MEADOWBANK
MINING CORPORATION

MEADOWBANK GOLD PROJECT

PRELIMINARY CLOSURE & RECLAMATION PLAN

AUGUST 2007

EXECUTIVE SUMMARY

This document presents the preliminary Closure and Reclamation Plan for the Meadowbank Gold Project in Nunavut. The site is located in an arctic environment and is underlain by continuous permafrost. Key issues for successful completion of the Closure and Reclamation Plan are related to both physical components (open pits, buildings, site infrastructure, and waste storage areas) and chemical components (clean and "contact" waters, potential spills of contaminated waters, tailings, and hazardous materials). The plan emphasizes permanent, environmentally sound disposal and storage of tailings, waste rock, and other waste materials generated over the 8 year life of the project.

The objectives of the Closure and Reclamation Plan are to:

- Present a site characterization of the Project and proposed mine site, including the natural setting, history, and a description of the site's proposed facilities;
- Present reclamation measures to address the proposed disturbed areas;
- Provide a schedule of the activities for mining, reclamation and closure of the site;
- Provide a schedule of post closure monitoring activities; and
- Provide a budget of the estimated costs for closure and reclamation of the property.

The Project entails an 8,500 tonnes per day (t/d) mine and processing operation designed to produce gold doré bars on site. The operation will also produce a total of 182 million tonnes (Mt) of mine waste rock, 9 Mt of overburden, and 22 Mt, or about 15 million cubic metres of tailings over the life of the mine. Four deposits will be developed containing the following rock types of varying chemical characteristics:

- Portage Area (North Portage/Connector Zone, and Third Portage Deposits) and Goose Island deposits – iron formation, intermediate volcanic, ultramafic, and minor quartzite rocks; and
- Vault Deposit – intermediate volcanic rocks.

The Portage and Goose Island deposits are located in a centralized mining and milling area. The Vault deposit is approximately 6 km to the north.

Some of the waste rock and all of the tailings are potentially acid-generating (PAG). The ultramafic rocks and approximately 72% of the intermediate volcanic rocks are expected to be acid buffering (non-PAG), while all iron formation, quartzite and the balance of intermediate volcanic rock are either PAG or have an uncertain potential to generate acid rock drainage (ARD). Suitable mine

waste rock will be used for mine development and construction purposes. Some of the reactive waste rock will be placed back into the Portage open pit to be flooded at end of mine life, or will be used to construct fish habitat within Second Portage and Third Portage lakes. Remaining waste rock will be stockpiled in Rock Storage Facilities (RSF) near the Portage and Vault open pit areas. Tailings from process operations will be deposited by pipeline in the Tailings Storage Facility (TSF).

Water management facilities will include some 4 km of Dewatering Dikes, water diversion and collection systems, contact water attenuation ponds and tailings water Reclaim Pond. Once mining and milling has been completed, reclaim water will be drained from the TSF and treated if required prior to discharge to the Goose Island or Portage pit lakes. Treatment of reclaim water, if required, may be completed in-situ or via a water treatment plant. The Dewatering Dikes will be constructed and maintained to enable open pit mine operations to progress from on-land pits initially, to deposit extensions beneath adjacent lakes, and to allow monitoring of pit lake water quality at closure. Diversion ditches will direct clean runoff water away from areas affected by mining activities. Contact water originating from project use areas will be intercepted, collected, and conveyed to central storage facilities and decanted to treatment facilities, if necessary, or to receiving lakes at the end of the mine life. Areas within the dewatered Vault Lake and northwest arm of Second Portage Lake will serve as central water attenuation ponds for the Vault and Portage mine areas, respectively.

This preliminary Closure and Reclamation Plan is based on the anticipated site conditions and water balance during the final year of mine operations and is summarized below.

Open Pits

At the end of active mining operations, rock berms will be placed around the perimeters of the pits that will be above water to restrict access and minimize hazards to people and wildlife. Re-watering of the Goose Island and Portage pits will commence before the completion of mining activities at Vault. All of the pits will eventually be flooded. The Dewatering Dikes will remain in place until water levels equilibrate and the quality of pit lake waters is acceptable for mixing with adjacent lakes.

Buildings and Infrastructure

The Process Plant and related buildings will be dismantled and either removed off site as salvage materials, or if not removed off site for salvage, would be decontaminated and disposed of in the open pits or Portage RSF. This includes the primary crusher, ore storage building, mill complex, site services, and power plant.

Other structures and buildings, including the camp complex, the shop, warehousing, and office complex, the mine site tank farm, and miscellaneous dry storage facilities, will be dismantled and disposed of on site in the Portage RSF. Any hazardous material would be washed or removed before disposal.

The ground surface in areas used for the facilities listed above and for other infrastructure associated with mine operations, such as the airstrip, roads, storage pads, quarries, and granular borrow areas (if present), will be recontoured and reclaimed according to site-specific conditions to minimize erosion from surface runoff and wind-blown dust and to enhance the sites for wildlife habitat.

Tailings and Rock Storage Facilities

The TSF and the Portage and Vault RSFs will be closed progressively during mine operations. Waste rock placed in the Portage Pit will be flooded upon completion of mining.

A dry cover of acid buffering, non-PAG ultramafic rockfill will be placed over Portage waste rock piles containing PAG materials and over the previously drained TSF to confine the active permafrost layer within relatively inert materials.

At present, a cover is not anticipated to be required at the Vault RSF as static and kinetic test results suggest that the bulk of the material is non-PAG and that a sufficient quantity of buffering rock is present within the pile to neutralize any localized acidification. Drainage water quality will be monitored during operation and post closure to confirm predictions.

The progressive closure activities will be monitored, inspected, and maintained during and post mine operations. Procedures will be modified as required to achieve the objectives of the Reclamation and Closure Plan.

Water Management Facilities

The Reclaim Pond will remain in place until mining has been completed. At closure, reclaim water will be discharged to the Portage or Goose Island pit lakes, which will be isolated from the receiving lakes by the Dewatering Dikes. If required, reclaim water will be treated prior to discharge to the pit lakes; treatment

may be in-situ (within the Reclaim Pond) or via a water treatment plant. Once drained, the Reclaim Pond area will be filled with acid buffering ultramafic rock, and contoured to promote drainage. Additional surface water collecting within the Reclaim Pond area will be monitored and treated, if necessary, prior to release to the Goose Island or Portage pit lakes. Once monitoring indicates that the runoff water quality is acceptable for mixing with receiving lakes, surface water runoff from the TSF will be allowed to flow to Third Portage Lake untreated.

Water quality predictions suggest treatment of Portage and Goose Island pit lake water will not be required; however, in-situ treatment through lime addition to control pH will be applied if necessary. Once monitoring results demonstrate that the water quality of all contact water is acceptable for discharge to the environment without further treatment, the Portage and Goose Island pit lakes will be hydraulically re-connected with Third Portage Lake through breaching of the Goose Island Dike. Dike breach will occur only after the Portage and Goose Island pit lake water levels have equilibrated with Third Portage Lake, and pit lake water quality is deemed acceptable for mixing with receiving lakes.

The Vault Attenuation Pond and Pit within the Vault Lake basin will be reflooded upon cessation of mining activities. Water quality predictions suggest treatment will not be required; however, water quality will be monitored, and in-situ treatment will be undertaken if necessary. The concentrations of constituents that are to be monitored in the Vault Pit Lake are currently predicted to meet the Metal Mining Effluent Regulations (MMER) for all constituents. In addition, the water quality is predicted to be within the recommended Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life, for the majority of constituents except for cadmium, copper, and zinc, whose concentrations are predicted to be of the same order of magnitude as the guidelines. The Vault Dike will be breached only after the Vault Pit Lake water level has equilibrated with Wally Lake, and pit lake water quality is acceptable for mixing with receiving lakes.

All contact water ditches and sumps will be drained, recontoured, stabilized and/or capped to minimize erosion from surface runoff and wind-blown dust. Non-contact water diversion ditches may be retained to promote surface water drainage.

The final Reclamation and Closure Plan will be developed in conjunction with the mine plan so that considerations for site closure can be incorporated into the mine design. Monitoring will be carried out during all stages of the mine life to demonstrate the safe performance of the mine facilities. If any non-compliant conditions are identified, then maintenance and planning for corrective measures will be completed in a timely manner to ensure successful completion of the Reclamation and Closure plan.

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SECTION 1 • INTRODUCTION

Meadowbank Mining Corporation (MMC), formerly Cumberland Resources Ltd. (Cumberland), has decided to develop the Meadowbank Gold Project, approximately 70 km north of Baker Lake, Nunavut as shown on Figure 1.1. This Preliminary Closure and Reclamation Plan is a required component to the Type-A Water License Application for the Project (MMC, 2007a).

The design goals for the Project include minimizing the area of surface disturbance, stabilizing disturbed land surfaces against erosion, and returning the land to suitable conditions for post-mining uses such as traditional pursuits and wildlife habitat. Successful completion of the Closure and Reclamation Plan involves both physical components (open pits, buildings, site infrastructure, and waste storage facilities) and chemical components (clean and contact waters, potential spills of contaminated waters, tailings, and hazardous materials). To provide flexibility, the Closure and Reclamation Plan is based on adaptive management methods and will be progressively modified in accordance with the results of ongoing monitoring and assessment during mine operations. The strategy outlined in this Plan is considered appropriate at this stage of the Project.

The proposed facility layout for the project is shown in Figure 1.2. The site will include the following structures and facilities:

- open pits;
- Dewatering Dikes (Vault Dike, East Dike, Bay Zone Dike and Goose Island Dike);
- Tailings Storage Facility (TSF) and related infrastructure;
- Rock Storage Facilities (RSFs);
- plant site and ancillary facilities;
- airstrip, roads, and storage areas;
- quarries and granular borrow areas, if present;
- water management facilities;
- All-Weather Private Access Road (AWPAR); and
- dry storage and marshalling facilities at Baker Lake.

MEADOWBANK **MINING CORPORATION**	
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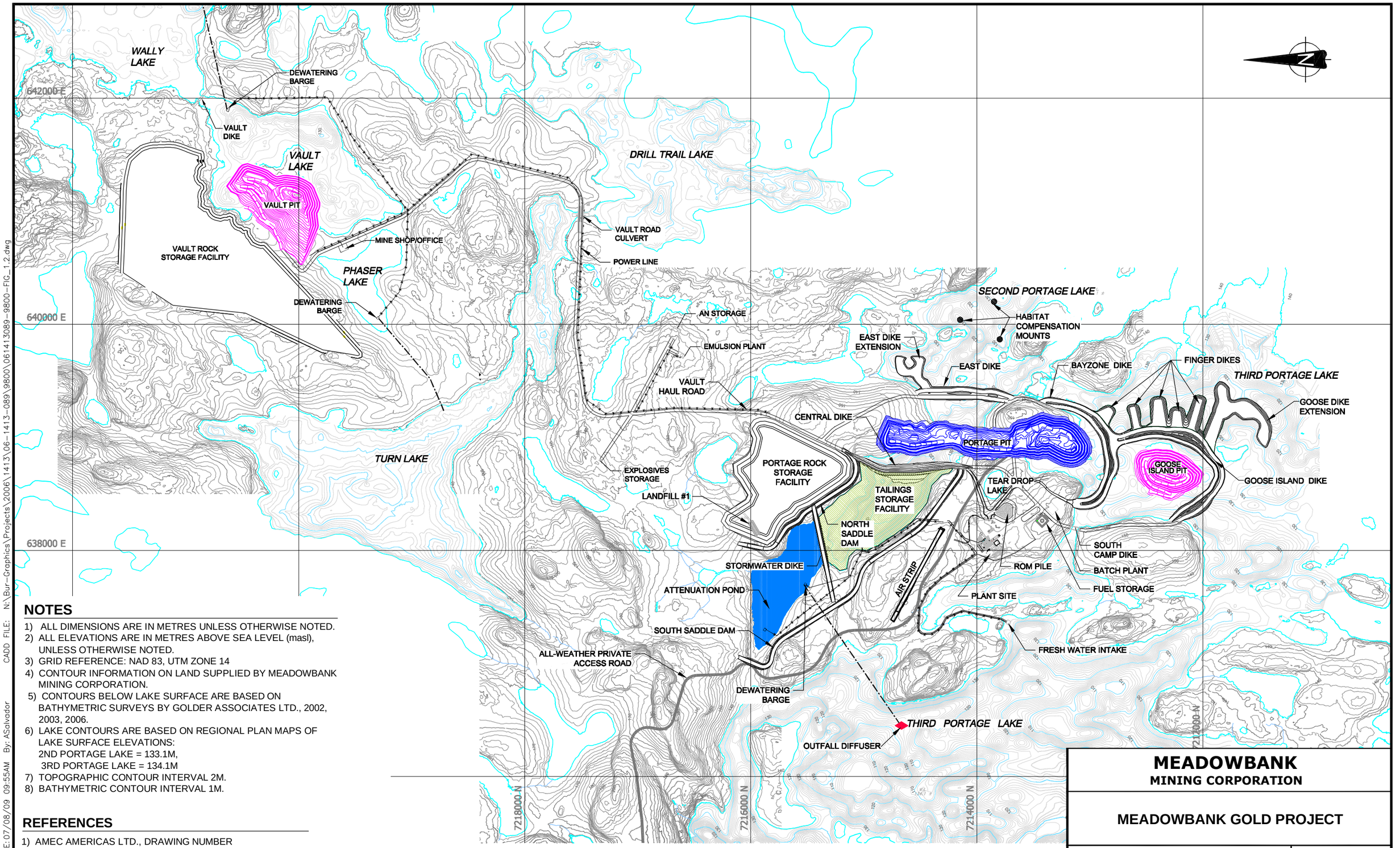
MEADOWBANK PROJECT LOCATION	**FIGURE 1.1**

REVISION DATE: 07/08/09 08:20AM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2006\1413\06-1413-089\9800\061413089-9800-FIG_1.1.dwg



NOTES

1) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2) ALL ELEVATIONS ARE IN METRES ABOVE SEA LEVEL (masl), UNLESS OTHERWISE NOTED.
3) GRID REFERENCE: NAD 83, UTM ZONE 14
4) CONTOUR INFORMATION ON LAND SUPPLIED BY MEADOWBANK MINING CORPORATION.
5) CONTOURS BELOW LAKE SURFACE ARE BASED ON BATHYMETRIC SURVEYS BY GOLDER ASSOCIATES LTD., 2002, 2003, 2006.
6) LAKE CONTOURS ARE BASED ON REGIONAL PLAN MAPS OF LAKE SURFACE ELEVATIONS:
   2ND PORTAGE LAKE = 133.1M,
   3RD PORTAGE LAKE = 134.1M
7) TOPOGRAPHIC CONTOUR INTERVAL 2M.
8) BATHYMETRIC CONTOUR INTERVAL 1M.

REFERENCES

1) AMEC AMERICAS LTD., DRAWING NUMBER A1-131395-100-C-0001 (100-C-0001.DWG), MEADOWBANK FEASIBILITY STUDY, APRIL 2005.

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GENERAL SITE PLAN | **FIGURE 1.2**

REVISION DATE: 07/08/09 09:55AM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2006\14131_06-1413-089\9800\061413089-9800-FIG_1.2.dwg

This Preliminary Closure and Reclamation Plan addresses all of these project components, as well as the handling of contaminated materials, hazardous wastes, and non-hazardous wastes.

1.1 SCOPE OF PRELIMINARY CLOSURE AND RECLAMATION PLAN

This Preliminary Plan is an update to the existing "Conceptual" Closure and Reclamation ("C&R") Plan (Cumberland, 2005a), in compliance with NIRB requirements for a Type A Water License.

The objectives of this Plan include:

- Comply with the Indian and Northern Affairs Canada (INAC) 2006 policy requirement for full cost of restoration (clean-up, modification, decommissioning, abandonment);
- Promote environmental stability of facilities and infrastructure and minimize maintenance and monitoring requirements at abandonment;
- Minimize potential impacts from contaminants and waste (acid rock drainage [ARD]);
- Ensure removal of all hazardous materials and waste; and,
- Assist in the development of written agreements with contractors to ensure all sites are cleaned up.

1.2 REGULATORY REQUIREMENTS

1.2.1 Water License Requirements

Section 173(1) of the Nunavut Waters and Nunavut Surface Rights Tribunal Act (Department of Justice Canada, 2002, c-10) states that the regulations made pursuant to the Northwest Territories Waters Act will continue to apply in Nunavut until they are replaced or repealed under the Act. Therefore, the Northwest Territories Waters Regulations (SOR/93-303) continue to apply in Nunavut, with some exceptions.

In December 2006, the Nunavut Impact Review Board (NIRB) granted Cumberland a project certificate, under the document Meadowbank Gold Mine Project Certificate; Nunavut Land Claims Agreement Article 12.5.12. The commitments pertaining to the Closure and Reclamation Plan are addressed in this document.

1.2.2 Nunavut Guidelines and Regulations

MMC has complied with all governmental policies and regulations pertaining to environmental and socioeconomic issues in developing the Meadowbank Gold Project and have a solid local employment and safety record over nine years of exploration in Canada's Arctic.

MMC has been forthcoming with all government authorities during all aspects of project development, and have a good rapport with the local Inuit people based on mutual respect and communication. In 2007, Agnico-Eagle Mines Limited through its purchase of Cumberland became the owner of the Meadowbank Gold Project. Agnico-Eagle intends to build a mine with integrity; one that is safe, environmentally responsible, and beneficial to all parties involved. To this end, Agnico-Eagle intends to balance good stewardship in the protection of human health and the natural environment with the need for economic growth.

This Preliminary C&R Plan was created consulting the following guidelines and regulations:

- Mine Site Reclamation Guidelines for Nunavut, Indian and Northern Affairs Canada, 2002;
- Mine Site Reclamation Guidelines for the Northwest Territories, Indian and Northern Affairs Canada, Yellowknife, NWT. January 2006 Version;
- The Metal Mining Effluent Regulations (MMER);
- Canadian Environmental Quality Guidelines, Canadian Council for Ministers of the Environment (CCME);
- Report on the Implications of the Precautionary Principle in Northern Mine Design and Closure, Indian and Northern Affairs Canada (INAC), March 27, 2003;
- Financial Assurance for Mine Closure and Reclamation, International Council of Mining & Metals, February, 2005; and,
- Framework for Responsible Mining: A Guide to Evolving Standards, Executive Summary, M. Miranda, D. Chambers and C. Coumans. October 2005.

SECTION 2 • SITE HISTORY

The Meadowbank property is located in the Kivalliq Region of Nunavut approximately 70 km north of the Hamlet of Baker Lake on Inuit-owned surface lands as shown on Figure 1.1. MMC has been actively exploring the Meadowbank area since 1995.

The original Cumberland camp, now referred to as the South Camp, was erected in 1995 on an island in Third Portage Lake in close proximity to the Third Portage and Goose Island Deposits. As the project advanced, additional space was required to accommodate larger field crews. In the summer of 2002, a new kitchen and dry facilities were constructed at the North Camp, located on the mainland approximately one kilometre north of the South Camp.

The location of the new site was selected on the basis of its proximity to the proposed mill complex required for development of the Meadowbank Gold Project. This location will allow the new camp to possibly be used as an initial construction camp. In the spring of 2003, a new office and core processing facilities were constructed at the North Camp. Decommissioning and progressive reclamation of the South Camp was also initiated in 2003.

Fuel storage systems at the site now utilize four 50,000 L and five 75,000 L double walled fuel “vaults”. Originally four 50,000 L tanks were installed in the South Camp for diesel containment. These tanks have now been moved to the North Camp and are installed next to the new 75,000 L tanks, installed in 2003, to provide storage for approximately 451,250 litres of diesel fuel and 71,250 litres of Jet-A. Transportation systems have also been upgraded to accommodate bulk fuel transport of both diesel and Jet-A fuels.

A proposal was made in the fall of 2003 for the construction of a single 5 ML fuel tank at the Meadowbank site which would provide increased diesel storage capacity and allow for consolidation of the multiple tanks currently in use. This tank is scheduled to be installed in 2007.

A 900 m long airstrip is located immediately northeast of the camp. The strip is of a suitable length to accommodate use by small aircraft, as required, in support of exploration work at the site.

SECTION 3 • CURRENT SITE CONDITIONS AND ENVIRONMENTAL BASELINE RESULTS

Engineering, environmental baseline studies and community consultations were undertaken concurrently with the exploration program discussed in Section 2.0. These studies were integrated in the Final Environmental Impact Statement (FEIS), submitted to NIRB on October 2005 (Cumberland, 2005b). The FEIS was submitted in accordance with the NIRB requirements for proposed mine developments established by Part 5 of the Nunavut Land Claims Agreement. The FEIS provided a detailed description of the proposed project, current physical, biological, and socioeconomic conditions, potential impacts, mitigation and management strategies, and long term monitoring plans. An overview of the biophysical, biological and socio-economic environments is presented below. The information in Section 3.1.1 summarises key data presented in the Baseline Physical Ecosystem Final report (Cumberland, 2005i).

3.1 BIOPHYSICAL ENVIRONMENT

3.1.1 Physical Environment

The Meadowbank Gold Project is located within the Low Arctic ecoclimatic zone, one of the coldest and driest regions of Canada. The topography of the area is of generally low relief with an elevation of approximately 70 m. The surficial geology is dominated by discontinuous thin veneers of organic material, till, and/or weathered parent material overlying undulating to hummocky bedrock.

The underlying bedrock consists of iron formation (IF), intermediate volcanic (IV), and ultramafic (UM) rocks, with quartzite (QTZ) in some areas. Two main faults, the Bay Zone Fault and the Second Portage Fault, are present. The sheared and faulted stratigraphic contacts and overall foliation orientations will dip at steep angles to the west at the western and eastern margins of the Third Portage and Goose Island deposits, while they dip at shallower angles through the central portion and north end of the Third Portage deposit, the Connector Zone and the North Portage deposit. The sheared stratigraphic contacts and overall foliation orientations at the Vault deposit will dip to the south and southeast at shallow angles.

The observed periglacial geomorphic processes are typical of areas underlain by continuous permafrost, although their expression is subdued by the relatively thin cover of overburden and the relatively dry site conditions. In general, the geomorphology and soils observed within the area do not present any features or processes that prohibit the development of the proposed mine.

Continuous permafrost to depths of between 450 m and 550 m underlies most of the Project area. The depth of the active layer in the Project area ranges from about 1.3 m in areas of shallow overburden and

away from the influence of lakes, up to 4 m adjacent to lakes, and up to 6.5 m beneath the stream connecting Third Portage and Second Portage lakes. It is suspected that Second Portage and Third Portage lakes have taliks extending through the permafrost. The talik beneath Vault Lake (if present) is considered to be isolated, not extending through the permafrost.

The shallow groundwater flow regime at the Project site has little to no hydraulic connection with the groundwater regime located below the deep permafrost. On a regional scale, deep groundwater in the Project area is suspected to flow either to the northwest or to the southeast from Third Portage Lake. This is due to the project being located near the drainage divide between the Back River Basin, which flows north and northwest to the Arctic Ocean, and the Thelon River Basin, which flows east to southeast towards Hudson Bay. The northwest portion of Second Portage Lake, however, is a discharge zone with water flowing upwards from the deep groundwater regime. This is due to large and higher elevation lakes located to the east of Second Portage Lake.

The groundwater velocity near the Second Portage Lake and Third Portage Lake was estimated to be between 0.30 and 0.50 m per year although flows may be higher along specific features such as the Second Portage Lake Fault.

3.2 BIOLOGICAL AND SOCIO-CULTURAL ENVIRONMENTS

3.2.1 Biological Environment

Vegetation Cover

The Meadowbank study area lies at the lower end of the Northern Arctic Ecozone and is characterized by a continuous vegetation cover interspersed with bedrock outcroppings and continuously aggrading surfaces (Cumberland, 2005i).

Vegetative cover is composed of lichens, mosses, ericaceous shrubs and heaths, herbs, grasses, and sedges. Baseline vegetation studies indicated that vegetation at the mine site is typical of upland tundra. No sensitive, rare, or endangered species or communities were identified.

Wildlife

Multiple surveys were used to establish baseline conditions and determine diversity, relative abundance, and distribution of wildlife species within the local and regional study areas. Based on existing information, baseline surveys, and traditional knowledge, the Meadowbank area and vicinity is

considered to be a low usage area for caribou hunting and is not used as a calving area for caribou. Grizzly bears have only been observed on two occasions since 1996.

Breeding land birds include Lapland longspur, horned lark, rock ptarmigan and savannah sparrow. Raptors, including peregrine falcon, rough-legged hawk, snowy owl, and gyrfalcon have been seen occasionally. Water birds occur at low densities with Canada goose, long-tailed duck, and loons being the most common. Waterfowl confirmed as nesting within the local study areas include long tailed duck, northern pintail, and Canada goose.

Fish Populations & Habitat

Key fish species in the Meadowbank region are lake trout, Arctic char, and round whitefish. Arctic char in the system are landlocked since there is an impassable barrier on the Quiche River near Chesterfield Inlet. Traditionally, fish has been the secondary food source for Baker Lake residents after caribou meat. Fishing is a year-round activity that is pursued on lakes near the community and Whitehills Lake, south of Meadowbank.

Second Portage, Third Portage, Tehek, and Turn lakes have been the subject of studies investigating seasonal and inter-annual trends in water and sediment quality, lower trophic level, community structure and abundance, and fisheries. All of the lower trophic level taxa identified from the project lakes are common, widespread species that are well known from this region of the Arctic.

Rare and Endangered Species

No rare or regionally unique vascular plants or plant communities have been found within the mine site or access road local study areas (LSAs) (Cumberland, 2005i).

3.2.2 Socio-Cultural and Socio-Economic Environment

The Kivalliq Region, one of three administrative regions in Nunavut, had an estimated population of over 7,500 people in 2001 (Cumberland, 2005b). Baker Lake, with an estimated population of over 1,500 in 2001, is the only inland Kivalliq Region community. In an economy that is predominantly based on traditional activity and government services, there are few employment opportunities for Baker Lake's growing labour force, with its constrained educational achievement. Unemployment levels are very high compared to the rest of Canada. Poor employment prospects have translated into a recent decline in family incomes, which in Baker Lake are substantially lower than in the region and the territory. The challenges to community health and wellness are large.

Participation in traditional ways of life is high, at about 50% both in Nunavut as a whole and in Baker Lake. Traditional activities shape social relationships and are a source of individual identity and values, sustaining Inuit culture.

During archaeological surveys, a total of approximately 70 sites were recorded. Most of the sites identified were considered temporary campsites that had been occupied relatively recently. Tent rings, autumn houses (qarmait), hearths, shelters, inuksuit, markers, blinds, caches, storage features, kayak stands, fox traps, and other unidentified features are described in the Baseline Archaeology Report (Cumberland, 2005c). No Pre-Dorset or Dorset sites were encountered in the study area, and only one Thule or early historic site was visited.

The area between Baker Lake and the mine site is considered primarily a transit route to Back River, a traditional winter hunting and fishing area. This is the likely origin of many campsites and other heritage features along the corridor, as supported by traditional knowledge.

A lack of human activity in Meadowbank prevails today. The area is not used by trappers, outfitters, tourist operators, or any other commercial organizations.

SECTION 4 • PROJECT DESCRIPTION

4.1 GENERAL DESCRIPTION OF MINE AND PLAN FOR CLOSURE

The Meadowbank Gold Project consists of several gold-bearing deposits within reasonable proximity to one another. The four main deposits are:

- Third Portage (including the Connector zone);
- North Portage;
- Goose Island; and
- Vault.

The Third and North Portage deposits will be mined as a single pit (Portage pit) approximately 2 km long running north-south. The Third Portage deposit extends from a peninsula northward under Second Portage Lake and southward under Third Portage Lake. The North Portage deposit is on the northern shore of Second Portage Lake.

The Goose Island deposit lies approximately 1,000 m south of the Third Portage deposit and extends beneath Third Portage Lake. The Vault deposit is located on a peninsula approximately 6 km north of the other mining areas and extends eastward under Vault Lake.

4.2 DIKES AND OPEN PITS

The deposits will be mined as truck-and-shovel open pit operations. A series of Dewatering Dikes will be required to isolate the mining activities from the lakes overlying or adjacent to parts of the deposits. It is proposed to use overburden and rock materials produced during initial mining on the Portage Peninsula or stripped from the footprint of the proposed RSF areas for dike construction.

The three open pits and their associated Dewatering Dikes are listed below, as shown in Figure 1.2:

1. The Third Portage and North Portage deposits will initially be mined in separate pits. The Connector Zone pit will ultimately amalgamate all three pits to form the Portage pit. Dewatering will be achieved using the East Dike and the Bay Zone Dike;

2. The Goose Island Pit. Dewatering will be achieved using the Goose Island Dike and South Camp Dike; and

3. The Vault Pit. Dewatering will be achieved using the Vault Dike.

Run-of-mine ore from the open pits will be trucked to a primary crusher and stockpiled for plant feed. Ore from the stockpile will be conveyed through a crushing and milling circuit to the process plant for treatment through gravity and leach circuits for the production of gold doré bars.

The mining plan indicates that approximately 22 Mt of ore will be mined and processed over 8 years. The mine and processing operation will generate approximately 182 Mt of waste rock materials, and 9 Mt of overburden soil and organic materials. Most of the waste rock will be delivered directly to RSFs, with lesser amounts used to construct fish habitat within Second Portage and Third Portage Lakes, or backfilled into the Portage Pit toward the end of mine life. Waste rock will also be used to construct graded surfaces for the plant site, ancillary facilities, airstrip, and roads; to construct the Dewatering Dikes; and to cap the TSF and PAG sections of the Portage RSF.

Mine pre-stripping and plant-site construction activities will be carried out over a period of 2 years, followed by the start-up of mining and process operations. Mine decommissioning and closure activities will commence on completion of mine operations, approximately 8 years from start-up, and be completed over a period of approximately 2 years. Pit flooding, water management, and closure monitoring will continue for an additional 2 to 3 years. Filling of the Goose Island Pit and the Portage Pit will commence following the completion of mining, in Year 4-5. In Year 6, tailings deposition will begin in the Portage Attenuation Pond basin, and contact water will be diverted to the Goose Island Pit Lake to assist with pit flooding. Filling of the Portage Pit will also commence before closure, once mining of the pit has been completed in approximately Year 5. Post-closure monitoring will commence after this period.

4.3 RECLAIM POND

Approximately 22 Mt, or 15 Mm3 of tailings will be produced and deposited by pipeline in the TSF over the mine life.

4.4 SADDLE DAMS

Saddle Dams will be constructed to retain the tailings and limit seepage from the TSF, and to act as a haul road surface during construction, and a pipe berm for tailings deposition (Golder, 2007a). Specifically, The North Saddle Dam is designed as a haul road and pipe berm only, while the South Saddle Dam is designed as a seepage and tailings barrier.

The South Saddle Dam will be constructed by dumping a 30 m wide rockfill along the alignment, re-sloping the upstream face, excavating a trench to bedrock along the upstream toe and the installation of an impermeable element.

The Saddle Dams will be constructed primarily of rockfill. Ice rich soils will be removed prior to construction.

4.5 CENTRAL DIKE

The Central Dike will be constructed across Second Portage Lake to create the TSF in the northwest arm of Second Portage Lake. The Central Dike is designed to retain tailings and the section includes a cutoff trench connected to a grout curtain at the upstream toe. Tailings will be transported by pipeline from the Process Plant to the TSF and spigotted from the Central Dike to fill the TSF progressively towards the west. The Central Dike will ultimately be some 3 to 4 meters above the surface of the tailings to allow for placement of the 2 m thick cap of ultramafic rock over the deposited tailings as shown on Figure 4.1.

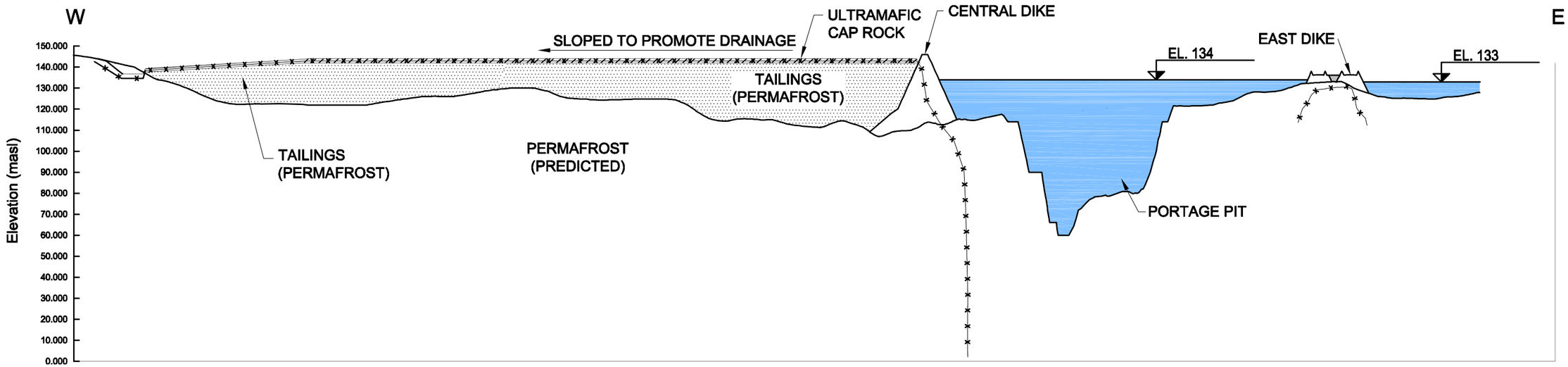
Upon closure, flooding of the Portage Pit will pond water against the downstream slope of the Central Dike.

4.6 ROCK STORAGE FACILITIES

Waste rock from the open pits not used for site development purposes will be deposited in the Portage and Vault RSFs. A smaller proportion will be placed in the Portage Pit near the end of pit operations or will be used to construct fish habitat with Second Portage and Third Portage lakes. The Vault and Portage RSFs will be closed progressively during the later stages of mine operations as the lifts of rock reach their ultimate elevation. Although all rock placed in the RSFs is expected to freeze, facility design in terms of permanent physical stability is not dependent on freezing.

During the later stages of mining of the Portage Pit, some waste rock will be placed back into the pit to be flooded during closure. Some Portage and Goose Island pit waste rock will also be used to build a series of fish habitat finger dikes and dike extensions extending from Goose Island and East dikes out into deep water. In addition, some rock will be used to construct a series of fish habitat compensation mounts within Second Portage Lake.

The mine plan will facilitate management of the non-PAG rock so that sufficient volume is produced from the Portage and Goose Island pits to adequately cover the Portage RSF, both during normal mining operations and immediately after mine closure, so that the underlying PAG waste rock is kept frozen at closure. For the feasibility-level assessment, it is assumed that the cover layer of non-PAG rock will be at least 2 m thick, requiring at least 2.5 Mt, or about 12% of the total amount of ultramafic rock supplied from Portage and Goose Island pit operations. This is shown on Figure 4.2. This thickness is consistent with other mines in the north. Depending on the results of thermal monitoring during mining operations,



A 7.1 CROSS SECTION A-A'
TAILINGS STORAGE FACILITY

0 100 200 300 400 500
Horizontal Scale in Metres

0 20 40 60 100 120
Vertical Scale in Metres

LEGEND:

PERMAFROST BOUNDARY (INFERRED)

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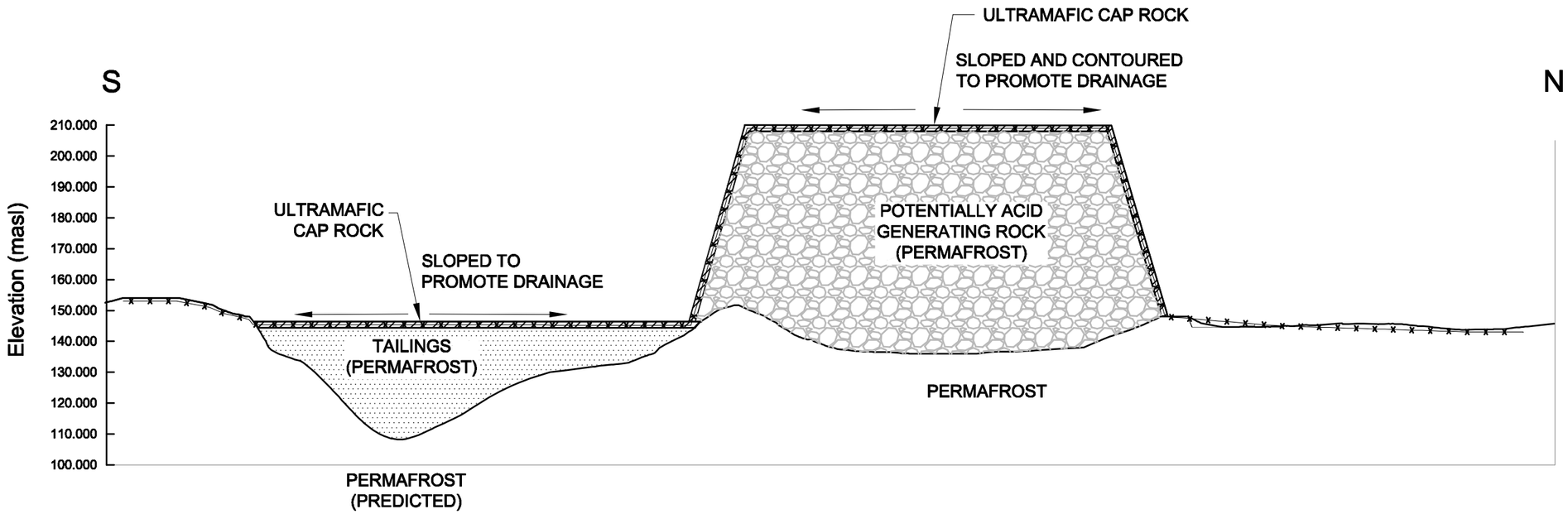
PORTAGE TAILINGS STORAGE FACILITY CLOSURE CONCEPT CROSS SECTION

FIGURE 4.1

REVISION DATE: 07/08/09 09:06AM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2006\1413\06-1413-089\9800\061413089-9800-FIG_4.1.dwg



CROSS SECTION B-B'
PORTAGE ROCK STORAGE FACILITY

B
7.1

0 100 200 300 400 500
Horizontal Scale in Metres

0 20 40 60 100 120
Vertical Scale in Metres

LEGEND:

PERMAFROST BOUNDARY (INFERRED)

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PORTAGE ROCK STORAGE CLOSURE DESIGN CONCEPT CROSS SECTION

FIGURE 4.2

REVISION DATE: 07/08/08 03:13PM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2006\1413\06-1413-089\9800\061413089-9800-FIG_4.2.dwg

the cover thickness design for closure may need to be adjusted. If the mine plan does not provide the quantities of non-PAG rock required at the scheduled times, it may be necessary to stockpile cover material adjacent to the waste rock pile for use later when needed.

A cover layer of non-PAG rock is predicted not to be required at the Vault RSF because the bulk of this rock is considered to be non-PAG. A cross section through the Vault RSF and Vault Pit Lake is shown on Figure 4.3. The drainage from the Vault RSF will be monitored during operations to verify predictions.

The final surfaces of both RSFs will be regraded to blend into the existing topography and to enhance conditions for wildlife access. On closure, the seepage and runoff collection sumps at both RSFs will be drained. A layer of non-PAG rock cover will be placed over any sediment in the sumps to prevent dusting and erosion.

The discharge water quality and water management structures for the RSFs 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.

4.7 ACID ROCK DRAINAGE (ARD)

Some of the waste rock and all of the tailings are potentially acid-generating (PAG). The ultramafic rocks and approximately 72% of the intermediate volcanic rocks are expected to be non-PAG, while all iron formation, quartzite and the balance of intermediate volcanic rock are either PAG or have an uncertain potential to generate ARD. Suitable waste rock will be used for mine development and construction purposes. Most of the rest will be stockpiled in separate RSFs in the Portage and Vault open pit areas. A smaller amount will be placed with the Portage Pit at the cessation of pit operations, or will be used to construct fish habitat within Second Portage and Third Portage Lakes. Tailings from process operations will be deposited by pipeline in the TSF.

As discussed in Section 4.1.4, the mine plan will facilitate the management of the non-PAG rock from the Portage Goose Island pits to adequately cover the Portage RSF. It is assumed that the cover layer of non-PAG rock will be at least 2 m thick, requiring at least 2.5 Mt, or about 12% of the total amount of ultramafic rock supplied from Portage Goose Island pit operations.

LEGEND:

PERMAFROST BOUNDARY (INFERRED)

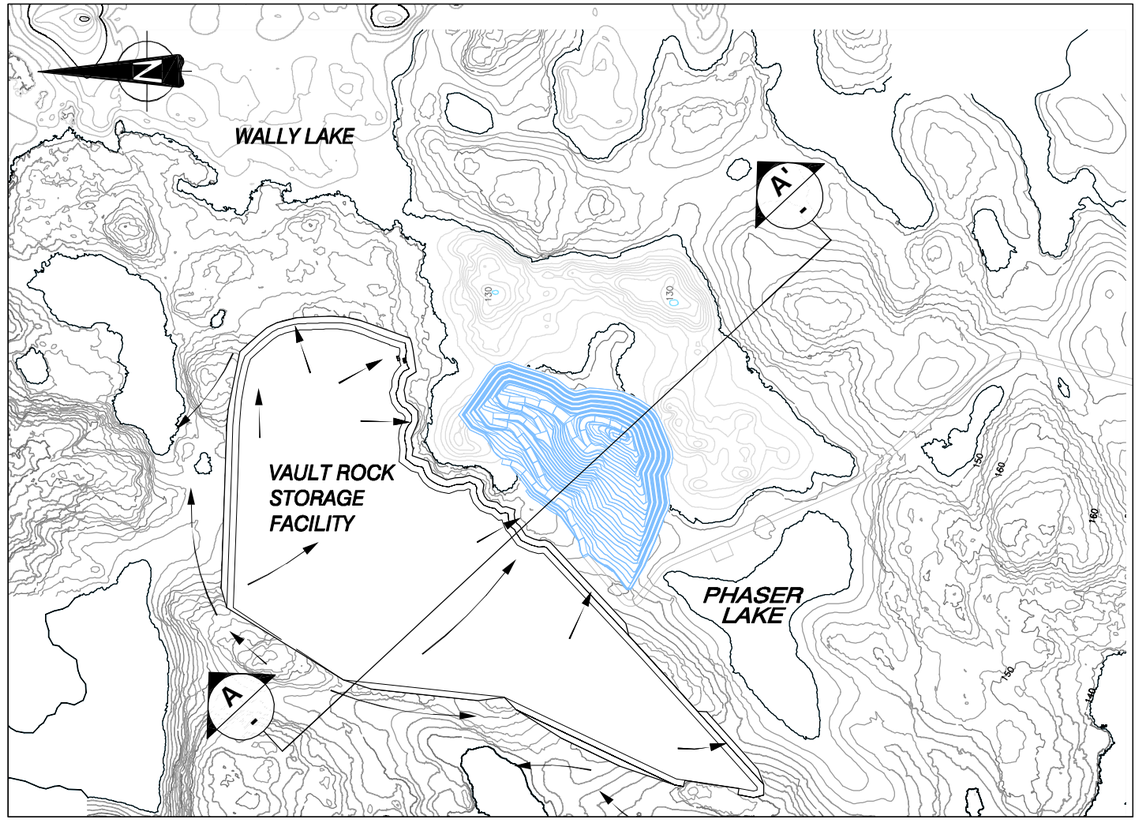
NOTES

1) TOPOGRAPHIC CONTOURS - 2M INTERVAL

2) BATHYMETRY CONTOURS - 1M INTERVAL

REFERENCES

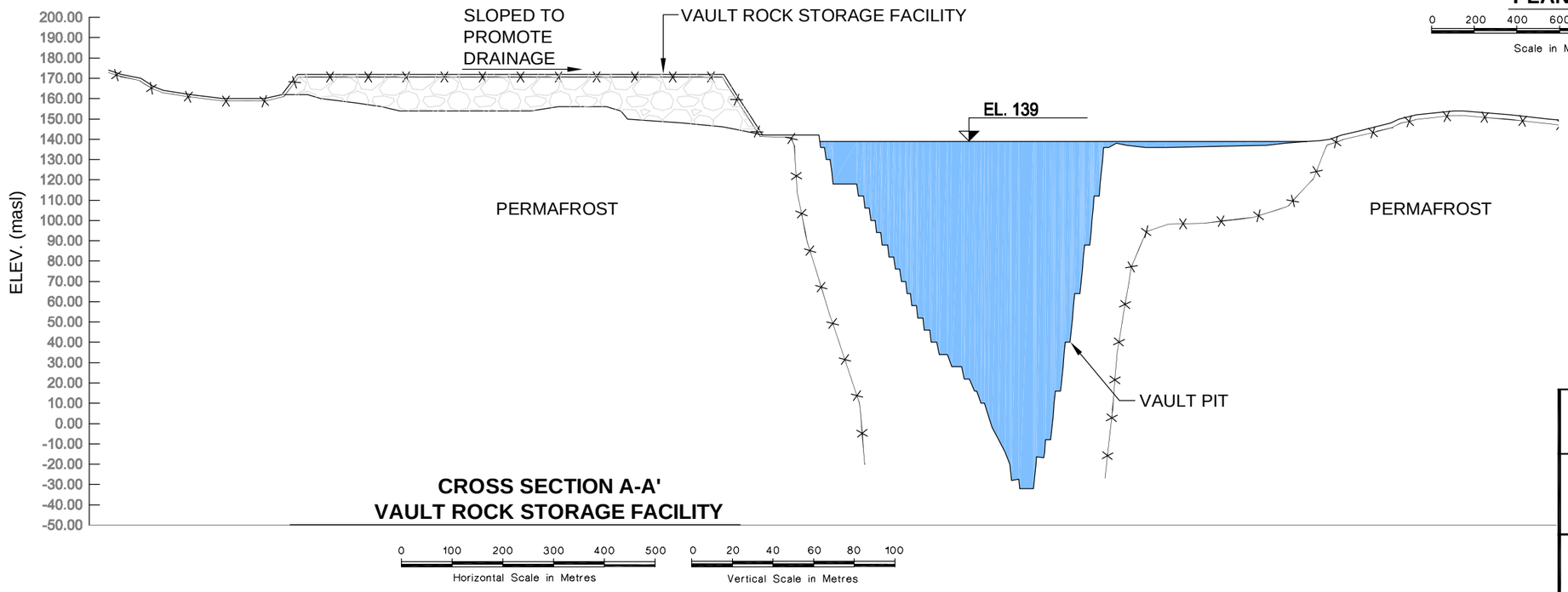
1) AMEC AMERICAS LTD., DRAWING NUMBER A1-131395-100-C-0001 (100-C-0001.DWG), MEADOWBANK FEASIBILITY STUDY, APRIL 2005.



PLAN

0 200 400 600 800 1000

Scale in Metres



CROSS SECTION A-A'
VAULT ROCK STORAGE FACILITY

0 100 200 300 400 500

Horizontal Scale in Metres

0 20 40 60 80 100

Vertical Scale in Metres

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VAULT ROCK STORAGE CLOSURE DESIGN CONCEPT CROSS SECTION

FIGURE 4.3

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The Vault RSF is not anticipated to require cover layer of non-PAG rock.

4.8 NORTH CAMP

The North Camp area currently has a kitchen, dry facilities, an office and core processing facilities and fuel storage for approximately of 450,000 litres of diesel and 71,250 litres of Jet-A fuel.

4.9 PLANT SITE, CAMP COMPLEX AND FUEL STORAGE

The plant facilities include a Process Plant, the Primary Crusher, ore storage building, Mill Complex, Power Plant and Batch Plant.

Other structures and buildings include the Accommodation Complex, the shop, warehousing, and office complex, the mine site Tank Farm, and miscellaneous dry storage facilities.

4.10 FUEL STORAGE AT SITE

Barges will transport diesel fuel to a lined and bermed tank farm at Baker Lake. From the Baker Lake Tank Farm, fuel will be trucked via haulage route to a 5 million litre (ML) containment facility at the Project site consisting of a steel tank located within a lined berm. A fuel unloading and distribution pump module will feed a network system throughout the plant area, supplying fuel to the exterior day tanks at the power plant and boiler house. The light vehicle fuel dispensing station and heavy vehicle fuel dispensing station will be located adjacent to the storage facility.

4.11 INFRASTRUCTURE

Other infrastructure associated with mine operations include: the airstrip, roads, storage pads, quarries, and granular borrow areas (if present).

4.12 WATER MANAGEMENT FACILITIES

The water management facilities will include 4 km of perimeter Dewatering Dikes, water diversion and collection systems, and contact water attenuation ponds and a tailings water Reclaim Pond. Once mining and milling has been completed, reclaim water will be drained from the TSF and treated prior to discharge to the Goose Island and Portage pit lakes. Reclaim water treatment may be completed in-situ (in the Reclaim Pond) or via a water treatment plant. The water treatment plant would be constructed in the closed Process Plant.

The Dewatering Dikes will be constructed and maintained to enable open pit mine operations to progress from on-land pits initially, to deposit extensions beneath adjacent lakes. Diversion ditches will direct clean runoff water away from areas affected by mining activities. Contact water originating from Project use areas will be intercepted, collected, and conveyed to central storage facilities and decanted to treatment facilities, if necessary, or to receiving lakes. Areas within the dewatered Vault Lake and northwest arm of Second Portage Lake will serve as central water attenuation facilities.

SECTION 5 • CLOSURE & RECLAMATION OBJECTIVES

5.1 MINE CLOSURE AND SITE RECLAMATION

5.1.1 Aim of C & R Planning

Three global post-closure objectives set out in INAC's *Mine Site Reclamation Guidelines for the NWT* (2006) are:

1. Physical Stability: All remaining physical structures will be designed such that they do not pose a threat to humans, wildlife, or environment health and safety;

2. Chemical Stability: All remaining mine components should be chemically stable, such that it does not endanger humans, wildlife, or environment health and safety; and,

3. Future Use and Aesthetics: The site should be compatible with the surrounding lands at the completion of reclamation activities.

5.2 ECOLOGICAL RESTORATION

5.2.1 Objectives

The Aquatics Effects Management Program (AEMP) (Cumberland, 2005d) and the Terrestrial Ecosystem Management Program (TEMP) (Cumberland, 2005e) reported on the programs and plans suggested to protect aquatic and terrestrial resources during construction, operation, and closure of the Meadowbank mine and the all-weather access road between the Hamlet of Baker Lake and the mine site.

The overall objective of these plans are to provide programs so that potential project-related adverse impacts are detected and mitigated, so that construction and operational activities do not cause any undue harm to water quality, sediment quality, vegetation, biota, wildlife, and wildlife habitats. Both of these documents provide the basis to integrate monitoring efforts to ensure compliance with regulatory instruments and agreements, both federally and territorially, such as the Department of Fisheries and Oceans (DFO), NNL, NIRB, and MMER policy.

5.2.2 Terrestrial Habitat Reclamation Strategies

As reported in the TEMP (Cumberland, 2005e), 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 facilities, and the deactivation of access roads and associated reclamation activities will result in the natural revegetation of many previously affected areas of the project.

Certain facilities will be reclaimed progressively during the life of the mine, such as camps, temporary workspace, marshalling yards, and storage areas. Other facilities will be reclaimed during the closure and post-closure phase of the project. General reclamation measures and mitigation measures for various Project components are outlined below.

Some disturbed areas will be allowed to recover naturally, while vegetation will be established in others. The ability to induce revegetation will be constrained by the limited resources available for revegetation, as well as the limited areas that are suitable for revegetation. In some cases, revegetation of an area may be a combination of both artificial and natural revegetation. In other cases, the surface may be prepared (e.g., scarified, recontoured, slopes stabilized, natural drainage patterns restored) to provide a suitable environment for plant growth to take place.

Areas where facilities have been removed and areas where vegetation has been disturbed will be considered for revegetation. Native soils will be stockpiled whenever and wherever possible. Lakebed sediments, organic soils, and other biosolids will also be used. Tailings will not be used due to their contaminant content. Native-grass cultivars and forbs (e.g., nitrogen-fixing legumes) will be used. Seeds, sprigs, cuttings and transplanted shrubs of indigenous species will also be used, but likely to a lesser extend due to their slower propagation rates observed in experiments at northern mines (BHP, 2000).

Reclamation and revegetation will be a progressive process that will continue throughout the life of the mine as soon as opportunities present themselves to reclaim decommissioned facilities. The Nunavut Water Board (NWB) and the Kivalliq Inuit Association (KIA) will be consulted during this process, and the experiences of reclamation and revegetation of other northern mines (e.g., Ekati and Diavik) will be drawn upon.

Terrestrial riparian vegetation may become established in shoreline areas; therefore, consideration will be given to contouring pit slopes to enhance recolonization of shoreline vegetation. 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 (if applicable), foundations and building structures will be dismantled, the area will be recontoured (e.g., berms flattened) to encourage regrowth of natural vegetation, and original drainage patterns will be restored to the greatest extent

possible. Where warranted, revegetation will be undertaken to enhance re-establishment of vegetation communities.

The airstrip will be retained in a usable condition for long-term safety and future development activity considerations in the initial stages of closure. Efforts will be made to ensure that the airstrip interferes as little as possible with local drainage patterns and allowable growth boundaries for recolonizing vegetation will be determined. Near the end of the closure phase, the airstrip would be decommissioned and restoration activities will include removing culverts, recontouring fill slopes for wildlife access, and scarifying the gravel surface of the airstrip to facilitate natural revegetation. A covering (e.g., large grain gravel) may be required for erosion and dust control.

The AWPAR 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 AWPAR).

At the Baker Lake site, revegetation and rehabilitation will only be conducted on a local level, as these facilities will likely remain for the Hamlet of Baker Lake and other industrial uses following mine closure. The access to the mine will be closed down and partial decommissioning of the in-town staging facility, the explosives magazine, and the tank farm may be necessary, depending on future demand for these facilities. In addition, decontamination of these sites will be undertaken if necessary.

5.2.3 Reclamation Materials Available

Overburden and organic materials stripped during mine preparation.

5.3 AQUATIC HABITAT RESTORATION STRATEGY

Authorization from DFO allows MMC to alter and or destroy fish habitat during the construction and operation phases of the mine under the condition that compensatory fish habitat be recreated resulting in a ‘no net loss’ of fish habitat. This authorization contains several conditions that need to be adhered to, including the development of detailed designs, specifications, and implementation plans that describe how MMC plans to recreate fish habitat that may be lost from the development. The fish habitat creation and modification will be completed as per the No Net-Loss Plan (Cumberland, 2005g).

SECTION 6 • MINE CLOSURE

6.1 GENERAL

Table 6.1 summarizes the key reclamation and closure commitments proposed in the following sub-sections and sections.

Table 6.1: Summary of Proposed Reclamation & Closure Methods

Item	Proposed Reclamation & Closure Method	Reference
Secure Open Pits	Close access ramps and secure pit perimeters.	Section 7.1
Flooding Open Pits	Flood pits over five to eight-year period following completion of pit operations.	Section 7.1
Pit Lake Discharge	Manage and monitor pit lake water quality during and post flooding.	Section 7.2
Breach Dewatering Dikes	Breach Dewatering Dikes at prescribed locations after the open pits are completely flooded and quality of pit lake water is acceptable.	Section 7.2
Maintain East Dike	Leave the East Dike intact to maintain water level differential between Second and Third Portage lakes.	Section 7.2
TSF	Place a minimum 2 m thick cover layer of non-PAG rock over the tailings deposition surface.	Section 7.3
Tailings Water Management	Maintain runoff collection sumps, and discharge ditches to collect, monitor and treat, as required, tailings runoff until water quality meets design discharge criteria.	Section 7.3
RSFs	Regrade and improve the surface for wildlife access through neighbouring areas.	Section 7.4
Portage RSF	Cover Portage RSF with a minimum 2 m thickness of non-PAG waste rock.	Section 7.4
Buildings and Equipment	Remove all hazardous materials, remove salvageable materials, and demolish all buildings.	Section 8.0
Roads and Airstrip	Remove culverts, regrade surfaces, recontour embankment slopes, and provide wildlife access.	Section 8.0
Dry Storage	Remove all storage materials and regrade site to suit surrounding topography.	Section 8.0
AWPAR	Remove culverts, regrade surfaces, recontour embankment slopes, and provide wildlife access.	Section 8.0
Hazardous Waste	Collect and dispose of hazardous waste at licensed off-site facility. Incinerate acceptable hydrocarbon waste on site.	Section 9.0
Non-Hazardous Waste	Collect and dispose in Portage RSF or open pits or in approved construction debris landfill site.	Section 10.0

6.2 CLOSURE FACTORS

The closure factors are based on the principles for mine site reclamation, covered in the Mine Site Reclamation Policy for Nunavut (INAC, 2002):

- The reclamation policy reflects the collective desire and commitment to operate under the principles of sustainable development, including the "polluter pays" principle;
- The required standard of reclamation is based on the 1994 Whitehorse Mining Initiative definition: "returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities;"
- This mining operation will support the cost of reclamation;
- Adequate security will be provided to ensure the cost of reclamation, including shutdown, closure and post-closure, is born by the operator of the mine;
- Best management practices, including progressive reclamation, will be applied to advance environmental protection and reduce environmental risks; and
- Communication and consultation among all applicable parties will be comprehensive, complete and timely.

SECTION 7 • MINE INFRASTRUCTURE AND CLOSURE PLANS

7.1 OPEN PIT WORKINGS

7.1.1 Description

This section describes the closure activities as these relate to the site closure plan shown in Figure 7.1.

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.

At the end of active mining operations, rock berms will be placed around the perimeters of the pits that will be above water to restrict access and minimize hazards to people and wildlife. Flooding of the Goose Island Pit and Portage Pit will commence before the completion of mining activities at Vault. All of the pits will eventually be flooded.

7.1.2 Closure Factors

The closure factors will be based on the global objectives of maintaining the physical and chemical stability of the open pits and integrating reclamation methods that take into consideration the future use and aesthetics of the area (INAC, 2006).

Factors that will be implemented as part of the C&R plan include:

- Minimizing access of humans and wildlife to open pits;
- Develop a plan for emergency access to, and exit from the flooded pits;
- Integrate a water management plan to minimize and control contaminated drainage; implement a system to collect and treat these waters; and have these waters meet site permit water quality objectives;
- Stabilize all slopes and flood open pits to satisfy end land use – open lake area; and
- Establish new surface drainage patterns.

WALLY LAKE

642000 E

VAULT LAKE

VAULT PIT

SUMP #1A

VAULT ROCK STORAGE FACILITY

PHASER LAKE

SUMP #3A

640000 E

SUMP #2A

DRILL TRAIL LAKE

VAULT HAUL ROAD

AN STORAGE

EMULSION PLANT

B' 4.2

SECOND PORTAGE LAKE

WL 1337 ±

A' 4.1

EAST DIKE EXTENSION

EAST DIKE

BAY ZONE DIKE

FINGER DIKES

GOOSE DIKE EXTENSION

SUMP #1

PORTAGE PIT

GOOSE ISLAND PIT

THIRD PORTAGE LAKE

SUMP #2

SUMP #3

EXPLOSIVES STORAGE

PORTAGE ROCK STORAGE FACILITY

CENTRAL DIKE

TAILINGS STORAGE FACILITY

TEARDROP LAKE

ROM PILE

FUEL STORAGE

SOUTH CAMP DIKE

GOOSE ISLAND DIKE

TURN LAKE

638000 E

RECLAIM POND

AIRSTRIP

SUMP #4

PLANT SITE

FRESHWATER INTAKE

ALL-WEATHER PRIVATE ACCESS ROAD

THIRD PORTAGE LAKE

A 4.1

B 4.2

7222000 N

7220000 N

7218000 N

7216000 N

7214000 N

7212000 N

N

0 300 600 900 1200 1500

Scale in Metres

LEGEND:

- TAILINGS
- WASTE ROCK
- PIT LAKE
- DIVERTED AREA
- COMPLIANCE MONITORING POINT
- INTERNAL MONITORING POINT
- WATER DIVERSION DITCH
- SURFACE RUNOFF

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CLOSURE PHASE

FIGURE 7.1

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7.1.3 Closure Strategies

As presented in INAC (2006), applicable progressive and post-closure strategies for the open pit workings include:

- Completing sequential backfilling of waste rock (and tailings);
- Backfilling the pit with waste rock, and non-hazardous wastes;
- Preventing or minimizing access to pits while maintaining access/exit ramp;
- Recontouring slopes;
- Flooding pits under controlled setting; and
- Monitoring of water quality during flooding and treat water as required.

7.1.4 Proposed Closure Methods

At the end of mining, all pit equipment will be removed and closure activities will proceed. The mined-out pits may be used for the final placement and permanent storage of waste materials, including but not limited to waste rock, non-salvaged buildings and structures, and non-hazardous wastes. The effects of waste rock disposal in pits have been considered in operational and post-closure water quality assessments, the results of which are described in the Physical Environmental Impact Assessment (Cumberland, 2005f) and Water Quality Predictions Report (Golder, 2007b). After disposal of these materials, all pit access ramps will be secured by rock berm barricades, and berms will be constructed around the perimeter of each pit in accordance with applicable mine regulations.

The open pits will be flooded once mining activities in each open pit are complete. Rather than simply breaching the Dewatering Dikes and permitting rapid inflow of lake water, water will be pumped in at controlled rates from the surrounding lakes using barge-mounted, high-capacity mechanical pump systems or syphons. In the case of the Goose Island Pit, filling of the pit may occur in Year 4 after cessation of pit operations. Filling of the Goose Pit via controlled pumping from Third Portage Lake continues through Year 11. In the case of the Portage Pit, filling may commence in Year 5, once mining of the pit has been completed and will continue through Year 12. In the case of Vault Pit, filling will begin in Year 8 and continue through Year 12. The maximum fill rate will be based on the maximum acceptable draw down in each lake. To minimize impacts to aquatic habitat in the surrounding lakes, pumping will be done during periods of increased flow in the spring and summer months. Water quality in the pits will be monitored continuously throughout the flooding process.

All Dewatering 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.

At closure, the walls of the mined-out open pits will have been exposed for several years during mine operation, and some oxidation will have occurred. During flooding, water quality will be affected by slightly increased concentrations of dissolved metals, potentially lower pH, and blasting residues. Treatment with lime will be applied should pH levels need adjustment; on-site test work would be carried out to determine the appropriate treatment method. The water quality within the flooded pits will be managed and monitored until the water is of acceptable quality to be allowed to mix freely with the surrounding lake water.

Concentrations for the constituents that are to be monitored in Portage Pit Lake water are predicted to meet MMER for all chemical constituents. It is also anticipated that concentrations of the majority of chemical constituents should be within the CCME freshwater aquatic life guidelines with the exception of cadmium, manganese, zinc and chromium, whose concentrations are predicted to be on the same order of magnitude as the guidelines. Flooding of the Portage Pit will take approximately 8 years. The water level will then be the same as that of Third Portage Lake (approximately 134.1 m elevation), although some small pit wall surfaces will remain visible above the lake level. The resulting pit lake will subsequently receive overland runoff.

Water quality at Goose Island Pit Lake is predicted to meet MMER for all chemical constituents. It is also anticipated that concentrations of most constituents should be within the CCME freshwater aquatic life guidelines except for arsenic, cadmium and manganese, whose concentrations are predicted to be on the same order of magnitude as the guidelines.

Vault Pit Lake water quality is also predicted to meet MMER criteria for all chemical constituents. It is also anticipated that concentrations of most constituents should be within the CCME freshwater aquatic life guidelines except for cadmium and chromium, although both of these constituents are predicted to have concentrations on the same order of magnitude as the guidelines.

7.1.5 Restoration Plan

The aim of the open pit restoration plan is restore the hydraulic connection between the pit lakes and neighbouring Third Portage or Wally lakes once water levels equilibrate and water quality satisfies MMER water quality guidelines.

7.2 DEWATERING DIKES

7.2.1 Description

The Dewatering Dikes (East Dike, Bayzone Dike, Goose Island Dike, and Vault Dike) will be designed to enable controlled flooding of the open pits, and to maintain the long-term stability of the dike sections to be left in place. Dewatering Dikes will remain intact during the controlled flooding of Goose Island, Portage and Vault pit areas, in order to isolate flooded pit waters from surrounding lakes. Pits will be filled gradually over the course of several years. Once the water levels have stabilized within the flooded pits and water quality is considered acceptable for mixing with neighbouring lakes, parts of dikes will be decommissioned to allow circulation of pit water and lake water.

7.2.2 Closure Factors

Closure factors for the Dewatering Dikes will be based on the overall objectives of maintaining the physical and chemical stability of the Dewatering Dikes and integrating reclamation methods that take into consideration the future use and aesthetics of the area.

7.2.3 Closure Strategies

The two most important closure strategies for the Dewatering Dikes are:

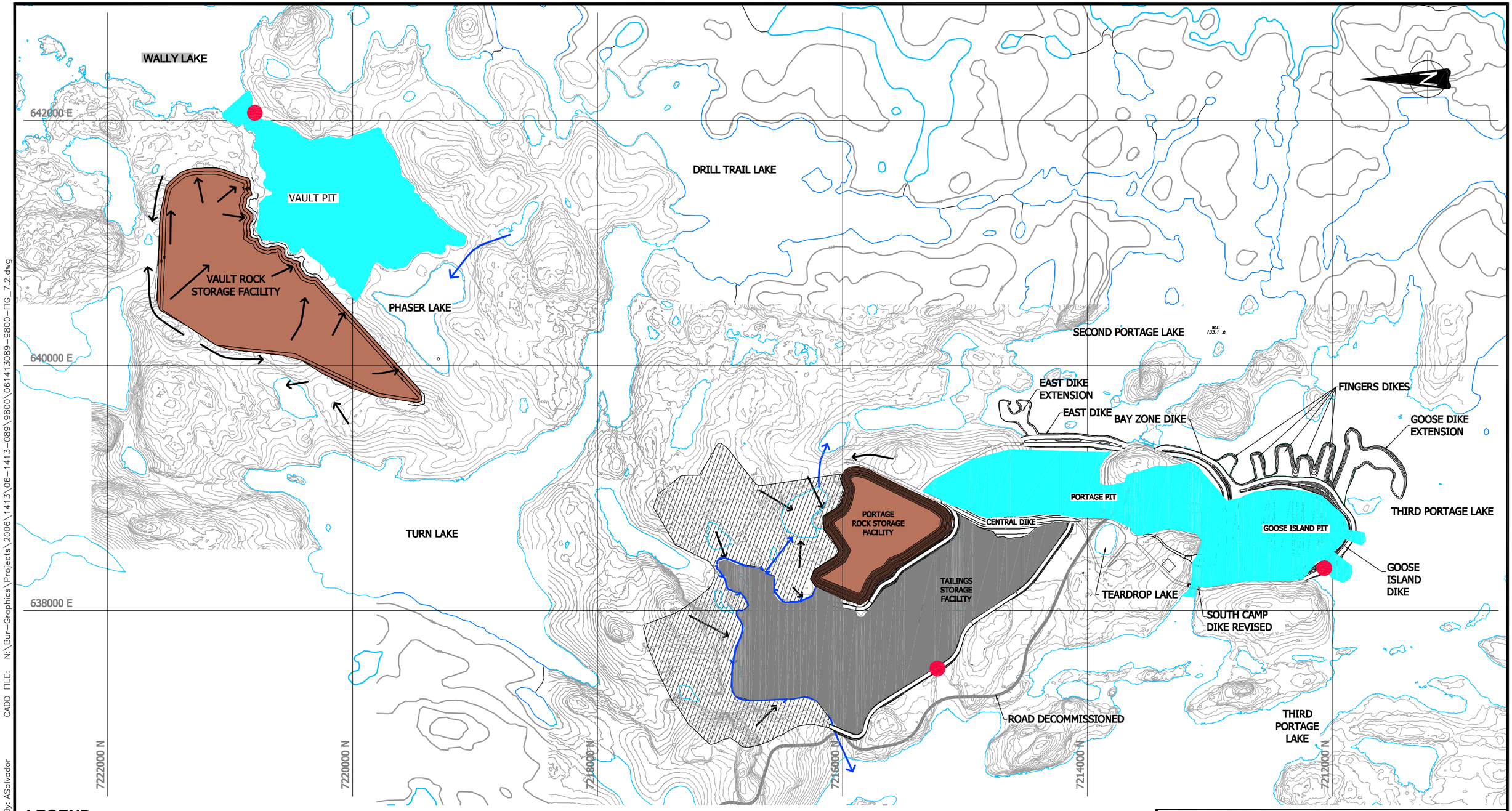
- Meeting applicable water quality objectives; and
- Maintaining controlled flooding and monitor sequential pit infilling.

7.2.4 Proposed Closure Methods

Once the Portage and Goose Island pits are completely flooded and monitoring and testing has determined that pit lake water meets MMER and drinking water quality criteria, the south end of the Goose Island Dike will be breached at a location selected to provide the desired attenuation period for surface water runoff to mix with the pit lake water before discharge to Third Portage Lake. Currently, it is estimated that about 200 m of the dike, in two sections, will be lowered by at least 3 m below the existing lake level to provide all-season aquatic access through the dike (see Figure 7.2). The till core of the excavated dike will be covered with at least 1 m of rockfill to limit sedimentation.

7.2.5 Restoration Plan

The Dewatering Dikes will remain intact during the controlled flooding of both Portage and Vault pit areas, in order to isolate flooded pit waters from surrounding lakes. Pits will be filled gradually over the course of



LEGEND:

- TAILINGS
- WASTE ROCK
- PIT LAKE
- DIVERTED AREA
- COMPLIANCE MONITORING POINT
- WATER DIVERSION DITCH
- SURFACE RUNOFF

0 300 600 900 1200 1500

Scale in Metres

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POST CLOSURE PHASE

FIGURE 7.2

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several years. Once the water levels have stabilized within the flooded pits and water quality is considered acceptable for mixing with neighbouring lakes, parts of dikes will be decommissioned during closure activities to allow circulation of pit water and lake water. At least two sections of the Goose Island dike will be taken down to a minimum of 3 metres below the average Third Portage Lake water level (134.1 m elevation) to allow Third Portage Lake and the flooded pits to mix. Similarly, the Vault Dike will be dismantled, to allow water from Wally Lake and the Vault Pit Lake to mix.

The East dike will remain, preserving the 1 m difference in elevation between Third Portage and Second Portage lakes. Similarly, the Central Dike will remain to contain the stored mine tailings. The remaining portions of Goose Island and East Dikes and the finger dikes and dike extensions exterior to these dikes will continue to provide high quality fish habitat during post-closure. The new habitat created along dike walls will be of greater surface area and equal or greater quality (coarse substrate providing shelter, and varying depth available along wall from pit ledges) relative to current pre-mine conditions.

7.2.6 Fish Habitat Creation & Navigable Waters Requirements

During mining of the Portage and Goose Island pit, a series of finger dikes and dike extensions will be constructed on the outside of the Goose Island and East dikes in the areas of deepest water. This will result in an increase in habitat along the dike structures, as indicated on Figure 7.1.

At closure, the Dike exterior and interior habitats will be designed to provide good quality habitat (Cumberland, 2005g). Habitat between 2 and 10 m below lake water surface is considered of high value Habitat Units (HUs) because it will have suitable depth, aspect, slope, substrate size and morphology to satisfy multiple life history requirements (spawning, rearing, foraging) for all important species (lake trout, round whitefish and Arctic char). All fish habitat finger dikes and dike extensions will be constructed to an elevation of 3 m below water surface using low metal leaching iron formation rock.

7.3 TAILINGS STORAGE FACILITY

7.3.1 Description

All tailings will be deposited in the TSF until the end of mine operations. The Central Dike and TSF will be designed so that the tailings freeze after deposition and remain frozen after closure. The TSF will be closed progressively during the mine life as the tailings deposit reaches its ultimate elevation. Closure will include the placement of an erosion barrier consisting of a minimum 2 m thick layer of non-PAG ultramafic waste rock over the tailings. The surface of the final cover will be graded to blend into the existing topography, and to shed water from the surface. Cross-sections through the TSF at closure are shown on Figures 4.1 and 4.2. With time, the TSF and Central Dike are predicted to freeze, resulting in permafrost encapsulation as the long term control strategy for ARD.

7.3.2 Closure Factors

The results of thermal modeling indicate that complete freezing of the tailings and bedrock beneath the TSF will occur with time (Golder, 2007a). Long-term analyses indicated that the entire tailings body will freeze no later than 10 years after the end of operations, and that the tailings foundation will progressively freeze to a depth of 30 to 50 m beneath the bottom of the tailings after 100 years. These analyses included consideration of the potential effects global warming, and therefore indicate that global warming will not be sufficient to prevent freezing beneath the tailings during the 100 years period analyzed.

Modeling has also shown that the rate of advance of the freezing front penetration through the TSF and into the bedrock will be greater than the rate of advective transport of constituents out of the TSF. Consequently, the tailings and any constituent release are predicted to be encapsulated by permafrost. If it is determined by monitoring during operations that the tailings are freezing at lower rates than predicted, then mitigative measures to enhance freezing would be implemented (MMC, 2007b).

7.3.3 Closure Strategies

The proposed closure methods for the TSF were designed in reference to the following closure strategies, as presented in INAC (2006):

- Slope stability;
- Minimizing tailings dust;
- Minimizing potential for contaminant migration;
- Blending with the aesthetics of the surrounding lands; and,
- Limiting access of humans and wildlife to the tailings.

7.3.4 Proposed Closure Methods

On closure, the Reclaim Pond, Portage Attenuation Pond, runoff collection sumps, and drainage ditches will be utilized to collect and manage drainage water from the Portage watershed area. Once the water quality from the mine development area meets discharge criteria, the water collection system will be drained and recontoured to blend with the surrounding topography and to allow uninterrupted drainage of surface runoff to the surrounding lakes. A layer of non-PAG rock cover will be placed over any sediment in the sumps and the Reclaim Pond to minimize dusting and erosion of these materials. Water quality

monitoring and assessment will be required during closure to determine when the runoff from the reclaimed TSF can be directed to Third Portage Lake untreated.

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.

7.3.5 Restoration Plan

The tailings will be allowed to freeze after the operation is complete. Closure will be completed with the placement of a rock barrier consisting of a minimum 2 m thick layer of non-PAG rock over the tailings. The surface of the final cover will be graded to blend into the existing topography, and to shed water from the surface of the TSF area.

7.4 ROCK STORAGE AREAS

7.4.1 Description

Waste rock from the open pit mines not used for site development purposes, fish habitat construction, or backfill to Portage Pit will be deposited in the Portage and Vault RSFs until the end of mine operations. The RSFs will be closed progressively during the later stages of mine operations as the lifts of rock reach their ultimate elevation. Although all rock placed in the RSFs is expected to freeze, facility design in terms of permanent physical stability is not dependent on freezing.

It is currently anticipated that a cover of non-PAG rock will only be required at the Portage RSF.

The water discharge quality and management structures for the RSFs 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.

7.4.2 Closure Factors and Objectives

The closure factors and objectives for the RSF areas include:

- Controlling erosion and the possible effects on the ground thermal regime (i.e., permafrost degradation);

- Confirming that the rock storage areas do not become a source of contamination; and,

- Returning the RSF areas back to a state compatible with the surrounding area and the desired end use.

7.4.3 Closure Strategies

Closure strategies for the RSF areas will include:

- Slope stability;
- Permafrost encapsulation;
- Minimizing potential for contaminant migration; and,
- Blending with the aesthetics of the surrounding lands.

7.4.4 Proposed Closure Methods

The proposed closure methods for the RSFs will follow similar methods as described for the TSF (Section 7.3.4) and the landfill areas (Section 10.3) including:

- Progressive closure activities will be monitored, inspected, and maintained during and post mine operations. Procedures will be modified as required to achieve the objectives of the Closure and Reclamation Plan.
- Capping the Portage RSF with a 2 m layer of coarse acid-buffering, non-PAG ultramafic waste rock material as shown on Figure 4.2.
- Contouring and grading the capping material to ensure stability, minimize infiltration of precipitation and direct surface runoff toward the Portage and Vault RSF catchment areas.
- Regrading final surfaces of RSF areas to blend into the existing topography and to allow for wildlife access and regress.
- On closure, the seepage and runoff collection sumps at both RSFs will be drained. A layer of non-PAG rock cover will be placed over any sediment in the sumps to prevent dusting and erosion.

Drainage water quality will be monitored during operation and post closure.

7.4.5 Restoration Plan

With the implementation of Terrestrial Habitat Reclamation Strategies discussed in Section 5.2.2, vegetation communities will be re-established by growth of natural vegetation or revegetation of disturbed areas, where warranted. The final surfaces of the RSFs will be graded to blend into the existing topography and enhance conditions for wildlife.

SECTION 8 • CLOSURE OF SITE-WIDE PLANT AND INFRASTRUCTURE

8.1 OVERVIEW

All surface buildings and infrastructure will require closure and reclamation measures upon completion of mine operations. The plant and related facilities will be dismantled and removed off-site as salvage materials; or disposed in the Portage RSF area. Other surface facilities will be dismantled and disposed on site.

8.2 FACILITIES TO BE CLOSED

8.2.1 Processing Facilities

The processing facilities that will be closed include:

- primary crusher and associated wall and conveyor system;
- covered ore storage and associated conveyor system;
- mill complex and truck shop;
- site services structures (pipes, power distribution system etc); and
- Power Plant.

8.2.2 Other Surface Facilities

The other surface facilities that will be closed include:

- Accommodation Complex;
- ancillary shop;
- warehousing;
- office facilities;
- mine site Tank Farm; and
- several dry storage facilities.

8.2.3 Other Infrastructure

Other infrastructure that would be considered for closing includes:

- the site roadways and the AWPAR, including bridges and culverts;
- the airstrip;
- the Baker Lake storage and marshalling facilities; and,
- the Baker Lake Tank Farm.

8.3 CLOSURE FACTORS

The closure strategy was designed in accordance to the following factors and objective criteria presented in INAC's reclamation guidelines (INAC, 2006):

- Assurance that buildings, equipment and infrastructure do not become a source of contamination, or that buildings and equipment do not become safety hazard to humans and wildlife;
- Return land to a condition similar to the original state and compatible with the surrounding lands and the goals of end land-use; and
- Once infrastructure has been removed, restore the natural drainage patterns and restore the natural use for wildlife.

8.4 CLOSURE OBJECTIVE AND STRATEGIES

8.4.1 Buildings and Equipment

The proposed progressive and post-closure objectives and strategies outlined for buildings and equipment are as follows:

- Dismantling of buildings not required for end land-use targets;
- Remove building foundations, or if approved and concrete flooring is remaining, break floor slabs and add materials to encourage vegetation growth;
- Backfill excavations and regrade land to restore natural drainage or new acceptable drainage;

- Bury materials below the active layer in approved areas or landfills;
- Remove potential contaminants, including fuel and batteries, from equipment. Remove hazardous materials prior to demolition of buildings or equipment and dispose of accordingly;
- Minimize volume of non-salvageable equipment and buildings being placed in landfill by crushing and breaking demolition debris; and
- Backhaul recyclable materials to appropriate facilities in the south.

8.4.2 Infrastructure

The following are the progressive and post-closure objectives and strategies defined by INAC (INAC, 2006) for mine related infrastructure:

- Removal of structures including bridges, culverts, pipes, power lines. Ditches should be filled in once they are no longer required.
- Areas should be reclaimed to their original topography, or approved new topography, maintaining consistency with end land-use targets;
- Abandoned road and runway surfaces should be scarified and berms or slopes on the sides of roads will be flattened.

8.5 PROPOSED CLOSURE METHODS

8.5.1 Buildings and Structures

Salvageable buildings and surface structures will be dismantled and demobilized from the site. Non-salvageable buildings and structures will be dismantled or demolished and disposed of in the Portage RSF. Concrete structures and foundations will be removed or buried to a point about 1 m below the final ground surface or the final regraded surface. All disturbed site areas will be regraded 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.

All site roads not required for post-closure monitoring will be decommissioned and the terrain restored. Wildlife access will be provided at suitable intervals along the Vault Haul Road by regrading the embankment shoulders to flatter slopes. Culverts will be removed and original drainage patterns restored.

Upon completion of mining, the Process Plant may be converted for treatment of the reclaim water remaining in the Reclaim Pond, if required. The water treatment plant in the Portage mining and milling area will likely be kept in operation until the treatment of the reclaim water, open pit flooding and mine closure activities are complete.

Reclamation and closure of quarries and granular borrow pits not located within the open pits will depend on the individual site conditions. All mobile and stationary equipment will be removed; the excavation slopes stabilized and contoured; and disturbed areas covered for erosion and dust control. Any stockpiled materials not used for mine operation and closure activities will be spread and contoured to blend with the natural surroundings.

8.5.2 Roadways and Airstrip

8.5.2.1 Roadways

Once decommissioning of the mine site has been completed, the AWPAR to the mine will be closed and the right of way reclaimed. Any side roads or quarries will also be reclaimed.

Borrow sources developed during the construction of the road have been selected to use only non-acid generating materials. These potential quarry sites are identified in the Project Alternatives Report (Cumberland, 2005h). Water quality monitoring and testing will be undertaken during the construction and operational period of the AWPAR to measure the quality of water draining the open quarry sites and

road base materials. During decommissioning of the AWPAR, should acid generating bedrock be exposed in a rock cut or borrow pits/quarries, these areas will be covered with a minimum 2 m thick layer of non-acid generating soil or rock, graded to direct water away from the surface and revegetated.

It is anticipated that the road deactivation works will be carried out as necessary to stabilize any low cut and fill slopes where potential for slope erosion may exist. Stabilization measures may require pulling back of side cast fill on locally steep slopes, or buttressing and/or recontouring of steepened cut slopes using non-acid generating material. These measures would also be applicable to borrow pits/quarries located adjacent to the AWPAR. As much as practical deactivated surfaces will be graded to blend with the existing topography.

The decommissioning would also restore as much as practical the natural pre-AWPAR hydrology. Natural drainage courses would be restored primarily through the removal of all culverts and/or bridges and the rehabilitation of channels and banks at the crossing sites. Cross-drain structures (cross-ditches) may also be installed where necessary between culvert sites. Where armouring rock (riprap) is required, this rock will be non-acid generating for the protection of aquatic life. Where affected watercourses are fish-bearing, the timing of work may be restricted to within the designated fisheries window. For these sites, appropriate fish exclusion and salvage will be undertaken prior to the in-stream works. All in-stream works will be carried out utilizing best management practices for erosion and sediment control.

To facilitate revegetation of the AWPAR, ripping or ploughing of the running surface may be necessary. Site preparation will be followed by seeding with plant species as recommended by the final Closure and Reclamation Plan.

8.5.2.2 Airstrip

The airstrip is expected to be closed near the end of the reclamation and closure phase, as it will not be needed to support the post-closure monitoring program. The actual timing of closure will depend on the progress of mine reclamation and closure monitoring. Airstrip reclamation will involve removing culverts, re-contouring fill slopes for wildlife access, and scarifying the gravel surface to facilitate natural re-vegetation. A cover may be required for erosion and dust control.

8.6 OTHER ANCILLARY FACILITIES - BAKER LAKE STORAGE & MARSHALLING FACILITY

It may prove desirable to leave some or all of the storage structures at the Baker Lake storage and marshalling facility in place for long term use by the local community. Any structures, materials, and equipment not required for future use by the community will be dismantled and demobilized from the site. Non-salvageable buildings and structures will be dismantled or demolished and disposed of off site at an approved disposal facility. Any site roads and storage pads not required for future use will be decommissioned and the terrain restored. Culverts will be removed and original drainage restored. All disturbed site areas will be regraded to suit the surrounding topography. Cover materials may be required for erosion and dust control in some areas.

SECTION 9 • CLOSURE – HAZARDOUS CHEMICALS AND WASTES

9.1 HAZARDOUS AND NON-HAZARDOUS WASTES

9.1.1 Hazardous Materials

As presented in the Hazardous Material Management Plan (MMC, 2007c), hazardous wastes that will be used during mine site operations include:

- Fuel and Lubricants – diesel fuel, oils, greases, anti-freeze, and solvents used for equipment operation and maintenance;
- Process Plant Consumables – sodium cyanide, sulphur (or metabisulphide), hydrochloric acid, lime, flocculants, and anti-scalants used in mineral extraction;
- 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.

All potentially hazardous materials remaining at the site, including materials in storage, spilled materials, and materials generated from the demolition of buildings and equipment, will be collected and disposed of according to an approved plan and procedure comparable to the current management practice for disposal of particular wastes. Hazardous waste materials will be transported to licensed disposal facilities in accordance with the Hazardous Material Management Plan (MMC, 2007c).

One exception is used oil, which is considered to be a hazardous material. Throughout the mine life operations, MMC intends to arrange for a permit to incinerate used petroleum on site, or use the oil in the production of explosives. Used petroleum products will be collected in tanks marked “Waste Oil” and disposed of under the direction of the Process Plant Manager. Empty petroleum containers will be stored on site in a designated area and returned to the supplier on backhauls.

9.1.2 Non-Hazardous Waste Materials

All non-hazardous materials remaining at the site, including materials in storage, spilled materials, and materials generated from the demolition of buildings and equipment, will be collected and disposed of according to an approved plan and procedure comparable to the current management practice for disposal of particular wastes. Non-hazardous materials with a net salvage value and those that can be cost-effectively recycled will probably be removed from the site. All other non-hazardous materials will be buried in the closure landfill on the top of the Portage RSF.

9.2 TANK FARMS

9.2.1 Mine Site

As discussed in the Hazardous Materials Management Plan (MMC, 2007c), some diesel fuel storage capacity will be left in place at closure of the mine and facilities for the use of personnel involved in close-out and reclamation activities. Small amounts of other petroleum products will also continue to be available. As the operation is concluded the volume of petroleum product will be reduced and ultimately any un-used product will be removed from site.

The mine site Tank Farm will be dismantled and disposed of on site in the closure landfill on the top of the Portage RSF.

Fuel not required during the close-out and reclamation activities will be offered to local residents 'where is' at the mine, and to be removed within agreed time frame, or will be incinerated in accordance with a proposed permit.

9.2.2 Baker Lake Site

Fuel storage for approximately 40 ML of diesel fuel and 1 ML of jet fuel will be provided by five single-walled, welded steel above-ground storage tanks. The storage tanks comprise four 10 ML diesel tanks, one 1 ML tank jet fuel tank and one 3,000 L day tank. The fuel will be transported to Baker Lake in bulk tanker barges and transported to site using truck unloading and refuelling centers. The Baker Lake Tank Farm will be contained within an approximately 27,000 m2 secondary containment facility comprising a geomembrane liner overlying soil containment berms and access ramps, seepage collection, a storm water sump and grease trap.

9.3 CONTAMINATED AREAS

9.3.1 General

According to the INAC Mine Site Reclamation Guidelines for the Northwest Territories (2006), contaminated soils include natural media such as soil, sediment, rock and pore water that has been contaminated by control substances. Reclamation activities for snow and ice are similar to soil.

9.3.2 Objectives

Throughout the mine lifespan, all reasonable efforts will be taken to minimize and mitigate soil, snow, and ice contamination caused by controlled substances including: fuel, fertilizers, chemicals, tailings and ore-associated metals through accident or failure of management facilities. Sources of contamination will be remediated in such a way as to be compatible with future uses of the surrounding areas; and to protect humans, wildlife and environmental health.

9.3.3 Progressive and Post Closure Reclamation Options

9.3.3.1 Spilled Materials

As reported in the Spill Contingency Plan (MMC, 2007d), all hydrocarbon product spills and tailings spills associated to the mine operation and closure activities will require written reporting to document the release and investigation to assess the nature and extent of the impacted area resulting from the spill. Remediation of the spilled material will be subject to the investigation results.

Remedial actions could include excavation and removal of the contaminated material (INAC, 2006). This material could be stored on-site in a contained, managed area. In situ treatments may be effective, including bioremediation. Otherwise, contaminants could be immobilized in the soil. If necessary, contaminated materials would be relocated offsite and disposed of at a licensed facility. A study evaluating the potential for an on-site landfarm biocell(s) to treat petroleum contaminated soils at the Meadowbank Gold Project is currently underway (Golder, 2007c).

SECTION 10 • CLOSURE OF LANDFILLS & OTHER WASTE MANAGEMENT DISPOSAL AREAS

10.1 DESCRIPTION

Two industrial waste landfills are required on-site for the disposal of non-salvageable, non-hazardous solid wastes that cannot be incinerated (Golder, 2007d).

Based on the "Mine Site Reclamation Guidelines for the Northwest Territories" (INAC, 2006), the following two locations were selected:

- Landfill #1 - developed near the northwest toe of the Portage RSF; and
- Landfill #2 - developed at the top of the Portage RSF.

While the preferred landfill location was the top of the Portage RSF (minimizing the disturbed area) such a landfill would hinder waste rock placement during mining activities. Therefore, Landfill #1 will be developed first and serve as the non-hazardous waste disposal site for the first 10 years of the mine development and operation. A cross section of Landfill #1 prior to the placement of a cover is shown on Figure 10.1. In the last two years of the mine operation and closure activities, Landfill #2 would serve as the non-hazardous waste disposal site.

10.2 CLOSURE FACTORS AND OBJECTIVES

The closure factors and objectives for the two landfills on the mine site include:

- Controlling erosion and effects to ground thermal regime (i.e., permafrost degradation);
- Ensuring that the landfill areas do not become a source of contamination; and,
- Returning the landfill areas to their original state or to a state compatible with desired end use.

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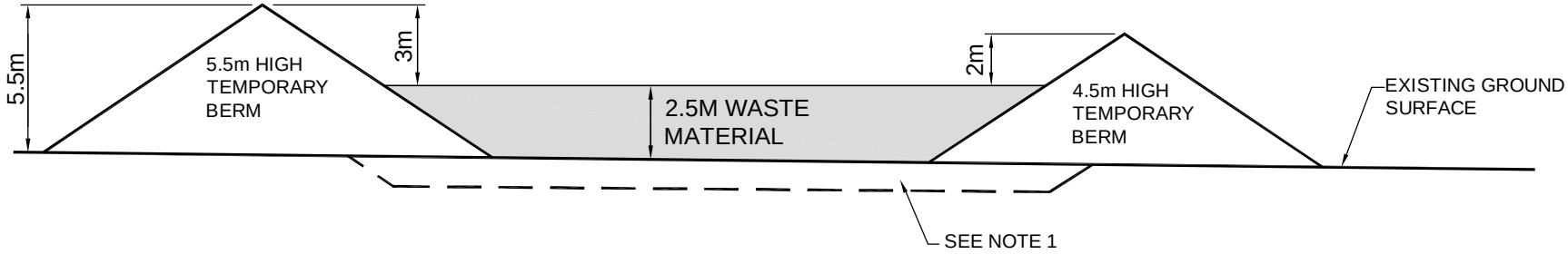

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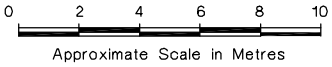

NOTES

1) EXCAVATION SOIL TO BEDROCK OR 2.1M DEPTH, WHICHEVER IS LESS AND REPLACE WITH GRAVEL.
2) TEMPORARY BERM MATERIAL SHALL BE ROCKFILL.

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CONCEPTUAL SECTION OF LANDFILL #1 PRIOR TO PLACEMENT OF COVER

FIGURE 10.1

10.3 CLOSURE OBJECTIVE AND STRATEGIES

Closure strategies for the landfills will follow the same strategies proposed for the Portage RSF, as described in Section 7.4.3. These strategies include:

- Slope stability;
- Permafrost encapsulation;
- Minimizing potential for contaminant migration; and,
- Blending with the aesthetics of the surrounding lands.

10.4 PROPOSED CLOSURE METHODS

The proposed closure methods for the landfills will follow the same methods for the Portage RSF and TSF, including:

- Capping landfill waste with 0.3 to 1 m of rockfill, followed by a 2 m layer of coarse acid-buffering ultramafic waste rock material;
- Contouring and grading the capping material to ensure stability, minimize infiltration of precipitation and direct surface runoff toward the Portage RSF catchment; and
- Regrading final surfaces of both landfills to blend into the existing topography and to allow for passage or access of wildlife.

Contact water from the landfills will continue to be managed under the *Mine Waste and Water Management Plan* (MMC, 2007b).

10.5 RESTORATION PLAN

With the implementation of Terrestrial Habitat Reclamation Strategies, discussed in Section 5.2.2, vegetation communities will be re-established by regrowth of natural vegetation or revegetation of disturbed areas, where warranted. The final surfaces of the landfills will be graded to blend into the existing topography and enhance conditions for wildlife.

SECTION 11 • CLOSURE OF WATER MANAGEMENT FACILITIES

11.1 DESCRIPTION

The water management system consists of the following mine site components: ditches and culverts, pipelines, storage tanks, and a diversion system to divert non-contact water. The water management system in closure may also include the Process Plant if it is converted at the end of the mine life to a water treatment plant to treat water within the Reclaim Pond (alternatively reclaim pond water may be treated *in-situ*). If constructed, the water treatment plant would be removed once treatment of reclaim water is complete.

11.2 CLOSURE FACTORS AND OBJECTIVES

The closure factors and objectives of the water management systems at the mine include:

- Engineered systems will be dismantled and removed to restore former drainage patterns, or establish new ones which reflect the new site conditions;
- Releases will be controlled from all points of water discharge into the receiving environment; and,
- MMER water quality standards will be satisfied.

11.3 CLOSURE STRATEGIES

The following are the progressive and post-closure strategies outlined for the water management systems:

- Ditches and settling ponds not required for long-term use will be cleaned out with the sediment removed and disposed of as needed on site. The ditches etc. will be backfilled and the area re-graded.
- Embankments and Dewatering Dikes where appropriate will be breached when no longer required.
- Water tanks and piping will be drained and dismantled prior to off-site removal, or alternatively filled and covered (if approved to remain on site).

11.4 MILL AREA CLOSURE

The proposed water management plan for the main milling area during closure involves the following:

- closing and reclaiming the Portage RSF and mill area collection sumps and reinstating natural surface flows to their respective catchments as practical;
- treatment and discharge of the remaining water in the Reclaim Pond;
- contouring the cover material on the TSF and Portage RSF to develop positive gravity drainage of surface runoff;
- controlled flooding of the Portage and Goose Island pits over a period of approximately eight years following completion of pit operations;
- monitoring water quality to confirm compliance; and
- localized breaching of the Goose Island Dike to establish aquatic habitat and attenuation of the pit lake water.

It is currently planned to progressively place a rock cover over the TSF and RSF areas. The cover will consist of a layer of coarse acid-buffering ultramafic waste rock material, coarse enough to allow the development of convective cooling during winter, and insulation through trapped air within voids during the summer. The cover design for the TSF may also include an insulating layer of finer grained material, possibly till. The inclusion of such a layer would result in a shallower depth of annual thaw penetration. The progressive reclaiming of the TSF and RSF areas would be monitored during operations as part of an adaptive management plan to compare predicted performance of the reclamation strategies against the actual field performance of the strategies.

The capping material will be contoured to direct surface runoff toward nearby lakes after acceptable drainage water quality has been achieved. Pumping from the perimeter sumps at the Portage RSF will be discontinued once capping and final contouring of the pile are complete and water quality monitoring indicates that the surface runoff is acceptable for discharge.

Flooding of the mined-out pits will be done gradually over a number of years through the accumulation of precipitation, seepage, and mine site runoff, and redirection of freshet flows from Third Portage Lake. The amount of water taken from Third Portage Lake will likely be governed by allowable lake level fluctuations and geochemical requirements. Flooding rates will be established during the latter part of the mine life to minimize impact to the surrounding environment. Complete flooding is expected to take about eight years following completion of pit operations.

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.

11.5 VAULT MINING AREA CLOSURE

The proposed water management plan for the Vault mining area during closure involves the following:

- suspending the Phaser Lake diversion and reinstating natural flows from Phaser Lake to Vault Lake;
- closing and reclaiming the collection sumps at the Vault RSF and reinstating natural surface flows to their respective catchments;
- controlled flooding of the Vault Pit;
- water quality monitoring to confirm compliance; and,
- localized breaching or removal of the Vault Dike to establish aquatic habitat and attenuation of the pit lake water.

Water management activities for reclaiming the Vault mining area will focus on reinstating the surface hydrology to pre-existing conditions. The small berm between Vault and Phaser lakes will be removed, and pumping from Phaser to Turn Lake will be discontinued. Beginning after Year 8 and continuing through Year 12, Vault Lake will gradually refill with runoff contributed from its tributary watershed and controlled flows across the Vault Dike from Wally Lake. The amount of water taken from Wally Lake to flood the Vault Pit and Vault Lake will be governed by allowable lake level fluctuations and geochemical requirements. Complete flooding is expected to take five years. Flooding rates will be established during the latter part of the mine life to minimize impact to the surrounding environment. Once the Vault Lake and pit are flooded, and water quality is acceptable to allow mixing with Wally Lake, the Vault Dike will be removed.

Pumping from the sumps at the Vault RSF will be discontinued once final contouring of the pile is complete and water quality monitoring indicates that the water reporting to the perimeter sumps is acceptable for natural discharge.

11.6 WATER TREATMENT PLANT DISMANTLING

Should a water treatment plant be required, it will be built within the Process Plant at the end of the mining operation. Once the O:\Active_2006\1413\06-1413-081 - Meadowbank Dewatering Dikes\Correspondence\Correspondence Log active water treatment needs are satisfied, the remaining portion of the Process Plant (*i.e*., the portion with treatment operation) will be removed as noted in the Section 8.5.1, the closure of the buildings and structures.

11.7 POST CLOSURE

11.7.1 Post Operational Groundwater Flow

After closure of the mine, the portion of Second Portage Lake northwest of the Central Dike will be filled by tailings. The tailings are expected to freeze over time, and therefore they will not be hydraulically connected to the regional flow system. During closure, the dewatered pit areas will be re-flooded. The water quality will be monitored and once guideline quality is satisfied, portions of the Goose Island Dike will be breached. This will result in the portion of original Second Portage Lake southeast of the Central Dike and west of the East Dike becoming connected to Third Portage Lake and the elevation of the lake level in this area will increase to the current level of Third Portage Lake (134.1 m elevation). The portion of Second Portage Lake east of the East Dike will remain at its original elevation (133.1 m elevation or approximately
1 m lower than Third Portage Lake).

Groundwater modeling results for these conditions suggest that the flooded area between the Central Dike and East Dike will act as a groundwater discharge zone in the north and as a groundwater recharge zone in the south where water is predicted to flow to the area of Second Portage Lake to the east of the East Dike (MMC, 2007b). The area east of the East Dike will act as a discharge zone in its northern portion with groundwater flow originating from two unnamed lakes to the north and northeast of the Project, from Third Portage Lake and from the flooded area between the two dikes. In the south, the area east of the East Dike will act as a recharge zone with groundwater flow to Tehek Lake, as in the baseline conditions.

Overall the predicted pattern of groundwater flow is similar to baseline conditions, but differs in that there is a gradient between the flooded area between the two dikes and the area of Second Portage Lake east of the East Dike. Overall the groundwater flow to Second Portage Lake is reduced due to the reduction of

the total lake area to accommodate the frozen tailings and due to flooding of the area between the dikes to the Third Portage Lake level (134.1 m elevation). The groundwater flow to Tehek Lake from Second Portage Lake is similar to the baseline values. The model estimates of groundwater fluxes to and from the flooded area between the two dikes and the area of Second Portage Lake east of the East Dike are summarized in Tables 11.1 and 11.2 below (MMC, 2007b; Golder, 2005) .

Table 11.1*: *Post-Closure Estimated Groundwater Flux – Flooded Area between the Central Dike and East Dike

	Flux (m^3/day)
Flooded Area between the Central Dike and East Dike to Second Portage Lake east of the East Dike	8.0
A lake located north of Second Portage Lake (141 m elev.) to flooded area between the Central Dike and East Dike	1.0

Table 11.2*: *Post-Closure Estimated Groundwater Flux – Second Portage Lake East of the East Dike

	Flux (m^3/day)
Second Portage Lake to Tehek Lake	1.1
A lake located north of Second Portage Lake (141 m elev.) to Second Portage Lake east of the East Dike	1.7
A lake located northeast of Second Portage Lake (144 m elev.) to Second Portage East of the East Dike	0.1
Third Portage Lake to Second Portage Lake east of the East Dike	0.4
Flooded Area between the Central Dike and East Dike to Second Portage Lake east of the East Dike	8.0

SECTION 12 • PROGRESSIVE RECLAMATION AND SCHEDULE

Best management practices, including progressive reclamation, will be applied to advance environmental protection and reduce environmental risks associated with the Project. Based on the current mine schedule, most reclamation and closure activities will commence at the end of mining and processing operations at the mill site and will be completed over a period of two to three years. A summary of key progressive reclamation activities and the proposed timeline are provided below.

12.1 TAILINGS STORAGE AND ROCK STORAGE FACILITIES

The RSFs will be closed progressively during the later stages of mine operations as the lifts of rock reach their ultimate elevation. Progressive closure of the TSF will commence in Year 4 and be finished within two years after completion of mining. Closure of the east half of the TSF is expected to be completed between Years 4 to 8 and the balance of the TSF and Reclaim Pond during the closure period in Years 9 and 10.

The RSFs are expected to be created in 5 m lifts, with the final lifts achieved in the later stages of pile development. Therefore, depending on actual mine operations, progressive closure of the RSFs will probably commence in about Year 5 and be completed in Year 9.

Closure of the TSF and Portage RSF will include the placement of an erosion barrier consisting of a minimum 2 m thick layer of non-PAG rock. The surface of the TSF and RSF areas will be graded to blend into the existing topography, and to shed water from the surface.

12.2 OPEN PITS

Flooding of the open pits, water management, and closure monitoring activities will take approximately eight years following completion of pit operations, followed by post-closure monitoring. The Goose Island and Portage pits will be reclaimed progressively.

Flooding of the Goose Island Pit via controlled pumping from Third Portage Lake is scheduled to commence in Year 4 and is expected to continue through Year 11. The average annual pumping rate was set to accommodate all of the pit inflows and tributary area runoff from Years 4 to approximately 11 (assuming average annual conditions) to Goose Island Pit without having to decant water to the environment (elevation remains below 134.1 m elevation). The re-watering volume within the Goose Island Pit dikes is 14.8 Mm3 assuming the waste rock is not placed inside the diked off area.

Flooding of the Portage Pit via natural inflows and controlled pumping from Third Portage Lake commences in Year 5 and is expected to continue through Year 12. The average annual pumping rate was set to accommodate all of the pit inflows and tributary area runoff for eight years following completion of pit operations (assuming average annual conditions) without having to decant water to the environment. The re-watering volume within the Portage dikes is approximately 30.0 Mm3. The placement of waste rock inside the diked off area of the Portage Pit will reduce the required re-watering volume.

Flooding of the Vault Pit and Attenuation Pond via controlled pumping from Wally Lake commences in Year 8 and is estimated to continue through Year 12. The average annual pumping rate was set to accommodate all of the pit inflows and tributary area runoff for five years (assuming average annual conditions) without having to decant water to the environment. The re-watering volume within the Vault dike, including the mined out pit, is approximately 21.5 Mm3.

12.3 SITE FACILITIES

Certain facilities will be reclaimed progressively during the life of the mine, such as camps, temporary workspace, marshalling yards, and storage areas. Buildings not required for end land-use targets will be dismantled. All excavations will be backfilled to grade to restore natural drainage or new acceptable drainage. All materials will be buried below the active layer. Select non-contact water diversion ditches may be retained to promote surface water drainage.

Some disturbed areas will be allowed to recover naturally, while vegetation will be established in others. In some cases, revegetation of an area may be a combination of both artificial and natural revegetation. In other cases, the surface may be prepared to provide a suitable environment for plant growth to take place.

12.4 SCHEDULE

Table 12.1 summarizes the project schedule time line for the reclamation and closure activities.

Table 12.1: Timeline for Reclamation and Closure Activities

Activity	Yr-2	Yr-1	Yr1	Yr2/3	Yr4	Yr5	Yr6/7	Yr8	Yr9	Yr10	Yr 12	Yr13	Yr30
Mine Construction													
Portage Pit													
Goose Pit													
Vault Pit													
Mine Operation													
Mine Complete								Yr8					
Progressive Closure													
Mine and Mill Closure / Demolition													
Pit Flooding Portage/Goose													
Pit Flooding Vault													
Water Management													
Post-Closure													

Note: Final removal of Mill in year 14 with completion of water treatment needs for Portage Pit flooding

SECTION 13 • INTERIM SHUTDOWN STRATEGIES

13.1 DESCRIPTION

The mine operation is planned to be continuous for the full proposed operating period. However, the mine may shut down temporarily or indefinitely. The plans for both of these shut down periods are discussed below.

13.1.1 Definitions

Temporary shutdown – A cessation of mining and processing operations for three to twelve months. The intention is that the mine will resume operations as soon as possible after the cause for the temporary shutdown has been removed. Possible causes for a temporary shutdown include a major mechanical equipment failure, late delivery of critical equipment or supplies, or labour conflict.

Indefinite shutdown – 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 removed. 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.

13.2 TEMPORARY SHUTDOWN

Care and maintenance measures to be taken during a temporary shutdown at the Meadowbank Gold Project will include:

- minimum staffing levels maintained to carry out care and maintenance;
- camp operated at reduced staffing level;
- environmental and geotechnical monitoring and sampling would continue at regular intervals as set out in the mine operations and monitoring program;
- continue to monitor the pumps in the open pits and maintain the pits in a dry condition to maintain dry, stable pit slopes;
- if shutdown is prior to the conversion of the Process Plant to Water Treatment Plant, then water from the Portage Pit and Portage RSF that does not meet discharge quality requirement would be accumulated in the Reclaim Pond;

- if shutdown is after the conversion of the Process Plant to Water Treatment Plant, then water from the Portage Pit, Goose Pit, and Portage RSF would be allowed to accumulate in the Reclaim Pond up to the allowable storage capacity (i.e., allowing for Central Dike freeboard plus storm attenuation volume). Once the available storage capacity has been reached, water would be treated, if required, and discharged;

- all water would 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;

- water from the Vault Pit and Vault RSF would continue to be accumulated within the Vault Attenuation Pond;

- surface water control structures would be maintained;

- tailings and water distribution lines would be drained or emptied, flushed with water, and allowed to drain, but would be left in place;

- critical facilities (plant and camp) would have nominal heat to prevent freezing of the facilities and possible damage;

- Sewage Treatment Plant would continue to operate, as needed; and,

- hazardous wastes on site would be collected and stored in an appropriate area for disposal at a later date.

13.3 INDEFINITE SHUTDOWN

Care and maintenance measures to be taken during an indefinite shutdown at the Meadowbank Gold Project will include:

- minimum staffing levels maintained to carry out care and maintenance;
- camp operated at reduced staffing levels;
- environmental and geotechnical monitoring and sampling would continue at the regular level as set out in the mine operations and monitoring program;
- continued monitoring of the pumps in the open pits and maintaining the pits in a dry condition to maintain dry, stable pit slopes;
- two-metre cover of ultramafic rock will be placed over potentially acid-generating rock and exposed tailings beach areas, to minimize acid generation and to control dust;
- the working face of the waste rock pile slopes would be graded to ensure stability, and to promote drainage to the surface water drainage system adjacent to the RSFs;
- if shutdown is for labour reasons, monitor the TSF and RSFs, and if needed, work with labour force to ensure any short term environmental concerns are addressed;
- monitor and maintain the perimeter dikes, and do not breach any of the Dewatering Dikes;
- if shutdown is prior to the availability of the Goose Island Pit for attenuation storage, then water from the Portage Pit and Portage RSF that does not meet discharge water quality requirements would be accumulated in the Reclaim Pond up to the allowable storage capacity (i.e., allowing for Central Dike freeboard plus storm attenuation volume). Once the available storage capacity had been reached, water would be treated in-pond as necessary, and discharged;
- if shutdown is after the availability of the Goose Island Pit for attenuation storage, then water not meeting discharge quality requirements could be accumulated in the Goose Island Pit Lake and treated in-pit as necessary;

- water from the Vault Pit and Vault RSF would continue to be accumulated within the Vault Attenuation Pond;

- surface water control structures would be maintained as required. In areas where water quality is suitable for discharge, natural drainage courses could be re-established;

- tailings and water distribution lines would be drained or emptied, flushed with water, and allowed to drain. The lines would be removed and placed in a secure lay down area, to reduce impacts on wildlife; and,

- hazardous wastes and hazardous materials would be removed from site and sent for proper disposal and a licensed facility.

SECTION 14 • CLOSURE, POST-CLOSURE MONITORING AND MAINTENANCE

14.1 DESCRIPTION

The Closure and Reclamation Plan will require a commitment to adaptive management and monitoring during all stages of the mine life to demonstrate the safe performance of the mine facilities. Monitoring will identify non-compliant conditions; allow timely maintenance and planning for adaptive and corrective measures, and enable successful completion of the Closure and Reclamation Plan. Monitoring programs will be initiated during pre-development, construction, and during operations to provide additional baseline information on which to base the final Closure Plan document.

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. The data collected during post-closure monitoring will allow the procedures and activities to be adjusted or modified as necessary to confirm on going environmental protection.

14.2 OBJECTIVES AND STRATEGIES

Key features of the Closure and Reclamation Plan will be developed in conjunction with the mine plan so that closure considerations are incorporated into the mine design. Wherever practical, surface facilities will be designed to facilitate reclamation requirements and natural recovery of areas affected by the Project. In line with this objective, reclamation will be carried out progressively during operations whenever possible, notably at the TSF and RSFs.

14.3 MONITORING AND MAINTENANCE PROGRAMS

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 operation and may be modified for closure and post-closure conditions.

The water quality monitoring programs is described in detail in the Water Quality and Flow Monitoring Plan (MMC, 2007e), and includes four levels of monitoring: compliance monitoring (CM); internal monitoring (IM); site specific (SS); and event monitoring (EM). Closure and Post-Closure Monitoring fall mainly within the compliance level of water quality monitoring and is briefly described below.

14.3.1 Closure Phase

During the closure phase, mining will have ceased in the Vault Pit and the pit will be allowed to flood using controlled inflow from Wally Lake. Current estimates are that it will take 5 years for the Vault Pit to completely flood at which time the Vault Attenuation Pond and Pit Lake will merge (MMC, 2007b).

By the end of the late operational phase or early in the closure phase the Portage and Goose Island pits will be completely flooded and the remaining portions of the TSF will be capped.

Sampling will completed to monitor surface water and pit lake water quality over the closure period to evaluate acceptability for release to the environment.

14.3.2 Post-Closure Phase

Monitoring activities conducted during the post-closure phase are primarily associated with water quality of selected mine facilities including flooded pit lakes, RSF areas, and the reclaimed TSF.

Closure and reclamation of the project facilities is expected to be completed after the cessation of mining and ore processing after pit lakes are fully flooded and dikes are breached (at different Project years in the Portage and Vault areas). The Project will then enter the post-closure phase where the physical and environmental conditions of decommissioned mine site infrastructure are expected to progress toward steady-state. There will be no full-time personnel presence at the site during this time, and environmental monitoring is anticipated to be carried out at a reduced frequency, most likely during short site visits by helicopter from Baker Lake. The level of monitoring required will be a function of environmental performance at the site and is expected to be phased out over an agreed-to period of time. Thus, it is proposed that for 10 years after closure is complete, the mine would monitor at the Compliance Monitoring sites annually during open water. After 10 years of monitoring, the results would be review and if appropriate an application to reduce the frequency of monitoring would be submitted. It would then be proposed to monitor every second year for a further 5 to 6 years and if the monitoring indicates consistent conditions have been achieved, a request to stop monitoring would be submitted with the Annual Report.

14.3.3 Location of Compliance Monitoring Points

The CM sampling program will include sites from the Portage and Vault areas. As presented in the AEMP (Cumberland, 2005d), it is possible that a subset of the core program will be retained for long-term monitoring. The choice of where and what to monitor would be made by reviewing the utility of monitoring applied over the course of mine life.

The proposed CM locations (MMC, 2007e) are listed on Table 14.1 as well as the mining phase(s) during which time monitoring will take place.

Table 14.1: Compliance Monitoring Sampling Points

Facility	Construction	Early Operations	Late Operations	Closure	Post-closure
Non-contact water diversion ditches	Two ditches Portage area, one ditch Vault area	Two ditches Portage area, one ditch Vault area	Two ditches Portage area, one ditch Vault area	Two ditches Portage area, one ditch Vault area	-
Portage and Goose Island pit lakes	-	-	-	-	Breached
Third Portage Diffuser discharge	-	At pipe	-	-	-
Vault Pit Lake	-	-	-	-	Breached
Wally Lake Diffuser discharge	-	-	At pipe	-	-

The actual location of each sampling site will be determined by access and safety considerations and will be marked by a highly visible stake that will define the exact location of the collection point for subsequent sampling events.

14.3.4 Post-Closure Revegetation Considerations

The pre-development terrain is covered by discontinuous vegetation interspersed with 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. Where appropriate, grading and contouring will be done to control soil stability to promote revegetation. Where rock slopes or other site features preclude revegetation, a layer of ultramafic capping rock will be placed on the surface to ensure long-term stability.

14.3.5 Habitat Enhancement (No Net Loss Management Plan)

Habitat enhancement options are detailed in the No Net Loss of Habitat (Cumberland, 2005g). There are many habitat enhancement options available at post-closure. Monitoring will be conducted by comparing net areas of high value habitat units (HUs) between baseline, construction/operation and closure/post-closure periods.

Habitat enhancement options may include:

- Engineering of structures to provide suitable quality habitats such as substrate/grain size quality, complexity and depth and other parameters.
- Deep (>10 m) areas can be built up to form reefs or shoals and shorelines can be engineered to provide high value habitat.
- The entire contiguous area from the Goose Island Pit north will become part of Third Portage Lake.
- Habitat within the pits and setback areas (sills) between the pit crest and the toe of each dike will be contoured to provide optimal fish habitat.

Details in the final Closure and Reclamation Plan would be based on the data collected and as set out in the No Net Loss of Habitat report (Cumberland, 2005g).

14.3.6 Other Management and Monitoring Programs

14.3.6.1 Environmental Management System

MMC will design and implement an environmental management system (EMS) that incorporates training, environmental monitoring, audits, inspections, and other tools to measure and manage actual environmental performance against established objectives. The EMS will continue through closure and post-closure phases and will consider regulatory compliance and project-related regional socioeconomic and environmental effects. It will also identify circumstances under which additional mitigation should be undertaken if impact predictions prove to be incorrect or underestimated. Later in the mine life, the program will be further refined to focus on monitoring of key issues during the reclamation and closure period. Environmental monitoring and maintenance requirements are expected to decline once the Project facilities have been fully decommissioned and the mine development area has been restored to the endpoints agreed upon in the Water License.

Management and monitoring of aquatic resources are discussed in the Aquatic Effects Monitoring Program (AEMP) (Cumberland, 2005d) and includes monitoring of sediment chemistry, zoo- and phytoplankton, benthic invertebrates and fish. Other management plans are detailed under separate cover (e.g., Metal Mining Effluent Regulations Plan, MMER, 2002).

14.3.6.2 Groundwater Quality Monitoring

MMC will continue with the groundwater quality monitoring programs at or close to the existing sampling stations on an annual basis during construction and operation; as well as through closure and post-closure at reduced frequency. The monitoring programs will evaluate closure performance such as comparison with water quality predictions (i.e., around the perimeter of the TSF to monitor the quality of the groundwater within the talik zone beneath the facility; and into the talik zones beneath the Portage, Goose Island, and Vault pits to collect water quality data).

14.3.6.3 Thermal Monitoring of Tailings, Tailings and Perimeter Dikes

Thermistors installed around the perimeter of the TSF and within the Central Dike and Saddle Dams to monitor freeze-back and compare against predictions will be monitored through closure and post-closure. The thermal performance of the TSF and Central Dike will be measured against the predicted performance.

SECTION 15 • CLOSURE AND RECLAMATION COST ESTIMATES

The financial security requirements for closure and reclamation are outlined in the Nunavut *Mine Site Reclamation Policy* (INAC, 2002):

- The total financial security for final reclamation required at any time during the life of the mine should be equal to the total outstanding reclamation liability for land and water combined (calculated at the beginning of the work year, to be sufficient to cover the highest liability over that time period).

- Estimates of reclamation costs, for the purposes of financial security, are based on the cost of having the necessary reclamation work done by a third-party contractor if the operator defaults. The estimates include contingency factors appropriate to the particular work required.

A closure and reclamation cost estimate has been prepared for the present mine layout and infrastructure. The estimate has been developed using the Reclaim Model 5.1 prepared for Water Resources Division of INAC, by Brodie Consulting Ltd. (2001). The summary of the estimate is presented on Table 15.1 – Summary Closure Cost Estimate. The estimated cost to close the mine / mill is $18 million. The Reclaim Model work sheets have not been provided, but will be submitted if desired by the Nunavut Water Board.

Table 15.1: Summary Closure Cost Estimate

Capital Costs

COMPONENT TYPE		TOTAL COST	Land Liability	Water Liability
OPEN PITS - PORTAGE, GOOSE, VAULT		$1,771,391.00	$120,491	$1,650,900
UNDERGROUND MINE		$0.00	$0.00	$0.00
TAILINGS		$5,490,990.00	$5,490,990	$0
ROCK PILE		$3,521,990.00	$3,521,990	$0
BUILDINGS AND EQUIPMENT		$2,384,085.00	$2,379,575	$4,510
CHEMICALS AND SOIL MANAGEMENT		$461,765.00	$457,125	$4,640
WATER MANAGEMENT		$283,055.45	$0	$283,055
POST-CLOSURE SITE MAINTENANCE		$743,873.74	$371,937	$371,937
SUBTOTAL		**$14,657,150**	**$12,342,108**	**$2,315,042**
		Percentages	84.21	15.79
MOBILIZATION/DEMOBILIZATION		$506,873	$426,814	$80,059
MONITORING AND MAINTENANCE		$550,000	$463,130	$86,870.45
PROJECT MANAGEMENT	3%	$439,715	$370,263	$69,451
ENGINEERING	3%	$439,715	$370,263	$69,451
CONTINGENCY	10%	$1,465,715	$1,234,211	$231,504
GRAND TOTAL - CAPITAL COSTS		**$18,059,167**	**$15,206,789**	**$2,852,378**

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