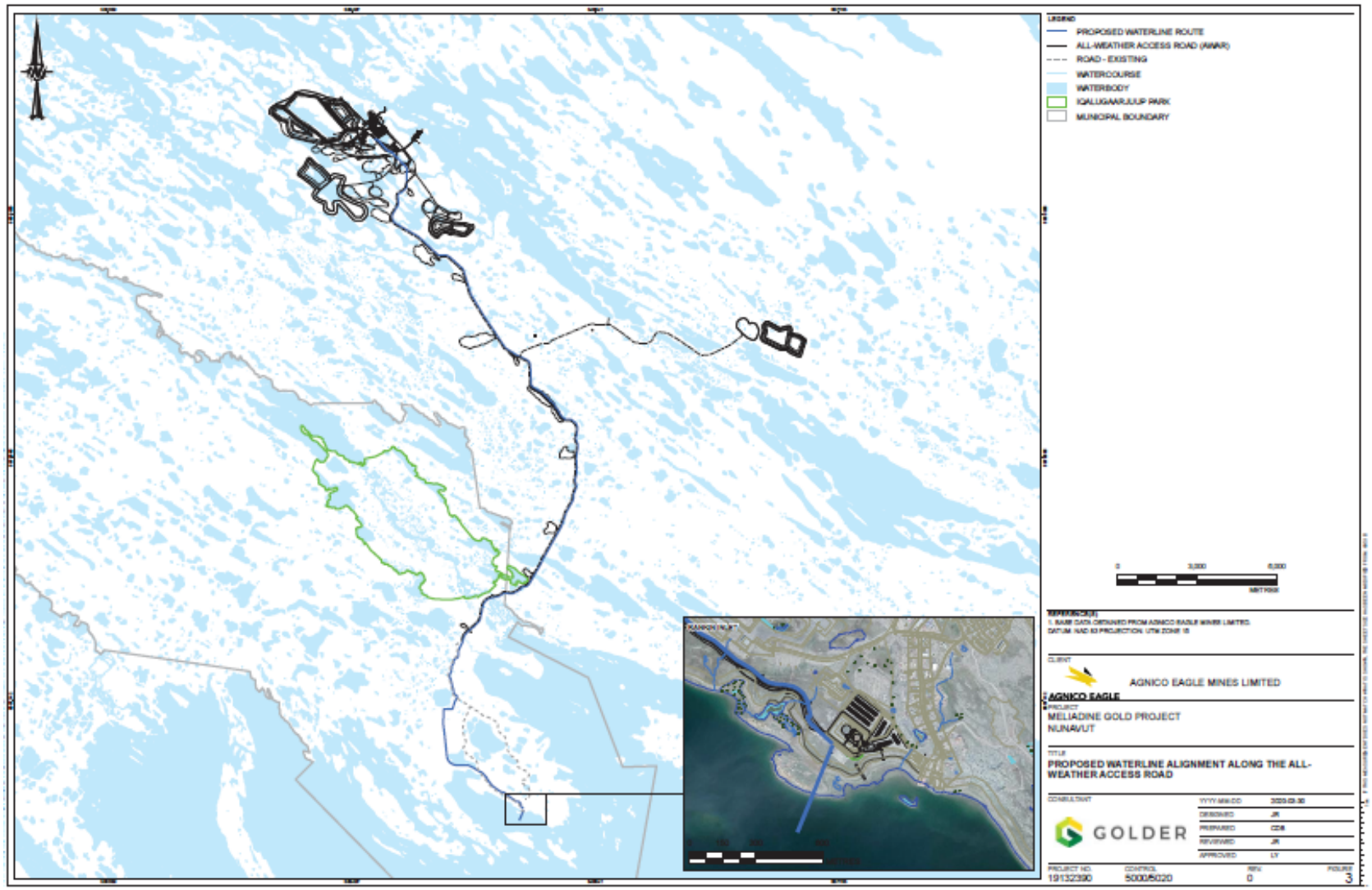

Figure 3 **Waterline Alignment Along the All-Weather Access Road**