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FINAL REPORT

SD 2-17 Preliminary Mine Closure and Reclamation Plan - Meliadine Gold Project, Nunavut

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REPORT

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Executive Summary

Agnico Eagle Mines Limited (AEM) is developing the Meliadine Gold Project (the Project), located approximately 25 kilometres north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula (the 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 involves building, operating, decommissioning, and the rehabilitation of a conventional gold mine. Five gold deposits have been identified on the Meliadine property, of which Tiriganiaq is the most significant. The other deposits are F Zone, Discovery, Pump, and Wesmeg. Underground mining is planned at present for Tiriganiaq. Mine site development will include a mill, camp, tank farm, tailings storage facility (TSF), waste rock storage facilities, water treatment plant, and sewage treatment plant to support the open pit and underground mining activities over a 13-year mine life. Other development facilities include a tank farm and laydown area in Rankin Inlet. Year-round access between Rankin Inlet and the mine site will be facilitated by an All-weather Access Road (AWAR).

This report presents a preliminary Mine Closure and Reclamation Plan (CRP) that has been prepared to a conceptual level appropriate for inclusion in the Project Environmental Impact Statement. Conceptual plans to close and reclaim the Project facilities are described, and a preliminary schedule to achieve the activities is presented. The plan does not include specifics of post-closure monitoring programs, as it is anticipated that these would be extensions of operations monitoring plans.

The open pits will be flooded once the operation in each pit is completed and the potential for underground operations in the pit has been dismissed. Flooding is planned to spread over a 10 year period. Resloping of the pit walls, as required for long term stability, would be carried out during operations and no re-sloping of slopes is planned for closure. Closure construction activities for the open pits would consist of placing a 2 to 3 m high berm along the edge of the pit perimeters in addition to flooding. Plug construction of the underground portal at the surface near the mill would occur immediately after the underground mining is completed and as the workings are flooded. The design of the plug will allow for flooding of the underground workings.

The TSF will be progressively reclaimed during operations such that an engineered cover will be placed on the tailings surface as the tailings reach final elevation. The closure activities upon completion of pit operations will be to drain the Reclaim Pond into the attenuation pond, fill in the Reclaim Pond area, cover the remaining exposed tailings and construct the closure spillway.

All water management facilities will be active during closure until water quality meets discharge criteria and dikes are breached. Ditches and ponds will be scarified to promote re-vegetation and natural drainage once the dikes have been breached.

The AWAR will be active during closure until water quality meets discharge criteria and dikes are breached. The road surface will be scarified to promote re-vegetation and natural drainage once the dikes have been breached and access to the mine site is no longer required.

Infrastructure will be dismantled and disposed of off-site at an approved disposal facility or sold.

Mine closure is integral to the mine design and this plan will be modified as a series of conceptual plans as the Project progresses. Planning for permanent closure is an active and iterative process, the intent of which is to develop a final plan using adaptive management. Adaptive management will enable the plan to evolve as new information becomes available through analyses, testing, monitoring, and progressive reclamation. As such, the CRP will be reviewed and updated on a regular basis as the Project proceeds into permitting, detailed design, construction, operations and closure. Likewise, the closure design and monitoring concepts will be advanced in greater detail through each of these phases as mine plans and designs are finalized, and site specific information and monitoring data become available.

Study Limitations

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Abbreviation and Acronym List

AANDC	Aboriginal Affairs and Northern Development Canada
AEM	Agnico Eagle Mines Limited
AEMP	Aquatic Effects Monitoring Plan
ARD	Acid Rock Drainage
AWAR	All-weather Access Road
CCME	Canadian Council for Ministers of the Environment
CRP	Mine Closure and Reclamation Plan
DFO	Fisheries and Oceans Canada
FEIS	Final Environmental Impact Statement
Golder	Golder Associates Ltd.
IPCC	Intergovernmental Panel on Climate Change
MEND	Mine Environment Neutral Drainage Program
MMER	Metal Mining Effluent Regulations
NIRB	Nunavut Impact Review Board
Non-PAG	Non-Potentially Acid-Generating
PAG	Potentially Acid-Generating
Project	Meliadine Gold Project
TEMMP	Terrestrial Environment Management and Monitoring Plan
TSF	Tailings Storage Facility
WRSF	Waste Rock Storage Facility

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TABLES

FIGURES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Agnico Eagle Mines Limited (AEM) to prepare a preliminary Mine Closure and Reclamation Plan (CRP) for the Meliadine Gold Project (the Project). This report presents the preliminary CRP.

The Project is located in the territory of Nunavut, centered at approximately 63°1'23.8"N, 92°13'6.42" W (UTM 6988500N, 540250E, NAD83, Zone 15), and is situated on the western shore of Hudson Bay (Figure 1.1). The Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake, approximately 25 kilometres (km) north of Rankin Inlet, on Inuit Owned Land in the Kivalliq Region of Nunavut, Canada. Inuit Owned Land is governed under the Nunavut Land Claims Agreement.

The Project involves building, operating, decommissioning, and the rehabilitation of a conventional gold mine. Development of some of the facilities, such as a tank farm and laydown area, will take place at Rankin Inlet, where materials will be received by air and sea transport. Year-round access between Rankin Inlet and the mine site will be facilitated by an All-weather Access Road (AWAR).

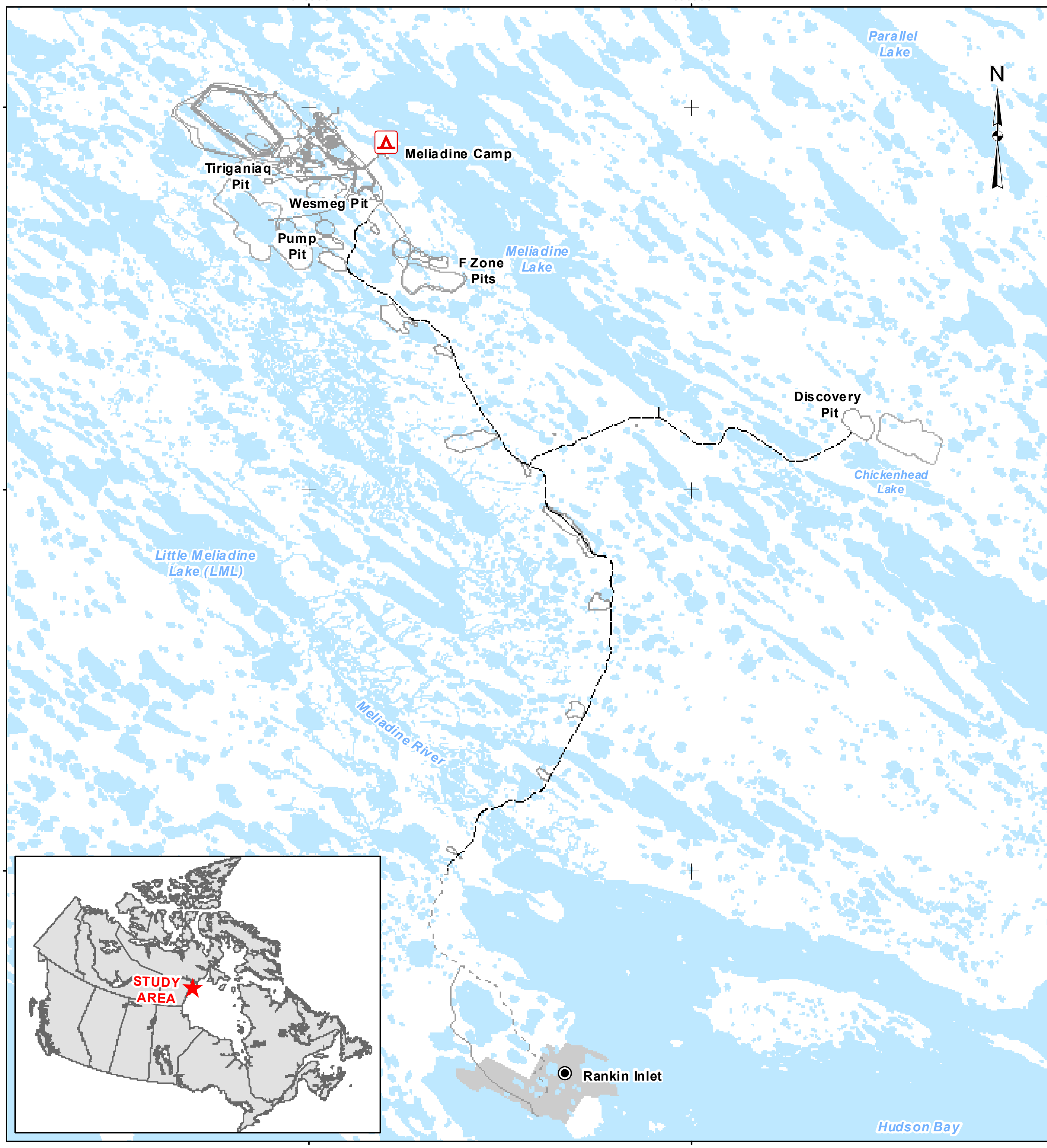
Mine site development will include a mill, camp, tank farm, tailings storage facility (TSF), waste rock storage facilities (WRSF), water treatment plant, and sewage treatment plant to support the open-pit and underground mining activities over a 13-year mine life.

Currently, 5 gold deposits have been identified on the Meliadine property, of which Tiriganiaq is the most significant. The other deposits are F Zone, Discovery, Pump, and Wesmeg. Underground mining is only planned for Tiriganiaq.

Mine closure is integral to the mine design and this plan is a “living” document that will be modified as a series of conceptual plans as the Project progresses. Planning for permanent closure is an active and iterative process, in which the intent is to develop a final plan using adaptive management. The process begins in the mine design phase and continues through to closure implementation. Adaptive management enables the plan to evolve as new information becomes available through analyses, testing, monitoring, and progressive reclamation.

This CRP summarizes the conceptual measures for reclamation, closure, and decommissioning of the following:

- open pits;
- underground facility;
- WRSF;
- TSF;
- water management facilities;
- quarries and granular borrow areas;
- AWAR;
- ancillary facilities, buildings and infrastructure related to the operation, maintenance and closure of the above mentioned facilities; and
- laydown area and tank farm at Rankin Inlet.



LEGEND

- Camp
- Project Infrastructure
- All-weather Access Road (AWAR)
- Road - New
- Road - Existing
- Watercourse
- Waterbody
- Municipal Boundary

3 0 3
KILOMETRES

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

LOCATION PLAN

Golder Associates

PROJECT		10-1373-0076	FILE No.	
DESIGN	AS	17 Dec. 2012	SCALE AS SHOWN	REV. A
GIS	DSC	20 Dec. 2012	FIGURE 1.1	
CHECK	GA	29 Dec. 2012		
REVIEW	DW	29 Dec. 2012		

N:\Bur-Graphics\Projects\2013\1428\13-1428-0007\GIS\Mapping\MXD\FEIS\Volume_2\SD_2-17_Closure_Rec_Plan\Figure_1+1_Location_Plan.mxd

A general layout plan of the proposed Project at end of operations is shown in Figures 1.2 to 1.4.

This preliminary CRP has been prepared to a conceptual level appropriate for inclusion in the Project Environmental Impact Statement. The CRP will be reviewed and updated on a regular basis as the Project proceeds into permitting, detailed design, construction, operations, and closure. Likewise, the closure design and monitoring concepts will be advanced in greater detail through each of these phases as mine plans and designs are finalized, and site specific information and monitoring data become available. Potential changes in technology and/or standards or legislation will be incorporated during the CRP revision process where relevant, as will information gathered during the ongoing public and stakeholder consultations for the Project. It is anticipated that the next revision to the CRP will be prepared and submitted as part of the Nunavut Water Board Type-A water license application process for the Project.

This report has been prepared in accordance with the **"Study Limitations of this report"** which are presented at the beginning of this report. The reader's attention is specifically drawn to this information for reference during the use of this report.

1.1 Concordance with Project Guidelines

The purpose of this document is to address Guidelines issued by the Nunavut Impact Review Board (NIRB) for the Project (NIRB 2012), and specifically those relating to the preparation of a CRP. The complete Guidelines for the Project, including Final Environmental Impact Statement (FEIS) section and page number referencing, are summarized in the main FEIS concordance table (FEIS Volume 1, Appendix 1.0-A).

1.2 Objectives

The general objectives of closure and reclamation for the Project are as follows:

- **Physical Stability**: To reclaim areas with respect to physical stability such that they do not erode, subside, or move from the intended location under natural extreme events or disruptive forces to which they may be subjected after closure and should not endanger public, wildlife, or environmental health and safety (AANDC 2007).
- **Chemical Stability**: To reclaim areas with respect to chemical stability such that any chemical constituents released from the mine components should not endanger public, wildlife, or environmental health and safety, should not result in the inability to achieve the water quality objectives in the receiving environment, and should not adversely affect soil or air quality into the long-term (AANDC 2007).
- **Future Use and Aesthetics**: The reclaimed site should be compatible with the surrounding lands once reclamation activities have been completed. Reclamation activities should consider natural recovery of areas affected by mining and the mining related activities at the Project site and re-establish productive use of the land and water in the vicinity of the mine site for future generations in a manner that is consistent with the pre-development use of the land and water (AANDC 2007).

LEGEND

Dike	Dewatered or Filled in Lake
Watercourse	Contact Water Pond
Existing Infrastructure	Watershed Boundary
Road	Lake
Open Pit	Waste Rock Storage Facility
Topographic Contour (1.0 m Interval above sea level)	Tailings Storage Facility

NOTE

Dewatering of lakes may require Total Suspended Solids (TSS) control.
Pumped water from waste rock storage facilities, pits and the tailing storage facility to sumps not shown for clarity.

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

TIRIGANIAQ AND F ZONE GENERAL LAYOUT PLAN AT END OF OPERATIONS

Golder Associates

PROJECT NO.		10-1373-0076	FILE No.
DESIGN	AS	17 Dec. 2012	SCALE AS SHOWN REV. A
GIS	DSC	20 Dec. 2012	
CHECK	GA	29 Dec. 2012	FIGURE 1.2
REVIEW	DW	29 Dec. 2012	

1000 0 1000

METRES

LEGEND

Road	Dewatered or Filled in Lake
Open Pit	Contact Water Pond
Watercourse	Watershed Boundary
Topographic Contour	Lake
Waste Rock Storage Facility	

NOTE

Pumped water may require Total Suspended Solids (TSS) control.
Pumped water from waste rock storage facility and pit to sumps not shown for clarity.
Water from D-S-01 will be used as dust control or trucked to site.
Contour data in certain areas are separated every 1 m and 7-8 m in others

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

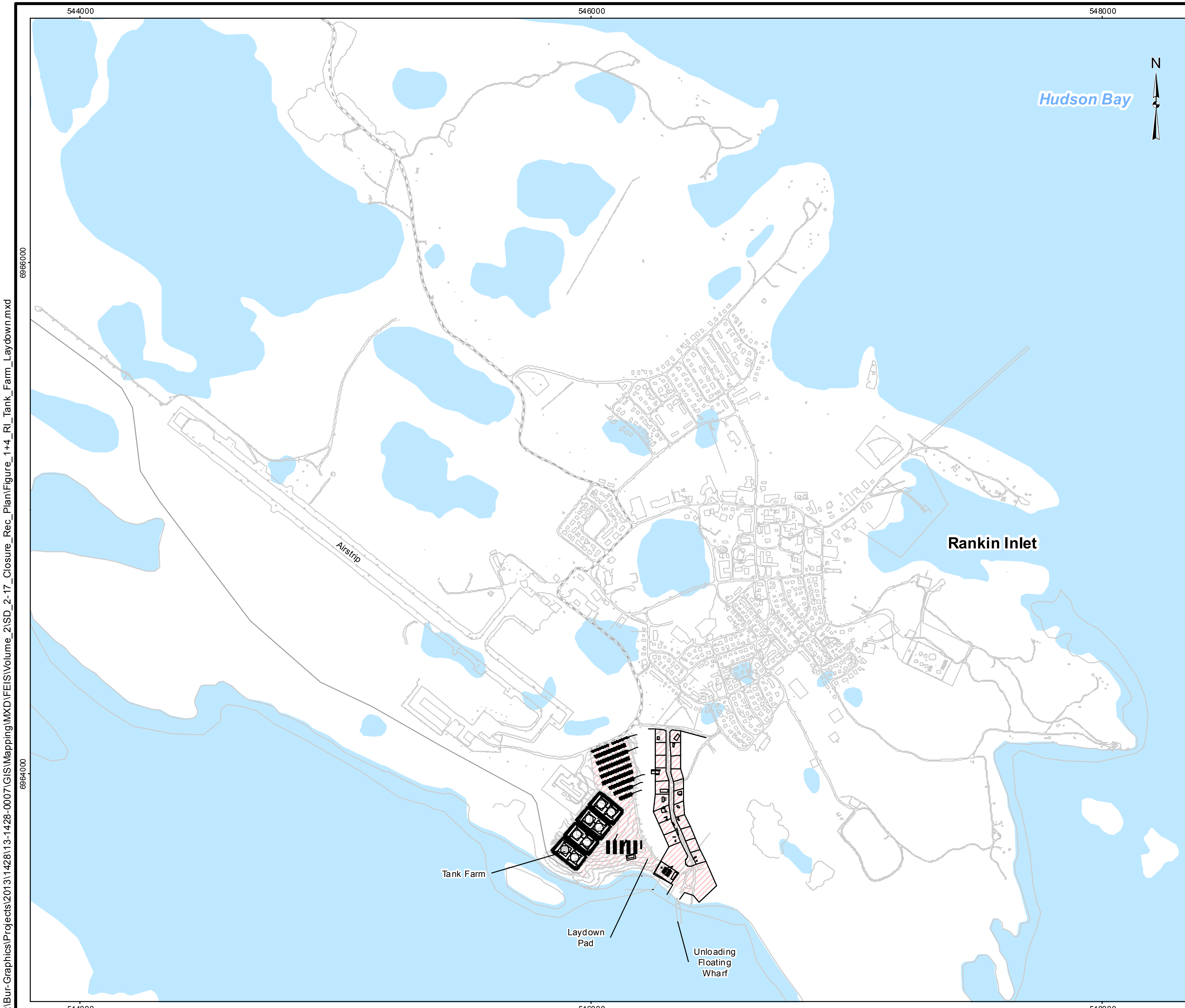
AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

DISCOVERY GENERAL LAYOUT PLAN AT END OF OPERATIONS

Golder Associates

PROJECT NO.		10-1373-0076	FILE No.
DESIGN	AS	17 Dec. 2012	SCALE AS SHOWN REV. A
GIS	DSC	20 Dec. 2012	
CHECK	GA	29 Dec. 2012	FIGURE 1.3
REVIEW	DW	29 Dec. 2012	



LEGEND

- Tank Farm and Laydown Pad
- Existing Town Structure
- Road - New
- Road - Existing
- Watercourse
- Laydown Pad
- Waterbody

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

AGNICO EAGLE

TITLE

RANKIN INLET TANK FARM AND LAYDOWN PAD

Golder Associates

PROJECT NO.	10-1373-0076		FILE No.	
DESIGN	AS	17 Dec. 2012	SCALE AS SHOWN	REV. A
GIS	DSC	20 Dec. 2012		
CHECK	GA	29 Dec. 2012	**FIGURE 1.4**	
REVIEW	DW	29 Dec. 2012		

According to the results of the environmental impact assessment for the Project (FEIS Volumes 5 to 10), environmental effects are anticipated to cease for most VECs and VSEC following closure; however, effects to wildlife, vegetation, water quality and fish habitat will not be eliminated. It is anticipated that there will be a lasting footprint at the mine that will not be habitat for some species (FEIS Volume 6); there will be residual copper concentrations in the Tiriganiaq Pit (FEIS Volume 10); and there will be permanent changes to watershed areas that may affect downstream habitat quality for fish and other aquatic organisms (FEIS Volume 7). These effects are predicted to be low in magnitude and should not have a significant residual impact. Meliadine Lake and all watercourses downstream are expected to be available for continued traditional use. Any changes in habitat quantity or quality are not expected to impact the populations of wildlife or fish VECs nor the opportunity for their continued traditional use following closure (FEIS Volumes 6 and 7).

The intent of reclamation is to produce a final landscape that reflects the surrounding land features and land forms. The mine will result in a permanent change to the landscape. Reclamation cannot totally remove the disturbance caused by the development and operation of the mine: certain features, such as the TSF, pit lakes and WRSF, will become permanent parts of the future landscape. Other features, such as site access roads, will be removed. Reclamation is intended to restore ecosystem integrity by minimizing the potential for disturbances to cause degradation of the surrounding water, air, and land after mining operations cease.

1.3 Guidelines and Regulatory Requirements

Regulations and guidelines can provide guidance for closure and reclamation objectives. This preliminary CRP was developed consulting the following guidelines and regulations:

- Mine Site Reclamation Policy for Nunavut. Indian and Northern Affairs Canada, 2002 (AANDC 2002);
- Mine Site Reclamation Guidelines for the Northwest Territories. Indian and Northern Affairs Canada, Yellowknife, NT. January 2007 Version (AANDC 2007);
- Environment Canada Code of Practice for Metal Mines. Environment Canada, 2009 (EC 2009);
- The Metal Mining Effluent Regulations (SOR/2002-2222), Fisheries and Oceans Canada (DFO), 2012 (MMER 2012); and
- Canadian Environmental Quality Guidelines. Canadian Council for Ministers of the Environment, 2012 (CCME 2012).

2.0 BACKGROUND INFORMATION

2.1 Climate

Climate characteristics for the Project presented herein were extracted from SD 7-1 2009 Aquatics Synthesis Baseline. The site is located in an arid arctic environment that experiences extreme winter conditions, with an annual average temperature of -10.4^{o}C. The monthly average temperature ranges from -30.9^{o}C in January to +10.5^{o}C in July, with above-freezing averages for only 4 months of the year (i.e., June to September). The site is underlain by thick and continuous permafrost, except under larger waterbodies where taliks can exist. Winds are moderate to strong and generally originate from the north-northwest and the north. Mean monthly wind speeds are typically between 19 kilometres per hour (km/hr) and 29 km/hr, with an average of 23 km/hr.

The annual average total precipitation at the mine site is 404.8 millimetres per year (mm/year) and falls almost equally as snow and rainfall. Average annual evaporation for small waterbodies in the Project area is estimated to be 323 mm between June and September. The average annual loss of snowpack to sublimation and snow redistribution is estimated to vary between 46% and 52% of the total precipitation for the winter period and occurs between October and May. Table 2.1 summarizes the estimated monthly climate characteristics at the mine site.

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 2009 Aquatics Synthesis Baseline.

[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 summarizes the extreme 24-hour rainfall events derived for the mine site based intensity-duration-frequency curves established from the regional Rankin Inlet rainfall observation.

Table 2.2: 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

a) Precipitation extreme obtained from SD 7-1 2009 Aquatics Synthesis Baseline.

b) No adjustments were made for undercatch since undercatch is generally not significant for extreme rainfall events on a daily time scale.

2.2 Climate Change

Long-term climate trends were assessed as part of the Project (FEIS Volume 5, Section 5.4), and included estimating changes in air temperature and precipitation from observed historical values for 3 typical time horizons: 2011 to 2040 (the 2020s), 2041 to 2070 (the 2050s) and 2071 to 2100 (the 2080s). The average projected climate trend deviations from the observed historical values are provided in Table 2.3. 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 2020s, 2050s and 2080s time horizons when compared to the observed historical values; and
- Precipitation shows a larger per cent increase compared to historical values, however the majority of projections are within the annual recorded precipitation values.

Conclusions from FEIS Volume 5 Section 5.4 also indicate that a warming climate can increase the thickness of the permafrost active layer. Overall, warming could cause thawing of ice-rich permafrost, potentially resulting in permafrost degradation including thaw lakes and subsidence of the land surface.

Table 2.3: Summary of Average Projected Climate Trend Deviations from Observed Historic Values

Station and Period			Air temperature (°C)	Precipitation (mm equiv.)
Baker Lake	2020s	Annual	+ 1.5 to 2.0	+ 20 to 40
		Spring	+ 2 to 2.5	+ 5 to 10
		Summer	+ 1 to 1.5	+ 10 to 15
		Fall	+ 2 to 2.5	+ 10 to 15
		Winter	+ 2 to 2.5	+ 5 to 10
	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

2.3 Topography and Lake Bathymetry

The dominant terrain in the Project area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand) and lakes. A series of low relief ridges composed of glacial deposits oriented northwest-southeast control the regional surface drainage patterns.

The Tiriganiaq, F Zone, Pump, and Wesmeg deposits are located on a large peninsula separating the east and west basins of Meliadine Lake. The Discovery deposit is located south and east of Meliadine Lake.

The surveyed lake surface elevations in the Project area range from about 51 metres above sea level (masl) at Meliadine Lake to about 74 masl for local small perched lakes. Kettle lakes, and other lakes formed by glacio-fluvial processes or glacial processes, are common throughout the Project area. Several of the lakes will be affected by development of the project components including the open pits, waste rock storage facilities and the TSF.

The TSF will be developed in Lake B7, which is about 2000 m long and a maximum of about 400 m wide. The mean depth for Lake B7 is about 2.5 m and the maximum depth is about 5.5 m (SD 7-1 2009 Aquatics Synthesis Baseline).

Late-winter ice thickness on freshwater lakes in the Project area ranges between 1.0 m and 2.3 m with an average thickness of 1.7 m. Therefore, lake ice freezes to the lake bottom at depths shallower than approximately 1.0 m to 2.3 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 (SD 7-1 2009 Aquatics Synthesis Baseline).

2.4 Permafrost

The Project is located in a zone of continuous permafrost within the Southern Arctic terrestrial ecozone, one of the coldest and driest regions of Canada. Continuous permafrost to depths of between 360 m and 495 m is expected based on historical and recent ground temperature data from thermistors installed near Tiriganiaq, F Zone, and Discovery deposits. The ground temperature data indicates that the active layer is 1.0 m to 3.0 m in areas of shallow soil and away from the influence of lakes. It is anticipated that the active layer adjacent to lakes or below a body of moving water such as a stream will be deeper (SD 6-1 Permafrost Baseline Report).

Taliks (areas of unfrozen ground) are to be expected where lake depths are greater than about 1.0 m to 2.3 m. Formation of an open talik, which penetrates through the permafrost, would be expected for lakes which exceed a critical depth and size. It is possible that an open talik exists below Lake B7 based on the depth and geometry of this lake (SD 6-1 Permafrost Baseline Report).

2.5 Groundwater

Groundwater characteristics for the Project area are detailed in FEIS Volume 7 Section 7.2, 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 ground surface.

The water table in the active layer is expected to be a subdued replica of topography, and is expected to parallel the topographic surface. The shallow groundwater flow regime has little to no hydraulic connection with the groundwater regime located below the permafrost.

Taliks (unfrozen ground surrounded by permafrost) exist beneath lakes which have sufficient depth such that they do not freeze to the bottom over the winter. Beneath small lakes 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. When the size of a lake is above a critical value, the talik beneath the lake will be an open talik, which connects to the deep groundwater flow regime beneath the permafrost. Elongated lakes with terraces (where lake depth is within the range of winter ice thickness), a central pool(s) (where lake depth is greater than the range of winter ice thickness) and a width of 340 m to 460 m or greater are expected to have open taliks extending to the deep groundwater flow regime at the Project site (SD 6-1 Permafrost Baseline Report). A review of bathymetric data, ice thickness data, and results of thermal modelling suggests that near the Tiriganiaq deposit, only Meliadine Lake, Lake B7, and Lake D7 will have open taliks connected to the deep groundwater flow regime.

3.0 PROJECT DESCRIPTION

3.1 Open Pits and Underground Facility

The Project is a gold-only operation, with gold mined, milled, and poured on site. The estimated mine production rate is approximately 8500 tpd. About 6000 tpd of the ore will come from the open pits (~2.2 million tonnes per year), and 2500 tpd will come from the underground mining (~0.9 million tonnes per year).

The Project is proposed to be a combination of open-pit and underground mining. Based on current known resources, these methods will result in an estimated operating life of about 13 years for the mine. Mining is proposed on five gold deposits on the property at this time: Tiriganiaq as the main deposit, and the F Zone, Wesmeg, Pump, and Discovery deposits as satellite operations. Gold mineralization extends to the bedrock surface in all five deposits, but is generally covered by glacial deposits of varying thickness.

Gold mineralization in the five deposits is mostly made up of mesothermal quartz-vein-dominated gold systems in strongly sheared and complexly folded host rocks or Archean turbidites, iron formation and volcanic rocks. Within each deposit are many gold-bearing lodes of quartz-vein stock work, laminated veins, and sulphidized iron formation with strike lengths of up to 3 km. The stratigraphic units generally strike northwest-southeast, dip steeply to the north and are overturned, with the oldest units to the north. All 5 deposits remain open at depth, with the potential for discovery of additional gold resources.

Open-pit mining is proposed for the Tiriganiaq, F Zone, Pump, Wesmeg, and Discovery deposits using conventional surface mining methods using drill and blast excavation and truck haulage. Dewatering dikes will be required for select pits for surface water management. At present, underground mining is also proposed for the Tiriganiaq deposit using two different underground mining methods: mechanized cut and fill mining for narrower, more complex zones; and longhole/blasthole mining for larger, thick ore horizons (FEIS Volume 2, Section 2.0).

Underground mine workings for the Project are planned to extend to approximately 770 m below the ground surface, and therefore part of that facility would be below the base of the continuous permafrost. The underground excavations will act as a sink for groundwater flow, with water induced to flow through the bedrock to the underground mine workings once the mine has advanced below the base of the permafrost (FEIS Volume 7, Section 7.2). The conceptual design for the underground mine workings is in progress; the CRP will be reviewed upon finalization of the underground mine design.

None of the open pits of the Project intersect the deep groundwater regime below the permafrost or through-taliks below large lakes. The Discovery Deposit is excavated entirely within permafrost using open pit mining methods and groundwater inflows are expected to be negligible. Portions of the Pump, Wesmeg, F Zone and Tiriganiaq open pits intersect dewatered lakes that have unfrozen groundwater within closed taliks beneath them. Groundwater will flow from these taliks into the open pits (FEIS Volume 7, Section 7.2).

The locations of the open pits are shown in Figures 1.2 and 1.3.

3.2 Waste Rock Storage Facilities

Waste rock and overburden from the open pits that is not used for site development purposes will be deposited in waste rock storage facilities. The closure footprints for the WRSFs, as shown in Figures 1.2 and 1.3, have been identified based on the anticipated volumes of waste rock and overburden.

The waste rock and overburden from Tiriganiaq open pits and underground facility will be placed at the B7 WRSF located around the TSF. The waste rock and overburden from Wesmeg and Pump open pits will be placed at the B4 WRSF, which would encompass Lake B4. The waste rock and overburden from the F Zone open pits will be placed at the A45 WRSF located south of the F Zone open pits. The waste rock and overburden from the Discovery open pits will placed at the Discovery WRSF located east of the Discovery open pit (SD 2-8 Mine Waste Management Plan).

3.3 Tailings Storage Facility

The TSF is located north of the Tiriganiaq open pit and includes Lake B7 as shown in Figure 1.2. The TSF is to be surrounded on the east, west, and south sides by the B7 WRSF. The TSF has been designed to store the approximately 34.5 million tonnes of tailings based on a tailings solids content of 55% (SD 2-3 TSF Preliminary Design Report).

Excess pore water and runoff from the facility during operations will be managed with a Reclaim Pond. The tailings are to be deposited from the north to the south such that the Reclaim Pond shifts southward during operations (SD 2-3 TSF Preliminary Design Report). It is estimated that Lake B7 is underlain by an open talik (SD 6-1 Permafrost Baseline Report). It is anticipated that the talik will freeze back with time following the placement of tailings within the TSF. A simplified 1-dimensional thermal model was developed to evaluate the potential rate of freeze back of the tailings and TSF foundation, both under current climate conditions and with climate change. The model was run for a period of 100 years considering instantaneous placement of the tailings to the full capacity of the facility at time zero, and at a temperature of 6°C. This is considered conservative as the tailings would in fact be placed in layers and would freeze progressively throughout the mine life. To investigate the potential effect of climate change, a 6.4°C temperature increase was assumed to occur uniformly over the 100 year period, equivalent to an annual increase of 0.064°C. The 6.4°C temperature increase follows the worst case "high sensitivity" model described by the Intergovernmental Panel on Climate Change (IPCC 2007). Further details on the analytical methodology, input parameters, and results from the thermal model are provided in FEIS Volume 6 Appendix 6.3-C.

Tables 3.1 and 3.2 summarize the modelled length of time required to freeze the tailings and foundation materials within the B7 basin footprint and on the surrounding dry ground, respectively. Results are presented for both current temperatures and temperatures affected by climate change. A detailed thermal assessment of the TSF will be completed during the detailed design phases of the Project to confirm that the facility will freeze; however; it is important to note a reliance on the freeze back of the tailings is not required as a long term management strategy. Freeze back of the tailings is an enhancing feature but is not necessary for long term chemical stability of the proposed TSF (SD 2-3 TSF Preliminary Design Report).

Table 3.1: Time to Freeze Tailings and Foundation within the B7 Footprint

Location in Section	Approximate Time to Freeze (years)	
	Current Average Temperature	Assuming Climate Change Predictions
Mid-depth of tailings (El. 71.5 m)	12 years	12 years
Base of tailings (El. 58 m)	28 years	28 years
Bedrock surface (El. 52 m)	40 years	41 years
Bedrock 66 m below tailings surface (El.19 m)	95 years	100 years

Table 3.2: Time required to Freeze Tailings and Foundation on Dry Ground

Location in Section	Approximate Time to Freeze (years)	
	Current Average Temperature	Assuming Climate Change Predictions
Mid-depth of tailings (El. 74.5 m)	3 years	3 years
Base of tailings (El. 64 m)	Less than 1 year	Less than 1 year
Bedrock surface (El. 55.5 m)	Remains Frozen	Remains Frozen

The simplified thermal model results indicate that complete freezing of the tailings, foundation soils and bedrock will occur with time even when climate change is considered. The model results also suggest that minimal thawing of the original ground is expected in permafrost areas.

3.4 Mine Infrastructure

The key mine infrastructure on site, shown on Figure 1.2, include: a process plant, power plant, camp, mine maintenance shop, sewage treatment plant, tank farm, and explosives facility. The key mine infrastructure at Rankin Inlet, shown on Figure 1.4, include a laydown area and a tank farm. The following facility descriptions are summarized from FEIS Volume 2.

The on-site process plant will treat the mineralized material by crushing and grinding the rock, followed by gravity separation, cyanidation of the gravity concentrate, cyanidation of the gravity tailings, and carbon adsorption. These processes will be followed by refining. The final step is the smelting of gold bars on site. Before the tailings are discharged to the TSF, they will be treated with a cyanide destruction step. Water and reagents used in these processes will be recycled to the greatest extent practicable.

Power for the site would be diesel-generated using multiple medium-speed reciprocating engines housed in a powerhouse. The power plant will be a pre-engineered insulated building constructed on pile foundation or on competent bedrock.

A maintenance shop will be constructed on site for haul trucks and construction equipment repair and maintenance. A fully catered permanent camp will be built on the site to accommodate employees, along with other infrastructure appropriate to a remote mine site.

A sewage treatment plant will be constructed on site capable of treating all human, kitchen, laundry and other liquid wastes. The final effluent from the sewage treatment plant will be directed to the TSF. Sludge will be incinerated if possible; if not, it will also be disposed of in the TSF (FEIS Volume 2).

A 5.6 million litre tank farm will be developed on site and any additional fuel will be stored at the Rankin Inlet tank farm. Both tank farms will be a lined area with berms.

Explosives will be placed in secure facilities away from the camp and other infrastructure on site.

Infrastructure proposed at Rankin Inlet include a laydown area and a tank farm with a capacity of approximately 80 million litres.

Supplies will be sent to Rankin Inlet by ship, barge, or air and either stored at the Rankin Inlet laydown pad or transported to site along the AWAR.

3.5 All-weather Access Road

Current access to the mine site is by air and the Phase 1 All-weather Access Road (AWAR). Rankin Inlet, the closest hamlet, is located approximately 24 km to the south on the western shore of Hudson Bay. Rankin Inlet acts as a staging post for transhipment of samples and personnel. Development of the Project will include the Phase 2 AWAR which will involve the widening of the Phase 1 road to an 8.0 m wide running surface to allow two-way traffic. All previously installed or constructed Phase 1 AWAR road, bridges and culverts will be managed and maintained as part of the Phase 2 AWAR (Figure 3.1).

Once Phase 2 is complete, the AWAR will consist of approximately 24 km long road from Rankin Inlet to Tiriganiaq deposit and an approximately 10 km long spur road to allow access to the Discovery deposit. In addition, a short bypass road approximately 5 km long will be developed south of the airport to minimize traffic through Rankin Inlet. The AWAR is expected to allow open non-project-related access to Meliadine Lake, but will have controlled access to the Tiriganiaq, F Zone, and Discovery deposits by gates (FEIS Volume 2).

3.6 Waste Management

The mine site will include a dedicated waste management building in accordance with current practice at other northern mines. This building will be separate from the accommodation and mill complexes and will be used for waste processing. The building will house a high-efficiency, dual-chamber, controlled-air industrial incinerator for all combustible, non-hazardous wastes. The unit will be diesel-fired and its exhaust will be located downwind of the facilities. Other equipment in the waste management building will include a barrel crusher, a plastic shredder, drip trays for oil filters and paint cans, and a means of packaging hazardous wastes (FEIS Volume 2).

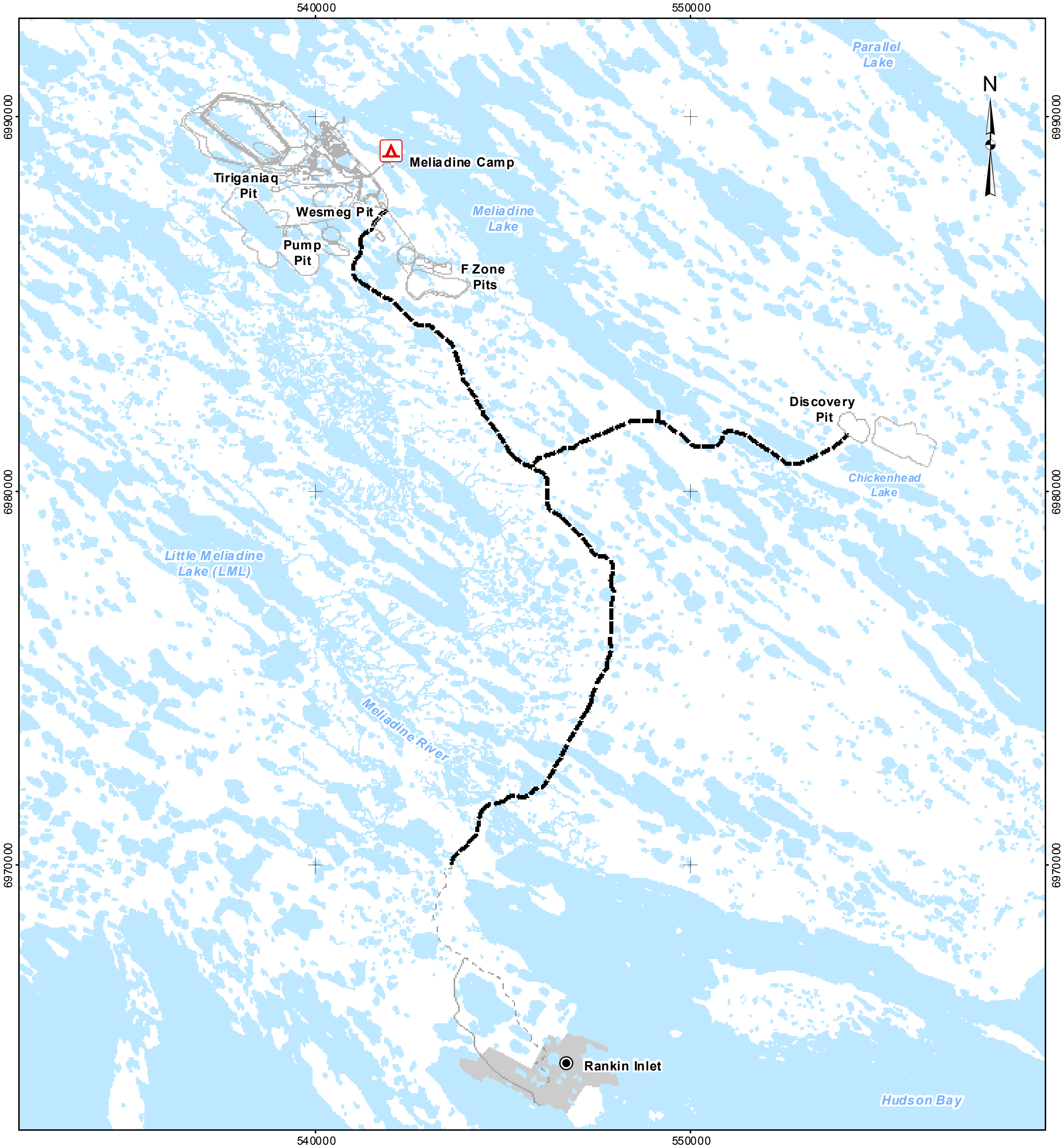
Hazardous wastes will be packaged for shipment off site to registered hazardous waste management facilities. Wastes that can be handled locally or on site will be managed daily. The accumulation of wastes will be avoided through an active waste management program.

The following waste will be acceptable for incineration:

- Solid waste: mainly organic matter including food, food containers and wrappings contaminated by food;
- Sewage sludge: mainly generated during the construction phase; during the mine's operation; and
- Used oils: includes plastic products and flammable or combustible petroleum hydrocarbons.

Hazardous waste will include the following:

- Waste fuel and lubricants: diesel fuel, oils, greases, antifreeze, and solvents used for equipment operation and maintenance;
- Waste process plant consumables: sodium cyanide, sulphur (or metabisulphide), hydrochloric acid, lime, flocculants, and anti-scalants used in mineral extraction;
- Waste explosives: ammonium nitrate and high explosives used for blasting in the mine; and
- Laboratory wastes: various by-products classified as hazardous waste and chemicals used in the assay laboratory.



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LEGEND

- Camp
- Project Infrastructure
- All-weather Access Road (AWAR)
- Road - New
- Road - Existing
- Watercourse
- Waterbody
- Municipal Boundary

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT
AGNICO EAGLE
AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE
ALL-WEATHER ACCESS ROAD

Golder Associates

PROJECT		10-1373-0076	FILE No.	
DESIGN	AS	17 Dec. 2012	SCALE AS SHOWN	REV. A
GIS	DSC	20 Dec. 2012	**FIGURE 3.1**	
CHECK	GA	29 Dec. 2012		
REVIEW	DW	29 Dec. 2012		

Hazardous waste and contaminated soil will be managed by removal off site to an appropriate licensed facility (light hydrocarbon contaminated soils, i.e. diesel fuel contaminated soil, will be treated on site at an engineered biopile facility). Non-hazardous inert waste will be disposed of in an on-site landfill that will be located in the B7 WRSF. The leachate from the landfill is anticipated to be of very low ionic strength (dilute) due to controls on materials to be placed in the landfill. Moreover, drainage from the landfill is largely expected to freeze within the Waste Rock Storage Facility, with little to none reporting to the water collection infrastructure (SD 2-11 Landfill Management Plan).

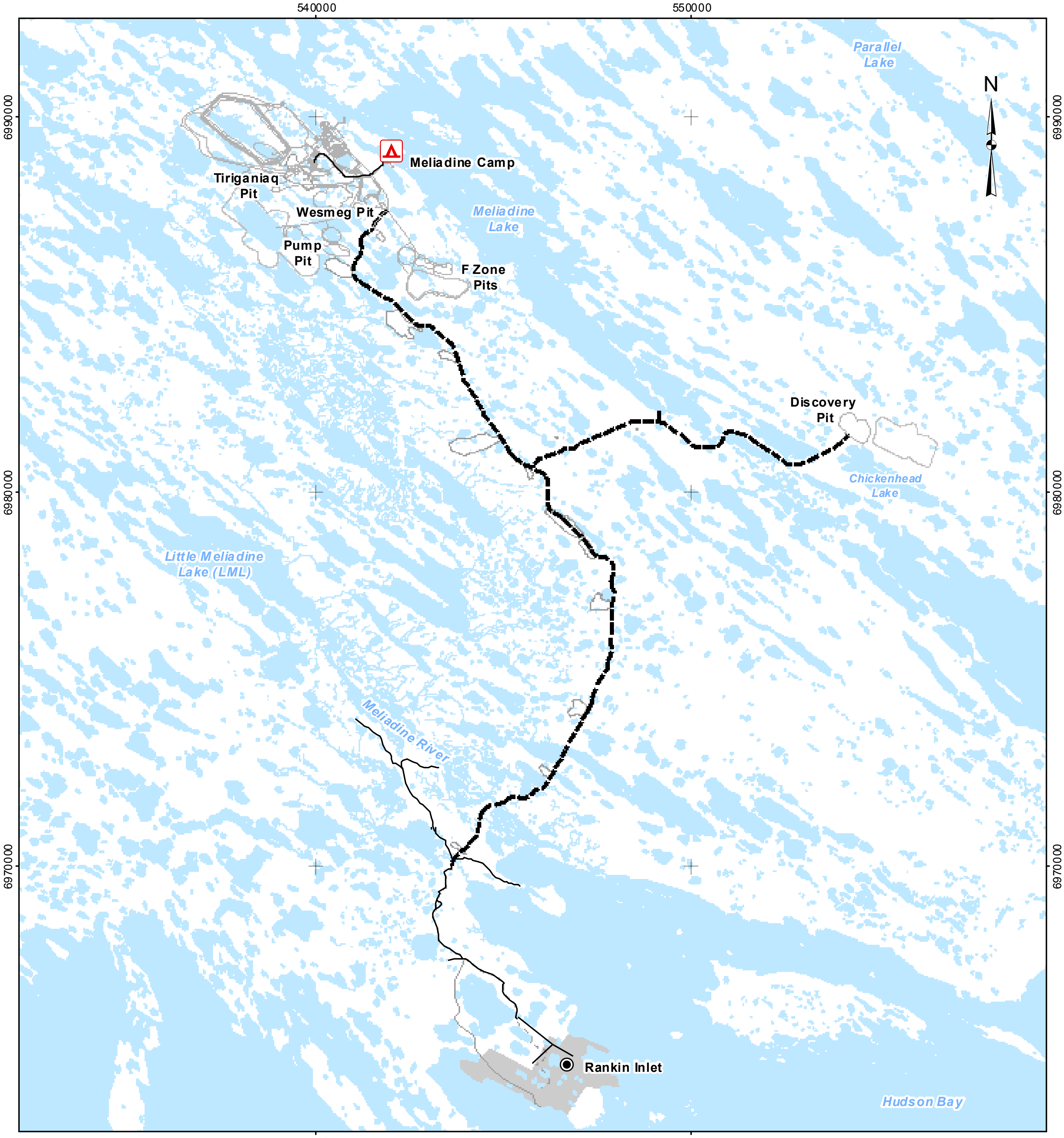
3.7 Quarries and Granular Borrow Sites

Quarries and granular borrow sites were developed for building the AWAR. The quarries and granular borrow sites not required for ongoing maintenance of the access roads will be reclaimed following completion of construction of the Phase 2 AWAR. The quarry and granular borrow site locations have been identified for the AWAR as shown in Figure 3.2. AEM intends to use suitable open pit waste rock where practical to minimize or eliminate the need for additional rock quarries. More information of quarry and borrow site management is presented in SD 2-10 Borrow Pits and Quarry Management Plan.

3.8 Water Management Facilities

The water management facilities will include sumps, attenuation ponds, interceptor channels, dikes, water treatment plant and tailings water Reclaim Pond as shown in Figures 1.2 and 1.3. The details for the water management facilities described below were summarized from SD 2-6 Surface Water Management Plan. Interceptor channels will direct non-contact runoff water away from areas affected by mining activities. Contact water originating from mine site areas will be intercepted, collected, and conveyed to sumps and pumped to attenuation ponds. Water from the attenuation ponds and Reclaim Pond will be discharged to the environment if water quality meets discharge criteria or the water would be treated before release to the environment.

The attenuation ponds and sumps during operations have been sized to store the runoff volume from the 24-hour, 1:100-year storm event, in addition to their peak annual operating volume under average climate conditions with 1 m freeboard. A summary of attenuation ponds and sumps by area is given in Table 3.3.



3 0 3
KILOMETRES

LEGEND

- Camp
- Project Infrastructure
- All-weather Access Road (AWAR)
- Road - New
- Road - Existing
- Watercourse
- Waterbody
- Municipal Boundary

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

QUARRIES AND GRANULAR BORROW SITES

Golder Associates

PROJECT		10-1373-0076	FILE No.
DESIGN	AS	31 Aug. 2012	SCALE AS SHOWN REV. A
GIS	DSC	04 Sep. 2012	
CHECK	GA	29 Dec. 2012	FIGURE 3.2
REVIEW	DW	29 Dec. 2012	

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Table 3.3: Summary of Attenuation Ponds and Sumps

Area	Description
Attenuation Pond (AP01)	AP01
Attenuation Pond (AP02)	AP02
Plant Site	PS-S-01
Tailings Storage Facility	TSF-S-01
	TSF-S-02
	Reclaim Pond
B7 WRSF	B7-S-01
	B7-S-02
	B7-S-03
	B7-S-04
B4 WRSF and Pump[b]	B4-S-01
	B4-S-02
	B4-S-04
	Lake B36[a]
Tiriganiaq/Wesmeg	WM-S-01
	WM-S-02
	Lake A8
A45 WRSF and F Zone[b]	F-S-01
	F-S-02
	F-S-03
Discovery[b]	D-S-01

a Sumps B4-S-04, B4-S-03, B4-S-02, and B4-S-01 will also be pumped through this sump**.**

b Likely distributed amount a number of sumps at low points surrounding the facility.

Interceptor channels for either diverting non-contact water or collecting contact water are sized for flows from an 1:100-year, 24-hour precipitation event.

Dikes are constructed to maintain water levels in specific waterbodies, and to divert water away from pits. At the end of mine life, all dikes will be breached, except dikes TSF-D-01, TSF-D-02, and B4-D-01. The dike breaches will be designed to accommodate the peak runoff rate from a 1:100-year, 24-hour storm. This will be reviewed in the final closure plan to confirm this is acceptable for the each dike facility. A summary of the dikes by area is given in Table 3.4.

Table 3.4: Summary of Dikes by Area

Area	Dike	Dike Height (m)[a]	Length (m)
Plant Site Area	PS-D-01	2.0	75
Tailings Storage Facility	TSF-D-01	2.5	55
	TSF-D-02	2.0	135
B7 WRSF	B7-D-01	2.5	235
	B7-D-02	2.5	190
Tiriganiaq	B5-D-01	2.5	330
B4 WRSF and Pump	B4-D-01	2.5	135
	B4-D-02	2.0	280
	P-D-01	2.0	80
	P-D-02	2.0	80
Wesmeg	WM-D-01	3.5	345
	WM-D-02	3.0	155
F Zone	F-D-01	2.5	265
	F-D-02	2.0	100

[a] The height of dikes is based on maximum waterbody depth below the dike alignment and a minimum of 2 m over the water surface, if the dike is aligned across a waterbody. If the dike is aligned across a stream, the maximum depth is 2 m over the ground surface at the location of the stream.

The inflows to the Reclaim Pond increase throughout mine life. Water from each open pit would be pumped to the TSF, and therefore each pit increases the total inflows to the TSF as the operation continues. The size of the Reclaim Pond will reach a maximum capacity of 2.9 Mm^3. Water treatment begins at the Reclaim Pond in the second year of mine life. Once mining and milling has been completed, reclaim water will be drained from the TSF and treated prior to discharge to one of the pit lakes to assist with pit re-flooding. The water management ditches needed on the closed surface of the TSF would be designed for a 1 in 200 year storm event. This will be reviewed in the final closure plan to confirm this is acceptable for the facility.

3.9 Water Balance

A preliminary water balance model was developed to assist in the evaluation of the proposed water management infrastructure on a monthly basis over the life of the mine and under closure conditions. The water balance for the Project is detailed in SD 2-6 Surface Water Management Plan and the results of the water balance model are briefly summarized herein.

The model results indicate that the Reclaim Pond will operate as a positive water balance. Large volumes of contact water from the site pits are pumped into the Reclaim Pond over the freshet and summer periods. The water is then discharged over the open water period to the attenuation pond east of the TSF. To meet anticipated discharge criteria, there is no discharge of water from the Reclaim Pond over the winter period; however, the Reclaim Pond is predicted to have sufficient capacity to store all excess water once reclaim demands are satisfied.

Model results indicate the treatment of excess Reclaim Pond water to the attenuation pond, occurs during operations. A treatment rate of 525 cubic metres per hour (m^3/hr) has been assumed for the first 10 years and 1500 m^3/hr from then on while the Reclaim Pond water volume is being drawn down from max levels of 2.9 Mm^3 to 1 Mm^3. The treated effluent will be discharged to the attenuation ponds or pit lakes to assist with pit flooding. The proposed water treatment strategy for tailings pond water will be reviewed and updated as required throughout mine life based on observed reclaim water quality and TSF volumes.

Mill water demands are met from 3 sources. Reclaim water will be drawn from the Reclaim Pond and shortfalls will be sourced firstly from the attenuation ponds and then Meliadine Lake. Model results indicate that during the summer, the attenuation ponds have enough water to satisfy excess mill demands while during the winter, process make-up water is drawn from both the attenuation ponds and Meliadine Lake.

Attenuation ponds will be operated such that the annual volume of water collected within the ponds on a hydrologic year basis (1 November through 30 October) will be decanted during the open water period between June and September (less any water used for process make-up). This limits the amount of water that will be stored over the winter period and maximizes the storage capacity available for the spring freshet.

Underground water will be temporarily stored in Lake B4 while final sizing and construction of the desalination plant is taking place. Model results indicate that Lake B4 will form a temporary storage for underground seepage and drill water for approximately 1 year under average climate conditions, after which desalination or expanded capacity of Lake B4 will become necessary.

Flooding of the underground workings will begin at the end of mining operations and will be completed as a priority at the start of closure. Flooding of the open pits and re-flooding of Lake A8 via pumped inflows from Meliadine Lake will commence at the same time at the end of operations and continue at an average annual rate for approximately 10 years. The average annual pumping rates would be set to fill the pits with pumped water and tributary area runoff over a period of 10 years, assuming average annual precipitation conditions. The closure water management features around the pits will be designed for 1 in 200 year storm events.

3.10 Geochemistry

The geochemistry details for the Project are provided in SD 6-3 Geochemistry Baseline Report, and are briefly summarized herein.

3.10.1 Waste Rock

Most waste rock lithologies are non-potentially acid-generating (non-PAG) except for Discovery greywacke and iron formations that are uncertain (SD 6-3 Geochemistry Baseline Report). The iron formation waste rock from the Pump and F Zone deposits have an uncertain potential to generate acid rock drainage (ARD); although, these rock units constitute a minor proportion of waste from these deposits (14% and 8% by tonnage, respectively). All other rock types from these deposits have excess buffering capacity such that the overall ARD potential of waste generated from Pump and F Zone as well as from Tiriganiaq, Wesmeg, and Wolf deposits is expected to be non-PAG. Based both on kinetic testing results completed on all waste rock types and at various scales, and the Mine Site Water Quality Predictions (SD 2-6 Surface Water Management Plan), leachate from the WRSFs is expected to meet MMER monthly mean effluent limits. Waste rock from most deposits in most WRSFs does not require means to prevent oxidation, with the possible exception of the Discovery

WRSF. However, the Discovery WRSF is not expected to generate acidic drainage in the short-term based on the low reactivity of potentially acid-generating (PAG) rock samples from the kinetic testing results and AEM's experience at the Meadowbank mine where the waste rock pile containing a large portion of PAG iron formation rock froze within the first year of deposition. The long-term ARD potential of Discovery waste rock, and particularly in the active thaw layer on the surface of the waste rock stockpile, is uncertain; it will depend on the availability and reactivity of sulphide minerals and the availability and effectiveness of buffering minerals under site conditions. Waste rock pile seepage and contact water will be managed by collecting contact water and monitoring water quality prior to treatment (if required) and discharge. Suspended solids and explosives residues (ammonia and/or nitrate) have not been assessed but can be present in mine rock contact water (SD 6-3 Geochemistry Baseline Report).

3.10.2 Tailings

Most of the tested tailings samples from the Project have no potential to generate ARD except for Discovery deposit tailings that are PAG (SD 6-3 Geochemistry Baseline Report). Based on the current mine plan (FEIS Volume 2, Table 2-12), the bulk of the tailings in the TSF is therefore anticipated to be non acid-generating on an annual basis over most of the mine life except for short periods during operations where the acid generation potential of the bulk tailings may be uncertain to PAG. The tailings over the last 3 years of deposition are non-PAG, which will enable placement of a non-PAG tailings layer over the entire tailings mass to protect the underlying tailings from oxidizing agents. Prolonged exposure of Discovery tailings will be avoided to prevent the development of localized acidification.

The concentrations of most leachate parameters from static leaching tests of whole ore tailings samples (shake flask extraction test) meet MMER monthly mean effluent criteria with the exception of arsenic, which exceeds the MMER average monthly values in F Zone, Pump, and Tiriganiaq tailings; however, results from kinetic testing show decreased concentrations with time (SD 6-3 Geochemistry Baseline Report).

3.10.3 Overburden

Overburden from within the pit footprints is non acid-generating and does not require means to prevent oxidation. Metal release under laboratory conditions is low despite the relatively high total arsenic content. Leachate concentrations in overburden are generally lower than waste rock and meet MMER monthly mean limits. Waste rock and overburden have compatible geochemical characteristics such that they could be managed together in the same facility (SD 6-3 Geochemistry Baseline Report).

3.11 Site Water Quality

Surface water quality modelling has been carried out to assess the requirement for water treatment during operations and closure. In general, run off from the waste rock and overburden materials used in construction or placed in the waste rock storage facilities are expected to meet MMER criteria during operations and into closure.

Process water during operations and during closure will be treated to destroy cyanide prior to discharge to the TSF to meet International Cyanide Code guidance concentrations. Tailing water within the Reclaim Pond is likely to require attenuation of pH, arsenic, cyanide, and suspended solids to meet MMER criteria prior to discharge to the receiving environment. Other parameters may also require treatment for discharge if recycling of the Reclaim Pond water results in further concentration of the process water (SD 6-3 Geochemistry Baseline Report). Tailings water or surface runoff from the TSF during construction of the engineered cover is expected to require water treatment. However, once the cover is complete, water treatment should not be required as the runoff will not directly contact tailings and should be considered non-contact water.

3.12 Vegetation

The vegetation baseline details for the Project are provided in SD 6-2 2009 Terrestrial Synthesis Baseline, and are briefly summarized herein.

Vegetation studies have been undertaken since the mid-1990s to establish a baseline prior to the development of the mine. In general, the community types identified within the Project and AWAR areas, or in the vicinity, include upland terrestrial vegetation classes, wetland classes and un-vegetated classes.

The Upland terrestrial vegetation is predominantly heath vegetation. Heath vegetation in this area is defined as land where the soils are not saturated for extended periods of the year. Heath refers to the presence of low growing evergreen shrubs, such as Labrador tea, bearberry, and black crowberry that are typical of these areas. Heath vegetation in the area also consists of heath tundra or heath boulder and bedrock associations.

Wetlands or riparian vegetation are defined as areas that are saturated for most, or all of the growing season. Wetlands or riparian vegetation in the area consists of wet sedge meadows or tussock-hummock areas and low shrubby riparian vegetation along the margins of lakes and rivers.

Miscellaneous land cover types include un-vegetated areas, such as areas disturbed by pre-mining activities or bare ground and water.

A total of 6 rare plant species were observed within the Project area and include: pretty milkvetch (*Astragalus eucosmus*), northern tansy-mustard (*Descurainia sophioides*), hairy butterwort (*Pinguicula villosa*), Lanate willow (*Salix lanata* sp. *calcicola*), moor rush (*Juncus stygius*) and false chamomile (*Tripleurospermum maritimum*).

There are an additional 11 species of rare plants that may have the potential to occur in the Project area, though they were not encountered during previous field programs. These are all listed as “Sensitive” in NU (CESCC 2011), though none are federally listed (COSEWIC 2012; *SARA* 2012).

Assessments of baseline metal concentrations in plant tissue and soil in the Project area was undertaken in the fall of 2008 and completed in the fall of 2009, to provide a basis for evaluating potential effects of dust borne contaminants containing metals originating from the proposed mine sites and AWAR. In total, 29 permanent sample sites were established in the vicinity of the mine site and along the road; plant tissue samples from at least 2 different plant species and a soil sample were collected from each site. Most of the soil metal concentrations were within acceptable guidelines, with the exception of arsenic, which exceeded CCME (2007) guidelines for agricultural use on 12 plots, all but 3 of which were found in the immediate vicinity of the proposed Project site or along the AWAR near the mine site. Metal concentrations in tissue from selected plant species were also analyzed to provide an understanding of baseline levels of various metals that may be concentrated in plant tissue. The results of the plant tissue metals analyses indicated a wide variability in the range of metal concentrations, with highest levels of arsenic found in alpine manzanita *(Arctostaphylos alpine)*, and water sedge (*Carex aquatilis)* on 2 plots located near the proposed Meliadine main mine site.

3.13 Wildlife

The wildlife baseline details for the Project are provided in SD 6-2 2009 Terrestrial Synthesis Baseline, and are briefly summarized herein.

Wildlife studies identified the following species within the Project and AWAR areas:

- barren-ground caribou;
- Arctic fox;
- raptors;
- upland birds;
- shorebirds; and
- waterfowl.

Key baseline details from the area include:

- barren-ground caribou of the Qamanirjuaq herd are regular but transient visitors during their spring migration and calving periods;
- 37 bird species have been observed including 14 species of waterfowl, 5 species of shorebird, 3 species of raptor, and 2 owl species;
- the most common species of upland birds are Lapland Longspur (*Calcarius lapponicus)*, Horned Lark (*Eremophila alpestris)*, and Savannah Sparrow (*Passerculus sandwichensis)*;
- shorebirds are uncommon and have not been documented breeding;
- Pacific Loons (*Gavia pacifica)* and Tundra Swans (*Cygnus columbianus)* are confirmed, regular breeding summer residents;
- Peregrine Falcon (*Falco peregrines)*, Rough-legged Hawk *(Buteo lagopus)*, and Gyrfalcon (*Falco rusticolus)* have been documented and confirmed as breeding;
- Short-eared Owls (*Asio flammeus)* have been documented and nest observations indicate that they are likely breeding;
- Sandhill Cranes (*Grus canadensis*) occur throughout the study area in summer and are confirmed as breeding;
- Arctic fox (*Alopex lagopus*) and Arctic hare (*Lepus arcticus*) are common residents;
- wolves (*Canis lupus*), muskox (*Ovibos moschatus)*, and polar bears (*Ursus maritimus)* are infrequently observed;
- grizzly bear (*Ursus arctos)* and wolverine (*Gulo gulo*) are listed under Committee on the Status of Endangered Wildlife in Canada as "Special Concern" and have the potential to be in the study area, but were not observed in the study area during wildlife surveys for the Project;
- red knots, *Calidris canutus rufa* and *Calidris canutus islandica* are listed as "Endangered" and "Special Concern", respectively under the Committee on the Status of Endangered Wildlife in Canada and have the potential to be in the study area, but were not observed during wildlife surveys for the Project; and

- polar bear, peregrine falcon and short-eared owl were the only species that are listed under Committee on the Status of Endangered Wildlife in Canada as "Special Concern" that have been documented in the study area.

4.0 CLOSURE AND RECLAMATION STRATEGIES

4.1 General Strategy

The intent of closure and reclamation is to restore ecosystem integrity by producing a final landscape that reflects the surrounding land features and land forms, and by minimizing the potential for disturbances to cause degradation of the surrounding water, air, and land. The following summarizes the general closure strategy to achieve these objectives:

- Comply with applicable standards and guidelines requirements and objectives;
- Give preference to closure solutions that do not require subsequent maintenance ("walk away" solutions) or else solutions that minimize maintenance (example "passive water treatment"); and
- Whenever possible, the closure of facilities would be progressive, spaced out over the operational life of the mine as activities in areas are completed.

4.2 Ecological Restoration

4.2.1 Terrestrial Habitat Reclamation Strategies

The closure and reclamation phase is the first opportunity to initiate major reclamation of areas lost to wildlife use during the construction and operations phases. Removal of Project facilities, reclamation of tailings and waste rock storage facilities, and the deactivation of access and haul roads and associated reclamation activities will result in the natural re-vegetation of many previously affected areas of the Project.

Certain facilities will be reclaimed progressively during the life of the mine, such as the TSF, camps, temporary workspace, marshalling yards, quarries, borrow pits, and storage areas. Other facilities will be reclaimed during the closure and post-closure phase of the Project.

Disturbed areas will be allowed to revegetate naturally. The surface may be prepared (e.g., scarified, re-contoured, slopes stabilized, natural drainage patterns restored) to provide a suitable environment for plant growth to take place.

Reclamation will be a progressive process that will continue throughout the life of the mine as soon as opportunities to reclaim decommissioned facilities present themselves.

Terrestrial riparian vegetation may become established in shoreline areas; therefore, consideration will be given to contouring the upper portion of the pit slopes if the slope is in soils above the final water level to enhance re-colonization of shoreline vegetation and to prove for local slope stability. In areas where solid rock is exposed at the final water level, no re-sloping would be planned. Terrestrial area(s) created by dikes will be contoured, and erosion by wind and water will be minimized by providing proper drainage. Shoreline areas encroached upon by dikes will be restored.

For all mine facilities and structures, all contaminated soil will be removed for treatment at a licensed facility, foundations and building structures will be dismantled, the area will be re-contoured (e.g., berms flattened) to encourage re-growth of natural vegetation, and original drainage patterns will be restored to the greatest extent possible.

The AWAR, Rankin Inlet bypass road, and temporary mine roads will be scarified, culverts and bridges removed, drainage patterns restored, and slopes stabilized. Consideration will be given to rehabilitating roads to imitate esker habitats. Disturbance of near-shore vegetation will be minimized during removal of culverts and bridges (e.g., along the AWAR).

All Rankin Inlet infrastructure, including spud barge, laydown pad and tank farm, will be removed and the site allowed to revegetate, where applicable.

Further details on the proposed terrestrial habitat reclamation strategies that will be employed during closure (permanent and progressive) and interim shutdown (if necessary) are provided in Sections 5 to 7 below.

4.2.2 Aquatic Habitat Reclamation Strategies

A number of closure strategies will be implemented to minimize potential impacts to, and minimize potential contaminant levels in the aquatic environment after mine operations cease. These include the following:

- Open pits and underground workings will be flooded;
- Excess water in the Reclaim Pond will be drained and sent to the water treatment plant;
- An engineered cover will be progressively placed on the surface of the tailings to limit vertical infiltration of water to the tailings surface;
- Disturbed areas will be stabilized, re-contoured to promote positive drainage, and original drainage patterns restored where practicable;
- Hazardous waste and soil will be removed and sent to a licensed offsite treatment facility;
- Unused hazardous materials and explosives will be removed from site; and
- Mine water management infrastructure, including ditches, sumps, dikes, ponds, and the water treatment plant, will be maintained until water quality monitoring demonstrates that the water reporting from the reclaimed areas is of acceptable water quality for release to the environment without further management.

Further details on the proposed aquatic habitat reclamation strategies that will be employed during closure (permanent and progressive) and interim shutdown (if necessary) are provided in Sections 5 to 7 below.

It is anticipated that AEM will be allowed by DFO to alter and/or destroy select fish habitat during the construction and operation phases of the mine, under the condition that the net residual effects of the Project will be offset by measures to ensure the sustainability and ongoing productivity of the commercial, recreational or Aboriginal fishery. This authorization will probably contain several conditions that need to be adhered to, such as the development of detailed designs, specifications, and implementation plans that describe how AEM plans to offset the residual net effects to the fishery. The proposed Conceptual Fisheries Protection and Offsetting Plan for the Project is presented in SD 7-4.

5.0 PERMANENT CLOSURE PLANS

Permanent closure is defined as the final closure of the mine site. At this time there would be no foreseeable intent by AEM to use the site for future active exploration or mining, though permanent closure would not preclude renewed or future mining. Permanent closure also means that site activities are intended to be limited to post closure monitoring and possible contingency closure actions.

The following sub-sections describe closure objectives, strategies, and plans for the various components of the mine site. Specific objectives for each component are proposed in addition to the general closure objectives discussed in Section 1.2. Closure objectives were developed based on requirements from regulations, guidelines and activities carried out at other applicable mine sites. All closure planning and activities would be developed and implemented to provide for long term stable conditions (physical and chemical), minimize potential contaminant levels in the environment, and ensure the safety of the public after mine operations cease. The following are specified objectives and may be revised with subsequent updates to the CRP, but are considered adequate at this time to guide the advancement of closure planning.

5.1 Underground Facilities

This section describes the closure activities as they relate to the underground facilities proposed for Tiriganiaq.

The underground facility consists of mine workings that will extend to approximately 770 m below the ground surface, which is below permafrost. Therefore, groundwater flows are expected into the underground mine workings. The underground mine inflows will be managed during the operations phase of the project and all mine access is planned with a single access portal near the mill as shown in Figure 1.2.

5.1.1 Closure Objectives

The closure objectives for the underground facilities are as follows:

- remove access to underground workings and surface openings at the end of the mine life to protect human and wildlife safety;
- maximize the stability of underground workings and crown pillars so that there is no surface expression of underground failure;
- close underground workings so they do not become a source of contamination to the surface environment;
- minimize potential for contamination and, if required, collect and treat; and
- contour as required to achieve the desired end land use targets.

5.1.2 Closure Methods and Strategies

Guidance on generic options or strategies for closure of underground mine workings is provided in AANDC (2007). The relevant strategies are discussed below:

- seal drill holes and other surface openings, especially those connecting the underground workings to the surface;

- assess risk of subsidence in underground mines and take appropriate measures to prevent subsidence in cases where the risk of subsidence is determined to be significant;
- remove infrastructure and equipment if needed. Any equipment or infrastructure left underground will be cleaned, drained of fluids, inspected and remediated as appropriate to ensure that there is no risk of any contaminant leakage;
- remove hazardous materials from underground shops, equipment and magazines (fuels, oils, glycol, batteries, explosives, etc.);
- identify and remediate contamination associated with vehicle and equipment operations at Project maintenance shops or work areas prior to final closure;
- secure underground shafts and raise openings using properly designed concrete caps for permanent closure;
- flood and plug underground workings as appropriate based on hydrogeological and groundwater quality studies;
- contour the surface to establish positive natural drainage patterns and blend in with the surrounding topography or re-contour to prevent natural surface flows to the underground; and
- un-used explosives and areas with excessive hydrocarbon contamination will be removed or cleaned as necessary.

The estimated total flooding volume of the underground workings is 1,372,000 m^3 (SD 2-6 Surface Water Management Plan). The workings will be flooded over approximately 6.1 years by a combination of groundwater seepage and freshwater from Meliadine Lake. Approximately 160,000 m^3 of freshwater will be pumped in a controlled manner from Meliadine Lake to provide a minimum 150 m deep freshwater cap and keep high TDS groundwater in the lower portions of the mine. The maximum fill rate will be based on the maximum acceptable draw down of Meliadine Lake. Testing and monitoring would be carried out to assess the water quality in the underground workings as they are flooded progressively.

5.2 Open Pits

This section describes the closure activities as they relate to the following open pits shown in Figures 1.2 and 1.3:

- Tiriganiaq open pits;
- Wesmeg open pits;
- Pump open pits;
- F Zone open pits; and
- Discovery open pit.

5.2.1 Closure Objectives

The closure objectives for the open pits are as follows:

- minimize access of humans and wildlife to open pits;
- develop a plan to enable exit from the flooded pits;
- integrate a water management plan to minimize and control contaminated drainage from the flooded pits, implement a system to collect and treat these waters, and have these waters meet site permit water quality objectives, which will be developed during operation;
- stabilize all slopes and flood open pits to satisfy end land use for the open lake area;
- establish in-pit water habitat where feasible for pits which may be flooded; and
- establish new surface drainage patterns if necessary.

5.2.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining each open pit facility, and will include the following:

- All pit access ramps will be secured by rock berm barricades, and berms will be constructed around the perimeter of each pit at a given setback in accordance with applicable mine regulations and rock mechanics studies conducted for pit stability.
- The open pits are designed to have stable slopes during the mine life and post-closure. The slopes will be monitored as part of mine operations and will be progressively modified as required to maintain stability.
- Each open pit will be flooded over a period of approximately ten years (SD 2-6 Surface Water Management Plan). Estimated pit flooding volumes are provided in Table 5.1. Flooding will be achieved by a combination of seepage, precipitation, partial re-direction of annual freshet flows, and active pumping from Meliadine Lake.

Table 5.1: Estimated Pit Flooding Volumes

Pit	Volume (m^3)	Final Water Elevation (masl)
Wesmeg #1	506,340	59.0
Wesmeg #2	25,081,282	62.2
Wesmeg #3	4,169,520	65.0
Wesmeg #4	675,905	64.0
Wesmeg #5	845,002	64.0
Pump #1	14,469,923	62.2
Pump #2	7,004,134	60.5
Tiriganiaq #1	66,877,675	57.8
Tiriganiaq #2	1,501,932	57.8
F Zone # 1	2,297,157	54.0
F Zone # 2	1,952,586	55.0
F Zone # 3	9,498,301	56.0
Discovery	35,745,437	66.0

- Water will be pumped in at controlled rates from Meliadine Lake using barge-mounted, high-capacity mechanical pump systems or siphons. Water intakes will be properly screened.
- It is anticipated that the F Zone open pits #1 and #2 and Pump open pit #1 will be backfilled with waste rock such that water cover depth is 20 m. Thus, it is anticipated that these pits will be able to provide fish habitat.
- A water quality assessment will be carried out prior to closure to assess the effects of waste rock disposal in flooded open pits.
- It is anticipated that water quality in the open pits will meet discharge criteria within five years of flooding the pits as sources for acid rock drainage or metal leaching will be under water or covered by non-potentially acid generating rockfill cover. Meliadine Lake water will be used to flood the bulk of the pit volumes.
- Additional surface water quality testing is required to assess surface water quality from runoff of various facilities. Testing and monitoring would be carried out to assess the open pit water quality as they are flooded. The information would be used to develop a strategy to minimize contamination of the regional surface water systems.
- Water quality in the pits will be monitored continuously throughout the flooding process. All diversion dikes will be kept intact to provide a barrier between the open pits and surrounding lakes until the pit lake water levels achieve static conditions and the water quality is considered acceptable for release to the environment without treatment. If the water quality is unacceptable for discharge, then the water will be treated either in-situ or through the water treatment plant depending on the specific water quality concerns. The duration of the treatment will be dependent on monitoring results and acceptable discharge criteria.

5.3 Waste Rock Storage Facilities

This section describes the closure activities as they relate to the following waste rock storage facilities shown on the site closure plan in Figures 1.2 and 1.3:

- B7, located around the TSF dikes;
- B4, located south of Tiriganiaq Pit #2 and east of Pump Pit #1;
- A45, located south of the F Zone pits; and
- Discovery, located east of the Discovery Pit.

It is currently proposed to manage overburden material and waste rock in the same facilities as it is not anticipated that there will be a potential to reuse the overburden at closure. Separately salvaging and storing overburden for reclamation activities has not been found feasible at northern mine sites as the material freezes and handling becomes very difficult. Overburden is retrieved early in the mining life, and based on the results from field investigations (SD 2-4A Factual Report on 2011 Geotechnical Drilling Program) the overburden is expected to have relatively high water and ice content. Overburden placed within the facilities is expected to be completely frozen at the time of closure, and therefore would require blasting and melting prior to reuse as a reclamation material. Experience from Meadowbank has shown that once the overburden material is blasted and melted, its nature and water content causes complete liquefaction which would make its handling and transportation a major challenge, if at all possible.

5.3.1 Closure Objectives

The closure objectives for the waste rock storage facilities are as follows:

- minimize erosion, thaw settlement, slope failure, collapse or the release of contaminants or sediments;
- develop and implement preventative and control strategies to effectively minimize the potential for acid rock drainage and/or metal leaching to occur;
- mitigate and minimize impacts to the environment if acid rock drainage and/or metal leaching is occurring;
- avoid reliance on long-term treatment as a management tool (e.g. effluent treatment facilities are not appropriate for final reclamation but may be used as a progressive reclamation tool);
- build to meet future land use targets; and
- build to minimize the overall project footprint.

5.3.2 Closure Methods and Strategies

Proposed closure strategies and activities will include the following for waste rock storage facilities:

- Geochemical testing indicates that most of the waste rock and overburden is non-potentially acid generating and non-metal leaching. Kinetic tests completed on all waste rock types and at various scales show that drainage water quality is expected to meet MMER monthly mean effluent limits, including results for arsenic. It is anticipated that some PAG material may be encountered. The geochemistry testing to date suggests that if the PAG rock is mixed with non-PAG material the overall waste rock storage facility would not be potentially acid generating. Therefore, a closure cover system is not currently proposed for the WRSFs, with the possible exception of Discovery, the need for which will be verified during operations.

  The ARD potential of Discovery rock will be verified during operations through monitoring of the buffering capacity and sulphur content of Discovery waste rock and monitoring of rock pile contact water quality (SD 2-8 Mine Waste Management Plan). A surface layer of non-PAG rock will be placed on the WRSF to host the active thaw layer should operational monitoring identify that some of the Discovery waste rock is PAG.

  Water quality monitoring will be completed throughout the mine life to monitor the contribution of specific infrastructure components (including the WRSFs) to the overall site water quality. The water quality monitoring, which is referred to as Verification Monitoring (SD 2-6 Surface Water Management Plan), will be used to support the closure planning process for the WRSFs. The intent of the closure planning process is to develop a final plan using adaptive management. The use of adaptive management will enable the closure plan to evolve as new information becomes available through analysis, testing, monitoring, and progressive reclamation.

- The WRSF contact water system will be maintained during the closure period until water quality monitoring demonstrates that water reporting from these facilities is acceptable for direct release to the environment. Once water quality is acceptable for direct release based on criteria established through the water licensing process, contact water channels and sumps will be re-contoured and/or surface treated according to site-specific conditions to minimize wind-blown dust and erosion.

- The waste rock storage facilities will be designed for long-term stability. No additional re-grading or construction of wildlife ramps will be carried out as part of closure activities.
- The waste rock storage facilities will be allowed to naturally re-vegetate. It is anticipated that the lichen community will re-vegetate the surface over time. Dust from the WRSF is anticipated to be a minor issue during closure. Waste rock produced at the site will generally be large in size, and not susceptible to wind erosion. The overburden materials are relatively high in moisture content, and therefore, wind eroded dust from the overburden stockpiles is not expected to be an issue. The need for additional dust control measures will be evaluated and implemented during operations and closure, as required.

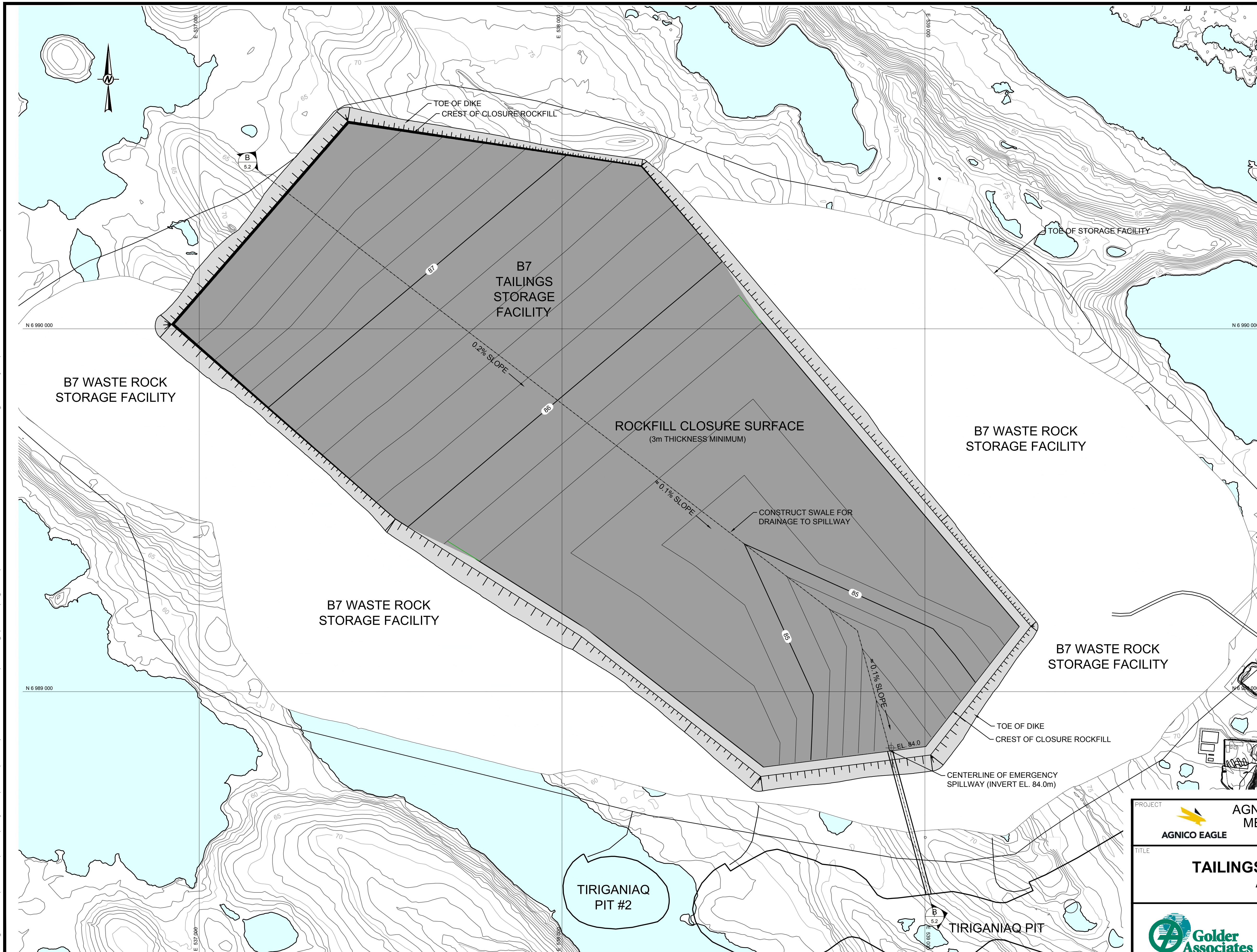
5.4 Tailings Storage Facility

This section describes the closure activities as they relate to the TSF shown on the site closure plan in Figures 5.1 and 5.2.

5.4.1 Closure Objectives

The closure objectives for the TSF are as follows:

- stabilize slopes surrounding the tailings impoundment;
- minimize catastrophic and/or chronic release of the tailings based on associated risk;
- minimize wind migration of tailings dust as the operations approach closure;
- minimize the threat of the TSF becoming a source of contamination (e.g. tailings migration outside of contained area, contamination of water outside of contained area); and
- blend with local topography where appropriate.



LEGEND

- CONCEPTUAL ROCKFILL PLACEMENT AT CLOSURE
- TAILINGS STORAGE FACILITY DIKE
- LAKE
- MAJOR TOPOGRAPHIC CONTOUR (5m)
- MINOR TOPOGRAPHIC CONTOUR (1m)

NOTES

1. ALL ELEVATIONS ARE IN METRES TO NORTH AMERICAN DATUM 1983 (NAD 83).
2. ALL COORDINATES ARE IN METRES TO UNIVERSAL TRANSVERSE MERCATOR PROJECTION (UTM) NAD83 ZONE 15.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. EXISTING TOPOGRAPHIC CONTOURS SHOWN AT 1m INTERVALS.

REFERENCES

1. 2007, 2009 AND 2011 TEST HOLE LOCATIONS SURVEYED AND PROVIDED BY AGNICO EAGLE MINES LIMITED. CAD FILE: GT_HOLES .DWG, NOVEMBER 2011.
2. BASE PLAN PROVIDED BY AGNICO EAGLE MINES LIMITED. DATE: SEPTEMBER 27 AND 29, 2011.
3. DRAWING FROM SD 2-3 TSF PRELIMINARY DESIGN REPORT.

0 100 200 300m
SCALE

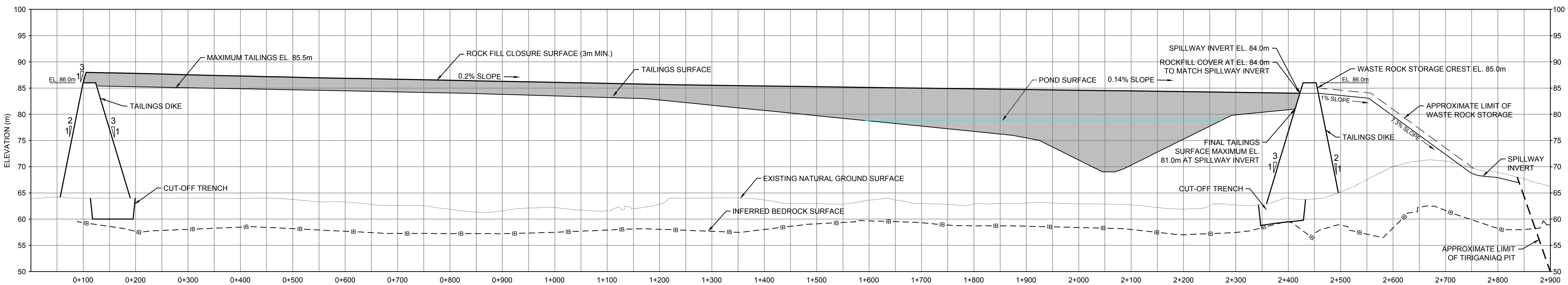
PROJECT
AGNICO EAGLE
AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE
TAILINGS STORAGE FACILITY AT CLOSURE

Golder Associates

PROJECT No. 10-1373-0076			PHASE No. 6300	
DESIGN	A.S.	14JAN2013	SCALE AS SHOWN	REV. 0
CADD	R.H.	14JAN2013	**FIGURE 5.1**	
CHECK	D.W.	14JAN2013		
REVIEW	J.H.	14JAN2013		

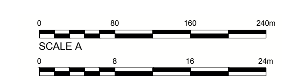
Drawing File: N:\Bur-Graphics\Projects\2010\1373\10-1373-0076\Drafting\6300\Figures\10-1373-0076-6000-FIG5_1-R0.dwg Friday, April 04, 2014 9:56:39 AM By: TYKlassen



HORZ. SCALE : SCALE A
VERT. SCALE : SCALE B

B
5.1

TYPICAL SECTION - ROCKFILL COVER AT CLOSURE



NOTES

1. VERTICAL SCALE IS EXAGGERATED 10 TIMES HORIZONTAL SCALE.
2. ALL ELEVATIONS ARE IN METRES TO NORTH AMERICAN DATUM 1983 (NAD 83).
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REFERENCE

1. INFERRED BEDROCK PROVIDED BY AGNICO EAGLE MINES LIMITED. CAD FILE: 3D bed rock.DWG, NOVEMBER 4, 2011.
2. DRAWING FROM SD 2-3 TSF PRELIMINARY DESIGN REPORT.

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

TAILINGS STORAGE FACILITY SPILLWAY AT CLOSURE

Golder Associates

PROJECT No. 10-1373-0076			PHASE No.	6300
DESIGN	A.S.	14JAN2013	SCALE AS SHOWN	REV. 0
CADD	R.H.	14JAN2013	FIGURE 5.2	
CHECK	D.W.	14JAN2013		
REVIEW	J.H.	14JAN2013		

5.4.2 Closure Methods and Strategies

Proposed closure strategies and activities for the TSF include the following:

- An engineered cover will be progressively placed on the surface of the tailings as the tailings deposit reaches the ultimate elevation. The intent of the engineered cover will be to limit vertical infiltration of water to the tailings surface. The placement of the engineered cover will also help prevent dust production. The cover will be graded to divert runoff to the adjacent closed open pit once the water quality of the run off satisfies discharge criteria.

  Cover design will be finalized during the detailed design phase of the Project and will consider operational experience at other northern mine sites, and available design guidelines including MEND Report 1.61.5c – Cold Regions Cover System Design Technical Guidance Document (Mine Environment Neutral Drainage (MEND) Program 2012). A detailed thermal assessment of the TSF will also be completed during the detailed design phases of the Project. The TSF closure plan will be reviewed and updated as required based on the results of the thermal analysis.
- At closure, the Reclaim Pond will be drained and filled in with waste rock to promote surface drainage towards the operating spillway as shown in Figures 5.1 and 5.2. The closure spillway invert elevation is at 84 m as shown in Figure 5.2. The operating spillway at the southwest corner of the facility will be excavated 2 m deeper at closure so that surface runoff from the TSF will be directed through the spillway to Tiriganiaq Pit. However, during construction of the engineered cover and spillway, surface water will be collected in a small sump or pond at the south end of the TSF and the water will be monitored. If treatment is required prior to release, the surface water will be pumped to the water treatment plant prior to being discharged to Tiriganiaq Pit or Meliadine Lake. Once the water quality satisfies discharge water quality, it will be diverted directly to Tiriganiaq Pit.
- The discharge water quality and the water management structures for the TSF will be monitored and assessed according to an approved environmental protocol during each stage of the mine life, including pre-development, operations, closure, and post-closure.
- The current geochemistry characterization and mine plan indicate that the last three years of tailings production are non-PAG; however, some of the tailings produced prior to that time have an uncertain acid generation potential. The current tailings deposition plan would, with exception of the north end of the facility, result in non-PAG tailings deposition over the tailings deposit in the last three years. During the detailed design phase of the Project, the tailings deposition plan will be reviewed and updated to extend non-PAG tailings deposition at the north end of the facility toward the end of mine life to ensure that non-PAG tailings cover the entire surface area of the TSF at closure.
- Kinetic tests completed on whole ore tailings samples show that drainage water quality is expected to meet MMER monthly mean effluent limits except for arsenic. Therefore, the cover design will consider infiltration and potential arsenic loading in surface runoff. Water quality analysis through hydrogeological (groundwater) modelling, unsaturated flow modelling in the cover layer, and field trials will be undertaken to assess the water quality from the TSF at closure, if necessary. If undertaken, the modelling will be completed during operations and the CRP will be revised based on the results of the water quality analysis.

The tailings deposition allows for progressive closure activities. Additional details on progressive closure of the TSF are provided in Section 6.0.

5.5 Mine Infrastructure

This section describes the closure activities as they relate to key mine infrastructure on site and at Rankin Inlet, as shown on Figures 1.2 and 1.4, respectively. These include the process plant, power plant, camp, mine maintenance shop, sewage treatment plant, tank farm, explosives facility, Rankin Inlet laydown area and Rankin Inlet tank farm.

5.5.1 Closure Objectives

The closure objectives for mine infrastructure are as follows:

- confirm buildings and equipment do not become a source of contamination or a safety hazard to wildlife and humans; and
- return the general area to its original state or to a condition compatible with the end land use targets.

5.5.2 Closure Methods and Strategies

Proposed closure strategies and activities for the mine infrastructure will commence at the end of mining, and will include the following:

- Salvageable buildings and surface structures will be dismantled and demobilized from the site. The buildings will be offered to the Kivalliq Inuit Association (the land owner) for potential re-use elsewhere at closure.
- Non-salvageable buildings and structures will be dismantled or demolished and disposed of in waste rock storage facilities in areas designated for inert non-hazardous landfill materials.
- Concrete structures and foundations will be removed or buried to a point about 1 m below the final ground surface or the final re-graded surface.
- All disturbed site areas will be re-graded to suit the surrounding topography. In areas where the original ground surface was lowered for site grading or structural requirements, the slopes will be stabilized and contoured. Cover materials may be required for erosion and dust control.
- The mine site tank farm will be dismantled and, if necessary, the residue disposed of offsite at an approved disposal facility.
- Fuel not required during the closure and reclamation activities will be incinerated.
- In Rankin Inlet, the laydown area will be reclaimed, the tankfarm dismantled and, if necessary, disposed offsite at an approved disposal facility. The Government of Nunavut owns the land for the facilities in Rankin Inlet and it is important to note that the proposed fuel tank farm and laydown area are all situated on lands leased from the Government of Nunavut and thus AEM’s commitment is to remove all of these facilities.

5.6 All-weather Access Road

This section describes the closure activities as they relate to the AWAR shown in Figure 3.1. The 8 m wide AWAR is approximately 24 km from Rankin Inlet to the Tiriganiaq deposit with an approximately 10 km spur to Discovery deposit. Also to be closed is the approximately 5 km long bypass road running south of the airport to the AWAR.

The AWAR is discussed in detail in the Roads Management Plan (FEIS SD 2-9). AEM has committed to decommission the AWAR once mine reclamation has been completed and the site no longer requires ongoing care and maintenance. However during the consultation activity, AEM has heard from the community of Rankin Inlet, including the HTO that the community wants the AWAR to remain open to allow public access with minimal restrictions. Consequently AEM has proposed that the AWAR be operated as a privately operated road with unrestricted public access. AEM would continue to operate the AWAR under these conditions for as long as it has a physical presence at the Meliadine site. Once the mine closure activities are complete and the physical presence is gone from the mine site, then AEM would not be able to provide maintenance or emergency services along the road. The road would then be closed to cars and trucks, as AEM could then no longer guarantee public safety. At that point, AEM would complete the closure activities discussed below.

In addition, AEM expects that during a short term or temporary mine site shut down, the road would remain open; however, during a long term or indefinite shut down the road would likely be closed.

5.6.1 Closure Objectives

The closure objectives for the AWAR and Rankin Inlet bypass road are as follows:

- ensure road does not become a source of contamination;
- return area to a state compatible with the desired end use;
- restore natural drainage patterns where surface infrastructure has been removed; and
- restore natural use for wildlife.

5.6.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining and the closure tasks for other mine infrastructure, and will include the following:

- The AWAR, all site roads and the bypass road not required for post-closure monitoring will be decommissioned and the terrain restored. Decommissioning of the road will start from the site and progress south towards Rankin Inlet.
- The road surface will be scarified, allowing the native plant community to establish itself on the former road surface.
- Slopes will be stabilized against erosion potential.
- If necessary, wildlife access will be provided at suitable intervals by re-grading the embankment shoulders to provide flatter slopes, if required.
- All bridges and culverts will be removed and original drainage patterns restored.

- Stream crossings will be rehabilitated as they are encountered during the progression of the work.
- Cross-drain structures (cross-ditches) will also be installed where necessary between culvert sites. Where armouring rock (rip-rap) is required, this rock will be non-acid generating and non-metal leaching for the protection of aquatic life. Where affected watercourses are fish bearing, the timing of work will have to be restricted to within the designated DFO fisheries work window.
- Should potentially acid generating bedrock be exposed along the roadway, these areas will be covered with a minimum 2 m thick layer of non- potentially acid generating and non-metal leaching soil or rock to direct water away from the surface.

5.7 Landfill

This section describes the closure activities related to the landfill site and the waste management building.

5.7.1 Closure Objectives

The closure objectives for the landfill are as follows:

- control erosion and effects on the ground thermal regime;
- prevent inadvertent access;
- ensure waste disposal areas do not become a source of contamination; and
- return area to its original state or to a state compatible with the desired end use.

5.7.2 Closure Methods and Strategies

Proposed closure strategies and activities will commence at the end of mining, and will include the following:

- the landfill is located within the B7 WRSF. The leachate from the landfill is anticipated to be of very low ionic strength (dilute) due to controls on materials to be placed in the landfill. Moreover, drainage from the landfill is largely expected to freeze within the Waste Rock Storage Facility, with little to none reporting to the water collection infrastructure (SD 2-11 Landfill Management Plan). The design, operation and/or closure of the landfill do not rely on total freezing; however, as an added control strategy, a minimum of 3 m thick non-potentially acid generating and non-metal leaching rockfill cover will be placed over the landfill. The cover thickness of 3 m is considered sufficient for planning purposes and is based on maintaining the active layer within the rockfill so that the materials landfilled will remain frozen. The 3 m cover is designed to account for potential warming and would be modified if required. When finalizing the design for the cover, the need for thermistors to be installed will be evaluated. The surface will be left irregular so as to capture snow, windblown sediment and plant seeds.;
- hazardous waste and contaminated soil (soil not treated through the proposed biopile, i.e., soil contaminated with heavy hydrocarbons or other contaminants not suitable for remediation in the biopile) will be managed continually during operations and during closure in sending the soil to a licensed offsite treatment facility. Therefore, there will be little to no accumulation of such wastes during mine operations or during closure at the mine site, subject to seasonal shipping considerations;

- the biopile area will be excavated and the material placed in the TSF area below the final cover. The area would then be re-graded to confirm positive surface drainage;
- dispose of inert, non-combustible wastes in underground mine workings and waste rock storage facilities;
- burn domestic waste in the incinerator during operation and at closure as part of camp maintenance;
- burn waste oils, solvents, and other hydrocarbons on site in the incinerator if approved (chlorinated substances will not be burned);
- if necessary, divert runoff with cover waste rock; and
- the waste management building will be the last building to undergo closure and reclamation.

5.8 Quarries and Granular Borrow Sites

This section describes the closure activities as they relate to the quarries and granular borrow sites shown on the site closure plan in Figure 3.2.

5.8.1 Closure Objectives

The closure objectives for the quarries and granular borrow sites are as follows:

- minimize access of humans and wildlife to quarries and granular borrow sites;
- if necessary, integrate a water management plan to minimize and control contaminated drainage should it be encountered, implement a system to collect and treat these waters, and have the waters meet site permit water quality objectives;
- meet water quality objectives for any discharge;
- meet end land use target for resulting surface expression; and
- establish new surface drainage patterns.

5.8.2 Closure Methods and Strategies

Proposed closure activities may commence prior to the end of mining, and would include the following:

- reclamation and closure of quarries and granular borrow pits will depend on the individual site conditions;
- all mobile and stationary equipment would be removed;
- excavated slopes would be stabilized and contoured;
- progressive reclamation of the quarries should lead to vegetation re-establishing on disturbed areas;
- loose rock will be pulled to the floors of the quarries, and the entrances blocked with large boulders;
- the slopes and base of the quarries would be re-contoured to promote positive drainage; and
- rock quarries would remain open and will be re-contoured as necessary to promote positive drainage.

5.9 Water Management Facilities Closure Plan

This section describes the closure activities as they relate to the following water management facilities shown on the site closure plan in Figures 5.3 and 5.4: sumps, attenuation ponds, interceptor channels, dikes, and water treatment plant.

5.9.1 Closure Objectives

The closure objective for the water management facilities are as follows:

- dismantle and remove and/or dispose of as much of the system as possible and restore natural or establish new drainage patterns;
- stabilize and protect from erosion and failure for the long-term;
- maintain controlled release from water dams, ditches, and all points of water discharge to the environment; and
- achieve approved water quality limits and, implement long-term treatment only if necessary and ensure that minimal maintenance is required.

1000 0 1000
METRES

LEGEND

Contact Flow Path	Pumped Contact Water	Dewatered or Filled in Lake
Non Contact Flow Path	Pumped Dewatering	Contact Water Pond
Dike	Mine Water discharge to Environment	Watershed Boundary
Existing Infrastructure	Fresh Water Intake	Lake
Road	Topographic Contour (1.0 m Interval above sea level)	Waste Rock Storage Facility
Open Pit	Watercourse	Tailings Storage Facility

NOTE

Dewatering of lakes may require Total Suspended Solids (TSS) control.
Pumped water from waste rock storage facilities, pits and the tailing storage facility to sumps not shown for clarity.

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

WATER MANAGEMENT FACILITIES AT START OF CLOSURE

Golder Associates

PROJECT NO.	10-1373-0076		FILE No.
DESIGN	AS	05 Sep. 2012	SCALE AS SHOWN REV. A
GIS	DSC	05 Sep. 2012	
CHECK	GA	29 Dec. 2012	FIGURE 5.3
REVIEW	DW	29 Dec. 2012	

LEGEND

- Non Contact Flow Path
- Dike
- Watercourse
- Existing Infrastructure
- Topographic Contour (1.0 m Interval above sea level)
- Waste Rock Storage Facility
- Tailings Storage Facility
- Watershed Boundary
- Dewatered or Filled in Lake
- Lake

1000 0 1000

METRES

NOTE

Dewatering of lakes may require Total Suspended Solids (TSS) control.

REFERENCE

Base data obtained from Agnico Eagle Mines Limited (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

WATER MANAGEMENT FACILITIES AT START OF POST CLOSURE

Golder Associates

PROJECT NO.		10-1373-0076	FILE No.
DESIGN	AS	05 Sep. 2012	SCALE AS SHOWN REV. A
GIS	DSC	05 Sep. 2012	
CHECK	GA	29 Dec. 2012	**FIGURE 5.4**
REVIEW	DW	29 Dec. 2012	

5.9.2 Closure Methods and Strategies

Proposed closure activities will commence at the end of mining water management facilities, and will include the following:

- **Water Treatment Plant:** A water treatment plant will be required during operations and during the closure period. Once the active water treatment needs are satisfied, which is anticipated to be at 5 to 7 years into the closure period, the need for water treatment plant will be re-evaluated. If a plant is required for the long term, a new plant to satisfy the treatment requirements into post closure period will be built. The need for a plant will be determined based on closure water quality monitoring at key locations around the site. If the water treatment plant is found not to be required, it will be maintained for 3 water treatment seasons as a contingency before being dismantled and disposed of in an appropriate landfill facility either on site or in Rankin Inlet (if approved).

- **Dikes:** Dike breaching will involve the removal of a portion of the dikes to a minimum depth of 1 m below average lake water level or back to original lake bed levels. Consideration will be given to breach staging, with above-water portions of the dike 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 lakes. The remainder of the breach would be completed during the following freshet so as to allow for the deployment of turbidity curtains to control potential releases of sediment. Exposed till surfaces within the breach opening above normal lake water levels will be covered with non-potentially acid generating and non-metal leaching materials. Non-potentially acid generating and non-metal leaching materials will also be used below water surface depending upon availability.

  It should be noted that it will be several years before the dikes are breached after flooding of the pits begins. Consequently, any fine sediments that have potentially been re-mobilized into the water column during flooding are expected to have settled out by the time the pit lake areas are reconnected to the surrounding lakes. In all cases, pit lake water quality will need to meet discharge objectives, including turbidity and TSS, before the dikes are breached.

- **Interceptor channels, sumps and ponds:** The contact water management system will be maintained as required in closure until site water quality monitoring results indicate that the water can be released directly to the environment without further management. Once the mill site is reclaimed, the local mill sump(s) will be reclaimed and surface runoff will flow to its original catchment. Select non-contact water diversion ditches may be retained to promote surface water drainage. Figures 5.3 and 5.4 show which ditches will be required during closure and flooding of the pits.

  All water management infrastructure that may be maintained for closure and reclamation, including ditches and sumps, will be re-contoured and/or surface-treated according to site-specific conditions to minimize wind-blown dust and erosion from surface runoff to and enhance the development site area for natural revegetation and wildlife habitat post-closure.

6.0 PROGRESSIVE CLOSURE AND RECLAMATION MEASURES

Progressive reclamation includes closure activities that take place prior to final closure in areas or at facilities that are no longer actively required for the current or future mining operation. Reclamation activities can be done during operations with the available equipment and resources to reduce future reclamation costs, minimize the duration of environmental exposure, and enhance environmental protection. Progressive reclamation may shorten the time for achieving reclamation objectives and may provide valuable experience on the effectiveness of certain measures that might be implemented during permanent closure.

A summary of key progressive reclamation activities and the proposed timeline are provided below.

6.1 Tailings Storage Facility

The TSF will be closed progressively as shown in Figure 6.1. Closure of the TSF will include the placement of an engineered cover to limit vertical infiltration of water to the tailings surface. The placement of the engineered cover will also help prevent dust production. The surface of the TSF will be graded to shed water.

As noted above, cover design will be finalized during the detailed design phase of the Project and will consider operational experience at other northern mine sites, and available design guidelines (e.g., MEND 2012). A detailed thermal assessment of the TSF will also be completed during the detailed design phases of the Project. Thermistors will also be installed in the northwest area of the TSF during progressive reclamation, as the pond is shifted to the southeast and the closure cover is placed over the final tailings surface. Data collected from these thermistors will provide information regarding the post-closure thermal performance of the facility. The locations and number of instruments will be defined during the detailed design phase for the TSF (SD 2-3 TSF Preliminary Design Report)

6.2 Open Pits

Flooding of the open pits, water management, and closure monitoring activities will take approximately 10 years following completion of pit operations, and will be followed by post-closure monitoring. At present the open pits will not be closed as mining in each pit is completed to enable an evaluation of the potential to develop the deposits underground. If there is no potential for future mining, the pits will be reclaimed progressively as excavation or mining in the each pit is completed.

6.3 Site Facilities

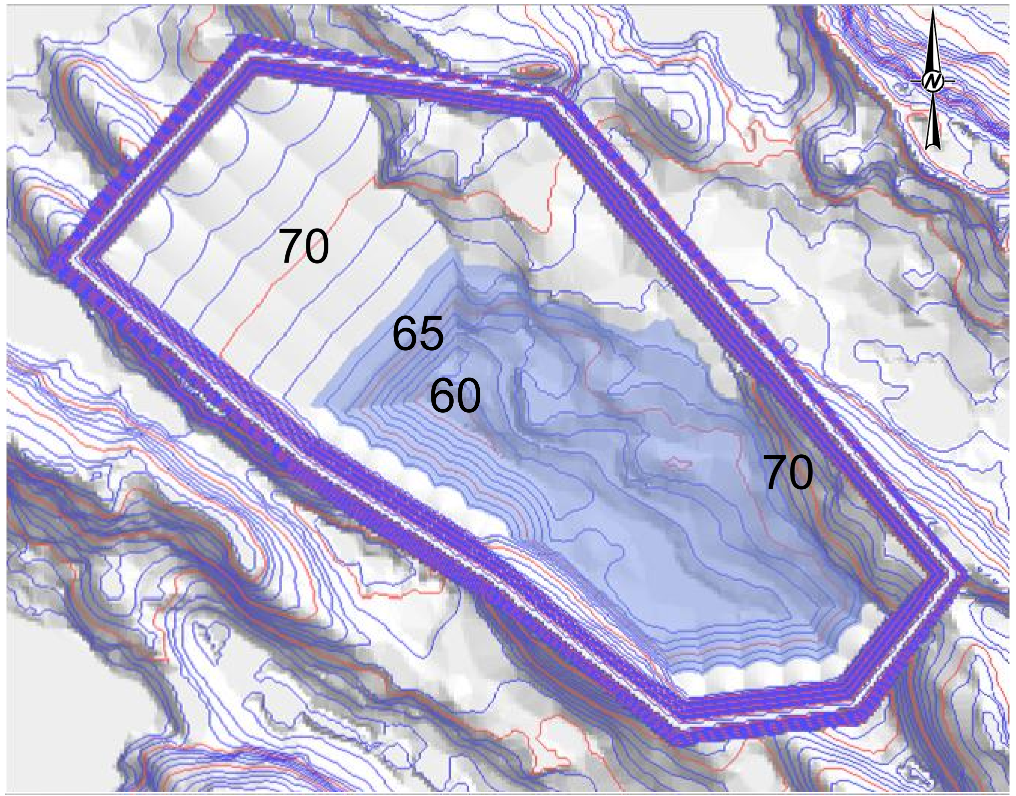
Certain facilities will be reclaimed progressively during the life of the mine, such as camps, temporary workspace, marshaling yards, quarries, borrow pits, and storage areas. Buildings not required for end land use targets will be dismantled. All building excavations or sumps will be backfilled to grade to restore natural drainage or acceptable new drainage. Small footings and floor slabs would be removed and buried. All materials that are placed in the final landfill in the waste rock storage facility will be buried at a minimum depth of 3 m below the active layer. Select non-contact water diversion ditches may be retained to promote surface water drainage. Disturbed areas will be allowed to recover naturally.

LEGEND

ENGINEERED COVER

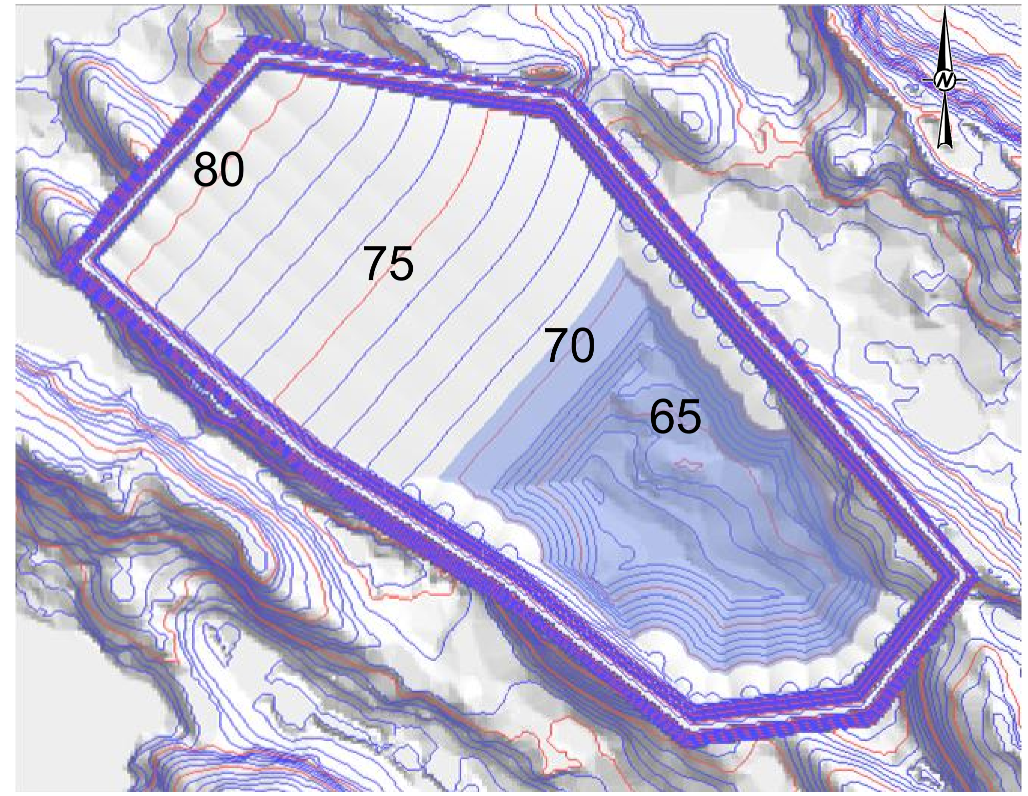
REFERENCE

1. IMAGES FROM: SD 2-3 TSF PRELIMINARY DESIGN REPORT.



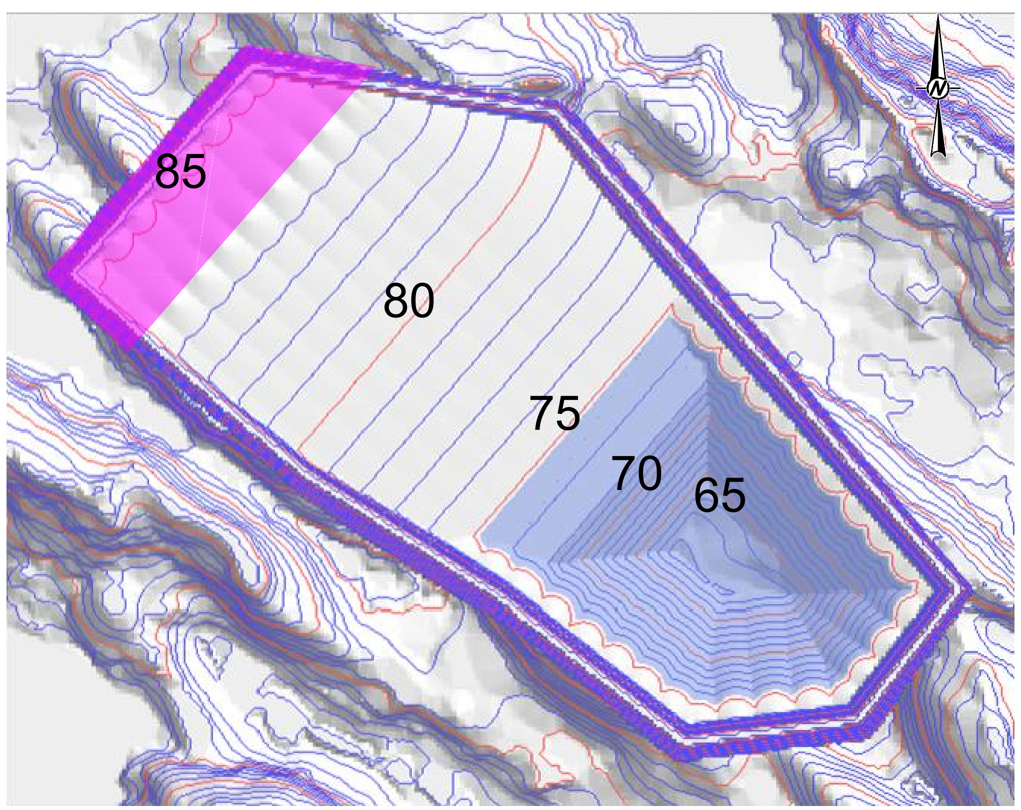
YEAR 2

TAILINGS DEPOSITION FROM NORTH, SOUTHWEST, AND NORTHWEST SIDE OF TAILINGS STORAGE FACILITY.



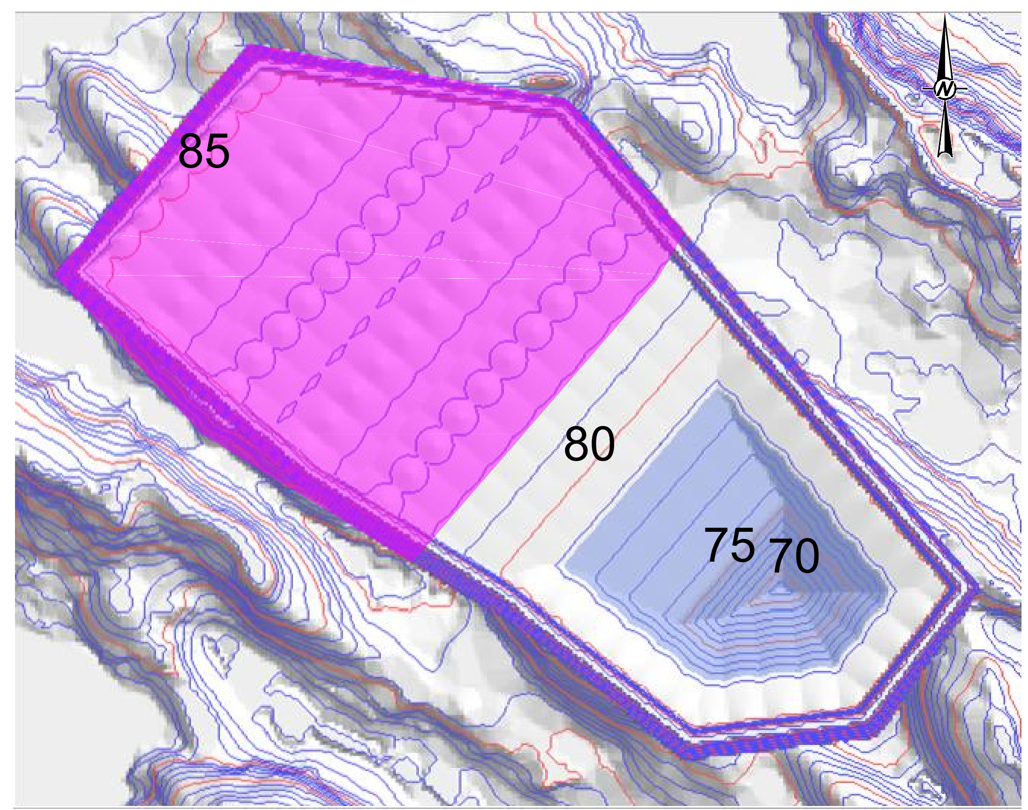
YEAR 5

TAILINGS DEPOSITION CONTINUED FROM NORTH, WEST SIDE, AND SOUTHWEST SIDE OF TAILINGS STORAGE FACILITY. TAILINGS DEPOSITION COMMENCING ON EAST SIDE. RECLAIM POND IS SHIFTED TOWARDS SOUTH END OF FACILITY.



YEAR 9

TAILINGS DEPOSITION FROM ALL SIDES OF STORAGE FACILITY. RECLAIM POND IS SHIFTED FURTHER SOUTH. ENGINEERED COVER PLACEMENT HAS COMMENCED AS PART OF PROGRESSIVE CLOSURE ACTIVITIES. APPROXIMATELY 300m BEACH SURFACE COVERED.



YEAR 13

TAILINGS DEPOSITION IS COMPLETE. ENGINEERED COVER IS PLACED ON APPROXIMATELY HALF OF EXPOSED TAILINGS BEACH SURFACE AS PART OF PROGRESSIVE CLOSURE ACTIVITIES.

0 200 400 600m
SCALE

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

PROGRESSIVE CLOSURE OF TAILINGS STORAGE FACILITY

Golder Associates

PROJECT No. 10-1373-0076			PHASE No. 6300	
DESIGN	A.S.	14JAN2013	SCALE AS SHOWN	REV. 0
CADD	R.H.	14JAN2013	**FIGURE 6.1**	
CHECK	D.W.	14JAN2013		
REVIEW	J.H.	14JAN2013		

Drawing File: N:\Bur-Graphics\Projects\2010\1373\10-1373-0076\Drafting\6300\Figures\10-1373-0076-6000-FIG6_1-R0.dwg Friday, April 04, 2014 10:05:40 AM By: TYKlassen

7.0 INTERIM SHUTDOWN

7.1 Description

The mine operation is planned to be continuous for the full proposed operating period. However, the mine may need to shut down temporarily or indefinitely due to economic, environmental and/or social factors. Notification of interim shut down would be presented to the staff and the local population with at least 30 days' notice; if the conditions allow, a longer notice period will be provided where possible. The plans for both of these shutdown periods are discussed below.

7.2 Temporary Shutdown

Temporary shutdown occurs when a mine ceases operations with the intent to resume mining activities in the near future. Temporary shutdown could last for a period of weeks or for several months (up to 12 months) based on economic, environmental, and social factors. The objective of temporary shutdown is to ensure ongoing protection of the environment and regulatory compliance during the shutdown period. Measures deemed necessary will depend upon the duration and extent of site activities/presence during the temporary shutdown. It is anticipated that water management facilities will function at the same level during temporary shutdown periods as in operations.

The following summarizes the measures that will be taken as required during a temporary shutdown:

- Post warning signs and fences or berms as needed around the open pit perimeters.
- Dewatering of open pits and any underground areas will continue as conducted during operations since flooding and subsequent dewatering may adversely impact stability of the pit walls or underground workings.
- Environmental monitoring and sampling will continue at regular intervals as set out in the mine operations and monitoring program and in accordance with all applicable licenses, permits and authorizations.
- Routine geotechnical stability monitoring and maintenance will continue at a reduced rate compared to that conducted during operations. The open pit areas will be inspected routinely to check for rock falls, changes to groundwater inflows and overall integrity.
- All mobile equipment except for small service equipment required for open pit inspections will be removed and placed in secure onsite storage.
- Fuel, lubricants, and hydraulic fluids will be removed from the open pit area and stored in designated areas.
- Fluid levels in all fuel tanks will be recorded and monitored regularly for leaks or removed from the site.
- An inventory of chemicals and reagents, petroleum products, and other hazardous materials will be conducted and secured appropriately or removed.
- All explosives will be relocated to the main powder magazine and secured, disposed of, or removed from the site.

- Surface water management facilities such as the ditches, water treatment plant and attenuation ponds will be maintained to manage contact water runoff.
- All water will be treated and discharged during a four-month period from June to September each year. Therefore, if the temporary shutdown occurs during the October to May period, then little or no water would need to be considered for storage or treatment.
- Monitoring of water quality of the attenuation ponds will continue as per during operations.
- Tailings and water distribution lines will be drained or emptied, flushed with water, and allowed to drain, but would be left in place.
- Minimum staffing levels will be maintained to carry out care and maintenance.
- The camp will be operated at reduced staffing level.
- Critical facilities (plant and camp) will have nominal heat to prevent freezing of the facilities and possible damage.
- The Sewage Treatment Plant will continue to operate as needed.
- Hazardous wastes on site will be collected and stored in an appropriate area for annual disposal to a registered disposal facility.

7.3 Indefinite Shutdown

Indefinite shutdown is a cessation of mining and processing operation for an indefinite period of time greater than twelve months. The intention is that the mine will resume operations as soon as possible after the cause for the indefinite shutdown has been addressed. The site must maintain safety and environmental stability during this time. Possible causes for an indefinite shutdown include prolonged adverse economic conditions or extended labour disputes. A decision on the estimated length of the indefinite shutdown would be made after the initial 12 month period. Decisions on possible extensions to the indefinite shutdown would be made every 6 months thereafter and would be based on the conditions at that time. At present, the maximum length of time or number of extensions for interim shutdown before moving to final closure has not been defined.

The following summarizes the measures that will be taken as required during an indefinite shutdown:

- Minimum staffing levels will be maintained to carry out care and maintenance.
- The camp will be operated at reduced staffing levels.
- Environmental and geotechnical monitoring and sampling will continue at the regular level as set out in the mine operations and monitoring program, and in accordance with all applicable licenses, permits and authorizations.
- Monitoring of the pumps in the open pits will continue and the open pits will be maintained in a dry condition to maintain dry, stable pit slopes.
- Minimum 1 m cover of non-potentially acid generating waste rock will be placed over the exposed tailings beach areas to control dust.

- If necessary, the working face of the waste rock pile slopes will be graded to ensure stability and drainage to the surface water drainage system adjacent to the waste rock storage facilities. As the WRSF will be designed and operated for long-term stability, it is anticipated that any grading required will be localized and minimal. The TSF and WRSFs will be monitored to ensure the site stays in compliance with any permits and/or licences.
- The dikes will be monitored and maintained, and none of the dikes will be breached.
- Surface water control structures will be maintained as required. In areas where water quality is suitable for discharge, natural drainage courses may be re-established.

Tailings and water distribution lines will be drained or emptied, flushed with water, and allowed to drain. The lines will be removed and placed in a secure lay down area to reduce impacts on wildlife. Hazardous wastes and hazardous materials will be removed from site and sent for proper disposal at a licensed facility.

8.0 CLOSURE AND POST-CLOSURE MONITORING AND MAINTENANCE

The CRP is a "living" document and includes a commitment to adaptive management and monitoring during all stages of the mine life to demonstrate the safe performance of the mine facilities and to minimize any contamination on the site or in the adjacent area after mine operations cease. Monitoring during operations and in closure will identify non-compliant conditions; allow timely maintenance and clean up as needed; allow timely planning for adaptive and corrective measures; and enable successful completion of the CRP. In this way, the Project is not anticipated to contribute residual contaminants to the environment after closure and reclamation (FEIS Volume 10, Sections 10.1.9 and 10.2.7).

Monitoring programs will be initiated during pre-development, construction, and operations to provide additional baseline information on which to base the final CRP document. The adaptive management plans to be used in closure will follow the actions completed during operations, and will be co-ordinated with the existing operational monitoring programs (e.g., AEMP, TEMMP) to set appropriate trigger levels, and mitigation plans and actions.

Monitoring and maintenance programs that are implemented during the closure and post-closure phases of the mine life will use the data collected during operational monitoring to assess the performance of the reclamation and closure procedures, and identify long-term maintenance requirements, if any. The data collected during post-closure monitoring will allow the procedures and activities to be adjusted or modified as necessary to confirm ongoing environmental protection.

8.1 Operational Monitoring Strategies

The overall objectives of the Aquatics Effects Monitoring Plan (AEMP) and the Terrestrial Environment Management and Monitoring Plan (TEMMP) plans are to provide programs to identify and mitigate potential adverse Project-related impacts, so that construction and operational activities do not cause any undue harm to water quality, sediment quality, vegetation, biota, wildlife, and wildlife habitats. Both the AEMP and the TEMMP provide the basis for integrating monitoring efforts with future revisions to the CRP to ensure compliance with regulatory instruments and agreements, both federally and territorially, such as administered by the Nunavut

Water Board, DFO, NIRB, Kivalliq Inuit Association, Environment Canada, Aboriginal Affairs and Northern Development Canada (AANDC) and the Government of Nunavut.

The AEMP and the TEMMP would be reviewed and updated in the final year of operations to reflect conditions at the site as the mine approaches closure. The changes would allow the basic portions of the plans to continue to be used to cover the closure period activities. Finally, as the closure effort is completed, the 2 plans would be reviewed and updated again to cover the long-term or post closure monitoring period. It is anticipated in time it may be practical to reduce monitoring to a minimum.

8.2 Closure and Post-Closure Strategies

Development of monitoring and maintenance programs is an iterative process and will be developed in more detail in consultation with communities and regulators as the Project advances. The programs will be extensions of efforts undertaken during the operations phase and would reflect the success of the management of the site during operations to limit contamination. The actual conditions or impact from the operations within the mine footprint would be understood at closure and this information would be used to modify monitoring plans moving to closure and post-closure.

It is anticipated that monitoring and maintenance will be carried out during closure at frequencies similar to those required during operations. Post closure monitoring and maintenance will be carried out at a reduced frequency depending on the results of the monitoring and the measures of success selected for closure.

Guidance on generic monitoring and maintenance programs for closure and post-closure is provided in AANDC (2007). The relevant strategies are discussed below:

- Underground facilities
  - check for surface expression (subsidence) of underground failure;
  - conduct geotechnical assessment of the overall safety and risk within the subsidence zone;
  - install and check thermistors where appropriate to monitor freeze-back in permafrost areas and to confirm that ground thermal regime has not degraded;
  - periodically backfill areas of subsidence as required; and
  - monitor groundwater hydrogeology in the closure period with reduced monitoring in the initial stages of post closure. It is anticipated that after several years in the post closure period, monitoring would not be required.
- Open pits
  - identify unstable areas;
  - check ground conditions to confirm permafrost conditions are being re-established as predicted;
  - sample surface water and profiles of flooded ponds/pits;
  - sample quality of groundwater seeping from pit walls in the initial closure period to assess potential for contamination of mine water;
  - identify and test water management points (including seepage) that were not anticipated;
  - inspect barriers such as berms; and

  - inspect fish habitat in flooded pits where applicable.
- Waste rock storage facilities
  - perform periodic inspections by a geotechnical engineer to visually assess stability and performance of waste rock storage facilities;
  - perform periodic inspections of ditches and diversion berms to confirm performance of the features developed and check the performance is consistent with similar features in the region;
  - examine ground conditions to confirm predicted permafrost conditions are being established as predicted;
  - check thermistor data to determine thermal conditions within waste piles to confirm predicted permafrost aggradation/encapsulation where applicable;
  - test water quality and measure water volumes from controlled discharge points of workings to confirm that drainage is performing as predicted and not adversely affecting the environment and that the predictions of metal leaching and acid rock drainage are consistent with modelling completed during operations; and
  - identify water discharge areas (include volume and quality) that were not anticipated.
- Tailings storage facility
  - conduct periodic dike safety and stability reviews of structures that remain after closure;
  - inspect seepage collection systems for water quality flows;
  - inspect and maintain dike structures and/or spillways associated with tailings over the long-term;
  - check for degradation or aggradation of permafrost for tailings containment structures where permafrost was used in the design; and
  - monitor TSF site water quality to confirm closure targets.
- Mine infrastructure
  - maintain all buildings and equipment left on site during closure and until the equipment is removed; and
  - inspect disposal areas periodically to establish if any buried materials are being pushed to the surface as a result of frost heaving.
- Landfills
  - test water quality and quantity to measure the success of the mitigation measures for waste disposal areas;
  - identify any unpredicted sources of potential contamination; and
  - check for cracking or slumping of the cover and for underlying waste material pushing its way up through the cover.
- Biopile
  - identify reclaimed area for any unpredicted sources of potential contamination; and
  - sample surface water and soil if site specific conditions dictate during the closure period.

- Water management facilities
  - perform periodic inspections in the post-closure period to assess the performance of the existing water management structures;
  - check the performance of erosion protection on embankment structures such as rip-rap, and the physical stability of water management systems including permafrost integrity where applicable;
  - check water quality and flows to ensure system is working as predicted;
  - conduct ongoing inspection and maintenance of passive or active water treatment facilities associated with non-compliant mine water or runoff discharges; and
  - sample surface and groundwater if site specific conditions dictate during the closure period.

The closure and post-closure monitoring described above will determine the long-term maintenance that would be required for the post-closure period. It is planned that the AWAR would be maintained for sufficient period to enable access to the site for minor maintenance required in the initial portion of the post closure period. The maintenance anticipated would be for ditches and minor erosion. The need for this maintenance will be reduced with time once the surface water management ditches are well established and the pits are flooded. The AWAR will be completely removed once maintenance requirements are anticipated to be minor and could be achieved with small crews sent to site via helicopter in the summer. It is anticipated that the need for ongoing maintenance would be reduced with time or will not be required once the site is physically and chemically stable.

8.3 Post-Closure Revegetation Considerations

The pre-development terrain is covered by discontinuous vegetation interspersed with few bedrock outcroppings and continuously aggrading surfaces. The vegetation includes lichens, mosses, shrubs, heaths, grasses, and sedges. The reclamation plan will be designed to encourage a natural succession of indigenous plant species within disturbed site areas. Grading and contouring would be done, where appropriate, to control soil stability to promote revegetation by natural colonization. Revegetation studies would be completed to assess the potential for vegetation to establish in disturbed areas or on rockfill covers.

9.0 FUTURE STUDIES

The following studies are proposed to be completed as the Project progresses through construction and operations into closure. The results of these studies will be used to prepare future revisions of the CRP.

9.1 Tailings Storage Facility Thermal Assessment

Based on the ground temperatures measured in thermistors installed in the TSF footprint area and climate data for the Project site, it is anticipated that the TSF will freeze in the long term.

While freeze back of the tailings is not required as a long term management strategy (SD 2-3 TSF Preliminary Design Report), it is anticipated that a thermal assessment would be completed during the detailed design phases of the Project to confirm that the facility will freeze.

9.2 Revegetation Study

It is anticipated that natural vegetation should re-establish in most disturbed areas, on the TSF rock fill cover and on the surface of the waste rock storage facilities. Revegetation studies would be carried out to assess the potential of vegetation growth on disturbed areas and rock fill covers to confirm that natural revegetation will be successful.

9.3 Groundwater Quality Monitoring

Groundwater quality and surface water quality testing will be carried out through monitoring programs during construction and operations. The monitoring programs will evaluate the quality of surface water runoff and groundwater reporting to the mine site areas against surface water quality predictions. The design for the water treatment plant during closure, if needed, will be based and revised on the results of the water quality testing.

10.0 CLOSURE AND RECLAMATION SCHEDULE AND COST ESTIMATE

The preliminary CRP is based on conceptual level design for many facilities and correspondingly the proposed schedule is based on the conceptual closure methods and strategies discussed in the above sections. It is anticipated that the schedule will be refined throughout the mine life as the designs are advanced and the closure methods and strategies are further developed. All schedules are subject to changes in mine plans and market conditions. The proposed closure schedule is given in Figure 10.1.

A closure and reclamation cost estimate has not been finalized for the Preliminary CRP with the present mine layout and infrastructure. An estimate will be submitted to the Nunavut Water Board during the Type-A Water License process.

The assumptions that would be considered for estimating the duration of the closure and reclamation activities and the associated costs are summarized as follows:

- Construction and operations activities were based on the mine development sequence described in FEIS Volume 2.
- Pumping rates to flood each open pit would be based on filling all pits in 10 years. Re-sloping of the pit walls as required for long term stability would be carried out during operations. Closure construction activities for the open pits consist of placing a 2 to 3 m high berm along the edge of the pit perimeter in addition to the flooding. Plug construction at the surface portal near the mill would occur immediately after the underground mining is completed and as the workings are flooded.
- The Tailings Storage Facility will be progressively reclaimed during operations using a minimum 3 m thick non-PAG and non-metal leaching rockfill cover placed on the tailings surface as the tailings reach final elevation. The closure activities upon completion of mining and milling operations will be to drain the

Reclaim Pond into the attenuation pond, fill in the Reclaim Pond area, cover the remaining exposed tailings and construct the closure spillway. All water management facilities will be active during closure until water quality meet discharge criteria and dikes are breached. Ditches and ponds will be scarified to promote vegetation and natural drainage once the dikes have been breached.

- The AWAR will be active during closure until water quality meets discharge criteria and dikes are breached. The road surface will be scarified to promote vegetation and natural drainage once the dikes have been breached and access to the mine site is no longer required.
- Infrastructure will be dismantled and disposed of onsite or, if necessary, at an approved disposal facility or sold. The schedule conservatively considers all infrastructure being dismantled onsite and at Rankin Inlet.

LEGEND

- Operations
- Operations and Progressive Closure
- Closure
- Closure Monitoring
- Post Closure Monitoring

NOTE

Tailings Storage Facility Operations Duration obtained from Golder SD 2-3 TSF Preliminary Design Report all other durations obtained from DEIS Volume 2
Durations may change as designs are further progressed and evaluated against results of additional studies and monitoring results obtained during construction, operations and closure.

PROJECT

AGNICO EAGLE

AGNICO EAGLE MINES LIMITED
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

CLOSURE AND POST CLOSURE SCHEDULE

Golder Associates

PROJECT NO.		10-1373-0076	FILE No.	
DESIGN	AS	07 Sep. 2012	SCALE: N/A	REV. A
GIS	DSC	07 Sep. 2012		
CHECK	GA	29 Dec. 2012	FIGURE 10.1	
REVIEW	DW	29 Dec. 2012		

11.0 CLOSING REMARKS

This report should be read in conjunction with the included "Study Limitations" which is included in the report. The reader's attention is specifically drawn to this information, as it is essential that it be followed for the proper use and interpretation of this report.

We trust the above meets your current requirements. Should you have any questions or require further details please do not hesitate to contact the undersigned.

Yours very truly,

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

ORIGINAL SIGNED

John Hull, P.Eng. (BC, YK, NT/NU)
Principal, Senior Geotechnical Engineer

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Principal, Senior Water Resources Engineer

AS/JAH/DRW/lw

o:\final\2013\1428\13-1428-0007\feis ver 0\vol 2\sd 2-17\sd 2-17 doc 261-1314280007 0407_14 closure rec plan - mel ver 0.docx

12.0 REFERENCES

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