

# CLOSURE AND RECLAMATION STRATEGY AND SECURITY ESTIMATE

## **Type B Water Licence**

Submitted to:

Nunavut Water Board P.O. Box 119 Gjoa Haven, NU X0B1J0

## **Executive Summary**

In June 2016, Agnico Eagle Mines Limited (Agnico Eagle) filed amendment applications to the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB) for development of the Whale Tail Pit. A joint coordinated review of the Final Environmental Impact Statement (FEIS) and Type A Water Licence Application are ongoing pending final ministerial approval. Following submission of the application it may take up to one year before Agnico Eagle receives a Ministerial approved Type A Water Licence authorizing full development of the Project. Since construction scheduling and implementation for the Project is dependent upon, and restricted by, the seasonal sea lift to support mobilization of supplies and equipment, waiting up to a year to receive a Type A Water Licence before starting construction has significant impact on the overall project schedule.

The regulatory framework provided in the Nunavut Land Claims Agreement (NLCA) and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) allows for interim, short-term approvals for water uses related to exploration or development work (referred to as pre-development work herein) for a proposal under development impact review. The NWB is not restricted from issuing an interim, short-term period water licence for development work related to the Project.

Agnico Eagle has identified specific pre-development (site preparation) activities that would be beneficial in achieving the overall project schedule. The schedule planned for pre-development activities to be permitted separately, allowing construction to start soon thereafter, rather than delay the project significantly, while other permitting issues involving mine operations are addressed. This pre-development permitting approach could allow construction work to start while awaiting the Type A Water Licence, following issuance of the Project Certificate, which would be a substantial gain considering the very small window for construction in the Arctic each year.

In accordance with NWNSRTA, Agnico Eagle is required to furnish and maintain security with the Minister, in a form determined by the Regulations or satisfactory to the Minister. For the NWB to be able to issue a licence, Agnico Eagle must satisfy the Board that the company has the financial ability to adequately implement mitigation measures and apply any costs associated with closing or abandonment of the undertaking.

This document provides for the closure and reclamation approach proposed by Agnico Eagle and an estimate of financial liability for the site as it pertains to the facilities and infrastructure related to pre-development and site preparations of the Whale Tail Pit and Haul Road Project in advance of receipt of a Type A Water Licence.

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#### 1.0 INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to develop the Whale Tail Pit, a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine (herein referred to as the Project). The Meadowbank Mine is an approved mining operation and Agnico Eagle is looking to extend the life of the mine by constructing and operating the Whale Tail Pit within the Amaruq property. The Amaruq property is located in the Kivalliq Region of Nunavut, Canada, centered at approximately latitude 65° 24' 36" N, longitude 96° 41' 41" W. The property was acquired by Agnico Eagle in April 2013 subject to a mineral exploration agreement with Nunavut Tunngavik Incorporated. The Amaruq property is a 408 square kilometre (km²) site located on Inuit Owned Land (IOL) approximately 150 kilometres (km) north of the hamlet of Baker Lake and northwest of the Meadowbank Mine. Inuit Owned Land is governed under the Nunavut Land Claims Agreement (NLCA).

The Whale Tail deposit is partly located within Whale Tail Lake. The proposed approach to develop the pit involves isolating the pit area with three dikes (Whale Tail Dike, Mammoth Dike, and Northeast Dike). The operations phase will span approximately three to four years, during which time the Whale Tail Pit will produce approximately 8.3 million tonnes (Mt) of ore, 46.1 Mt of waste rock, and 5.6 Mt of overburden (with very limited organic material) for a total of 51.7 Mt of waste.

The proposed Project facilities will consist of a personnel camp (i.e., Main Camp), a power plant, a heli-pad, a maintenance shop, a tank farm, a waste rock storage facility (WRSF), an ore stockpiling facility, an attenuation pond, a water and sewage collection and treatment system, haul roads, access roads, water management infrastructure (e.g., collection ponds, channels, dikes, dams, and culverts), and the Whale Tail Pit. To accommodate development, Agnico Eagle is also proposing to expand the width of the existing exploration access road to a haul road to accommodate increased traffic rates and haul trucks. No new infrastructure is required at the existing Meadowbank Mine to support the development of the Project.

Ore from Whale Tail Pit will be segregated by grade then crushed on-site after which it will be transported to Meadowbank Mine for milling. The milling rate will be approximately 9,000 to 12,000 tonnes per day. Agnico Eagle proposes to process the Whale Tail ore and to dispose of the tailings slurry at the existing Meadowbank Mine tailings storage facility (TSF), which is authorized under the current Project Certificate and Type A Water Licence.

The Project is subject to the regulatory requirements of the the NLCA and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act), and as such is required to obtain a project certificate from the Nunavut Impact Review Board (NIRB) and a Type A Water Licence (Application) from the Nunavut Water Board (NWB) to allow for mine development and mining of the Project. In June 2016, Agnico Eagle filed amendment applications to the NIRB and NWB for development of the Project.

Following submission of the Type A Water Licence Amendment Application, it may take up to one year before Agnico Eagle receives a Ministerial approved Type A Water Licence authorizing full development of the Project. Since construction scheduling and implementation for the Project is dependent upon, and restricted by, the seasonal sea lift to support mobilization of supplies and equipment, waiting up to a year to receive a Type A Water Licence before starting construction has significant impact on the overall project schedule. The regulatory framework provided in the NLCA and the Act allows for interim, short-term approvals for water uses related to exploration or development work for a proposal under development impact review. The NWB is not restricted from

issuing an interim, short-term period water licence for pre-development work related to the Project. As such, Agnico Eagle is submitting the Type B application (the Application) for the pre-development activities.

Agnico Eagle has identified specific pre-development (site preparation) activities that would be beneficial in accelerating the overall project schedule. These facilities are listed in Section 3.0 and the closure and reclamation of these facilities along with an estimate of financial liability are provided in this document.

#### 2.0 REGULATORY CONTEXT

A detailed overview of the legislative and regulatory requirements are provided in Section 2.0 of the Main Application Supporting Document. In summary:

- The Project is subject to conformity determination to the Keewatin Regional Land Use Plan. On June 17, 2016, the Nunavut Planning Commission (NPC) issued a positive conformity determination for the Project proposal and forwarded the Project proposal and determination to the NIRB for screening (NPC 2016).
- The Project is subject to environmental and socio-economic impact assessment processes by the NIRB established under Article 12 of the NLCA and more recently subject to the *Nunavut Planning and Project Assessment Act* legislative requirements. The Project is currently under joint review by the NIRB and NWB. For more information on the timelines and processes used by the NIRB in screening and review, refer to Section 2.2 on the Main Application Supporting Document.
- The Project is subject to the requirements of the NWNSRTA, Regulations for water management. A Type A Water Licence Application is pending (Agnico Eagle 2016b). A Type B Water Licence is required from the NWB in order for Agnico Eagle to undertake site preparation and pre-development works.
- The 408 km² Amaruq property is located on IOL, and the rights to explore and develop mineral resources were acquired by Agnico Eagle in 2013 subject to a mineral exploration agreement with NTI. The surface ownership of the land is held by the Kivalliq Inuit Association (KIA). Land and environmental management in this area are generally governed by the provisions of the NLCA. The proposed Whale Tail Pit and associated infrastructure is to be constructed on IOL leased by Agnico Eagle from the KIA. In addition, quarry permits will be sought from the KIA as needed. The Project will require the authorization and consent of the KIA for development, construction, operations, and closure of the Mine and its related facilities.
- Fisheries protection and pollution prevention measures for the Project are subject to the requirements of the Fisheries Act s.35, which states that no person shall carry on any work, undertaking, or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal fishery (CRA), or to fish species that support such a fishery. Agnico Eagle has conducted two years' of aquatic baseline studies for the Project, and will work together with Fisheries and Oceans Canada (DFO) to seek a Fisheries Act Authorization during the review/regulatory phase of this Project.

There will be serious harm to fish habitat as a result of the Project during both the operations and post-closure phases. Accepted methods of habitat enhancement and habitat creation will be utilized, possibly with complementary measures, to offset the serious harm that will occur. The final offsetting plan will be prepared with input from local stakeholders and Fisheries and Oceans Canada. Pre-development activities is not expected to cause serious harm to fish that are part of commercial, recreational, or Aboriginal fisheries, or to fish that support the commercial, recreational, or Aboriginal fisheries. Therefore, it is not anticipated that an

authorization will be required under the *Fisheries Act* for the proposed pre-development activities undertakings, works, or activities.

- The Project will be subject to Metal Mining Effluent Regulations (MMER) requirements (Government of Canada 2012). Pre-development works proposed in the Application will not require deposit of mine effluent. Agnico Eagle will ensure requirements of the MMER are met under the Type A Water Licence Application.
- The Project may be subject to the *Navigation Protection Act*. Agnico Eagle met with Transport Canada to explore the implications of applying the *Navigation Protection Act* to the Project. The *Navigation Protection Act* which came into force on 1 April 2014, is the result of the 2012 amendments made to the *Navigable Waters Protection Act*. Along the current alignment of the haul road, none of the water crossings are located on Transport Canada's schedule of navigable waters. Eleven watercourses are considered to be potential migration routes and/or potentially provide spawning or nursery habitat for large-bodied or small-bodied fish. At this time, Agnico Eagle does not believe that the small lakes, ponds, and streams within the Project's footprint on the Whale Tail site are navigable waterbodies. Agnico Eagle will work with Transport Canada to confirm this to ensure compliance with the *Navigation Protection Act*.
- The Mammoth Temporary Bridge to be constructed at the crossing of the watercourse connecting Whale Tail Lake and Mammoth Lake will facilitate ongoing exploration activities and connect the pre-development quarry and associated activities to the WRSF during the pre-construction phase. A pathway of effects analysis and review of mitigation measures were carried out for the proposed temporary bridge using the DFO guidelines.

#### 3.0 SCOPE OF PRE-DEVELOPMENT WORKS

The scope of pre-development works is provided in Section 3.0 of the Main Application Supporting Document. In summary the following pre-development works are proposed (Figure 3.1):

- commence stripping of Whale Tail Pit (overburden and waste rock), use material for construction and ore/waste stockpiling:
  - quarrying at Quarry 2 (which is within the ultimate Whale Tail Pit); and
  - preparation of dike construction material (i.e., crushing and stockpiling)
- construction of ore stockpile and overburden storage pads
- start construction of the permanent camp and infrastructure:
  - pad construction;
  - start of work on concrete foundations, and
  - start installation of pilings.
- construction of the waste rock berm
- construction of the Whale Tail Bulk Fuel Storage Facility
- installation of four turbidity curtains
- construction of Mammoth Temporary Bridge

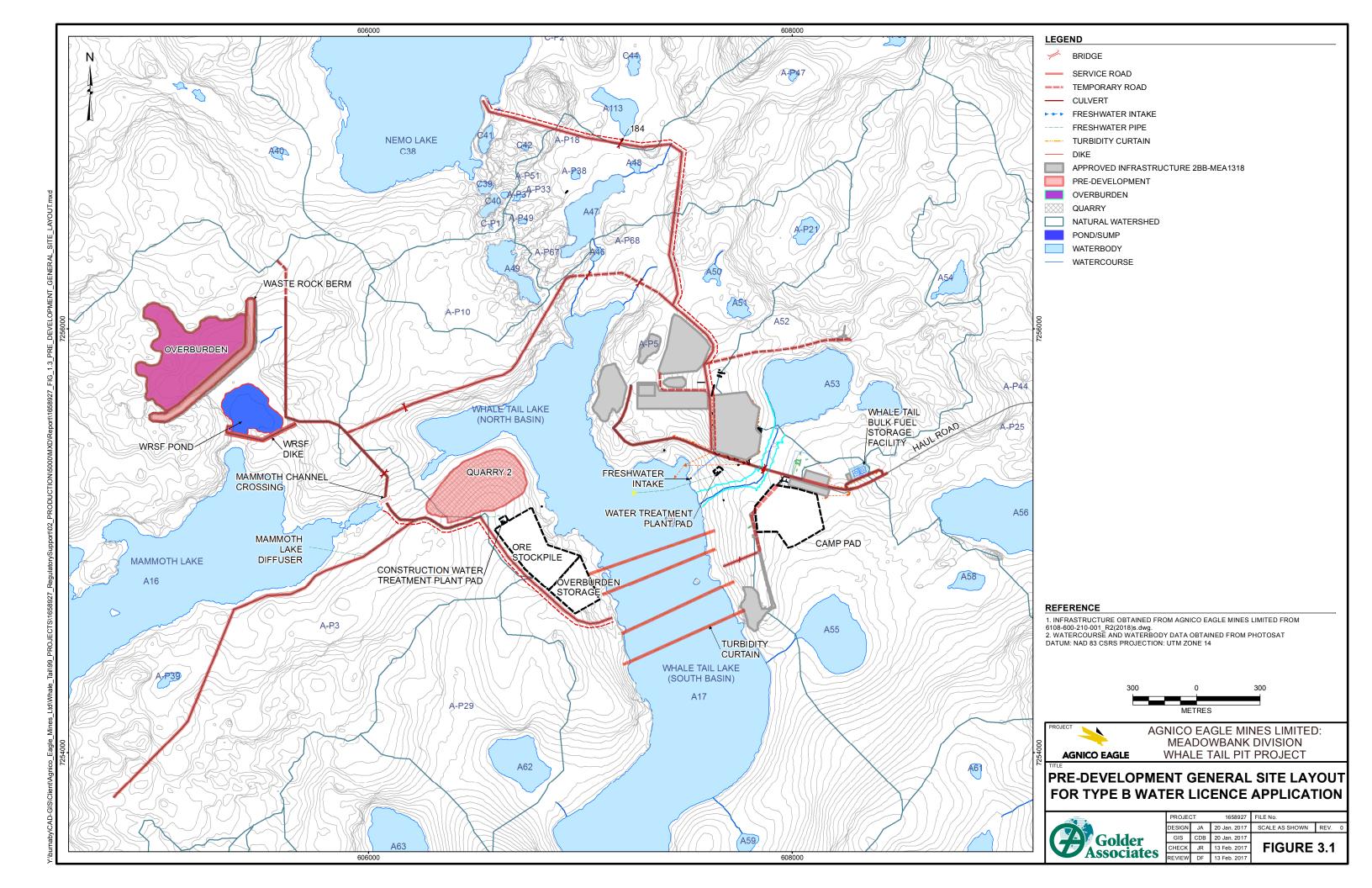


- preparation of piping and pump for dewatering (i.e., roads, pads, water treatment pads)
- pre-delivery of material (i.e., equipment, material, and fuel)
- construction of necessary service roads to undertake the pre-development activities:
  - a road between Quarry 2 and the Waste Rock Storage Facility (WRSF);
  - a road and one culvert between exploration camp and proposed Nemo freshwater intake
  - a road between exploration area and new road between Quarry 2 and the WRSF; and
  - upgrade/widen Project access road from 6.5 m wide to 9.5 m (referred to in this document as the Haul Road) plus the construction of associated bypasses.

During pre-development, fuel at Amaruq will be stored in the existing double-walled envirotanks permitted under license 2BB-MEA1318, which have a total capacity of 1,960,000 litres.

A bulk fuel storage facility has been proposed for Whale Tail Site under in the Type A Whale Tail Pit and Haul Road Project Application submitted in June 2016 (currently under joint NIRB/NWB review, which is expected to be approved in 2018). The facility will hold 500,000 litres in 2- 250,000 litres tanks in a tank farm.

Agnico Eagle does not anticipate construction of the fuel storage facility at the pre-development stage; however, would request that the Type B licence allows for flexibility and inclusion of construction of the fuel storage facility as a contingency. Agnico Eagle is committed to providing the NWB with detailed engineering drawings related to the fuel storage facility at least 60 days prior to proposed construction and revising the spill contingency plan and monitoring plans to account for the change in operation, if implemented prior to issuance of a possible Type A Water Licence.



The stripping of the Whale Tail Pit (overburden and waste rock) will be conducted in accordance with the Quarry Management Plan Addendum (Main Application Supporting Document, Appendix D) for the proposed quarrying activities at Quarry 2 (to be located west of Whale Tail Lake). During pre-development activities, approximately 2.90 Mt of material will be excavated from Quarry 2, 1.32 Mt of which will either be used to construct the proposed: water management structures, the infrastructure pads, the access roads, and the waste rock berm, or it will be stockpiled for future use for dike construction (this material will be placed in temporary piles to be located near the proposed dike). The Whale Tail deposit (intermediate intrusive, southern greywacke waste rock and mafic volcanic rock away from the greywacke and ultramafic units) being considered for use as infrastructure construction material on the mine site are non-potentially acid generating (non-PAG) and leach relatively low levels of arsenic. The overburden suitable for construction will be stockpiled in the proposed overburden storage (i.e., west of the Whale Tail Lake).

Any overburden or waste rock material unsuitable for construction and classified as non-PAG/non-metal leaching (non-ML) will be stockpiled in the proposed waste rock pile. It has been assumed that runoff and seepage from the waste rock pile will be suitable for direct discharge to the environment. Any overburden and waste rock material identified as potentially acid generating and/or metal leaching, will be disposed of in the existing exploration waste rock pad. The exploration waste rock pad is not covered in this application as it is covered under the approved Type B Water Licence for advance exploration activities (2BB-MEA1318).

During the pre-development stage, 0.16 Mt of ore from Quarry 2 will be segregated by grade and temporarily stored in the ore stockpile located adjacent to the Quarry 2 or at approved storage facility locations at Meadowbank site until issuance of the Type A Licence.

A portable construction water treatment plant and an operational water treatment plant will be required for the Project. The construction of the water treatment plant pads are covered under this application.

In November 2015, Agnico Eagle received approval to construct an access road under the approved Type B Water Licence (8BC-AEA1525), which will connect the Vault Pit (one of the Meadowbank Mine pits) to the Amaruq exploration camp site in support of exploration activities. The proposed access road will be about 64.1 km long and, during the exploration stage, it will have a top width of 6.5 m. Agnico Eagle is proposing to upgrade the proposed access road to accommodate increased traffic rates and haul trucks (Haul Road). The proposed upgrade of the access road entails widening from the top width from the current 6.5 m width to 9.5 m width and the construction of the associated bypasses.

A temporary bridge will be constructed across the inlet to Mammoth Lake. The temporary bridge is expected to be used for pre-development activities during the open water season from June to October 2018. It has been designed to comply with all of the application DFO Operational Statements (i.e., bridge maintenance, clear span bridges, culvert maintenance, and ice bridge) for protecting fish and fish habitat. The bridge will consist of two spans of 28 m, supported by abutments on each bank and a center pier.

Four turbidity curtains will be constructed (i.e., two layers upstream and two layers downstream of the proposed Whale Tail dike location) to control suspended sediment during construction of the Whale Tail dike. Construction of the Whale Tail Dike is part of the Type A Water Licence Amendment Application.

The existing emulsion plant located near the Meadowbank Mine will be maintained with deliveries on an as need basis during operations. The exploration access road will be used to truck explosives between Meadowbank Mine

and the Whale Tail site, with minimal amounts of explosives to be stored at the Whale Tail Pit site. Explosives truck(s) will be based at the emulsion plant at Meadowbank Mine.

For the purposes of this Type B Application, any use, production and storage of explosives, will be undertaken in conjunction with the existing Type B Water Licence 2BB-MEA1318.

Fuel and raw materials for manufacturing explosives will continue to be supplied to Meadowbank Mine using the approved shipping routes.

All wastes that could attract wildlife, used spill response supplies, and other appropriate wastes will be incinerated in the Amaruq Exploration on-site incinerators. Wastes that cannot be incinerated but that can be landfilled will be shipped by winter road or access road and disposed of in Meadowbank's approved landfill. Wastes that cannot be incinerated or landfilled will be prepared for shipment to a certified waste management company outside of Nunavut for treatment, recycling and/or disposal.

The exploration facilities (i.e., exploration laydown area, camp, stormwater storage pond, communication tower, exploration magazine, ramp, two vent raises, a small airstrip, 10 km of exploration roads, two borrow pits, Quarry 1, and the proposed access road and associates borrow pits (seven in total) are not covered under this application as they are covered under the Type B Licence 2BB-MEA1318 amended on December 1, 2016 for advanced exploration activities on the Amaruq property.

#### 4.0 CLOSURE AND RECLAMATION APPROACH

Agnico Eagle estimates pre-development work could be initiated as early as January 2018, subject to NWB approval of the Type B Application for pre-development works and issuance of the Project Certificate. The process for application for pre-development work in this case is similar to the approach taken by Agnico Eagle for the pre-development work that was completed at the Meadowbank Mine.

Agnico Eagle acknowledges that the NWB may require the company to furnish and maintain security with the Minister, in a form determined by the Regulations or satisfactory to the Minister. As such, Agnico Eagle has provided this Closure and Reclamation Approach and Security Estimate (the Plan). The Plan includes an estimate of financial liability for pre-development works and site preparation of \$1,042,997; however, Agnico Eagle would propose that the NWB defer full consideration of security of project liability to the Type A Water Licence submitted to the NWB in June 2016.

For further information on Agnico Eagle's past performance and financial responsibility refer to the Whale Tail Pit FEIS and Type A Amendment Application (Volume 8, Appendix 8-F, Section 10.0 and Appendix D; Agnico Eagle 2016b).

In accordance with the Nunavut Mine Site Reclamation Policy, Agnico Eagle's financial security cost estimate for the pre-development works requested in the Application for a Type B Water Licence has been developed assuming third party contractor rates, on the presumption that Agnico Eagle would be somehow unable to fulfill its closure and reclamation obligations, and that the government would be required to take over reclamation of the works.

The decision to implement the Type B closure and reclamation approach does not mean Agnico Eagle would abandon its current work program for which it holds valid authorizations, licenses and permits. Therefore, Agnico Eagle proposes to defer security of the pre-development components to the Type A Water Licence.

Should the pre-development activities require the implementation of the reclamation and closure plans as outlined Section 5.0 in advance of receipt of a Type A Water Licence, then the pre-development works remediation and closure would be undertaken at the same time as current approvals for the Amaruq property (refer to Section 2.3 of the Main Application Supporting Document for the Type B Application). For additional information on closure and reclamation refer to the Closure and Reclamation Plan submitted under the Type A Water Licence (where appropriate).

The closure and reclamation activities associated with the proposed Type B Water Licence pre-development work will follow applicable KIA and federal/territorial guidelines and policies, and the closure and reclamation objectives and criteria outlined in this document and in general the Preliminary Closure and Reclamation Plan submitted with the Type A Water Licence application for the Project.

#### 5.0 CLOSURE AND RECLAMATION ACTIVITIES

Closure and reclamation of proposed pre-development and site preparation works described in Section 3.0 will include:

- Salvageable surface structures will be dismantled and demobilized from the site.
- Non-salvageable structures will be dismantled or demolished, and inert non-hazardous materials disposed of in the Meadowbank Mine landfill area.
- The material from the temporary waste rock stockpiles and overburden storage not used for reclamation will be hauled to the waste rock pile. The areas will be regraded to promote natural drainage and re-vegetation.
- Any above grade concrete structures will be demolished and the rubble will be disposed of in the Meadowbank Mine landfill. Any slabs on grade will be punctured and then left in place and covered with soil or non-PAG/non-ML waste rock. Any subgrade foundations will be left in place.
- Hazardous wastes will be removed for disposal by a licenced handler.
- The waste rock pile will be left in place. A closure spillway will be constructed to avoid ponding of water and the overflow will be directed into the Mammoth Lake. It is expected that natural re-vegetation will occur over the overburden top area over time.
- The turbidity curtains will be dismantled and waste materials will be disposed of in the Meadowbank Mine landfill area.
- The temporary bridge on Mammoth Lake will be dismantled and waste materials will be disposed of in the Meadowbank Mine landfill area.
- An assessment will be carried out to identify areas where soils may be contaminated by hydrocarbons. Any hydrocarbon contaminated soils will be excavated and hauled to Meadowbank Mine landfarm for remediation.
- Fuel resupply, the year before closure, will be planned to leave a minimum amount in the envirotanks that will be required for closure activities. Fuel not required during the closure and reclamation activities, if any, will be sent to Meadowbank Mine for use, sold, returned to suppliers, disposed by a licensed handler, or incinerated on-site.
- Waste oil will be incinerated on-site.



All disturbed site areas will be re-graded to suit the surrounding topography. In areas where the original ground surface was lowered for site grading or structural requirements, the slopes will be stabilized and contoured. Cover materials may be required for erosion and dust control. It is anticipated that a succession of indigenous plant species will naturally re-vegetate the surface over time.

#### Quarry 2:

- All mobile equipment will be demobilized from the site.
- Quarry 2 will be allowed to flood naturally. The water in the quarry lake will be tested for water quality and if found acceptable, it will be released to the environment. A lined channel will be constructed north of the Quarry 2 to connect and convey any overflow into the Whale Tail Lake. If the water quality in the quarry lake is not acceptable, it will be treated before discharging to the environment.
- Should acid-generating bedrock be exposed, these areas will be covered with a minimum 2 m thick layer of non-acid generating soil or rock.
- Exposed slopes (on the south side of the quarry) will be stabilized and contoured.
- A safety berm will be constructed at the crest of the perimeter of Quarry 2 (south side) to restrict access, and access to the Quarry 2 will be blocked with boulders.
- Service Roads to Support Pre-Development Activities:
  - The roads not required for post-closure monitoring, and not assumed by the community or by a third party after consultation, will be decommissioned and the terrain will be restored. Decommissioning of the road will start from the site.
  - Decommissioning will occur by loosening compacted surfaces and flattening side slopes.
  - The road surface will be scarified, allowing the native plant community to naturally establish itself on the former road surface.
  - Slopes will be stabilized against erosion potential.
  - If necessary, wildlife access will be provided at suitable intervals by re-grading the embankment shoulders to provide flatter slopes.
  - Should potentially acid generating bedrock be exposed along the roadway, these areas will be covered with a minimum 2 m thick layer of non-potentially acid generating and non-metal leaching soil or rock to direct water away from the surface.
  - All bridges and culverts will be removed and original drainage patterns will be restored.
  - Stream crossings will be rehabilitated as they are encountered during the progression of the road decommissioning work.

Monitoring and maintenance of the reclaimed facilities will be carried out during pre-development, operations, and into closure. Periodic inspections will be performed to visually assess the reclaimed areas.

Surface and groundwater will be sampled if site specific conditions dictate during the closure period.



#### 6.0 SCHEDULE OF CLOSURE AND RECLAMATION ACTIVITIES

Agnico Eagle requests a term of at least one (1) year to allow for construction of some basic infrastructure and for site preparation for the pre-development phase of the Whale Tail Project and that this application expires on issuance of the Type A Water Licence. Agnico Eagle would request that, should a Type A Water Licence be issued for the Project in the future, that the Board incorporate the scope of this Type B Application/Licence into the Type A Water Licence.

Similar to the Term of Licence, Agnico Eagle also requests that, should a Type A Water Licence be issued for the Project in the future, that the Board incorporate the security required under the Type B Licence into the Type A Water Licence such that a "double bonding" for project activities of the same scope does not occur.

Agnico Eagle estimates that, if the Type A Licence is not issued, it would require 1 to 2 summer seasons to complete the work noted in this Plan. Agnico Eagle anticipates the Type A Water Licence will be issued, so this Plan would not need to be implemented.

## 7.0 ESTIMATE OF PROPOSED PRE-DEVELOPMENT WORKS FINANCIAL LIABILITY

A permanent closure and reclamation financial security cost estimate for the proposed pre-development works described in this Plan has been prepared to a conceptual level using RECLAIM Version 7.0, March 2014 (Attachment A).

A summary of the financial security cost estimate for the pre-development works is provided in Table 7.1.



Table 7.1: Summary Financial Security Cost Estimate

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
QUARRY	Quarry 2	\$33,721	\$0	\$33,721
UNDERGROUND MINE		\$0	\$0	\$0
TAILINGS FACILITY		\$0	\$0	\$0
ROCK PILE	Waste Rock Pile	\$143,470	\$0	\$143,470
BUILDINGS AND EQUIPMENT		\$426,438	\$0	\$426,438
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT		\$42,470	\$0	\$42,470
SURFACE AND GROUNDWATER MANAGEMENT		\$8,000	-	\$8,000
INTERIM CARE AND MAINTENANCE		\$0	-	\$0
	SUBTOTAL: Capital Costs	\$654,099	\$0	\$654,099
	PERCENT OF SUBTOTAL		0%	100%
INDIRECT COSTS	PERCENT OF SUBTOTAL	COST	LAND	WATER
INDIRECT COSTS  MORILIZATION/DEMORILIZATION	PERCENT OF SUBTOTAL	COST \$100 448	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION	PERCENT OF SUBTOTAL	\$100,448	LAND LIABILITY	WATER LIABILITY \$100,448
MOBILIZATION/DEMOBILIZATION POST-CLOSURE MONITORING AND MAINTENANCE		\$100,448 \$79,138	LAND LIABILITY \$0 \$0	WATER LIABILITY \$100,448 \$79,138
MOBILIZATION/DEMOBILIZATION  POST-CLOSURE MONITORING AND MAINTENANCE  ENGINEERING	5%	\$100,448 \$79,138 \$32,705	LAND LIABILITY \$0 \$0 \$0	WATER LIABILITY \$100,448 \$79,138 \$32,705
MOBILIZATION/DEMOBILIZATION POST-CLOSURE MONITORING AND MAINTENANCE		\$100,448 \$79,138 \$32,705 \$32,705	LAND LIABILITY \$0 \$0 \$0 \$0	WATER LIABILITY \$100,448 \$79,138 \$32,705
MOBILIZATION/DEMOBILIZATION  POST-CLOSURE MONITORING AND MAINTENANCE  ENGINEERING  PROJECT MANAGEMENT	5% 5%	\$100,448 \$79,138 \$32,705	LAND LIABILITY \$0 \$0 \$0	WATER LIABILITY \$100,448 \$79,138 \$32,705 \$32,705 \$6,541
MOBILIZATION/DEMOBILIZATION  POST-CLOSURE MONITORING AND MAINTENANCE  ENGINEERING  PROJECT MANAGEMENT  HEALTH AND SAFETY PLANS/MONITORING & QA/QC	5% 5% 1%	\$100,448 \$79,138 \$32,705 \$32,705 \$6,541	LAND LIABILITY  \$0  \$0  \$0  \$0  \$0  \$0  \$0	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION  POST-CLOSURE MONITORING AND MAINTENANCE  ENGINEERING  PROJECT MANAGEMENT  HEALTH AND SAFETY PLANS/MONITORING & QA/QC  BONDING/INSURANCE	5% 5% 1%	\$100,448 \$79,138 \$32,705 \$32,705 \$6,541 \$6,541	\$0 \$0 \$0 \$0 \$0 \$0 \$0	WATER LIABILITY \$100,448 \$79,138 \$32,705 \$32,705 \$6,541
MOBILIZATION/DEMOBILIZATION  POST-CLOSURE MONITORING AND MAINTENANCE  ENGINEERING  PROJECT MANAGEMENT  HEALTH AND SAFETY PLANS/MONITORING & QA/QC  BONDING/INSURANCE  CONTINGENCY	5% 5% 1% 1% 20%	\$100,448 \$79,138 \$32,705 \$32,705 \$6,541 \$6,541 \$130,820	\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$	WATER LIABILITY \$100,448 \$79,138 \$32,705 \$32,705 \$6,541 \$6,541 \$130,820

#### 8.0 References

Agnico Eagle (Agnico Eagle Mines Limited). 2016a. Quarry Management Plan KVCA15Q01.

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Government of Canada. 2012. Metal Mining Effluent Regulation (MMER). SOR/2002-222.

NPC (Nunavut Planning Commission). 2016. File #148297 Whale Tail Pit Project – Meadowbank Division on June 17, 2016.

NWB (Nunavut Water Board). 2016. Water Licence 2BB-MEA-1318 Meadowbank Advanced Exploration Project (previously 2BE-MEA1318). Issued on December 01, 2016. Expires on March 06, 2018).

## **ATTACHMENT A**

**Security Estimate - Reclaim Model v.7.0 - Whale Tail Pit Type B Water Licence for Pre-development Works** 

Project Name:	Reclaim Model - Overview of Program
Whale Tail -Predevelopment	All users are urged to read the Reclaim Model User Manual - Scroll down for overview description of program.
	Important! Reclaim 7.0 works better with no other excel files open. If other excel files are open ignore run time error and proceed
Reclaim Menu	The default Excel menu bar has an additional tab labelled "Add-Ins" that provides options specific to the Reclaim Model.
	Clear This option deletes all input data, deletes any duplicated elements and blanks out the project name. It also allows for segregation into land costs vs water costs if required.  This option Duplicates components of the project. E.g., if there is more than one Open Pit, use duplicate to add a second Open Pit
	Duplicate Quantities for the new Open Pit are erased, but the Activities and Cost Codes are carried over from the original Open Pit. The new Open Pit subtotal is added to the Summary page.
t	This option opens a window of unit costs to provide easy reference. NOTE: the unit cost table has a filter in the 'UNITS' column. You can select to only see a particular unit (eg km) or multiple units (km and m3) or all units.
	Print All This option prints the Summary Worksheet, Unit Cost Worksheet, and the individual component worksheets having non-zero balances. Individual worksheets can be printed directly using standard printing methods, such as Ctl - P.
	Quit Select Quit to exit the program  Help Redirects user to Instructions worksheet.
WorkSheets	
:	This worksheet contains a cumulative summary of costs for each component of the project. Associated costs such as engineering and project management are added as a percentage of the component costs.
Co	Costs are derived for individual closure and reclamation activities by multiplying a "quantity" of activity by a "unit cost".  mponents An activity can be edited, added, or deleted from worksheet. However, care should be taken not to modify cells that are defined and used elsewhere in the program.
	Do not change the content or column width of the first column of each component worksheet.  Init Costs This worksheet contains a look up table with costs for typical work associated with each closure and reclamation activity
Limitations	The Reclaim Program will NOT work if the worksheets are changed such that the following requirements are not met.
	Please review the following prior to modifiying worksheets.
WorkShe	tet Names The names of the worksheets must not be changed.
Defin	ed Names Certain cells have defined names, which must not be changed. Where the cell is named, the name will appear in the "Name Box" to the left of the formula bar.
First li	ne of data The first line of data for any component worksheet starts on line 4. Do not change the first line of a component worksheet, ie the component name.
	Cell A1 on the component sheet MUST always contain the count of that component for the duplicate function to operate. DO NOT CHANGE.
Add	You can add lines to components and the unit cost table, as long as they are not the last lines.  In Lines The last line might fall outside the named ranges. You can check the size of the named range by selecting the name from the dro
	down box at the top left of the sheet. Usually this box has a cell reference, or a name.  Printing A component will only be printed if its sub-total is greater than zero. In addition, a component and the summary sheet cannot be printed if there is an error. Printing has been set to print 1 page per component.
Conditions of Use	The Reclamation Cost Estimating Model was prepared to serve as a guide for Government Agencies, mining companies, and
Conditions of Ose	others to estimate the cost of mine reclamation. This model is not intended to replace reclamation planning or to be used to determine the activities required to reclaim a site or to dictate how much should be spent on reclamation.
	Reclaim was prepared by Brodie Consulting Ltd. on behalf of AANDC. AANDC and Brodie Consulting Ltd. are not responsible fo the completeness or accuracy of any reclamation estimate made using this model. The user agrees to check and take responsibility for all aspects of any cost estimate made using this model.

The following table provides guidance as to whether water management and treatment is considered short term or long term. Short term closure activities may be costed within a component (eg 'Open Pit' or 'Rock Pile') or 'Water Management'. Long term or post-closure water treatment is costed in 'Water Treatment'.

		Short Term/ Capital Ex.	
	flood pit - install/operate pumping system	X	1
	construct diversion ditches	X	1
	treat 1st filling	X	1
Open Pit	install pump/decant system	x	1
	passive/biological treatment	x	
	overflow treatment		x
	construct diversion ditches	x	
	install groundwater collection system	x	1
	install toe seepage collection system	x	1
	collect and treat groundwater		X
Rock Pile/Heap Leach Facility	collect and treat seepage (ARD/ML)		X
	install passive treatment system	X	1
	operate and maintain passive treatment system	^	x
	operate pump and detoxify heap leach pile (cyanide destruction)	X	1
	construct diversion ditches	X	
	pump supernatant (to pit, U/G)	x	
	treat supernatant	x	
Tailings Facility	install toe seepage collection system	x	1
,	collect and treat seepage (ARD/ML)		X
	install passive treatment system	x	1
	operate and maintain passive treatment system	^	x
	accelerate flooding	X	
	install seepage collection system	X	1
U/G Mine	install dewatering/pumping system	X	1
	operate seepage/dewatering system (ARD/ML)	^	x
	refill lakes		<u> </u>
	redirect creeks/streams	X	1
	stabilize water management ponds	X	1
	stabilize/close sediment ponds	X	†
	fresh water supply - breach embankment	x	1
Water Management	fresh water supply - remove piping system	X	†
	construct water treatment plant	X	+
	construct sludge pond	X	+
	water control in reclamation quarry	······································	·
	operate/maintain water treatment plant		×

#### **SUMMARY OF COSTS**

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
QUARRY	Quarry 2	\$33,721	\$0	\$33,721
UNDERGROUND MINE		\$0	\$0	\$0
TAILINGS FACILITY		\$0	\$0	\$0
ROCK PILE	Waste Rock Pile	\$143,470	\$0	\$143,470
BUILDINGS AND EQUIPMENT		\$426,438	\$0	\$426,438
CHEMICALS AND CONTAMINATED SOIL MANAGEMEN		\$42,470	\$0	\$42,470
SURFACE AND GROUNDWATER MANAGEMENT		\$8,000	-	\$8,000
INTERIM CARE AND MAINTENANCE	<u>-</u>	\$0		\$0
	SUBTOTAL: Capital Costs	\$654,099	\$0	\$654,099
	PERCENT OF SUBTOTAL		0%	100%

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION		\$100,448	\$0	\$100,448
POST-CLOSURE MONITORING AND MAINTENANCE		\$79,138	\$0	\$79,138
ENGINEERING	5%	\$32,705	\$0	\$32,705
PROJECT MANAGEMENT	5%	\$32,705	\$0	\$32,705
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	1%	\$6,541	\$0	\$6,541
BONDING/INSURANCE	1%	\$6,541	\$0	\$6,541
CONTINGENCY	20%	\$130,820	\$0	\$130,820
MARKET PRICE FACTOR ADJUSTMENT	0%	\$0	\$0	\$0
	SUBTOTAL: Indirect Costs	\$388,898	\$0_	\$388,898
TOTAL COSTS		\$1,042,997	\$0	\$1,042,997

Note: Existing underground workings from explorations are covered under Type B land and water permits

Quarry Nam	e: Quarry	2			Quarry # <u>2</u>			
				Cost		%	Land	
ACTIVITY/MATERIAL	Notes	Units	Quantity	Code	Unit Cost	Cost Land	Cost	Water Cost
CONTROL ACCESS						_		
Fence,		m		#N/A	\$0.00	\$0	\$0	
Signs	Assumed	each		SS	\$75.00	\$150	\$0	
Berm at crest	At crest of rock backslope only - assumed 600 m x 1.5 m3/m Assumed: 1 entrance, each block 5m base, 1 m crest width, 1 m	m3	900	RC1L	\$12.05	\$10,845	\$0	\$10,845
Block roads	high, 2H:1V slopes and 30m long	m3	90	RB1L	\$11.40	\$1,026	\$0	\$1,026
Other				#N/A	\$0.00	\$0	\$0	\$0
STABILITY STUDY								
Conduct stability and setback study		Allow		#N/A	\$0.00	\$0	\$0	\$0
STABILIZE SLOPES								
Off-load crest, soil A		m3		#N/A	\$0.00	\$0	\$0	\$0
Off-load crest, soil B		m3		#N/A	\$0.00	\$0	\$0	
Doze/trim overburden at crest		hrs		dozersL	\$205.00	\$4,100	\$0	
Drill & blast pit crest		m3		#N/A	\$0.00	\$0	\$0	
Buttress slope		m3		#N/A	\$0.00	\$0	\$0	
Other	Backhoe to pull down loose rock on 600 m long bedrock backslope	hrs hrs	40	exc-sL	\$190.00	\$7,600	\$0	\$7,600
COVER/CONTOUR SLOPES								
Place fill, soil A		m3		#N/A	\$0.00	\$0	\$0	\$0
Place fill, soil B		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	
Vegetate slopes		ha		#N/A	\$0.00	\$0	\$0	
Vegetate pit floor		ha		#N/A	\$0.00	\$0	\$0	
Other		IId		#N/A	\$0.00	\$0	\$0	
CONSTRUCT DIVERSION DITCHES				#11//	φ0.00	ΨΟ	φυ	ΨÜ
Excavate ditches -soil		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate ditches -rock		m3		#N/A	\$0.00	\$0	\$0	
Rip rap in channel base		m3		#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT SPILLWAY								
Overflow lined channel	Construct lined overflow channel - discharge into Whale Tail Take	Allow		AE	\$10,000.00	\$10,000	\$0	
Concrete		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
RECLAIM QUARRIES								
Contour slopes		Allow		#N/A	\$0.00	\$0	\$0	\$0
Place overburden		m3		#N/A	\$0.00	\$0	\$0	
Vegetate		m3		#N/A	\$0.00	\$0	\$0	
FLOOD PIT-Captital					*****	**		
Remove stationary equipment (sump pumps) and dewatering								
pipeline	Quarry will be allowed to pond naturally	Allow		#N/A	\$0.00	\$0	\$0	\$0
	Quality will be allowed to porta flatdrally					\$0	\$0	
Remove dewatering pipeline		m		#N/A	\$0.00			
Remove power lines		each		#N/A	\$0.00	\$0	\$0	
Construct diversion ditches		m3		#N/A	\$0.00	\$0	\$0	
-Ditch, mat'l A		m3		#N/A	\$0.00	\$0	\$0	
-Ditch, mat'l B		m3		#N/A	\$0.00	\$0	\$0	
Construct embankment/dam		m3		#N/A	\$0.00	\$0	\$0	
Supply/install pump station and piping system (including pump:		Allow		#N/A	\$0.00	\$0	\$0	
Supply/install piping system		m		#N/A	\$0.00	\$0	\$0	
Remove pump post-closure		each		#N/A	\$0.00	\$0	\$0	
Remove pipeline post-closure		m		#N/A	\$0.00	\$0	\$0	\$0
FLOOD PIT-Annual Cost								
Operate pumps to flood pit	Quarry will be allowed to pond naturally	each		#N/A	\$0.00	\$0	\$0	\$0
Maintain pump/pipeline	* * *	allow		#N/A	\$0.00	\$0	\$0	
Labour:fuel management, comissioning/decom		\$/h		#N/A	\$0.00	\$0	\$0	
Chemical addition, kg/m3 of water		tonne		#N/A	\$0.00	\$0	\$0	
Chemical addition, kg/ms of water  Chemicals, purchase and shipping		tonne		#N/A	\$0.00	\$0	\$0	
		tonne \$/ha		#N/A #N/A	\$0.00	\$0 \$0	\$0 \$0	
Passive/biological additives								
Passive additives purchase and shipping		tonne		#N/A	\$0.00	\$0	\$0	
Other- Pump operation cost		m3		#N/A	\$0.00	\$0	\$0	\$0
					I pumping costs	\$0		
Number of years of pump flooding		years	0					
				Tota	I pumping costs	\$0	\$0	
					Total	\$33,721	\$0	
					% of Total		0%	100%

Note: No water purchase is needed for quarry flooding

1	Rock Pile Name:	Waste Rock Pile

			Cost		%	Land	
ACTIVITY/MATERIAL	Notes	Units	Quantity Code	Unit Cost	Cost Land		Nater Cost
STABILIZE SLOPES			·				
Flatten slopes with dozer		m3	#N/A	\$0.00	\$0	\$0	\$0
Flatten "bubble dump" areas	overburden	m3	75000 DRL	\$1.05	\$78,750	\$0	\$78,750
Divert runon, ditch mat'l A		m3	#N/A	\$0.00	\$0	\$0	\$0
Divert runon, ditch mat'l B		m3	#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, drain mat'l		m3	#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, fill mat'l A		m3	#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, fill mat'l B		m3	#N/A	\$0.00	\$0	\$0	\$0
COVER ROCK PILE							
Subgrade preparation - doze surface		m3	#N/A	\$0.00	\$0	\$0	\$0
Soil cover - excavate,haul,spread&compa	Not required - only NPAG/NML material from Quarry 2 will be a placed in WRSF	m3	#N/A	\$0.00	\$0	\$0	\$0
D10	Not required - only NPAG/NML material from Quarry 2 will be		//A	***	•	•	•
non-PAG waste rock cover (4 m thick)	placed in WRSF	m3	#N/A	\$0.00	\$0	\$0	\$0
Excavate downslope drainage channel &	chute	m3	#N/A	\$0.00	\$0	\$0	\$0
Rip rap drainage channel and chute		m3	#N/A	\$0.00	\$0	\$0	\$0
Vegetate		ha	#N/A	\$0.00	\$0	\$0	\$0
Other			#N/A	\$0.00	\$0	\$0	\$0
VERY LOW PERMEABILITY COVER (in	addition to above)			4			
Liner subgrade preparation - compact		m2	#N/A	\$0.00	\$0	\$0	\$0
Supply geomembrame		m2	#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane		m2	#N/A	\$0.00	\$0	\$0	\$0
Protective cover - excavate,haul,spread&	compact	m3	#N/A	\$0.00	\$0	\$0	\$0
Vegetate		ha	#N/A	\$0.00	\$0	\$0	\$0
Install infiltration/seepage instrumentation		allow	#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT DIVERSION DITCHES / S	PILLWAY						
Construct closure spillway		allow	1 AE	\$20,000.00	\$20,000	\$0	\$20,000
Excavate ditches -soil		m3	10400 SB1L	\$4.30	\$44,720	\$0	\$44,720
Excavate ditches -rock		m3	#N/A	\$0.00	\$0	\$0	\$0
Rip rap in channel base		m3	#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT SEEPAGE COLLECTION	POND						
Excavate seepage collection pond		m3	#N/A	\$0.00	\$0	\$0	\$0
Doze & spread excavated material		m3	#N/A	\$0.00	\$0	\$0	\$0
Vegetate spread material		ha	#N/A	\$0.00	\$0	\$0	\$0
Bedding layer		m3	#N/A	\$0.00	\$0	\$0	\$0
Supply geomembrane		m2	#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane		m2	#N/A	\$0.00	\$0	\$0	\$0
Erosion protection layer		m3	#N/A	\$0.00	\$0	\$0	\$0
INSTALL GROUNDWATER COLLECTIO	N SYSTEM						
Excavate/install sumps		m3	#N/A	\$0.00	\$0	\$0	\$0
Install pumping wells		m3	#N/A	\$0.00	\$0	\$0	\$0
Install pumps/pipelines/power supply RELOCATE DUMPS		allow	#N/A	\$0.00	\$0	\$0	\$0
Load, haul, dump or doze		m3	#N/A	\$0.00	\$0	\$0	\$0
Add lime		tonne	#N/A	\$0.00	\$0	\$0	\$0
Contour reclaimed area		ha	#N/A	\$0.00	\$0	\$0	\$0
Other			#N/A	\$0.00	\$0	\$0	\$0
SPECIALIZED ITEMS							
Install permanent instrumentation		Allow	#N/A	\$0.00	\$0	\$0	\$0
Install permanent instrumentation, drilling		each	#N/A	\$0.00	\$0	\$0	\$0
TREAT ROCK PILE SEEPAGE - "It is inc	cluded on Water Treatment Sheet"						
HEAP LEACH SEEPAGE TREATMENT -	- Cyanide Detox						
Cyanide destruction water treatment pum	ping	m3	#N/A	\$0.00	\$0	\$0	\$0
Reagents		tonnes	#N/A	\$0.00	\$0	\$0	\$0
Electrician/mechanic to maintain treatmen	nt plant	allow	#N/A	\$0.00	\$0	\$0	\$0
Equipment maintenance and parts		allow	#N/A	\$0.00	\$0	\$0	\$0
Number of years of treatment		years	Annu	al treatment costs	\$0		
		yoaro	Tot	al treatment costs	\$0		\$0
HEAP LEACH SEEPAGE TREATMENT -							
Upgrade/modify pumping system - report	to WTP	allow	#N/A	\$0.00	\$0		\$0
				Total	\$143,470	\$0	\$143,470
				% of Total		0%	100%

<sup>\*</sup> For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost
\*\*Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

Reclaim 7.0 Project: Whale Tail -Predevelopment 16/02/2017

Building / Equip Name: Bldg / Equip #: ACTIVITY/MATERIAL
DISPOSE MOBILE EQUIPMENT Unit Cos Decontaminate and ship off-site Blast hole drill covered in Exploration Type B. Construction eqpt will be demobed by Contractor 1 AE \$5,000.00 \$5,000 \$5,000 Decontaminate and dispose on-site manhours #N/A \$0.00 sc \$0 Other REMOVE BUILDINGS - see note below Accomodation Complex - Main Camp Process Facilities - Crushers Offices, kitchen, ERT hrs m2 m2 No buildings, only pads and pilings in pre-development. Excavator with hoe roam to demolish pilings to grade 30.0 exc-sL \$190.00 \$5,700 \$0 \$5,700 No crushers. Only pads in pre-development.
Use exploration facilities during pre-development. In exploration Type B estimate. Storage Facilites (Main Warehouse) No buildings, only pads and pilings in pre-development m2 #N/A \$0.00 \$0 \$0 Water and Wastewater Treatment Facilities No buildings, only pads and pilings in pre-development #N/A \$0.00 \$0 so so m2 Power Plant
Communication Tower No buildings, only pads and pillings in pre-development In exploration Type B estimate. \$0.00 \$0.00 #N/A \$0 U/G Heating Plant In exploration Type B estimate \$0.00 \$0 \$0 \$0 \$0 #N/A #N/A #N/A Emulsion Plant In exploration Type B estimate In exploration Type B estimate \$0.00 \$0 \$0 \$0 AN Storage Facility No buildings, only pads and pilings in pre-development Shops and Other \$0.00 Storage Facility at Laydown/Airstrip Not applicable #N/A \$0.00 \$0 \$0 \$0 Fuel tanks on site / Bulk fuel tank Fuel Tanks Fire protection- Pumping station #N/A #N/A #N/A Only pads in pre-development. In exploration Type B estimate \$0.00 \$0.00 \$0 \$0 m2 allow allow Freshwater intake #N/A \$0.00 \$0 so so \$5,000.00 \$20,000.00 Portable pump - load and ship to Meadowbank 5000 \$5,000 \$5,000 Not applicable \$0 #N/A Airstrip lighting, navigation, electrician Not applicable mandays \$0.00 \$0 \$0 \$0 Airstrip lighting, navigation, mechanical Break foundation slabs Not applicable
Assume pre-developent includes slab on grade for cold storage andays m2 #N/A \$0.00 so \$0 \$0 Consolidate & dump boneyard debris Load debris and haul to landfill at Meadowbank m3 200 SC2H \$11.75 \$2,350 \$2,350 hrs m2 m2 Steel - teardown Torch cutting re-bar on building pedestals (after hoe ram above) 40.0 lab-sH \$49.60 \$1.984 \$0 \$1.984 In exploration Type B estimate.

No buildings, only pads and pilings in pre-development \$0.00 \$0.00 \$0 \$0 WTP & Fresh water pumping station m2 #N/A \$0.00 \$0 \$0 \$0 WRSF Pond. Attenuation Pond pumphouses m2 #N/Δ \$0.00 \$0 sn sn LANDFILL FOR DEMOLITION WASTE Place rock cover No on-site landfill for pre-development - haul to Meadowbank m3 #N/A \$0.00 \$0 \$0 \$0 \$0.00 \$0.00 Place soil cover #N/A \$0 Vegetate
GRADE AND CONTOUR PADS Accomodation Complex - Main Camp Process Facilities - Crushers Scarify building and infrastructure pads ha 6 SCFYL \$4,300.00 \$25.800 \$0 \$25.800 No crusher in pre-development. Only pads (see above).

Use exploration facilities during pre-development. In exploration Type B estimate m3 Offices, kitchen, ERT Storage Facilites (Main Warehouse) Slab only (see above) m3 #N/A \$8.47 \$0 \$0 #N/A #N/A #N/A Water and Wastewater Treatment Facilities m3 m3 \$8.47 \$0 sn Power Plant Use exploration facilities during pre-development. In exploration Type B estimate Communication Tower In current Type B permit for exploration. m2 \$8.47 U/G Heating Plant In current Type B permit for exploration. m3 #N/A \$0.00 \$0 \$0 \$0 #N/A #N/A #N/A In current Type B permit for exploration.
In current Type B permit for exploration. \$0 \$0 \$0 \$0 \$0 \$0 m3 m3 \$0.00 Fuel tanks on site / Bulk fuel tank m3 \$8.47 \$0 m3 m3 m3 Fire protection- Pumping station Use exploration facilities during pre-development. In exploration Type B estimate #N/A \$8.47 \$0 \$0 \$0 In current Type B permit for exploration.
In current Type B permit for exploration. #N/A #N/A \$0.00 \$0 \$0 Workers Dry Place rock cover m3 #N/A \$0.00 \$0 \$0 \$0 Vegetate Operational WTP #N/A \$0.00 \$0 sn sn Construction WTP will be portable WRSF Pond, Attenuation Pond pumphouses Not in pre-development m3 \$8.47 \$0 PUNCTURE LINED SUMPS m3 #N/A \$0.00 \$0 \$0 \$0 For on site access roads from pre-development. Removal of bridges and culverts on haul road are already in Type B for site access road. 1 EA 4.8 SCFYH \$3,000 \$28,944 \$3,000 \$28,944 Remove culverts and rip rap sides of roads \$3,000.00 On site access roads - assumed 8 m wide, 6 km \$6,030.00 Scarify roads ha Remove bridge Temporary Mammoth Lake Bridge allow 1 EA \$35.000.00 \$35,000 \$0 \$35,000 Incremental width from exploration road (9.5m-6.5m) x 64.1 km. Bridges and culverts are in current Type B permit for Scarify and install water breaks - Haul Road 19.23 SCFYH \$6,030.00 \$115,957 \$115,957 Bypass details: 9.5m wide, 100m long, one every 400 m Not applicable Pads: ore pad, overburden Scarify bypasses - Haul Road Scarify airstrip 15.22 SCFYH \$6,030.00 \$91,799 \$91,799 #N/A 12 SCFYH \$72,360 \$72,360 Scarify overburden storage and ore stockpile areas ha ha \$6,030.00 Vegetate Allow to revegetate naturally #N/A \$0.00 \$0 \$0 Other SPECIALIZED ITEMS #N/A Dispose of misc. debris and laydown area refuse \$0 \$0 each #N/A \$0.00 \$0 Total \$426,438

Note Costs are based on file "6108 Building Listing\_RA.xlsx" dated 3/14/2016, ground area used to remove foundation, grade and contour pads

#### 1 Chemicals/Soil Area Name:

**Note:** The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost Land	Land Cost	Water Cost
HAZARDOUS MATERIALS AUDIT								
Hazardous materials audit		mandays		#N/A	\$0.00	\$0	\$0	\$0
Phase 1 audit		each		#N/A	\$0.00	\$0	\$0	\$0
Phase 2 audit		each		#N/A	\$0.00	\$0	\$0	\$0
<b>BUILDING DECONTAMINATION &amp; CONS</b>	OLIDATION OF HAZARDOUS MATERIALS							
Environmental technician/coordinator		mandays		#N/A	\$0.00	\$0	\$0	\$0
Decontaminate: oil, fuel		mandays	2	2 AE	\$1,000.00	\$2,000	\$0	\$2,000
Decontaminate maintenance shop		mandays		#N/A	\$0.00	\$0	\$0	\$0
Decontaminate power plant		mandays		#N/A	\$0.00	\$0	\$0	\$0
Decontaminate bulk fuel storage		mandays		#N/A	\$0.00	\$0	\$0	\$0
Decontaminate ANFO plant	In exploration Type B estimate.	mandays		#N/A	\$0.00	\$0	\$0	\$0
Decontaminate offices/warehouse/accom		mandays		#N/A	\$0.00	\$0	\$0	\$0
Removal of asbestos siding on buildings		m2		#N/A	\$0.00	\$0	\$0	\$0
Removal of friable asbestos on equipment		m2		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
HAZARDOUS MATERIALS REMOVAL								
Waste oils	Burn on site	litre	2000	ORL	\$0.43	\$860	\$0	\$860
Unused fuel	Burn on site	litre	1000	ORL	\$0.43	\$430	\$0	\$430
Waste batteries	includes fee and transportation	allow	10	) AE	\$500.00	\$5,000	\$0	\$5,000
Assay & environmental lab reagents		kg		#N/A	\$0.00	\$0	\$0	\$0
Machine shop paints, solvents etc		allow		AE	\$10,000.00	\$0	\$0	\$0
Glycol		allow		AE	\$20,000.00	\$0	\$0	\$0
Process reagents		kg		#N/A	\$0.00	\$0	\$0	\$0
Nuclear sources		allow		#N/A	\$0.00	\$0	\$0	\$0
Other hazardous materials	includes fee and transportation	allow	1	AE	\$5,000.00	\$5,000	\$0	\$5,000
HAZARDOUS MATERIALS								
Transportation to disposal facility		allow		#N/A	\$0.00	\$0	\$0	\$0
Disposal fees		allow		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
CONTAMINATED SOILS								
Contam. soil investigation - Phase 1		each	0.5	CS1L	\$7,500.00	\$3,750	\$0	\$3,750
Contam. soil investigation - Phase 2		each	0.4	CS2L	\$50,000.00	\$20,000	\$0	\$20,000
CONTAMINATED SOIL REMOVAL								
Excavate and transport to Meadowbank								
landfarm (Site fuel, power plant,Mine		m3	400	SB2H	\$7.30	\$730	\$0	\$730
maitenance shop)  Manage hydrocarbon remediation at Mead	lowbook londform	m3		) CSRL	\$47.00	\$4,700	\$0 \$0	\$4,700
• ,	owbank landianni	m2	100	#N/A	\$0.00	\$4,700 \$0	\$0 \$0	\$4,700
Reagents/stabilizing agent				#N/A #N/A				
Excavate and transport to offsite facility		m3 m3		#IN/A DSL	\$0.00 \$0.95	\$0 \$0	\$0 \$0	\$0 \$0
Contour decontaminated area CONTAMINATED SOIL VERY LOW PERM	MEABILITY COVER	ms		DSL	\$0.95	<b>\$</b> 0	\$0	\$0
Supply geomembrame, HDPE, ES3, GCL		m2		#N/A	\$0.00	\$0	\$0	\$0
Upper and lower bedding layers		m3		#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane, HDPE, ES3, GCL		m2		#N/A	\$0.00	\$0	\$0	\$0
Erosion protection layer Vegetate		m3 m2		#N/A #N/A	\$0.00 \$0.00	\$0 \$0	\$0 \$0	\$0 \$0
Install infiltration/seepage instrumentation		m∠ allow		#N/A #N/A	\$0.00	\$0 \$0	\$0 \$0	\$0 \$0
Other				#N/A	\$0.00	\$0	\$0	\$0
OTHER								
				#N/A	\$0.00	\$0	\$0	\$0
					Total % of Total	\$42,470	\$0 0%	\$42,470 100%
					/0 UI TUIAI		U 70	100 /0

#### 1 Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet

ACTIVITY/MATERIAL	Notes	Units	Cost Quantity Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT					
Remove (excavate) fill		m3	#N/A	\$0.00	\$0
Contour water intake area	ATED MANAGEMENT BONDS	m3	#N/A	\$0.00	\$0
STABILIZE SEDIMENT PONDS/W/	ATER MANAGEMENT PONDS		#N/A	<b>#</b> 0.00	ФО.
Place soil cover		m3 m3	#N/A #N/A	\$0.00 \$0.00	\$0 \$0
Doze & spread excavated material					\$0 \$0
Vegetate spread material		ha each	#N/A #N/A	\$0.00 \$0.00	\$0 \$0
Rip rap in channel base Remove sediments from WRSF por	nd and	each	#IN/A	\$0.00	φυ
place them in the landfill		allow	#N/A	\$0.00	\$0
REDIRECT RUNOFF/CONSTRUCT	T DIVERSION DITCHES		#N/A	\$0.00	
Excavate ditches -soil		m3	#N/A	\$0.00	\$0
Excavate ditches -rock		m3	#N/A	\$0.00	\$0
Stabilize side slopes		m3	#N/A	\$0.00	\$0
Rip rap in channel base		m3	#N/A	\$0.00	\$0
BREACH DITCHES			#N/A		
Excavate breaches		m3	#N/A	\$0.00	\$0
Backfill/recontour		m3	#N/A	\$0.00	\$0
Install flow dissipation		m3	#N/A	\$0.00	\$0
Vegetate remainder of ditch		m2	#N/A	\$0.00	\$0
DECOMMISSION CURTAINS					
Decommission turbidity curtains	Remove and haul to Meadowbaank landfill	allow	4 AE	\$2,000.00	\$8,000
DECOMMISSION FRESH WATER	SUPPLY				
Breach embankment		m	#N/A	\$0.00	\$0
Remove pump		LS	#N/A	\$0.00	\$0
Remove pipeline	TON OUADDY	LS	#N/A	\$0.00	\$0
WATER CONTROL IN RECLAMAT	ION QUARRY	1.0	// <b>h</b> 1/A	<b>#</b> 0.00	
Install pumping system		LS	#N/A	\$0.00	\$0
Remove pumping system REMOVE PIPELINES		LS	#N/A	\$0.00	\$0
Remove pipes		m	#N/A	\$0.00	\$0
• • • • • • • • • • • • • • • • • • • •		m3	#N/A #N/A	\$0.00	\$0
Concrete plug deep pipes Other		IIIS	#N/A	\$0.00	\$0
GROUNDWATER COLLECTION S	VSTEM		#11/74	φυ.υυ	φυ
Excavate/install sumps	TOTEW	m3	#N/A	\$0.00	\$0
Install pumping wells		m3	#N/A	\$0.00	\$0
Install pumps/pipelines/power suppl	lv	LS	#N/A	\$0.00	\$0
CONSTRUCT CONTAMINATED W	•		mun	ψ0.00	ΨΟ
Excavate pond	THE ROTOR REPORT	m3	#N/A	\$0.00	\$0
Doze & spread excavated material		m3	#N/A	\$0.00	\$0
Vegetate spread material		ha	#N/A	\$0.00	\$0
Bedding layer		m3	#N/A	\$0.00	\$0
Supply geomembrane		m2	#N/A	\$0.00	\$0
Install geomembrane		m2	#N/A	\$0.00	\$0
Erosion protection layer		m3	#N/A	\$0.00	\$0
· ·	ENT SYSTEM (e.g. Constructed Wetland)				
Construct access roads	,	km	#N/A	\$0.00	\$0
Install HDPE piping system from co	illection pond	m	#N/A	\$0.00	\$0
Inter-cell flow structures		allow	#N/A	\$0.00	\$0
Install liners		m2	#N/A	\$0.00	\$0
Install growth media		m3	#N/A	\$0.00	\$0
Wetland vegetation		ha	#N/A	\$0.00	\$0
CONSTRUCT WATER TREATMEN	NT PLANT				
Build treatment plant		LS	#N/A	\$0.00	\$0
Build sludge containment facility	<u> </u>	LS	#N/A	\$0.00	\$0
				Total	\$8,000

For cost of long-term/post-closure water treatment see "WATER TREATMENT" Worksheet"

## 1 Post-Closure Monitoring & Maintenance:

		Cost			
ACTIVITY/MATERIAL Notes	Units Qua	ntity Code	<b>Unit Cost</b>	Cost	
MONITORING & INSPECTIONS					
Annual geotechnical inspection	each	1 VIH	\$7,977.79	\$7,978	
Surface water sampling	each	1 WSH	\$10,000.00	\$10,000	
Ground water sampling	each	0 WSH	\$10,000.00	\$0	
Receiving/downstream water sampling	each	1 WSH	\$10,000.00	\$10,000	
Monitoring program	ech	#N/A	\$0.00	\$0	
Survey inspection	each	#N/A	\$0.00	\$0	
Regulatory costs*	each	#N/A	\$0.00	\$0	
Site water monitoring (AEMP and SNP)	each	#N/A	\$0.00	\$0	
- Active closure and flooding	each	#N/A	\$0.00	\$0	
- Post pit flooding	each	#N/A	\$0.00	\$0	
Air Quality Monitoring Program (AQMP)	each	#N/A	\$0.00	\$0	
Wildlife Effects Monitoring Program (WEMP)	each	#N/A	\$0.00	\$0	
Vegetation Monitoring	each	#N/A	\$0.00	\$0	
Other		#N/A	\$0.00	\$0	
COVER MAINTENANCE					
Repair erosion - infill gullies	allow	#N/A	\$0.00	\$0	
Repair erosion - upgrade diversion ditches	allow	#N/A	\$0.00	\$0	
Remove problem vegetation	allow	#N/A	\$0.00	\$0	
Repair animal damage	allow	#N/A	\$0.00	\$0	
Repair/upgrade access controls	allow	#N/A	\$0.00	\$0	
Other		#N/A	\$0.00	\$0	
SPILLWAY MAINTENANCE					
Repair erosion	m3	#N/A	\$0.00	\$0	
Clear spillway	each	#N/A	\$0.00	\$0	
CWTS MAINTENANCE					
Maintain flow, restore vegetation	allow	#N/A	\$0.00	\$0	
WATER TREATMENT					
Water treatment - refer to water treatment tab	each	1 WT tab	\$0.00	\$0	
POST-CLOSURE WATER TREATMENT					
Subtotal, Annual post-closure costs				\$27,978	
Discount rate for calculation of net present value of post-closure cost, %		3.00%			
Number of years of post-closure activity	Assumed	3 y	rears		
Present Value of payment stream				\$79,138	

<sup>\*</sup>Regulatory costs - annual reporting, management plans, progress reports etc

#### 1 Mobilization/Demobilization:

			Quantit Cost		
ACTIVITY/MATERIAL	Notes	Units	y Code	Unit Cost	Cos
MOBILIZE HEAVY EQUIPMENT					
Excavators	2 excavators, one with hoe ram - time in transit	hrs	6 exc-sL	190	\$1,14
Dump trucks		each	#N/A	0	\$
Dozers	1 dozer - time in transit from Meadowbank	hrs	3 dozersH	260	\$78
Demolition shears	Use hoe ram and cutting torches instead	each	//81/8		
	Ç		#N/A	0	\$1
Crane		each	#N/A	0	\$
Loader		each	#N/A	0	\$
Compactor	0.000 4.1 0.501 501	each	#N/A	0	\$
Flat bed truck	2 excavators @ 30t + 1 dozer @ 50 t x 70 km	kmtonne	7700 MHERL	3.4	\$26,18
Light duty vehicles	2 at 3hrs each way	each	6 AE	20	\$12
MOBILIZE MISC. EQUIPMENT			//h1/A		
Pump shipping		each	#N/A	0	\$
Pipe shipping		m -"	#N/A		\$
Minor tools and equipment		allow	1 AE	5000	\$5,00
Truck tires		allow	#N/A	0	\$
Other			#N/A	0	\$
MOBILIZE CAMP					
Maintain Camp Accomodations		mandays	336 ACCML	100	\$33,60
Reclamation activities		allow	#N/A	0	\$
Long term reclamation activities (eg pump flooding)		allow	#N/A	0	\$
MOBILIZE WORKERS					
	Round trip to Baker Lake by light duty trucks: 4				
Reclamation activities - travel time	hours each way	manhours	96 AE	31	\$2,97
Crew transportation (ticket and travel accomodation)		each	#N/A		\$
Reclamation activities - transport	2 round trips from Baker Lake by 2 trucks	km	1200 AE	0.75	\$90
Long term reclamation activities (eg pump flooding) - travel time	Round trip to Baker Lake by light duty trucks: 4 hours each way	manha	32 #N/A	31	\$99
	nouis each way	manhours			
Long term reclamation activities (eg pump flooding) - ticket and travel accomodation	2 round tring from Poker Lake by 1 truck	each	#N/A	0	\$
Long term reclamation activities - transport WORKER ACCOMODATIONS	2 round trips from Baker Lake by 1 truck	km	600 AE	0.75	\$45
Reclamation activities			#N1/A	0	\$
		manmonths manmonths	#N/A #N/A	0	\$
Long term reclamation activities (eg pump flooding)		manmonus	#IN/A	U	Ф
MOBILIZE FUEL Fuel freight - reclamation activities		litre	#N/A	0	\$
		litre	#N/A	0	\$
Fuel freight - long term reclamation activities				0	\$
Fuel freight accomodations		litre	#N/A	U	Ф
WINTER ROAD		Long	#N1/A	0	•
Construction and operation		km	#N/A	0	\$
Limited winter use		km	#N/A		\$
Winter road tarriff		km	#N/A	0	\$
DEMOBILIZE HEAVY EQUIPMENT					
Excavators	2 excavators, one with hoe ram - time in transit	hrs	6 exc-sL	190	\$1,14
Dump trucks		km	#N/A	0	\$
Dozers	1 dozer - time in transit back to Meadowbank	hrs	3 dozersH	260	\$78
Demolition shears		km	#N/A	0	\$
Crane		km	#N/A	0	\$
Loader		km	#N/A	0	\$
Compactor		each	#N/A	0	\$
Light duty vehicles	Two vehicles, 70 km each way	km	280 AE	0.75	\$21
Flat bed truck	2 excavators @ 30t + 1 dozer @ 50 t x 70 km	kmtonne	7700 MHERL	3.4	\$26,18
DEMOBILIZE CAMP					
		allow	#N/A	0	\$
DEMOBILIZE WORKERS					
crew travel time	trip)	mandays	#N/A	0	\$
crew transportation	trip)	each	#N/A	0	\$
WINTED DOAD					
WINTER ROAD					_
Construction and operation		km	#N/A	0	\$
		km km km	#N/A #N/A #N/A	0 0 0	\$( \$(

Note: Labour costs not included under mobilization - included elsewhere

## Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

ITEM	Detail	COST	UNITS	LOW\$	HIGH \$	SPECIFIED \$	COMMENTS
					•		
Acco	modation						
Duild	lings - Docontaminato	ACCM	manday	100.00	175.00		
Dullu	lings - Decontaminate  Asbestos	BDA	m2	25.60	51.20		Law annual of achasta siding 0 flagging High yamayal of insulated given frights achasta
Build	lings - Remove	DDA	1112	25.00	31.20		Low: removal of asbestos siding & flooring; High: removal of insulated pipes, friable asbestos  Unit costs are based on 3m high, single storey building. Scale areas accordingly.
	Wood	BRW	m2	27.50	41.00		Only cools are based on on high, single closely ballang. Could allow accordingly.
	Concrete	BRC	m2	40.00	65.00	6.00	Specified: puncture concrete foundation slabs
	Steel - teardown	BRS1	m2	45.00	65.00		•
	Steel - for salvage	BRS2	m2	67.00	100.00		
Conc	rete work						
	Small pour	CSF	m3	426.50	639.75		Low: YK; High=1.5xLow
	Large pour	CLF	m3	353.50	530.25	2,130.00	Specified: concrete crown pillar
Conta	aminated Soils						
	ESA Phase 1	CS1	each	7500.00			Low: small, "clean" site
	ESA Phase 1 Remediate on site	CS2 CSR	each	50000.00	146.00		Low: small, "clean" site
Dozir		CSR	m3	47.00	146.00		
<b>D</b> 02	doze rock piles	DR	m3	1.05	2.40		Low cost: doze crest off dump
	doze overburden/soil piles	DS	m3	0.95	3.80		High cost: push up to 300 m
Exca	vate Rock; Low Spec's and 0						3
	drill/blast/load/short haul	RB1	m3	11.40	17.05		Low:quarry operations for bulk fill
	drill/blast/load/long haul	RB2	m3	12.05	17.80		
	RB1 + spread and compact	RB3	m3	12.05	17.80		
	RB2 + spread and compact	RB4	m3	12.50	30.75		
<b></b>	Specified activity	RBS	m3				
Exca	vate Rock; High Spec's and			40.05	47.00		(e.g. ditch/spillway excavation)
	drill/blast/load/short haul	RC1 RC2	m3	12.05 12.70	17.80 18.40		Low:foundation excavation;High:spillway excavation
	drill/blast/load/long haul RC1 + spread and compact	RC3	m3 m3	12.70	18.40		e.g. cover construction
	RC2 + spread and compact	RC4	m3	13.50	19.20		e,g, cover construction
	Specified activity	RCS	m3	10.00	10.20	175.00	Specified-drift excavation
Exca	vate Rip Rap						
	drill/blast/load/short haul/place	RR1	m3	13.50	17.75		High: quarry & place rip rap in channel
	drill/blast/load/long haul/place	RR2	m3	14.20	20.65		
	source is waste dump/short haul	RR3	m3	7.00			cost includes sorting
	source is waste dump/long haul	RR4	m3	7.60			
	Specified activity	RRS	m3				
Exca	vate Soil; Low Spec's and Qa clear & grub			0.40	F 00		
	•	SBC	m2	3.40	5.00		
	excavate/load/short haul excavate/load/long haul	SB1 SB2	m3 m3	4.30 4.60	5.90 7.30		
	SB1 + spread and compact	SB3	m3	5.10	8.90		Low: non-engineered; High:engineered
	SB2 + spread and compact	SB4	m3	5.50	11.00		Low: non-engineered; High:engineered
	Specified activity	SBS	m3	3.20	6.30		Low: rehandle waste rock dump by dozing; High:rehandle waste rock by hauling
	Tailings	SBT	m3	1.35	3.70	15.50	High:contour surface - wet or frozen; Specified:haul/place wet infill
Exca	vate Soil, High Spec's and Q						
	excavate/load/short haul	SC1	m3	6.80	9.30		
	excavate/load/long haul	SC2	m3	7.10	11.75		
	SC1 + spread and compact	SC3	m3	8.90	14.20		Low: non-engineered; High:engineered
	SC2 + spread and compact	SC4	m3	9.30	23.20		Low: non-engineered; High:engineered (e.g. complex covers, low volume dam construction)
F	Specified activity	SCS	m3			18.80	Backfill adit with waste rock
Fence	е	ENIO		40.55	000.00		
Fuel a	and Electricity	FNC	m	13.55	203.00		
	Fuel cost - gas	FCG	litre	1.05	1.40		
	Fuel cost - diesel	FCD	litre	0.99	1.39		
	Fuel mobilization	FCM	litre	0.22	0.42		High: winter road usage
C 1	Electricity	FCE	kW-h	0.17	0.19	0.49	Low and High:Yellowknife; Specified:diesel generator
Geo-	Synthetics	COT	m2	0.44			Overhand State II
	geotextile	GST	m2	3.44 5.75			Supply and install
	geogrid	GSG	m2	5.75			

## Unit Cost Table (for refining unit costs see "Estimator" worksheet)

		Filter by	unit				
	liner, HDPE	GSHDP		7.95			Supply and install; large quantity
	liner, ES3	GSES3	m2	20.20			FOB Yellowknife
	geosynthetic installation	GSI	m2	3.16	14.00		Low:geotextile; High:ES3 or HDPE
Grouti	bentonite soil ammendment ng (/m3 of rock grouted)	GSBA	tonne	308.30	348.50		FOB Edmonton, add shipping & mixing
Giodii	ing (inits of rock grouted)	arout	m3	236.55	286.75		High: coment EOP Vellouksife
Labora	atory Chemicals	grout	1113	230.33	200.73		High: cement, FOB Yellowknife
	Remove from site	LCR	pallet	1966.36	2606.83		
Labou	r & Equipment Rates	2011	panor	.000.00	2000.00		
	Site manager	sman	\$/hr	125.00	152.00		
	Supervisor	super	\$/hr	52.00	91.84		
	Registered engineer	eng	\$/hr	95.00	220.00		
	Environmental coordinator	envco	\$/hr	74.16	130.00		
	Evironmental technologist	envtech	\$/hr	36.00			
	Electrician	elec	\$/hr	74.00	95.00		
	Journeyman - various	journey	\$/hr	44.00	71.79		
	Labour - skilled	lab-s	\$/hr	41.00	49.60	120.00	Specified - Skilled Manufacturer Mechanic
	Labour - unskilled	lab-us	\$/hr	31.00	43.98		
	Equipment operator	oper	\$/hr	41.00	65.00		
	Heavy duty mechanic	mech	\$/hr	49.00	72.85		
	Water treatment plant operator	oper-wt	\$/hr	41.00	59.86		
	Security / first aid Administative staff	safety admin	\$/hr \$/hr	36.00 38.00	66.97 57.89		
	Administative stan	aumm	φ/111	36.00	37.09		
	Equipment rates include operator a	nd fuel					
	Loader - 4 cu.yd (3.06m3)	load-s	\$/hr	175.00			
	Loader - 7 cu.yd (5.35m3)	load-l	\$/hr	315.00			
	Excavator - 26.76-30.84 tonnes	exc-s	\$/hr	190.00			
	Excavator - 68.95+tonnes	exc-l	\$/hr	420.00			
	Grader	grad	\$/hr	190.00			
	Dump truck off hwy 30-50 tonnes	truck-s	\$/hr	225.00			
	Dump truck off hwy 55-75 tonnes	truck-l	\$/hr	300.00			
	dozer, small	dozers	\$/hr	205.00 20	60.00		
	dozer, large	dozerl	\$/hr	490.00 56	65.00		
	smooth drum compactor	comp	\$/hr	155.00			
	scooptram, 6 yd3 bucket	scoop	\$/hr	170.00			
	flat bed truck with hiab	hiab	\$/hr	155.00			
	fuel truck	ftruck	\$/hr	150.00			
Makili	water truck	wtruck	\$/hr	58.00 1	50.00		
MIODIII	ze Heavy Equipment	MUED	luntan a	2.40	40.05		
	Road access Air access	MHER	kmtonne kmtonne	3.40 12.00	10.25		FOOR
Mobili	ze Camp	MHEA	KIIIOIIIIE	12.00			cargo rate>500lb
MODILL	Road access	MCR	each	50000.00			refurbish existing camp
Mobili	ze Workers	WOR	CGOIT	00000.00			Total biolit existing earlip
	flight	MW	each	4500.00	9100.00	400.00	Low:e.g. 8 passenger; High: Dash 7 Spec'd 8 hour by bus from Baker Lake
Oil Re							
	oil removal	OR	litre	0.43	1.20		Low:waste oil heater; High: ship offsite
PCB R	emoval						
	Remove from site	PCBR	litre	40.20	46.90		Low: shipping, handling & disposal from Yellowknife
Pipes,	small (<6in dia.)						
	remove/dispose on site	PSR	m	1.00	24.00		Low: remove/dispose on site; High: remove/re-use
	supply	PSS	m	6.10	11.10		Low:supply; High:supply and ship
	install	PSI	m	25.00			
Pipes,	large (>6in dia.)						
	remove/dispose on site	PLR	m	22.00	72.00		Low: remove/dispose on site; High: remove/re-use
	supply	PLS	m	129.00	143.00		Low:supply; High:supply and ship
Power	install	PLI	m	50.00			
Lower		DOWD.	m	25 50			
Proces	remove/dispose on site	POWR	m	25.50			
1 1000	Remove from site	PCR	kg	0.45	2.50		Low: shipping, handling & disposal from Yellowknife
Pumps		FOR	۸y	0.40	2.50		Low. suppling, nationing a disposal notification tellowkille
	Pump capital cost	PC	each	195000.00			
	. 1	. •	300.1	. 55555.00			

## Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Oille V	Cost Table (for Terming t			LStilliatoi	WOIKSIIC	et)	
		Filter by	unit				
	Pump shipping	PS	each	2500.00			
	Pump operating cost	POC	m3	0.12			pump operating costs should be calculated based on pump capacity, fuel costs, etc.
	Pump maintenance	PM	allow	25000.00			
Pump	sand BackFill						
		PBF	m3	85.00	300.00		
Scarif	y - road/mine site						
		SCFY	ha	4300	6030	2150	
Shaft,	Raise & Portal Closures						
	Shaft & Raises	SR	m2	645.00	2132.00		Low:pre-cast concrete slabs, little site prep. Area=shaft+>1m all around
	Portals	POR	m3	18.80	250.00	1200.00	Low:unit cost code SCS;High:excavate & backfill collapsed portal;Spec: installed pressure plug
Signs							
ŭ	Signs	S	each	12.36	37.08	75.00	AEM used \$75 in Type B for Exploration
Site In	spection Report						
	- при	RPT	each	10000.00	20000.00		
SpillW	/ay - Clear						
Орши	ruy Cloui	SW	each	3000.00	7000.00		
Surve	y/Instrumentation	011	odon	0000.00	7000.00		
ou. vo	y/mon umomunom	SI	each	1800.00	3600.00		2 person crew
Treatn	ment Plant - Construct	Oi .	Cacii	1000.00	3000.00		2 person crew
Heath	Small (< 1000 m3/d)	TPS	lumn aum	0000000	15000000		
	Large (> 1000 m3/d)	TPL	lump sum	9000000	15000000		
	Constructed Wetland		lump sum	15000000	46000000		
Troots	ment Plant - Operate	CWTS	ha	200000	300000		
Heati	nent Flant - Operate	TPO	0	0.05	2.00		
Troots	ment Chemicals	IPO	m3	0.35	2.00		
reath							
	ferric sulphate	ferric	kg	1.19			
	ferrous sulphate	ferrous	kg	1.32			
	lime	lime	kg	0.56			
	hydrogen peroxide, 35%	hperox	kg	1.50			
	Sodium Metabisulfate	Nametab	kg	1.18			
	Caustic soda, 50%	caustic	kg	0.74			
	Sulfuric acid, 93%	sulfuric	kg	0.31			
	flocculant	flocc	kg	6.00			
	copper sulphate	copper	kg				
	shipping	shipping	kg	0.20			
Vegeta	ation						
	Hydroseed, Flat	VHF	ha	4000.00			
	Hydroseed, Sloped	VHS	ha	4500.00			
	Veg. blanket/erosion mat	VB	ha	13000.00			
	Tree planting	VT	ha	2600.00	6000.00		
	Wetland species	VW	ha			47.72	Specified=/m3, Wetland Growth Media Substrate mixed and installed (sand, biochar and
Visual	l Site Inspection						fertilizer, woodchips)
	Visual site inspection	VI	each	3955.18	7977.79	11000.00	
Water	Sampling/Analysis/Reporting	g					
	· · · · · · · · · · · · · · · · · · ·	ws	each	7000.00	10000.00		
Winter	r Road						
	Construction	WRC	km	2000.00	11500.00		
	Usage	WRU	kmtonne	0.29			

#### Unit Cost Estimator

1 Equipment Productivity Figures and Graphs have been reproduced from Caterpillar Performance Handbook - Edition 42

Productivity		
Machine Cat 336EL	-	
bucket capacity	3.16	m3
fill factor	75%	%
cycle time	45	seconds
operator skill	80%	%
machine availability	83%	%
altitude adjustment	100%	
Hourly productivity	125.89	m3/hr
- Contractor		
- Contractor  Contractor hourly rate	\$180.00	
- Contractor		\$/hr \$/m3
- Contractor  Contractor hourly rate		
- Contractor  Contractor hourly rate  Excavation cost - contractor rate  - Owner	1.43	\$/m3 \$/day
- Contractor Contractor hourly rate Excavation cost - contractor rate - Owner ownership, daily maintenance	1.43	\$/m3 \$/day \$/hr
- Contractor Contractor hourly rate Excavation cost - contractor rate  - Owner ownership, daily maintenance fuel	1.43	\$/m3 \$/day \$/hr \$/hr
- Contractor Contractor hourly rate Excavation cost - contractor rate - Owner ownership, daily maintenance fute fute consumables (cutters, tires)	1.43	\$/m3 \$/day \$/hr \$/hr \$/hr
- Contractor Contractor hourly rate Excavation cost - contractor rate  - Owner ownership, daily maintenance fuel consumables (cutters, tires) operator	1.43	\$/m3 \$/day \$/hr \$/hr \$/hr \$/hr
- Contractor Contractor hourly rate Excavation cost - contractor rate  - Owner ownership, daily maintenance fuel consumables (cutters, tires) operator Owner hourly rate	1.43	\$/m3 \$/day \$/hr \$/hr \$/hr \$/hr
Contractor hourly rate  Excavation cost - contractor rate  - Owner  ownership, daily maintenance fuel consumables (cutters, tires) operator  Owner hourly rate Excavation cost - owner rate	1.43	\$/m3 \$/day \$/hr \$/hr \$/hr \$/hr
- Contractor Contractor hourly rate Excavation cost - contractor rate  - Owner ownership, daily maintenance fuel consumables (cutters, tires) operator Owner hourly rate	1.43	\$/m3 \$/day \$/hr \$/hr \$/hr \$/hr

Productivity		
Machine Cat 770		
truck capacity	25.1	m3
fill factor	80%	%
load time	6.0	min.
haul distance	1.5	km
average velocity	20.0	km/hr
haul time + return time	9.0	min.
wait time	0.5	min.
dump time	1.0	min.
cycle time	16.5	min.
machine availability	83%	%
altitude adjustment	100%	%
	13.7	ve. min/cycle
Hourly productivity	88.0	m3/hr
Operating Costs		
- Contractor		
Contractor hourly rate	\$225.00	\$/hr
Haul and Dump - contractor rate	2.56	\$/m3
- Owner		
ownership, daily		\$/day
maintenance		\$/hr
fuel		\$/hr
consumables (cutters, tires)		\$/hr
operator		\$/hr
Owner hourly rate	\$0.00	\$/hr
Haul/Dumping Cost - owner rate	\$0.00	\$/m3
Haul/Dumping Cost - select contractor or owner rate (I22 or		
I31		\$/m3

Productivity	
Machine Cat D8	
Estimate production using example curves provided or	600 m3/h
equivalent from other supplier	
Correction factors (see table provided)	
operator skill	0.75
material type, see table	0.80
slot dozing	1.00
side by side dozing	1.00
visibility	1.00
job efficiency	0.83
altitude adjustment	1.00
slope adjustment	1.00
Hourly productivity	298.8 m3/h
Operating Costs	
Operating Costs - Contractor	
	\$260.00 \$/hr
- Contractor	\$260.00 \$/hr 0.87 \$/m3
- Contractor Hourly rate - contractor supplied	
Contractor     Hourly rate - contractor supplied     Dozing - contractor rate      Owner	
- Contractor  Hourly rate - contractor supplied  Dozing - contractor rate  - Owner  ownership, daily	0.87 \$/m3
Contractor     Hourly rate - contractor supplied     Dozing - contractor rate      Owner     ownership, daily maintenance	0.87 \$/m3 \$/da \$/hr \$/hr
- Contractor  Hourly rate - contractor supplied  Dozing - contractor rate  - Owner  ownership, daily maintenance fuel consumables (cutters, tires)	0.87 \$/m3 \$/da; \$/hr \$/hr \$/hr
- Contractor  Hourly rate - contractor supplied Dozing - contractor rate  - Owner ownership, dally maintenance fuel consumables (cutters, tires) operator	0.87 \$/m3 \$/da; \$/hr \$/hr \$/hr
Contractor  Hourly rate - contractor supplied Dozing - contractor rate  - Owner ownership, daily maintenance fuel consumables (cutters, tires) operator Owner hourly rate	0.87 \$/m3 \$/day \$/hr \$/hr \$/hr \$/hr
- Contractor  Hourly rate - contractor supplied Dozing - contractor rate  - Owner ownership, dally maintenance fuel consumables (cutters, tires) operator	0.87 \$/m3 \$/da; \$/hr \$/hr \$/hr
Contractor  Hourly rate - contractor supplied Dozing - contractor rate  - Owner ownership, daily maintenance fuel consumables (cutters, tires) operator Owner hourly rate	0.87 \$/m3 \$/day \$/hr \$/hr \$/hr \$/hr

EXCAVATO		
	Cat 320	Cat 325B
heaped bucket capacity, m3	1.5	2.2
	Typical Cy	cle Times (se
easy digging, shallow digging,		

Machine availability

Correction factor

heaped bucket capacity, m3	1.5	2.2	5.4
	Typical Cyc	le Times (seco	nds)
easy digging, shallow digging,			
small swing angle	16	18	20
med. to hard digging, rocky soil,			
swing angle to 90 deg.	23	23	25
tough digging, sandstone,			
caliche, at max. machine depth,			
swing angle > 120 deg.	27	29	35

Fill Factor (% of	Fill Factor (% of heaped bucket capaci				
1	100 - 110				
9	95 - 110				
8	80 - 90				
6	60 - 75				
4	40 -60				
poor	average	good			
	1				
	1 9 8 6	100 - 110 95 - 110 80 - 90 60 - 75 40 - 60			

poor average

Cat 375	
5.4	Truck
nds)	
20	
25	

good

king			
	Cat 771 D	Cat 777D	Cat 789C
k capacity - heaped, m3	27.5	60.5	137

Dozi	ing	1		

#### JOB CONDITION CORRECTION FACTORS TRACK-TYPE

	TRACTOR
OPERATOR -	
Excellent	1.00
Average	0.75
Poor	0.60
MATERIAL —	
Loose stockpile	1.20
Hard to cut; frozen -	
with tilt cylinder	0.80
without tilt cylinder	0.70
Hard to drift; "dead" (dry, non- cohesive material) or very sticky material	0.80
Rook, ripped or blasted	0.60-0.80
SLOT DOZING	1.20
SIDE BY SIDE DOZING	1.15-1.25
VISIBILITY -	
Dust, rain, snow, fog or darkness JOB EFFICIENCY —	0.80
50 min/hr	0.83
40 min/hr	0.67
BULLDOZER*	
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.	
GRADES — See following graph.	

