



# **AGNICO EAGLE**

**MELIADINE GOLD PROJECT**

## **Freshet Management Plan**

**MARCH 2023**

**VERSION 8 NWB**

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## DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
1	March 2016	ALL	-	Comprehensive plan	
2	March 2017	ALL	-		
3	March 2018	ALL	-		
4	December 2018	ALL	-		
5	March 2019	ALL	All	Update to reflect transitional changes to Operations phase	
			2	Include DCP-1 and DCP-5 in areas of risk during Fresh	
			3	Update section 2.1.2/2.1.3 noting 5 evaporators and discuss SP3.	
			5-6	Update Section 2.8, discuss time of pond construction.	
			9-10	Update Section 3.1, discussion of SP3 and update on inspections.	
			13	Update Section 3.6., 3.7, 4 to reflect changes in freshet management.	
			Figure 1	Updated to include structure names	
			Figure 2	Updated to include SP3	
			Appendix A	Update to include emulsion pad to inspection list	
6	March 2020	ALL	All	Document formatting to match common style	
		2	2	Risk areas to include CP6 and TSF	
			Figure 1	Include TSF	
			4	P-Area volumes, source of inflows	
			6-7	Portal sump wording & grammar; include CP6	
			7	Itivia wording & grammar	
		3	10	Update to P-Area management for 2020	

			10	Addition of P-Area emergency pumping strategy
			13	Remove downstream D-CP5 risk mitigation; Add TSF
			13	Addition of temporary water management structure section
	4		15	Update Snow Management information
			Figure 5	Update Site snow management figure
			Figure 6	Update Itivia snow management figure
7	April 2022	ALL	All	General Plan Update
8	March 2023	ALL	ALL	Minor text edits
		2.4	6	Addition of Ore Storage Pad 2 monitoring at Freshet
		4	13-14 Appendix	Updates of figures 4 and 5. Removed Appendices

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## ACRONYMS

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Agnico Eagle	Agnico Eagle Mines Limited
AWAR	All Weather Access Road
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CP	Collection Pond
Freshet	Freshet Action Plan
Itivia	Itivia laydown and fuel handling facility
Licence	Type A Amended Water Licence 2AM-MEL1631
the Mine or Site	Meliadine Mine
NWB	Nunavut Water Board
OP	Ore Storage Pad
P3	P-Area
SP	Saline Pond
Sump LV50	Portal 1 and 2 Sump 1
TSF	Tailings Storage Facility
TSS	Total Suspended Solids
WMP	Water Management Plan
WRSF	Waste Rock Storage Facility

## UNITS

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m <sup>3</sup>	Cubic metre
m	metre
mbg	meters below grade



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## SECTION 1 • INTRODUCTION

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

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

The following guiding principles are applicable to the Plan:

- To ensure that mine surface contact water from runoff or seepage is managed to prevent adverse environmental impacts;
- To ensure the health and safety of Agnico Eagle employees and contractors; and
- To ensure the Site is in compliance with the Nunavut Water Board (NWB) Type A Amended Water Licence 2AM-MEL1631 (Licence).

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

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## SECTION 2 • AREAS OF RISK DURING FRESHET

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

- Pond P3 (remaining component of the P-Area)
- Portal 1 Sump 1 (Sump LV50)
- Portal 2 Sump 1 (Sump LV50)
- Landfarm A and Landfarm B
- Landfill
- All Weather Access Road (AWAR)
- Infrastructure Areas; including the Exploration Camp area, Portal 1 & 2 and the Industrial Pad Areas
- Collection Pond 1 (CP1), Collection Pond 2 (CP2), Collection Pond 3 (CP3), Collection Pond 4 (CP4), Collection Pond 5 (CP5) and Collection Pond 6 (CP6)
- D-CP1 and D-CP5
- Meliadine Esker Quarry
- Bypass Road
- Itivia laydown and fuel handling facility (Itivia)
- Tailings Storage Facility

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

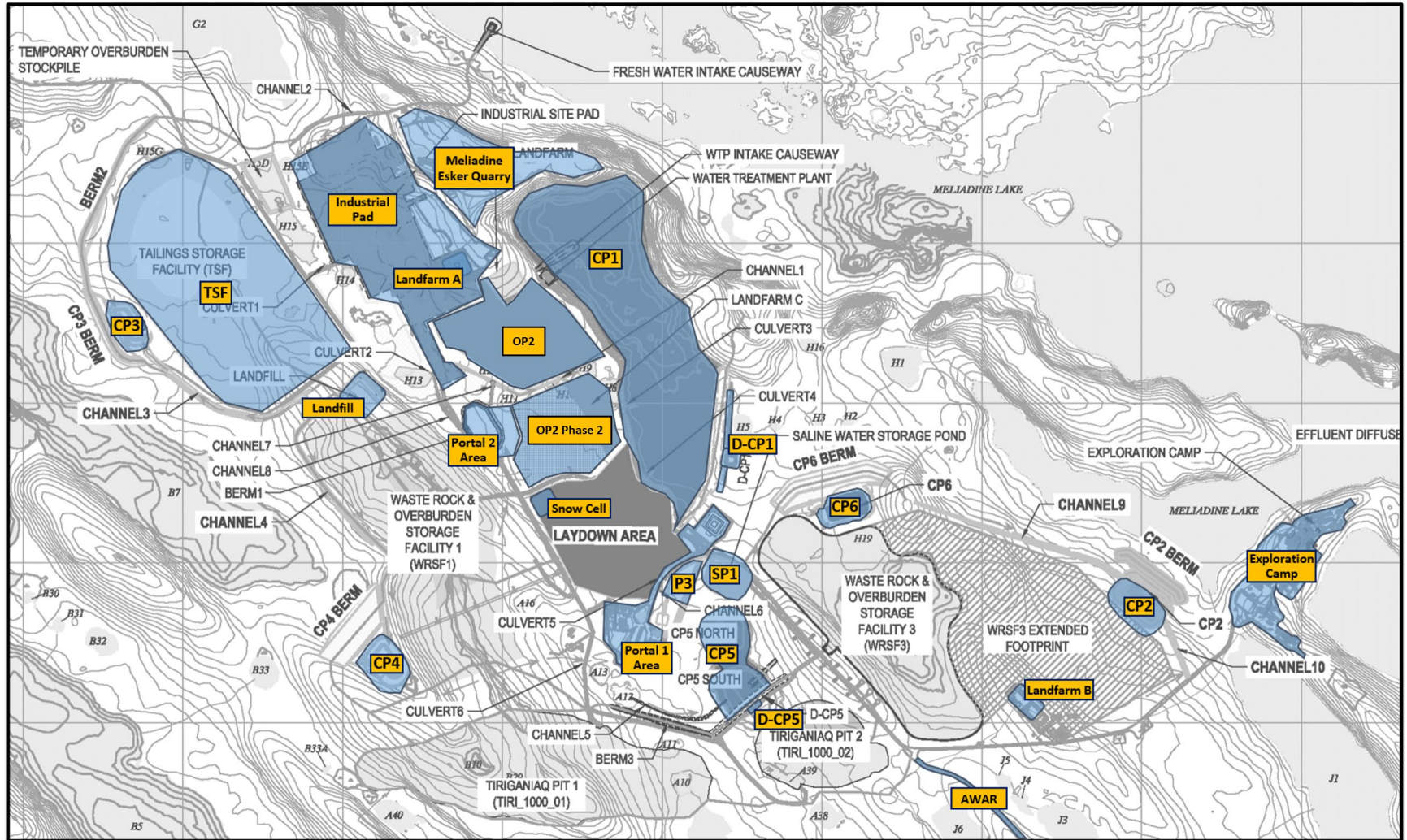


Figure 1: Site plan view with identified areas of risk at Site during freshet.

## 2.1 P-Area

The P-Area formerly consisted of three storage ponds as part of the saline contact water management system from 2016-2018. P3 is the remaining cell with a limited capacity of 2,912 m<sup>3</sup>. More information on the decommissioning of the P-Area can be found in the most recent version of the Water Management Plan (WMP).

Surface contact water collected in P3 is monitored and managed as per the WMP to ensure the water level remains below the maximum design water elevation (66.22 m) and the protection of the Saline Pond 3 (SP3) liner. Information on SP3 can be found in the WMP.

## 2.2 Portal 1 Sump 1 (LV50 SUMP)

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

## 2.3 Portal 2 Sump 1 (LV50 SUMP)

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

## 2.4 Ore Pad 2

Ore Storage Pad 2 (OP2) and OP2 Stage 2 are located on either side of Channel 1 and are designed ore storage facilities. Freshet monitoring of OP2 and OP2 Stage 2 will include occurrences of seepage, and any observed seepages will be monitored for water quality.

## 2.5 Landfarm

The Type A Licence Landfarm is located adjacent and north of the OP2 and is designed to receive soils, rock, snow, and ice contaminated with petroleum hydrocarbons, as per the Landfarm Management Plan. This includes light hydrocarbons such as diesel and gasoline. It was assumed that an annual volume of 500 m<sup>3</sup> of contaminated ice and snow would require management and the Landfarm has been designed to account for this volume. Additional details for Landfarm water management are described in the Landfarm Management Plan.

## 2.6 Infrastructure Areas

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

## 2.7 CP1, CP2, CP3, CP4, CP5, and CP6

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

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

CP6 and CP2 are designed to collect runoff from Waste Rock Storage Facility 3 (WRSF3) where the water will then be pumped to CP1 for containment prior to treatment at the EWTP-WTC and discharge to the receiving environment (Meliadine Lake). CP2 and CP6 design implements an engineered thermal protection berm. Maximum operating level within the collection ponds is such that thermal berms will not be required to retain water (further details on these Pond as-built characteristics can be found in the Water Management Plan).

## 2.8 Tailings Storage Facility

The Tailings Storage Facility (TSF) is a dry stack tailings storage facility. The TSF dry stack is located west of the Industrial Pad as shown in Figure 1. The facility stores compacted tailings that are transported from the process plant by haul truck. The tailings are spread and compacted in the facility. The tailings are deposited within a rockfill berm that is continuously heightened to progressively cover the placed tailings. Culvert 1 is in place to allow passage of water through the TSF haul road and towards CP1 catchment.

## 2.9 All Weather Access Road (AWAR)

The All-Weather Access Road (AWAR) was built in 2013 to connect the Site to the hamlet of Rankin Inlet. The road is approximately 23.8 km long with twenty-two water crossings; three bridge crossings and nineteen culverts installed (Figure 2).

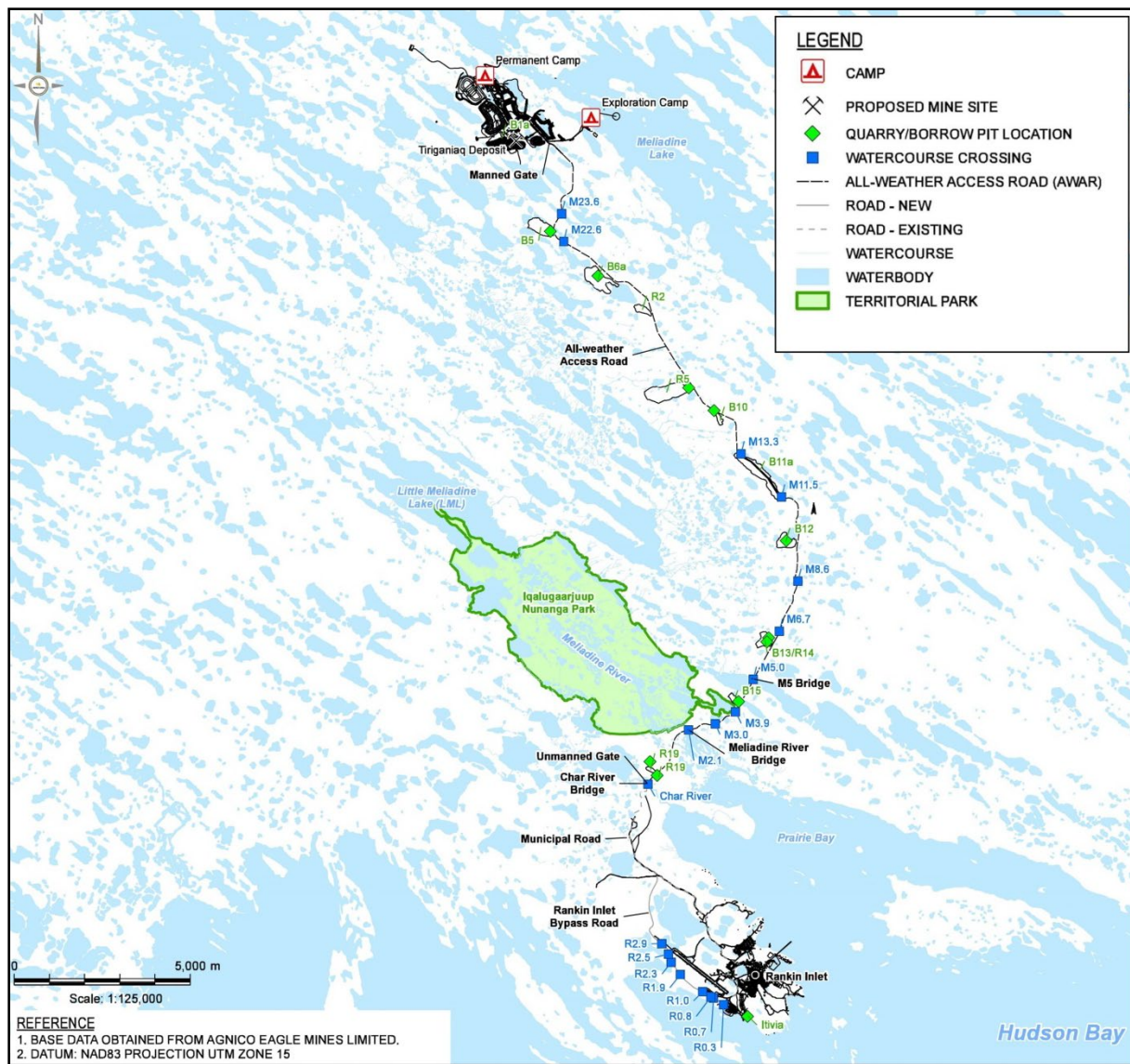
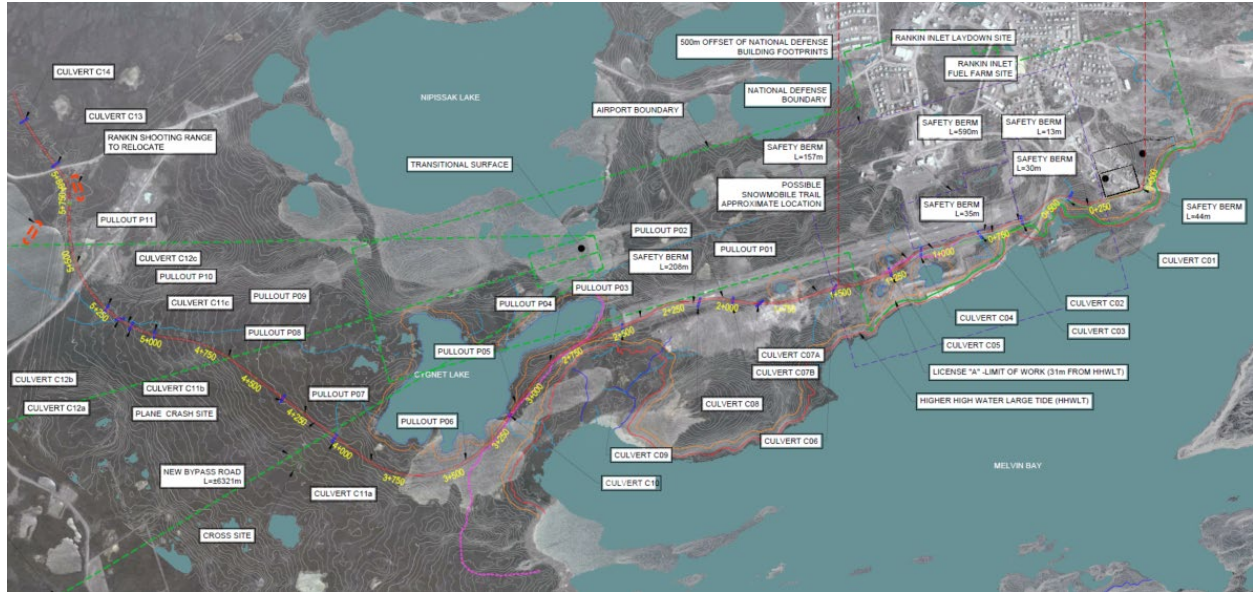


Figure 2: AWAR Map Showing Water Crossing Location Section

### 2.10 Bypass road

The Bypass Road is a 5.9 km access road that provides a means to divert site-related traffic around the community of Rankin Inlet. The Bypass Road spans from the northwest margin of Itivia to km 2.9 on the AWAR (Figure 3) and has 19 culverts installed at 13 locations along the road.



**Figure 3: Bypass Road and Culvert Location**

## 2.11 Itivia

Itivia is located in Rankin Inlet and is accessed by the Site from the AWAR and Bypass Road. In combination with the Bypass Road, Itivia is intended to support the Site as a staging point for incoming and outgoing fuel and material handling for barge shipments. Itivia is also the location of the final discharge point for saline effluent generated by the mine. The location of Itivia is shown on Figure 3 and the plan view of the Itivia Site is presented as Figure 5. A culvert is installed to divert upstream runoff around the Itivia Site and to allow passage of runoff from the Itivia laydown area (Figure 5).

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## SECTION 3 • FRESHET RISK MANAGEMENT

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Managing the risks prior to Freshet is a primary objective at Site. Planning and preparing before Freshet alleviates some of the risk from excess water that may suddenly occur and helps to ensure compliance with applicable regulations.

This is managed by removing water (pumping) at collection pond areas prior to winter freeze (fall) to allow sufficient storage capacity from precipitation, snow and ice melt during freshet. For road water crossings, culverts, ditches, and select collection ponds, snow or ice removal after winter freeze and before Freshet (winter and spring) ensure these infrastructure function properly throughout freshet.

Risk management practices for the Site areas during Freshet are described below. Section 4 describes snow management at Site.

### 3.1 P-Area Risk Management

The following management practices are maintained at the P-Area (P3) during Freshet:

- P3 water levels are monitored daily during freshet. Runoff water collected in P3 will also be monitored for salinity and managed as described in the Water Management Plan.
- Agnico Eagle will conduct weekly freshet structural inspections of berm DP3 and note any observed seepage. Inspections will also include monitoring the base of SP3 for settling, slumping and cracking.
- Weekly water sampling during Freshet.

### 3.2 Portal 1 Sump 1 Risk Management

Overflow from the Portal 1 LV50 sump will flow down ramp where it will be managed by the underground mine water management system. If the water level against D-CP5 reaches the maximum operating level, any water in the Portal 1 LV50 sump requiring pumping will also be directed down ramp.

### 3.3 Portal 2 Sump 1 Risk Management

Overflow from the Portal 2 LV50 sump will flow down ramp where it will be managed by the underground mine water management system. In the unlikely situation where flooding conditions would be observed downstream of Culvert 1, water in the Portal 2 LV50 sump requiring pumping will also be directed down ramp.



### 3.4 Landfarm Risk Management

An oil-water separator is installed at the Landfarm A. The oil-water separator is used to treat both direct precipitation to the landfarm footprint and melt from snow containing hydrocarbons (i.e. snow on which spills occur) that is stored in the landfarm and contaminated snow cell over winter. Treated water is analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), lead, and oil and grease prior to discharge to CP1 or used on the windrows to increase moisture content, as required. Hydrocarbons removed from water are stored and managed as hazmat.

A contaminated snow cell used to store snow containing hydrocarbons (i.e., snow on which spills occur) is located in the northwest corner of the laydown area (Figure 1). Upon snowmelt, water within the contaminated snow cell is transferred to the Landfarm for treatment at the oil-water separator.

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

### 3.5 AWAR, Bypass Road and Site access roads Risk Management

The following management practices are maintained to ensure the integrity of the AWAR, Bypass Road and site access roads before and during Freshet:

- Large culverts will be heated/steamed as necessary to allow the free flow of Freshet water.
- Prior to Freshet, water crossings and culverts will have snow removed from ice surface on the upstream and downstream sides of the crossing to allow free flow of water as necessary.
- Visual inspections of AWAR and Bypass Road will be undertaken as to the structural integrity of the abutments and road integrity.
- Weekly (minimum) written inspections throughout Freshet and daily during excessive rainfall response will be completed. The following aspects are monitored during visual inspections: total suspended solids (TSS) transport and signs of erosion, culvert/crossing function, flow intensity, and integrity of roads.

If erosion or ground surface scouring are observed, the E&I Department will be notified for repairs. TSS barriers, silt fences, straw logs or other sediment control methods will be implemented as required. Sediment and erosion monitoring and mitigation will be conducted in accordance with the most recent version of the Sediment and Erosion Management Plan.

### 3.6 Infrastructure Areas

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

### 3.6.1 Camp Pads and Surroundings

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

- Clearing off ice and debris from culverts prior to and during Freshet;
- Visual inspections to ensure flow through culverts and along channels is not impeded;
- Visual inspections for excessive water pooling. If pooled water is observed to flow into a water body, a water sample will be collected and monitored for TSS. Follow-up samples will be collected on a weekly basis thereafter;
- Visual inspections for snowmelt runoff. If runoff is observed to flow into a water body, a water sample will be collected and monitored for TSS in accordance with the Sediment and Erosion Management Plan. Follow-up samples will be collected on a weekly basis thereafter; and
- TSS transport will also be monitored at the culvert beside the garage at Exploration Camp that flows towards Meliadine Lake. This area will be monitored for TSS, and preventative measures (install straw wattles and/or booms) will be installed to prevent deleterious substances from entering Meliadine Lake. Sediment and erosion monitoring and mitigation will be conducted in accordance with the most recent version of the Sediment and Erosion Management Plan.

### 3.6.2 Industrial Pad and Access Road

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

- This area will be monitored for turbidity and preventative measures (install straw wattles and/or booms) will be implemented to limit TSS in runoff to CP1.

### 3.6 CP1, CP2, CP3, CP4, CP5 and CP6

Risk management practices for CP1, CP2, CP3, CP4, CP5 and CP6 include discharging/pumping the water prior to winter freeze to be treated and/or discharged as per the Licence and the Water Management Plan. Inspections of CP1, CP2, CP3, CP4, CP5, CP6, and associated water management structures or thermal protection berms, will be conducted following Part E Item 16 of the Licence and as per the Water Management Plan.

### 3.7 Itivia

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

- The culvert installed between the Itivia laydown and the existing laydown areas (Figure 5) will be cleared of snow and ice prior to Freshet and the upstream and downstream monitored for TSS transport in accordance with the most recent version

- of the Sediment and Erosion Management Plan. Preventative measures (installation of straw wattles and/or booms) will be implemented as needed;
- Rip rap was installed around the culvert to control erosion and a decantation sump will be maintained downstream to collect suspended sediment;
  - Two rock check dams were installed in 2019 and two additional rock check dams were installed in the fall of 2021 upstream of the culvert to mitigate TSS transport through the Itivia site (Figure 5; Tetra Tech 2019);
  - Monitoring at other locations of runoff during Freshet in accordance with the most recent version of the Sediment and Erosion Management Plan.

### **3.8 Tailings Storage Facility**

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

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

### **3.9 Temporary Water Management Structures**

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

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

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## SECTION 4 • SNOW MANAGEMENT

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Proper snow management during the winter is a key component of the freshet action plan since it contributes to risk mitigation from excess water during Freshet and prevents possible environmental impacts. An internal Snow Management Procedure was developed to efficiently manage snow at the Site.

Snow that is removed from the Main Camp, Industrial Pad, Ore Pad, 6 Million Liter Fuel Farm, Portal 2 Pad, and Crusher Pad will be transported to a snow dump located at the north margin of CP1. Snow removed from the Tailing Storage Facility (TSF) will be transported to either the northeast side of the TSF or to the northwest side, just north of CP3. Snow removed from the Paste Plant, Batch Plant, and surrounding laydowns will be transported immediately north of the Batch Plant and maintained as a level snow pad. Snow removed from the 3 Million Liter Fuel Farm, Portal 1 Pad, Vent Raise, SWTP/SETP Pad, and associated laydowns will be transported north of the warehouse laydown pad, west of the main access road to the industrial pad (Lake H8 snow pad) and maintained as a level snow pad. Snow from Tiriganiaq Open Pit 1 will be transported to CP4 watershed and maintained as a snow pad.

Snow removed from roadways must be blown or maintained as a snow pad next to the road. Snow removal outside of the designated zones is maintained as a clean, level snow pad. Figure 4 illustrates the locations for snow collection during the winter and prior to Freshet. Figure 5 illustrates the snow management and storage areas for Itivia.

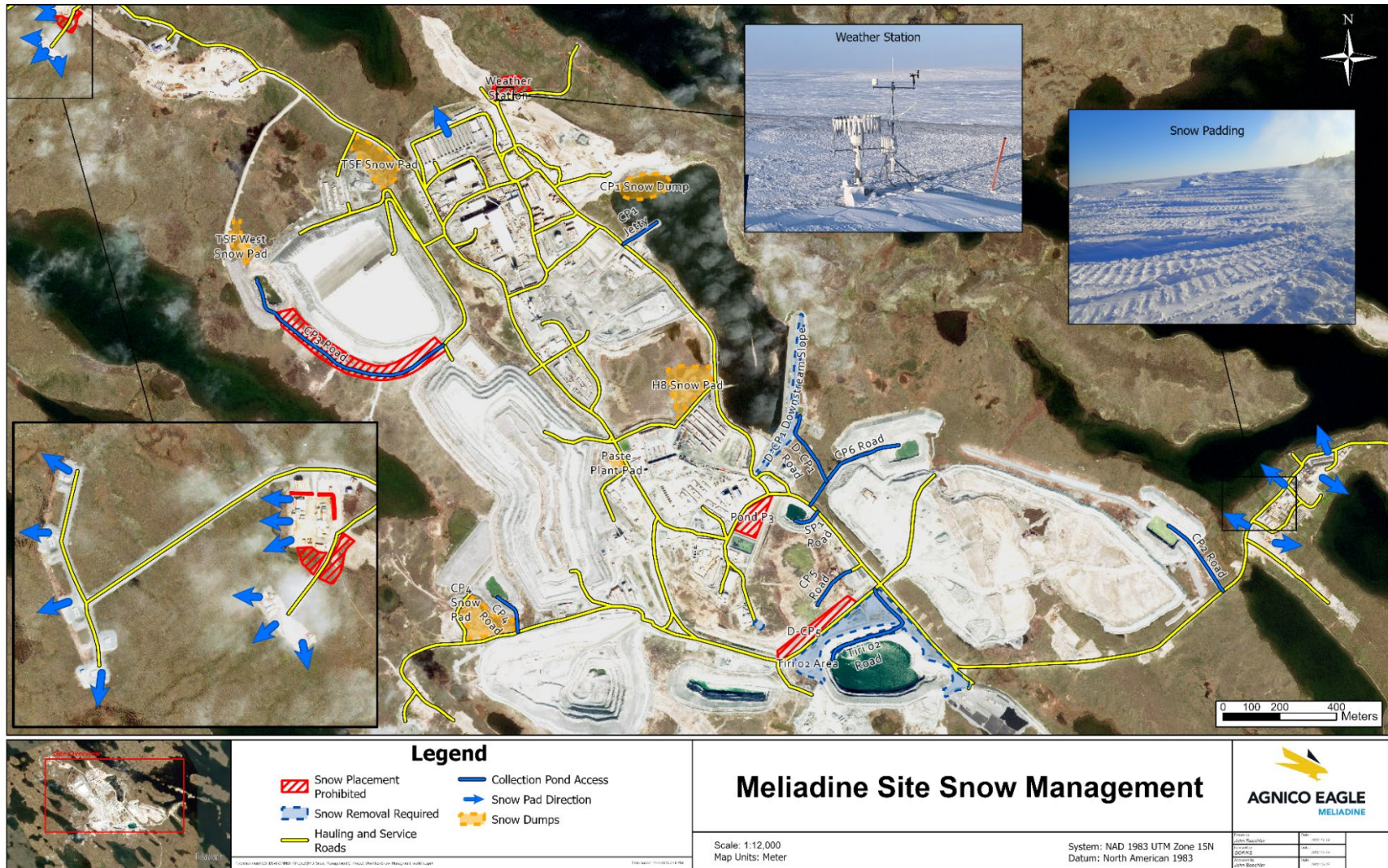


Figure 4: Snow Management Plan on Site.

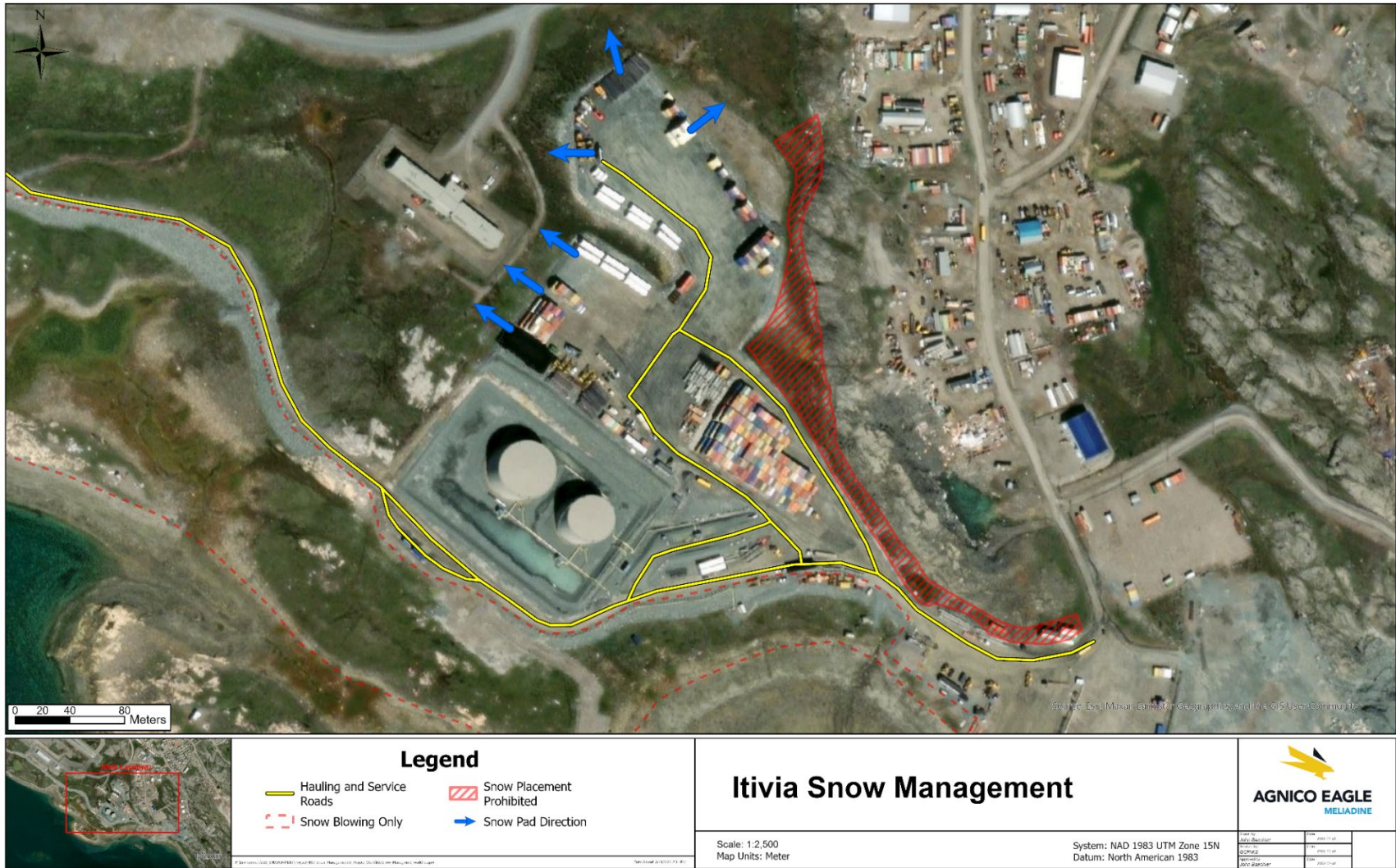


Figure 5: Itivia Snow Management Areas

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