

**Red Dog Mine  
Closure and Reclamation Plan**

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**Supporting Document J  
Cost Estimates**

**Red Dog Mine  
Closure and Reclamation Plan**

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**SD J1: Basis of Estimate – Closure Costs**

# **Basis of Estimate – Closure Costs Red Dog Mine, Alaska**

Prepared for

**Teck Alaska Incorporated**

Prepared by



May 2009

# **Basis of Estimate – Closure Costs Red Dog Mine, Alaska**

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# 1 Introduction

Teck Alaska Incorporated (TAK) and NANA are working closely with State of Alaska agencies, through the Large Mine Permitting Team, to develop an integrated Closure and Reclamation Plan that will support issuance of a Solid Waste Permit for Red Dog Mine, pursuant to 18 AAC 60.210. One objective of the process is to estimate the cost of suspension, closure and post-closure activities. This document provides details about the estimate of closure costs.

Estimates were developed for two different scenarios:

**Planned Closure.** This estimate assumes that closure will commence in 2031, and that progressive reclamation tasks will be completed during operations, as described in the Red Dog Mine Closure & Reclamation Plan.

**Premature Closure.** This estimate assumes that the mine would close prematurely sometime before 2031. The year 2012 is selected because it represents the worst case in terms of the amount of disturbed area requiring reclamation. Specifically the Aqqaluk Pit would be fully stripped but the Main Pit would only be partially backfilled.

Both scenarios also assume that closure activities would be carried out by an independent contractor working under the direction of the State. TAK and NANA fully expect that all closure activities will be carried out by mine staff and equipment acting under TAK and NANA direction. However, the assumption of an independent contractor is required as a basis for setting the amount of financial security to be held by the State.

The total estimated closure costs for each scenario are as follows, in undiscounted 2009 dollars.

Scenario	Independent Contractor
Planned Closure (2031)	\$47,000,000
Premature Closure (2012)	\$51,000,000

## 2 Scope of Estimate

### 2.1 Estimate Structure

The estimate was prepared in an Excel workbook organized as follows:

A summary worksheet presents the total costs.

- Five separate activity worksheets present the estimated Direct Costs for activities in the “Mine Area (2031)”, “Mine Area (2012)”, “Tailings Area”, “Water Treatment”, and “Ore Processing & Infrastructure”. The direct cost estimates are broken down into tasks, and the cost of each task is estimated on the basis of a quantity estimate multiplied by a unit cost estimate.
- Eleven worksheets provide the detail behind the quantity estimates used in the activity worksheets. The worksheets provide quantities for “Pit walls”, “Stockpile re-sloping”, “Cover volumes”, “Cover compaction”, “Ditches”, “Seepage collection”, “Tailings beaches”, “Borrow sources”, “Contaminated soils and roads”, “Demolition”, “Revegetation”. The large number of worksheets is necessary because of the variety of quantity types. Section 3 below provides details of each calculation.
- Three worksheets provide the basis for the unit cost estimates in the activity worksheets. The first of these provides “Unit Cost Inputs” including rates for labor, equipment and supplies. The second provides “Relocation Unit Costs” which translate the unit cost inputs into estimates of cost per unit volume of material in each of the major excavation, load, haul, dump, spread and compact operations. The third provides “Task Unit Costs” where the unit cost inputs are translated to costs per production unit for other tasks. Section 4 below presents details of the unit cost calculations.
- Each of the activity worksheets also includes an estimate of the associated Indirect Costs. Two worksheets provide the inputs to the indirect costs, and are discussed in Section 5 below.

As noted, estimates were prepared for both the “Planned Closure (2031)” scenario described in the Red Dog Mine Closure and Reclamation Plan, as well for a “Premature Closure (2012)” scenario. The major differences between the two scenarios are in the Mine Area, and the workbook includes separate sheets for “Mine Area (2031)” and “Mine Area (2012)”. Differences in costs for the other areas are expected to be very small, so separate estimates were not prepared for those areas.

### 2.2 Mine Area Activities

#### 2.2.1 Planned Closure (2031)

The planned closure activities in the Mine Area are described in Section 3.1 of the Red Dog Mine Closure and Reclamation Plan. The major activities are as follows.



## **Pit Rims**

Inadvertent access to the rim of the Aqqaluk, Qanaiyaq, and Main East pits will be discouraged by boulder berms and cutting back of high walls to improve visibility for snow machine or ATV drivers. For the cost estimate, it was assumed boulder berms would be constructed along 30% of the final pit crests, and the rim would be resloped along another 30%.

## **Waste Stockpiles**

Remaining areas of the Main Waste stockpile as well as the Low Grade Ore and Main Pit stockpiles will be regraded to varying slopes ranging between 2.5H:1V to 4H:1V, with an overall average of 3H:1V.

An 18-inch layer of Okpikruak or unmineralized Kivalina shale will be spread over the stockpiles, graded and heavily compacted.

A second 18-inch layer of Okpikruak or unmineralized Kivalina shale will then be spread over the compacted layer.

The stockpiles would also be shaped during regrading to develop a ‘trellis’ pattern to direct surface water flow into the surface water collection system. Where necessary, ditches and swales would be constructed on the covered stockpile to collect and remove surface overflow.

## **Red Dog Creek**

The Red Dog Creek Diversion will be re-built as an HDPE-lined open channel designed to pass the 500-year flood. The alignment will be around the toe of the regraded Main Pit stockpile, at a distance sufficient to allow space for a sediment collection ditch between the toe and the diversion ditch. A spillway will be constructed to route flows exceeding the 500-year flood into the Aqqaluk Pit.

## **Main Pit Water Collection System**

A system of wells will be installed in the backfilled Main Pit to keep contaminated groundwater below the level of the pit rim.

## **Revegetation**

All covered areas will be seeded and fertilized. Shrub cuttings will be applied over 10% of the surface.

### **2.2.2 Premature Closure (2012)**

The premature closure scenario for the mine area differs from the planned closure in the following ways:

- Qanaiyaq Pit would not be opened (scheduled for 2016-2025);
- The north end of the Main Waste stockpile would need to be regraded and covered (scheduled for 2016-2032) and the south end cover would need to be completed (scheduled for 2012);
- The Main Pit would be allowed to flood and used to store contaminated water (rather than Aqqaluk Pit) and the Main Pit groundwater collection system would not be required;
- The Red Dog Creek Diversion spillway would be constructed between the diversion and the Main Pit (rather than Aqqaluk Pit); and
- The seepage collection system between the Main Waste stockpile and the tailings pond would still need to be constructed (scheduled for 2010-2028).

## 2.3 Tailings Area Activities

Closure activities in the Tailings Area are described in Section 3.2 of the Red Dog Mine Closure and Reclamation Plan. The major activities are as follows.

### Spillway

A spillway will be constructed around the Main Dam. The conceptual design for the spillway is provided in Appendix B of Supporting Document C4.

### Main Dam Beach

A 600-foot wide beach will be constructed upstream of the Main Dam. The beach will consist of a geosynthetic liner and un-mineralized rock overlying tailings. The type of geosynthetic will depend on economics at the time. A geosynthetic clay liner is assumed for the cost estimate. The unmineralized rock is assumed to be obtained from the Overburden stockpile. A berm will be constructed to act as a coffer dam during deposition of the beach material, and subsequently faced with riprap for erosion protection.

### Overburden Stockpile

The remainder of the Overburden stockpile will be re-sloped to an average 3H:1V, seeded and fertilized. Shrub cuttings will be applied over 10% of the surface.

### Seepage Collection

The seepage collection systems at both the Main Dam and Back Dam will be re-configured to send water to Aqqaluk Pit via heat-traced pipe. Emergency storage ponds will be constructed at both dams to prevent the escape of seepage in the event of a short term shutdowns of the piping system.

### Borrow Areas

The DD-2 and MS-14 borrow pits would be resloped, where practical, and revegetated.

## 2.4 Water Treatment Activities

Closure activities related to water treatment and discharge are described in Section 3.3 of the Red Dog Mine Closure and Reclamation Plan. The major activities are as follows.

### Water Treatment System Upgrades

There is uncertainty about the extent to which the water treatment system will need to be upgraded at closure. Minor modifications could be sufficient, especially if they can be coordinated with the changes that will be required in the last few years of operations (as discussed in Section 2.3.2 of the Red Dog Closure and Reclamation Plan).

To provide a conservative estimate of the cost of upgrades, the following steps were taken:

- A worst-case scenario was developed by assuming that all of the existing water treatment facilities be replaced by a system equivalent to two entirely new plants, one to treat the Aqqaluk Pit water and one to treat the tailings pond water.
- The cost of constructing those two plants was estimated using a treatment plant simulation model.
- To reflect the fact that at least some components of the existing system (or the system that is upgraded during the last few years of operation) will certainly be usable, it was assumed that the actual upgrade cost would be 50% of the cost of the hypothetical two new plants.

These assumptions are roughly equivalent to assuming that one entirely new plant will need to be built in the closure period.

### Ongoing Water Treatment and Discharge

The cost of water treatment operations during the closure period is also uncertain. It is expected to take 2.5 years to fill the Aqqaluk Pit to its long-term level, meaning that water treatment and discharge could completely cease during the two-year closure period. There is also uncertainty about the length of time in which the water quality and flowrates from each of the contaminant sources will transition from operating to post-closure conditions.

To avoid bringing these uncertainties into the closure cost estimate, water treatment operating costs are not included in the closure cost estimate. Instead, they are included in the suspension cost estimate. A similar approach has been taken to the cost of infrastructure operations during the closure period (see next section).

## 2.5 Ore Processing Area and Infrastructure Activities

Closure activities related to ore processing area and infrastructure are described in Sections 3.4 and 3.5 of the Red Dog Mine Closure and Reclamation Plan. The major activities are as follows:

## **Demolition**

All facilities not required for long-term use will be decommissioned. Hazardous materials will be removed, high value components salvaged, and the remainder demolished and landfilled along the toe of the Main Waste or Low Grade Ore stockpiles. Further details regarding demolition methods are provided in Supporting Document G.

## **Contaminated Soil Removal**

Contaminated soil will be removed and the areas backfilled with unmineralized material. Known or likely future areas of soil contamination are shown in Figure 3.5.1 of the Red Dog Closure and Reclamation Plan. It is assumed that the depth of soil removal and backfilling will average 2 feet.

## **Road Decommissioning**

Site roads that are no longer needed will be reshaped to integrate with the surrounding topography and drainage.

## **Limestone Quarry Reclamation**

The limestone quarry will be reclaimed by regrading the steep slopes. The disturbed ground will be seeded and fertilized.

## **Revegetation**

All areas where contaminated soils are removed or roads decommissioned will be seeded and fertilized. Shrub cuttings will be applied over 10% of the surface.

## **Infrastructure Operations**

Camp-related costs are covered in the indirect portion of the closure cost estimate, but other costs for operating the site facilities during the closure period are not included in the closure cost estimate. They are included in the suspension study estimate.

## 3 Quantities

Quantity estimates needed as input to the closure cost estimates were derived using standard engineering calculations. Eleven worksheets provide the details for different types of quantities. Most of the calculations are straightforward. The following sections provide any necessary explanations.

### Pit Walls

Pit berms were estimated to be constructed around 30% of the perimeter of the Aqqaluk and Qanaiyaq Pits. Pit berms were assumed to be 3.3 feet high with a 1 foot wide crest width and 1H:1V side slopes. The pit perimeters were obtained from topographic plans showing conditions at closure.

Pit rims were estimated to be resloped around 30% of the perimeter of the Aqqaluk and Qanaiyaq Pits. The pit rims were estimated to be blasted back 100 feet to a slope of 2H:1V to improve visibility for snow machine or ATV drivers.

### Stockpile Re-Sloping

The duration of re-sloping activities on the Waste and Overburden stockpiles was estimated using a re-sloping productivity spreadsheet which makes use of equipment specifications obtained from manufacturer's data, generally the Caterpillar Handbook. The re-sloping was assumed to be completed by a CAT D11 dozer. The dump heights and initial slope angles were obtained from topographic plans showing conditions at closure.

### Cover Volumes

The volumes of material needed to cover the waste stockpiles were estimated from average depths and surface areas taken from topographic plans.

### Cover Compaction

The durations of compaction activities on the covered areas were estimated by a simplified productivity calculation. The compaction was assumed to be completed by a CAT D9 with a sheepsfoot roller. The estimate assumes two passes and productivities of 215,000 ft<sup>2</sup>/hr/pass on flat surfaces and 150,000 ft<sup>2</sup>/hr/pass on sloped surfaces.

### Ditches

Quantities for the ditches to convey water off the covered dumps were estimated based on the following assumptions:

- Contouring of the trellis pattern for surface water collection will be completed during operations and regrading of the stockpiles;

- Excavation of the surface water collection channels to a channel depth of 3.3 feet with 2H:1V side slopes;
- Channel locations and lengths determined from topographic plans; and
- Drop structures in the channels with excavation depths of 5.5 feet, bedding and rip-rap thicknesses of 1 foot each, and a layer of geotextile in between.

Quantities for the Red Dog Creek Diversion Channel upgrade were estimated based on the following assumptions:

- Clearing and grading over 10% of the overall channel length over a width of 100 feet;
- Channel design based on a flow of 500 ft<sup>3</sup>/s and a grade of 1.8%;
- Channel excavation optimized to have the excavation quantity equal the berm quantities on each side of the channel;
- A channel width of 6.5 feet and side slopes of 3H:1V with 15 foot wide berms on each side of the diversion channel; and
- A channel bedding thickness of 0.5 feet and a rip-rap thickness of 1.2 feet.

### **Seepage Collection**

Quantities for the Main Waste seepage collection system were estimated based on the following assumptions:

- Groundwater wells will be installed along the Main Stockpile at known seep locations. The depths to bedrock were estimated based on borehole data from nearby locations.
- Piping and pump sizes were estimated based on historical data from the existing seeps.
- Bentonite cut-off walls were included around seeps with high flows (MWD 24 and MWD 18). The cut-off wall around MWD-24 was assumed to be 650 feet long, 5 feet wide with a 50 foot average depth to bedrock. The cut-off wall around MWD-18 was assumed to be 650 feet long, 5 feet wide with a 33 foot average depth to bedrock.

The new piping systems for seepage from the Main and Back Dams were assumed to be buried, at an average depth of 6.5 feet.

### **Tailings Beaches**

Material quantities for the tailings beaches were determined from topographic plans and an assumed beach width of 600 feet. Estimates of liner area, cover material volume and revegetation area were derived for both a beach at the Main Dam and one at the Back Dam. The Back Dam beach is not expected to be necessary and therefore was not carried through the cost estimate.

## **Contaminated Soils and Roads**

Areas of contaminated soils and roads shown in Figure 3.5.1 of the Red Dog Mine Closure and Reclamation Plan were estimated from the 2007 site topography.

## **Demolition**

Demolition quantities were estimated by Denison Environmental Services, as described in Supporting Document G.

## **Revegetation**

Surface areas requiring revegetation were estimated from AutoCAD drawings and plans.

## 4 Unit Costs

### 4.1 Unit Cost Inputs

#### 4.1.1 Equipment Rates

Equipment rates were based on estimates developed by State of Alaska Department of Natural Resources (Memo to Red Dog File, from Steve J. McGroarty, PE, dated March 19, 2009). Those estimates were in turn based on 2009 monthly rental rates provided by NC Machinery. The base NC Machinery rates were reduced by 5% to account for a fleet discount.

The equipment rates included ownership and maintenance (less labor) but excluded overhead and profit. Maintenance labor, overhead and profit were included a line items elsewhere in the estimate.

#### 4.1.2 Fuel

A fuel unit cost of \$2.58 per gallon (3.785 liters) was used throughout the cost estimate. That estimate is the average of the price paid for fuel delivered to Red Dog port over the five-year period from 2004 to 2008.

Equipment fuel rates used in the estimates were derived based on the equipment horsepower, obtained from the Caterpillar Performance Handbook. The equation used to calculate the fuel rate is:

$$\text{Fuel Rate (\$/hr)} = \text{HP} \times \text{FF} \times \text{Fuel Cost per Liter}$$

where: HP = horsepower

FF = Fuel Factor (Liter/hr/HP)

The fuel factors for each type of equipment represent the average fuel consumed per hour per horsepower. The fuel factors used in determining the fuel costs were as follows:

Equipment Type	Fuel Factors (L/hr/HP)	Source
Backhoes	0.110	CAT Handbook
Excavators	0.130	CAT Handbook
Lifting Equipment	0.100	Estimated
Loaders	0.121	CAT Handbook
Dozers	0.135	CAT Handbook
Graders	0.140	CAT Handbook
Trucks	0.065	CAT Handbook
Compactors	0.130	CAT Handbook
Drills	0.130	Estimated



### 4.1.3 Labor Rates

Labor rates for an independent contractor were built up from base hourly rates presented in Issue 15 (effective September 1, 2008) of the “Laborers’ and Mechanics’ Minimum Rates of Pay” published by the Alaska Department of Labor and Workforce Development. The base hourly rates were increased to cover overtime, benefits and payroll burden.

The labor rates do not include the costs of camp accommodation or flights, which are included as indirect costs.

### 4.1.4 Material Costs

Estimates of material costs were obtained from the following sources:

- Specific vendor quotes;
- “Environmental Remediation Cost Data – Unit Price” 11th Annual Edition, R.S. Means Company, Inc. 2005; and
- Recent SRK experience on other projects.

Quotes obtained in Canadian dollars were converted to U.S. dollars at the exchange rate of 1 USD = 1.134 CAD, slightly lower than the most recent 12-month average of 1 USD = 1.148 CAD.

## 4.2 Relocation Unit Costs

The Relocation Unit Cost spreadsheet follows standard estimation procedures, such as are used by earthwork contractors. The calculations make use of equipment specifications obtained from manufacturer’s data, in this case the Caterpillar Handbook.

### Equipment Selection

Equipment models used in the cost estimate were chosen to match existing Red Dog equipment as much as possible. Equipment fleets were selected depending on the size of the task. For smaller relocation tasks, CAT 735 rock trucks were assumed to be used and loaded by either a CAT 966F loader or a CAT 325 excavator. For larger relocation tasks, CAT 777 trucks were assumed to be used and loaded by a CAT 992 loader. Where appropriate CAT D9 dozers were assumed to be used to spread material and assist the loader, with CAT CP563 or walk-behind vibrating plate compactors for compaction.

In general, relocation unit costs are optimized when enough trucks are used to keep the loader at constant operation with no stand-by time. In some cases, this may result in an optimized truck number greater than the amount of trucks available on-site. For the purpose of this cost estimate, the CAT 777 truck fleet was capped at 4 trucks, and the CAT 735 truck fleet was capped at 5 trucks. The use of larger equipment, or greater numbers of trucks could reduce the cost of some activities.

## Material Properties

The materials involved vary from one task to another and the material properties needed in the productivity calculations were varied accordingly, as follows.

	Bulk density tonne/m <sup>3</sup>	Bulking Factor	Excavated Density tonne/m <sup>3</sup>	Shrinkage Factor	Compacted Density tonne/m <sup>3</sup>
Earth	1.90	1.25	1.52	0.95	2.00
Misc.	2.00	1.00	2.00	1.00	2.00
Rip-Rap	3.00	1.20	2.50	1.00	3.00
Shale	2.00	1.20	1.67	0.90	2.22
Top Soil	1.37	1.40	0.98	1.10	1.25
Till	1.84	1.20	1.53	0.90	2.04
Waste Rock	2.10	1.10	1.91	1.00	2.10

## Haul Routes

Distances and grades used in the haul time calculations were obtained from topographic plans. Reasonable assumptions were made as to where roads would be located at the time of closure.

## Relocation Unit Rate Calculations

Relocation productivities were calculated using the material properties, haul route characteristics and equipment performance data from the Caterpillar Handbook. The calculations used to convert the productivity estimates and unit rate inputs into relocation unit rates for each category are:

- Equipment Cost (\$/Bank-m<sup>3</sup>) is calculated as the sum of the equipment hourly rates divided by the bank material productivity (Bm<sup>3</sup>/hr).
- The fuel cost (\$/Bm<sup>3</sup>) is calculated as the sum of the hourly fuel costs for each piece of equipment divided by the bank material productivity (Bm<sup>3</sup>/hr).
- The labor cost (\$/Bm<sup>3</sup>) is calculated as the sum of the operator rates for each piece of equipment divided by the bank material productivity (Bm<sup>3</sup>/hr).
- The man-hours per bank-volume of material moved assumes one operator per piece of equipment and is equal to the sum of pieces equipment used divided by the bank material productivity (Bm<sup>3</sup>/hr).
- The Total Bank Unit Rate (\$/Bm<sup>3</sup>) is equal to the sum of the equipment, fuel and operator costs.

## 4.3 Task Unit Rates

The Task Unit Rate worksheet calculates the labor, material, equipment, and fuel costs per unit quantity for various other tasks. The methodology also provided an estimate of the man-hours required for each unit of production.

### Productivity Selection

The productivities for each task were obtained from the following sources:

- Equipment specifications obtained from manufacturer's data, in this case the Caterpillar Handbook.
- "Environmental Remediation Cost Data – Unit Price" 11th Annual Edition, R.S. Means Company, Inc. 2005; and
- Recent SRK experience on other projects.

### Task Unit Rate Calculations

The calculations used to estimate unit rates for each task are summarized below:

- Equipment Cost (\$/Unit) is calculated as the sum of the equipment hourly rates divided by the task productivity (Unit/hr).
- The fuel cost (\$/Unit) is calculated as the sum of the hourly fuel costs for each piece of equipment divided by the task productivity (Unit/hr).
- The material cost (\$/Unit) is calculated as the sum of the material's unit rate times the materials' multiplier factor.
- The labor cost (\$/Unit) is calculated as the sum of the operator rates for each piece of equipment divided by the unit productivity (Unit/hr).
- The man-hours per unit is calculated to the sum of the equipment operators, tradesman and laborers divided by the unit productivity (Unit/hr).
- The Total Unit Rate is equal to the sum of the equipment, fuel, material and labor costs.

## 5 Indirect Costs

### General Structure

Indirect costs were defined as any costs that can not be directly associated with individual tasks.

Separate estimates were prepared for the indirect costs associated with activities in each of Mine Area (2031), Mine Area (2012), Tailings Area, Water Treatment, and Ore Processing and Infrastructure. The indirect costs are therefore included in the respective activity spreadsheets.

Many of the indirect cost depend on the project duration. The project duration was estimated by dividing the total man-hours by the estimated crew size of 13 people, working 10 hours per day.

The indirect cost categories include all of those that SRK would normally consider, as well as others specified in the State of Alaska “Financial Assurance Guidelines”. Input factors that are common to many of the indirect cost estimates are collected in the “Indirect Cost Inputs” spreadsheet.

### Mobilization and Demobilization

The mob-demob costs for the independent contractor were included as a lump sum allocated to the Mine Area worksheets. The estimate allows for mobilization and demobilization of the complete equipment fleet, plus a second mobilization and demobilization of a smaller fleet. The estimate was developed using a method provided by the State of Alaska Department of Natural Resources (personal communication from Steve J. McGroarty, PE), which incorporates quotes from Alaskan barge operators. Details are provided in the Mob-Demob worksheet.

### Administration Costs

Workers’ Compensation costs were included in the labor unit costs.

Additional administration costs included office and communication costs. Office supplies were included at a rate of \$100/month. Communication costs were included at a rate of \$1000/month, based on using Iridium satellite phones for both voice and data communications.

Camp costs were included at a rate of \$100 per day per person. Heating fuel for camp and office operations was included at a rate of 400 gallons/month.

Miscellaneous supplies were included at a rate of \$500/month.

### Field Support

It was assumed that a supervisor, administrative assistant, foreman and mechanic would be on site throughout the project duration. A survey field manager and crew were assumed to be on-site for half of the project duration.

Field support staff wages were obtained from Issue 15 (effective September 1, 2008) of the “Laborers’ and Mechanics’ Minimum rates of Pay” published by the Alaska Department of Labor and Workforce Development and adjusted as discussed in Section 4.1.3 above.

Field support staff vehicle rates were based on the estimates discussed in Section 4.1.1.

The turnaround quantities were estimated assuming a 2 week in, 2 week out work schedule for both crew and field support staff.

Turnaround costs were included at a rate of \$770 (trip in + trip out). This cost assumes charters to Kotzebue and scheduled service to Anchorage. Crew and support staff was estimated to be on a 2 weeks in, 2 weeks out schedule.

### **Contract Administration and QA/QC**

It was assumed that an independent engineer would act as the State’s representative throughout the duration of each activity, with technician and laboratory testing support, and vehicles.

### **Other**

Insurance costs were estimated as 1.6% of the labor cost.

Contractor overhead was included at a rate of 10% of the labor and insurance costs.

The cost of freight to site was estimated as 12% of the materials cost.

Haul road maintenance costs were included at a rate of \$300,000 per year, based on recent site experience.

Contractor profit was included at a rate of 10% of the direct and above indirect costs.

Bonding costs were estimated as 3% of the direct and above indirect costs.

An engineering re-design cost was included in the independent contractor’s case, to cover the cost of design review and revisions by the State. The cost was estimated as 3% of the direct and above indirect costs.

State management and oversight costs were included at a rate of 1% of the direct and above indirect costs.

### **Contingency**

A contingency of 20% of direct costs was added to each estimate.



Table 1. Mine Area Closure Costs - Planned Closure

(Unit Rates = AlaskanContractor )

Work Area Code	Item	Task	Estimate Type	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments	
<b>CLOSURE COSTS - DIRECT CAPITAL</b>																							
Install berms and regrade pit rims																							
1	1	1	-	Aqqaq: Pit Berm (Boulder Fence) @ 30% perimeter	1170	Bm3	R.001	0.093	109.2	\$ 2.73	\$ 3,197	\$ -	\$ -	\$ 8.63	\$ 10,096	\$ 2.10	3,598	\$ 2,456	\$ 13.46	\$ 15,749	\$1,189,902	Material Costs = Explosives	
1	1	2	-	Aqqaq: Drill and Blast Steep Pit Slopes (30% perimeter)	162000	Bm3	C2.09	0.007	1134.0	\$ 0.45	\$ 73,637	\$ 2.08	\$ 336,857	\$ 0.21	\$ 33,215	\$ 0.03	7,280	\$ 4,969	\$ 2.77	\$ 448,678			
1	1	3	-	Aqqaq: Push blasted material into pit	18	hrs	C2.23	1.000	18.0	\$ 68.99	\$ 1,242	\$ -	\$ -	\$ 357.35	\$ 6,432	\$ 73.68	1,943	\$ 1,326	\$ 500.03	\$ 9,000			
1	1	4	-	Qanalyaq: Pit Berm (Boulder Fence) @ 30% perimeter	715	Bm3	R.002	0.086	61.3	\$ 2.51	\$ 1,794	\$ -	\$ -	\$ 7.92	\$ 5,666	\$ 1.93	2,019	\$ 1,378	\$ 12.36	\$ 8,839			
1	1	5	-	Qanalyaq: Drill and Blast Steep Pit Slopes (30% perimeter)	99000	Bm3	C2.09	0.007	693.0	\$ 0.45	\$ 45,000	\$ 2.08	\$ 205,857	\$ 0.21	\$ 20,298	\$ 0.03	4,449	\$ 3,036	\$ 2.77	\$ 274,192			
1	1	6	-	Qanalyaq: Push blasted material into Pit	11	hrs	C2.23	1.000	11.0	\$ 68.99	\$ 759	\$ -	\$ -	\$ 357.35	\$ 3,931	\$ 73.68	1,187	\$ 811	\$ 500.03	\$ 5,500			
1	1	7	-	Main Pit: Drill and blast highwall along eastern limit (4H:1V)	150000	Bm3	C2.09	0.007	1050.0	\$ 0.45	\$ 68,182	\$ 2.08	\$ 311,905	\$ 0.21	\$ 30,755	\$ 0.03	6,740	\$ 4,601	\$ 2.77	\$ 415,443			
1	1	8	-	Main Pit: Push blasted material into pit	25	hrs	C2.23	1.000	25.0	\$ 68.99	\$ 1,725	\$ -	\$ -	\$ 357.35	\$ 8,934	\$ 73.68	2,699	\$ 1,842	\$ 500.03	\$ 12,501			
Regrade and Cover Waset Stockpiles																							
Regrade and Compact Main Pit and North end of Main Waste stockpiles																							
1	2	1	-	Regrade slopes to an average slope of 3.0H:1V using D11 Dozer	1854	hrs	C2.23	1.000	1854.1	\$ 68.99	\$ 127,914	\$ -	\$ -	\$ 357.35	\$ 662,557	\$ 73.68	200,153	\$ 136,613	\$ 500.03	\$ 927,083	\$1,697,834		
1	2	2	-	D9 with impact roller (all surfaces)	66	hrs	C2.06	1.000	66.2	\$ 68.99	\$ 4,568	\$ -	\$ -	\$ 153.84	\$ 10,185	\$ 33.32	3,232	\$ 2,206	\$ 256.14	\$ 16,958			
Complex soil cover - First layer, high compaction (1.5 ft) - Main Pit and North end of Main Waste stockpiles					259,519	Bm3	R.004	0.006	1454.9	\$ 0.17	\$ 43,509	\$ -	\$ -	\$ 1.03	\$ 268,444	\$ 0.22	82,728	\$ 56,465	\$ 1.42	\$ 368,417			
1	3	2	-	Load, haul, dump, spread material from S. end of MWD	66	hrs	C2.06	1.000	66.2	\$ 68.99	\$ 4,568	\$ -	\$ -	\$ 153.84	\$ 10,185	\$ 33.32	3,232	\$ 2,206	\$ 256.14	\$ 16,958	\$261,889		
Complex soil cover - Second layer, light compaction (1.5 ft) - Main Pit and North end of Main Waste Stockpiles					259,519	Bm3	R.004	0.006	1454.9	\$ 0.17	\$ 43,509	\$ -	\$ -	\$ 1.03	\$ 268,444	\$ 0.22	82,728	\$ 56,465	\$ 1.42	\$ 368,417			
Install surface water collection																							
1	5	1	-	Excavate trellis pattern	16,459	Bm3	C2.11	0.044	731.5	\$ 3.00	\$ 49,361	\$ -	\$ -	\$ 3.66	\$ 60,215	\$ 0.85	20,450	\$ 13,958	\$ 7.51	\$ 123,534	\$1,182,578		
1	5	2	-	Excavate drop structures	8,664	Bm3	C2.11	0.044	385.1	\$ 3.00	\$ 25,982	\$ -	\$ -	\$ 3.66	\$ 31,695	\$ 0.85	10,764	\$ 7,347	\$ 7.51	\$ 65,025			
1	5	3	-	Bedding material (Load, haul, dump, place, 0.5 ft Okpikruak shale)	2,085	Bm3	R.005	0.067	140.1	\$ 3.19	\$ 6,647	\$ -	\$ -	\$ 4.95	\$ 10,318	\$ 1.03	3,141	\$ 2,144	\$ 9.17	\$ 19,109			
1	5	4	-	Place riprap: Drill, blast, stockpile	2,085	Bm3	C2.24	0.045	93.8	\$ 2.96	\$ 6,177	\$ 13.86	\$ 28,901	\$ 2.31	\$ 4,814	\$ 0.50	1,532	\$ 1,045	\$ 19.64	\$ 40,937			
1	5	5	-	Place riprap: Load, haul, dump	2,085	Bm3	R.006	0.038	80.1	\$ 1.31	\$ 2,721	\$ -	\$ -	\$ 2.84	\$ 5,913	\$ 0.54	1,635	\$ 1,116	\$ 4.68	\$ 9,750			
1	5	6	-	Place riprap: place and secure	2,085	Bm3	C2.27	0.013	26.1	\$ 0.86	\$ 1,798	\$ -	\$ -	\$ 0.67	\$ 1,401	\$ 0.16	493	\$ 336	\$ 1.70	\$ 3,535			
Upgrade Red Dog Creek (1:500yr)																							
1	6	1	-	Additional clearing and grading	20,170	m2	C2.05	0.015	293.4	\$ 1.00	\$ 20,241	\$ -	\$ -	\$ 2.18	\$ 43,944	\$ 0.48	14,320	\$ 9,774	\$ 3.67	\$ 73,959			
1	6	2	-	Excavation and placement of Creek Berms	16,678	Bm3	C2.17	0.100	1667.8	\$ 6.68	\$ 111,453	\$ -	\$ -	\$ 8.22	\$ 137,141	\$ 1.85	45,182	\$ 30,838	\$ 16.75	\$ 279,432			
1	6	3	-	Bedding layer:Screen and stockpile	2,938	Bm3	C2.02	0.010	29.4	\$ 0.70	\$ 2,065	\$ -	\$ -	\$ 2.09	\$ 6,151	\$ 0.46	1,971	\$ 1,345	\$ 3.25	\$ 9,561			
1	6	4	-	Bedding layer: Load, haul, dump, place 150mm layer (25mm minus)	2,938	Bm3	R.019	0.048	141.0	\$ 2.19	\$ 6,438	\$ -	\$ -	\$ 4.10	\$ 12,033	\$ 0.85	3,656	\$ 2,495	\$ 7.14	\$ 20,967			
1	6	5	-	Supply and place geotextile	21,383	m2	C3.06	0.071	1527.4	\$ 4.31	\$ 92,147	\$ 3.09	\$ 65,997	\$ 0.95	\$ 20,399	\$ 0.24	7,660	\$ 5,229	\$ 8.59	\$ 183,771			
1	6	6	-	Supply and place HDPE liner	21,383	m2	C3.11	0.143	3054.7	\$ 9.13	\$ 195,253	\$ 8.34	\$ 178,334	\$ 1.91	\$ 40,798	\$ 0.49	15,321	\$ 10,457	\$ 19.87	\$ 424,842			
1	6	7	-	Place riprap: Drill, blast, stockpile	6,224	Bm3	C2.24	0.045	280.1	\$ 2.96	\$ 18,439	\$ 13.86	\$ 86,275	\$ 2.31	\$ 14,371	\$ 0.50	4,572	\$ 3,121	\$ 19.64	\$ 122,205			
1	6	8	-	Place riprap: Load, haul, dump	6,224	Bm3	R.020	0.048	298.7	\$ 1.97	\$ 12,245	\$ -	\$ -	\$ 4.40	\$ 27,378	\$ 0.90	8,164	\$ 5,572	\$ 7.26	\$ 45,196			
1	6	9	-	Place riprap: place and secure	6,224	Bm3	C2.27	0.013	77.8	\$ 0.86	\$ 5,367	\$ -	\$ -	\$ 0.67	\$ 4,182	\$ 0.16	1,471	\$ 1,004	\$ 1.70	\$ 10,554			
1	6	10	-	Revegetation: willow cuttings/birch seeding	0.7	hec	C4.02	62.500	43.2	\$ 3,635.38	\$ 2,511	\$ 1,675.49	\$ 1,157	\$ 784.99	\$ 542	\$ 244.43	247	\$ 169	\$ 6,340.28	\$ 4,380			
1	7	1	-	Excavate Spillway	383	Bm3	C2.11	0.044	17.0	\$ 3.00	\$ 1,148	\$ -	\$ -	\$ 3.66	\$ 1,400	\$ 0.85	476	\$ 325	\$ 7.51	\$ 2,873			
1	7	2	-	Bedding layer:Screen and stockpile	53	Bm3	C2.02	0.010	0.5	\$ 0.70	\$ 37	\$ -	\$ -	\$ 2.09	\$ 111	\$ 0.46	35	\$ 24	\$ 3.25	\$ 172			
1	7	3	-	Bedding layer: Load, haul, dump, place 150mm layer (25mm minus)	53	Bm3	R.019	0.048	2.5	\$ 2.19	\$ 116	\$ -	\$ -	\$ 4.10	\$ 216	\$ 0.85	66	\$ 45	\$ 7.14	\$ 377			
1	7	4	-	Place riprap: Drill, blast, stockpile	150	Bm3	C2.24	0.045	6.8	\$ 2.96	\$ 444	\$ 13.86	\$ 2,079	\$ 2.31	\$ 346	\$ 0.50	110	\$ 75	\$ 19.64	\$ 2,945			
1	7	5	-	Place riprap: Load, haul, dump	150	Bm3	R.020	0.048	7.2	\$ 1.97	\$ 295	\$ -	\$ -	\$ 4.40	\$ 660	\$ 0.90	197	\$ 134	\$ 7.26	\$ 1,089			
1	7	6	-	Place riprap: place and secure	150	Bm3	C2.27	0.013	1.9	\$ 0.86	\$ 129	\$ -	\$ -	\$ 0.67	\$ 101	\$ 0.16	35	\$ 24	\$ 1.70	\$ 254			
Install Main Pit Water Collection System																							
1	8	1	-	GW Wells: Drill wells (Air Rotary Drill Rig)	276	m	C2.10	2.000	552.0	\$ 142.72	\$ 39,392	\$ -	\$ -	\$ 68.34	\$ 18,863	\$ 10.22	4,134	\$ 2,822	\$ 221.29	\$ 61,076	\$917,553		
1	8	2	-	GW Wells: Install 6" stainless steel well casing and screen	276	m	C3.20	0.150	41.4	\$ 10.70	\$ 2,954	\$ 205.11	\$ 56,612	\$ 5.13	\$ 1,415	\$ 0.77	310	\$ 212	\$ 221.71	\$ 61,192			
1	8	3	-	GW Wells: Install 6" Submersible Pump with controls (59-95 GPM)	3	ea.	C3.08	12.000	36.0	\$ 762.55	\$ 2,288	\$ 6,033.51	\$ 18,101	\$ -	\$ -	\$ -	0	\$ -	\$ 6,796.06	\$ 20,388			
1	8	4	-	GW Wells: Install protective housing (shack)	3	ea.	C3.19	20.000	60.0	\$ 1,249.91	\$ 3,750	\$ 392.42	\$ 1,177	\$ 167.46	\$ 502	\$ 52.15	229	\$ 156	\$ 1,861.94	\$ 5,586			
1	8	5	-	Piping System: Excavate piping trench	9,000	Bm3	C2.14	0.020	180.0	\$ 1.38	\$ 12,418	\$ -	\$ -	\$ 1.08	\$ 9,677	\$ 0.26	3,405	\$ 2,324	\$ 2.71	\$ 24,419			
1	8	6	-	Piping System: Supply and install insulated 350mm HDPE pipe	1,500	m	C3.13	0.231	346.2	\$ 13.42	\$ 20,134	\$ 315.76	\$ 473,638	\$ -	\$ -	\$ -	0	\$ -	\$ 329.18	\$ 493,772			
1	8	7	-	Piping System: Backfill ditches	9,000	Bm3	C2.01	0.030	270.0	\$ 1.85	\$ 16,679	\$ -	\$ -	\$ 0.57	\$ 5,157	\$ 0.14	1,826	\$ 1,246	\$ 2.56	\$ 23,082			
1	8	8	-	Heat Tracing: Supply and install heat trace in HDPE pipe	1,500	m	C3.14	0.060	90.0	\$ 4.04	\$ 6,058	\$ 25.01	\$ 37,513	\$ 0.50	\$ 754	\$ 0.16	344	\$ 235	\$ 29.71	\$ 44,560			
1	8	9	-	Heat Tracing: Supply/Install heat tracing power feed kil	2	ea.	C3.15	4.000	8.0	\$ 342.44	\$ 685	\$ 456.90	\$ 914	\$ -	\$ -	\$ -	0	\$ -	\$ 799.34	\$ 1,599			
1	8	10	-	Heat Tracing: Supply/Install electrical thermostate for heat tracing	1	ea.	C3.16	1.000	1.0	\$ 85.61	\$ 86	\$ 905.91	\$ 906	\$ -	\$ -	\$ -	0	\$ -	\$ 991.52	\$ 992			
1	8	11	-	Power Supply: Supply/Install treated power poles	20	ea.	C3.03	4.545	90.9	\$ 367.88	\$ 7,358	\$ 7,878.31	\$ 157,566	\$ 243.50	\$ 4,870	\$ 20.07	588	\$ 401	\$ 8,509.75	\$ 170,195			
1	8	12	-	Power Supply: Supply/Install overhead conductor	1,500	m	C3.02	0.032	48.0	\$ 2.63	\$ 3,941	\$ 1.24	\$ 1,865	\$ 1.29	\$ 1,929	\$ 0.11	233	\$ 159	\$ 5.26	\$ 7,893			
1	8	13	-	Power Supply: Supply/Install transformers	1	ea.	C3.04	20.000	20.0	\$ 1,642.04	\$ 1,642	\$ 287.44	\$ 287	\$ 803.55	\$ 804	\$ 66.23	97	\$ 66	\$ 2,799.26	\$ 2,799			
Revegetation																							
1	9	1	-	Native seed, application by helicopter	35	hec	C4.01	1.250	43.9	\$ 80.44	\$ 2,823	\$ 801.76	\$ 28,142	\$ 481.38	\$ 16,897	\$ 2.79	144	\$ 98	\$ 1,366.38	\$ 47,960	\$118,174		
1	9	2	-	Live plants - shrub cuttings (10% of surface area)	4	hec	C4.02	62.500	219.4	\$ 3,635.38	\$ 12,760	\$ 1,675.49	\$ 5,881	\$ 784.99	\$ 2,755	\$ 244.43	1,257	\$ 858	\$ 6,340.28	\$ 22,254			
1	9	3	-	Fertilizer pellets, application by helicopter	35	hec	C4.01	1.250	43.9	\$ 80.44	\$ 2,823	\$ 801.76	\$ 28,142	\$ 481.38	\$ 16,897	\$ 2.79	144	\$ 98	\$ 1,366.38	\$ 47,960			
<b>Subtotal Direct Costs - Mine Area Planned Closure (2031)</b>									<b>18954</b>		<b>\$ 1,116,410</b>		<b>\$ 2,028,106</b>		<b>\$ 1,843,789</b>		<b>\$ 379,625</b>		<b>\$ 5,367,931</b>				

Work Area Code	Item	Task	Estimate Type	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
<b>CLOSURE COSTS - INDIRECT</b>																						
Mobilization & Demobilization				Mob/Demob - Entire Project	1	ls													\$ 4,920,000.00	\$4,920,000	\$ 4,920,000	Note: Mob/Demob cost is for entire project
Administration costs																					\$ 314,703	
-	2	1	-	Worker's compensation	1,849,574	Direct labor + Field Supp		0.00		percent of labor cost -- Included in labor unit cost										\$0		
-	2	2	-	Office Supplies	5	months	x			\$100 /month										\$500		
-	2	3	-	Communications	5	months	x			\$1,000 /month										\$5,000		
-	2	4	-	Heating Fuel (avg. 400 gal per month)	5	months	x			400 gal/month	x	\$ 2.58 / gallon								\$5,160		
-	2	5	-	Misc. Supplies	5	months	x			\$500 /month										\$2,500		
-	2	6	-	Camp Operation	3,015	Man-days	x			\$100 per day per person										\$301,543		
Field support																					\$ 845,400	
-	3	1	-	Supervisor #1	80	days	x	12	hrs/day								960	hr	\$ 76.10	\$73,060		
-	3	2	-	Supervisor #2	80	days	x	12	hrs/day								960	hr	\$ 76.10	\$73,060		
-	3	3	-	Administrative Assistant #1	80	days	x	12	hrs/day								960	hr	\$ 57.40	\$55,107		
-	3	4	-	Administrative Assistant #2	80	days	x	12	hrs/day								960	hr	\$ 57.40	\$55,107		
-	3	5	-	Foreman #1	80	days	x	12	hrs/day								960	hr	\$ 75.58	\$72,552		
-	3	6	-	Foreman #2	80	days	x	12	hrs/day								960	hr	\$ 75.58	\$72,552		
-	3	7	-	Mechanic #1	80	days	x	12	hrs/day								960	hr	\$ 71.58	\$68,717		
-	3	8	-	Mechanic #2	80	days	x	12	hrs/day								960	hr	\$ 71.58	\$68,717		
-	3	9	-	Survey Field Manager	80	days	x	12	hrs/day								960	hr	\$ 71.50	\$68,641		
-	3	10	-	Survey Crew (Surveyor + helper)	80	days	x	12	hrs/day								960	hr	\$ 130.89	\$125,651		
-	3	11	-	Field Support Vehicles	80	days	x	3	trucks								240	day	\$ 251.20	\$60,287		
-	3	12	-	Turnaround costs - Admin	27	trips	x			\$ 770.00 per trip	+	10 %								\$22,587		
-	3	13	-	Turnaround costs - Crew	35	trips	x			\$ 770.00 per trip	+	10 %								\$29,363		
Contract Administration and QA/QC																					\$ 402,706	
-	4	1	-	Resident Engineer #1	80	days	x	12	hrs/day								960	hr	\$ 115.86	\$111,228		
-	4	2	-	Resident Engineer #2	80	days	x	12	hrs/day								960	hr	\$ 115.86	\$111,228		
-	4	3	-	Engineering Technician #1	80	days	x	12	hrs/day								960	hr	\$ 76.10	\$73,060		
-	4	4	-	Engineering Technician #2	80	days	x	12	hrs/day								960	hr	\$ 76.10	\$73,060		
-	4	5	-	Laboratory and Material Testing Costs	5	months	x			\$1,000 /month										\$5,000		
-	4	6	-	Field Support Vehicles	80	days	x	1	trucks								80	day	\$ 251.20	\$20,096		
-	4	7	-	Turnaround costs - QA/QC	11	trips	x			\$ 770.00 /trip	+	10 %								\$9,035		
Other Indirect Allocations																					\$ 3,322,478	
-	5	1	-	Insurance (1.6% of labor cost)	1.6	%	of			\$1,849,574 Direct Labor Cost+Field Support Labor											\$29,593	
-	5	2	-	Contractor Overhead	10	%	of			\$1,879,167 Direct Labor Cost+Field Support Labor+ Insurance											\$187,917	
-	5	3	-	Freight costs	12	%	of			\$2,028,106 Direct Material Costs											\$243,373	
-	5	4	-	Allowance for haul road maintenance	2.0	yr													\$ 300,000.00	\$600,000		
-	5	5	-	Contractor profit	10	%	of			\$12,610,080 Total Direct Cost+mob/demob+site admin-CAMP OPERATION+field support+Insurance+OH+Freight+Haul Road Maint.											\$1,261,008	
-	5	6	-	Engineering Re-Design	3	%	of			\$14,172,631 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit											\$425,179	
-	5	7	-	Bonding	3.0	%	of			\$14,172,631 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit											\$425,179	
-	5	8	-	State Management and Oversight	1.0	%	of			\$15,022,989 Total Project Cost EXCLUDING State Contract Admin, Contingency											\$150,230	
<b>Subtotal Indirect Costs</b>																				<b>\$9,805,288</b>		
<b>CLOSURE COSTS - CONTINGENCY</b>																						
				Contingency	20	%	of			\$5,367,931 Direct Cost											\$1,073,586	<b>\$1,073,586</b>
<b>CLOSURE COSTS - TOTAL</b>																				<b>\$16,246,805</b>		
				Total direct and indirect costs																	<b>\$16,246,805</b>	



Table 2. Mine Area Closure Costs - Premature Closure (2012)

(Unit Rates = Alaskan Contractor )

Work Area Code	Item	Task	Estimate Type	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
<b>CLOSURE COSTS - DIRECT CAPITAL</b>																						
Install berms and regrade pit rims																						
1	1	1	-	Aqqaluk: Pit Berm (Boulder Fence) @ 30% perimeter	1170	Bm3	R.001	0.093	109.2	\$ 2.73	\$ 3,197	\$ -	\$ -	\$ 8.63	\$ 10,096	\$ 2.10	3,598	\$ 2,456	\$ 13.46	\$ 15,749	\$927,896	Material Costs = Explosives
1	1	2	-	Aqqaluk: Drill and Blast Steep Pit Slopes (30% perimeter)	162000	Bm3	C2.09	0.007	1134.0	\$ 0.45	\$ 73,637	\$ 2.08	\$ 336,857	\$ 0.21	\$ 33,215	\$ 0.03	7,280	\$ 4,969	\$ 2.77	\$ 448,678		
1	1	3	-	Aqqaluk: Push blasted material into pit	18	hrs	C2.23	1.000	18.0	\$ 68.99	\$ 1,242	\$ -	\$ -	\$ 357.35	\$ 6,432	\$ 73.68	1,943	\$ 1,326	\$ 500.03	\$ 9,000		
1	1	4	-	Main Pit: Pit Berm (Boulder Fence) @ 50% perimeter	2080	Bm3	R.003	0.088	183.9	\$ 2.59	\$ 5,385	\$ -	\$ -	\$ 8.18	\$ 17,004	\$ 1.99	6,059	\$ 4,136	\$ 12.75	\$ 26,525		
1	1	5	-	Main Pit: Drill and blast highwall along eastern limit (4H:1V)	150000	Bm3	C2.09	0.007	1050.0	\$ 0.45	\$ 68,182	\$ 2.08	\$ 311,905	\$ 0.21	\$ 30,755	\$ 0.03	6,740	\$ 4,601	\$ 2.77	\$ 415,443		
1	1	6	-	Main Pit: Push blasted material into pit	25	hrs	C2.23	1.000	25.0	\$ 68.99	\$ 1,725	\$ -	\$ -	\$ 357.35	\$ 8,934	\$ 73.68	2,699	\$ 1,842	\$ 500.03	\$ 12,501		
Regrade and Cover Main Waset Stockpile																						
Regrading and compaction																						
1	2	1	-	Regrade slopes to an average slope of 3.0H:1V using D11 Dozer	574	hrs	C2.23	1.000	573.6	\$ 68.99	\$ 39,573	\$ -	\$ -	\$ 357.35	\$ 204,979	\$ 73.68	61,923	\$ 42,265	\$ 500.03	\$ 286,817	\$ 1,603,139	
1	2	2	-	D9 with impact roller (all surfaces)	97	hrs	C2.06	1.000	97.2	\$ 68.99	\$ 6,703	\$ -	\$ -	\$ 153.84	\$ 14,946	\$ 33.32	4,742	\$ 3,237	\$ 256.14	\$ 24,886		
Complex soil cover - First layer, high compaction (1.5 ft)																						
1	3	2	-	Load, haul, dump, spread material from S. end of MWD	446,089	Bm3	R.004	0.006	2500.9	\$ 0.17	\$ 74,787	\$ -	\$ -	\$ 1.03	\$ 461,430	\$ 0.22	142,201	\$ 97,058	\$ 1.42	\$ 633,275		
1	3	3	-	Compact material D9 with sheepfoot roller (all surfaces)	97	hrs	C2.06	1.000	97.2	\$ 68.99	\$ 6,703	\$ -	\$ -	\$ 153.84	\$ 14,946	\$ 33.32	4,742	\$ 3,237	\$ 256.14	\$ 24,886		
Complex soil cover - Second layer, light compaction (1.5 ft)																						
1	4	1	-	Load, haul, dump, spread material from S. end of MWD	446,089	Bm3	R.004	0.006	2500.9	\$ 0.17	\$ 74,787	\$ -	\$ -	\$ 1.03	\$ 461,430	\$ 0.22	142,201	\$ 97,058	\$ 1.42	\$ 633,275		
Install surface water collection																						
1	5	1	-	Excavate trellis pattern	6,399	Bm3	C2.11	0.044	284.4	\$ 3.00	\$ 19,191	\$ -	\$ -	\$ 3.66	\$ 23,410	\$ 0.85	7,951	\$ 5,427	\$ 7.51	\$ 48,027		
1	5	2	-	Excavate drop structures	8,664	Bm3	C2.11	0.044	385.1	\$ 3.00	\$ 25,982	\$ -	\$ -	\$ 3.66	\$ 31,695	\$ 0.85	10,764	\$ 7,347	\$ 7.51	\$ 65,025		
1	5	3	-	Bedding material (Load, haul, dump, place, 0.5 ft Okpikruak shale)	2,085	Bm3	R.005	0.067	140.1	\$ 3.19	\$ 6,647	\$ -	\$ -	\$ 4.95	\$ 10,318	\$ 1.03	3,141	\$ 2,144	\$ 9.17	\$ 19,109		
1	5	4	-	Place riprap: Drill, blast, stockpile	2,085	Bm3	C2.24	0.045	93.8	\$ 2.96	\$ 6,177	\$ 13.86	\$ 28,901	\$ 2.31	\$ 4,814	\$ 0.50	1,532	\$ 1,045	\$ 19.64	\$ 40,937		
1	5	5	-	Place riprap: Load, haul, dump	2,085	Bm3	R.006	0.038	80.1	\$ 1.31	\$ 2,721	\$ -	\$ -	\$ 2.84	\$ 5,913	\$ 0.54	1,635	\$ 1,116	\$ 4.68	\$ 9,750		
1	5	6	-	Place riprap: place and secure	2,085	Bm3	C2.27	0.013	26.1	\$ 0.86	\$ 1,798	\$ -	\$ -	\$ 0.67	\$ 1,401	\$ 0.16	493	\$ 336	\$ 1.70	\$ 3,535		
Upgrade Red Dog Creek (1:500yr)																						
1	6	1	-	Additional clearing and grading	20,170	m2	C2.05	0.015	293.4	\$ 1.00	\$ 20,241	\$ -	\$ -	\$ 2.18	\$ 43,944	\$ 0.48	14,320	\$ 9,774	\$ 3.67	\$ 73,959	\$1,784,934	
1	6	2	-	Excavation and placement of Creek Berms	25,840	Bm3	C2.17	0.100	2584.0	\$ 6.68	\$ 172,678	\$ -	\$ -	\$ 8.22	\$ 212,476	\$ 1.85	70,002	\$ 47,779	\$ 16.75	\$ 432,933		
1	6	3	-	Bedding layer:Screen and stockpile	4,552	Bm3	C2.02	0.010	45.5	\$ 0.70	\$ 3,199	\$ -	\$ -	\$ 2.09	\$ 9,530	\$ 0.46	3,053	\$ 2,084	\$ 3.25	\$ 14,813		
1	6	4	-	Bedding layer: Load, haul, dump, place 150mm layer (25mm minus)	4,552	Bm3	R.019	0.048	218.5	\$ 2.19	\$ 9,975	\$ -	\$ -	\$ 4.10	\$ 18,643	\$ 0.85	5,664	\$ 3,866	\$ 7.14	\$ 32,484		
1	6	5	-	Supply and place geotextile	33,129	m2	C3.06	0.071	2366.4	\$ 4.31	\$ 142,766	\$ 3.09	\$ 102,251	\$ 0.95	\$ 31,604	\$ 0.24	11,869	\$ 8,101	\$ 8.59	\$ 284,723		
1	6	6	-	Supply and place HDPE liner	33,129	m2	C3.11	0.143	4732.8	\$ 9.13	\$ 302,512	\$ 8.34	\$ 276,299	\$ 1.91	\$ 63,209	\$ 0.49	23,737	\$ 16,202	\$ 19.87	\$ 658,221		
1	6	7	-	Place riprap: Drill, blast, stockpile	9,643	Bm3	C2.24	0.045	433.9	\$ 2.96	\$ 28,567	\$ 13.86	\$ 133,669	\$ 2.31	\$ 22,265	\$ 0.50	7,084	\$ 4,835	\$ 19.64	\$ 189,336		
1	6	8	-	Place riprap: Load, haul, dump	9,643	Bm3	R.020	0.048	462.8	\$ 1.97	\$ 18,972	\$ -	\$ -	\$ 4.40	\$ 42,418	\$ 0.90	12,649	\$ 8,633	\$ 7.26	\$ 70,023		
1	6	9	-	Place riprap: place and secure	9,643	Bm3	C2.27	0.013	120.5	\$ 0.86	\$ 8,316	\$ -	\$ -	\$ 0.67	\$ 6,480	\$ 0.16	2,280	\$ 1,556	\$ 1.70	\$ 16,351		
1	6	10	-	Revegetation: willow cuttings/birch seeding	0.7	hec	C4.02	62.500	43.2	\$ 3,635.38	\$ 2,511	\$ 1,675.49	\$ 1,157	\$ 784.99	\$ 542	\$ 244.43	247	\$ 169	\$ 6,340.28	\$ 4,380		
1	7	1	-	Excavate Spillway	383	Bm3	C2.11	0.044	17.0	\$ 3.00	\$ 1,148	\$ -	\$ -	\$ 3.66	\$ 1,400	\$ 0.85	476	\$ 325	\$ 7.51	\$ 2,873		
1	7	2	-	Bedding layer:Screen and stockpile	53	Bm3	C2.02	0.010	0.5	\$ 0.70	\$ 37	\$ -	\$ -	\$ 2.09	\$ 111	\$ 0.46	35	\$ 24	\$ 3.25	\$ 172		
1	7	3	-	Bedding layer: Load, haul, dump, place 150mm layer (25mm minus)	53	Bm3	R.019	0.048	2.5	\$ 2.19	\$ 116	\$ -	\$ -	\$ 4.10	\$ 216	\$ 0.85	66	\$ 45	\$ 7.14	\$ 377		
1	7	4	-	Place riprap: Drill, blast, stockpile	150	Bm3	C2.24	0.045	6.8	\$ 2.96	\$ 444	\$ 13.86	\$ 2,079	\$ 2.31	\$ 346	\$ 0.50	110	\$ 75	\$ 19.64	\$ 2,945		
1	7	5	-	Place riprap: Load, haul, dump	150	Bm3	R.020	0.048	7.2	\$ 1.97	\$ 295	\$ -	\$ -	\$ 4.40	\$ 660	\$ 0.90	197	\$ 134	\$ 7.26	\$ 1,089		
1	7	6	-	Place riprap: place and secure	150	Bm3	C2.27	0.013	1.9	\$ 0.86	\$ 129	\$ -	\$ -	\$ 0.67	\$ 101	\$ 0.16	35	\$ 24	\$ 1.70	\$ 254		
Install Main Waste Stockpile Seepage Collection System																						
1	7	1	-	GW Wells: Drill wells (Air Rotary Drill Rig)	120	m	C2.10	2.000	240.0	\$ 142.72	\$ 17,127	\$ -	\$ -	\$ 68.34	\$ 8,201	\$ 10.22	1,797	\$ 1,227	\$ 221.29	\$ 26,555		\$2,454,271
1	7	2	-	GW Wells: Install 6" stainless steel well casing and screen	120	m	C3.20	0.150	18.0	\$ 10.70	\$ 1,285	\$ 205.11	\$ 24,614	\$ 5.13	\$ 615	\$ 0.77	135	\$ 92	\$ 221.71	\$ 26,605		
1	7	3	-	GW Wells: Install 6" Submersible Pump with controls (59-95 GPM)	6	ea.	C3.08	12.000	72.0	\$ 762.55	\$ 4,575	\$ 6,033.51	\$ 36,201	\$ -	\$ -	\$ -	\$ -	\$ 6,796.06	\$ 40,776			
1	7	4	-	GW Wells: Install 6" Submersible Pump w/ controls (681-1400 GPM)	2	ea.	C3.09	12.000	24.0	\$ 762.55	\$ 1,525	\$ 24,633.40	\$ 49,267	\$ -	\$ -	\$ -	\$ -	\$ 25,395.95	\$ 50,792			
1	7	5	-	GW Wells: Install protective housing (shack)	8	ea.	C3.19	20.000	160.0	\$ 1,249.91	\$ 9,999	\$ 392.42	\$ 3,139	\$ 167.46	\$ 1,340	\$ 52.15	611	\$ 417	\$ 1,861.94	\$ 14,896		
1	7	6	-	Pumping Stations: Excavate sump for manholes	200	Bm3	C2.12	0.011	2.2	\$ 0.77	\$ 153	\$ -	\$ -	\$ 0.60	\$ 119	\$ 0.14	42	\$ 29	\$ 1.51	\$ 301		
1	7	7	-	Pumping Stations: Supply and place precast concrete manhole	2	ea.	C3.17	16.000	32.0	\$ 1,045.71	\$ 2,091	\$ 1,185.78	\$ 2,372	\$ 215.03	\$ 430	\$ 51.64	151	\$ 103	\$ 2,498.17	\$ 4,996		
1	7	8	-	Pumping Stations: Backfill and compact around manhole	200	Bm3	C2.01	0.030	6.0	\$ 1.85	\$ 371	\$ -	\$ -	\$ 0.57	\$ 115	\$ 0.14	41	\$ 28	\$ 2.56	\$ 513		
1	7	9	-	Pumping Stations: Install primary pump	2	ea.	C3.18	12.000	24.0	\$ 751.65	\$ 1,503	\$ 1,612.87	\$ 3,226	\$ -	\$ -	\$ -	\$ -	\$ 2,364.52	\$ 4,729			
1	7	10	-	Piping System: Excavate piping trench	21,630	Bm3	C2.14	0.020	432.6	\$ 1.38	\$ 29,845	\$ -	\$ -	\$ 1.08	\$ 23,256	\$ 0.26	8,183	\$ 5,585	\$ 2.71	\$ 58,686		
1	7	11	-	Piping System: Supply and install insulated 350mm HDPE pipe	3,605	m	C3.13	0.231	831.9	\$ 13.42	\$ 48,390	\$ 315.76	\$ 1,138,309	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 329.18	\$ 1,186,699		
1	7	12	-	Piping System: Backfill ditches	21,630	Bm3	C2.01	0.030	648.9	\$ 1.85	\$ 40,085	\$ -	\$ -	\$ 0.57	\$ 12,394	\$ 0.14	4,387	\$ 2,995	\$ 2.56	\$ 55,474		
1	7	13	-	Heat Tracing: Supply and install heat trace in HDPE pipe	3,605	m	C3.14	0.060	216.3	\$ 4.04	\$ 14,560	\$ 25.01	\$ 90,157	\$ 0.50	\$ 1,811	\$ 0.16	826	\$ 564	\$ 29.71	\$ 107,092		
1	7	14	-	Heat Tracing: Supply/Install heat tracing power feed kit	2	ea.	C3.15	4.000	8.0	\$ 342.44	\$ 685	\$ 456.90	\$ 914	\$ -	\$ -	\$ -	\$ -	\$ 799.34	\$ 1,599			
1	7	15	-	Heat Tracing: Supply/Install electrical thermostate for heat tracing	1	ea.	C3.16	1.000	1.0	\$ 85.61	\$ 86	\$ 905.91	\$ 906	\$ -	\$ -	\$ -	\$ -	\$ 991.52	\$ 992			
1	7	16	-	Power Supply: Supply/Install treated power poles	24	ea.	C3.03	4.545	109.1	\$ 367.88	\$ 8,829	\$ 7,878.31	\$ 189,079	\$ 243.50	\$ 5,844	\$ 20.07	706	\$ 482	\$ 8,509.75	\$ 204,234		
1	7	17	-	Power Supply: Supply/Install overhead conductor	1,800	m	C3.02	0.032	57.6	\$ 2.63	\$ 4,729	\$ 1.24	\$ 2,238	\$ 1.29	\$ 2,314	\$ 0.11	279	\$ 191	\$ 5.26	\$ 9,472		
1	7	18	-	Power Supply: Supply/Install transformers	4	ea.	C3.04	20.000	80.0	\$ 1,642.04	\$ 6,568	\$ 287.44	\$ 1,150	\$ 803.55	\$ 3,214	\$ 66.23	388	\$ 265	\$ 2,799.26	\$ 11,197		
1	7	19	-	Cut-off Wall: Install bentonite slurry wall by MWD18 and MWD 24	6,000	m2	C2.08	0.500	3000.0	\$ 34.84	\$ 209,013	\$ 42.86	\$ 257,143	\$ 23.74	\$ 142,422	\$ 6.68	58,729	\$ 40,085	\$ 108.11	\$ 648,663		
Revegetation																						
1	8	1	-	Native seed, application by helicopter	195	hec	C4.01	1.250	243.8	\$ 80.44	\$ 15,686	\$ 801.76	\$ 156,344	\$ 481.38	\$ 93,							

Work Area Code	Item	Task	Estimate Type	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Mat	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments																			
<b>CLOSURE COSTS - INDIRECT</b>																																									
Mobilization & Demobilization				Mob/Demob - Entire Project	1	ls													\$ 4,920,000.00	\$4,920,000	\$ 4,920,000	Note: Mob/Demob cost is for entire project																			
Administration costs				Worker's compensation	2,642,126	Direct labor + Field Supp			0.0 % of labor cost -- Included in labor unit cost											\$	\$ 458,116																				
-	2	1	-	Office Supplies	8	months	x		\$100 /month												\$ 800																				
-	2	3	-	Communications	8	months	x		\$1,000 /month												\$8,000																				
-	2	4	-	Heating Fuel (avg. 400 gal per month)	8	months	x		400 gal/month	x	\$ 2.58 / gallon										\$8,256																				
-	2	5	-	Misc. Supplies	8	months	x		\$500 /month												\$4,000																				
-	2	6	-	Camp Operation	4,371	Man-days	x		\$100 per day per person												\$437,060																				
Field support				Supervisor #1	110	days	x	12	hrs/day								1320	hr	\$ 76.10	\$100,457	\$ 1,162,425																				
-	3	2	-	Supervisor #2	110	days	x	12	hrs/day								1320	hr	\$ 76.10	\$100,457																					
-	3	3	-	Administrative Assistant #1	110	days	x	12	hrs/day								1320	hr	\$ 57.40	\$75,771																					
-	3	4	-	Administrative Assistant #2	110	days	x	12	hrs/day								1320	hr	\$ 57.40	\$75,771																					
-	3	5	-	Foreman #1	110	days	x	12	hrs/day								1320	hr	\$ 75.58	\$99,759																					
-	3	6	-	Foreman #2	110	days	x	12	hrs/day								1320	hr	\$ 75.58	\$99,759																					
-	3	7	-	Mechanic #1	110	days	x	12	hrs/day								1320	hr	\$ 71.58	\$94,486																					
-	3	8	-	Mechanic #2	110	days	x	12	hrs/day								1320	hr	\$ 71.58	\$94,486																					
-	3	9	-	Survey Field Manager	110	days	x	12	hrs/day								1320	hr	\$ 71.50	\$94,381																					
-	3	10	-	Survey Crew (Surveyor + helper)	110	days	x	12	hrs/day								1320	hr	\$ 130.89	\$172,771																					
-	3	11	-	Field Support Vehicles	110	days	x	3	trucks								330	day	\$ 251.20	\$82,895																					
-	3	12	-	Turnaround costs - Admin	37	trips	x		\$ 770.00 per trip	+	10 %										\$31,057																				
-	3	13	-	Turnaround costs - Crew	48	trips	x		\$ 770.00 per trip	+	10 %										\$40,374																				
Contract Administration and QA/QC				Resident Engineer #1	110	days	x	12	hrs/day								1320	hr	\$ 115.86	\$152,939	\$ 554,846																				
-	4	2	-	Resident Engineer #2	110	days	x	12	hrs/day								1320	hr	\$ 115.86	\$152,939																					
-	4	3	-	Engineering Technician #1	110	days	x	12	hrs/day								1320	hr	\$ 76.10	\$100,457																					
-	4	4	-	Engineering Technician #2	110	days	x	12	hrs/day								1320	hr	\$ 76.10	\$100,457																					
-	4	5	-	Laboratory and Material Testing Costs	8	months	x		\$1,000 /month												\$8,000																				
-	4	6	-	Field Support Vehicles	110	days	x	1	trucks								110	day	\$ 251.20	\$27,632																					
-	4	7	-	Turnaround costs - QA/QC	15	trips	x		\$ 770.00 /trip	+	10 %										\$12,423																				
Other Indirect Allocations				Insurance (1.6% of labor cost)	1.6	%	of		\$2,642,126 Direct Labor Cost+Field Support Labor													\$42,274																			
-	5	2	-	Contractor Overhead	10	%	of		\$2,684,400 Direct Labor Cost+Field Support Labor+ Insurance													\$268,440																			
-	5	3	-	Freight costs	12	%	of		\$3,337,192 Direct Material Costs													\$400,463																			
-	5	4	-	Allowance for haul road maintenance	2.0	yr													\$ 300,000.00			\$600,000																			
-	5	5	-	Contractor profit	10	%	of		\$15,582,649 Total Direct Cost+mob/demob+site admin-CAMP OPERATION+field support+Insurance+OH+Freight+Haul Road Maint.													\$1,558,265																			
-	5	6	-	Engineering Re-Design	3	%	of		\$17,577,975 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit													\$527,339																			
-	5	7	-	Bonding	3.0	%	of		\$17,577,975 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit													\$527,339																			
-	5	8	-	State Management and Oversight	1.0	%			\$18,632,653 Total Project Cost EXCLUDING State Contract Admin, Contingency													\$186,327																			
<b>Subtotal Indirect Costs</b>																																								<b>\$11,205,834</b>	
<b>CLOSURE COSTS - CONTINGENCY</b>																																									
				Contingency	20	%	of		\$7,613,146 Direct Cost													\$1,522,629	<b>\$1,522,629</b>																		
<b>CLOSURE COSTS - TOTAL</b>																																									
				Total direct and indirect costs																			<b>\$20,341,609</b>																		

Table 3. Tailings Area Closure Costs

(Unit Rates = Alaskan Contractor )

Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments		
<b>CLOSURE COSTS - DIRECT CAPITAL</b>																				
<b>Construct Spillway</b>																				
Clear and grub	5000	m2	C2.05	0.015	72.7	\$ 1.00	\$ 5,018	\$ -	\$ -	\$ 2.18	\$ 10,893	\$ 0.48	3,550	\$ 2,423	\$ 3.67	\$ 18,334	\$150,971			
Strip topsoil	1500	Bm3	C2.13	0.024	35.3	\$ 1.59	\$ 2,382	\$ -	\$ -	\$ 1.94	\$ 2,905	\$ 0.45	987	\$ 673	\$ 3.97	\$ 5,960				
Excavate channel	5094	Bm3	C2.11	0.044	226.4	\$ 3.00	\$ 15,277	\$ -	\$ -	\$ 3.66	\$ 18,636	\$ 0.85	6,329	\$ 4,320	\$ 7.51	\$ 38,233				
Place riprap: Drill, blast, stockpile	2997	Bm3	C2.24	0.045	134.9	\$ 2.96	\$ 8,879	\$ 13.86	\$ 41,546	\$ 2.31	\$ 6,920	\$ 0.50	2,202	\$ 1,503	\$ 19.64	\$ 58,848				
Place riprap: Load, haul, dump	2997	Bm3	R.008	0.038	115.1	\$ 1.31	\$ 3,912	\$ -	\$ -	\$ 2.84	\$ 8,500	\$ 0.54	2,350	\$ 1,604	\$ 4.68	\$ 14,016				
Place riprap: place and secure	2997	Bm3	C2.27	0.013	37.5	\$ 0.86	\$ 2,585	\$ -	\$ -	\$ 0.67	\$ 2,014	\$ 0.16	709	\$ 484	\$ 1.70	\$ 5,082				
Energy Dissipation: Place geotextile	346	m2	C3.06	0.071	24.7	\$ 4.31	\$ 1,491	\$ 3.09	\$ 1,068	\$ 0.95	\$ 330	\$ 0.24	124	\$ 85	\$ 8.59	\$ 2,974				
Energy Dissipation: Gravel bedding - screen and stockpile	79	Bm3	C2.02	0.010	0.8	\$ 0.70	\$ 56	\$ -	\$ -	\$ 2.09	\$ 166	\$ 0.46	53	\$ 36	\$ 3.25	\$ 258				
Energy Dissipation: Gravel bedding - Load, haul, dump, place	79	Bm3	R.009	0.044	3.5	\$ 1.80	\$ 143	\$ -	\$ -	\$ 3.19	\$ 252	\$ 0.64	74	\$ 51	\$ 5.63	\$ 446				
Energy Dissipation: Riprap - Drill, blast, stockpile	262	Bm3	C2.24	0.045	11.8	\$ 2.96	\$ 777	\$ 13.86	\$ 3,635	\$ 2.31	\$ 606	\$ 0.50	193	\$ 131	\$ 19.64	\$ 5,149				
Energy Dissipation: Riprap - Load, haul, dump	262	Bm3	R.008	0.038	10.1	\$ 1.31	\$ 342	\$ -	\$ -	\$ 2.84	\$ 744	\$ 0.54	206	\$ 140	\$ 4.68	\$ 1,226				
Energy Dissipation: Riprap - Place and secure	262	Bm3	C2.27	0.013	3.3	\$ 0.86	\$ 226	\$ -	\$ -	\$ 0.67	\$ 176	\$ 0.16	62	\$ 42	\$ 1.70	\$ 445				
<b>Construct Main Dam Beach</b>																				
Regrade tailings surface	157	hrs	C2.23	1.000	156.8	\$ 68.99	\$ 10,819	\$ -	\$ -	\$ 357.35	\$ 56,039	\$ 73.68	16,929	\$ 11,555	\$ 500.03	\$ 78,412		\$4,863,094		
Coffer Dam: Load, haul, dump, place, compact berm material	21,397	Bm3	R.011	0.019	410.8	\$ 0.64	\$ 13,737	\$ -	\$ -	\$ 3.11	\$ 66,506	\$ 0.65	20,510	\$ 13,999	\$ 4.40	\$ 94,242				
Final berm: Load, haul, dump, place, compact Run-of-mine material	35,662	Bm3	R.013	0.013	448.3	\$ 0.43	\$ 15,474	\$ -	\$ -	\$ 2.09	\$ 74,509	\$ 0.45	23,288	\$ 15,895	\$ 2.97	\$ 105,879				
Beach: Supply and place GCL liner	235,224	m2	C3.07	0.040	9409.0	\$ 2.56	\$ 601,407	\$ 11.03	\$ 2,594,930	\$ 0.53	\$ 125,662	\$ 0.14	47,191	\$ 32,209	\$ 14.26	\$ 3,354,209				
Beach: Load, haul, dump, place cover of shale from Ovb.	65,218	Bm3	R.012	0.021	6319.0	\$ 0.49	\$ 144,965	\$ -	\$ -	\$ 2.44	\$ 726,198	\$ 0.61	351,143	\$ 182,594	\$ 3.53	\$ 1,053,758				
Erosion Protection: Riprap - Drill, blast, stockpile	2,378	Bm3	C2.24	0.045	107.0	\$ 2.96	\$ 7,045	\$ 13.86	\$ 32,965	\$ 2.31	\$ 5,491	\$ 0.50	1,747	\$ 1,192	\$ 19.64	\$ 46,693				
Erosion Protection: Riprap - Load, haul, dump	2,378	Bm3	R.014	0.064	151.5	\$ 2.18	\$ 5,176	\$ -	\$ -	\$ 5.72	\$ 13,606	\$ 1.14	3,979	\$ 2,716	\$ 9.04	\$ 21,498				
Erosion Protection: Riprap - Place and secure	2,378	Bm3	C2.27	0.013	29.7	\$ 0.86	\$ 2,051	\$ -	\$ -	\$ 0.67	\$ 1,598	\$ 0.16	562	\$ 384	\$ 1.70	\$ 4,032				
Revegetate: Native seed, application by helicopter	31.00	hec	C4.01	1.250	38.8	\$ 80.44	\$ 2,494	\$ 801.76	\$ 24,855	\$ 481.38	\$ 14,923	\$ 2.79	127	\$ 87	\$ 1,366.38	\$ 42,358				
Revegetate: Live plants - shrub cuttings (10% of surface)	3.10	hec	C4.02	62.500	193.8	\$ 3,635.38	\$ 11,270	\$ 1,675.49	\$ 5,194	\$ 784.99	\$ 2,433	\$ 244.43	1,110	\$ 758	\$ 6,340.28	\$ 19,655				
Revegetate: Fertilizer pellets, application by helicopter	31.00	hec	C4.01	1.250	38.8	\$ 80.44	\$ 2,494	\$ 801.76	\$ 24,855	\$ 481.38	\$ 14,923	\$ 2.79	127	\$ 87	\$ 1,366.38	\$ 42,358				
<b>Reclaim Overburden Stockpile</b>																				
Reslope steep slopes to 3H:1V	275	hrs	C2.23	1.000	274.8	\$ 68.99	\$ 18,955	\$ -	\$ -	\$ 357.35	\$ 98,183	\$ 73.68	29,660	\$ 20,244	\$ 500.03	\$ 137,382	\$213,808			
Revegetate: Native seed, application by helicopter	22.70	hec	C4.01	1.250	28.4	\$ 80.44	\$ 1,826	\$ 801.76	\$ 18,200	\$ 481.38	\$ 10,927	\$ 2.79	93	\$ 63	\$ 1,366.38	\$ 31,017				
Revegetate: Live plants - shrub cuttings (10% of surface)	2.27	hec	C4.02	62.500	141.9	\$ 3,635.38	\$ 8,252	\$ 1,675.49	\$ 3,803	\$ 784.99	\$ 1,782	\$ 244.43	813	\$ 555	\$ 6,340.28	\$ 14,392				
Revegetate: Fertilizer pellets, application by helicopter	22.70	hec	C4.01	1.250	28.4	\$ 80.44	\$ 1,826	\$ 801.76	\$ 18,200	\$ 481.38	\$ 10,927	\$ 2.79	93	\$ 63	\$ 1,366.38	\$ 31,017				
<b>Upgrade Seepage Collection (Main Dam)</b>																				
Pumping Stations: Excavate sump for manholes	200	Bm3	C2.12	0.011	2.2	\$ 0.77	\$ 153	\$ -	\$ -	\$ 0.60	\$ 119	\$ 0.14	42	\$ 29	\$ 1.51	\$ 301	\$620,686			
Pumping Stations: Supply and place precast concrete manhole	1	ea.	C3.17	16.000	16.0	\$ 1,045.71	\$ 1,046	\$ 1,185.78	\$ 1,186	\$ 215.03	\$ 215	\$ 51.64	76	\$ 52	\$ 2,498.17	\$ 2,498				
Pumping Stations: Backfill and compact around manhole	200	Bm3	C2.01	0.030	6.0	\$ 1.85	\$ 371	\$ -	\$ -	\$ 0.57	\$ 115	\$ 0.14	41	\$ 28	\$ 2.56	\$ 513				
Pumping Stations: Install primary pump	1	ea.	C3.18	12.000	12.0	\$ 751.65	\$ 752	\$ 1,612.87	\$ 1,613	\$ -	\$ -	\$ -	0	\$ -	\$ 2,364.52	\$ 2,365				
Piping System: Excavate piping trench	11,142	Bm3	C2.14	0.020	222.8	\$ 1.38	\$ 15,374	\$ -	\$ -	\$ 1.08	\$ 11,980	\$ 0.26	4,215	\$ 2,877	\$ 2.71	\$ 30,230				
Piping System: Supply and install insulated 150mm HDPE pipe	1,857	m	C3.12	0.207	384.2	\$ 12.03	\$ 22,348	\$ 156.38	\$ 290,390	\$ -	\$ -	\$ -	0	\$ -	\$ 168.41	\$ 312,737				
Piping System: Backfill ditches	11,142	Bm3	C2.01	0.030	334.3	\$ 1.85	\$ 20,649	\$ -	\$ -	\$ 0.57	\$ 6,384	\$ 0.14	2,260	\$ 1,543	\$ 2.56	\$ 28,576				
Heat Tracing: Supply and install heat trace in HDPE pipe	1,857	m	C3.14	0.060	111.4	\$ 4.04	\$ 7,500	\$ 25.01	\$ 46,441	\$ 0.50	\$ 933	\$ 0.16	426	\$ 291	\$ 29.71	\$ 55,165				
Heat Tracing: Supply/Install heat tracing power feed kit	2	ea.	C3.15	4.000	8.0	\$ 342.44	\$ 685	\$ 456.90	\$ 914	\$ -	\$ -	\$ -	0	\$ -	\$ 799.34	\$ 1,599				
Heat Tracing: Supply/Install electrical thermostat for heat tracing	1	ea.	C3.16	1.000	1.0	\$ 85.61	\$ 86	\$ 905.91	\$ 906	\$ -	\$ -	\$ -	0	\$ -	\$ 991.52	\$ 992				
Power Supply: Supply/Install treated power poles	7	ea.	C3.03	4.545	31.8	\$ 367.88	\$ 2,575	\$ 7,878.31	\$ 55,148	\$ 243.50	\$ 1,704	\$ 20.07	206	\$ 140	\$ 8,509.75	\$ 59,568				
Power Supply: Supply/Install overhead conductors	500	m	C3.02	0.032	16.0	\$ 2.63	\$ 1,314	\$ 1.24	\$ 622	\$ 1.29	\$ 643	\$ 0.11	78	\$ 53	\$ 5.26	\$ 2,631				
Power Supply: Supply/Install transformers	1	ea.	C3.04	20.000	20.0	\$ 1,642.04	\$ 1,642	\$ 287.44	\$ 287	\$ 803.55	\$ 804	\$ 66.23	97	\$ 66	\$ 2,799.26	\$ 2,799				
Emergency storage pond: clear and grub retention dam	3,450	m2	C2.05	0.015	50.2	\$ 1.00	\$ 3,462	\$ -	\$ -	\$ 2.18	\$ 7,516	\$ 0.48	2,449	\$ 1,672	\$ 3.67	\$ 12,650				
Supply and place HDPE Liner	3,450	m2	C3.10	0.033	115.0	\$ 2.13	\$ 7,351	\$ 8.34	\$ 28,773	\$ 0.45	\$ 1,536	\$ 0.11	577	\$ 394	\$ 11.03	\$ 38,053				
Supply and place geotextile on each side of liner	6,900	m2	C3.05	0.016	110.4	\$ 0.97	\$ 6,720	\$ 3.09	\$ 21,296	\$ 0.27	\$ 1,843	\$ 0.07	692	\$ 472	\$ 4.40	\$ 30,332				
Emergency storage pond: Load, haul, dump, place	13,475	Bm3	R.012	0.012	168.0	\$ 0.43	\$ 5,799	\$ -	\$ -	\$ 2.07	\$ 27,921	\$ 0.44	8,727	\$ 5,956	\$ 2.94	\$ 39,676				
<b>Upgrade Seepage Collection (Back Dam)</b>																				
Pumping Stations: Excavate sump for manholes	200	Bm3	C2.12	0.011	2.2	\$ 0.77	\$ 153	\$ -	\$ -	\$ 0.60	\$ 119	\$ 0.14	42	\$ 29	\$ 1.51	\$ 301	\$683,440			
Pumping Stations: Supply and place precast concrete manhole	1	ea.	C3.17	16.000	16.0	\$ 1,045.71	\$ 1,046	\$ 1,185.78	\$ 1,186	\$ 215.03	\$ 215	\$ 51.64	76	\$ 52	\$ 2,498.17	\$ 2,498				
Pumping Stations: Backfill and compact around manhole	200	Bm3	C2.01	0.030	6.0	\$ 1.85	\$ 371	\$ -	\$ -	\$ 0.57	\$ 115	\$ 0.14	41	\$ 28	\$ 2.56	\$ 513				
Pumping Stations: Install primary pump	1	ea.	C3.18	12.000	12.0	\$ 751.65	\$ 752	\$ 1,612.87	\$ 1,613	\$ -	\$ -	\$ -	0	\$ -	\$ 2,364.52	\$ 2,365				
Piping System: Excavate piping trench	13,200	Bm3	C2.14	0.020	264.0	\$ 1.38	\$ 18,214	\$ -	\$ -	\$ 1.08	\$ 14,192	\$ 0.26	4,993	\$ 3,408	\$ 2.71	\$ 35,814				
Piping System: Supply and install insulated 150mm HDPE pipe	2,200	m	C3.12	0.207	455.2	\$ 12.03	\$ 26,476	\$ 156.38	\$ 344,026	\$ -	\$ -	\$ -	0	\$ -	\$ 168.41	\$ 370,502				
Piping System: Backfill ditches	13,200	Bm3	C2.01	0.030	396.0	\$ 1.85	\$ 24,463	\$ -	\$ -	\$ 0.57	\$ 7,564	\$ 0.14	2,678	\$ 1,828	\$ 2.56	\$ 33,854				
Heat Tracing: Supply and install heat trace in HDPE pipe	2,200	m	C3.14	0.060	132.0	\$ 4.04	\$ 8,885	\$ 25.01	\$ 55,019	\$ 0.50	\$ 1,105	\$ 0.16	504	\$ 344	\$ 29.71	\$ 65,354				
Heat Tracing: Supply/Install heat tracing power feed kit	2	ea.	C3.15	4.000	8.0	\$ 342.44	\$ 685	\$ 456.90	\$ 914	\$ -	\$ -	\$ -	0	\$ -	\$ 799.34	\$ 1,599				
Heat Tracing: Supply/Install electrical thermostat for heat tracing	1	ea.	C3.16	1.000	1.0	\$ 85.61	\$ 86	\$ 905.91	\$ 906	\$ -	\$ -	\$ -	0	\$ -	\$ 991.52	\$ 992				
Power Supply: Supply/Install treated power poles	7	ea.	C3.03	4.545	31.8	\$ 367.88	\$ 2,575	\$ 7,878.31	\$ 55,148	\$ 243.50	\$ 1,704	\$ 20.07	206	\$ 140	\$ 8,509.75	\$ 59,568				
Power Supply: Supply/Install overhead conductors	500	m	C3.02	0.032	16.0	\$ 2.63	\$ 1,314	\$ 1.24	\$ 622	\$ 1.29	\$ 643	\$ 0.11	78	\$ 53	\$ 5.26	\$ 2,631				
Power Supply: Supply/Install transformers	1	ea.	C3.04	20.000	20.0	\$ 1,642.04	\$ 1,642	\$ 287.44	\$ 287	\$ 803.55	\$ 804	\$ 66.23	97	\$ 66	\$ 2,799.26	\$ 2,799				
Emergency storage pond: clear and grub retention dam	3,650	m2	C2.05	0.015	53.1	\$ 1.00	\$ 3,663	\$ -	\$ -	\$ 2.18	\$ 7,952	\$ 0.48	2,591	\$ 1,769	\$ 3.67	\$ 13,384				
Supply and place HDPE Liner	3,650	m2	C3.10	0.033	121.7	\$ 2.13	\$ 7,777	\$ 8.34	\$ 30,441											

Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments	
<b>CLOSURE COSTS - INDIRECT</b>																			
Mobilization & Demobilization																	\$ -	Note: Mob/Demob cost appears on "2031B Mine and "2021 Mine" tabs	
Mobilization		ls															\$0		
Demobilization		ls															\$0		
Administration costs																	\$ 365,206		
Worker's compensation	\$ 1,949,982	labor cost		0.00		percent of labor cost --	Included in labor unit cost										\$0		
Office Supplies	6	months	x			\$100 /month											\$600		
Communications	6	months	x			\$1,000 /month											\$6,000		
Heating Fuel (avg. 400 gal per month)	6	months	x			400 gal/month	x	\$ 2.58 /gallon									\$6,192		
Misc. Supplies	6	months	x			\$500 /month											\$3,000		
Camp Operation	3,494	Man-days	x			\$100 per day per person											\$349,414		
Field support																	\$ 951,075		
Supervisor #1	90	days	x	12		hrs/day							1080	hr	\$ 76.10	\$82,192			
Supervisor #2	90	days	x	12		hrs/day							1080	hr	\$ 76.10	\$82,192			
Administrative Assistant #1	90	days	x	12		hrs/day							1080	hr	\$ 57.40	\$61,995			
Administrative Assistant #2	90	days	x	12		hrs/day							1080	hr	\$ 57.40	\$61,995			
Foreman #1	90	days	x	12		hrs/day							1080	hr	\$ 75.58	\$81,621			
Foreman #2	90	days	x	12		hrs/day							1080	hr	\$ 75.58	\$81,621			
Mechanic #1	90	days	x	12		hrs/day							1080	hr	\$ 71.58	\$77,307			
Mechanic #2	90	days	x	12		hrs/day							1080	hr	\$ 71.58	\$77,307			
Survey Field Manager	90	days	x	12		hrs/day							1080	hr	\$ 71.50	\$77,221			
Survey Crew (Surveyor + helper)	90	days	x	12		hrs/day							1080	hr	\$ 130.89	\$141,358			
Field Support Vehicles	90	days	x	3		trucks							270	day	\$ 251.20	\$67,823			
Turnaround costs - Admin	30	trips	x			\$ 770.00 /trip	+	10 %									\$25,410		
Turnaround costs - Crew	39	trips	x			\$ 770.00 /trip	+	10 %									\$33,033		
Contract Administration and QA/QC																	\$ 453,420		
Resident Engineer #1	90	days	x	12		hrs/day							1080	hr	\$ 115.86	\$125,132			
Resident Engineer #2	90	days	x	12		hrs/day							1080	hr	\$ 115.86	\$125,132			
Engineering Technician #1	90	days	x	12		hrs/day							1080	hr	\$ 76.10	\$82,192			
Engineering Technician #2	90	days	x	12		hrs/day							1080	hr	\$ 76.10	\$82,192			
Laboratory and Material Testing Costs	6	months	x			\$1,000 /month											\$6,000		
Field Support Vehicles	90	days	x	1		trucks							90	day	\$ 251.20	\$22,608			
Turnaround costs - QA/QC	12	trips	x			\$ 770.00 /trip	+	10 %									\$10,164		
Other																	\$ 2,270,796		
Insurance (1.6% of equipment cost)	1.6	%	of			\$1,949,982 Direct Labor Cost+Field Support Labor											\$31,200		
Contractor Overhead	10	%	of			\$1,981,182 Direct Labor Cost+Field Support Labor+ Insurance											\$198,118		
Freight costs	12	%	of			\$3,779,896 Direct Material Costs											\$453,588		
Allowance for haul road maintenance	-	yr												\$ 300,000.00			\$0	(Only applied for independent contractor)	
Contractor profit	10	%	of			\$8,798,955 Total Direct Cost+mob/demob+site admin-CAMP OPERATION+field support+Insurance+OH+Freight+Haul Road Maint.											\$879,896		
Engineering Re-Design	3.0	%	of			\$10,028,265 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit											\$300,848		
Bonding	3.0	%	of			\$10,028,265 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haul Road Maint.+Profit											\$300,848		
State Management and Oversight	1.0	%	of			\$10,629,961 Total Project Cost EXCLUDING State Contract Admin, Contingency											\$106,300		
<b>Subtotal Indirect Costs</b>																	<b>\$4,040,497</b>		
<b>CLOSURE COSTS - CONTINGENCY</b>																			
Contingency	20	%	of			\$6,695,764 Direct Costs											\$1,339,153	<b>\$1,339,153</b>	
<b>CLOSURE COSTS - TOTAL</b>																			
Total direct and indirect costs																		<b>\$12,075,413</b>	

**Table 4. Water Treatment Closure Costs****Annual volumes to treatment plant**

Tailings	5.81E+08 US gallons per year
Aqqaluk pit	1.05E+09 US gallons per year

**Operating assumptions**

Treatment season start	1-Jun
Treatment season end	30-Sep
Operating days	121 days per year
	24 hours per day
	60 minutes per hour
	90% operating
	156816 minutes per year

**Average treatment rates**

Tailings	3705 gpm
Aqqaluk pit	6696 gpm

**Design flows**

Assume	120% of average flow
Tailings	4446 gpm
Aqqaluk pit	8035 gpm
Tailings	0.28 m <sup>3</sup> s <sup>-1</sup>
Aqqaluk pit	0.51 m <sup>3</sup> s <sup>-1</sup>

**Quick estimates of capital costs**

Tailings	5000 gpm
Tailings	0.32 m <sup>3</sup> s <sup>-1</sup>
HDS-SIM Estimate	\$ 5,741,000

Aqqaluk pit	8000 gpm
Aqqaluk pit	0.50 m <sup>3</sup> s <sup>-1</sup>
HDS-SIM Estimate	\$ 8,701,000

**Assumption for Closure & Reclamation Plan**

Total for entirely new plants	\$ 14,442,000
Assume 50% new construction	
Total capital	\$ 7,221,000
Direct	\$ 4,465,172
Indirect + Contingency	\$ 2,755,828

## Estimate details (from HDS\_Sim\_Red\_Dog.dh\_v1.xls)

		5000 gpm	8000 gpm
Plant Feed, Sump and Recycle Pumps		\$ 160,000	\$ 217,000
Package Flocculant Preparation and Dosage		\$ 60,000	\$ 69,000
Lime storage, slaker and dosage			\$ 255,000
Process and Instrument Control Compressors		\$ 53,000	\$ 55,000
Clarifier		\$ 779,000	\$ 963,000
Reactor and Rapid Mix Tanks complete with agitators		\$ 491,000	\$ 762,000
Buildings and services		\$ 474,000	\$ 737,000
<b>Major Equipment Sub-total</b>		<b>\$ 2,017,000</b>	<b>\$ 3,058,000</b>
Equipment Installation	10 % of Major Equipment Sub-total	\$ 202,000	\$ 306,000
Process Piping	30 % of Major Equipment Sub-total	\$ 605,000	\$ 917,000
Electrical	20 % of Major Equipment Sub-total	\$ 403,000	\$ 612,000
Instrumentation	16 % of Major Equipment Sub-total	\$ 323,000	\$ 489,000
Polishing Pond		\$ -	\$ -
<b>Total Direct Costs</b>		<b>\$ 3,550,000</b>	<b>\$ 5,382,000</b>
Administration costs	15 % of Total Direct Costs	\$ 533,000	\$ 807,000
Field Supervision	10 % of Total Direct Costs	\$ 355,000	\$ 538,000
Contract Administration and QA/QC	5 % of Total Direct Costs	\$ 178,000	\$ 269,000
Contractor Profit	10 % of Total Direct Costs	\$ 355,000	\$ 538,000
Freight costs	10 % of Major Equipment Sub-total	\$ 202,000	\$ 306,000
Engineering Re-Design	6 % of Total Direct Costs	\$ 213,000	\$ 323,000
<b>Total Indirect Costs</b>		<b>\$ 1,836,000</b>	<b>\$ 2,781,000</b>
Total Direct and Indirect		\$ 5,386,000	\$ 8,163,000
Contingency	10 % of Total Direct Costs	\$ 355,000	\$ 538,000
<b>ESTIMATED CAPITAL COSTS</b>		<b>\$ 5,741,000</b>	<b>\$ 8,701,000</b>
Percentages			
Direct		62%	62%
Indirect + Contingency		38%	38%

Table 5. Ore Processing and Infrastructure Closure Costs (Unit Rates = AlaskanContractor )

Sub Area	Description	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments	
<b>CLOSURE COSTS - DIRECT CAPITAL</b>																				
Water Treatment Plant #1 Area																				
Clarifier (steel bottom/wall)	Excavator: CAT 345 w/ shear	30	hrs	C1.04	1.000	30.0	\$ 68.99	\$ 2,070	\$ -	\$ -	\$ 126.75	\$ 3,802	\$ 25.11	1,104	\$ 753	\$ 220.85	\$ 6,626	\$34,328		
	Excavator: CAT 345 w/ grapple	20	hrs	C1.02	1.000	20.0	\$ 68.99	\$ 1,380	\$ -	\$ -	\$ 105.10	\$ 2,102	\$ 25.11	736	\$ 502	\$ 199.21	\$ 3,984			
	Truck: CAT 735	20	hrs	C1.06	1.000	20.0	\$ 66.97	\$ 1,339	\$ -	\$ -	\$ 80.56	\$ 1,611	\$ 14.28	418	\$ 286	\$ 161.81	\$ 3,236			
Clarifier Cover	Excavator: CAT 345 w/ grapple	15	hrs	C1.02	1.000	15.0	\$ 68.99	\$ 1,035	\$ -	\$ -	\$ 105.10	\$ 1,577	\$ 25.11	552	\$ 377	\$ 199.21	\$ 2,988			
	Truck: CAT 735	10	hrs	C1.06	1.000	10.0	\$ 66.97	\$ 670	\$ -	\$ -	\$ 80.56	\$ 806	\$ 14.28	209	\$ 143	\$ 161.81	\$ 1,618			
Drive Support Walkway	Excavator: CAT 345 w/ shear	10	hrs	C1.04	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 126.75	\$ 1,267	\$ 25.11	368	\$ 251	\$ 220.85	\$ 2,209			
	Excavator: CAT 345 w/ grapple	10	hrs	C1.02	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 105.10	\$ 1,051	\$ 25.11	368	\$ 251	\$ 199.21	\$ 1,992			
	Truck: CAT 735	5	hrs	C1.06	1.000	5.0	\$ 66.97	\$ 335	\$ -	\$ -	\$ 80.56	\$ 403	\$ 14.28	105	\$ 71	\$ 161.81	\$ 809			
WTP#1 MCC's, tunnels, foundations	Excavator: CAT 345	30	hrs	C1.01	1.000	30.0	\$ 68.99	\$ 2,070	\$ -	\$ -	\$ 87.59	\$ 2,628	\$ 25.11	1,104	\$ 753	\$ 181.69	\$ 5,451			
	Emergency Exit Tunnel	15	hrs	C1.02	1.000	15.0	\$ 68.99	\$ 1,035	\$ -	\$ -	\$ 105.10	\$ 1,577	\$ 25.11	552	\$ 377	\$ 199.21	\$ 2,988			
Underflow Tunnel	Truck: CAT 735	15	hrs	C1.06	1.000	15.0	\$ 66.97	\$ 1,005	\$ -	\$ -	\$ 80.56	\$ 1,208	\$ 14.28	314	\$ 214	\$ 161.81	\$ 2,427			
Jaw Crusher Area																				
incl. building, foundation, retaining wall	Excavator: CAT 345 w/ grapple	80	hrs	C1.02	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 105.10	\$ 8,408	\$ 25.11	2,944	\$ 2,009	\$ 199.21	\$ 15,937	\$116,220		
	Excavator: CAT 345 w/ hammer	50	hrs	C1.03	1.000	50.0	\$ 68.99	\$ 3,450	\$ -	\$ -	\$ 142.77	\$ 7,138	\$ 25.11	1,840	\$ 1,256	\$ 236.87	\$ 11,844			
	Excavator: CAT 345 w/ shear	30	hrs	C1.04	1.000	30.0	\$ 68.99	\$ 2,070	\$ -	\$ -	\$ 126.75	\$ 3,802	\$ 25.11	1,104	\$ 753	\$ 220.85	\$ 6,626			
	Excavator: CAT 345	80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535			
	Truck: CAT 735	260	hrs	C1.06	1.000	260.0	\$ 66.97	\$ 17,413	\$ -	\$ -	\$ 80.56	\$ 20,945	\$ 14.28	5,439	\$ 3,712	\$ 161.81	\$ 42,070			
	Dozer: CAT D9	100	hrs	C1.05	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 149.78	\$ 14,978	\$ 33.32	4,881	\$ 3,332	\$ 252.09	\$ 25,209			
Course Ore Storage Area																				
2C to 3C Transfer Tower	Excavator: CAT 345 w/ grapple	45	hrs	C1.02	1.000	45.0	\$ 68.99	\$ 3,105	\$ -	\$ -	\$ 105.10	\$ 4,730	\$ 25.11	1,656	\$ 1,130	\$ 199.21	\$ 8,964	\$309,855		
	Existing Conveyor & Conveyors 2A,	60	hrs	C1.02	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 105.10	\$ 6,306	\$ 25.11	2,208	\$ 1,507	\$ 199.21	\$ 11,953			
Course Ore Storage Building Conveyor 1	Excavator: CAT 345 w/ hammer	50	hrs	C1.03	1.000	50.0	\$ 68.99	\$ 3,450	\$ -	\$ -	\$ 142.77	\$ 7,138	\$ 25.11	1,840	\$ 1,256	\$ 236.87	\$ 11,844			
	Excavator: CAT 345 w/ shear	50	hrs	C1.04	1.000	50.0	\$ 68.99	\$ 3,450	\$ -	\$ -	\$ 126.75	\$ 6,337	\$ 25.11	1,840	\$ 1,256	\$ 220.85	\$ 11,043			
	Excavator: CAT 345	30	hrs	C1.01	1.000	30.0	\$ 68.99	\$ 2,070	\$ -	\$ -	\$ 87.59	\$ 2,628	\$ 25.11	1,104	\$ 753	\$ 181.69	\$ 5,451			
	Truck: CAT 735	180	hrs	C1.06	1.000	180.0	\$ 66.97	\$ 12,055	\$ -	\$ -	\$ 80.56	\$ 14,500	\$ 14.28	3,765	\$ 2,570	\$ 161.81	\$ 29,125			
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125			
	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905			
	Excavator: CAT 345 w/ grapple	170	hrs	C1.02	1.000	170.0	\$ 68.99	\$ 11,728	\$ -	\$ -	\$ 105.10	\$ 17,868	\$ 25.11	6,255	\$ 4,269	\$ 199.21	\$ 33,865			
	Excavator: CAT 345 w/ hammer	80	hrs	C1.03	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 142.77	\$ 11,421	\$ 25.11	2,944	\$ 2,009	\$ 236.87	\$ 18,950			
	Excavator: CAT 345 w/ shear	100	hrs	C1.04	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 126.75	\$ 12,675	\$ 25.11	3,680	\$ 2,511	\$ 220.85	\$ 22,085			
	Excavator: CAT 345	80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535			
Truck: CAT 735	500	hrs	C1.06	1.000	500.0	\$ 66.97	\$ 33,486	\$ -	\$ -	\$ 80.56	\$ 40,279	\$ 14.28	10,459	\$ 7,138	\$ 161.81	\$ 80,904				
Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
General Labour	120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980				
Primary Grinding & Mill Maintenance Facility Module																				
PG & MM Addition	Excavator: CAT 345 w/ grapple	150	hrs	C1.02	1.000	150.0	\$ 68.99	\$ 10,349	\$ -	\$ -	\$ 105.10	\$ 15,765	\$ 25.11	5,519	\$ 3,767	\$ 199.21	\$ 29,881	\$305,046		
	Mill Module & Cyclone Addition	300	hrs	C1.02	1.000	300.0	\$ 68.99	\$ 20,697	\$ -	\$ -	\$ 105.10	\$ 31,531	\$ 25.11	11,039	\$ 7,534	\$ 199.21	\$ 59,763			
Grinding Area	Excavator: CAT 345 w/ hammer	150	hrs	C1.03	1.000	150.0	\$ 68.99	\$ 10,349	\$ -	\$ -	\$ 142.77	\$ 21,415	\$ 25.11	5,519	\$ 3,767	\$ 236.87	\$ 35,531			
	Excavator: CAT 345 w/ shear	300	hrs	C1.04	1.000	300.0	\$ 68.99	\$ 20,697	\$ -	\$ -	\$ 126.75	\$ 38,024	\$ 25.11	11,039	\$ 7,534	\$ 220.85	\$ 66,256			
	Excavator: CAT 345	100	hrs	C1.01	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 87.59	\$ 8,759	\$ 25.11	3,680	\$ 2,511	\$ 181.69	\$ 18,169			
	Truck: CAT 735	500	hrs	C1.06	1.000	500.0	\$ 66.97	\$ 33,486	\$ -	\$ -	\$ 80.56	\$ 40,279	\$ 14.28	10,459	\$ 7,138	\$ 161.81	\$ 80,904			
	Dozer: CAT D9	30	hrs	C1.05	1.000	30.0	\$ 68.99	\$ 2,070	\$ -	\$ -	\$ 149.78	\$ 4,494	\$ 33.32	1,464	\$ 999	\$ 252.09	\$ 7,563			
	General Labour	120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980			
	Grinding Module	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905	\$195,278	
		Excavator: CAT 345 w/ hammer	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905		
	Equipment	Excavator: CAT 345 w/ hammer	120	hrs	C1.03	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 142.77	\$ 17,132	\$ 25.11	4,416	\$ 3,014	\$ 236.87	\$ 28,425		
Excavator: CAT 345 w/ shear		120	hrs	C1.04	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 126.75	\$ 15,210	\$ 25.11	4,416	\$ 3,014	\$ 220.85	\$ 26,502			
Excavator: CAT 345		80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535			
Truck: CAT 735		400	hrs	C1.06	1.000	400.0	\$ 66.97	\$ 26,789	\$ -	\$ -	\$ 80.56	\$ 32,223	\$ 14.28	8,367	\$ 5,711	\$ 161.81	\$ 64,723			
Dozer: CAT D9		25	hrs	C1.05	1.000	25.0	\$ 68.99	\$ 1,725	\$ -	\$ -	\$ 149.78	\$ 3,745	\$ 33.32	1,220	\$ 833	\$ 252.09	\$ 6,302			
General Labour		120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980			
Zinc Re grind Area																				
Zinc Re grind Module	Excavator: CAT 345 w/ grapple	400	hrs	C1.02	1.000	400.0	\$ 68.99	\$ 27,596	\$ -	\$ -	\$ 105.10	\$ 42,041	\$ 25.11	14,718	\$ 10,046	\$ 199.21	\$ 79,683	\$280,271		
	Excavator: CAT 345 w/ hammer	150	hrs	C1.03	1.000	150.0	\$ 68.99	\$ 10,349	\$ -	\$ -	\$ 142.77	\$ 21,415	\$ 25.11	5,519	\$ 3,767	\$ 236.87	\$ 35,531			
	Excavator: CAT 345 w/ shear	150	hrs	C1.04	1.000	150.0	\$ 68.99	\$ 10,349	\$ -	\$ -	\$ 126.75	\$ 19,012	\$ 25.11	5,519	\$ 3,767	\$ 220.85	\$ 33,128			
	Excavator: CAT 345	100	hrs	C1.01	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 87.59	\$ 8,759	\$ 25.11	3,680	\$ 2,511	\$ 181.69	\$ 18,169			
	Truck: CAT 735	600	hrs	C1.06	1.000	600.0	\$ 66.97	\$ 40,184	\$ -	\$ -	\$ 80.56	\$ 48,335	\$ 14.28	12,550	\$ 8,566	\$ 161.81	\$ 97,085			
	Dozer: CAT D9	20	hrs	C1.05	1.000	20.0	\$ 68.99	\$ 1,380	\$ -	\$ -	\$ 149.78	\$ 2,996	\$ 33.32	976	\$ 666	\$ 252.09	\$ 5,042			
	General Labour	200	hrs	C1.07	1.000	200.0	\$ 58.17	\$ 11,633	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 11,633			
Ball Mill Addition Area																				
Ball Mill Addition	Excavator: CAT 345 w/ grapple	320	hrs	C1.02	1.000	320.0	\$ 68.99	\$ 22,077	\$ -	\$ -	\$ 105.10	\$ 33,633	\$ 25.11	11,775	\$ 8,037	\$ 199.21	\$ 63,747	\$237,986		
	Excavator: CAT 345 w/ hammer	120	hrs	C1.03	1.000	120.0	\$ 68.99													





Sub Area	Description	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments		
<b>Lead Flotation</b>																					
Lead Flotation Addition	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905	\$151,627			
Lead Flotation Addition 2	Excavator: CAT 345 w/ grapple	170	hrs	C1.02	1.000	170.0	\$ 68.99	\$ 11,728	\$ -	\$ -	\$ 105.10	\$ 17,868	\$ 25.11	6,255	\$ 4,269	\$ 199.21	\$ 33,865				
	Excavator: CAT 345 w/ hammer	80	hrs	C1.03	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 142.77	\$ 11,421	\$ 25.11	2,944	\$ 2,009	\$ 236.87	\$ 18,950				
	Excavator: CAT 345 w/ shear	100	hrs	C1.04	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 126.75	\$ 12,675	\$ 25.11	3,680	\$ 2,511	\$ 220.85	\$ 22,085				
	Excavator: CAT 345	80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535				
	Truck: CAT 735	100	hrs	C1.06	1.000	100.0	\$ 66.97	\$ 6,697	\$ -	\$ -	\$ 80.56	\$ 8,056	\$ 14.28	2,092	\$ 1,428	\$ 161.81	\$ 16,181				
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
	General Labour	120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980				
<b>Zinc Rougher/ Cleaner Flotation Area</b>																					
Zinc Thickener (steel bottom)	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905			\$151,627	
Cover, drive support, tunnel, building	Excavator: CAT 345 w/ grapple	170	hrs	C1.02	1.000	170.0	\$ 68.99	\$ 11,728	\$ -	\$ -	\$ 105.10	\$ 17,868	\$ 25.11	6,255	\$ 4,269	\$ 199.21	\$ 33,865				
	Excavator: CAT 345 w/ hammer	80	hrs	C1.03	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 142.77	\$ 11,421	\$ 25.11	2,944	\$ 2,009	\$ 236.87	\$ 18,950				
	Excavator: CAT 345 w/ shear	100	hrs	C1.04	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 126.75	\$ 12,675	\$ 25.11	3,680	\$ 2,511	\$ 220.85	\$ 22,085				
	Excavator: CAT 345	80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535				
	Truck: CAT 735	100	hrs	C1.06	1.000	100.0	\$ 66.97	\$ 6,697	\$ -	\$ -	\$ 80.56	\$ 8,056	\$ 14.28	2,092	\$ 1,428	\$ 161.81	\$ 16,181				
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
	General Labour	120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980				
<b>PAC</b>																					
Accommodations	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905			\$151,627	Partially needed. Assume cost of partial mothballing portions of PAC is similar to cost of complete demolition
PAC, WTPs, Wood Shop, Emerg. S	Excavator: CAT 345 w/ grapple	170	hrs	C1.02	1.000	170.0	\$ 68.99	\$ 11,728	\$ -	\$ -	\$ 105.10	\$ 17,868	\$ 25.11	6,255	\$ 4,269	\$ 199.21	\$ 33,865				
	Excavator: CAT 345 w/ hammer	80	hrs	C1.03	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 142.77	\$ 11,421	\$ 25.11	2,944	\$ 2,009	\$ 236.87	\$ 18,950				
	Excavator: CAT 345 w/ shear	100	hrs	C1.04	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 126.75	\$ 12,675	\$ 25.11	3,680	\$ 2,511	\$ 220.85	\$ 22,085				
	Excavator: CAT 345	80	hrs	C1.01	1.000	80.0	\$ 68.99	\$ 5,519	\$ -	\$ -	\$ 87.59	\$ 7,007	\$ 25.11	2,944	\$ 2,009	\$ 181.69	\$ 14,535				
	Truck: CAT 735	100	hrs	C1.06	1.000	100.0	\$ 66.97	\$ 6,697	\$ -	\$ -	\$ 80.56	\$ 8,056	\$ 14.28	2,092	\$ 1,428	\$ 161.81	\$ 16,181				
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
	General Labour	120	hrs	C1.07	1.000	120.0	\$ 58.17	\$ 6,980	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 6,980				
<b>Process Water Plant</b>																					
Process Water Pumphouse	Excavator: CAT 345 w/ grapple	10	hrs	C1.02	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 105.10	\$ 1,051	\$ 25.11	368	\$ 251	\$ 199.21	\$ 1,992	\$21,434			
Incinerator	Excavator: CAT 345 w/ grapple	15	hrs	C1.02	1.000	15.0	\$ 68.99	\$ 1,035	\$ -	\$ -	\$ 105.10	\$ 1,577	\$ 25.11	552	\$ 377	\$ 199.21	\$ 2,988				
Reclaim Barge	Excavator: CAT 345 w/ hammer	10	hrs	C1.03	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 142.77	\$ 1,428	\$ 25.11	368	\$ 251	\$ 236.87	\$ 2,369				
	Excavator: CAT 345 w/ shear	10	hrs	C1.04	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 126.75	\$ 1,267	\$ 25.11	368	\$ 251	\$ 220.85	\$ 2,209				
	Excavator: CAT 345	10	hrs	C1.01	1.000	10.0	\$ 68.99	\$ 690	\$ -	\$ -	\$ 87.59	\$ 876	\$ 25.11	368	\$ 251	\$ 181.69	\$ 1,817				
	Truck: CAT 735	40	hrs	C1.06	1.000	40.0	\$ 66.97	\$ 2,679	\$ -	\$ -	\$ 80.56	\$ 3,222	\$ 14.28	837	\$ 571	\$ 161.81	\$ 6,472				
	Dozer: CAT D9	5	hrs	C1.05	1.000	5.0	\$ 68.99	\$ 345	\$ -	\$ -	\$ 149.78	\$ 749	\$ 33.32	244	\$ 167	\$ 252.09	\$ 1,260				
	General Labour	40	hrs	C1.07	1.000	40.0	\$ 58.17	\$ 2,327	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 2,327				
<b>Original Power House Area</b>																					
Power House	Excavator: CAT 345 w/ grapple	120	hrs	C1.02	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 105.10	\$ 12,612	\$ 25.11	4,416	\$ 3,014	\$ 199.21	\$ 23,905	\$233,520			
Power House Addition	Excavator: CAT 345 w/ grapple	170	hrs	C1.02	1.000	170.0	\$ 68.99	\$ 11,728	\$ -	\$ -	\$ 105.10	\$ 17,868	\$ 25.11	6,255	\$ 4,269	\$ 199.21	\$ 33,865				
	Excavator: CAT 345 w/ hammer	100	hrs	C1.03	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 142.77	\$ 14,277	\$ 25.11	3,680	\$ 2,511	\$ 236.87	\$ 23,687				
	Excavator: CAT 345 w/ shear	100	hrs	C1.04	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 126.75	\$ 12,675	\$ 25.11	3,680	\$ 2,511	\$ 220.85	\$ 22,085				
	Excavator: CAT 345	100	hrs	C1.01	1.000	100.0	\$ 68.99	\$ 6,899	\$ -	\$ -	\$ 87.59	\$ 8,759	\$ 25.11	3,680	\$ 2,511	\$ 181.69	\$ 18,169				
	Truck: CAT 735	540	hrs	C1.06	1.000	540.0	\$ 66.97	\$ 36,165	\$ -	\$ -	\$ 80.56	\$ 43,501	\$ 14.28	11,295	\$ 7,710	\$ 161.81	\$ 87,376				
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
	General Labour	160	hrs	C1.07	1.000	160.0	\$ 58.17	\$ 9,307	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 9,307				
<b>Service Complex</b>																					
Truck Scales	Excavator: CAT 345 w/ hammer	120	hrs	C1.03	1.000	120.0	\$ 68.99	\$ 8,279	\$ -	\$ -	\$ 142.77	\$ 17,132	\$ 25.11	4,416	\$ 3,014	\$ 236.87	\$ 28,425	\$112,778			
Assay Lab	Truck: CAT 735	320	hrs	C1.06	1.000	320.0	\$ 66.97	\$ 21,431	\$ -	\$ -	\$ 80.56	\$ 25,779	\$ 14.28	6,694	\$ 4,569	\$ 161.81	\$ 51,778				
	Dozer: CAT D9	60	hrs	C1.05	1.000	60.0	\$ 68.99	\$ 4,139	\$ -	\$ -	\$ 149.78	\$ 8,987	\$ 33.32	2,929	\$ 1,999	\$ 252.09	\$ 15,125				
	General Labour	300	hrs	C1.07	1.000	300.0	\$ 58.17	\$ 17,450	\$ -	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ 58.17	\$ 17,450				
<b>Cleanup of Contaminated Soils in Mill Area &amp; Fuel Pad</b>																					
	Excavate, haul, dump contaminated soils	118,478	Bm3	R.021	0.028	3370.5	\$ 1.17	\$ 138,160	\$ -	\$ -	\$ 2.53	\$ 300,120	\$ 0.51	87,955	\$ 60,033	\$ 4.21	\$ 498,312	\$996,624			
	Backfill excavated rockfill areas	118,478	Bm3	R.022	0.028	3370.5	\$ 1.17	\$ 138,160	\$ -	\$ -	\$ 2.53	\$ 300,120	\$ 0.51	87,955	\$ 60,033	\$ 4.21	\$ 498,312				
<b>Cleanup of Other Laydown &amp; Borrow Areas</b>																					
	Excavate, haul, dump contaminated soils	72,451	Bm3	R.021	0.028	2061.1	\$ 1.17	\$ 84,486	\$ -	\$ -	\$ 2.53	\$ 183,526	\$ 0.51	53,785	\$ 36,711	\$ 4.21	\$ 304,723	\$609,446			
	Backfill excavated rockfill areas	72,451	Bm3	R.022	0.028	2061.1	\$ 1.17	\$ 84,486	\$ -	\$ -	\$ 2.53	\$ 183,526	\$ 0.51	53,785	\$ 36,711	\$ 4.21	\$ 304,723				
<b>Road Decommissioning</b>																					
	Roads: Reshape and scarify shoulders	30,664	m	C2.30	0.020	613.3	\$ 1.38	\$ 42,311	\$ -	\$ -	\$ 1.53	\$ 46,917	\$ 0.37	16,655	\$ 11,368	\$ 3.28	\$ 100,596	\$100,596			
<b>Reclamation of RDM (Limestone) Quarry Site</b>																					
	Regrade steep slopes (rip & push) Dozer: CAT D9	35	hrs	C1.05	1.000	35.0	\$ 68.99	\$ 2,415	\$ -	\$ -	\$ 149.78	\$ 5,242	\$ 33.32	1,708	\$ 1,166	\$ 252.09	\$ 8,823	\$8,823			
<b>Reclamation of Contaminated Soil, Other Laydown &amp; Borrow Areas and Decommissioned Roads</b>																					
	Revegetate - Native seed, application by helicopter	83	ha	C4.01	1.250	104.2	\$ 80.44	\$ 6,707	\$ 801.76	\$ 66,850	\$ 481.38	\$ 40,137	\$ 2.79	341	\$ 233	\$ 1,366.38	\$ 113,927	\$280,718			
	Revegetate - Live plants - shrub cuttings (10% of area)	8	ha	C4.02	62.500	521.1	\$ 3,635	\$ 30,311	\$ 1,675.49	\$ 13,970	\$ 784.99	\$ 6,545	\$ 244.43	2,986	\$ 2,038	\$ 6,340.28	\$ 52,864				
	Revegetate - Fertilizer pellets, application by helicopter	83	ha	C4.01	1.250	104.2	\$ 80.44	\$ 6,707	\$ 801.76	\$ 66,850	\$ 481.38	\$ 40,137	\$ 2.79	341	\$ 233	\$ 1,366.38	\$ 113,927				
<b>Subtotal Direct Costs - Demolition, Contaminated Soils &amp; Road Decommissioning</b>						<b>33316</b>		<b>\$ 1,945,831</b>		<b>\$ 147,670</b>		<b>\$ 3,024,006</b>		<b>\$ 610,881</b>		<b>\$ 5,728,387</b>					

Sub Area	Description	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments	
<b>CLOSURE COSTS - INDIRECT</b>																				
Mobilization & Demobilization																				
	Mobilization		ls																	
	Demobilization		ls																	
Administration Costs																				
	Worker's compensation	3,137,221			0.00			percent of labor cost -- Included in labor unit cost												
	Office Supplies	9	months	x				\$100 /month												
	Communications	9	months	x				\$1,000 /month												
	Heating Fuel (avg. 400 gal per month)	9	months	x				400 gal/month	x											
	Misc. Supplies	9	months	x				\$500 /month												
	Camp Operation	5,152	Man-days	x				\$100 per day per person												
Field Support																				
	Supervisor #1	130	days	x	12			hrs/day						1560	hr	\$ 76.10	\$118,722			
	Supervisor #2	130	days	x	12			hrs/day						1560	hr	\$ 76.10	\$118,722			
	Administrative Assistant #1	130	days	x	12			hrs/day						1560	hr	\$ 57.40	\$89,548			
	Administrative Assistant #2	130	days	x	12			hrs/day						1560	hr	\$ 57.40	\$89,548			
	Foreman #1	130	days	x	12			hrs/day						1560	hr	\$ 75.58	\$117,897			
	Foreman #2	130	days	x	12			hrs/day						1560	hr	\$ 75.58	\$117,897			
	Mechanic #1	130	days	x	12			hrs/day						1560	hr	\$ 71.58	\$111,665			
	Mechanic #2	130	days	x	12			hrs/day						1560	hr	\$ 71.58	\$111,665			
	Survey Field Manager	130	days	x	12			hrs/day						1560	hr	\$ 71.50	\$111,542			
	Survey Crew (Surveyor + helper)	130	days	x	12			hrs/day						1560	hr	\$ 130.89	\$204,184			
	Field Support Vehicles	130	days	x	3			trucks						390	day	\$ 251.20	\$97,966			
	Turnaround costs - Admin	43	trips	x				\$ 770.00 /trip												
	Turnaround costs - Crew	56	trips	x				\$ 770.00 /trip												
Contract Administration and QA/QC																				
	Resident Engineer #1	130	days	x	12			hrs/day						1560	hr	\$ 115.86	\$180,746			
	Resident Engineer #2	130	days	x	12			hrs/day						1560	hr	\$ 115.86	\$180,746			
	Engineering Technician #1	130	days	x	12			hrs/day						1560	hr	\$ 76.10	\$118,722			
	Engineering Technician #2	130	days	x	12			hrs/day						1560	hr	\$ 76.10	\$118,722			
	Laboratory and Material Testing Costs	9	months	x				\$1,000 /month												
	Field Support Vehicles	130	days	x	2			trucks						260	day	\$ 251.20	\$65,311			
	Turnaround costs - QA/QC	17	trips	x				\$ 770.00 /trip												
Other																				
	Insurance (1.6% of labor)	1.6	%	of				\$3,137,221 Direct Labor Cost+Field Support Labor												
	Contractor Overhead	10	%	of				\$3,187,417 Direct Labor Cost+Field Support Labor+ Insurance												
	Freight costs	12	%	of				\$147,670 Direct Material Costs												
	Hazardous Materials	1	ls																	
	Contractor profit	10	%	of				\$7,612,507 Total Direct Cost+mob/demob+site admin-CAMP OPERATION+field support+Insurance+OH+Freight+Haz Mat												
	Engineering Re-Design	3	%	of				\$8,888,918 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haz Mat												
	Bonding	3.0	%	of				\$8,888,918 Total Direct Cost+mob/demob+site admin+field support+Insurance+OH+Freight+Haz Mat												
	State Management and Oversight	1.0	%	of				\$10,110,181 Total Project Cost EXCLUDING State Contract Admin, Contingency												
<b>Subtotal Indirect Costs</b>																		<b>\$4,482,896</b>		
<b>CLOSURE COSTS - CONTINGENCY</b>																				
	Contingency	20	%	of				\$5,728,387 Direct Cost												
<b>CLOSURE COSTS - TOTAL</b>																		<b>\$11,356,961</b>		
Total direct and indirect costs																				

Note: Mob/Demob cost appears on "2031B Mine" and "2021 Mine" tabs

(Only applied for independent contractor)

Project duration 13 Crew Size  
256.3 days  
8.54 months

**Table 6. Pit Wall Quantities**

Item	Option	Area	Task	Qty	unit	Length (m)	Width (m)	Height (m)	Side Slope	Area (m2)	Volume (m3)	Source / Comments		
Safety Berms	Mine Area	Qanaiyaq	Clear (grub access road)			0								
			Construct Access road			0								
			LHD Material (1/3 of perimeter; from DD-2)			550		0.3	1	1:1	1.3	715		
			Shape Material into berm			550		0.3	1	1:1	1.3	715		
					Drill/Blast dangerous slopes			550	30	12		180	99000	
		Aqqaluk	Clear (grub access road)					0				0		
			Construct Access road					0						
			LHD Material (1/3 of perimeter; from DD-2)					900	0.3	1	1:1	1.3	1170	
			Shape Material into berm					900	0.3	1	1:1	1.3	1170	
					Drill/Blast dangerous slopes			900	30	12		180	162000	
				East Highwall - Main Pit	Drill/Blast dangerous slopes			500	50	12		300	150000	
				Main Pit (2012)	LHD Material			1600	0.3	1	1:01	1.3	2080	



**Table 8. Cover Volumes**

Note: all volumes bulk in place.

Area	Option	Segment	Lift #	Compactive Effort	Area (ft2)	Area (m2)	Side Slope (after re-grade)	Cover Thickness (m)	Total Required Cover Volume (m3)	
Waste Rock Cover	A: Complete	Flat 1	1	Highly Compacted	7,189,450	667,921		0.5	333,961	
		Flat 2	1	Highly Compacted	239,796	22,278		0.5	11,139	
		Flat 3	1	Highly Compacted	227,629	21,147		0.5	10,574	
		A	1	Highly Compacted	3,755,312	348,880	3 H:1V	0.5	174,440	
		B	1	Highly Compacted	1,012,379	94,053	3 H:1V	0.5	47,027	
		C	1	Highly Compacted	706,412	65,628	3 H:1V	0.5	32,814	
		D	1	Highly Compacted	340,095	31,596	3 H:1V	0.5	15,798	
		E	1	Highly Compacted	1,119,800	104,033	3 H:1V	0.5	52,016	
		F	1	Highly Compacted	3,407,600	316,576	3 H:1V	0.5	158,288	
		G	1	Highly Compacted	700,060	65,038	3 H:1V	0.5	32,519	
		H	1	Highly Compacted	879,255	81,685	3 H:1V	0.5	40,843	
	I	1	Highly Compacted	667,370	62,001	3 H:1V	0.5	31,000		
	<b>TOTAL:</b>	<b>1</b>			<b>20,245,158</b>	<b>1,880,836</b>			<b>940,418</b>	
			Flat 1	2	Loosely Compacted	7,189,450	667,921		0.5	333,961
			Flat 2	2	Loosely Compacted	239,796	22,278		0.5	11,139
			Flat 3	2	Loosely Compacted	227,629	21,147		0.5	10,574
			A	2	Loosely Compacted	3,755,312	348,880	3 H:1V	0.5	174,440
			B	2	Loosely Compacted	1,012,379	94,053	3 H:1V	0.5	47,027
			C	2	Loosely Compacted	706,412	65,628	3 H:1V	0.5	32,814
			D	2	Loosely Compacted	340,095	31,596	3 H:1V	0.5	15,798
			E	2	Loosely Compacted	1,119,800	104,033	3 H:1V	0.5	52,016
		F	2	Loosely Compacted	3,407,600	316,576	3 H:1V	0.5	158,288	
		G	2	Loosely Compacted	700,060	65,038	3 H:1V	0.5	32,519	
		H	2	Loosely Compacted	879,255	81,685	3 H:1V	0.5	40,843	
		I	2	Loosely Compacted	667,370	62,001	3 H:1V	0.5	31,000	
<b>TOTAL:</b>	<b>2</b>			<b>20,245,158</b>	<b>1,880,836</b>			<b>940,418</b>		
Waste Rock Cover	B: Progressive	Flat	1	Highly Compacted	447,204	41,547		0.5	20,773	
		Flat (LGO)	1	Highly Compacted	1,297,365	120,529		0.5	60,265	
		B	1	Highly Compacted	1,012,379	94,053	3 H:1V	0.5	47,027	
		C	1	Highly Compacted	706,412	65,628	3 H:1V	0.5	32,814	
		D	1	Highly Compacted	340,095	31,596	3 H:1V	0.5	15,798	
		Sloped	1	Highly Compacted	1,783,427	165,686	3 H:1V	0.5	82,843	
	<b>TOTAL:</b>	<b>1</b>			<b>5,586,882</b>	<b>519,038</b>			<b>259,519</b>	
			Flat	2	Loosely Compacted	447,204	41,547		0.5	20,773
			Flat (LGO)	2	Loosely Compacted	1,297,365	120,529		0.5	60,265
			B	2	Loosely Compacted	1,012,379	94,053	3 H:1V	0.5	47,027
			C	2	Loosely Compacted	706,412	65,628	3 H:1V	0.5	32,814
		D	2	Loosely Compacted	340,095	31,596	3 H:1V	0.5	15,798	
		Sloped	2	Loosely Compacted	1,783,427	165,686	3 H:1V	0.5	82,843	
<b>TOTAL:</b>	<b>2</b>			<b>5,586,882</b>	<b>519,038</b>			<b>259,519</b>		
Waste Rock Cover	C: 2012	Flat	1	Highly Compacted	4,185,040	388,803		0.5	194,401	
		A	1	Highly Compacted	3,755,312	348,880	3 H:1V	0.5	174,440	
		B	1	Highly Compacted	1,012,379	94,053	3 H:1V	0.5	47,027	
	<b>TOTAL:</b>	<b>1</b>			<b>8,952,731</b>	<b>831,736</b>			<b>415,868</b>	
			Flat	2	Loosely Compacted	4,185,040	388,803		0.5	194,401
			A	2	Loosely Compacted	3,755,312	348,880	3 H:1V	0.5	174,440
			B	2	Loosely Compacted	1,012,379	94,053	3 H:1V	0.5	47,027
<b>TOTAL:</b>	<b>2</b>			<b>8,952,731</b>	<b>831,736</b>			<b>415,868</b>		
Waste Rock Cover	C: 2012	Flat	1	Highly Compacted	650,600	60,443		0.5	30,221	
		<b>TOTAL:</b>	<b>1</b>		<b>650,600</b>	<b>60,443</b>			<b>30,221</b>	
		Flat	2	Loosely Compacted	650,600	60,443		0.5	30,221	
		<b>TOTAL:</b>	<b>2</b>		<b>650,600</b>	<b>60,443</b>			<b>30,221</b>	

**Table 9. Cover Compaction Quantities**

Area	Option	Segment	Area (m2)	D9 /w Roller Productivity (flat Surface) (m2/hr/pass)	# of Passes	Grade Factor	Actual D9 /w Roller Productivity (flat Surface) (m2/hr)	Time Required (hrs)	Quantity Source
Waste Rock Dumps	A. Complete	Top	711,347	20,000	2	1	10000	71.1	AutoCAD <site layout 2031.dwg>
		Sloped	1,169,489	20,000	2	0.7	7000	167.1	AutoCAD <site layout 2031.dwg>
<b>Total Hours Required:</b>								<b>238.2</b>	
Waste Rock Dumps	B: Progressive	Top	162,076	20,000	2	1	10000	16.2	AutoCAD <site layout 2031.dwg>
		Sloped	349,994	20,000	2	0.7	7000	50.0	AutoCAD <site layout 2031.dwg>
<b>Total Hours Required:</b>								<b>66.2</b>	
Waste Rock Dumps	C: 2012	Top	338,803	20,000	2	1	10000	33.9	AutoCAD <site layout 2012.dwg>
		Sloped	442,933	20,000	2	0.7	7000	63.3	AutoCAD <site layout 2012.dwg>
<b>Total Hours Required:</b>								<b>97.2</b>	
Aqqaluk Pit	C: 2012	Flat Areas	60,443	20,000	2	0.7	7000	8.6	AutoCAD <site layout 2012.dwg>
<b>Total Hours Required:</b>								<b>8.6</b>	

**Table 10. Ditch Construction Quantities**

**A: Channels**

Area	Segment	Ditch Parameters							X-Section Quantities				Total Quantities				Source
		Final Ditch Bottom Width (m)	Ditch Side Slope (:1)	Final Average Channel Depth (m)	Rip-Rap Thickness (m)	Bedding Thickness (m)	Average Excavation Depth (m)	Ditch Length (m)	Average Excavated Area (m2)	Rip-Rap Area (m2)	Bedding Area (m2)	Filter Fabric/Liner Length (m)	Excavation Volume (m3)	Bedding Volume (m3)	Rip-Rap Volume (m3)	Filter Fabric/Liner Area (m2)	
Waste Rock Dump 2031	Trelis pattern	1	2	1	0	0	1	5486.4	3.0	0.0	0.0	5.5	16459.2	0.0	0.0	30022.3	
	Drop Structures (2)	1	2	1.1	0.3	0.3	1.7	1158.24	7.5	1.8	2.2	8.6	8663.6	2501.8	2084.8	9963.9	
Waste Rock Dump 2012	Trelis pattern	1	2	1	0	0	1	2133	3.0	0.0	0.0	5.5	6399.0	0.0	0.0	11672.1	
	Drop Structures (2)	1	2	1.1	0.3	0.3	1.7	1158.24	7.5	1.8	2.2	8.6	8663.6	2501.8	2084.8	9963.9	
Red Dog Creek 2031		2	3	0.83	0.38	0.15	<b>1.36</b>	2017	8.3	3.1	1.5	10.6	16678.2	2937.8	6223.7	21383.0	
Red Dog Creek 2012		2	3	0.83	0.38	0.15	<b>1.36</b>	3125	8.3	3.1	1.5	10.6	25840.0	4551.6	9642.5	33129.4	
Spillway (Red Dog Creek)		5	2	2	1	0.3	3.3	10	38.3	15.0	5.3	19.8	382.8	52.8	150.0	197.6	
Spillway (Main Dam)	Excludes Energy Dissipation Struct.	3.66	1	1	1	0	2	450	11.3	6.7	0.0	9.3	5094.0	0.0	2997.0	4192.6	URS - Conceptual Design of Spillway for Tailings Main Dam at Closure

2017

**B: Sediment Basins/Storage Ponds**

Area	Item	Qty	Pond Parameters							Total Quantities			
			Pond Base Length (m)	Pond Base Width (m)	Pond Side Slope (:1)	Pond Depth (m)	Inlet/Outlet Rip-Rap X-Section Area (m2)	Inlet/Outlet Rip-Rap length (m)	Inlet/Outlet Rip-Rap Thickness (m)	Excavation Volume (m3)	Liner Area	Rip-Rap Volume (m3)	
Main Dam	Seepage Emergency Storage Pond	1	10								0.0		0.0
Borrow Area	Lined Pond	1	10	20	2	2					672.0	504.0	0.0
											0.0		0.0

**C: Energy Dissipation Structures**

Area	Segment	Ditch Parameters							X-Section Quantities				Total Quantities				Source
		Final Ditch Bottom Width (m)	Ditch Side Slope (:1)	Final Average Channel Depth (m)	Rip-Rap Thickness (m)	Bedding Thickness (m)	Average Excavation Depth (m)	Ditch Length (m)	Average Excavated Area (m2)	Rip-Rap Area (m2)	Bedding Area (m2)	Filter Fabric/Liner Length (m)	Excavation Volume (m3)	Bedding Volume (m3)	Rip-Rap Volume (m3)	Filter Fabric/Liner Area (m2)	
Spillway (Main Dam)	Normal Channel	3.66	1	2.3	1	0.3	3.6	25	26.1	9.3	3.2	13.8	653.4	79.2	231.5	346.1	URS - Conceptual Design of Spillway for Tailings Main Dam at Closure
	Extra Rip-rap	3.66	1		0.6			7		4.4					30.7		URS - Conceptual Design of Spillway for Tailings Main Dam at Closure
	<b>TOTAL</b>												<b>653.4</b>	<b>79.2</b>	<b>262.2</b>	<b>346.1</b>	

**D: Red Dog Creek Diversion - Typical section**

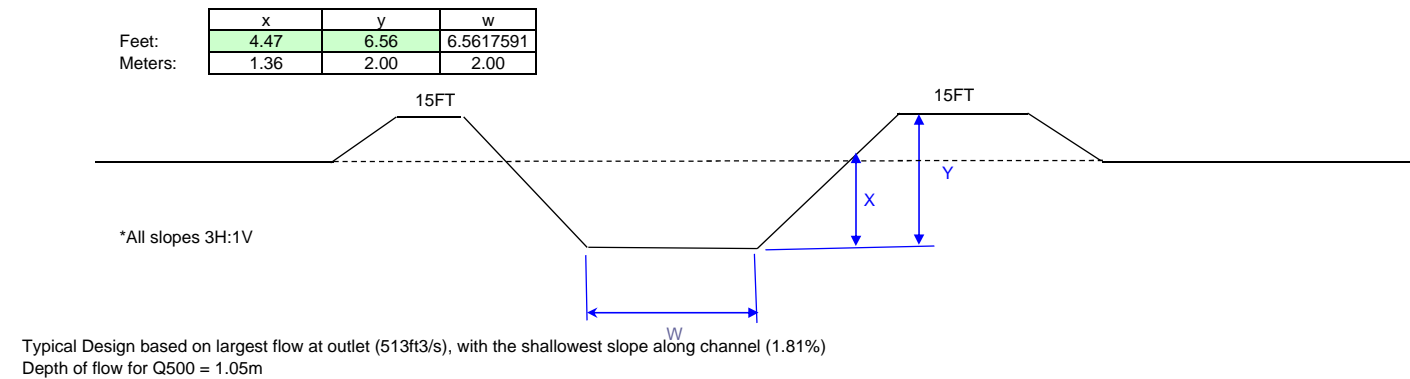


Table 11. Seepage Collection System Quantities

A. Groundwater/Seepage Pipeline Collection Systems

Option	Access Road Length (m)	Sumps, Wells, Pumps						Associated Monitoring Wells		Ditch Parameters					Heat Trace Requirements		Electricity Requirements				X-Section Quantities			Total Quantities		
		Well #	Name	Estimated Pumping Well Depth (m)	Submersible Pump (56-95 GPM)	Submersible Pump (681-1400 GPM)	# of Sumps	Sump Depth (m)	# of Monitoring Wells	Well Depth (m)	Ditch/Pipe Length (m)	Ditch Bottom Width (m)	Ditch Side Slope (:1)	Average Channel Depth (m)	Bedding Sand Depth (m)	# of power feed kits	# of thermostats	Distance to Power Source (m)	Power Pole Distance (m)	Power Poles Required	Transformers	Average Excavated Area (m2)	Bedding Sand Area (m2)	Sump Excavation Volume (m3)	Pipeline Excavation Volume (m3)	Bedding Sand Volume (m3)
Mine Waste Stockpile Seepage Collection	0	1	MWD 21	15	1																					
		2	MWD 17	15	1																					
		3	MWD 18	15		1																				
		4	MWD 7	15	1																					
		5	MWD 22	15	1																					
		6	MWD 23	15	1																					
		7	MWD 20	15	1																					
		8	MWD 24	15		1																				
<b>TOTAL:</b>	<b>0</b>	<b>8</b>		<b>120</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>3605</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>1800</b>	<b>77</b>	<b>24</b>	<b>4</b>	<b>6.0</b>	<b>0.0</b>	<b>200.0</b>	<b>21630.0</b>	<b>0.0</b>	
Main Dam Seepage Collection						1	4			1857	1	1	2	0	2	1	500	77	7	1	6.0	0.0	200.0	11142.0	0.0	
Back Dam Seepage Collection						1	4			2200	1	1	2	0	2	1	500	77	7	1	6.0	0.0	200.0	13200.0	0.0	
Main Pit Water Collection	0	3	-	92	3		0	0		1500	1	1	2	0	2	1	1500	77	20	1	6.0	0.0	8.0	9000.0	0.0	

B. Cut-off Walls

Option	Area	Length (m)	Parameters				Working Surface Width (m)	Level working surface (m3)	Comments
			Avg. Depth to bedrock (m)	Wall Area (m2)	Wall Thickness (m)	Wall Volume (m3)			
Main Waste Dump Seepage collection	MWD 24	200	15.0	3000	1.5	4500			
	MWD 18	200	15.0	3000	1.5	4500			
<b>TOTAL:</b>		<b>400</b>		<b>6000</b>		<b>9000</b>			



**Table 12. Tailings Beach Quantities**

Area	Option	Item	Task	Qty	unit	Length (m)	Width (m)	Height (m)	Side Slope	Area (m2)	Volume (m3)	Source / Comments
Main Dam	Tailings Area	Cofferdam				1189	3	2	2	18	21397	
		Run-of-mine berm				1189	5	2	2	30	35662	
		Liner Protection Material				1189	183	0.3			65218	
		Liner				1189	198			235224		
		Erosion Protection				1189	1	2	2	2	2378	
		Emergency Storage Pond	Clear/grub Pond dam area								3450	
			Load, haul, dump, place, compact				110		7	2.5		13475
Back Dam	Tailings Area	Cofferdam				1143	3	2	2	18	20574	
		Run-of-mine berm				1143	5	2	2	30	34290	
		Beach				1143	183	1.4			286708	
		Liner				1143	198			226177		
		Erosion Protection				1143	1	2	2	2	2286	
		Emergency Storage Pond	Clear/grub Pond dam area								3650	
			Load, haul, dump, place, compact				165		4	2.5		6600

**Table 13. Borrow Source Quantities**

Zone	Flat Surfaces			Sloped Areas					Theoretical Production (from Dozer Spreadsheet)				Sources/Comments
	Area (m2)	(m2)	Dozing Distance	Height (m)	(m)	Slope (%)	Slope	Slope (%)	Productio	push	ha	Total Time Required (hrs)	
DD-2		20000		15	300	75.0	36.87	33	964	0.1595	103	48	Borrow Size Estimated
MS-14		20000		15	300	75.0	36.87	33	964	0.1595	103	48	Borrow Size Estimated
<b>TOTALS HOURS REQUIRED:</b>	<b>0</b>	<b>27</b>										<b>96</b>	

**Table 14. Contaminated Soil Area and Road Quantities**

**A. Areas from Figure 3.5.1**

	Area (acres) (hectares)		Road	Cont. Soil	Other	Revised estimates of areas (per 2007 topography)				
						feet 2	m2	ha	acre	
1 CC Laydown	13.7	5.5			5.5	1	597019	55465	5.55	13.7
2 Road CC to end of AIDEA road	8.9	3.6	3.6			2	387285	35980	3.60	8.9
3 Kivalina south road	1.0	0.4	0.4			3	41596	3864	0.39	1.0
4 Kivalina east laydown	12.0	4.8			4.8	4	521367	48437	4.84	12.0
5 Road around Kivalina & DD2	11.1	4.5	4.5			5	482032	44782	4.48	11.1
6 DD2 South	24.1	9.8			9.8	6	1051633	97700	9.77	24.1
7 DD2 North	20.2	8.2			8.2	7	877934	81563	8.16	20.2
8 DD2 East (flooded bbefore 2031)						8	160355	14897	1.49	3.7
9 Conex laydown	22.3	9.0			9.0	9	970633	90175	9.02	22.3
10 Water treatment laydown area						10	531660	49393	4.94	12.2
11 AIC laydown	27.1	11.0			11.0	11	1180416	109664	10.97	27.1
12 Roadend of AIDEA to Mill	15.5	6.3	6.3			12	673895	62607	6.26	15.5
13 Fuel Pad Mill	1.8	0.7		0.7		13	77870	7234	0.72	1.8
14 Mill Site	47.0	19.0		19.0		14	2047605	190229	19.02	47.0
15 Road Mill to Red Dog Creek	0.5					15	22375	2079	0.21	0.5
16 Road Mill to Seepage dam	1.5	0.6	0.6			16	65511	6086	0.61	1.5
17 In Pit										
<b>Total</b>	<b>206.5</b>	<b>84</b>	<b>15</b>	<b>20</b>	<b>48</b>	<b>83</b>				

**B. Summary Quantities for Cost Estimate**

<b>Road reshaping</b>		
	15	ha
	153320	m2
	10	m width
	15332	m road length
	<b>30664</b>	m shoulder length
<b>Contaminated soils</b>		
Mill area	19.0	ha
Fuel pad	0.7	ha
Total	19.7	ha
	197463	m2
Assumed depth of soil removal and backfill	0.6	m
Volume	<b>118478</b>	m3
<b>Other areas</b>		
Total area	48	ha
	25%	assumed to be contaminated
	12	ha
	120751	m2
Assumed depth of soil removal and backfill	0.6	m
Volume	<b>72451</b>	m3

Table 15. Demolition Quantities

Section	Area/Item	Sub Component/Building/Section	Status	Qty	Building Size			Material Quantities						
					Length (ft.)	Width (ft.)	Avg. Height (ft.)	Steel Thickness	No. 1 Steel (tons)	Scrap Steel (yds)	Wood (yds)	Concrete (yds)	Other (yds)	Hydrocarbons (litres)
1001	Mine Sump Collection System	Retaining Wall	Retain		150	1	30				200	4	10	
6005		Pumphouse & Gen. Trailer	Retain		20	20	15		5	2	33		2	500
2000-1	Water Treatment Plant #1 Area	Clarifier (steel bottom/wall)	Retain			120	21	0.0416667	180	50			100	
2000-1		Clarifier Cover	Retain			120	20			50			20	
2000-1		Drive Support	Retain						5	2				100
2000-1		Walkway (Steel)			97		10		7	2				
2000-1		WTP#1 MCC's	Retain						1	2				
2000-1		Emergency Exit Tunnel (CSP)	Retain		92	7				5				
2000-1		Underflow Tunnel (CSP)	Retain		102	8				15				
2000-1		Ring Wall Foundation	Retain									50		
2000-2		Water Treatment Plant #2 Area	Tank Wall	Retain			200	17	0.0416667	99	50			75
2000-2	Clarifier Cover		Retain			200	20			20			50	
2000-2	Drive Support		Retain						8	5		10		
2000-2	Walkway (Steel)				102		10		10	2				
2000-2	Underflow Pumphouse		Retain							2		10		
2000-2	Pipe Trench		Retain							20				
6005	Sand Filter Plant (does not include pipe)	Lime Sludge Tank	Retain	1						2				
6005		Rapid Mix Tank	Retain	1						2				
6005		Lime Reactor	Retain	1						2				
6005		Floc Day Tank	Retain	1						2				
6005		Floc Mix Tank	Retain	1						2				
6005		Clarifier	Retain	1						2				
6005		Sand Filters	Retain	3						2				
6005		Tent Enclosure	Retain	1	120	60							30	
6005		Potable Water Plant		1						2				
6005		Sewage Treatment Plant		1						2				
6005		Emergency Generator		1						2				500
2001	Jaw Crusher Area	Shell/Building			60	35	43		103	50			20	200
2001		Pit Cover			15	35	30		18	20				
2001		Rock Breaker							2					
2001		Foundation										25		
2001		Retaining Wall (Concrete)				200	2	30				300		
2002	Course Ore Storage Area	2C to 3C Transfer Tower			42	25	30		36	5			40	
2002		Existing Conveyor			30					7				
2002		Conveyor 2A (36")		9'	310	7	7		17	70			10	
2002		Conveyor 2B (36")		9'	310	7	7		17	70			10	
2002		Conveyor 2C (36")		9'	210	7	7		12	50			15	
2002		Course Ore Storage Building (Part buried)			215	160	85		1108	150			100	
2012		Conveyor 1 (36")		9'	450	7	7		25	50		50		
2003	Primary Grinding & Mill Maintenance	PG & MM Addition			100	60	75		818	739				
2003		Mill Module			130	80	75		1418					
2003		Cyclone Addition			30	20	75		82					
2004	Grinding Area	Grinding Module			100	80	75		1091					
2004		Equipment												
2005	Zinc Re grind Area	Zinc Re grind Module			100	70	75		955					
2006	Ball Mill Addition Area	Ball Mill Addition			80	75	75		818					
2007	Lead Flotation Area	Flotation Module			145	70	75		1384					
2008	Zinc Flotation Module Area	Mill Module			145	70	75		1384					
2008		Lead Thickener			200	3	35		38					
2009	Compressor Building Area	Compressor Building			40	75	70		239					
2009		Pipe Bridge			70	10	10		8					
2009		Equipment												
2010	Grinding Building Addition Area	Grinding Building Addition			105	75	60		537					
2010		Conveyor 3A			40	36"								
2010		Conveyor 3B			40	36"								
2010		Conveyor 3C			275	36"	9'							
2011	Dewatering	Pressure Filters			95	75	75		972					
2011		Air Receivers												
2012	Gyratory Crushing Plant Area	Gyratory Crusher Pit Shelter			80	30	40		109					
2012		Foundation			30	25	70							
2012		Lower Building			80	30	40							
2012		Retaining Wall			500		45							
2012		Conveyor 1A (36")		9'	723	10	10		82					
2016	Reagent Handling	RH Building	Retain		200	65	50		739					

Section	Area/Item	Sub Component/Building/Section	Status	Qty	Length (ft.)	Width (ft.)	Avg. Height (ft.)	Steel Thickness	No. 1 Steel (tons)	Scrap Steel (yds)	Wood (yds)	Concrete (yds)	Other (yds)	Hydrocarbons (litres)
2018	Mill Concentrate Storage	Mill Concentrate Storage Building			325	134	70		1155			300		
2018		Truck Loading			325	18	20		133			200		
2018		Conveyor 10				395	30"							
2020	Lime Slaking	Lime Slaking Module			66	63	55		416					
2025	Lead Flotation	Lead Flotation Addition			62	40	60		169					
2025		Lead Flotation Addition 2			62	40	60		169					
2030	Zinc Rougher/ Cleaner Flotation Area	Zinc Thickener (steel bottom)				140	15	0.0416667	60					
2030		Zinc Thickener Cover				140	15							
2030		Zinc Drive Support				140	10	10						
2030		Zinc Underflow Tunnel				100	8	8						
2030		Building Addition				100	70	85		676				
6002	Airport and Connex	Airport							4000		400	200	1000	
6002		Connex Storage												
6002		Rebar Bending												
6002		Equipment Repair (tent)												
6002		Construction Camp												
6002		Bone Yards												
6003	PAC	Accomodations (Wing)	Retain	5	150	35	35		1045				400	
6003		PAC	Retain		276	111	25		870				400	
6003		PAC Extension	Retain											
6003		Sewage Treatment Plant	Retain											
6003		Potable Water Treatment	Retain	1	32	18	22							
6003		Wood Shop												
6003	Emergency Services Building (Addition)													
6005	Freshwater and Overburden Seepage	Freshwater Tank	Retain											
6005		Freshwater Pumphouse (mill)	Retain		40	15	18		12					
6005		Bons Creek Freshwater Pumphouse	Retain	1	40	15	18		12					
6005		Kivalina Overburden Pumps and Pipe	Retain											
6007	Fuels Distribution	Fuels Tanks	Retain	2		80'	32'		195					
6007		Piping to Fuel Island	Retain											
6007		Fuel Island	Retain	2		44	30		70					
6007		2 x 1,000,000 US gals.												
6007		Decontamination of Steel and Pipe removal												
6017	Process Water Plant	Process Water Pumphouse	Retain											
6017		Incinerator	Retain											
6017		Reclaim Barge	Retain											
6022	Original Power House Area	Power House			74	113	45		428					
6022		Power House Addition			74	20	45		76					
6025	Service Complex	Vehicle Shop			215	100	45		1099					
6025		Support Facility			290	105	45		1557					
6025		Truck Scales												
6025		Emergency Generators												
6025		Power House Support												
6025	Assay Lab													
6030	New Power House	New Power House	Retain		75	70	50		477	150		10		500
6030		Utilidor E	Retain							150				
HDPE	HDPE Pipelines	Reclaim Barge Line 1	Retain	1	2400	24"								
HDPE		Reclaim Barge Line 2	Retain	1	2400	16"								
HDPE		Freshwater	Retain	1		6"								
HDPE		WTP#2 Over Flow	Retain	1										
HDPE		WTP#1 Over Flow	Retain	1										
HDPE		Red Dog Creek Interception	Retain	3		10"								
HDPE		Main Dam Seepage Return Line	Retain	1										
HDPE		Seepage Seepage Return Line	Retain	1										
HDPE		Tailings Discharge	Retain	1	5000	16"								
HDPE		Red Dog Creek Mine Line	Retain	1	5000	12"								
	Cleanup of Contaminated Rockfill	Dozer time covered												
		Estimated Quantity		92000	yd3									
		Rock Backfill - Haulage		37500	yd3									
	Hydrocarbon remediation	estimated quantity		240	yd3									
	<b>TOTALS</b>								<b>24946</b>	<b>1758</b>	<b>633</b>	<b>1334</b>	<b>2107</b>	<b>1800</b>

**Table 16. Revegetation Quantities**

Site	Area	Option	Areas (hec)			Source/Comments
			Native Seed	Fertilizer Pellets	Live Plants (shrub Cuttings)	
Mine	Waste Rock Covers	A: Complete 2031	195	195	20	ACAD
		B: Progressive 2031	35	35	4	Low Grade Ore Stockpile +NW end of the Main Pit Stockpile
		C: 2012	113	113	11	ACAD <site layout 2012.dwg>
	Red Dog Crk Div.			0.69	Length-ACAD, width (45ft) from Figure 3.1.5 (Closure and Reclamation Plan) - x .25 (25% of total area planted)	
<b>Overburden Dump</b>			22.70	22.70	2.27	(from ACAD)
<b>Back Dam</b>			26.90	26.90	2.69	Includes beach and dam (from ACAD)
<b>Main Dam</b>			31.00	31.00	3.10	Includes beach and dam (from ACAD)
<b>Roads</b>			24.10	24.10	2.41	Includes beach and dam (from ACAD)
<b>Borrow Areas</b>	DD-2		24.00	24.00	2.40	Figure 3.5.1 (Closure & Reclamation Plan)
	MS-14		24.00	24.00	2.40	Estimated

Table 17. Unit Rate Inputs

A. Equipment Rates

Adjustment Factors		
Adjustment Factor for ownership/maintenance cost vs Blue Book	1.00	
Equipment Rates Used:	AlaskanContractor	
Exchange Rate: 1USD =	1.134	CAD
Include Operator?	No	Avg. Wage (\$/hr)
Include Equipment Owner Overhead?	No	Owner OH Rate: 10%
Include Equipment Owner Profit?	No	Profit rate: 10%
Include Fuel Cost?	No	Fuel Cost pe litre: \$0.683

Fuel (USD/g)  
\$ 2.58

Model	HP	# of Operators	Operator Type	Operator Rate (US \$/hr)	Rates Used in Estimate			Cominco Equipment Rate Breakdown				Contractor Cost Breakdown										
					Equipment Rate (US \$/hr)	Fuel Rate (US \$/hr)	Equipment Rate Source	2009 Rates based on NC Machinery (US)	NC Machinery - 5% fleet discount	TC Equipment Rate (USD/hr)	Fuel Operating Cost (USD/hr) <sup>(4)</sup>	Bare Equipment Rate (incl. repairs) (USD/hr)	Rental Rates 2004 <sup>(1)</sup> (USD/hr)	NC Machinery Rental Rates 2006 <sup>(2)</sup> (USD/hr)	Ownership Cost (USD/hr)	ce Parts + Labor + Lube +	Ownership/ Maintenance Cost (\$/hr)	Fuel Operating Cost (\$/hr)	Overhead Cost (USD/hr)	Profit (USD/hr)		
<b>Compactor</b>																						
CAT CP563	153	1	Power Equipment Operator - Group 3	\$66.79	\$38.03	\$11.98	Alaskan Contractor	\$39.93	\$38.03					\$22.48	\$23.83	\$19.69	\$16.79	\$36.48	\$11.98	\$1.97	\$2.17	
Sheepsfoot (72 in, 2 drums)	0	0			\$4.05	\$0.00	Alaskan Contractor	\$4.26	\$4.05													
Walk-behind vibrating (30 in)	12	1	Labourers - Group 1	\$58.17	\$3.54	\$0.93	Alaskan Contractor	\$3.72	\$3.54													
<b>Dozer</b>																						
CAT D7	240	1	Power Equipment Operator - Group 1	\$68.99	\$83.50	\$19.50	Alaskan Contractor	\$87.67	\$83.50					\$61.11	\$64.78	\$53.53	\$21.56	\$75.09	\$19.50	\$5.35	\$5.89	
CAT D8	310	1	Power Equipment Operator - Group 1	\$68.99	\$104.13	\$25.19	Alaskan Contractor	\$109.34	\$104.13					\$70.95	\$75.21	\$68.99	\$27.39	\$96.38	\$25.19	\$6.22	\$6.84	
CAT D9	410	1	Power Equipment Operator - Group 1	\$68.99	\$149.78	\$33.32	Alaskan Contractor	\$157.27	\$149.78	\$60.58	\$27.05	\$33.53		\$93.30	\$98.90	\$81.73	\$33.48	\$115.21	\$33.32	\$8.17	\$8.99	
CAT D10	570	1	Power Equipment Operator - Group 1	\$68.99	\$203.37	\$46.31	Alaskan Contractor	\$213.53	\$203.37					\$130.95	\$138.81	\$114.72	\$47.67	\$162.39	\$46.31	\$11.47	\$12.62	
CAT D11	850	1	Power Equipment Operator - Group 1	\$68.99	\$357.35	\$73.68	Alaskan Contractor	\$375.22	\$357.35							\$134.25	\$60.80	\$195.05	\$73.68	\$0.00	\$0.00	
<b>Drill</b>																						
Air track rig (900cfm)	215	2	Power Equipment Operator - Group 1	\$68.99	\$81.12	\$16.83	Alaskan Contractor	\$85.18	\$81.12	\$141.96	\$13.66	\$128.30										
Air Rotary, 200 cfm compressor	196	2	Power Equipment Operator - Group 1	\$68.99	\$102.52	\$15.34	Alaskan Contractor	\$107.64	\$102.52													
<b>Excavator</b>																						
CAT 325	165	1	Power Equipment Operator - Group 1	\$68.99	\$53.76	\$12.91	Alaskan Contractor	\$56.45	\$53.76	\$92.56	\$10.48	\$82.08		\$34.92	\$37.02	\$30.59	\$9.31	\$39.90	\$12.91	\$3.06	\$3.37	
CAT 350	428	1	Power Equipment Operator - Group 1	\$68.99	\$87.59	\$33.49	Alaskan Contractor	\$91.97	\$87.59					\$64.30	\$68.15	\$56.32	\$33.81	\$90.13	\$33.49	\$5.63	\$6.20	
CAT 345	321	1	Power Equipment Operator - Group 1	\$68.99	\$87.59	\$25.11	Alaskan Contractor	\$91.97	\$87.59					\$65.80	\$69.75	\$57.64	\$17.92	\$75.56	\$25.11	\$5.76	\$6.34	
CAT 345 Grapple	321	1	Power Equipment Operator - Group 1	\$68.99	\$105.10	\$25.11	Alaskan Contractor	\$110.36	\$105.10					\$83.30	\$88.30	\$72.97	\$17.92	\$90.89	\$25.11	\$7.30	\$8.03	
CAT 345 Hammer	321	1	Power Equipment Operator - Group 1	\$68.99	\$142.77	\$25.11	Alaskan Contractor	\$149.90	\$142.77					\$93.30	\$98.90	\$81.73	\$17.92	\$99.65	\$25.11	\$8.17	\$8.99	
CAT 345 Shear	321	1	Power Equipment Operator - Group 1	\$68.99	\$126.75	\$25.11	Alaskan Contractor	\$133.09	\$126.75					\$93.30	\$98.90	\$81.73	\$17.92	\$99.65	\$25.11	\$8.17	\$8.99	
<b>Grader</b>																						
CAT 16H	220	1	Power Equipment Operator - Group 1	\$68.99	\$76.50	\$18.54	Alaskan Contractor	\$80.33	\$76.50	\$42.18	\$15.05	\$27.13		\$54.20	\$57.45	\$47.48	\$19.47	\$66.95	\$18.54	\$4.75	\$5.22	
<b>Lifting</b>																						
Crane (Cable Boom), 100T	220	1	Power Equipment Operator - Group 1A	\$71.58	\$160.71	\$13.25	Alaskan Contractor	\$168.74	\$160.71	\$168.29	\$10.75	\$157.54										
Crane (Cable Boom), 150T	220	1	Power Equipment Operator - Group 1A	\$71.58	\$225.64	\$13.25	Alaskan Contractor	\$236.93	\$225.64	\$168.29	\$10.75	\$157.54										
Forklift CAT 924G	114	1	Power Equipment Operator - Group 3	\$66.79	\$20.80	\$6.86	Alaskan Contractor	\$21.84	\$20.80	\$52.27	\$5.57	\$46.70		\$31.40	\$33.28	\$27.50	\$2.27	\$29.77	\$6.86	\$2.75	\$3.03	
<b>Loader</b>																						
CAT 966F	235	1	Power Equipment Operator - Group 1	\$68.99	\$66.78	\$17.12	Alaskan Contractor	\$70.12	\$66.78	\$44.46	\$13.90	\$30.56		\$40.58	\$43.01	\$35.55	\$14.18	\$49.73	\$17.12	\$3.55	\$3.91	
CAT 988F	430	1	Power Equipment Operator - Group 1A	\$71.58	\$122.68	\$31.31	Alaskan Contractor	\$128.82	\$122.68	\$88.80	\$25.43	\$63.37		\$89.49	\$94.86	\$78.40	\$33.83	\$112.23	\$31.31	\$7.84	\$8.62	
CAT 992D	800	1	Power Equipment Operator - Group 1A	\$71.58	\$268.98	\$58.26	Alaskan Contractor	\$282.43	\$268.98	\$155.46	\$47.31	\$108.15				\$113.71	\$79.28	\$192.99	\$62.54	\$0.00	\$0.00	
<b>Truck</b>																						
Light Truck (3/4T) 4x2	200	0	Truck Drivers - Group 5		\$25.12	\$7.82	Alaskan Contractor	\$26.38	\$25.12	\$10.75	\$6.35	\$4.40										
CAT 735	365	1	Truck Drivers - Group 1	\$66.97	\$80.56	\$14.28	Alaskan Contractor	\$84.59	\$80.56	\$53.93	\$11.60	\$42.33		\$60.69	\$64.33	\$53.16	\$13.64	\$66.80	\$14.28	\$5.32	\$5.85	
CAT 777D	938	1	Truck Drivers - Group 1A	\$68.76	\$180.75	\$36.69	Alaskan Contractor	\$189.79	\$180.75	\$87.71	\$29.80	\$57.91										

1. Hourly rate for a long term rental based on 10 hour shifts.  
 2. Price increase of 6% based on average increase in equipment costs noted from BC BlueBook between 2004 and 2006.  
 3. Maintenance costs from Western Mine Engineering Inc. Mine and Mill Equipment Costs 2005 (equal to the total hourly operating cost minus the Fuel cost)  
 4. Fuel Operating cost used to determine the Bare Equipment Rate based on fuel cost at site of \$1.85 USD/gal.

Misc. Equipment	Rate (USD/hr)	Rate (CAD/hr)	Est. Fuel Rate	Source
Crusher (200 Tons/hr)	\$107.57	\$121.99		RSMears 2005 (17 03 9902)
Helicopter	\$1,322.75	\$1,500.00		Estimated
Spreader: Dozer attachment (3m width)	\$4.28	\$4.85		BCBlue book 2005-06

## B. Labour Rates

Cost Code	Category	Rate Used in Estimate	Unit	Contractor Labour Rates			Teck Cominco Labour Rates			Contractor Source
				Basic Hourly Rate	Fringes + Burden + OT Adjustment	Contractor Total Unit Cost	Basic Hourly Rate	Loading Rate (102.11%)	Teck Cominco Unit Cost	
P.01	Asbestos Workers (Labourer Group 2)	\$58.17	USD/hr	\$28.24	\$29.93	\$58.17	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.02	Carpenter	\$68.43	USD/hr	\$33.30	\$35.13	\$68.43	\$27.65	\$28.23	\$55.88	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.03	Electrician	\$85.61	USD/hr	\$42.73	\$42.88	\$85.61	\$27.65	\$28.23	\$55.88	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.04	Engineer	\$115.86	USD/hr	\$60.00	\$55.86	\$115.86	\$25.37	\$25.90	\$51.27	Estimated
P.05	Engineering Technician	\$76.10	USD/hr	\$42.00	\$34.10	\$76.10	\$18.51	\$18.90	\$37.42	Estimated
P.06	Foreman	\$75.58	USD/hr	\$40.00	\$35.58	\$75.58	\$27.17	\$27.74	\$54.91	Prior contract pricing
P.07	Hazardous Material Handler (Painter Group 2)	\$58.17	USD/hr	\$28.24	\$29.93	\$58.17	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.08	Health and Safety Supervisor	\$75.58	USD/hr	\$40.00	\$35.58	\$75.58	\$27.17	\$27.74	\$54.91	Estimated
P.09	Labourers - Group 1	\$58.17	USD/hr	\$28.24	\$29.93	\$58.17	\$17.85	\$18.23	\$36.09	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.10	Labourers - Group 2	\$59.53	USD/hr	\$29.14	\$30.39	\$59.53	\$17.85	\$18.23	\$36.09	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.11	Labourers - Group 3	\$60.74	USD/hr	\$29.94	\$30.80	\$60.74	\$17.85	\$18.23	\$36.09	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.12	Labourers - Group 3A	\$65.13	USD/hr	\$32.84	\$32.29	\$65.13	\$17.85	\$18.23	\$36.09	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.13	Labourers - Group 4	\$44.17	USD/hr	\$19.00	\$25.17	\$44.17	\$17.85	\$18.23	\$36.09	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.14	Mechanic (Truck Drivers/Surveyors Group 2)	\$71.58	USD/hr	\$37.23	\$34.35	\$71.58	\$27.65	\$28.23	\$55.88	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.15	Millwright	\$66.90	USD/hr	\$33.39	\$33.51	\$66.90	\$27.65	\$28.23	\$55.88	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.16	Power Equipment Operator - Group 1	\$68.99	USD/hr	\$35.52	\$33.47	\$68.99	\$23.50	\$23.99	\$47.49	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.17	Power Equipment Operator - Group 1A	\$71.58	USD/hr	\$37.23	\$34.35	\$71.58	\$25.96	\$26.51	\$52.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.18	Power Equipment Operator - Group 2	\$67.85	USD/hr	\$34.77	\$33.08	\$67.85	\$23.50	\$23.99	\$47.49	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.19	Power Equipment Operator - Group 3	\$66.79	USD/hr	\$34.07	\$32.72	\$66.79	\$23.50	\$23.99	\$47.49	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.20	Power Equipment Operator - Group 4	\$57.66	USD/hr	\$28.04	\$29.62	\$57.66	\$21.50	\$21.96	\$43.46	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.21	Site Clerk / Medic	\$57.40	USD/hr	\$28.00	\$29.40	\$57.40	\$23.56	\$24.06	\$47.62	Estimated
P.22	Superintendent	\$76.10	USD/hr	\$42.00	\$34.10	\$76.10	\$28.54	\$29.14	\$57.68	Estimated
P.23	Survey Field Manager	\$71.50	USD/hr	\$37.97	\$33.53	\$71.50	\$25.37	\$25.90	\$51.27	Estimated
P.24	Survey Crew (Surveyor and Helper)	\$130.89	USD/hr	\$67.94	\$62.95	\$130.89	\$37.28	\$38.07	\$75.35	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.25	Truck Drivers - Group 1A	\$68.76	USD/hr	\$36.16	\$32.60	\$68.76	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.26	Truck Drivers - Group 1	\$66.97	USD/hr	\$34.98	\$31.99	\$66.97	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.27	Truck Drivers - Group 2	\$65.20	USD/hr	\$33.81	\$31.39	\$65.20	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.28	Truck Drivers - Group 3	\$64.05	USD/hr	\$33.05	\$31.00	\$64.05	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.29	Truck Drivers - Group 4	\$63.23	USD/hr	\$32.51	\$30.72	\$63.23	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"
P.30	Truck Drivers - Group 5	\$62.16	USD/hr	\$31.80	\$30.36	\$62.16	\$19.53	\$19.94	\$39.47	Alaska Dep. Of Labor - Laborers' & Mechanics Min. Rate of Pay (Sept. 1, 2008) - see "Red Dog Wage Analysis 3-3-09.xls"

## C. Material Costs

Cost Code	Item	Unit Cost (USD)	Unit Cost (CAD)	Unit	Source
M.01	Bentonite	\$264.55	\$300.00	tonnes	Quote: Apr. 2006
M.02	Dust Suppressant	\$0.03	\$0.03	m2	estimated
M.03	Electricity	\$0.28	\$0.32	kWh	average power cost based on post-closure power costs
M.04	Electricity - Overhead electrical conductors	\$1.24	\$1.41	m	RSMMeans 2005 (20 02 0302)
M.05	Electricity - Pole mounted transformer	\$7,878.31	\$8,934	each	RSMMeans 2005 (20 02 0101)
M.06	Electricity - Treated Power Poles (40' class 3)	\$287.44	\$325.96	each	RSMMeans 2005 (20 02 0403)
M.07	Explosives (for rip-rap production)	\$13.86	\$15.72	m3	unit is in per Bm3 of rock; Source:RSMMeans (17 03 0309)
M.08	Fertilizer	\$0.88	\$1.00	kg	JBrodie
M.09	Flocculant	\$4,685	\$5,313	tonne	Univar USA, Rick Holland
M.10	Fuel: Diesel	\$0.68	\$0.77	Litre	Cost set in cell L12 above
M.11	Fuel: Diesel	\$2.58	\$2.93	Gallon	Cost set in cell L12 above
M.12	Geosynthetic Clay Liner	\$11.03	\$12.51	m2	Quote: Layfield Sept. 2007, added 50% for freight costs
M.13	Geotextile	\$3.09	\$3.50	m2	Quote: Yukon Pump Aug. 2004
M.14	Groundwater Pump: 6" Submersible Pump (56-95 GPM)	\$6,033.51	\$6,842.00	each	RSMMeans 2005 (33 23 0558)
M.15	Groundwater Pump: 6" Submersible Pump (681-1400 GPM)	\$24,633.40	\$27,934.28	each	RSMMeans 2005 (33 23 0591)
M.16	HDPE liner	\$8.45	\$9.58	m2	Quote: Yukon Pump Aug. 2004
M.17	HDPE pipe: 100mm	\$5.33	\$6.04	m	RSMMeans 2005 (33 26 0512)
M.18	HDPE pipe: 150mm	\$7.66	\$8.69	m	RSMMeans 2005 (33 26 0513)
M.19	HDPE pipe: 150mm, insulated	\$156.38	\$177.33	m	Quote : Wolsley Engineered Pipe Group (Feb, 2009 - Cory Wilkinson)
M.20	HDPE pipe: 300mm	\$124.12	\$140.75	m	Quote: KWH Pipe - Wolsley Eng. (GD)
M.21	HDPE pipe: 350mm, insulated	\$315.76	\$358.07	m	Quote : Wolsley Engineered Pipe Group (Feb, 2009 - Cory Wilkinson)
M.22	HDPE pipe: 650mm SDR9	\$614.81	\$697.20	each	Quote: KWH Pipe - Wolsley Eng. (GD)
M.23	Heat trace electrical thermostat	\$905.91	\$1,027.30	each	Quote : Wolsley Engineered Pipe Group (Feb, 2009 - Cory Wilkinson)
M.24	Heat trace Power Feed Kit	\$456.90	\$518.13	each	Quote : Wolsley Engineered Pipe Group (Feb, 2009 - Cory Wilkinson)
M.25	Heat trace: constant watt cables	\$25.01	\$28.36	m	Quote : Wolsley Engineered Pipe Group (Feb, 2009 - Cory Wilkinson)
M.26	Lime	\$496.00	\$562.46	tonne	Univar USA, Rick Holland
M.27	Lumber: 2x4 Stud framing	\$1.31	\$1.48	m	RSMMeans 2005 (16 01 9916)
M.28	Native seed	\$6.01	\$6.82	kg	JBrodie
M.29	Plants: live shrub cuttings	\$1,675.49	\$1,900.00	hec	DH
M.30	Plywood: 1/2"	\$5.82	\$6.60	m2	RSMMeans 2005 (16 01 9916)
M.31	Precast manhole: 4' dia. Per linear vertical meter	\$296.45	\$336.17	m	RSMMeans 2005 (19 02 0210)
M.32	Pump: 250PSI pump with motor	\$1,612.87	\$1,829.00	each	RSMMeans 2005 (33 29 0601)
M.33	Pump: Maintenance cost (per event)	\$1,322.75	\$1,500.00	each	Estimated
M.34	Pumphouse	\$4,409.17	\$5,000.00	each	Estimated
M.35	Pumping well protective housing	\$1,763.67	\$2,000.00	each	Estimated
M.36	Quick lime	\$70.37	\$79.80	tonne	Quote: 2006
M.37	Riparian Area vegetation (willow)	\$8.82	\$10.00	kg	Estimated
M.38	Sodium Sulfide	\$1,929	\$2,187	tonne	Univar USA, Rick Holland
M.39	Steel Pipe: 200mm dia. Sched. 20	\$59.04	\$66.95	m	Melanie Cadioux, Napsteel, Van. (GD)
M.40	Steel Pipe: 400mm dia. Sched. 20	\$135.17	\$153.28	m	Melanie Cadioux, Napsteel, Van. (GD)
M.41	Steel Pipe: 550mm dia. Standard wall	\$408.29	\$463.00	m	Marija Jarcevic SRK Reno (GD)
M.42	Steel Pipe: 600mm dia. Sched. 20	\$209.05	\$237.06	m	Melanie Cadioux, Napsteel, Van. (GD)
M.43	Sump: 2m dia. HDPE perforated sump	\$1,697.53	\$1,925.00	each	RSMMeans 2005 (19 04 0622)
M.44	Well Casing, 150mm Stainless Steel	\$205.11	\$232.60	m	RSMMeans 2005 (33 23 0123)
M.45	Well Cover: steel protective well cover	\$145.10	\$164.54	each	RSMMeans 2005 (33 23 2217)
M.46	Well Screen, 150mm Stainless Steel	\$205.11	\$232.60	m	RSMMeans 2005



Table 18. Relocation Unit Costs

**Relocation Tables**  
*Relocation Productivity (Lm3/hr) obtained from 'Master\_Waste\_Rock\_Relocation' spreadsheet, using the equipment, route and other parameters listed below*

Cost Code	Area	Activity	Material	Source	Destination	Distance (1 way)	Productivities			Unit Rates			Loader			Excavator			Truck			Equipment Used			Dozer 1			Dozer 2			Compactor							
							Loose (Lm <sup>3</sup> /hr)	Bank (Bm <sup>3</sup> /hr)	Total Loose Unit Rate (\$/hr)	Total Bank Unit Rate (\$/hr)	Manhours (hrs/Bm <sup>3</sup> )	Labor Cost (\$/Bm <sup>3</sup> )	Equipment Cost (\$/Bm <sup>3</sup> )	Fuel Cost (\$/Bm <sup>3</sup> )	Qty	Model	Equipment Rate (\$/hr)	Fuel Cost (\$/hr)	Operator Wage (\$/hr)	Qty	Model	Equipment Rate (\$/hr)	Fuel Cost (\$/hr)	Operator Wage (\$/hr)	Qty	Model	Equipment Rate (\$/hr)	Fuel Cost (\$/hr)	Operator Wage (\$/hr)	Qty	Model	Equipment Rate (\$/hr)	Fuel Cost (\$/hr)	Operator Wage (\$/hr)	Qty	Model	Equipment Rate (\$/hr)	Fuel Cost (\$/hr)
R.001	Aqguluk Pit	Load, haul, dump, place	Rip-Rap	DD-2	Aqguluk Pit Perimeter	6.9	90	75	\$11.22	\$13.46	0.093	\$ 2.73	\$ 8.63	\$ 2.10																								
R.002	Qanallyaq Pit	Load, haul, dump, place	Rip-Rap	DD-2	Qanallyaq Pit Perimeter	4.92	98	82	\$6.60	\$12.36	0.086	\$ 2.51	\$ 7.92	\$ 1.93																								
R.003	Main Pit	Load, haul, dump, place	Rip-Rap	DD-2	Main Pit Perimeter	6.62	95	79	\$6.81	\$12.75	0.088	\$ 2.59	\$ 8.18	\$ 1.99																								
R.004	Waste Dump Covers	Load, haul, dump, place	Shale	South End of Main Waste Dump		1	1498	1249	\$0.86	\$1.42	0.006	\$ 0.17	\$ 1.03	\$ 0.22	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.005	Waste Dump Covers	Load, haul, dump, place	Shale	Opikruak Pit	Waste Dump channels	1.84	125	104	\$4.12	\$9.17	0.067	\$ 3.19	\$ 4.95	\$ 1.03	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.006	Waste Dump Covers	Load, haul, dump, place	Rip-Rap	Kivalina Pit	Waste Dump channels	2.28	125	104	\$2.36	\$4.68	0.038	\$ 1.31	\$ 2.84	\$ 0.54																								
R.007	Spillway	Load, haul, dump, place	Shale	Opikruak Pit	Spillway	2.85	136	113	\$4.36	\$8.71	0.062	\$ 2.42	\$ 5.23	\$ 1.06	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.008	Spillway	Load, haul, dump, place	Rip-Rap	Kivalina Pit	Spillway	1.8	125	104	\$2.36	\$4.68	0.038	\$ 1.31	\$ 2.84	\$ 0.54																								
R.009	Spillway	Load, haul, dump, place	Gravels	Kivalina Pit	Spillway	1.8	125	114	\$2.90	\$5.63	0.044	\$ 1.80	\$ 3.19	\$ 0.64	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.010	Tailing Water ditches	Load, haul, dump, place	Shale	Opikruak Pit	Tailings Water control ditches	2.85	150	125	\$4.49	\$8.65	0.064	\$ 2.19	\$ 5.98	\$ 1.08	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.011	Main Dam	Load, haul, dump, place, compact	Shale	Opikruak Pit	Main Dam	2.85	500	417	\$2.59	\$4.40	0.019	\$ 0.64	\$ 3.11	\$ 0.65	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.012	Main Dam	Load, haul, dump, place, compact	Shale	Overburden Dump	Main Dam	4.07	770	642	\$1.73	\$2.94	0.012	\$ 0.43	\$ 2.07	\$ 0.44	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.013	Main Dam	Load, haul, dump, place, compact	Waste Rock	Main Waste Stockpile	Main Dam	1.3	700	636	\$1.90	\$2.97	0.013	\$ 0.43	\$ 2.09	\$ 0.45	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.014	Main Dam	Load, haul, dump, place	Rip-Rap	Kivalina Pit	Main Dam Beach	2.79	113	94	\$4.77	\$9.04	0.064	\$ 2.18	\$ 5.72	\$ 1.14	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.015	Back Dam	Load, haul, dump, place, compact	Shale	Overburden Dump	Back Dam	1.01	700	583	\$1.64	\$2.87	0.012	\$ 0.47	\$ 1.97	\$ 0.42	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.016	Back Dam	Load, haul, dump, place, compact	Shale	Overburden Dump	Back Dam	1.01	700	583	\$1.64	\$2.87	0.012	\$ 0.47	\$ 1.97	\$ 0.42	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.017	Back Dam	Load, haul, dump, place, compact	Waste Rock	Main Waste Stockpile	Back Dam	4.04	430	391	\$3.09	\$4.83	0.020	\$ 0.71	\$ 3.40	\$ 0.73	1	CAT 992D	\$268.98	\$58.26	\$71.58																			
R.018	Back Dam	Load, haul, dump, place	Rip-Rap	DD-2	Back Dam Beach	1.37	200	167	\$2.69	\$5.11	0.036	\$ 1.23	\$ 3.23	\$ 0.65	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.019	Red Dog Creek	Load, haul, dump, place	Shale	Opikruak Pit	Red Dog Creek	3.08	150	125	\$3.41	\$7.14	0.048	\$ 2.19	\$ 4.10	\$ 0.85	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.020	Red Dog Creek	Load, haul, dump, place	Rip-Rap	Kivalina Pit	Red Dog Creek	2.09	125	104	\$3.67	\$7.26	0.048	\$ 1.97	\$ 4.40	\$ 0.90	1	CAT 966F	\$66.78	\$17.12	\$68.99																			
R.021	Mill Area	Load, haul, dump, place	Waste Rock	Mill Area	Waste Dump	1.97	193.3	176	\$2.30	\$4.21	0.028	\$ 1.17	\$ 2.53	\$ 0.51																								
R.022	Mill Area	Load, haul, dump, place	Waste Rock	Waste Dump	Mill Area	1.97	193.3	176	\$2.30	\$4.21	0.028	\$ 1.17	\$ 2.53	\$ 0.51																								
R.023	Mill Area	Load, haul, dump, place	Earth	Mill Area	Waste Dump	1.97	175	140	\$2.54	\$5.28	0.036	\$ 1.46	\$ 3.18	\$ 0.64																								

Material Properties

Assumed Material Properties	Bulk density Mg/m <sup>3</sup>	Bulking Factor	Excavated Density Mg/m <sup>3</sup>	Shrinkage Factor	Compacted Density Mg/m <sup>3</sup>
Clay - Natura	2.02	1.20	1.68	0.90	2.24
Earth	1.90	1.25	1.52	0.95	2.00
Gravels	2.17	1.10	1.97	0.97	2.24
Misc.	2.00	1.00	2.00	1.00	2.00
Rip-Rap	3.00	1.20	2.50	1.00	3.00
Sands	1.90	1.10	1.73	0.90	2.11
Sand & Gravel	2.23	1.10	2.02	1.00	2.23
Shale	2.00	1.20	1.67	0.90	2.22
Top Soil	1.37	1.40	0.98	1.10	1.25
Till	1.84	1.20	1.53	0.90	2.04
Waste Rock	2.10	1.10	1.91	1.00	2.10

Haul Route Information

Cost Code	Segment 1		Segment 2		Segment 3		Segment 4		Segment 5		Segment 6		Segment 7	
	Grade (%)	Distance (km)	Grade (%)	Distance (km)	Grade (%)	Distance (km)	Grade (%)	Distance (km)	Grade (%)	Distance (km)	Grade (%)	Distance (km)	Grade (%)	Distance (km)
R.001	0	0.38	0	0.46	0	0.12	10	0.76	0	3.2	0	1.22	10	0.76
R.002	0	0.38	0	0.46	0	0.12	0	2.44	10	1.52				
R.003	0	0.38	0	0.46	0	0.12	10	0.76	0	3.2	0	1	10	0.7
R.004	-1	0.2	0	0.8										
R.005	-9	0.58	0	1.26										
R.006	-6	0.76	9	1.22										
R.007	-9	0.58	0	0.72	-10	0.76	-1	0.79						
R.008	-6	1.1	-5	0.4	4	0.3								
R.009	-6	1.1	-5	0.4	4	0.3								
R.010	-9	0.58	0	0.72	-10	0.76	-1	0.79						
R.011	-9	0.58	0	0.72	-10	0.76	-1	0.79						
R.012	-2	0.61	0	3.46										
R.013	-9	0.58	0	0.72										
R.014	-7	1	5	0.64	0	0.55	0	0.6						
R.015	-2	0.61	0	0.4										
R.016	-2	0.61	0	0.4										
R.017	-9	0.58	0	3.46										
R.018	-7	0.42	0	0.95										
R.019	-9	0.58	0	2.5										
R.020	0	0.35	0	1.74										
R.021	4	0.9	0	1.07										
R.022	0	1.07	-4	0.9										
R.023	4	0.9	0	1.07										

Table 19. Tasks Unit Costs

Cost Code	Item	Unit	Productivity (unit/hr)	Rates						
				Total Unit Cost	Manhours per Unit (hrs/Unit)	Labor Cost Per Unit (\$/Unit)	Material Cost Per Unit (\$/Unit)	Equipment Cost Per Unit (\$/Unit)	Fuel Cost Per Unit (\$/Unit)	Power Cost Per Unit
<b>Demolition</b>										
C1.01	Excavator: CAT 345 w/ bucket	hrs	1	\$ 181.69	1.000	\$ 68.99	\$ -	\$ 87.59	\$ 25.11	
C1.02	Excavator: CAT 345 w/ grapple attachment	hrs	1	\$ 199.21	1.000	\$ 68.99	\$ -	\$ 105.10	\$ 25.11	
C1.03	Excavator: CAT 345 w/ hammer attachment	hrs	1	\$ 236.87	1.000	\$ 68.99	\$ -	\$ 142.77	\$ 25.11	
C1.04	Excavator: CAT 345 w/ shear attachment	hrs	1	\$ 220.85	1.000	\$ 68.99	\$ -	\$ 126.75	\$ 25.11	
C1.05	Dozer: CAT D9	hrs	1	\$ 252.09	1.000	\$ 68.99	\$ -	\$ 149.78	\$ 33.32	
C1.06	Truck: CAT 735	hrs	1	\$ 161.81	1.000	\$ 66.97	\$ -	\$ 80.56	\$ 14.28	
C1.07	General Labour	hrs	1	\$ 58.17	1.000	\$ 58.17	\$ -	\$ -	\$ -	
<b>Earthworks</b>										
C2.01	Backfill excavated ditches	m3	100	\$ 2.56	0.030	\$ 1.85	\$ -	\$ 0.57	\$ 0.14	
C2.02	Bedding: Produce and stockpile	m3	200	\$ 3.25	0.010	\$ 0.70	\$ -	\$ 2.09	\$ 0.46	
C2.03	Berm: shaping material	m	50	\$ 5.04	0.020	\$ 1.38	\$ -	\$ 3.00	\$ 0.67	
C2.04	Clearing land	m2	275	\$ 0.92	0.004	\$ 0.25	\$ -	\$ 0.54	\$ 0.12	
C2.05	Clearing and Grubbing	m2	275	\$ 3.67	0.015	\$ 1.00	\$ -	\$ 2.18	\$ 0.48	
C2.06	Compaction: D9 with Impact Roller	hrs	1	\$ 256.14	1.000	\$ 68.99	\$ -	\$ 153.84	\$ 33.32	
C2.07	Crusher: crush materials	m3	125	\$ 4.28	0.024	\$ 1.66	\$ -	\$ 2.13	\$ 0.50	
C2.08	Cut-off Wall: Install (all-inclusive)	m2	10	\$ 108.11	0.500	\$ 34.84	\$ 42.86	\$ 23.74	\$ 6.68	
C2.09	Drilling and blasting	m3	500	\$ 2.77	0.007	\$ 0.45	\$ 2.08	\$ 0.21	\$ 0.03	
C2.10	Drilling: Air Rotary 8" dia.	m	1.5	\$ 221.29	2.000	\$ 142.72	\$ -	\$ 68.34	\$ 10.22	
C2.11	Excavation: Large channel (short haul)	m3	90	\$ 7.51	0.044	\$ 3.00	\$ -	\$ 3.66	\$ 0.85	
C2.12	Excavation: Common (no haul)	m3	90	\$ 1.51	0.011	\$ 0.77	\$ -	\$ 0.60	\$ 0.14	
C2.13	Excavation: Common (short haul)	Bm3	170	\$ 3.97	0.024	\$ 1.59	\$ -	\$ 1.94	\$ 0.45	
C2.14	Excavation: Shallow trench (no haul)	m3	50	\$ 2.71	0.020	\$ 1.38	\$ -	\$ 1.08	\$ 0.26	
C2.15	Excavation: Deep trench (short haul)	m3	35	\$ 14.68	0.086	\$ 5.80	\$ -	\$ 7.11	\$ 1.77	
C2.16	Excavation: Rock	m3	15	\$ 21.85	0.173	\$ 11.90	\$ -	\$ 8.27	\$ 1.67	
C2.17	Excavate and create berms (Red Dog Creek)	m3	50	\$ 16.75	0.100	\$ 6.68	\$ -	\$ 8.22	\$ 1.85	
C2.18	Foundation Preparation	m2	22	\$ 41.08	0.318	\$ 21.11	\$ -	\$ 16.58	\$ 3.40	
C2.19	Grading: roads, ramps, etc.	m2	460	\$ 0.36	0.002	\$ 0.15	\$ -	\$ 0.17	\$ 0.04	
C2.20	Grouting: Setting Packers	each	14	\$ 22.29	0.214	\$ 15.29	\$ -	\$ 5.79	\$ 1.20	
C2.21	Landfarm: operate	hrs	1	\$ 310.26	2.000	\$ 127.16	\$ -	\$ 149.78	\$ 33.32	
C2.22	Level and compact working surface (nominal compaction)	m3	80	\$ 3.15	0.013	\$ 0.86	\$ -	\$ 1.87	\$ 0.42	
C2.23	Regrading	hrs	1	\$ 500.03	1.000	\$ 68.99	\$ -	\$ 357.35	\$ 73.68	
C2.24	Rip-Rap: Drill, Blast and Stockpile	m3	100	\$ 19.64	0.045	\$ 2.96	\$ 13.86	\$ 2.31	\$ 0.50	
C2.25	Rip-Rap (rounded, low quality): Screen and Stockpile	m3	50	\$ 13.02	0.040	\$ 2.81	\$ -	\$ 8.38	\$ 1.83	
C2.26	Rip-Rap (angular, high quality): Screen and Stockpile	m3	35	\$ 18.60	0.057	\$ 4.02	\$ -	\$ 11.96	\$ 2.62	
C2.27	Rip-Rap rock placement	m3	80	\$ 1.70	0.013	\$ 0.86	\$ -	\$ 0.67	\$ 0.16	
C2.28	Road: Construct access road	m	40	\$ 25.54	0.131	\$ 8.95	\$ -	\$ 13.66	\$ 2.92	
C2.29	Road: Construct haul road	m	18	\$ 129.98	0.375	\$ 24.96	\$ -	\$ 86.89	\$ 18.13	
C2.30	Road: Reshape and Scarify Shoulders	m	50	\$ 3.28	0.020	\$ 1.38	\$ -	\$ 1.53	\$ 0.37	
C2.31	Tailings: spilled tailings cleanup	m3	75	\$ 11.64	0.067	\$ 4.52	\$ -	\$ 5.94	\$ 1.19	
<b>Materials</b>										
C3.01	Dust Suppressant - Supply and Apply	m2	1000	\$ 0.15	0.002	\$ 0.09	\$ 0.03	\$ 0.03	\$ 0.01	
C3.02	Electricity - Overhead electrical conductors	m	125	\$ 5.26	0.032	\$ 2.63	\$ 1.24	\$ 1.29	\$ 0.11	
C3.03	Electricity - Treated Power Poles (40' class 3)	each	0.66	\$ 8,509.75	4.545	\$ 367.88	\$ 7,878.31	\$ 243.50	\$ 20.07	
C3.04	Electricity - Pole mounted transformer	each	0.2	\$ 2,799.26	20.000	\$ 1,642.04	\$ 287.44	\$ 803.55	\$ 66.23	
C3.05	Geotextile: Supply and Install (large areas)	m2	250	\$ 4.40	0.016	\$ 0.97	\$ 3.09	\$ 0.27	\$ 0.07	
C3.06	Geotextile: Supply and Install (channels)	m2	70	\$ 8.59	0.071	\$ 4.31	\$ 3.09	\$ 0.95	\$ 0.24	
C3.07	Geosynthetic Clay Liner: Supplied & Installed	m2	125	\$ 14.26	0.040	\$ 2.56	\$ 11.03	\$ 0.53	\$ 0.14	
C3.08	Groundwater Pump: 6" Submersible Pump (56-95 GPM)	m2	0.25	\$ 6,796.06	12.000	\$ 762.55	\$ 6,033.51	\$ -	\$ -	
C3.09	Groundwater Pump: 6" Submersible Pump (681 - 1400GPM)	m2	0.25	\$ 25,395.95	12.000	\$ 762.55	\$ 24,633.40	\$ -	\$ -	
C3.10	HDPE liner: Supplied & Installed (large areas)	m2	150	\$ 11.03	0.033	\$ 2.13	\$ 8.34	\$ 0.45	\$ 0.11	
C3.11	HDPE liner: Supplied & Installed (channels)	m2	35	\$ 19.87	0.143	\$ 9.13	\$ 8.34	\$ 1.91	\$ 0.49	
C3.12	HDPE pipe: 150mm, insulated; supplied and installed	m	14.5	\$ 168.41	0.207	\$ 12.03	\$ 156.38	\$ -	\$ -	
C3.13	HDPE pipe: 350mm, insulated; supplied and installed	m	13	\$ 329.18	0.231	\$ 13.42	\$ 315.76	\$ -	\$ -	
C3.14	Heat trace: constant watt cables, installed	m	50	\$ 29.71	0.060	\$ 4.04	\$ 25.01	\$ 0.50	\$ 0.16	
C3.15	Heat trace Power Feed Kit	each	0.5	\$ 799.34	4.000	\$ 342.44	\$ 456.90	\$ -	\$ -	
C3.16	Heat trace electrical thermostat	each	2	\$ 991.52	1.000	\$ 85.61	\$ 905.91	\$ -	\$ -	
C3.17	Manholes: Precast 12' deep: supplied and installed	each	0.25	\$ 2,498.17	16.000	\$ 1,045.71	\$ 1,185.78	\$ 215.03	\$ 51.64	
C3.18	Pump: Install large seepage pump	each	0.25	\$ 2,364.52	12.000	\$ 751.65	\$ 1,612.87	\$ -	\$ -	
C3.19	Pumping well protective housing	each	0.15	\$ 1,861.94	20.000	\$ 1,249.91	\$ 392.42	\$ 167.46	\$ 52.15	
C3.20	Well Casing, 150mm Stainless Steel, supplied and installed	m	20	\$ 221.71	0.150	\$ 10.70	\$ 205.11	\$ 5.13	\$ 0.77	
C3.21	Well Cover: steel protective well cover	each	1.5	\$ 315.65	1.333	\$ 91.99	\$ 145.10	\$ 68.34	\$ 10.22	
<b>Revegetation</b>										
C4.01	Seeding/Fertilizing: Application by Helicopter	hec	2.8	\$ 1,366.38	1.250	\$ 80.44	\$ 801.76	\$ 481.38	\$ 2.79	
C4.02	Planting (shrubs, seedlings, etc.): By hand	hec	0.032	\$ 6,340.28	62.500	\$ 3,635.38	\$ 1,675.49	\$ 784.99	\$ 244.43	
<b>Relocations</b>										
C5.01	See Unit Cost Relocations Worksheet									

Table 19. Tasks Unit Costs

Cost Code	Item	Manhour Details					
		Labourers/Trades			Equipment Operators		
		Qty	Description	Rate (USD/hr)	Qty	Description	Rate (USD/hr)
<b>Demolition</b>							
C1.01	Excavator: CAT 345 w/ bucket				1.0	Power Equipment Operator - Group 1	\$68.99
C1.02	Excavator: CAT 345 w/ grapple attachment				1.0	Power Equipment Operator - Group 1	\$68.99
C1.03	Excavator: CAT 345 w/ hammer attachment				1.0	Power Equipment Operator - Group 1	\$68.99
C1.04	Excavator: CAT 345 w/ shear attachment				1.0	Power Equipment Operator - Group 1	\$68.99
C1.05	Dozer: CAT D9				1.0	Power Equipment Operator - Group 1	\$68.99
C1.06	Truck: CAT 735				1.0	Truck Drivers - Group 1	\$66.97
C1.07	General Labour	1.0	Labourers - Group 1	\$58.17			
<b>Earthworks</b>							
C2.01	Backfill excavated ditches	1.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
					1.0	Labourers - Group 1	\$58.17
C2.02	Bedding: Produce and stockpile				1.0	Power Equipment Operator - Group 1A	\$71.58
					1.0	Power Equipment Operator - Group 1	\$68.99
C2.03	Berm: shaping material				1.0	Power Equipment Operator - Group 1	\$68.99
C2.04	Clearing land				1.0	Power Equipment Operator - Group 1	\$68.99
C2.05	Clearing and Grubbing				1.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Power Equipment Operator - Group 1	\$68.99
C2.06	Compaction: D9 with Impact Roller				1.0	Power Equipment Operator - Group 1	\$68.99
C2.07	Crusher: crush materials				1.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Power Equipment Operator - Group 1	\$68.99
C2.08	Cut-off Wall: Install (all-inclusive)	1.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
		2.0	Engineering Technician	\$76.10	1.0	Power Equipment Operator - Group 1	\$68.99
C2.09	Drilling and blasting	1.5	Labourers - Group 2	\$59.53	2.0	Power Equipment Operator - Group 1	\$68.99
C2.10	Drilling: Air Rotary 8" dia.	1.0	Engineering Technician	\$76.10	2.0	Power Equipment Operator - Group 1	\$68.99
C2.11	Excavation: Large channel (short haul)				1.0	Power Equipment Operator - Group 1	\$68.99
					3.0	Truck Drivers - Group 1	\$66.97
C2.12	Excavation: Common (no haul)				1.0	Power Equipment Operator - Group 1	\$68.99
C2.13	Excavation: Common (short haul)				1.0	Power Equipment Operator - Group 1	\$68.99
					3.0	Truck Drivers - Group 1	\$66.97
C2.14	Excavation: Shallow trench (no haul)				1.0	Power Equipment Operator - Group 1	\$68.99
C2.15	Excavation: Deep trench (short haul)				1.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Truck Drivers - Group 1	\$66.97
C2.16	Excavation: Rock				2.0	Power Equipment Operator - Group 1	\$68.99
					0.2	Power Equipment Operator - Group 1	\$68.99
					0.4	Truck Drivers - Group 1	\$66.97
C2.17	Excavate and create berms (Red Dog Creek)	1.0	Labourers - Group 1	\$58.17	2.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Power Equipment Operator - Group 1	\$68.99
C2.18	Foundation Preparation	2.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
		1.0	Engineering Technician	\$76.10	1.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Truck Drivers - Group 1	\$66.97
C2.19	Grading: roads, ramps, etc.				1.0	Power Equipment Operator - Group 1	\$68.99
C2.20	Grouting: Setting Packers	1.0	Engineering Technician	\$76.10	2.0	Power Equipment Operator - Group 1	\$68.99
C2.21	Landfarm: operate	1.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
C2.22	Level and compact working surface (nominal compaction)				1.0	Power Equipment Operator - Group 1	\$68.99
C2.23	Regrading				1.0	Power Equipment Operator - Group 1	\$68.99
C2.24	Rip-Rap: Drill, Blast and Stockpile	1.5	Labourers - Group 2	\$59.53	2.0	Power Equipment Operator - Group 1	\$68.99
					1.0	Power Equipment Operator - Group 1	\$68.99
C2.25	Rip-Rap (rounded, low quality): Screen and Stockpile				1.0	Power Equipment Operator - Group 1A	\$71.58
					1.0	Power Equipment Operator - Group 1	\$68.99
C2.26	Rip-Rap (angular, high quality): Screen and Stockpile				1.0	Power Equipment Operator - Group 1A	\$71.58
					1.0	Power Equipment Operator - Group 1	\$68.99
C2.27	Rip-Rap rock placement				1.0	Power Equipment Operator - Group 1	\$68.99
C2.28	Road: Construct access road				1.0	Power Equipment Operator - Group 1	\$68.99
					2.0	Truck Drivers - Group 1	\$66.97
					2.0	Power Equipment Operator - Group 1	\$68.99
					0.3	Power Equipment Operator - Group 1	\$68.99
C2.29	Road: Construct haul road				1.0	Power Equipment Operator - Group 1A	\$71.58
					3.0	Truck Drivers - Group 1A	\$68.76
					2.0	Power Equipment Operator - Group 1	\$68.99
					0.5	Power Equipment Operator - Group 3	\$66.79
					0.3	Power Equipment Operator - Group 1	\$68.99
C2.30	Road: Reshape and Scarify Shoulders				1.0	Power Equipment Operator - Group 1	\$68.99
C2.31	Tailings: spilled tailings cleanup				1.0	Power Equipment Operator - Group 1	\$68.99
					3.0	Truck Drivers - Group 1	\$66.97
<b>Materials</b>							
C3.01	Dust Suppressant - Supply and Apply	2.0	Labourers - Group 4	\$44.17			
C3.02	Electricity - Overhead electrical conductors	3.0	Electrician	\$85.61	1.0	Power Equipment Operator - Group 1A	\$71.58
C3.03	Electricity - Treated Power Poles (40' class 3)	2.0	Electrician	\$85.61	1.0	Power Equipment Operator - Group 1A	\$71.58
C3.04	Electricity - Pole mounted transformer	3.0	Electrician	\$85.61	1.0	Power Equipment Operator - Group 1A	\$71.58
C3.05	Geotextile: Supply and Install (large areas)	3.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
C3.06	Geotextile: Supply and Install (channels)	4.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
C3.07	Geosynthetic Clay Liner: Supplied & Installed	3.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
		1.0	Engineering Technician	\$76.10			
C3.08	Groundwater Pump: 6" Submersible Pump (56-95 GPM)	1.0	Mechanic (Truck Drivers/Surveyors Group 2)	\$71.58			
		2.0	Labourers - Group 2	\$59.53			
C3.09	Groundwater Pump: 6" Submersible Pump (681 - 1400GPM)	1.0	Mechanic (Truck Drivers/Surveyors Group 2)	\$71.58			
		2.0	Labourers - Group 2	\$59.53			
C3.10	HDPE liner: Supplied & Installed (large areas)	3.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
		1.0	Engineering Technician	\$76.10			
C3.11	HDPE liner: Supplied & Installed (channels)	3.0	Labourers - Group 1	\$58.17	1.0	Power Equipment Operator - Group 1	\$68.99
		1.0	Engineering Technician	\$76.10			
C3.12	HDPE pipe: 150mm, insulated; supplied and installed	3.0	Labourers - Group 1	\$58.17			
C3.13	HDPE pipe: 350mm, insulated; supplied and installed	3.0	Labourers - Group 1	\$58.17			
C3.14	Heat trace: constant watt cables, installed	1.0	Electrician	\$85.61			
		2.0	Labourers - Group 1	\$58.17			
C3.15	Heat trace Power Feed Kit	2.0	Electrician	\$85.61			
C3.16	Heat trace electrical thermostat	2.0	Electrician	\$85.61			
C3.17	Manholes: Precast 12' deep: supplied and installed	1.0	Engineering Technician	\$76.10	1.0	Power Equipment Operator - Group 1	\$68.99
		2.0	Labourers - Group 1	\$58.17			
C3.18	Pump: Install large seepage pump	1.0	Mechanic (Truck Drivers/Surveyors Group 2)	\$71.58			
		2.0	Labourers - Group 1	\$58.17			
C3.19	Pumping well protective housing	1.0	Carpenter	\$68.43			
		2.0	Labourers - Group 2	\$59.53			
C3.20	Well Casing, 150mm Stainless Steel, supplied and installed	1.0	Engineering Technician	\$76.10	2.0	Power Equipment Operator - Group 1	\$68.99
C3.21	Well Cover: steel protective well cover				2.0	Power Equipment Operator - Group 1	\$68.99
<b>Revegetation</b>							
C4.01	Seeding/Fertilizing: Application by Helicopter	1.5	Labourers - Group 1	\$58.17	2.0	Power Equipment Operator - Group 1	\$68.99
C4.02	Planting (shrubs, seedlings, etc.): By hand	2.0	Labourers - Group 1	\$58.17			
<b>Relocations</b>							
C5.01	See Unit Cost Relocations Worksheet						

Table 19. Tasks Unit Costs

Cost Code	Item	Equipment Details				Fuel Cost (\$/hr)
		Equipment Type	Equipment Model	# of Equipment	Equipment Rate (\$/hr)	
<b>Demolition</b>						
C1.01	Excavator: CAT 345 w/ bucket	Excavator	CAT 345	1	\$87.59	\$25.11
C1.02	Excavator: CAT 345 w/ grapple attachment	Excavator	CAT 345 Grapple	1	\$105.10	\$25.11
C1.03	Excavator: CAT 345 w/ hammer attachment	Excavator	CAT 345 Hammer	1	\$142.77	\$25.11
C1.04	Excavator: CAT 345 w/ shear attachment	Excavator	CAT 345 Shear	1	\$126.75	\$25.11
C1.05	Dozer: CAT D9	Dozer	CAT D9	1	\$149.78	\$33.32
C1.06	Truck: CAT 735	Truck	CAT 735	1	\$80.56	\$14.28
C1.07	General Labour				\$0.00	\$0.00
<b>Earthworks</b>						
C2.01	Backfill excavated ditches	Excavator	CAT 325	1	\$53.76	\$12.91
		Compactor	Walk-behind vibrating (30 in)	1	\$3.54	\$0.93
C2.02	Bedding: Produce and stockpile	Loader	CAT 992D	1	\$268.98	\$58.26
		Dozer	CAT D9	1	\$149.78	\$33.32
C2.03	Berm: shaping material	Dozer	CAT D9	1	\$149.78	\$33.32
C2.04	Clearing land	Dozer	CAT D9	1	\$149.78	\$33.32
C2.05	Clearing and Grubbing	Dozer	CAT D9	1	\$149.78	\$33.32
		Excavator	CAT D9	1	\$149.78	\$33.32
		Truck	CAT D9	2	\$149.78	\$33.32
C2.06	Compaction: D9 with Impact Roller	Dozer	CAT D9	1	\$149.78	\$33.32
		Compactor	Sheepsfoot (72 in, 2 drums)	1	\$4.05	\$0.00
C2.07	Crusher: crush materials	Other	Crusher	1	\$107.57	\$20.00
		Loader	CAT 966F	2	\$66.78	\$17.12
		Truck	Light Truck (3/4T) 4x2	1	\$25.12	\$7.82
C2.08	Cut-off Wall: Install (all-inclusive)	Excavator	CAT 350	1	\$87.59	\$33.49
		Dozer	CAT D9	1	\$149.78	\$33.32
C2.09	Drilling and blasting	Drill	Air Rotary, 200 cfm compressor	1	\$102.52	\$15.34
C2.10	Drilling: Air Rotary 8" dia.	Drill	Air Rotary, 200 cfm compressor	1	\$102.52	\$15.34
C2.11	Excavation: Large channel (short haul)	Excavator	CAT 350	1	\$87.59	\$33.49
		Truck	CAT 735	3	\$80.56	\$14.28
C2.12	Excavation: Common (no haul)	Excavator	CAT 325	1	\$53.76	\$12.91
C2.13	Excavation: Common (short haul)	Excavator	CAT 350	1	\$87.59	\$33.49
		Truck	CAT 735	3	\$80.56	\$14.28
C2.14	Excavation: Shallow trench (no haul)	Excavator	CAT 325	1	\$53.76	\$12.91
C2.15	Excavation: Deep trench (short haul)	Excavator	CAT 350	1	\$87.59	\$33.49
		Truck	CAT 735	2	\$80.56	\$14.28
C2.16	Excavation: Rock	Drill	Air track rig (900cfm)	1	\$81.12	\$16.83
		Excavator	CAT 325	0.2	\$53.76	\$12.91
		Truck	CAT 735	0.4	\$80.56	\$14.28
C2.17	Excavate and create berms (Red Dog Creek)	Excavator	CAT 325	2	\$53.76	\$12.91
		Dozer	CAT D9	2.0	\$149.78	\$33.32
		Compactor	Sheepsfoot (72 in, 2 drums)	1.0	\$4.05	\$0.00
C2.18	Foundation Preparation	Dozer	CAT D9	1	\$149.78	\$33.32
		Excavator	CAT 325	1	\$53.76	\$12.91
		Truck	CAT 735	2	\$80.56	\$14.28
C2.19	Grading: roads, ramps, etc.	Grader	CAT 16H	1	\$76.50	\$18.54
C2.20	Grouting: Setting Packers	Drill	Air track rig (900cfm)	1	\$81.12	\$16.83
C2.21	Landfarm: operate	Dozer	CAT D9	1	\$149.78	\$33.32
C2.22	Level and compact working surface (nominal compaction)	Dozer	CAT D9	1	\$149.78	\$33.32
C2.23	Regrading	Dozer	CAT D11	1	\$357.35	\$73.68
C2.24	Rip-Rap: Drill, Blast and Stockpile	Drill	Air track rig (900cfm)	1	\$81.12	\$16.83
		Dozer	CAT D9	1	\$149.78	\$33.32
C2.25	Rip-Rap (rounded, low quality): Screen and Stockpile	Loader	CAT 992D	1	\$268.98	\$58.26
		Dozer	CAT D9	1	\$149.78	\$33.32
C2.26	Rip-Rap (angular, high quality): Screen and Stockpile	Loader	CAT 992D	1	\$268.98	\$58.26
		Dozer	CAT D9	1	\$149.78	\$33.32
C2.27	Rip-Rap rock placement	Excavator	CAT 325	1	\$53.76	\$12.91
C2.28	Road: Construct access road	Loader	CAT 966F	1	\$66.78	\$17.12
		Truck	CAT 735	2	\$80.56	\$14.28
		Dozer	CAT D9	2	\$149.78	\$33.32
		Grader	CAT 16H	0.25	\$76.50	\$18.54
C2.29	Road: Construct haul road	Loader	CAT 992D	1	\$268.98	\$58.26
		Truck	CAT 777D	3	\$180.75	\$36.69
		Dozer	CAT D11	2	\$357.35	\$73.68
		Compactor	CAT CP563	0.5	\$38.03	\$11.98
		Grader	CAT 16H	0.3	\$76.50	\$18.54
C2.30	Road: Reshape and Scarify Shoulders	Grader	CAT 16H	1	\$76.50	\$18.54
C2.31	Tailings: spilled tailings cleanup	Excavator	CAT 325	1	\$53.76	\$12.91
		Dozer	CAT D9	1.0	\$149.78	\$33.32
		Truck	CAT 735	3.0	\$80.56	\$14.28
<b>Materials</b>						
C3.01	Dust Suppressant - Supply and Apply	Truck	Light Truck (3/4T) 4x2	1	\$25.12	\$7.82
C3.02	Electricity - Overhead electrical conductors	Lifting	Crane (Cable Boom), 100T	1	\$160.71	\$13.25
C3.03	Electricity - Treated Power Poles (40' class 3)	Lifting	Crane (Cable Boom), 100T	1	\$160.71	\$13.25
C3.04	Electricity - Pole mounted transformer	Lifting	Crane (Cable Boom), 100T	1	\$160.71	\$13.25
C3.05	Geotextile: Supply and Install (large areas)	Loader	CAT 966F	1	\$66.78	\$17.12
C3.06	Geotextile: Supply and Install (channels)	Loader	CAT 966F	1	\$66.78	\$17.12
C3.07	Geosynthetic Clay Liner: Supplied & Installed	Loader	CAT 966F	1	\$66.78	\$17.12
C3.08	Groundwater Pump: 6" Submersible Pump (56-95 GPM)					
C3.09	Groundwater Pump: 6" Submersible Pump (681 - 1400GPM)					
C3.10	HDPE liner: Supplied & Installed (large areas)	Loader	CAT 966F	1	\$66.78	\$17.12
C3.11	HDPE liner: Supplied & Installed (channels)	Loader	CAT 966F	1	\$66.78	\$17.12
C3.12	HDPE pipe: 150mm, insulated; supplied and installed					
C3.13	HDPE pipe: 350mm, insulated; supplied and installed					
C3.14	Heat trace: constant watt cables, installed	Truck	Light Truck (3/4T) 4x2	1	\$25.12	\$7.82
C3.15	Heat trace Power Feed Kit					
C3.16	Heat trace electrical thermostat					
C3.17	Manholes: Precast 12' deep: supplied and installed	Excavator	CAT 325	1	\$53.76	\$12.91
C3.18	Pump: Install large seepage pump				\$0.00	\$0.00
C3.19	Pumping well protective housing	Truck	Light Truck (3/4T) 4x2	1	\$25.12	\$7.82
C3.20	Well Casing, 150mm Stainless Steel, supplied and installed	Drill	Air Rotary, 200 cfm compressor	1	\$102.52	\$15.34
C3.21	Well Cover: steel protective well cover	Drill	Air Rotary, 200 cfm compressor	1	\$102.52	\$15.34
<b>Revegetation</b>						
C4.01	Seeding/Fertilizing: Application by Helicopter	Other	Helicopter	1.0	\$1,322.75	\$0.00
		Truck	Light Truck (3/4T) 4x2	1.0	\$25.12	\$7.82
C4.02	Planting (shrubs, seedlings, etc.): By hand	Truck	Light Truck (3/4T) 4x2	1.0	\$25.12	\$7.82
<b>Relocations</b>						
C5.01	See Unit Cost Relocations Worksheet					

Table 19. Tasks Unit Costs

Material Details								
Cost Code	Item	Cost Code	Item	Unit Rate	Unit	Multiplier	Multiplier Comments	Task Comments/Productivity Sources
<b>Demolition</b>								
C1.01	Excavator: CAT 345 w/ bucket							
C1.02	Excavator: CAT 345 w/ grapple attachment							
C1.03	Excavator: CAT 345 w/ hammer attachment							
C1.04	Excavator: CAT 345 w/ shear attachment							
C1.05	Dozer: CAT D9							
C1.06	Truck: CAT 735							
C1.07	General Labour							
<b>Earthworks</b>								
C2.01	Backfill excavated ditches							
C2.02	Bedding: Produce and stockpile							
C2.03	Berm: shaping material							
C2.04	Clearing land							
C2.05	Clearing and Grubbing							
C2.06	Compaction: D9 with Impact Roller							
C2.07	Crusher: crush materials							RSMMeans2005 (17 03 9901)
C2.08	Cut-off Wall: Install (all-inclusive)	M.01	Bentonite	\$264.55	tonnes	0.162	Assumes 1.5m wide trench, 6% b	Estimated
C2.09	Drilling and blasting	M.07	Explosives (for rip-rap production)	\$13.86	m3	0.15		Material Cost from RSMMeans 2005
C2.10	Drilling: Air Rotary 8" dia.							
C2.11	Excavation: Large channel (short haul)							
C2.12	Excavation: Common (no haul)							
C2.13	Excavation: Common (short haul)							
C2.14	Excavation: Shallow trench (no haul)							
C2.15	Excavation: Deep trench (short haul)							
C2.16	Excavation: Rock							
C2.17	Excavate and create berms (Red Dog Creek)							
C2.18	Foundation Preparation							BGC
C2.19	Grading: roads, ramps, etc.							
C2.20	Grouting: Setting Packers							BGC
C2.21	Landfarm: operate							
C2.22	Level and compact working surface (nominal compaction)							
C2.23	Regrading							
C2.24	Rip-Rap: Drill, Blast and Stockpile	M.07	Explosives (for rip-rap production)	\$13.86	m3	1		
C2.25	Rip-Rap (rounded, low quality): Screen and Stockpile							
C2.26	Rip-Rap (angular, high quality): Screen and Stockpile							
C2.27	Rip-Rap rock placement							see unit rate calcs; excavator cost only
C2.28	Road: Construct access road							based on 3m wide by .5m high fill at \$8.00/m3
C2.29	Road: Construct haul road							based on 10m wide by .5m high fill at \$8.00/m3
C2.30	Road: Reshape and Scarify Shoulders							
C2.31	Tailings: spilled tailings cleanup							
<b>Materials</b>								
C3.01	Dust Suppressant - Supply and Apply	M.02	Dust Suppressant	\$0.03	m2	1		estimated
C3.02	Electricity - Overhead electrical conductors	M.04	Electricity - Overhead electrical condu	\$1.24	m	1		RSMMeans 2005 (18 04 0108)
C3.03	Electricity - Treated Power Poles (40' class 3)	M.05	Electricity - Pole mounted transformer	\$7,878.31	each	1		RSMMeans 2005 (18 04 0108)
C3.04	Electricity - Pole mounted transformer	M.06	Electricity - Treated Power Poles (40'	\$287.44	each	1		RSMMeans 2005 (18 04 0108)
C3.05	Geotextile: Supply and Install (large areas)	M.13	Geotextile	\$3.09	m2	1		
C3.06	Geotextile: Supply and Install (channels)	M.13	Geotextile	\$3.09	m2	1		
C3.07	Geosynthetic Clay Liner: Supplied & Installed	M.12	Geosynthetic Clay Liner	\$11.03	m2	1		
C3.08	Groundwater Pump: 6" Submersible Pump (56-95 GPM)	M.14	Groundwater Pump: 6" Submersible P	\$6,033.51	each	1		
C3.09	Groundwater Pump: 6" Submersible Pump (681 - 1400GPM)	M.15	Groundwater Pump: 6" Submersible P	\$24,633.40	each	1		
C3.10	HDPE liner: Supplied & Installed (large areas)	M.16	HDPE liner	\$8.45	m2	1		
C3.11	HDPE liner: Supplied & Installed (channels)	M.16	HDPE liner	\$8.45	m2	1		
C3.12	HDPE pipe: 150mm, insulated; supplied and installed	M.19	HDPE pipe: 150mm, insulated	\$156.38	m	1		
C3.13	HDPE pipe: 350mm, insulated; supplied and installed	M.21	HDPE pipe: 350mm, insulated	\$315.76	m	1		
C3.14	Heat trace: constant watt cables, installed	M.25	Heat trace: constant watt cables	\$25.01	m	1		
C3.15	Heat trace Power Feed Kit	M.24	Heat trace Power Feed Kit	\$456.90	each	1		
C3.16	Heat trace electrical thermostat	M.23	Heat trace electrical thermostat	\$905.91	each	1		
C3.17	Manholes: Precast 12' deep: supplied and installed	M.31	Precast manhole: 4' dia. Per linear ve	\$296.45	m	4	Assumes 4m deep manhole	
C3.18	Pump: Install large seepage pump	M.32	Pump: 250PSI pump with motor	\$1,612.87	each	1		
C3.19	Pumping well protective housing	M.27	Lumber: 2x4 Stud framing	\$1.31	m	100		
		M.30	Plywood: 1/2"	\$5.82	m2	45		
C3.20	Well Casing, 150mm Stainless Steel, supplied and installed	M.44	Well Casing, 150mm Stainless Steel	\$205.11	m	1		
C3.21	Well Cover: steel protective well cover	M.45	Well Cover: steel protective well cover	\$145.10	each	1		
<b>Revegetation</b>								
C4.01	Seeding/Fertilizing: Application by Helicopter	M.28	Native seed	\$6.01	kg	60	60kg per hectare	JB
		M.08	Fertilizer	\$0.88	kg	500	500kg per hectare	
C4.02	Planting (shrubs, seedlings, etc.): By hand	M.29	Plants: live shrub cuttings	\$1,675.49	hec	1		estimated from FWSD work
<b>Relocations</b>								
C5.01	See Unit Cost Relocations Worksheet							

Table 20. Indirect Cost Inputs

Cost Code	Category	Rate Used in Estimate	Unit	Source/Comments
I.01	Bonding	3.0	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.02	Camp Operation	\$100.00	USD/day/man	Round average of NANA quote (\$74) and ESS quote (\$130)
I.03	Communications	\$1,000.00	Month	Assuming Iridium phone
I.04	Contractor Profit	10	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.05	Contingency	20	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.06a	Engineering Re-Design 1	3.0	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.06b	Engineering Re-Design 2	3.0	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.06c	Engineering Re-Design 3	3.0	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.07	Freight	12	%	Of Material Costs
I.08	Heating Fuel	400	gal/month	
I.09	Insurance	1.5	%	See "Red Dog Closure Cost Estimate - Indirect Cost Allocations 3-5-09.xls" for more detail on indirect allocation
I.10	Laboratory/Material Testing	\$1,000.00	Month	Estimated
I.11	Misc. Admin Supplies	\$500.00	Month	Estimated
I.12	Office Supplies	\$100.00	Month	Estimated
I.13	Turnaround Costs	\$770.00	USD/trip	DH - Suspension Study costs; Trip = in and out
I.14	Workers' Compensation	\$0.00	USD/\$100 payroll	included in unit labor rates