Example Alternatives for Closure of Anvil Range Mining Complex

Final Draft

Prepared for

Deloitte & Touche Inc.

on behalf of the

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
Engineers and Scientists

September 2006

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1 Introduction

This document describes example alternatives for the closure of the Anvil Range Mining Complex. It is intended to provide a basis for presenting closure options, and their associated risks and costs, to the local communities and stakeholders. An independent peer review panel will also be convened and tasked with reviewing the technical details presented herein.

Feedback gathered from the local communities and stakeholders will be used by the Faro Mine Closure Planning Office (FMCPO) and the Faro Mine Closure Oversight Committee to select a single set of preferred alternatives that can be taken forward into the final closure plan.

The remaining sections of the document present:

- An overview of the project;
- Detailed descriptions of four example alternatives for each of the Faro Tailings area, the Faro Mine area, and the Vangorda/Grum Mine area;
- Initial assessments of the risks and costs associated with each example alternative; and
- Attachments providing further details of analyses and cost estimates.

The relationship to other ongoing projects is worth noting. More detailed studies of technical components of the closure alternatives are still underway, and the ongoing work will undoubtedly result in further modifications of the alternatives presented herein. However, it is the opinion of SRK and the FMCPO that the current technical understanding is sufficient to support the definition of these example alternatives to the extent necessary for eliciting community and stakeholder feedback, and for initiating independent peer review.

2 Overview

2.1 Project Background

Closure planning for the Anvil Range Mining Complex has a long history. The first comprehensive closure plan, known as the Integrated Closure and Abandonment Plan (ICAP), was produced for the site operator in 1996. It was reviewed by regulatory agencies and other interested parties but never approved or revised.

The Interim Receiver initiated a review of the ICAP in 2002, as part of the application for a new Water License. It was clear that there were several parts of the ICAP that could no longer be implemented and other parts that would not meet approval of the broader range of stakeholders that are now involved in the project. The Interim Receiver therefore initiated a series of technical workshops to initiate development of a new closure plan.

Over the period April 2002 to January 2004, there were a total of four technical workshops. Attendees at the workshops have included representatives of the Type II Mines Office, First Nations, the town of Faro, Yukon regulatory agencies, Environment Canada, the Department of Fisheries and Oceans, the Yukon Salmon Committee, and specialist consultants in several of the key technical disciplines. In general, each workshop began with a presentation of the current state of knowledge of the site, including updates on recent technical studies. Participants in each technical workshop then developed lists of methods that could be used to close various parts of the site. The methods were then reviewed and the uncertainties preventing selection of preferred methods were identified. Studies to resolve the critical uncertainties were then designed. Over the years 2003-2005, the Interim Receiver, working together with DIAND, commissioned approximately forty of these studies, at a total cost of several million dollars.

In addition to the technical workshops and studies, efforts were underway to consult with interested stakeholders to determine their principal objectives for the project. One formal workshop was held as part of that process, in July 2004, and additional meetings were held with each group of stakeholders.

In January 2005, a final technical workshop was held. Mr. Tony Keen, who had been leading the stakeholder consultation process, presented a summary of the objectives expressed by the various stakeholder groups. Technical specialists then presented the results of the investigations that they had carried out in 2004. Attachment A presents an annotated bibliography of the investigation reports that were used in the development of this report.

2.2 Project Execution

Subsequent to the January 2005 workshop, SRK was asked to initiate a review of the available closure alternatives, to provide a basis for the project's Oversight Committee to select preferred options. The "primary alternatives" project, as it came to be called, was initiated in February 2005. The first step was to select groups of methods to represent the range of options that were still under consideration. SRK completed an initial list of methods and then circulated it to other project participants representing the Type II Mines Office, the Faro Mine Closure Planning Office, and the Ross River and Selkirk First Nations. The list of methods was heavily modified based on feedback from the other participants. A number of critical uncertainties were also identified, and the project team worked to resolve these over the period March – June 2005.

Other commitments, in particular to field studies, then delayed the project for several months. In October 2005, with the appointment of a Director for the Faro Mine Closure Planning Office, the project regained momentum. In November and early December, the results of the earlier studies were reviewed by a small team consisting of SRK and FMCPO staff, and a complete set of sketches and cost estimates for each of the primary alternatives was prepared. Results from studies of post-closure water quality, ecological risk and human health risk became available, and these were integrated into the analysis of each alternative.

In January and February, 2006, a series of meetings were held to assess the "primary alternatives". Participants in the meetings included technical representatives from the FMCPO, the federal and Yukon governments, First Nations, and SRK. Each of the primary alternatives was reviewed and major risks identified. The primary alternatives were then modified to reduce risks, where practicable, and then re-assessed. New alternatives were developed to represent a wider range of options, and also reviewed and modified to reduce risks. Both the primary and the new alternatives are presented herein, and they are referred to as simply "example alternatives".

During the 18-month period when the example alternatives were under development and review, investigations into selected technical issues continued. Draft reports from any of those investigations that were used in the development of the example alternatives are also listed in Attachment A.

2.3 Overview of the Example Alternatives

Table 2.1 lists the example alternatives. Although the final closure plan will need to cover all of the Anvil Range Mining Complex, the assessment of example alternatives was facilitated by dividing the complex into three parts, namely the Faro Mine area, the Rose Creek Tailings area and the Vangorda/Grum mine area.

Table 2.1: Example Alternatives

Faro Mine Area	Rose Creek Tailings	Vangorda/Grum Mine Area
1. Flow-Through Pit	1. Stabilize in Place	1. Backfill Vangorda Pit
2. Upgrade Faro Creek Diversion	2. Complete Relocation	2. Stabilize in Place
3. Minimize Construction	3. Partial Relocation	3. Minimize Construction
4. Minimize Water Treatment	4. Minimize Construction	4. Minimize Water Treatment

As Table 2.1 shows, four example alternatives were developed for each of the three areas. Several common points are worth explaining:

- The names of the alternatives highlight particular features only. Longer and more explanatory names were experimented with, but were found to make the text unreadable.
- The alternatives are truly intended as "examples" only; other alternatives are possible. However, the examples are thought to represent the range of reasonable options.
- Almost all of the alternatives presented include construction of soil covers on either waste rock or tailings. These covers can vary in thickness, soil type and construction methods. Attachment B provides details about the cover design and performance assumptions used herein. Studies to define cover designs and performance are ongoing, so all of the cover designs herein are subject to refinement.
- Differences in cover designs lead to changes in other closure activities, especially those related to the collection and treatment of contaminated water. Generally, covers that allow greater infiltration of water will lead to increased requirements for groundwater collection and treatment.
- The technical studies completed to-date clearly show that even with extensive up front reclamation work it will be necessary to carry out active water treatment at some locations for at least a century or more. Therefore, all alternatives include a groundwater collection and treatment component. In the Faro Mine and Vangorda/Grum alternatives, groundwater collection and treatment is expected to be required for several centuries. In the Rose Creek Tailings alternatives, groundwater collection and treatment is also required, but the duration may be limited if the tailings are completely relocated.

3 Example Alternatives for Faro Mine Area

The major components of the Faro Mine Area include the Faro Pit, various waste rock dumps (including sulphide cells, low-grade ore and oxide fines), the Faro Creek Diversion and the North Fork Rock Drain.

By selecting various combinations of closure methods for each of the components listed above, it is possible to create a closure alternative for the entire area: selection of different combinations will lead to different alternatives. Each alternative created in this way addresses the issues at the Faro Mine Area.

Differences between alternatives for the Faro Mine Area arise from the following three key considerations:

- The closure method for the Faro Creek Diversion, which can be either:
  - Rerouting of Faro Creek into the Faro Pit, with construction of a Plug Dam and a discharge channel; or
  - Continued diversion of Faro Creek around the Faro Pit.
- The primary approach to long-term water treatment, which can be either:
  - Biological water treatment in the Faro Pit,
  - Chemical water treatment in a treatment plant, or
  - A combination of biological and chemical water treatment.
- The approaches taken for covering and/or moving waste rock.

All of the example alternatives for the Faro Mine Area, and in fact all reasonable alternatives, include requirements for long-term groundwater collection and treatment.

Table 3.1 summarizes the major components of the four example alternatives for the Faro Mine Area.

Table 3.1: Faro Mine Area Example Alternatives

Component	Alternative 1 Flow-Through Pit	Alternative 2 Upgrade Faro Creek Diversion	Alternative 3 Minimize Construction	Alternative 4 Minimize Water Treatment
Faro Creek	Re-route to pit	Upgrade now	Upgrade in future as needed	Upgrade now
Primary Water Treatment	Biological in Pit with seasonal pump-out	High density sludge	High density sludge	High density sludge with potential to switch to Biological in Pit
Waste Rock	*Dependent on waste type (see below)*			
Oxide Fines/ Low-Grade Ore	Consolidate with plastic cover	Consolidate with plastic cover	0.5m soil cover	Relocate to Pit with lime
Sulphide Cells	2.0m soil cover	2.0m soil cover	0.5m soil cover	Consolidate with 2.5m soil cover
Faro Valley Dump	0.5m soil cover	0.5m soil cover	0.5m soil cover	Relocated to sulphide cell with 2.5m soil cover
Other Waste Rock	Reslope with 0.5m soil cover	Reslope with 0.5m soil cover	0.5m soil cover – no resloping	Reslope with 2.0 m soil cover

3.1 Faro Mine Area Alternative 1 – Flow-Through Pit

The “Flow-Through Pit” alternative for the Faro Mine area is illustrated in Figure 3.1. The distinguishing feature of this alternative is that both Faro Creek and all contaminated water will be routed to the Faro Pit. The pit water will be treated each summer using the passive biological treatment system tested in the Grum pit in 2004. Options to allow the Faro Creek water to flow freely out of the pit were assessed, but none allows adequate treatment of the contaminated water during the spring freshet. Therefore, the water will need to be retained each summer until the biological treatment can lower zinc concentrations to a level suitable for discharge. It will then need to be pumped out of the pit to provide adequate room for next year’s inflow.

Other elements of the alternative are described in the following paragraphs. Further details on all the Faro Mine area alternatives can be found in the “Construction Details and Cost Estimates” presented in Appendix A.

Closure Activities

Faro Creek will be routed into the pit via a lined ditch cut through or around the Faro Valley Dump. Water will cascade over the pit wall into the pit.

To increase the water storage capacity, a plug dam will be constructed across the mouth of the pit to elevation 1170 m. A berm will be constructed around the rim of the pit to prevent inadvertent access. Phosphate will be added to pit water each spring to promote the biological growth needed to drive the treatment process.

The water pumped out of the pit will run through a pipe system installed in an excavation through the waste rock and mill areas. The base of the excavation will have a maximum elevation of 1168 m so that any excess water will spill before exceeding the Plug Dam freeboard limit. The excavation will connect to the North Wall Interceptor Ditch, which will be upgraded to carry the flow to Rose Creek downstream of the current Cross Valley Dam

The oxide fines and low grade ore stockpiles will be consolidated and covered with very low infiltration covers, to consist of a bedding layer, HDPE geomembrane, and 1.0 m of lightly compacted till. A design variant to covering with similar cost and water quality implications is to add lime to neutralize the acidity in the oxide fines and low grade ore materials, and relocate them to a location below the water level in the Faro Pit. The water quality implications of this variant are still being evaluated.

Waste rock slopes will be regraded to 3H:1V. A low infiltration cover consisting of 0.5 m of compacted till overlain by 1.5 m of uncompacted till will be placed on the sulphide cell. The remainder of the waste rock piles will be covered with 0.5 m of lightly compacted till. Runoff control ditches will be constructed on the cover. All surfaces will be seeded and fertilized.

The ETA tailings will be relocated to the tailings impoundment or to the Faro Pit if the remainder of the Rose Creek tailings are to be re-located there. A groundwater and surface water collection system will be installed in the ETA area. All collected water will be pumped to the Faro Pit. Additional wells and/or collection trenches will be installed as needed to reduce the escape of contaminated water.

Groundwater collection systems will be installed below the Zone II Pit and in the S-well area. If necessary, a lined diversion channel will be constructed to route the North Fork Rose Creek, to facilitate collection of contaminated groundwater from the base of the valley. The ditch will be continued through a cut in the Haul Road and, if necessary, below the S-wells. Water quality in Rose Creek and groundwater quality down-gradient of the collection systems will be monitored, and additional wells and/or cutoff walls will be constructed as needed to reduce the escape of contaminated groundwater.

Groundwater will also be pumped from the Zone II pit and piped back into the Faro Pit. Outwash material at the toe of the slope below the Zone II pit will be excavated and placed on the Intermediate Dump.

Unnecessary roads will be scarified, seeded and fertilized. All buildings will be demolished and disposed of in a landfill area in the waste rock. Hydrocarbon-contaminated soils will be excavated and bio-remediated. These activities are common to all of the alternatives discussed in this report.

Post-Closure Requirements

Post-closure requirements for the “Flow-Through Pit” alternative include:

- Year-round pumping of contaminated groundwater and seepage to the Faro Pit;
- Seasonal addition of phosphate to the pit water;
- Seasonal discharge of water from the pit;
- Monitoring of water quality in the Faro Pit, in and around each of the groundwater collection systems, and in Rose Creek above and below the site;
- Relocation or installation of additional extraction and monitoring wells;
- Annual inspections of all earthworks, and maintenance or repairs as needed;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

Except for the intensive initial monitoring, all of the above activities are expected to continue to be required for several hundred years.

The current information on the passive water treatment system indicates that the zinc removal capacity could be overwhelmed by future increases in zinc loadings. To cover that risk, and other uncertainties associated with performance of the passive treatment system, a contingency to construct and operate an active water treatment plant is included in the cost estimate. To cover the risk of future deterioration in seepage water quality below the Northwest Dump, a contingency is included for future collection of a seepage and its transfer to the Faro pit.

3.2 Faro Mine Area Alternative 2 – Upgrade Faro Creek Diversion

The "Upgrade Faro Creek Diversion" alternative for the Faro Mine area is illustrated in Figure 3.2. The distinguishing feature of this alternative is the storage of all contaminated water in the Faro Pit for seasonal treatment in an active treatment system. To reduce the risk of contaminated water being washed out of the pit, the Faro Creek diversion will be upgraded. Other elements of this alternative are described in the following paragraphs.

Closure Activities

Faro Creek will be diverted to the east of the pit via a geosynthetic clay lined channel. The east interceptor will be constructed upstream of the present Faro Creek diversion and will discharge into the present diversion north of the Northeast Waste Rock Dump before flowing into North Fork Rose Creek. The channel will include a thermal blanket consisting of granular fill to prevent permafrost degradation on the uphill cut slope. An optional extension of the channel on the west side of the Faro Creek Valley would collect additional runoff.

A water treatment plant will be constructed to treat the water stored in Faro Pit. Water will be continuously pumped out of the pit and treated year-round. The treated water will be discharged into Rose Creek.

Closure measures for the oxide fines, low grade ore and waste rock will be the same as in the previous alternative. Closure measures and groundwater collection in the ETA, Zone II, and S-Well areas will also be the same as in the previous alternative. Closure measure for roads, buildings and soils are the same in all alternatives.

Post-Closure Requirements

Post-closure requirements for the "Upgrade Faro Creek Diversion" alternative include:

- Year-round pumping of contaminated groundwater and seepage to the water treatment plant with storage of seasonal excess flow in the Faro Pit;
- Annual operation and maintenance of the water treatment plant;
- Periodic disposal of water treatment sludge in constructed cells;
- Monitoring of water quality in the Faro Pit, in and around each of the groundwater collection systems, and in Rose Creek above and below the site;
- Possible installation of additional extraction and monitoring wells;
- Annual inspections of all earthworks;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

With the exception of the initial cover maintenance exception noted above, all of the above activities are expected to continue to be required for several hundred years.

The water treatment system is expected to be capable of dealing with any increases in contaminant loads, so there is no additional treatment contingency in this alternative. There might be an opportunity to reduce treatment costs by using the passive biological method to pre-treat water in the pit. A contingency for future collection of Northwest Dump seepage is included.

3.3 Faro Mine Area Alternative 3 – Minimize Construction

The “Minimize Construction” alternative for the Faro Mine area is illustrated in Figure 3.3. This alternative is intended to represent the case where the up-front expenditure on the site is kept to the minimum which would still provide some level of environmental protection. The focus is then on the long-term collection and treatment of contaminated water.

Closure Activities

The Faro Creek diversion will continue to be maintained in its current channel. A contingency is included to re-construct the channel in a new location, either after it fails or when failure is imminent.

Contaminated water will be stored in the Faro Pit. The pit water level will be maintained at a level low enough to store any floods that could breach the Faro Creek diversion channel. No plug dam will be constructed.

A water treatment plant will be constructed to treat contaminated water. Water will be pumped out of the pit and treated each year during the open water season. The treated water will be discharged into Faro Creek.

Rudimentary covers, consisting of 0.5 m of lightly compacted till, will be constructed on the waste rock dumps, sulphide cells, as well as the oxide fines and low grade ore stockpiles. The covers will be seeded and fertilized to promote vegetation growth. The sideslopes of the waste rock dumps will not be re-sloped, and the cover will not be constructed on any slopes greater than 2H:1V.

The ETA tailings and Zone II Pit outwash material will be left in place. Groundwater collection systems will be constructed below the Zone II Pit and in the S-well area. A contingency is included to upgrade the system as needed. There will be no groundwater or surface collection in the ETA area. Contaminated water will be allowed to drain onto the tailings, as in the current situation, and picked up in the tailings groundwater collection system.

Post-Closure Requirements

Post-closure requirements for the “Minimize Construction” alternative are generally the same as in the “Upgrade Faro Creek Diversion” alternative. However, there will be the following differences:

- The rudimentary covers are expected to require additional maintenance and repair.
- The groundwater collection systems will need to operate with a very high efficiency and will therefore need extensive monitoring and possibly upgrading.
- Contaminated water that escapes from the ETA area will need to be collected and treated by the down-gradient tailings groundwater collection system.

- Due to the lack of effective covers on the waste rock, sulphide cells, oxide fines and low grade ore, acid generation is expected to continue and water treatment costs are expected to be higher than in the other Faro Mine alternatives.

3.4 Faro Mine Area Alternative 4 – Minimize Water Treatment

The "Minimize Water Treatment" alternative for the Faro Mine area is illustrated in Figure 3.4. This alternative represents the case where additional source control measures are taken in an effort to minimize the generation of contaminated water and the requirements for long-term treatment. Simply put, this alternative represents the opposite of the "Minimize Construction" alternative.

Closure Activities

The closure activities under the "Minimize Water Treatment" alternative are similar to those in the "Upgrade Faro Creek Diversion" alternative, with the following differences.

- The oxide fines and low grade ore will be excavated, mixed with lime to neutralize their acidity, and deposited below the water level in the Faro Pit.
- The small sulphide cell to the north of the Zone II pit will be excavated, mixed with lime and relocated to the other sulphide cells, where it will be used to contour the surface into a shape that, once covered, will tend to shed water.
- The Faro Valley dumps will be excavated and acidic material will be mixed with lime and placed on the sulphide cells, as above. Neutral material will be used to fill depressions and contour the surface of the other waste rock piles.
- The sulphide cells will be covered with a very low infiltration soil cover, consisting of 1 m of compacted till overlain by 1.5 m of lightly compacted till, seeded and fertilized to promote vegetation growth.
- The remainder of the waste rock piles will be resloped and covered with a low infiltration soil cover, consisting of 0.5 m of compacted till overlain by 1.5 of uncompacted till, seeded and fertilized to promote vegetation growth.

As in the "Upgrade Faro Creek Diversion" alternative, contaminated groundwater will be collected, stored in the Faro Pit, and treated in an active treatment system each summer. The groundwater collection and water treatment systems specified under that alternative will also be required here.

Post-Closure Requirements

Post-closure requirements for the "Minimize Water Treatment" alternative are the same as in the "Upgrade Faro Creek Diversion" alternative. However, it is expected that, with these additional source control measures, both groundwater collection requirements and treatment costs will be reduced. If the source control measures prove to be sufficiently effective, this option could be converted to a passive treatment system, using only in pit biological treatment. The additional source control measures will also reduce, but not eliminate, the requirements for long-term inspections, maintenance and repairs.

4 Example Alternatives for Rose Creek Tailings

The major components of the Tailings Area include the tailings, a series of dams (Cross-Valley, Intermediate, Secondary and Original) and the Rose Creek Diversion.

The example alternatives for the Tailings Area consider three closure methods for the tailings:

- Relocate all of the tailings to the Faro Pit,
- Stabilize the tailings in place, or
- Relocate some of the tailings (Intermediate) and stabilize the remainder in place.

Because the design team considers catastrophic failures of tailings containment structures to be unacceptable, decisions to leave tailings in the Rose Creek Valley lead to requirements for upgrading critical tailings containment and water conveyance structures. Upgrades to these critical structures will include design, construction and maintenance to withstand the Maximum Credible Earthquake (MCE) and the Probable Maximum Flood (PMF), as per the Canadian Dam Association standards.

Table 4.1 summarizes the closure methods proposed in the four example alternatives for the Tailings Area.

Table 4.1: Tailings Area Example Alternatives

Component	Alternative 1 Complete Relocation	Alternative 2 Stabilize in Place	Alternative 3 Partial Relocation	Alternative 4 Minimize Construction
Tailings				
Intermediate	Relocate to Pit	2.0m rock/soil cover	Relocate to Pit	Fence with Annual soil tackifier
Original & Secondary			2.0m rock/soil cover	
Rose Creek Diversion	Re-route to Valley	Upgrade to PMF	Upgrade part to PMF and re-route part to Valley	Upgrade to PMF
Dams				
Cross-Valley	Remove (Breach)			
Intermediate	Remove (Breach)	Upgrade to MCE	Remove (Breach)	Upgrade to MCE
Secondary	Remove (Breach)	Upgrade to MCE	Upgrade to MCE	Upgrade to MCE
Original	Remove (Breach)	No Action	No Action	No Action
Water Collection and Treatment	Estimated 10 to 20 years	Long-term	Long-term with additional for estimated 10 to 20 years	Long-term

4.1 Tailings Alternative 1 – Stabilize In Place

The "Stabilize In Place" alternative for the Rose Creek Tailings is illustrated in Figure 4.1. The objective of this alternative is to make the tailings physically stable in their current location. Meeting that objective requires upgrading of the Rose Creek Diversion Channel to prevent a flood-induced breaching of the Intermediate Dam, buttressing of the Intermediate and Secondary Dams to prevent earthquake-induced breaching, and covering of the tailings to limit dust releases and direct uptake of tailings contaminants by animals.

The following paragraphs summarize the major activities in each portion of the site. Further details on all the tailings area alternatives can be found in the "Construction Details and Cost Estimate" sheets in Appendix A.

Closure Activities

The Cross-Valley Dam will be removed. The impounded sludge will be excavated and hauled to a sludge containment cell and contaminated soils will be removed to the mill area. The Intermediate Dam will be stabilized against foundation liquefaction through ground densification with vibro-replacement stone columns and/or the construction of a buttress. The East Limb of the Secondary Dam will also be stabilized through ground densification with vibro-replacement stone columns.

Tailings in the Intermediate, Secondary and Primary Impoundments will be covered with a low-infiltration cover consisting of 0.5 m of waste rock overlain by 1.5 m of lightly compacted till. Construction of the covers will be sequenced and, if necessary, delayed to allow consolidation and settlement prior to placing a final grading layer. The cover will be seeded and fertilized.

The Rose Creek Diversion Channel will be upgraded to pass the PMF by deepening and widening the channel along its current alignment. The slopes above the diversion will be stabilized where necessary. A concrete spillway will be constructed to route flood flows back to Rose Creek below beyond the intermediate dam. The current channel will be maintained for normal flows and to provide fish passage. The North Fork Rock Drain will be breached. The material will be hauled to the Faro Waste Dump or used as tailing cover material.

Interception and diversion ditches on the north side of the valley will be upgraded to minimize the amount of water flowing onto the tailings surface. The existing spillway for the Intermediate Dam will be upgraded to manage any remaining runoff from the covered tailings and north side of Rose Valley.

A groundwater collection system will be installed below or along the alignment of the Cross Valley Dam. The collected groundwater will be pumped to a water treatment plant and treated. The groundwater collection system will be extended to the north side of the valley, if necessary using a cutoff wall where the soil stratigraphy becomes too complex for effective collection by wells only. Spare pumps and a redundant power supply will be put in place for emergency use.

Post-Closure Requirements

Post-closure requirements for the "Stabilize In Place" alternative include:

- Year-round pumping of contaminated groundwater and seepage to the water treatment plant;
- Year-round operation and maintenance of the water treatment plant;
- Periodic disposal of water treatment sludge in constructed cells;
- Monitoring of water quality in and around the groundwater collection system, and in Rose Creek above and below the site;
- Relocation or installation of additional extraction and monitoring wells;
- Annual geotechnical inspections of all remaining earthworks and dams;
- Regular inspections and maintenance of the Rose Creek Diversion Channel;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

With the maintenance exception noted above, all of the above activities are expected to continue to be required for several hundred years.

4.2 Tailings Alternative 2 – Complete Relocation

The "Complete Relocation" alternative for the Rose Creek Tailings is illustrated in Figure 4.2. As the name suggests, the objective in this alternative is to move the tailings completely out of the Rose Creek valley, and into the Faro Pit. The following paragraphs summarize the major activities.

Closure Activities

The Intermediate and Secondary Tailings will be pumped to the Faro Pit. The tailings will be hydraulically monitored along excavated trenches to a collection sump and pumped. Lime will be added to the slurry during pumping. Excess water is to be treated through a HDS system in a new treatment plant and discharged. Any remaining contaminated material in the impoundments will be removed by truck and shovel to the Faro Pit. The re-exposed valley area impoundment will be graded for drainage and all surfaces will be seeded and fertilized. Removal of the tailings is expected to take up to 14 years. The process will be sequenced and monitored to ensure stability is maintained.

To prevent releases of tailings during the relocation, all dams will be kept in place to control water and sediment. The dams will be breached after basin cleanup is completed. The Rose Creek Diversion Channel will be maintained during the period of tailings relocation and groundwater cleanup.

A groundwater collection system consisting of multiple shallow extraction and monitoring wells will be constructed to capture localized groundwater contamination within the footprint of the relocated tailings. The extracted groundwater will be piped to a treatment plant and treated. The locations of the extraction and monitoring wells will be selected after the tailings are relocated. An adaptive management approach will be used, meaning that additional wells will be installed where necessary, until the groundwater is sufficiently clean that it will not contaminate Rose Creek.

After groundwater cleanup is complete, the Rose Creek Diversion will then be breached to restore flow to approximately the original channel. Fish habitat along the restored channel will be enhanced by installing riffles and excavating pools. Willows will be planted along the restored stream channel and seeded and fertilized. The Rose Creek Diversion channel will then be regraded to create stable slopes and be breached where streams enter the channel from the south. The North Fork Rock Drain will be breached and the material hauled to the Faro Waste Dump.

Post-Closure Requirements

Post-closure requirements for the "Complete Relocation" alternative include:

- Year-round pumping of contaminated groundwater and seepage to the water treatment plant for an estimated period of twenty years starting after the completion of tailings removal;
- Year-round operation and maintenance of the water treatment plant for the same period;

- Monitoring of water quality in and around the groundwater collection system for an estimated twenty years, but until no longer required, and in Rose Creek above and below the site for longer;
- Possible relocation or installation of additional extraction and monitoring wells;
- Possible relocation or installation of additional extraction and monitoring wells during the twenty year period;
- Annual inspections of all earthworks for an estimated period of twenty years but until no longer necessary.

4.3 Tailings Alternative 3 – Partial Relocation

The “Partial Relocation” alternative for the Rose Creek Tailings is illustrated in Figure 4.3. The primary objective of this alternative is to remove the portion of the tailings that presents the greatest risks and the greatest stabilization costs. The tailings in the Intermediate Pond are below the level of the Rose Creek Diversion Channel, and are therefore most at risk from failures of that structure. Relocating those tailings to the Faro Pit will mitigate those risks and significantly reduce the costs of upgrading the channel. The remaining tailings, in the Primary and Secondary Ponds, will present much lower risks of physical failure but will continue to need long-term management, including collection and treatment of contaminated groundwater. The following paragraphs summarize the major activities.

Closure Activities

The Intermediate Tailings will be pumped to the Faro Pit. The tailings will be hydraulically monitored along excavated trenches to a collection sump and pumped. Lime will be added to the slurry during pumping. Excess water is to be treated through a HDS system in a new treatment plant and discharged. Any remaining contaminated material in the intermediate impoundment area basin will be removed by truck and shovel to the Faro Pit. This area will be then graded for drainage and all surfaces will be seeded and fertilized.

The Secondary and Original Tailing Impoundments will be covered with a low-infiltration cover consisting of 0.5m of waste rock overlain by 1.0m of lightly compacted till. The tailings cover will be seeded and fertilized.

The Cross-Valley Dam will be removed. The impounded sludge will be excavated and hauled to a sludge containment cell and contaminated soils will be removed to the mill area. The Intermediate Dam will be kept in place to control water and sediment during tailings monitoring will be and breached after basin cleanup is completed. The east and west limbs of the Secondary Dam will be stabilized, either through ground densification with vibro-replacement stone columns or by the construction of buttresses. A compacted berm will also be constructed along the crest of the west limb to increase the freeboard and prevent the release of water that ponds on the tailings surface.

The Secondary and Primary tailings will be covered with a low-infiltration cover consisting of 0.5 m of waste rock overlain by 1.5 m of lightly compacted till. Construction of the covers will be sequenced and, if necessary, delayed to allow consolidation and settlement prior to placing a final grading layer. The cover will be seeded and fertilized.

The upper portion of the Rose Creek Diversion Channel will be upgraded to pass the PMF by deepening and widening the channel along its current alignment. Once the basin cleanup is completed, the diversion channel will be breached and re-connected to Rose Creek well downstream of the Secondary Dam. Fish habitat along the thalweg of the Intermediate Impoundment will be enhanced by installing riffles and excavating pools. Willows will be planted along the restored stream channel and the area will be seeded and fertilized. The lower portion of the Rose Creek Diversion channel will then be regraded to create stable slopes and will be breached where streams enter the channel from the south. The North Fork Rock Drain will be breached and the material hauled to the Faro Waste Dump or used as tailing cover material.

As in the "Complete Relocation" alternative, a groundwater collection system consisting of multiple shallow wells will be constructed to capture localized groundwater contamination from below the footprint of the relocated tailings. An additional long-term groundwater collection system will be constructed below the toe of the Secondary Dam, and will be operated with sufficient drawdown to capture any of the seepage that currently exits from the dam toe. Spare pumps and a redundant power supply will be put in place for emergency use. All extracted groundwater will be piped to a treatment plant and treated.

Post-Closure Requirements

Post-closure requirements for the "Partial Relocation" alternative include:

- Year-round pumping of contaminated groundwater and seepage to the water treatment plant;
- Year-round operation and maintenance of the water treatment plant;
- Periodic disposal of water treatment sludge in constructed cells;
- Monitoring of water quality in and around the groundwater collection system, and in Rose Creek above and below the site;
- Relocation or installation of additional extraction and monitoring wells;
- Annual inspections of all earthworks;
- Intensive maintenance of ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

With the maintenance exception noted above, all of the above activities are expected to continue to be required for several hundred years.

4.4 Tailings Alternative 4 – Minimize Construction

The "Minimize Construction" alternative for the tailings area is illustrated in Figure 4.4. This alternative represents the case where the up-front expenditure is kept to the minimum that could provide physical stability and environmental protection. The following paragraphs summarize the major activities.

Closure Activities

Physical stabilization measures are generally the same as those in the "Stabilize in Place" alternative:

- Upgrading of the Rose Creek Diversion Channel to pass a probable maximum flood;
- Buttressing of the Intermediate and Secondary dams; and,
- Removal of the Cross Valley Dam and pond.

The tailings would not be covered. Instead, a soil tackifier would be applied each year to prevent dust release, and a fence would be constructed to prevent direct uptake of tailings by animals.

A groundwater collection system similar to that of the "Stabilize in Place" alternative will eventually be needed, but construction will be deferred until monitoring shows that the groundwater contamination is about to reach the surface. An interim water treatment plant will be constructed to treat seepage and tailings runoff.

Post-Closure Requirements

Post-closure requirements for the "Minimum Construction" alternative include:

- Annual applications of soil tackifier to the tailings;
- Inspection and regular maintenance of the fence around the tailings;
- Monitoring of water quality in and around the groundwater collection system, and in Rose Creek above and below the site;
- Collection of seepage and eventually contaminated groundwater, and pumping to the water treatment plant;
- Year-round operation and maintenance of the water treatment plant;
- Periodic disposal of water treatment sludge in constructed cells;
- Possible relocation or installation of additional extraction and monitoring wells;
- Annual geotechnical inspections of all remaining earthworks and dams; and,
- Regular inspections and maintenance of the Rose Creek Diversion Channel.

5 Example Alternatives for Vangorda/Grum Area

The major components of the Vangorda/Grum Mine Area include the Vangorda Pit, Grum Pit, Vangorda waste rock, Grum waste rock (including sulphide cell, till dump, ore transfer pad and other waste) and the Vangorda Creek Diversion.

In general, different alternatives for the Vangorda/Grum Mine Area arise from a decision either to place the Vangorda waste rock back in the Vangorda Pit, or to stabilize it in place.

Technical studies indicate that the decision about Vangorda waste rock constrains the other major choice of closure method in the Vangorda/Grum Area, that of water treatment methodology. If the Vangorda waste rock is relocated to the Vangorda Pit, biological treatment in the Grum Pit will be the primary, and possibly the only water treatment method. If the Vangorda waste rock is stabilized in place, long-term chemical water treatment will be necessary.

In addition to the above components, all closure alternatives for the Vangorda/Grum Mine Area will include long-term groundwater collection and covers for the Grum waste rock. This report describes two example alternatives for the Vangorda/Grum Mine Area. It is possible to derive other alternatives that contain a broader range of closure options, but these are simply minor variances based on changes in cover design.

Table 5.1 summarizes the closure methods proposed in the example alternatives for the Vangorda/Grum Mine Area.

Table 5.1: Vangorda/Grum Mine Area Example Alternatives

Component	Alternative 1 Backfill Vangorda Pit	Alternative 2 Stabilize in Place	Alternative 3 Minimize Construction	Alternative 4 Minimize Water Treatment
Vangorda Waste Rock	Relocate to Vangorda Pit	Cover with 2.0m soil cover	Cover with 0.5m soil cover	Relocate to Vangorda Pit
Vangorda Creek Diversion	Re-route over Vangorda Pit	Upgrade now	Upgrade in future as needed	Upgrade now
Grum Waste Rock	*Dependent on waste type (see below)*			
Sulphide Cell	Cover with 2.0m soil cover	Cover with 2.0m soil cover	Cover with 0.5m soil cover	Cover with 2.5m soil cover
Ore Transfer Pad	Relocate part to Vangorda Pit Cover remainder with 0.5m soil cover	Relocate part to Grum Sulphide Cell Cover remainder with 0.5m soil cover	Cover with 0.5m soil cover	Cover with 2.0m soil cover
Other Waste	Cover with 0.5m soil cover	Cover with 0.5m soil cover	Cover with 0.5m soil cover	Cover with 2.0m soil cover
Water Collection	Below Grum Waste Rock	Below Grum and Vangorda waste rock	Delay until necessary below Grum and Vangorda waste rock	Below Grum and Vangorda waste rock
Water Treatment	Biological in Grum Pit	High density sludge with biological in Grum Pit	High density sludge with biological in Grum Pit	High density sludge with biological in Grum Pit

5.1 Vangorda/Grum Alternative 1 – Backfill Vangorda Pit

The “Backfill Vangorda Pit” alternative for the Vangorda Mine area is illustrated in Figure 5.1. The distinguishing feature of this alternative is the relocation of the entire Vangorda Dump into the Vangorda Pit. The relocation will accomplish two objectives. It will neutralize the most strongly acid-generating material in the area, thereby reducing the likelihood that long-term water treatment will be required. And it will allow Vangorda Creek to be routed back along its original alignment, thereby minimizing the risk of future failures. The following paragraphs summarize the major activities in each portion of the site. Further detail can be found in the “Construction Details and Cost Estimate” sheets found in Appendix A.

Closure Activities

Water from the Vangorda Pit will be pumped and treated at the present water treatment plant. The pit will then be backfilled with material from the Vangorda Dump, the high sulphide parts of the ore transfer pad and the high sulphide area at the southern end of the pit. Lime will be added to the acidic material during the backfill. The backfilled pit will be graded to direct runoff to runoff control ditches. Dust control measures will be taken during the relocation. A low infiltration cover consisting of 0.5m of compacted till overlain by 1.5m of uncompacted till will be placed over the area. All surfaces will be seeded and fertilized.

Vangorda Creek will be routed over the backfilled pit via a constructed channel. A series of rip rap lined drop sections will be included.

The footprint of the Vangorda Dump, after relocation of all material to the Vangorda Pit will be graded to ensure runoff, seeded and fertilized. Little Creek Dam will be breached.

The Grum Pit will be used for passive treatment by seasonal phosphate addition. The Grum Interceptor Ditch will be routed into the pit. The ditch will include a rip-rapped overflow point from which the water will cascade into the pit lake. A rock berm will be constructed at the mouth of the outlet channel at the slot cut on the south end of the pit to filter algae from discharging water. The outlet channel will be excavated to a elevation of 1230m, at the Grum Pit Lake and will discharge either into Vangorda Creek Tributary B or directly along its previous channel. In this case, waste rock will be excavated as needed to establish a drainage path. A berm will be constructed around the rim of the pit to prevent inadvertent access.

The Grum Dump waste rock slopes will be regraded to 3H:1V. A low infiltration cover consisting of 0.5 m of compacted till overlain by 1.5 m of uncompacted till will be placed on the sulphide cell. The remainder of the waste rock piles will be covered with 0.5 m of lightly compacted till. Runoff control ditches will be constructed on the cover. All surfaces will be seeded and fertilized.

The Overburden Dump slopes will be regraded to 3H:1V, seeded and fertilized.

The Ore Transfer Pad after relocation of acidic materials to the Vangorda Pit, will be graded to ensure runoff and covered with 0.5 m of lightly compacted till, then seeded and fertilized.

A groundwater collection system will be installed below the Grum Waste Dumps. An adaptive management program will be followed, and additional wells and cutoff walls will be constructed as required. A contingency is provided for groundwater collection at the backfilled Vangorda Pit. All collected groundwater will be pumped to the Grum Pit.

Unnecessary roads will be scarified, seeded and fertilized. All buildings will be demolished and disposed off in an unlined landfill area in the waste rock. Hydrocarbon contaminated soils located around mine maintenance areas will be excavated and remediated in the bioremediation cell. The existing bioremediation cell and sludge pond will be covered. All dams and existing settling ponds will be breached.

Post-Closure Requirements

Post-closure requirements for the “Backfill Vangorda Pit” alternative include:

- Year-round pumping of contaminated groundwater and seepage to the Grum Pit;
- Seasonal addition of phosphate to the Grum Pit lake;
- Monitoring of water quality in the Grum Pit, in and around the groundwater collection systems, and in Vangorda Creek above and below the site;
- Annual inspections of all earthworks;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

With the maintenance exception noted above, all of the above activities are expected to continue to be required for several hundred years.

5.2 Vangorda/Grum Alternative 2 – Stabilize In Place

The "Stabilize In Place" alternative for the Vangorda Mine area is illustrated in Figure 5.2. The objective of this alternative is to physically stabilize the area, collect all contaminated water in the Vangorda Pit, and treat it year-round. The following paragraphs summarize the major activities in each portion of the site.

Closure Activities

A berm will be constructed around the rim of the pit to prevent inadvertent access. A water treatment plant will be constructed to treat all contaminated water from the area, which will be stored in Vangorda Pit. The treated water will be discharged into Vangorda Creek.

The Vangorda Dump and the waste rock piles located at the southern end of the Vangorda Pit will be regraded to 3H:1V. The dumps will be covered with a low infiltration cover consisting of 0.5 m of compacted till overlain by 1.5 m of uncompacted till. Runoff control ditches will be constructed on the cover. All surfaces will be seeded and fertilized.

Vangorda Creek will be routed north of the pit along the present Vangorda Creek Diversion. The channel will be slightly re-aligned and also widened and deepened. A plunge pool will be constructed at the bottom of the diversion to disperse energy before discharging into Vangorda Creek. The Dixon Creek Diversion will be upgraded.

Acidic materials from the Ore Transfer Pad will be relocated to the sulphide cell area at the Grum Dump. The pad will be graded to promote runoff, covered with 0.5m of lightly compacted till, seeded and fertilized.

The Grum Dump waste rock slopes will be regraded to 3H:1V. A low infiltration cover consisting of 0.5 m of compacted till overlain by 1.5 m of uncompacted till will be placed on the sulphide cell. The remainder of the waste rock piles will be covered with 0.5 m of lightly compacted till. Runoff control ditches will be constructed on the cover. All surfaces will be seeded and fertilized.

The Overburden Dump slopes will be regraded to 3H:1V, seeded and fertilized.

A groundwater collection system will be installed below the Grum Waste Dump. A cost contingency is provided for a groundwater collection system that maybe required at the backfilled Vangorda Pit. All collected groundwater will be pumped to the water treatment plant.

Unnecessary roads will be scarified, seeded and fertilized. All buildings will be demolished and disposed off in an unlined landfill area in the waste rock. Hydrocarbon contaminated soils located around mine maintenance areas will be excavated and remediated in the bioremediation cell. The existing bioremediation cell and sludge pond will be covered. All dams and existing settling ponds except for Little Creek Dam will be breached.

Post-Closure Requirements

Post-closure requirements for the "Stabilize in Place" alternative include:

- Year-round pumping of contaminated groundwater and seepage to the water treatment plant;
- Year-round operation and maintenance of the water treatment plant;
- Periodic disposal of water treatment sludge in constructed cells;
- Seasonal addition of phosphate to the Grum Pit lake;
- Monitoring of water quality in the Grum Pit, in and around the groundwater collection systems, and in Vangorda Creek above and below the site;
- Annual inspections of all earthworks;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

With the maintenance exception noted above, all of the above activities are expected to continue to be required for several hundred years.

5.3 Vangorda/Grum Alternative 3 – Minimize Construction

The "Minimize Construction" alternative for the Vangorda/Grum area is illustrated in Figure 5.3. This alternative represents the case where the up-front expenditure on the site is kept to the minimum while still providing some level of environmental protection.

Closure Activities

The Vangorda Creek diversion will be maintained in its current channel, with only minor upgrades. A contingency is included to re-construct the channel after it fails or when failure is imminent.

Contaminated water will be stored in the Vangorda Pit. The pit water level will be maintained at a level low enough to store any floods that may breach the Vangorda Creek diversion channel. A water treatment plant will constructed to treat contaminated water.

Rudimentary covers, consisting of 0.5 m of lightly compacted till, will be constructed on the waste rock dumps, sulphide cells, as well as the oxide fines and low grade ore stockpiles. The covers will be seeded and fertilized to promote vegetation growth. The sideslopes of the waste rock dumps will not be re-sloped, and the cover will not be constructed on any slopes greater than 2H:1V.

The construction of groundwater collection systems below the Grum and Vangorda Dumps will be deferred until escape of groundwater contamination is determined to be imminent.

Post-Closure Requirements

Post-closure requirements for the "Minimize Construction" alternative are generally the same as in the "Stabilize in Place" alternative. However, there will be the following differences:

- The rudimentary covers are expected to require additional maintenance and repair.
- Groundwater will need to be rigorously monitored to determine when it is necessary to construct a groundwater collection system.
- Once groundwater collection begins, the systems will need to operate with a very high efficiency, and will therefore need extensive monitoring and possibly regular upgrading.
- Due to the lack of effective covers on the waste rock, sulphide cells, oxide fines and low grade ore, acid generation is expected to continue and water treatment costs are expected to be higher than in the other Faro Mine alternatives.

5.4 Vangorda/Grum Alternative 4 – Minimize Water Treatment

The “Minimize Water Treatment” alternative for the Vangorda/Grum area is illustrated in Figure 5.4. This alternative represents the case where additional source control measures are taken in an effort to minimize the generation of contaminated water and the requirements for long-term treatment.

Closure Activities

The closure activities in this alternative are the same as in the “Backfill Vangorda Pit” alternative, with the following exceptions:

- The Grum sulphide cell will be covered with a very low infiltration soil cover, assumed to consist of 1 m of compacted till overlain by 1.5 m of lightly compacted till, seeded and fertilized to promote vegetation growth.
- The remainder of the Grum Dump and the backfilled Vangorda Pit will be covered with a low infiltration soil cover, assumed to consist of 0.5 m of compacted till overlain by 1.5 of uncompacted till, seeded and fertilized to promote vegetation growth.

Post-Closure Requirements

Post-closure requirements for the “Minimize Water Treatment” alternative include:

- Year-round pumping of contaminated groundwater and seepage to the Grum Pit, and seasonal addition of phosphate to the water;
- Monitoring of water quality in the Grum Pit, in and around the groundwater collection systems, and in Vangorda Creek above and below the site;
- Annual inspections of all earthworks;
- Intensive maintenance of covers and ditches for a period of five years after closure, and limited bi-annual maintenance thereafter with additional repairs after extreme events.

6 Assessment of Residual Risks

The risks associated with each alternative were assessed in three facilitated workshops with representatives of the FMCPO, SRK, the Type II Mines Office, First Nations, and Environment Canada. The workshop participants identified risks, proposed mitigation measures that were subsequently added to the alternatives, and then assessed the level of residual risk. All residual risks that were judged by the group to be moderately high, high or very high are discussed herein. The complete results of the risk rating workshops are presented in Attachment C.

6.1 Faro Mine Area Residual Risks

The residual risks associated with the example alternatives for the Faro Mine area can be grouped into five categories:

- Risks that the soil covers and groundwater collection systems will not perform adequately;
- Risks of failure of the groundwater collection systems;
- Risks that water treatment systems will not perform adequately;
- Risks that implementation costs will be higher than estimated; and,
- Risks that long-term costs will be higher than estimated.

There are significant differences among the alternatives in the level of some of these risks. The major distinctions are pointed out in the more detailed discussions below.

6.1.1 Performance of Covers and Groundwater Collection Systems

All of the Faro Mine area alternatives carry some level of risk that the covers on the waste rock, oxide fines and low grade ore, and/or the groundwater collection systems, will not perform as well as expected. The amount of risk varies from one alternative to another.

- Under the Minimize Construction alternative, almost any combination of poor cover performance, poor groundwater collection, and/or contaminant concentrations above the estimates would lead to long-term contamination of Rose Creek;
- Under the Flow-Through Pit and Upgrade Faro Creek Diversion alternatives, only the S-Well groundwater collection system, which requires a high capture efficiency in difficult ground conditions, presents a high risk. The other risks are also present in these alternatives, but are less than in the Minimize Construction case.
- Under the Minimize Water Treatment alternative, the improved control of the contaminant sources reduces all of these risks. However, because the collection of contaminated water will be required even in this alternative, the risks are not completely eliminated.

Another way to examine this group of risks is shown in Table 6.1 below. The table present estimates of the groundwater collection efficiencies needed under each alternative, given consistent assumptions about groundwater quality and cover performance. The alternatives estimated to require the higher groundwater collection efficiencies are at greater risk of allowing downstream contamination. By extension, those alternatives are also more sensitive to variability in cover performance and groundwater quality.

Complete results of the water and load balance runs used to produce these tables, including sensitivity analyses are included in Attachment D. Key input assumptions are summarized in Table 6.2. It is important to note here that the assumptions in calculations of this type are numerous and, therefore, the numbers shown in Table 6.1 should be taken only as indicative of the differences amongst the alternatives. The absolute numbers are not meaningful.

Table 6.1: Required Groundwater Collection to meet BC Zinc Criterion of 0.24 mg/L at X14 during March Low Flow Period

Mine Area Example Alternatives	Required Groundwater Collection[1]					
	Tailings Stabilized In Place			Tailings Completely Relocated		
	Waste Rock[2]	ETA	Tailings	Waste Rock[2]	ETA	Tailings
1 Flow-Through Pit	>95%	>99%	>99%	>95%	>99%	n/a
2 Upgrade Faro Ck Diversion	96%	99%	99%	90%	95%	n/a
3 Minimize Construction	99%	99%	99%	95%	99%	n/a
4 Minimize Water Treatment	80%	93%	98%	70%	80%	n/a

Notes: 1. Based on "Future 2" source chemistry and base case assumptions shown in Table 6.2
2. Groundwater collection systems below Zone II Pit and in S-Well area

Table 6.2: Assumptions in Water and Load Balance

Covers	**Infiltration**
Rudimentary covers	20% of MAP
Low infiltration covers	5% of MAP
Very low infiltration covers	
Soil only	2% of MAP
Soil and geosynthetic	0.5% of MAP
Waste rock and till covers on Rose Creek Tailings	10% of MAP
Treatment effectiveness	**Assumption**
Bio-remediation in Faro Pit lake	Zinc removal of 37 tonnes per year
Lime addition during tailings relocation	No contaminants from relocated tailings

6.1.2 Failure of Groundwater Collection Systems

A related but different group of risks is associated with temporary failure of the groundwater collection systems (which are assumed to otherwise perform well). Two time periods are relevant. A short-term failure of, say, two weeks could occur when, for example, the power supply to the site is damaged and backup systems are not maintained. Alternatives, where the groundwater is more contaminated, present higher levels of this type of risk for reasons very similar to those given in the preceding paragraphs.

A longer term failure of up to a year or more could result from a significant management problem, for example a complete cessation in funding. Interestingly, the levels of this type of risk are roughly similar in all of the alternatives. The reasons are that all of the alternatives are subject to management failures, and in all cases the groundwater would be contaminated enough that a year of uncontrolled release would cause significant contamination in Rose Creek.

6.1.3 Performance of Water Treatment System

The Flow-Through Pit alternative carries additional performance risks related to the passive biological treatment process. Future increases in contaminant loadings, errors in the water quality estimates, or ineffective treatment could all lead to environmental and/or cost risks. The environmental risk would be a discharge of poor quality water if any of the above problems occurred during a year of high inflows. The cost risk would arise if the problems persist for several years, so that it becomes necessary to switch to active treatment. The other three alternatives include active treatment using high density sludge lime addition systems, which is a well established treatment technology.

This alternative also results in higher risks for the cover and groundwater collection systems due to the release of higher volumes of treated water.

6.1.4 Cost Risks

Two groups of risk common to all of the alternatives are related to cost. The first group covers the risks of implementation costs being higher than estimated. These risks are generally similar under all alternatives, because the estimates include variable levels of contingencies.

The second group covers the risks of long-term operating, maintenance, or repair costs being higher than estimated. The Minimize Water Treatment alternative has less risks of this type, principally because the higher costs are incurred up front. The other three alternatives have a higher risk of increased groundwater collection and treatment costs for the reasons discussed above.

6.2 Tailings Area Residual Risks

The residual risks associated with the example alternatives for the Rose Creek Tailings area can be grouped into six categories:

- Risks that the soil covers and groundwater collection systems will not perform adequately;
- Risks of failure of the groundwater collection systems;
- Risks of dam breaches and tailings release;
- Risks of other maintenance failures;
- Risks that implementation costs will be higher than estimated; and,
- Risks that long-term costs will be higher than estimated.

Again, there are significant differences in the level of risk amongst the alternatives. These distinctions are pointed out in the more detailed discussions below.

6.2.1 Performance of Covers and Groundwater Collection Systems

The Stabilize in Place, Partial Relocation and Minimize Construction alternatives leave some or all of the tailings in place, leading to risks that more water will infiltrate the tailings surface (with or without a cover), that the resulting groundwater contamination will be more severe, and/or that the long-term groundwater collection system will not perform as well as predicted. As was the case for the Faro Mine area, any or all of these risks could result in environmental impacts in Rose Creek. The Complete Relocation alternative does not leave tailings in the valley and therefore does not have these risks.

6.2.2 Failure of Groundwater Collection Systems

Temporary failure of the groundwater collection system could also lead to downstream contamination. In the absence of a functioning collection system, the contaminated groundwater in the tailings area is expected to discharge quickly to the surface. Therefore, even a short-term failure of, say, two weeks duration would lead to impacts in Rose Creek. Longer term failures, such as the example of a one-year cessation in funding, would lead to more severe impacts. Again, only the three alternatives that keep some or all of the tailings in place have these risks; the Complete Relocation alternative does not.

6.2.3 Dam Failure or Breach and Tailings Release

As long as there are tailings remaining behind a dam, there is at least some risk of the dam failing in an earthquake or breaching in a flood, resulting in the release of tailings. However, there are significant differences among the alternatives:

- In the Stabilize in Place and Minimize Construction alternatives, the Rose Creek Diversion Channel remains above the tailings over much of its length. Failure of that channel, for example due to poor maintenance or a slope failure above the channel, coupled with a severe flood could cause a breach of the Intermediate Dam and a very significant outflow of tailings. The tailings transported downstream would be a long-term source of contamination throughout Rose and Anvil Creeks.

- In contrast, the Partial Relocation option eliminates the more hazardous portion of the Rose Creek Diversion Channel. The Secondary Dam could conceivably still fail, but there would be no mechanism by which a large amount of tailings could be flushed downstream.
- The risk of a tailings dam breach in the Complete Relocation option is limited to the relatively short period when the tailings are being relocated.

6.2.4 Other Maintenance Failures

Other failures of maintenance could lead to less significant impacts under the Stabilize in Place, Partial Relocation and Minimize Construction alternatives. In all three cases, failure of diversions on either side of the valley could inundate the tailings and either transport tailings solids downstream or contaminate the soil cover. In addition, under the Minimize Construction alternative, failure to apply an adhesive agent to the tailings surface could allow tailings dust to be blown out of the impoundment surface, causing contamination of the surrounding soil and vegetation.

6.2.5 Cost Risks

The two groups of cost-related risks are also common to the tailings area alternatives. There is a risk that implementation costs will be higher than expected in all cases. These risks are higher for the Complete Relocation alternative, due to the extended duration of the relocation work and the exposure to changes in third party prices such as for lime and power. The Partial Relocation alternative shares some of the same risks as the Complete Relocation alternative. Uncertainties in costs for the Rose Creek Diversion Channel upgrade are the most significant implementation cost risks for the Stabilize in Place and Minimize Construction alternatives. This is the only risk grouping where the Tailings Relocation alternative is riskier than the others.

The Stabilize in Place, Partial Relocation and Minimize Construction alternatives have higher risks associated with long-term operating, maintenance, or repair costs. Two examples are the risk that a significant earthquake could damage the tailings covers, and the risk that maintenance costs for the Rose Creek Diversion Channel will be high.

6.3 Vangorda/Grum Mine Area Residual Risks

The residual risks associated with the example alternatives for the Vangorda/Grum area are the same as those for the Faro Mine area:

- Risks that the soil covers and groundwater collection systems will not perform adequately;
- Risks of failure of the groundwater collection systems;
- Risks that water treatment systems will not perform adequately;
- Risks that implementation costs will be higher than estimated; and,
- Risks that long-term costs will be higher than estimated.

6.3.1 Performance of Covers and Groundwater Collection Systems

All four of the Vangorda/Grum alternatives have risks associated with performance of the waste rock covers and groundwater collection systems, and uncertainty in the water quality predictions. There are significant differences among the alternatives:

- Under the Backfill Vangorda Pit, Stabilize Current Situation, and Minimize Water Treatment alternatives, the high risks are those associated with the Grum Dump. In particular, if the Grum Dump becomes more acidic than is currently predicted, the requirements for cover performance and groundwater collection would increase to levels that would be hard to meet.
- The Minimize Construction alternative shares the risks associated with the Grum Dump, and heightens them because of the relatively poorer cover and groundwater collection system. In addition, the poorer covers on the Vangorda Dump, which is already acidic, create additional risks.

6.3.2 Failure of Groundwater Collection Systems

Unlike the Faro Mine area and the tailings area, short-term failures of groundwater collection in the Vangorda/Grum area are less likely to lead to significant environmental impacts. The reason is that the contaminated groundwater in this area moves more slowly. Only the Minimize Construction alternative has a significant risk in this group, and it arises because of the possibility that a delay in detecting the escape of groundwater contamination could allow some of it to pass beyond the zone from which it could be re-captured.

6.3.3 Vangorda Diversion Risks

Risks associated with the failure of damage to the Vangorda Creek diversion also differ among the four alternatives. Under the Backfill Vangorda Pit alternative, the Vangorda Creek diversion would not be required in the long term, and the only risk is that there could be flooding and a washout of solids during implementation of the backfilling. The Stabilize Current Situation and Minimize Water Treatment alternatives include relocation and upgrading of the diversion, but there would remain a reduced possibility of failure in future. The Minimize Construction alterative does not include relocation or major upgrading of the diversion, and therefore would carry a higher risk of failure.

6.3.4 Cost Risks

The Backfill Vangorda Pit alternative has a risk that implementation costs will be higher than expected, due principally to uncertainty in the amount of lime that would need to be added to the waste rock prior to backfilling.

Risks of increased operating, maintenance and repair costs are common to all four of the Vangorda/Grum alternatives. The primary risks are those arising from uncertainties in groundwater collection costs at the Grum Dump, and the possibility that the Grum Pit passive water treatment system might need to be replaced by an active treatment system.

7 Estimated Costs

Cost estimates were developed for both the closure and post-closure phases of each alternatve. The closure phase was assumed to include design and construction of all components (except water treatment systems). The post-closure phase was assumed to include construction and perpetual operation of the water treatment systems, as well as inspection, maintenance and repairs of other components constructed in the clsoure phase.

Table 7.1 provides a summary of the closure period costs for each example alternative.

Table 7.2 provides a summary of the post-closure costs. To allow comparison with the closure period costs, the annual operating and maintenance costs are converted to a net present value (NPV). The NPV calculations assume that operating and maintenance costs will be required in perpetuity, and use a net discount rate of 3%. A simple way to interpret the NPV is that it is the amount of money that would need to be put into the bank today in order to fund perpetual post-closure operations and minatenance, if the bank provided an interest rate of 3%.

Table 7.3 summarizes the total closure and post-closure costs for each example alternative.

Attachment E presents further details of the cost estimates.

Table 7.1: Estimated Closure Period Costs for Example Alternatives

Example Alternative	Direct Costs	Indirect Costs	Total Closure Costs
Faro Mine Area			
Flow-through Faro Pit	$55,100,000	$25,800,000	$80,900,000
Ugrade Faro Ck Diversion	$53,900,000	$25,300,000	$79,300,000
Minimize Up-Front Construction	$23,700,000	$11,400,000	$35,000,000
Minimize Water Treatment	$123,000,000	$57,100,000	$180,100,000
Rose Creek Tailings			
Complete Relocation	$286,300,000	$132,200,000	$418,500,000
Stabilization in place	$89,300,000	$41,600,000	$130,900,000
Partial Relocation	$173,300,000	$80,200,000	$253,500,000
Minimize Up-Front Construction	$38,700,000	$18,300,000	$57,000,000
Vangorda/Grum Mine Area			
Vangorda Pit Backfill	$57,800,000	$28,500,000	$86,400,000
Stabilize Current Situation	$22,800,000	$11,500,000	$34,300,000
Minimize Up-Front Construction	$8,400,000	$4,600,000	$12,900,000
Minimize Water Treatment	$69,500,000	$34,200,000	$103,700,000

Table 7.2: Estimated Post-Closure Costs for Example Alternatives

Example Alternative	Treatment System Capital Cost	Average Annual Post-Closure Operating & Maintenance Cost	Treatment Capital + Post-Closure (Net Present Value)
Faro Mine Area			
Flow-through Faro Pit	$0	$1,100,000	$38,400,000
Ugrade Faro Ck Diversion	$3,500,000	$1,100,000	$36,800,000
Minimize Up-Front Construction	$3,400,000	$1,100,000	$38,400,000
Minimize Water Treatment	$2,800,000	$1,100,000	$35,400,000
Rose Creek Tailings			
Complete Relocation	$3,400,000	$600,000	$24,600,000
Stabilization in place	$5,200,000	$1,700,000	$52,800,000
Partial Relocation	$3,900,000	$1,400,000	$41,800,000
Minimize Up-Front Construction	$5,300,000	$1,900,000	$56,800,000
Vangorda/Grum Mine Area			
Vangorda Pit Backfill	$0	$600,000	$17,200,000
Stabilize Current Situation	$2,700,000	$900,000	$30,700,000
Minimize Up-Front Construction	$3,900,000	$1,000,000	$32,200,000
Minimize Water Treatment	$6,400,000	$700,000	$18,600,000

Table 7.3: Summary Cost Estimates for Example Alternatives

Example Alternative	Closure	Post-Closure NPV	Total
Faro Mine Area			
Flow-through Faro Pit	$80,900,000	$38,400,000	$119,300,000
Ugrade Faro Ck Diversion	$79,300,000	$36,800,000	$116,100,000
Minimize Up-Front Construction	$35,000,000	$38,400,000	$73,400,000
Minimize Water Treatment	$180,100,000	$35,400,000	$215,400,000
Rose Creek Tailings			
Complete Relocation	$418,500,000	$24,600,000	$443,100,000
Stabilization in place	$130,900,000	$52,800,000	$183,700,000
Partial Relocation	$253,500,000	$41,800,000	$295,400,000
Minimize Up-Front Construction	$57,000,000	$56,800,000	$113,800,000
Vangorda/Grum Mine Area			
Vangorda Pit Backfill	$86,400,000	$17,200,000	$103,600,000
Stabilize Current Situation	$34,300,000	$30,700,000	$65,000,000
Minimize Up-Front Construction	$12,900,000	$32,200,000	$45,200,000
Minimize Water Treatment	$103,700,000	$18,600,000	$122,300,000

Figures

Attachment A
Annotated Bibliography of Project Reports

Attachment B
Preliminary Soil Cover Designs

Attachment C
Results of Risk Rating Workshops

1 Introduction

This attachment presents the results of three facilitated workshops held to assess the risks associated with the example alternatives.

The workshop participants included representatives of the Faro Mine Closure Planning Office, SRK, the Type II Mines Office, Selkirk, Ross River, and Environment Canada. All participants were provided with draft copies of the example alternatives report prior to the workshop. A preparatory day was held immediately prior to the first workshop to review the draft report and introduce the risk rating method.

2 Method

The workshops used a modified form of the “Risk Rating” method developed by the INAC Contaminated Sites Program.

The risk rating method employs the three charts on the following pages.

The “Consequence-Severity Matrix” lists various types of negative outcomes, and classifies their severity from “Low” to “Critical”. The matrix shown here is taken directly from the INAC-CSP guidance. The examples show how consequence severities have been classified at other mine sites.

The “Likelihood” chart defines a series of terms used to define the likelihood that a consequence (from the previous chart) will be realized. The columns of the table give examples to guide the selection of the appropriate term.

The “Risk Matrix” assigns each combination of severity and likelihood to a “risk” level. The significance of the risk levels is only apparent when one considers the resulting actions. For the assessment of example alternatives, the following set of “required actions” was adopted.

- For “Very High”, “High” and most “Moderately High” risks, available mitigation measures were added to the alternative and included in the cost estimate.
- For “Moderate”, “Low” and “Moderately High” risks with low probabilities, contingencies were added to the cost estimates.
- All risks that, after mitigation measures and contingencies are added, still classified as “Very High”, “High” or “Moderately High” were identified as “residual risks” in subsequent presentations of the example alternatives.

The workshops were held at SRK’s Vancouver offices in January and February 2006. Within the workshops, the risk rating tools were applied as follows for each example alternative:

- The example alternative was introduced and its components described by the SRK and FMCPO engineers. Workshop participants asked questions where needed to clarify their understanding of the alternative.

- For each component of that alternative, the workshop participants were then asked to identify scenarios or conditions leading to risks. Each scenario or condition was followed through to one of the consequences shown on the C-S matrix. For example, if a "dam failure" scenario was suggested, the group was asked to work though the subsequent chain of events, such as "tailings release leading to severe long-term contamination of Rose Creek".

- The group then agreed where the consequence lies on the C-S scale. In the above example, it would likely be a "Major" or "Critical" consequence in the "Environmental" category.

- The group then assessed likelihood of the final consequence. Again using the above example, the likelihood of a dam failure is one quantity, but the quantity needed in the risk rating system is the likelihood of a dam failure leading to tailings release leading to a "Major" or "Critical" environmental consequence.

- Other consequences were then examined in the same manner. The above example would certainly also have "Consequence Costs". It would also have "Legal" and "Community/Media/Reputation" consequences.

- Once all components were assessed, the group returned to risks where mitigation measures are available, discussed the mitigation measure and its likely costs.

- The "mitigated alternative" was then re-assessed and the risk ratings revised.

Figure 1. Consequence Severity Matrix (*with examples from other Type II sites*)

Consequence Categories	Very Low	Minor	Moderate	Major	Critical
1. Environmental Impact	No impact.	Minor localized or short-term impacts.	Significant impact on valued ecosystem component.	Significant impact on valued ecosystem component and medium-term impairment of ecosystem function.	Serious long-term impairment of ecosystem function.
		UKHM: Ice plug release at Onek 400 adit	*UKHM: Tailings dam breach*	*Mt. Nansen: Failure of Main Dam leads to release of contaminated water & tailings into Victoria Creek*	
2. Special Considerations	Some disturbance but no impact to traditional land use.	Minor or perceived impact to traditional land use.	Some mitigable impact to traditional land use.	Significant temporary impact to traditional land use.	Significant permanent impact on traditional land use.
		Clinton Creek: Ongoing erosion of tailings into creek			*Mt. Nansen: Tailings dam breach*
3. Legal Obligations	No non-compliance but lack of conformance with departmental policy requirement. Informal advice from a regulatory. agency. No land claim or other agreement.	Technical/Administrative non-compliance with permit, approval or regulatory requirement. Warning letter issued. Land claim or other agreement requires the Crown to satisfy administrative obligations (e.g. notification).	Breach of regulations, permits, or approvals (e.g. 1 day violation of discharge limits). Order or direction issued. Land claim or other agreement requires the Crown to respond, but no time frame is specified.	Substantive breach of regulations, permits or approvals (e.g. multi-day violation of discharge limits). Prosecution. Land claim or other agreement requires the Crown to exercise its obligations within a specified time frame (i.e. 2-5 years)	Major breach of regulation – wilful violation. Court order issued. Land claim or other agreement requires the Crown to exercise its obligations within a specified short time frame (i.e. 1-2 years)
			Mt. Nansen: Hydrocarbon from historical spills seeps into receiving water	*UKHM: Tailings dam breach*	
4. Consequence Costs	< $100,000	$100,000 - $500,000	$ 500,000 - $2.5 Million	$2.5-$10 Million	>$10 Million
		Mt. Nansen: Erosion leads to loss of spillway		*Mt. Nansen: fire in mill leads to loss of power and treatment*	*UKHM: Tailings dam breach leading to tailings release*
5. Community/ Media/Reputation	Local concerns, but no local complaints or adverse press coverage.	Public concern restricted to local complaints or local adverse press coverage.	Heightened concern by local community, criticism by NGOs or adverse local /regional media attention.	Significant adverse national public, NGO or media attention.	Serious public outcry/demonstrations or adverse International NGO attention or media coverage.
				UKHM: Tailings dam breach	
6. Human Health and Safety	Low-level short-term subjective symptoms. No measurable physical effect. No medical treatment.	Objective but reversible disability/impairment and /or medical treatment injuries requiring hospitalization.	Moderate irreversible disability or impairment to one or more people.	Single fatality and /or severe irreversible disability or impairment to one or more people.	Multiple fatalities.
			UKHM: Public access to boneyards leads to injury	*UKHM: Snow machine accident on waste rock leads to fatality*	*UKHM: Vehicle accident on poorly maintained road leads to multiple fatalities*

Figure 2. Likelihood Terminology

Likelihood	Descriptor 2	Frequency Descriptor	Probability of occurrence over twenty years	Probability of occurrence in any one year
Almost Certain	Happens often	High frequency (more than once every 5 years)	98%	17.8%
Likely	Could easily happen	Event does occur, has a history, once every 15 years	75%	6.7%
Possible	Could happen and has happened elsewhere	Occurs once very 40 years	40%	2.5%
Unlikely	Hasn’t happened yet but could	Occurs once every 200 years	10%	0.5%
Very Unlikely	Conceivable, but only in extreme circumstances	Occurs once every 1000 years	2%	0.1%

Figure 3. Risk Matrix

Likelihood	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost Certain	Moderate	Moderately High	High	Very High	Very High
Likely	Moderate	Moderate	Moderately High	High	Very High
Possible	Low	Moderate	Moderately High	High	High
Unlikely	Low	Low	Moderate	Moderately High	Moderately High
Very Unlikely	Low	Low	Low	Moderate	Moderately High

3 Results

All steps in the risk rating process for each alternative were recorded on a spreadsheet. Print-outs of the spreadsheet were distributed to participants each evening, and reviewed the next day.

The final spreadsheets were then re-sorted by SRK to highlight the “Very High”, “High” and “Moderately High” residual risks. The re-sorted results are provided on the following twelve pages.

Although the results have been sorted, they remain are the raw output of the workshops. Some of the descriptions and ratings are likely to be understandable only to people who participated in the workshops. The description of residual risks in Section 6 of the Example Alternatives report provides the more complete discussion that will be of interest to most readers.

Tailings Alternative 1 - Stabilize in Place - After Mitigation

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			21C, 25E		
Possible			10C, 18C, 12E, 13E, 9E, 3C, 20E	15C	
Unlikely			14E, 16C	1C, 5E, 5C, 7E, 8E, 11E, 19E, 22E, 23E, 24E	
Very Unlikely			2E		4E, 4C, 6E, 17E, 17C

	Risks of groundwater collection and cover performance estimates not being achieved
8E	Escape of 3 % (or greater) of the groundwater (from Tailings) leads to chronic exceedance of site specific criterion (for current design)
11E	Cover does meet design performance for infiltration leading to increased load in seepage collection bypass causing an exceedance in site specific criterion
22E	Uncertainty in water quality modelings leads to loadings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion
12E	Runoff from the north side of the valley leads to increased loading in seepage collection bypass causing an exceedance in site specific criterion
	Risks of failure of groundwater collection & treatment system
7E	Water collection and treatment system fails due to technical constraint to operate for 1 year leading to contaminant release
9E	Shutdown or systematic failure of groundwater collection system for more than 2 weeks leads to periodic exceedance of site specific criterion
24E	Institutional upset leads to a year of groundwater seepage discharge without collection and treatment
	Risks of tailings dam breach and tailings release
4E	Flood exceeding the design flood, overtops the diversion and causes failure leading to failure of intermediate dam leading to tailings release
5E	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
6E	Institutional faiilure leads to lack of adequate maintenance leading to breach of the Intermediate Dam
17E	Dam stabilization ineffective leading to a breach of the Intermediate or Secondary Dam during an earthquake
	Risks of non-catastrophic maintenance failures
13E	Run-on (from Rose Creek Div) leakage causes inundation of Int. Pond Cover and causes zinc contamination of cover surface
20E	Failure of Guardhouse Creek diversion fails and leads to inundation of Int. Pond Cover and causes zinc contamination o fthe cover surface
19E	Aufeis (Glaciation) leads to partial blockage leads causing diversion overtopping of diversion causing erosion and release of tailings
23E	Vegetation growth and sedimentation cause decrease in capacity and overtopping of diversion
25E	Poor maintenance decisions lead to operational failures
	Risks of implementation costs being higher than estimated
1C	Construction of spillway more costly than expected
21C	Soil and/or permafrost conditions cause additional cost in construction of Rose Creek Diversion
18C	Addiitonal measures required to stabilize the downstream face of the intermediate dam
	Risks of operating, maintenance and repair costs being higher than estimated
15C	Liquefaction of tailings during an earthquake causes substantial damage to cover leading to significant reconstruction costs
3C	Spillway maintenance costs will be high
4C	Flood exceeding the design flood, overtops the diversion and causes failure leading to failure of intermediate dam leading to tailings release
5C	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
10C	Collection volume for treatment is substantially higher than allowed for in current design
17C	Dam stabilization ineffective leading to a breach of the Intermediate or Secondary Dam during an earthquake
	Moderate and low risks
14E	Upwelling of tailings through the waste rock and wicking causes formation of evaporites to form on the surface of the cover
16C	Differential settlement and erosion of the cover leads to increased maintenance costs
2E	The spillway does not allow fish passage leading to long term impacts

Tailings Alternative 2 - Complete Relocation - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			8C	2C	
Unlikely		7E, 12C, 19C, 20C	3C, 6C, 7C, 13C, 15C, 17E	9C, 10C, 23C	22C
Very Unlikely		21C	6E, 16C	4E, 4C, 5H, 11C, 14E, 18H	

	Risks of implementation costs being higher than estimated
2C	Slurry density less than CURRENT estimate 35 % leading to increased operating time and to 20 % increase in operating cost
8C	Local escalation in labour costs leading to higher closure cost
9C	Under-estimation of lime demand leading to increased lime costs
10C	Increase in lime costs (function of fuel costs) leading to increased overall costs
23C	Greater than 2 m thickness of tailings currently allowed for left after minitoring complete leading to increased cost
22C	Changes in government leading to short term stop in funding and resulting in project delays; ongoing care and maintenance

	Moderate and low risks
1	Failure of slurry pipeline leads to tailings cleanup and pipeline repair
3C	Slurry density less than DESIGN estimate 35 % leading to increased operating time and to 20 % increase in operating cost
4E, C	Hydrualic mining leads to a significant tailings and/or contaminated water release
5H	Unanticipated movement of faces leading to burying of operator
6C	Water loading to tailings leading to increased contaminant leaching to the aquifer leading to increased treatment costs
7C	Difficulties with final clean-up leads to extended loading to aquifer
11C	Increased power costs leading to increased overall costs
13C	Removal of contaminated material creates need for local reconstruction of Rose Creek between breached sections
14E	Failure of Rose Creek leading to the flooding of the tailings area during relocation and leads to loss of operations for 1 year
15C	Failure of Rose Creek diversion during adaptive management, after tailings relocated, leading to flooding of the valley
17E	Groundwater collection system performance does not meet design efficiency leading to seepage bypass causing an exceedance in the site specific site criterion
18H	Operator error leading to fatality
6E	Water loading to tailings leading to increased contaminant leaching to the aquifer
7E	Difficulties with final clean-up leads to extended loading to aquifer
12C	Use of geosynthetics in channels (dam breach) lead to increased maintenance and replacement costs
16C	Failure of Rose Creek diversion during adaptive management, after tailings relocated, leading to loss of flow in D/S Rose Creek
19C	Power supply to the mine site is interupted leading to loss in production
20C	Failure of the Faro Creek Diversion fails leads to flooding of the pit preventing tailings deposition
21C	Dam construction materials contains contamination that needs to be removed leading to increased closure costs

Tailings Alternative 3 - Partial Relocation - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely		2C			
Possible			7E, 15C, 24C	20C	
Unlikely			1C, 9C, 12E, 13E, 14E, 16C, 21C, 28C	6E, 10C, 11E, 19E, 25C	30C
Very Unlikely			18C	3C, 3E, 4C, 4E, 5C, 5E, 8E, 22C, 22E, 23H, 26C, 27C, 29H	17E, 17C

	Risks of groundwater collection and cover performance estimates not being achieved
11E	Cover design does not meet infiltration performance causing exceedence of site-specific criteria
19E	Uncertainty in WQ modelling leads to loadings greater than predicted and leading to chronic exceedence of site-specific criteria
	Risks of failure of groundwater collection & treatment system
6E	Water collection and treatment system fails to operate for one year leading to contaminant release
7E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria
	Risks of tailings dam breach and tailings release
17E	Dam stabilization ineffective leading to breach of Secondary Dam during earthquake
	Risks of implementation costs being higher than estimated
20C	Slurry density less than current estimate leads to increased operating time and cost
24C	Local escalation in labour costs leads to increase in tailings relocation costs
24C	Underestimation of lime demand leads to increase in liming costs
30C	Changes in government leading to short-term stop in funding and resulting project delays, ongoing C & M
10C	Adaptive management of groundwater is more lengthy and complex than anticipated
	Risks of operating, maintenance and repair costs being higher than estimated
17C	Dam stabilization ineffective leading to breach of Secondary Dam during earthquake
	Moderate and low risks
1C	Soil conditions result in increased costs for Rose Creek diversion channel upgrade
2C	Spillway maintenance costs will be high
3C, 3E	Failure of mtce in RCDC Failure of erosion control along leads to slumping of tailings into creek
4C, 4E	Rainfall induced slope movement liked to flood leads to erosion of Sec Dam and slumping of tailings into creek
5C, 5E	Institutional failure leads to RCDC failure, ersoion of Sec Dam and slumping of tailings into creek
8E	Escape of groundwater from tailings greater than expectations leads to chronic exceedence of site-specific criteria
9C	Long-term groundwater collection volume greater than assumed in design
12E	Runoff from north side of valley leads to increased loading in seepage collection bypass causing exceedence of site-specific criteria
13E	Runoff from north side and cover leads to erosion of dam and release of tailings
14E	Upwelling of tailings through waste rock and wicking causes formation of evaporites to form on the surface of the cover
21C	Slurry density less than design estimate leads to increased operating time and cost
22C	Hydraulic mining leads to significant release of tailings
23H	Unanticipated movement of faces leads to burying of operator
26C	Increased lime cost leads to increased liming costs
27C	Increased power costs leads to increased overall cost
28C	Removal of contaminated material creates need for local reconstruction of rose creek betweeen the breached sections
29H	Operator error leading to fatality
18C	Upon further investigation, additional measures are required to stabilize downstream face of secondary dam

Tailings Alternative 4 - Lowest Capital Cost or "Minimize Construction" - After Mitigation

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			20C, 24E		
Possible			3C, 9E, 10C, 12E, 14E, 17C, 19E	8E, 11E, 15C, 21E, 23E, 25E, 25C	22E
Unlikely			13E	1C, 5E, 5C, 7E, 18E	
Very Unlikely			2E		4E, 4C, 6E, 16E, 16C

	Risks of groundwater collection and cover performance estimates not being achieved
8E	Escape of sig greater than 1% of the groundwater (from Tailings) leads to chronic exceedance of site specific criterion (for current design)
11E	Infiltration thru uncovered tailings does meet expectation for infiltration leading to increased load in seepage collection bypass causing an exceedance in site specific
12E	Runoff from the north side of the valley leads to increased loading in seepage collection bypass
21E	Uncertainty in water quality modelings leads to laodings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion

	Risks of failure of groundwater collection & treatment system
22E	Vegetation growth and sedimentation cause decrease in capacity and overtopping of diversion
23E	Institutional upset leads to a year of groundwater seepage discharge without collection and treatment
25E, 25C	Delay in detection, implementation or improvement of collection leading to exceedence or additional cleanup cost
7E	Water collection and treatment system fails to operate for 1 year leading to contaminant release
9E	Shutdown or systematic failure of groundwater collection system for more than 2 weeks leads to periodic exceedance of site specific criterion
24E	Poor maintenance decisions lead to operational failures

	Risks of tailings dam breach and tailings release
4E, 4C	Rose Creek diversion does not pass design flood leading to failure of intermediate dam leading to tailings release
5E, 5C	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
6E	Institutional faiilure leads to lack of adequate maintenance leading to breach of the Intermediate Dam
16E, 16C	Dam stabilization ineffective leading to a breach of the Intermediate (or Secondary) during an earthquake

	Risks of non-catastrophic maintenance failures
18E	Aufeis (Glaciation) leads to partial blockage and overtopping of diversion causing erosion and release of tailings
19E	Failure of Guard House Creek diversion fails and leads to inundation of Int. Pond tailings and causes increased zinc contamination of the aquifer
14E	Dusting from the tailings leads to contamination of surrounding soils and vegetation
26E	Fence causes animal mortality

	Risks of implementation costs being higher than estimated
1C	Soil conditions result in spillway costs significantly greater than present cost estimate
17C	Addiitonal measures required to stabilize the downstream face of the intermediate dam
20C	Soil and/or permafrost conditions cause additional cost in construction of Rose Creek Diversion

	Risks of operating, maintenance and repair costs being higher than estimated
15C	Differential settlement in tailings lead to ponding and increased infiltration through the tailings leading to increased treatment costs
3C	Spillway maintenance costs will be high
10C	Collection volume for treatment is substantially higher than allowed for in current design

	Moderate and low risks
13E	Run-on (from diversion leakage) causes inundation of Intermediate Pond tailings and causes zinc contamination of surface
2E	The spillway does not allow fish passage leading to long term impacts

Faro Mine Alternative 1 - Flow-through Pit - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			14C		
Possible		13C	16E, 21C, 26E	1E, 1C	10C
Unlikely			11C, 17E, 18E, 19E, 20C, 22C, 24C	2E, 3E, 5C, 8C, 9C, 12C, 23E, 23C, 24E, 25E	6E, 7E
Very Unlikely				4E, 15E	

Risks of groundwater collection and cover performance estimates not being achieved

1E	Failure to meet 95% collection efficiency at S-Well area leads to chronic exceedence of site-specific criteria
23E	Failure to meet groundwater collection design efficiency in Zone II Pit outwash area leading to chronic exceedence exceedence..
24E	Failure to meet groundwater collection design efficiency at ETA leading to chronic exceedence exceedence..
16E	Failure of elevated North Fork channel leads to picking up of contaminated groundwater further contaminating downstream flow
2E	Cover infiltration to the sulphide cell increases from 5% to 10% leading to chronic exceedence of site-specific criteria
3E	Reduction in cover performance due to lack of maintenance leading to chronic exceedence…
7E	Some combination of water chemistry, capture efficeincy and cover failure leads to significant chronic exceedeences of site spec criteria

Risks of failure of groundwater collection & treatment system

25E	Water collection and treatment system fails to operate for one year leading to contaminant release
26E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria

Risks that pit lake biological treatment will not perform adequately

10C	Increased loadings to pit exceed biological treatment capacity and requiring perpetual active treatment
6E	Uncertainty in WQ modelling leads to greater loading than anticpiated
9C	In-situ treatment not effective, requiring active treatment for limited period of time

Risks of implementation costs being higher than estimated

5C	Failure to identify all of the high source material leading to increased cost
14C	Exavation difficulties along outflow ditch lead to increased costs

Risks of operating, maintenance and repair costs being higher than estimated

1C	Failure to meet 95% collection efficiency at S-Well area leads to chronic exceedence of site-specific criteria
8C	Monitoring shows the need for additional groundwater capture and upgrade of water treatment system
21C	Movement of pit wall below low grade ore stockpile leading to increased cover maintenance costs
12C	Plug dam leaks more than anticipated leading to increased flow thru Zone II Pit and increased loadings and costs

Moderate risks

4E	Failure to cover or relocate the high source material leading to chronic exceedence..
11C	Contamination from NW Dump leads to increased loadings at X14
13C	Increased grouting requirements at plug dam
15E	Plugging of outflow ditch leading to overtopping and breach of plug dam leading to overflow of Zone II Pit into Rose Creek
17E	Extreme wet year leading to release of contaminated pit water
18E	Pit wall failure leads to disruption of treatment system and requirement to discharge untreated water
19E	Excess phosphate in pit water discharge leads to eutrophication in downstream waters
20C	Technical uncertainties of passive treatment lead to significant increased pit water monitoring/study costs
22C	Cover maintenance costs higher than anticipated

Faro Mine Alternative 2 - Continued Faro Creek Diversion - After Mitigation

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			17E, 18C, 21E	4E, 4C	
Unlikely		1C	2C, 10C, 16E, 19C	3E, 3C, 5E, 6E, 8E, 9E, 10E, 11C, 13E 15C, 20E	14E
Very Unlikely				2E, 7E, 11E, 15E	12E

	Risks of groundwater collection and cover performance estimates not being achieved
4E	Fail to meet seepage collection design efficiency (95%) at S-Well area leading to chronic exceedance of site specific criterion
3E	Fail to meet seepage collection design efficiency (95%) at Zone II outwash area leading to chronic exceedance of site specific criterion
5E	Fail to meet seepage collection design efficiency (90%) at S-Well area leading to chronic exceedance of site specific criterion
10E	Risk that ETA collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
6E	Cover infiltration to sulphide cells increases from 5 % to 10 % leading to chronic exceedance of site specific criterion
8E	Infiltration through rudimentary cover increses from 20 to 30 % of MAP leading to chronic exceedance of site specific criterion
9E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site spefic criterion
12E	Uncertainty in water quality modelings leads to loadings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion
13E	Uncertainty in water quality modelings leads to laodiings greater than predicted (i.e. twice the Future 2 estimate) and leading to chronic exceedance of site specific c
14E	Some combination of water chemistry, capture effeiciency and cover failure leads to significant chronic exceedances of site speficic criterion
	Risks of failure of groundwater collection & treatment system
20E	Water collection and treatment system fails to operate for one year leading to contaminant release
21E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria
17E	Failure of elevated North Fork channel leads to flushing of contaminated groundwater
	Risks of implementation costs being higher than estimated
11C	Failure to identify all of the low grade oxide fines and ores leading to underestimation of total cost for remediation
15C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
	Risks of operating, maintenance and repair costs being higher than estimated
4C	Fail to meet seepage collection design efficiency (95%) at S-Well area leading to chronic exceedance of site specific criterion
3C	Fail to meet seepage collection design efficiency (95%) at Zone II outwash area leading to chronic exceedance of site specific criterion
18C	Movement of pit wall below low grade ore leads to cracking of cover
	Moderate and low risks
2C, 2E	Failure of the diversion leading to loss of storage capacity and increased water treatment requirements
7E	Cover infiltration to Low and Medium Grade and Oxide fInes increases from 0.5 % to 2%in ETA catchment leading to chronic exceedance of site soecific criterion
10C	Risk that ETA collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
11E	Failure to relocate and/or cover the high source materails (Ox fines + LG and MG ores) leading to continued loading and chronic exceedance of site speficic criteria
15E	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
16E	Contamination from Northwest Dump leads to increased loading to X14 and exceedance of site specific criterion
19C	Cover maintenance cost higher than anticipated
1C	Diversion of Faro Creek leads to increased seepage to Faro Valley Dumps leading to increased loading to Faro Pit leading to increased treatment

Faro Mine Alternative 3 - Lowest Capital Cost or "Minimize Construction" - After Mitigation

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			3C	4E, 4C, 5E, 12E, 13E, 14E, 15C	
Possible			18E	2E, 2C, 3E, 6E, 7E, 8E, 10E, 10C, 11E, 15E, 17E	
Unlikely		1C	16E, 19C	9E	
Very Unlikely					

	Risks of groundwater collection and cover performance estimates not being achieved
3E	Fail to meet seepage collection design efficiency at Zone II outwash area leading to chronic exceedance of site specific criteria
4E	Fail to meet seepage collection design efficiency (99%) at S-Well area leading to chronic exceedance of site specific criterion
6E	Infiltration to sulphide cells increases above 20 % leading to chronic exceedance of site specific criterion
7E	Infiltration to Low and Medium Grade Ore and Oxide fines increases above 20 % in ETA catchment leading to chronic exceedance of site specific criterion
8E	Infiltration through rudimentary cover increases from 20 to 30 % of MAP leading to chronic exceedance of site specific criterion
9E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site specific criterion
10E	Risk that Cross Valley Dam collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
12E	Uncertainty in water quality modeling leads to loadings greater than predicted (i.e. Future 3) and chronic exceedance of site specific criterion
13E	Uncertainty in water quality modeling leads to loadings greater than predicted (i.e. twice the Future 2 estimate) and chronic exceedance of site specific criterion
14E	Some combination of water chemistry, capture efficiency and cover failure leads to significant chronic exceedances of site specific criteria
	Risks of failure of groundwater collection & treatment system
5E	Delay in montioring or implementing groundwater collection improvements in S-Well Area leads to limited duration impact
11E	Delay in montioring or implementing groundwater collection improvements in CVD Area leads to limited duration impact
17E	Water collection and treament system fails to operate for 1 year leading to contaminant release
18E	2 week shutdown or systmatic failure of groundwater collection system leading to contaminants release
	Risks of implementation costs being higher than estimated
2E, 2C	Failure of the diversion leading to loss of storage capacity and overflowing leading to environmental impacts and increased costs
	Risks of operating, maintenance and repair costs being higher than estimated
3C	Fail to meet seepage collection design efficiency at Zone II outwash area leading to chronic exceedance of site specific criteria
4C	Fail to meet seepage collection design efficiency (99%) at S-Well area leading to chronic exceedance of site specific criterion
10C	Risk that Cross Valley Dam collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
15E, 15C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to exceedences and increased costs
	Moderate and low risks
16E	Contamination from Northwest Dump leads to increased loadings to X14 and exceedance of site specific criterion
19C	Cover maintenance costs higher than anticipated
1C	Deterioriation of diversion of Faro Creek leads to increased seepage to Faro Valley Dumps leading to increased loading to Faro Pit and increased treatment costs

Faro Mine Alternative 4 - Additional Relocation & Covering with Flow Through or "Minimize Water Treatment"

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			18C		
Possible		5C, 20C	9C, 12E, 14E		
Unlikely			22E, 23E, 24E, 25E, 26E	2E, 3E, 4E, 8E, 10C, 13E, 17C, 19C	7E, 15C, 16E
Very Unlikely			11E	1E, 5E, 6E, 9E, 21E	

Risks of groundwater collection and cover performance estimates not being achieved

2E	Fail to meet seepage collection design efficiency at S-Well area leading to chronic exceedance of site specific criterion
3E	Fail to meet seepage collection design efficiency (95%) at ETA leading to chronic exceedance of site specific criterion
16E	Uncertainty in water quality modelling leads to greater loading to the pit than anticpiated
4E	Cover infiltration to sulphide cells increases to above 5% of MAP leading to chronic exceedance of site specific criterion
8E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site specific criterion
7E	Some combination of water chemistry, caputure efficiency and cover failure leads to contaminant release and chronic exceedence of site specific criterion

Risks of failure of groundwater collection & treatment system

12E	Failure of elevated North Fork Channel leads to picking up of contaminated groundwater further contaminating downstream flow
13E	Water collection and treament system fails to operate for 1 year leading to contaminant release
14E	2 week shutdown or systmatic failure of groundwater collection system leading to contaminant release

Risks of implementation costs being higher than estimated

9C	Failure to identify all of the low grade oxide fines and ores leading to underestimation of total cost for remediation
18C	Excavation difficulties along the outflow channel leads to increased costs
19C	Plug dam leaks more than anticipated leading to greater flow thru Zone II Pit and increased loadings and costs

Risks of operating, maintenance and repair costs being higher than estimated

10C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
15C	Increased loadings to pit exceed biological treatment capacity requiring perpetual active treatment
17C	In-situ treatment not effective requiring active treatment for limited time

Moderate and low risks

1E	Fail to meet seepage collection design efficiency (80%) at Zone II outwash area leading to chronic exceedance of site specific criterion
5E, 5C	Neutralization of low to medium grade ore and oxide fines in pit lake not as effective as expected
6E	Infiltration through low infiltration cover increases from 5 to 10 % of MAP leading to chronic exceedance of site specific criterion
9E	Failure to identify and relocate all of the high source materails (Ox fines + LG and MG ores) leading to continued loading and chronic exceedance of site specific cri
20C	Increased grouting requirement at plug dam
21E	Plugging of outflow ditch leading to overtopping and breach of plug dam with overflow to Zone II Pit into Rose Creek
22E	Extreme wet year leading to relase of contaminated pit water
23E	Pit wall failure leads to disruption of treatment system and requirement to discharge untreated water
24E	Excess phosphate in pit water discharge leads to eutrophication in downstream waters
25E	Technical uncertainties of passive treatment lead to significant increased pit water monitoring/study costs
26E	Cover maintenance costs higher than anticipated
11E	Contamination from Northwest Dump leads to increased loadings to X14 and exceedance of site specific criterion

Vangorda/Grum Alternative 1 - Backfill Vangorda Pit - After Mitigation

	Consequence Severity				
Likelihood	**Very Low**	**Minor**	**Moderate**	**Major**	**Critical**
Almost Certain					
Likely				**20C**	
Possible		**22E**	**12E**		
Unlikely			**2E, 4E, 8H, 9E, 10E, 11C, 17E, 18C, 19C**	**1E, 1C, 3E, 7E, 15C, 16C, 21E**	
Very Unlikely			**13E**	**5H, 14H**	**7C**

	Risks of groundwater collection and cover performance estimates not being achieved
1E	Failure to meet groundwater collection targets below Grum Dump
3E	Low infiltration covers do not meet design performance leading to higher infiltration
7E	Grum Dump goes more acidic than expected
	Risks of failure of or damage to Vangorda Creek diversion
12E	Failure of channel leading to increased leakage into pit
21E	Failure of Vangorda diversion during backfilling leads to solids release
	Risks of implementation costs being higher than estimated
15C	Under-estimation of lime demand leads to increased costs
	Risks of operating, maintenance and repair costs being higher than estimated
20C	Grum pit unable to passively treat groundwater collected below Grum Dump
1C	Failure to meet groundwater collection targets below Grum Dump
7C	Grum Dump goes more acidic than expected
16C	Increase in lime costs due to fuel costs
	Moderate and low risks
2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
4E	Rudimentary cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
5H	Person or passerby falls into pit leading to fatality
8H	Exposure to contaminated sediment and soli leads to uptake in particular of As leading to an increased risk of cancer on human health
9H	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
10E	Backfill cover performance is less than expected leading to increased seepage from backfill pit
11C	Failure of channel leads to erosion damage of cover leading to increased cost of repair
14H	Rockfall in pit leads to fatality during relocation
17C	Predicted porewater quality not achived due to not adding sufficient lime leading to impacts on Vangorda Creek
18C	Residual contaminantion in Vangorda Dump foundation soils leading to increased relocation costs
19C	Temporary groundwater cleanup required under the Vangorda footprint area
22E	Release of algae from the pit lake leads to downstream eutrophication
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)

Vangorda/Grum Alternative 2 - Stabilize Current Situation - After Mitigation

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			11C, 19C	9C	
Unlikely			2E, 4E, 5E, 7E, 12E, 17H, 18E, 19E	1E, 6E, 9E, 16E	
Very Unlikely			3C, 10C	3E, 8E, 13E, 14H, 20E, 20C	16C

Risks of groundwater collection and cover performance estimates not being achieved

1E	Failure to meet groundwater collection targets below Grum Dump
6E	Low infiltration covers do not meet design performance leading to higher infiltration
16E	Grum Dump goes more acidic than expected

Risks of failure of or damage to Vangorda Creek diversion

9C	Geotechnical failure of pit wall below Vangorda Creekdiversion leading to release of pit water
9E	Geotechnical failure of pit wall below Vangorda Creekdiversion leading to release of pit water

Risks of operating and maintenance costs being higher than estimated

19C	Groundwater leakage from Vangorda Pit requires investigation, capture and treatment
11C	Steeper sections near bottom of Vangorda Creek diversion fail in flood and require costly repairs
16C	Grum Dump goes more acidic than expected

Moderate and low risks

2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
3E	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
4E	Shutdowm or systematic failure of the Vangorda Dump collection system leads to 2 weeks of release
5E	Toe drain failure leeds to short term (2 weks) surface water release at Vangorda Dump leading to impacts on in Vangorda Creek
7E	Rudimentary cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
8E	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
12E	Grum Pit water quality worse than predicted leading to release of contaminated water
13E	Water collection and treatment system fails to operate for one year leading to release of contaminated water due to lack of funding
14H	Person or passerby falls into pit leading to fatality
17H	Exposure to contaminated sediment and soli leads to uptake in particular of As leading to an increased risk of cancer on human health
18E	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
19E	Groundwater Leakage from Vangorda pit daylighting and contaminating Vangorda Creek
20E, 20C	Vangorda dump goes more acidic than expected leading to increased impact on Vangorda Creek
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)

Vangorda/Grum Alternative 3 - Lowest Capital Cost or "Minimize Construction"- After Mitigation

	Consequence Severity				
Likelihood	**Very Low**	**Minor**	**Moderate**	**Major**	**Critical**
Almost Certain			**11C**		
Likely			**10C**		
Possible			**19C**	**1E, 1C, 6E, 9E, 9C, 16E, 20E, 21E**	
Unlikely			**2E, 3C, 4E, 5E, 7E, 8C, 12E, 17H, 18E, 19E**	**3E, 8E, 20C**	
Very Unlikely				**13E, 14H**	**16C**

	Risks of groundwater collection and cover performance estimates not being achieved
1E	Failure to meet groundwater collection target in the Grum Dump Seepage collection System
3E	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection System
6E	Rudimentary covers on Vangorda and Grum sulphide cells do not meet design performance for infiltration leading to increased seepage (>20% infiltr)
16E	Grum dump goes more acidic than expected leading to increased contaminant release
20E	Vangorda dump goes more acidic than expected leading to increased impact on Vangorda Creek

	Risks of failure of or damage to Vangorda Creek diversion
21E	Delay in detection and implementation and improvement in collection leading to exceedences of site specific criterion for limited period

	Risks of failure or damage to Vangorda Creek Diversion
8E	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
9E	Geotechnical failure of the pit wall below the channel leading to a breach of the Vangorda Creek Diversion leading to the overtopping of the pit and release of conta
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)
11C	Vangorda Creek Diversion fails during a flood year flood leading to a cost of mitigation (repair of diversion)

	Risks of operating and maintenance costs being higher than estimated
1C	Failure to meet groundwater collection target in the Grum Dump Seepage collection System
9C	Geotechnical failure of the pit wall below the channel leading to a breach of the Vangorda Creek Diversion leading to the overtopping of the pit and release of conta
16C	Grum dump goes more acidic than expected leading to increased collection and treatment costs
19C	Groundwater leakage from Vangorda pit daylighting and contaminating Vangorda Creek
20C	Vangorda dump goes more acidic than expected leading to increased collection and treatment costs

	Moderate and low risks
2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection System leading to increased costs
4E	Shutdowm or systematic failure of the Vangorda Dump collection system leads to 2 weeks of release
5E	Toedrain failure leads to short term (2 weeks) surface water release at Vangorda Dump
7E	Rudimentary cover on Vangorda and Grum Dump other waste does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
8C	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
12E	Grum Pit water quality worse than predicted leading to release of contaminated water
13E	Water collection and treatment system fails to operate for one year leading to release of contaminated water due to lack of funding
14H	Person or passerby falls into pit leading to fatality
17H	Exposure to contaminated sediment and soil leads to uptake in particular of arsenic leading to an increased risk of cancer on human health
18E	Contaminant release from ore transfer pad lead to contamination of Vangorda Creek
19E	Groundwater leakage from Vangorda pit daylighting and contaminating Vangorda Creek

Vangorda/Grum Alternative 4 - Additional Covering or "Minimize Water Treatment"

Likelihood	Consequence Severity: Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible		22E	12E	20C	
Unlikely			2E, 4E, 8H, 9E, 10E, 11C, 15C, 16C, 17E, 18C, 19C	1E, 1C, 3E, 7E, 21E	
Very Unlikely			13E	5H, 14H	7C

	Risks of groundwater collection and cover performance estimates not being achieved
1E	Failure to meet groundwater collection target in the Grum Dump Seepage collection system
3E	Very Low infiltration soil cover on Grum Sulphide cell does not meet design performance for infiltration leading to increased seepage (>5% infiltr)
7E	Grum dump goes more acidic than expected leading to increased contaminant release
	Risks of failure of or damage to Vangorda Creek diversion
12E	Failure of channel leads loss of water to the pit leading increased contaminant loadings to Vangorda Creek
21E	Failure of Vangorda Creek diversion during backfilling leading to overtopping and release of contaminated water from the pit
	Risks of operating and maintenance costs being higher than estimated
1C	Failure to meet groundwater collection target in the Grum Dump Seepage collection system
7C	Grum dump goes more acidic than expected leading to increased collection and treatment costs
20C	Grum pit water quality does not reach predicted concentrations due to Grum Pit Lake treatment not being able to treat seepage collection from Grum Dump
	Moderate and low risks
2E	Shutdown or systematic failure of the Grum Dump collection system leads to 2 weeks of release
4E	Low infiltration cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
5H	Person or passerby falls into pit leading to fatality
8H	Exposure to contaminated sediment and soil leads to uptake in particular of arsenic leading to an increased risk of cancer on human health
9E	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
10E	Backfill cover performance is less than expected leading to increased seepage from backfill pit
11C	Failure of channel leads to erosion damage of cover leading to increased cost of repair
14H	Rockfall in pit leads to fatality during relocation
15C	Underestimation of lime demand leads to increased closure costs
16C	Increase in lime costs caused by increased fuel costs leads to increased overall costs
17E	Predicted porewater quality not achived due to not adding sufficient lime leading to impacts on Vangorda Creek
18C	Residual contaminantion in Vangorda Dump foundation soils leading to increased relocation costs
19C	Temporary groundwater cleanup required under the Vangorda footprint area
22E	Release of algae from the pit lake leads to downstream eutrophication
13E	Dust release during relocation leads to contaminant release to surrounding vegetation

Attachment D
Water and Load Balance Calculations

Attachment E
Construction Details and Cost Estimates

Summary NPV Calculations for Faro Mine Area Alternatives

NPV: Faro Mine Area Alternative 1 - Flow-Through Pit

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Faro Pit	$2,111,785	$568,226	$422,357	$3,102,368	4%	$2,978,420	$2,792,131	$0	$0	$0	$310,237	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,842,842	$1,034,009	$768,568	$5,645,420	7%	$5,040,479	$564,542	$0	$0	$4,234,065	$846,813	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$558,859	$150,374	$111,772	$821,006	1%	$687,579	$0	$0	$0	$0	$0	$821,006	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,062,813	$1,533,268	$11,262,421	14%	$10,647,760	$1,126,242	$10,136,179	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$371,620	$276,221	$2,028,948	3%	$1,814,376	$0	$1,095,632	$0	$0	$0	$933,316	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,825,962	$8,563,538	$6,365,192	$46,754,692	58%	$41,811,588	$0	$0	$19,987,631	$17,533,010	$8,766,505	$0	$467,547	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$659,253	$490,016	$3,599,352	4%	$3,059,801	$0	$431,922	$0	$0	$0	$3,167,430	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,416,849	$1,053,130	$7,735,627	10%	$7,251,498	$0	$7,426,202	$0	$0	$0	$0	$309,425	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$55,102,626**	**$14,826,683**	**$11,020,525**	**$80,949,834**		**$73,291,501**	**$4,482,915**	**$19,089,935**	**$19,987,631**	**$21,767,074**	**$9,923,555**	**$4,921,752**	**$776,972**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,976,078	$0	$0	$0	$0	$0	$0	$0	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235
Water Management Pumping Costs						$3,072,526	$0	$0	$0	$0	$0	$0	$0	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875
Water Treatment System Operation						$6,135,710	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$19,530,445	**$0**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**
TOTAL						**$92,821,946**	**$4,482,915**	**$19,289,935**	**$20,187,631**	**$21,967,074**	**$10,123,555**	**$5,121,752**	**$976,972**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**

NPV: Faro Mine Area Alternative 2 - Upgrade Faro Creek Diversion

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Faro Pit	$743,609	$200,230	$148,722	$1,092,561	1%	$894,303	$0	$0	$0	$0	$120,182	$0	$972,379	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$4,801,483	$1,292,888	$960,297	$7,054,668	9%	$6,240,597	$0	$0	$0	$5,996,468	$1,058,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$92,547	$68,740	$504,984	1%	$422,916	$0	$0	$0	$0	$0	$504,984	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,064,304	$1,533,268	$11,263,912	14%	$10,649,169	$1,126,391	$10,137,521	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,452,818	$391,198	$290,564	$2,134,580	3%	$1,920,055	$0	$1,259,402	$0	$0	$0	$875,178		$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,656,430	$8,524,078	$6,331,286	$46,511,794	59%	$41,594,370	$0	$0	$19,883,792	$17,441,923	$8,720,961	$0	$465,118	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,016,390	$542,950	$403,278	$2,962,618	4%	$2,801,243	$2,399,720	$0	$0	$0	$0	$562,897	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,417,873	$1,053,130	$7,736,651	10%	$7,455,938	$7,349,819	$0	$0	$0	$0	$232,100	$154,733	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$53,946,416**	**$14,526,068**	**$10,789,283**	**$79,261,768**		**$71,978,592**	**$10,875,930**	**$11,396,923**	**$19,883,792**	**$23,438,391**	**$9,899,343**	**$2,175,159**	**$1,592,230**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,889,463	$0	$0	$0	$0	$0	$0	$0	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621
Water Management Pumping Costs						$1,801,431	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$3,485,437	$3,590,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$21,116,523	$0	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$36,638,985	**$3,590,000**	**$688,316**	**$688,316**	**$688,316**	**$688,316**	**$688,316**	**$688,316**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**
TOTAL						**$108,617,577**	**$14,465,930**	**$12,085,238**	**$20,572,107**	**$24,126,706**	**$10,587,659**	**$2,863,474**	**$2,280,546**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**	**$1,268,806**

NPV: Faro Mine Area Alternative 3 - Minimize Up-Front Construction

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Faro Pit	$743,609	$209,050	$148,722	$1,101,381	1%	$1,007,920	$0	$0	$1,101,381	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$64,437	$18,115	$12,887	$95,440	0%	$92,660	$95,440	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$96,624	$68,740	$509,061	1%	$465,863	$0	$0	$509,061	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$16,823,112	$4,729,475	$3,364,622	$24,917,209	31%	$23,571,617	$3,239,237	$21,428,800	$249,172	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$422,982	$118,913	$84,596	$626,491	1%	$573,328	$0	$0	$626,491	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,480,330	$1,053,130	$7,799,108	10%	$7,550,216	$7,409,152	$0	$389,955	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$23,663,486**	**$6,652,506**	**$4,732,697**	**$35,048,690**		**$33,261,604**	**$10,743,830**	**$21,428,800**	**$2,876,061**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$1,305,690	$0	$0	$0	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$29,385	$29,385
Water Management Pumping Costs						$1,231,662	$0	$0	$0	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735
Water Treatment System Construction						$3,357,282	$3,458,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$24,153,700	$0	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316
Environmental Management						$8,329,214	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$38,377,548	**$3,458,000**	**$787,316**	**$787,316**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,148,436**	**$1,148,436**
TOTAL						**$71,639,152**	**$14,201,830**	**$22,216,115**	**$3,663,376**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,148,436**	**$1,148,436**

NPV: Faro Mine Area Alternative 4 - Minimize Water Treatment

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Faro Pit	$2,687,811	$709,757	$537,562	$3,935,130	2%	$3,619,459	$2,636,537	$0	$0	$0	$0	$157,405	$1,141,188	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,836,958	$1,013,207	$767,392	$5,617,557	3%	$5,083,346	$56,176	$505,580	$4,325,519	$0	$0	$0	$730,282	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$90,759	$68,740	$503,196	0%	$409,144	$0	$0	$0	$0	$0	$0	$503,196	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$18,118,849	$4,784,559	$3,623,770	$26,527,178	15%	$25,004,409	$0	$26,527,178	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$364,702	$276,221	$2,022,031	1%	$1,816,378	$1,091,897	$0	$0	$0	$0	$0	$930,134	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$88,908,675	$23,477,694	$17,781,735	$130,168,103	72%	$114,944,767	$0	$5,206,724	$42,955,474	$26,901,408	$26,901,408	$28,203,089	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$646,982	$490,016	$3,587,081	2%	$3,212,845	$538,062	$0	$35,871	$2,367,473	$0	$0	$681,545	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,390,475	$1,053,130	$7,709,253	4%	$7,414,764	$7,323,790	$0	$0	$0	$0	$0	$0	$385,463	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$122,992,828**	**$32,478,135**	**$24,598,566**	**$180,069,529**		**$161,505,113**	**$11,646,462**	**$32,239,482**	**$47,316,864**	**$29,268,881**	**$26,901,408**	**$28,360,494**	**$3,986,346**	**$385,463**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$6,059,606	$0	$0	$0	$0	$0	$0	$0	$0	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167
Water Management Pumping Costs						$1,745,486	$0	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$2,801,942	$2,886,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$17,435,098	$0	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316
Environmental Management						$7,117,992	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$35,160,123	**$2,886,000**	**$568,316**	**$568,316**	**$568,316**	**$568,316**	**$568,316**	**$568,316**	**$568,316**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**
TOTAL						**$196,665,237**	**$14,532,462**	**$32,807,798**	**$47,885,179**	**$29,837,197**	**$27,469,724**	**$28,928,810**	**$4,554,661**	**$953,778**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**	**$1,405,352**

Faro Mine Area Alternative 1 - Flow-Through Pit

Activity	Task	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	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																					
Faro Pit																					**1CD003.046**
Water Treatment																				$0	
Interim chemical treatment	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -		
Construct Plug Dam																				$1,981,626	
Foundation preparation	Bulk stripping: Excavate, load, haul, dump overburden	3700	Bm3	R.040	0.030	110.1	$ 1.09	$ 4,030	$ -	$ -	$ 3.04	$ 11,257	$ 1.54	4,380	$ 5,694	$ -	$ -	$ 5.67	$ 20,982		1CD003.052 (BGC) (SRK Library - BKG-254)
	Rock excavation: Core trench rock	4500	Bm3	C.2.15	0.173	780.0	$ 6.34	$ 28,548	$ -	$ -	$ 9.13	$ 41,074	$ 3.69	12,770	$ 16,601	$ -	$ -	$ 19.16	$ 86,223		
	Foundation preparation	1600	m2	C.2.17	0.318	509.1	$ 13.47	$ 21,556	$ -	$ -	$ 17.95	$ 28,715	$ 8.86	10,910	$ 14,183	$ -	$ -	$ 40.28	$ 64,455		
	Relocate Zone II Pit pump well discharge pipe	50	m	C.3.09	3.000	150.0	$ 150.00	$ 7,500	$ -	$ -	$ 26.07	$ 1,304	$ 18.59	715	$ 930	$ -	$ -	$ 194.66	$ 9,733		
	Foundation/Abutment grouting: Drilling of grout holes	4664	m	C.2.09	2.000	9328.0	$ 102.13	$ 476,350	$ -	$ -	$ 100.85	$ 470,376	$ 22.08	79,216	$ 102,981	$ -	$ -	$ 225.07	$ 1,049,707		
	Foundation/Abutment grouting: Water pressure testing	350	hrs	C.3.16	3.500	1225.0	$ 170.70	$ 59,745	$ -	$ -	$ 92.28	$ 32,298	$ 36.34	9,784	$ 12,719	$ -	$ -	$ 299.32	$ 104,762		
	Foundation/Abutment grouting: Setting packers	1400	ea.	C.2.19	0.214	300.0	$ 10.94	$ 15,320	$ -	$ -	$ 6.59	$ 9,228	$ 2.60	2,795	$ 3,634	$ -	$ -	$ 20.13	$ 28,182		
	Foundation/Abutment grouting: Cement	200000	kg	M.04	0.000	0.0	$ -	$ -	$ 0.50	$ 100,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 0.50	$ 100,000		
Place core material	Load, haul, dump, compact impervious core material (Till)	16540	Bm3	R.041	0.054	890.6	$ 1.97	$ 32,597	$ -	$ -	$ 4.75	$ 78,644	$ 2.32	29,555	$ 38,421	$ -	$ -	$ 9.05	$ 149,661		
Place filter material	Produce, screen and stockpile fine and coarse filter materials	10870	Bm3	C.2.02	0.010	108.7	$ 0.37	$ 3,978	$ -	$ -	$ 1.61	$ 17,486	$ 1.13	9,444	$ 12,277	$ -	$ -	$ 3.10	$ 33,741		
	Load, haul, dump, compact fine filter material	5740	Bm3	R.042	0.039	221.5	$ 1.41	$ 8,109	$ -	$ -	$ 3.41	$ 19,563	$ 1.67	7,352	$ 9,557	$ -	$ -	$ 6.49	$ 37,229		
	Load, haul, dump, compact coarse filter material	5130	Bm3	R.042	0.039	198.0	$ 1.41	$ 7,247	$ -	$ -	$ 3.41	$ 17,484	$ 1.67	6,571	$ 8,542	$ -	$ -	$ 6.49	$ 33,272		
Place rockfill	Load, haul, dump, and compact	48,500	Bm3	R.043	0.032	1569.1	$ 1.18	$ 57,430	$ -	$ -	$ 2.86	$ 138,557	$ 1.40	52,071	$ 67,692	$ -	$ -	$ 5.44	$ 263,679		
Safety Berm																				$130,159	
Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$ 7,296		
	Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$ 14,191		
Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$ 81,542		
	Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$ 27,130		
Subtotal Direct Costs - Faro Pit						**16,119**		**$749,092**		**$100,000**		**$934,795**		**252,229**	**$327,898**		**$0**			**$2,111,785**	
Faro Creek																					
Route into Faro Pit (East & West Channel)																				$510,560	
Construct access road	Clear access road area	1,800	m2	C.2.04	0.004	6.5	$ 0.13	$ 240	$ -	$ -	$ 0.62	$ 1,124	$ 0.36	504	$ 655	$ -	$ -	$ 1.12	$2,018		
	Construct access road	600	m	C.2.27	0.131	78.8	$ 4.80	$ 2,882	$ -	$ -	$ 10.14	$ 6,086	$ 5.33	2,458	$ 3,195	$ -	$ -	$ 20.27	$12,164		
Head-works dam	Load, haul, dump, place and compact till at headworks	54	Bm3	R.046	0.088	4.7	$ 3.20	$ 173	$ -	$ -	$ 7.52	$ 406	$ 3.60	150	$ 194	$ -	$ -	$ 14.32	$773		
Excavate channel	Soil excavation: Load, haul and dump locally	6,614	Bm3	C.2.10	0.032	211.7	$ 1.17	$ 7,747	$ -	$ -	$ 2.72	$ 17,963	$ 1.27	6,452	$ 8,388	$ -	$ -	$ 5.16	$34,097		
	Rock excavation: Drill, blast, load, haul and dump	4,863	Bm3	C.2.15	0.173	842.9	$ 6.34	$ 30,849	$ -	$ -	$ 9.13	$ 44,385	$ 3.69	13,799	$ 17,939	$ -	$ -	$ 19.16	$93,172		
Fill material	Placed as part of soil excavation, compact by hand	1,365	m2	C.2.06	0.016	21.8	$ 0.57	$ 782	$ -	$ -	$ 0.02	$ 29	$ 0.02	17	$ 22	$ -	$ -	$ 0.61	$833		
Place till	Till: Load, haul, dump place, compact	3,992	Bm3	R.046	0.088	349.3	$ 3.20	$ 12,786	$ -	$ -	$ 7.52	$ 30,010	$ 3.60	11,057	$ 14,374	$ -	$ -	$ 14.32	$57,170		
Place geotextile	Supply and place geotextile	3,142	m2	C.4.07	0.071	224.4	$ 2.52	$ 7,927	$ 3.50	$ 10,997	$ 0.82	$ 2,561	$ 0.53	1,276	$ 1,659	$ -	$ -	$ 7.37	$23,144		
Place bedding layer	Produce, screen and stockpile	3,992	Bm3	C.2.02	0.010	39.9	$ 0.37	$ 1,461	$ -	$ -	$ 1.61	$ 6,422	$ 1.13	3,468	$ 4,509	$ -	$ -	$ 3.10	$12,393		
	Load, haul, place and compact	3,992	Bm3	R.047	0.069	274.5	$ 2.52	$ 10,046	$ -	$ -	$ 5.22	$ 20,821	$ 2.40	7,367	$ 9,578	$ -	$ -	$ 10.13	$40,444		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	9,726	Bm3	C.2.25	0.057	555.8	$ 2.09	$ 20,341	$ -	$ -	$ 9.19	$ 89,403	$ 6.45	48,283	$ 62,768	$ -	$ -	$ 17.74	$172,512		
	Rip-rap: Load, haul, dump	9,726	Bm3	R.048	0.028	274.6	$ 1.03	$ 10,051	$ -	$ -	$ 2.42	$ 23,507	$ 1.09	8,169	$ 10,620	$ -	$ -	$ 4.54	$44,178		
	Rip-rap: Place and secure	9,726	Bm3	C.2.26	0.013	121.6	$ 0.46	$ 4,450	$ -	$ -	$ 0.89	$ 8,650	$ 0.47	3,509	$ 4,561	$ -	$ -	$ 1.82	$17,661		
Rip rap protection at pit inlet																				$14,457	
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	600	Bm3	C.2.25	0.057	34.3	$ 2.09	$ 1,255	$ -	$ -	$ 9.19	$ 5,515	$ 6.45	2,979	$ 3,872	$ -	$ -	$ 17.74	$10,642		
	Rip-rap: Load, haul, dump	600	Bm3	R.048	0.028	16.9	$ 1.03	$ 620	$ -	$ -	$ 2.42	$ 1,450	$ 1.09	504	$ 655	$ -	$ -	$ 4.54	$2,725		
	Rip-rap: Place and secure	600	Bm3	C.2.26	0.013	7.5	$ 0.46	$ 275	$ -	$ -	$ 0.89	$ 534	$ 0.47	216	$ 281	$ -	$ -	$ 1.82	$1,090		
Route out of Pit																				$2,721,925	
Excavate channel	Bulk excavate soil/waste rock (dump locally)	277,181	Bm3	C.2.10	0.032	8869.8	$ 1.17	$ 324,635	$ -	$ -	$ 2.72	$ 752,758	$ 1.27	270,393	$ 351,510	$ -	$ -	$ 5.16	$1,428,903		
	Rock excavation: Drill, blast, muck, load haul dump	5,584	Bm3	C.2.15	0.173	967.8	$ 6.34	$ 35,423	$ -	$ -	$ 9.13	$ 50,966	$ 3.69	15,845	$ 20,599	$ -	$ -	$ 19.16	$106,987		
Place till	Till: Load, haul, dump place, compact	17,569	Bm3	R.049	0.074	1294.5	$ 2.70	$ 47,380	$ -	$ -	$ 5.59	$ 98,200	$ 2.57	34,748	$ 45,172	$ -	$ -	$ 10.86	$190,752		
Place geotextile	Supply and place geotextile	12,089	m2	C.4.07	0.071	863.5	$ 2.52	$ 30,499	$ 3.50	$ 42,311	$ 0.82	$ 9,856	$ 0.53	4,911	$ 6,385	$ -	$ -	$ 7.37	$89,050		
Place bedding layer	Produce and stockpile (screen) bedding layer	17,569	Bm3	C.2.02	0.010	175.7	$ 0.37	$ 6,430	$ -	$ -	$ 1.61	$ 28,262	$ 1.13	15,263	$ 19,842	$ -	$ -	$ 3.10	$54,534		
	Load, Haul, Place and Compact bedding layer	17,569	Bm3	R.050	0.067	1171.3	$ 2.44	$ 42,868	$ -	$ -	$ 5.06	$ 88,848	$ 2.33	31,438	$ 40,870	$ -	$ -	$ 9.82	$172,585		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		
	Rip-rap: Load, haul, dump	29,402	Bm3	R.051	0.021	622.6	$ 0.78	$ 22,788	$ -	$ -	$ 1.88	$ 55,285	$ 0.89	20,110	$ 26,143	$ -	$ -	$ 3.54	$104,216		
	Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Siphon allowance																				$302,393	
Siphon for creek 'Out of pit'	Piping: Supply and install steel piping	1,130	m	C.3.14	0.300	339.0	$ 16.66	$ 18,826	$ 237.06	$ 267,878	$ 1.40	$ 1,586	$ 1.67	1,450	$ 1,885	$ -	$ -	$ 256.79	$290,175		
	Pumps: supply and install	2	ea.	C.3.10	12.000	24.0	$ 600.00	$ 1,200	$ 1,829.00	$ 3,658	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$4,858		
	Install protective housing (shack)	2	ea.	C.3.12	30.000	60.0	$ 1,950.00	$ 3,900	$ 1,730.00	$ 3,460	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$7,360		
Upgrade North Wall Interceptor																				$293,508	
Excavate channel	Soil Excavation: load, haul and dump locally	7,500	Bm3	C.2.10	0.032	240.0	$ 1.17	$ 8,784	$ -	$ -	$ 2.72	$ 20,368	$ 1.27	7,316	$ 9,511	$ -	$ -	$ 5.16	$38,663		assume same upgrade as Improved Creek option
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	10,800	Bm3	C.2.25	0.057	617.1	$ 2.09	$ 22,587	$ -	$ -	$ 9.19	$ 99,276	$ 6.45	53,615	$ 69,700	$ -	$ -	$ 17.74	$191,564		
	Rip-rap: Load, haul, dump	10,800	Bm3	R.052	0.025	266.8	$ 0.90	$ 9,766	$ -	$ -	$ 2.15	$ 23,205	$ 0.99	8,229	$ 10,698	$ -	$ -	$ 4.04	$43,669		
	Rip-rap: Place and secure	10,800	Bm3	C.2.26	0.013	135.0	$ 0.46	$ 4,941	$ -	$ -	$ 0.89	$ 9,605	$ 0.47	3,896	$ 5,065	$ -	$ -	$ 1.82	$19,612		
Subtotal Direct Costs - Faro Creek						**20,760**		**$766,852**		**$328,304**		**$1,793,495**		**733,993**	**$954,191**		**$0**			**$3,842,842**	
Zone II Pit																					
Water Management																				$558,859	
Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
	Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
	Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
	Install protective housing (shack)	90	m	C.3.13	20.000	1800.0	$ 1,300.00	$ 117,000	$ 445.00	$ 40,050	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$157,050		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
	Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
	Install protective well cover	180	ea.	C.3.18	1.333	240.0	$ 48.80	$ 8,784	$ 164.54	$ 29,617	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 336.27	$60,529		
Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
	Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
	Supply/Install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit						**3,432**		**$194,143**		**$286,234**		**$61,364**		**13,168**	**$17,119**		**$0**			**$558,859**	
Oxide Fines / LGSP																					
Consolidate oxide fines																				$770,373	
Relocate to Low Grade Stockpile C	Load, haul, place and compact oxide materials	262,315	Bm3	R.068	0.012	3119.4	$ 0.44	$ 114,171	$ -	$ -	$ 1.51	$ 396,927	$ 0.99	199,442	$ 259,275	$ -	$ -	$ 2.94	$770,373		
Medium-Grade Stockpile																				$1,130,719	
Regrade	Flattened surfaces	59	hrs	C.2.22	1.000	59.2	$ 36.60	$ 2,166	$ -	$ -	$ 173.28	$ 10,255	$149.18	6,791	$ 8,829	$ -	$ -	$ 359.06	$21,249		
	Regrade slopes	27	hrs	C.2.22	1.000	27.4	$ 36.60	$ 1,004	$ -	$ -	$ 173.28	$ 4,753	$149.18	3,148	$ 4,092	$ -	$ -	$ 359.06	$9,849		
Place HDPE Cover	Bedding layer: Produce, screen and stockpile	13,800	Bm3	C.2.02	0.010	138.0	$ 0.37	$ 5,051	$ -	$ -	$ 1.61	$ 22,199	$ 1.13	11,989	$ 15,586	$ -	$ -	$ 3.10	$42,836		
	Bedding layer: Load, haul, place (0.3m)	13,800	Bm3	R.065	0.042	583.8	$ 1.55	$ 21,369	$ -	$ -	$ 3.21	$ 44,289	$ 1.48	15,671	$ 20,373	$ -	$ -	$ 6.23	$86,030		
	Supply and place HDPE liner	27,600	m2	C.4.10	0.143	3942.9	$ 6.33	$ 174,747	$ 12.77	$ 352,452	$ 1.63	$ 45,002	$ 1.06	22,426	$ 29,153	$ -	$ -	$ 21.79	$601,355		
	Load, haul, place loose till (1.0m)	27,600	Bm3	R.064	0.050	1391.0	$ 1.84	$ 50,912	$ -	$ -	$ 6.95	$ 191,710	$ 4.49	95,290	$ 123,877	$ -	$ -	$ 13.28	$366,499		
Revegetate	Seed/Fertilize, helicopter low application rate	27,600	m2	C.5.02	0.000	3.5	$ 0.00	$ 124	$ 0.05	$ 1,255	$ 0.05	$ 1,504	$ 0.00	14	$ 18	$ -	$ -	$ 0.11	$2,901		
Low Grade Stockpile "A"																				$1,383,037	
Re-grade	Flattened surfaces	7	hrs	C.2.22	1.000	6.8	$ 36.60	$ 249	$ -	$ -	$ 173.28	$ 1,178	$149.18	780	$ 1,014	$ -	$ -	$ 359.06	$2,442		
	Re-grade slopes	15	hrs	C.2.22	1.000	15.5	$ 36.60	$ 567	$ -	$ -	$ 173.28	$ 2,683	$149.18	1,777	$ 2,310	$ -	$ -	$ 359.06	$5,560		
Place HDPE cover	Bedding layer: Produce, screen and stockpile	10,842	m3	C.2.02	0.010	108.4	$ 0.37	$ 3,968	$ -	$ -	$ 1.61	$ 17,440	$ 1.13	9,419	$ 12,245	$ -	$ -	$ 3.10	$33,653		
	Bedding layer: Load, haul, place (0.3m)	10,842	m3	R.066	0.044	477.0	$ 1.61	$ 17,459	$ -	$ -	$ 3.34	$ 36,186	$ 1.54	12,804	$ 16,646	$ -	$ -	$ 6.48	$70,291		

Activity	Task	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	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
	Supply and place HDPE liner	36,139	m2	C.4.10	0.143	5162.7	$6.33	$228,811	$12.77	$461,495	$1.63	$58,925	$1.06	29,364	$38,173	$ -	$ -	$21.79	$787,404		
	Load, haul, place till (1.0m)	36,139	Bm3	R.064	0.050	1821.4	$1.84	$66,663	$ -	$ -	$6.95	$251,022	$4.49	124,771	$162,202	$ -	$ -	$13.28	$479,887		
Revegetate	Seed/Fertilize, helicopter low application rate	36,150	m2	C.5.02	0.000	4.5	$0.00	$162	$0.05	$1,643	$0.05	$1,970	$0.00	18	$24	$ -	$ -	$0.11	$3,800		
Low Grade Stockpile "C"																				$4,382,212	
Re-grade	Flattened surfaces	27	hrs	C.2.22	1.000	26.9	$36.60	$983	$ -	$ -	$173.28	$4,653	$149.18	3,081	$4,005	$ -	$ -	$359.06	$9,641		
	Re-grade slopes	46	hrs	C.2.22	1.000	46.1	$36.60	$1,688	$ -	$ -	$173.28	$7,992	$149.18	5,293	$6,881	$ -	$ -	$359.06	$16,561		
Place HDPE cover	Bedding layer: Produce, screen and stockpile	54,770	Bm3	C.2.02	0.010	547.7	$0.37	$20,046	$ -	$ -	$1.61	$88,106	$1.13	47,583	$61,858	$ -	$ -	$3.10	$170,009		
	Bedding layer: Load, haul, place (0.3m)	54,770	Bm3	R.067	0.040	2190.8	$1.46	$80,184	$ -	$ -	$3.03	$166,188	$1.40	58,805	$76,446	$ -	$ -	$5.89	$322,818		
	Supply and place HDPE liner	109,541	m2	C.4.10	0.143	15648.7	$6.33	$693,551	$12.77	$1,398,839	$1.63	$178,606	$1.06	89,005	$115,707	$ -	$ -	$21.79	$2,386,703		
	Load, haul, place till (1.0m)	109,541	Bm3	R.064	0.050	5520.9	$1.84	$202,063	$ -	$ -	$6.95	$760,872	$4.49	378,192	$491,650	$ -	$ -	$13.28	$1,454,585		
Surface runoff management: Rock drains	Excavate channel for rock drains	610	Bm3	C.2.12	0.024	14.4	$0.86	$525	$ -	$ -	$2.00	$1,218	$0.93	438	$569	$ -	$ -	$3.79	$2,312		
	Rip-rap (rounded, low quality): Screen and stockpile	454	Bm3	C.2.24	0.040	18.2	$1.46	$664	$ -	$ -	$6.43	$2,920	$4.52	1,577	$2,050	$ -	$ -	$12.42	$5,635		
	Rip-rap: Load, haul, dump	454	Bm3	R.069	0.021	9.6	$0.78	$352	$ -	$ -	$1.88	$853	$0.89	310	$404	$ -	$ -	$3.54	$1,609		
	Rip-rap: Place and secure	454	Bm3	C.2.26	0.013	5.7	$0.46	$208	$ -	$ -	$0.89	$404	$0.47	164	$213	$ -	$ -	$1.82	$824		
Revegetate	Seed/Fertilize, helicopter low application rate	109,550	m2	C.5.02	0.000	13.7	$0.00	$492	$0.05	$4,980	$0.05	$5,971	$0.00	56	$73	$ -	$ -	$0.11	$11,515		
Subtotal Direct Costs - Oxide Fines						**40,904**		**$1,688,180**		**$2,220,664**		**$2,303,826**		**1,118,208**	**$1,453,671**		**$0**			**$7,666,340**	
ETA Tailings																					
Option 1: Pump Tailings to Faro Pit																				$662,124	
Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$1	$57,163	$0	$16,473	$0	$1,014	$0	496	$645	$0.27	$17,145	$1.44	$92,439		
	Operate Slurry Pumping System	64,000	m3	C.7.18	0.008	540.8	$0	$27,042	$0	$20,756	$ -	$ -	$ -	0	$ -	$0.54	$34,479	$1.29	$82,278		
	lime addition - qnty in tonnes per CaOH eq	1,088	ton	C.2.21	0.036	38.9	$1.59	$1,735	$320.00	$348,160	$1.67	$1,815	$0.98	819	$1,065	$ -	$ -	$324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$1.92	$24,595	$ -	$ -	$5.31	$68,008	$2.59	25,547	$33,211	$ -	$ -	$9.83	$125,814		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$36.60	$699	$ -	$ -	$173.28	$3,311	$149.18	2,193	$2,851	$ -	$ -	$359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$0.00	$58	$0.09	$1,182	$0.05	$709	$0.00	7	$9	$ -	$ -	$0.15	$1,957		
Option 2: Haul Tailings to Rose Creek Tailings Deposit																				$725,144	
Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$0.95	$61,011	$ -	$ -	$2.54	$162,621	$1.24	61,021	$79,327	$ -	$ -	$4.73	$302,959		
Lime addition	Add lime to waste rock (qnty= tonnes CaOH eq)	1,088	ton	C.2.21	0.036	38.9	$1.59	$1,735	$320.00	$348,160	$1.67	$1,815	$0.98	819	$1,065	$ -	$ -	$324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings Imp.	12,800	m3	R.074	0.026	333.4	$0.95	$12,202	$ -	$ -	$2.54	$32,524	$1.24	12,204	$15,865	$ -	$ -	$4.73	$60,592		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$36.60	$699	$ -	$ -	$173.28	$3,311	$149.18	2,193	$2,851	$ -	$ -	$359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$0.00	$58	$0.09	$1,182	$0.05	$709	$0.00	7	$9	$ -	$ -	$0.15	$1,957		
ETA Collection System (to Pit)																				$655,962	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$102.13	$10,213	$ -	$ -	$100.85	$10,085	$22.08	1,698	$2,208	$ -	$ -	$225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$7.66	$766	$232.60	$23,260	$7.56	$756	$1.66	127	$166	$ -	$ -	$249.48	$24,948		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$600.00	$3,000	$6,842.00	$34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$7,442.00	$37,210		
	Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$1,300.00	$6,500	$445.00	$2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$1,745.00	$8,725		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	60	m	C.2.09	2.000	120.0	$102.13	$6,128	$ -	$ -	$100.85	$6,051	$22.08	1,019	$1,325	$ -	$ -	$225.07	$13,504		
	Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$7.66	$460	$232.60	$13,956	$7.56	$454	$1.66	76	$99	$ -	$ -	$249.48	$14,969		
	Install protective well cover	3	ea.	C.3.18	1.333	4.0	$48.80	$146	$164.54	$494	$100.85	$303	$22.08	51	$66	$ -	$ -	$336.27	$1,009		
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$0.86	$172	$ -	$ -	$2.00	$399	$0.93	143	$186	$ -	$ -	$3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$746.40	$746	$1,344.68	$1,345	$72.47	$72	$62.92	48	$63	$ -	$ -	$2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$1.08	$216	$ -	$ -	$0.74	$148	$0.40	61	$79	$ -	$ -	$2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$600.00	$600	$1,829.00	$1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$2,429.00	$2,429		
Piping system	Excavate piping trench	13,200	m3	C.2.13	0.020	264.0	$0.73	$9,662	$ -	$ -	$1.42	$18,784	$0.75	7,619	$9,905	$ -	$ -	$2.91	$38,352		
	Supply and install insulated 150mm HDPE pipe	2,200	m	C.3.03	0.250	550.0	$8.75	$19,250	$155.84	$342,848	$ -	$ -	$ -	0	$ -	$ -	$ -	$164.59	$362,098		
	Bedding layer: Produce, screen and stockpile	858	m3	C.2.02	0.010	8.6	$0.37	$314	$ -	$ -	$1.61	$1,380	$1.13	745	$969	$ -	$ -	$3.10	$2,663		
	Bedding layer: Load, haul, place and compact	858	m3	R.073	0.031	26.2	$1.12	$960	$ -	$ -	$2.32	$1,989	$1.07	704	$915	$ -	$ -	$4.50	$3,863		
	Backfill ditches	13,200	m3	C.2.01	0.030	396.0	$1.08	$14,282	$ -	$ -	$0.74	$9,739	$0.40	4,016	$5,221	$ -	$ -	$2.22	$29,242		
Heat tracing	Supply and install heat trace in HDPE pipe	2,200	m	C.3.04	0.250	550.0	$12.50	$27,500	$21.32	$46,904	$ -	$ -	$ -	0	$ -	$ -	$ -	$33.82	$74,404		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$230.00	$230	$396.84	$397	$ -	$ -	$ -	0	$ -	$ -	$ -	$626.84	$627		
	Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$57.50	$58	$1,025.00	$1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$287.88	$1,192	$325.96	$1,304	$85.85	$343	$28.17	87	$113	$ -	$ -	$737.86	$2,951		
	Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$2.21	$664	$1.41	$423	$0.45	$136	$0.15	34	$45	$ -	$ -	$4.22	$1,267		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$1,383.00	$1,383	$8,934.00	$8,934	$224.98	$225	$143.00	110	$143	$ -	$ -	$10,684.98	$10,685		
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)						**4,454**		**$180,149**		**$828,495**		**$251,844**		**92,784**	**$120,619**		**$0**			**$1,381,107**	
Waste Rock																					
Re-slope Waste Rock																				$3,857,323	
Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$0.53	$31,942	$ -	$ -	$0.94	$56,103	$0.62	28,478	$37,021	$ -	$ -	$2.08	$125,066		
Re-grade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$36.60	$15,702	$ -	$ -	$173.28	$74,341	$149.18	49,232	$64,002	$ -	$ -	$359.06	$154,045		
	Flatten bubble dump surfaces	769	hrs	C.2.22	1.000	769.0	$36.60	$28,146	$ -	$ -	$173.28	$133,252	$149.18	88,246	$114,720	$ -	$ -	$359.06	$276,117		
	Re-grade slopes	7,329	hrs	C.2.22	1.000	7329.4	$36.60	$268,255	$ -	$ -	$173.28	$1,270,021	$149.18	841,074	$1,093,397	$ -	$ -	$359.06	$2,631,673		
Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	195,750	m3	R.077	0.012	2437.6	$0.46	$89,218	$ -	$ -	$1.80	$352,187	$1.17	176,166	$229,016	$ -	$ -	$3.42	$670,422		
Sulphide Cell																				$3,851,716	
Low Infiltration Cover	Load, haul, place compacted till (0.5m) (South cells)	86,823	m3	R.075	0.056	4862.1	$2.05	$177,953	$ -	$ -	$7.09	$616,001	$4.61	307,977	$400,370	$ -	$ -	$13.76	$1,194,325		
	Load, haul, place loose till (1.5m) (South cells)	173,647	m3	R.076	0.050	8751.8	$1.84	$320,316	$ -	$ -	$6.95	$1,206,153	$4.49	599,520	$779,376	$ -	$ -	$13.28	$2,305,845		
	Load, haul, place compacted till (0.5m) (East cell)	8,720	m3	R.075	0.056	488.3	$2.05	$17,873	$ -	$ -	$7.09	$61,869	$4.61	30,932	$40,212	$ -	$ -	$13.76	$119,954		
	Load, haul, place loose till (1.5m) (East cell)	17,441	m3	R.076	0.050	879.0	$1.84	$32,171	$ -	$ -	$6.95	$121,142	$4.49	60,214	$78,278	$ -	$ -	$13.28	$231,592		
Waste Rock Cover																				$23,572,431	
Place rudimentary cover	Load, haul, place loose till (0.5m)	1,775,173	m3	R.076	0.050	89468.7	$1.84	$3,274,555	$ -	$ -	$6.95	$12,330,389	$4.49	6,128,836	$7,967,487	$ -	$ -	$13.28	$23,572,431		
Steep Runoff channels																				$77,316	
Surface runoff management: Rock drains	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$0.73	$3,203	$ -	$ -	$1.42	$6,226	$0.75	2,525	$3,283	$ -	$ -	$2.91	$12,711		
	Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$1.46	$4,765	$ -	$ -	$6.43	$20,944	$4.52	11,311	$14,705	$ -	$ -	$12.42	$40,415		
	Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$1.28	$4,159	$ -	$ -	$2.99	$9,726	$1.35	3,380	$4,394	$ -	$ -	$5.62	$18,280		
	Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$0.46	$1,489	$ -	$ -	$0.89	$2,895	$0.47	1,174	$1,527	$ -	$ -	$1.82	$5,911		
Revegetate																				$467,177	
Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$0.00	$19,952	$0.05	$202,042	$0.05	$242,231	$0.00	2,270	$2,951	$ -	$ -	$0.11	$467,177		
Note: Removal of North Fork Rock Drain included in Tailings Alternatives																					
Subtotal Direct Costs - Waste Rock						**117,215**		**$4,289,699**		**$202,042**		**$16,503,482**		**8,331,338**	**$10,830,739**		**$0**			**$31,825,962**	
Groundwater																					
Upgrade North Fork Rose Creek																				$1,294,796	
Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$0.13	$878	$ -	$ -	$0.62	$4,120	$0.36	1,847	$2,401	$ -	$ -	$1.12	$7,399		
	Construct access road	2,200	m	C.2.27	0.131	288.8	$4.80	$10,568	$ -	$ -	$10.14	$22,315	$5.33	9,013	$11,717	$ -	$ -	$20.27	$44,600		
Construct channel	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$1.03	$22,477	$ -	$ -	$2.75	$59,910	$1.34	22,480	$29,224	$ -	$ -	$5.13	$111,611		
	Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$1.15	$41,481	$ -	$ -	$2.82	$101,628	$1.41	39,006	$50,708	$ -	$ -	$5.39	$193,817		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$0.57	$24,275	$3.50	$150,003	$0.23	$9,783	$0.15	4,875	$6,338	$ -	$ -	$4.44	$190,399		
Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$1.02	$13,176	$ -	$ -	$2.38	$30,596	$1.11	11,014	$14,318	$ -	$ -	$4.52	$58,090		
	Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$0.57	$7,364	$ -	$ -	$0.02	$270	$0.02	161	$209	$ -	$ -	$0.61	$7,843		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$0.57	$24,275	$3.50	$150,003	$0.23	$9,783	$0.15	4,875	$6,338	$ -	$ -	$4.44	$190,399		
Place bedding layer	Bedding layer: Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$0.37	$4,706	$ -	$ -	$1.61	$20,682	$1.13	11,170	$14,521	$ -	$ -	$3.10	$39,909		
	Bedding layer: Load, haul, place and compact	12,857	m3	R.084	0.029	374.4	$1.07	$13,702	$ -	$ -	$2.21	$28,392	$1.04	10,246	$13,320	$ -	$ -	$4.31	$55,413		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	15,914	m3	C.2.25	0.057	909.4	$2.09	$33,283	$ -	$ -	$9.19	$146,285	$6.45	79,003	$102,704	$ -	$ -	$17.74	$282,272		
	Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$1.18	$18,818	$ -	$ -	$2.81	$44,714	$1.30	15,857	$20,614	$ -	$ -	$5.29	$84,146		
	Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$0.46	$7,281	$ -	$ -	$0.89	$14,154	$0.47	5,741	$7,464	$ -	$ -	$1.82	$28,898		
Outwash material																				$287,728	
Relocate to Intermediate Dump	Load, haul, dump outwash material	76,350	m3	R.062	0.023	1758.1	$0.84	$64,345	$ -	$ -	$2.00	$152,895	$0.92	54,222	$70,488	$ -	$ -	$3.77	$287,728		
North Fork Rose Creek Detention Pond																				$10,883	
Excavate basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$0.86	$2,232	$ -	$ -	$2.00	$5,176	$0.93	1,859	$2,417	$ -	$ -	$3.79	$9,825		
Place rip-rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$1.46	$76	$ -	$ -	$6.43	$335	$4.52	181	$235	$ -	$ -	$12.42	$646		
	Rip-rap: Load, haul, dump	52	m3	R.086	0.037	1.9	$1.37	$71	$ -	$ -	$3.25	$169	$1.50	60	$78	$ -	$ -	$6.11	$318		
	Rip-rap: Place and secure	52	m3	C.2.26	0.013	0.7	$0.46	$24	$ -	$ -	$0.89	$46	$0.47	19	$24	$ -	$ -	$1.82	$94		
North Fork Rose Creek Collection System (to Pit)																				$541,110	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$102.13	$10,213	$ -	$ -	$100.85	$10,085	$22.08	1,698	$2,208	$ -	$ -	$225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$7.66	$766	$232.60	$23,260	$7.56	$756	$1.66	127	$166	$ -	$ -	$249.48	$24,948		
	Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$600.00	$1,800	$6,842.00	$20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$7,442.00	$22,326		
	Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$1,300.00	$3,900	$445.00	$1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$1,745.00	$5,235		

Activity	Task	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	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping system	Excavate piping trench	11,400	m3	C.2.13	0.020	228.0	$ 0.73	$ 8,345	$ -	$ -	$ 1.42	$ 16,223	$ 0.75	6,580	$ 8,555	$ -	$ -	$ 2.91	$33,122		
	Supply and install insulated 150mm HDPE pipe	1,900	m	C.3.03	0.250	475.0	$ 8.75	$ 16,625	$ 155.84	$ 296,096	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$312,721		
	Bedding layer: Produce, screen and stockpile	741	m3	C.2.02	0.010	7.4	$ 0.37	$ 271	$ -	$ -	$ 1.61	$ 1,192	$ 1.13	644	$ 837	$ -	$ -	$ 3.10	$2,300		
	Bedding layer: Load, haul, place and compact	741	m3	R.087	0.037	27.6	$ 1.36	$ 1,011	$ -	$ -	$ 2.83	$ 2,096	$ 1.30	742	$ 964	$ -	$ -	$ 5.49	$4,071		
	Backfill ditches	11,400	m3	C.2.01	0.030	342.0	$ 1.08	$ 12,335	$ -	$ -	$ 0.74	$ 8,411	$ 0.40	3,468	$ 4,509	$ -	$ -	$ 2.22	$25,254		
Heat tracing	Supply and install heat trace in HDPE pipe	1,900	m	C.3.04	0.250	475.0	$ 12.50	$ 23,750	$ 21.32	$ 40,508	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$64,258		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
	Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Pit)																				$315,565	
Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		
	Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		
Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
	Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
	Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
	Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping	Excavate piping trench	4,800	m3	C.2.13	0.020	96.0	$ 0.73	$ 3,514	$ -	$ -	$ 1.42	$ 6,831	$ 0.75	2,771	$ 3,602	$ -	$ -	$ 2.91	$13,946		
	Supply and install insulated 150mm HDPE pipe	800	m	C.3.03	0.250	200.0	$ 8.75	$ 7,000	$ 155.84	$ 124,672	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$131,672		
	Bedding layer: Produce, screen and stockpile	312	m3	C.2.02	0.010	3.1	$ 0.37	$ 114	$ -	$ -	$ 1.61	$ 502	$ 1.13	271	$ 352	$ -	$ -	$ 3.10	$968		
	Bedding Layer: Load, haul, place and compact	312	m3	R.088	0.037	11.4	$ 1.34	$ 419	$ -	$ -	$ 2.78	$ 868	$ 1.28	307	$ 399	$ -	$ -	$ 5.40	$1,686		
	Backfill and compact ditches	4,488	m3	C.2.01	0.030	134.6	$ 1.08	$ 4,856	$ -	$ -	$ 0.74	$ 3,311	$ 0.40	1,365	$ 1,775	$ -	$ -	$ 2.22	$9,942		
Heat Tracing	Supply and install heat trace in HDPE pipe	800	m	C.3.04	0.250	200.0	$ 12.50	$ 10,000	$ 21.32	$ 17,056	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$27,056		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide Electricity from WTP to pumps	Supply/Install treated power poles	9	ea.	C.4.03	4.545	40.9	$ 297.88	$ 2,681	$ 325.96	$ 2,934	$ 85.85	$ 773	$ 28.17	195	$ 254	$ -	$ -	$ 737.86	$6,641		
	Supply/Install overhead conductor	650	m	C.4.02	0.032	20.8	$ 2.21	$ 1,438	$ 1.41	$ 917	$ 0.45	$ 295	$ 0.15	74	$ 97	$ -	$ -	$ 4.22	$2,746		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater						**11,147**		**$431,663**		**$912,821**		**$721,478**		**295,477**	**$384,120**		**$0**			**$2,450,082**	
Miscellaneous																					
Roads																				$12,639	
Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
	Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ 0.29	$3,044.27		
	Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																				$4,980,737	
Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	67,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
	Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
	Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
	Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$149.18	2,295	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																				$125,599	
Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in landfarm	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
	Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
	Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																				$45,657	
Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
Decommission landfarm	Excavate soils for use as cover	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elswhere
	Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																				$101,017	
Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
	Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
	Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous						**62,361**		**$2,490,390**		**$28,708**		**$1,767,867**		**752,833**	**$978,683**		**$0**			**$5,265,648**	
Subtotal Direct Costs																					
	Subtotal direct costs					**276,393**		**$10,790,167**		**$4,907,268**		**$24,338,151**		**11,590,031**	**$15,067,040**		**$0**			**$55,102,626**	
CLOSURE COSTS - INDIRECT																					
Project Management	5.0% of direct costs															$55,102,626	x	5.0%		$2,755,131	
Field Supervision	(included in major tasks)																			$0	
Contractor profit and home office overhead	10% of direct costs															$55,102,626	x	10.0%		$5,510,263	
Insurance	0.5% of direct costs															$55,102,626	x	0.5%		$275,513	
Bonding	0.5% of direct costs															$55,102,626	x	0.5%		$275,513	
Field Engineering and QA	10% of direct costs															$55,102,626	x	10.0%		$5,510,263	
Mob - Demob																1	lump	$500,000		$500,000	
Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																					
Subtotal indirect costs																				**$14,826,683**	
CLOSURE COSTS - CONTINGENCY																					
Contingency	20% of direct costs															$55,102,626	x	20.0%		**$11,020,525**	
CLOSURE COSTS - TOTAL																					
Total direct and indirect costs																				**$80,949,834**	

Faro Mine Area Alternative 2 - Upgrade Faro Creek Diversion

Contract Code	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																						
Faro Pit																						
Water Treatment																					$613,450	
	Place pipeline from pit to treatment plant	Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
		Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
		Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
		Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
		Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
		Backfill ditches	15,000	Bm3	C.2.01	0.030	450.0	$ 1.08	$ 16,230	$ -	$ -	$ 0.74	$ 11,067	$ 0.40	4,563	$ 5,933	$ -	$ -	$ 2.22	$33,229		
	Heat tracing	Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	Provide electricity from WTP to pump	Supply/Install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
		Supply/Install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 149	$ -	$ -	$ 4.22	$4,225		
		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Safety Berm																					$130,159	
	Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$7,296		
		Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$14,191		
	Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
		Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit							**2,933**		**$118,988**		**$462,462**		**$107,296**		**42,202**	**$54,863**		**$0**			**$743,609**	
Faro Creek																						Golder report (Feb. 2004)
Construct East Interceptor																					$4,063,839	
	Construct access road	Clear access road area	135,000	m2	C.2.04	0.004	490.9	$ 0.13	$ 17,967	$ -	$ -	$ 0.62	$ 84,268	$ 0.36	37,777	$ 49,111	$ -	$ -	$ 1.12	$151,346		2700m * 50m avg
		Construct access road	3,057	m	C.2.27	0.131	401.2	$ 4.80	$ 14,685	$ -	$ -	$ 10.14	$ 31,007	$ 5.33	12,524	$ 16,281	$ -	$ -	$ 20.27	$61,973		
	Excavate channel	Soil excavation: Load, haul and dump locally	230,000	Bm3	C.2.10	0.032	7360.0	$ 1.17	$ 269,376	$ -	$ -	$ 2.72	$ 624,625	$ 1.27	224,367	$ 291,677	$ -	$ -	$ 5.16	$1,185,677		
	Place thermal blanket	Granular fill: Produce, screen and stockpile	81,000	Bm3	C.2.02	0.010	810.0	$ 0.37	$ 29,646	$ -	$ -	$ 1.61	$ 130,300	$ 1.13	70,370	$ 91,481	$ -	$ -	$ 3.10	$251,427		2700m * 20m avg. * 1.5m
		Granular fill: Load, haul, place and compact on uphill cut slope	81,000	Bm3	R.053	0.076	6144.8	$ 2.78	$ 224,901	$ -	$ -	$ 5.75	$ 466,125	$ 2.65	164,937	$ 214,418	$ -	$ -	$ 11.18	$905,444		
	Place GCL	Supply and place GCL	27,000	m2	C.4.08	0.143	3857.1	$ 6.33	$ 170,949	$ 16.00	$ 432,000	$ 1.63	$ 44,023	$ 1.06	21,938	$ 28,520	$ -	$ -	$ 25.02	$675,492		2700m * 10m avg.
	Place bedding layer	Bedding layer: Produce, screen and stockpile	8,100	Bm3	C.2.02	0.010	81.0	$ 0.37	$ 2,965	$ -	$ -	$ 1.61	$ 13,030	$ 1.13	7,037	$ 9,148	$ -	$ -	$ 3.10	$25,143		
		Bedding layer: Load, haul, place and compact	8,100	Bm3	R.053	0.076	614.5	$ 2.78	$ 22,490	$ -	$ -	$ 5.75	$ 46,613	$ 2.65	16,494	$ 21,442	$ -	$ -	$ 11.18	$90,544		
	Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		2700m * 10m avg. * 0.25m
		Rip-rap: Load, haul, dump	29,402	Bm3	R.054	0.030	882.0	$ 1.10	$ 32,283	$ -	$ -	$ 2.57	$ 75,502	$ 1.16	26,240	$ 34,112	$ -	$ -	$ 4.83	$141,897		
		Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Optional Extension across west of Faro Valley																					$737,645	
	Construct access road	Clear access road area	20,300	m2	C.2.05	0.015	295.3	$ 0.53	$ 10,807	$ -	$ -	$ 0.94	$ 18,982	$ 0.62	9,635	$ 12,525	$ -	$ -	$ 2.08	$42,314		
		Construct access road	2,100	m	C.2.27	0.131	275.6	$ 4.80	$ 10,088	$ -	$ -	$ 10.14	$ 21,300	$ 5.33	8,603	$ 11,184	$ -	$ -	$ 20.27	$42,572		
	Excavate channel	Soil excavation: Load, haul and dump locally	93,076	Bm3	C.2.10	0.032	2978.4	$ 1.17	$ 109,010	$ -	$ -	$ 2.72	$ 252,771	$ 1.27	90,796	$ 118,035	$ -	$ -	$ 5.16	$479,815		
	Place bedding layer	Bedding layer: Produce, screen and stockpile	4,263	Bm3	C.2.02	0.010	42.6	$ 0.37	$ 1,560	$ -	$ -	$ 1.61	$ 6,858	$ 1.13	3,704	$ 4,815	$ -	$ -	$ 3.10	$13,233		
		Bedding layer: Load, haul, place and compact	4,263	Bm3	R.055	0.100	426.3	$ 3.66	$ 15,603	$ -	$ -	$ 7.59	$ 32,338	$ 3.49	11,443	$ 14,875	$ -	$ -	$ 14.74	$62,816		
	Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	3,553	Bm3	C.2.25	0.057	203.0	$ 2.09	$ 7,430	$ -	$ -	$ 9.19	$ 32,655	$ 6.45	17,636	$ 22,927	$ -	$ -	$ 17.74	$63,012		
		Rip-rap: Load, haul, dump	3,553	Bm3	R.056	0.048	170.5	$ 1.76	$ 6,241	$ -	$ -	$ 4.11	$ 14,596	$ 1.86	5,073	$ 6,595	$ -	$ -	$ 7.72	$27,432		
		Rip-rap: Place and secure	3,553	Bm3	C.2.26	0.013	44.4	$ 0.46	$ 1,625	$ -	$ -	$ 0.89	$ 3,160	$ 0.47	1,282	$ 1,666	$ -	$ -	$ 1.82	$6,451		
Subtotal Direct Costs - Faro Creek							**27,125**		**$1,022,567**		**$432,000**		**$2,194,567**		**886,423**	**$1,152,349**		**$0**			**$4,801,483**	
Zone II Pit																						
Water Management																					$343,698	
	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
		Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
		Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 48.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 336.27	$673		
	Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
		Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
		Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
		Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
	Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	Provide electricity from WTP to pumps	Supply/Install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
		Supply/Install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit							**1,414**		**$69,756**		**$217,341**		**$43,412**		**10,145**	**$13,188**		**$0**			**$343,698**	
Oxide Fines / LGSP																						
Consolidate oxide fines																					$770,373	
	Relocate to Low Grade Stockpile C	Load, haul, place and compact oxide materials	262,315	m3	R.068	0.012	3119.4	$ 0.44	$ 114,171	$ -	$ -	$ 1.51	$ 396,927	$ 0.99	199,442	$ 259,275	$ -	$ -	$ 2.94	$770,373		
Medium-Grade Stockpile																					$1,130,719	
	Regrade	Flattened surfaces	59	hrs	C.2.22	1.000	59.2	$ 36.60	$ 2,166	$ -	$ -	$ 173.28	$ 10,255	$ 149.18	6,791	$ 8,829	$ -	$ -	$ 359.06	$21,249		
		Regrade slopes	27	hrs	C.2.22	1.000	27.4	$ 36.60	$ 1,004	$ -	$ -	$ 173.28	$ 4,753	$ 149.18	3,148	$ 4,092	$ -	$ -	$ 359.06	$9,849		
	Place HDPE Cover	Bedding layer: Produce, screen and stockpile	13,800	m3	C.2.02	0.010	138.0	$ 0.37	$ 5,051	$ -	$ -	$ 1.61	$ 22,199	$ 1.13	11,989	$ 15,586	$ -	$ -	$ 3.10	$42,836		
		Bedding layer: Load, haul, place (0.3m)	13,800	m3	R.065	0.042	583.8	$ 1.55	$ 21,369	$ -	$ -	$ 3.21	$ 44,289	$ 1.48	15,671	$ 20,373	$ -	$ -	$ 6.23	$86,030		
		Supply and place HDPE liner	27,600	m2	C.4.10	0.143	3942.9	$ 6.33	$ 174,747	$ 12.77	$ 352,452	$ 1.63	$ 45,002	$ 1.06	22,426	$ 29,153	$ -	$ -	$ 21.79	$601,355		
		Load, haul, place loose till (1.0m)	27,600	Bm3	R.064	0.050	1391.0	$ 1.84	$ 50,912	$ -	$ -	$ 6.95	$ 191,710	$ 4.49	95,290	$ 123,877	$ -	$ -	$ 13.28	$366,499		
	Revegetate	Seed/Fertilize, helicopter low application rate	27,600	m2	C.5.02	0.000	3.5	$ 0.00	$ 124	$ 0.05	$ 1,255	$ 0.05	$ 1,504	$ 0.00	14	$ 18	$ -	$ -	$ 0.11	$2,901		
Low Grade Stockpile "A"																					$1,383,037	
	Re-grade	Flattened surfaces	7	hrs	C.2.22	1.000	6.8	$ 36.60	$ 249	$ -	$ -	$ 173.28	$ 1,178	$ 149.18	780	$ 1,014	$ -	$ -	$ 359.06	$2,442		
		Re-grade slopes	15	hrs	C.2.22	1.000	15.5	$ 36.60	$ 567	$ -	$ -	$ 173.28	$ 2,683	$ 149.18	1,777	$ 2,310	$ -	$ -	$ 359.06	$5,560		
	Place HDPE cover	Bedding layer: Produce, screen and stockpile	10,842	m3	C.2.02	0.010	108.4	$ 0.37	$ 3,968	$ -	$ -	$ 1.61	$ 17,440	$ 1.13	9,419	$ 12,245	$ -	$ -	$ 3.10	$33,653		
		Bedding layer: Load, haul, place (0.3m)	10,842	m3	R.066	0.044	477.0	$ 1.61	$ 17,459	$ -	$ -	$ 3.34	$ 36,186	$ 1.54	12,804	$ 16,646	$ -	$ -	$ 6.48	$70,291		
		Supply and place HDPE liner	36,139	m2	C.4.10	0.143	5162.7	$ 6.33	$ 228,811	$ 12.77	$ 461,495	$ 1.63	$ 58,925	$ 1.06	29,364	$ 38,173	$ -	$ -	$ 21.79	$787,404		
		Load, haul, place till (1.0m)	36,139	Bm3	R.064	0.050	1821.4	$ 1.84	$ 66,663	$ -	$ -	$ 6.95	$ 251,022	$ 4.49	124,771	$ 162,202	$ -	$ -	$ 13.28	$479,887		
	Revegetate	Seed/Fertilize, helicopter low application rate	36,150	m2	C.5.02	0.000	4.5	$ 0.00	$ 162	$ 0.05	$ 1,643	$ 0.05	$ 1,970	$ 0.00	18	$ 24	$ -	$ -	$ 0.11	$3,800		
Low Grade Stockpile "C"																					$4,382,212	
	Re-grade	Flattened surfaces	27	hrs	C.2.22	1.000	26.9	$ 36.60	$ 983	$ -	$ -	$ 173.28	$ 4,653	$ 149.18	3,081	$ 4,005	$ -	$ -	$ 359.06	$9,641		
		Re-grade slopes	46	hrs	C.2.22	1.000	46.1	$ 36.60	$ 1,688	$ -	$ -	$ 173.28	$ 7,992	$ 149.18	5,293	$ 6,881	$ -	$ -	$ 359.06	$16,561		
	Place HDPE cover	Bedding layer: Produce, screen and stockpile	54,770	m3	C.2.02	0.010	547.7	$ 0.37	$ 20,046	$ -	$ -	$ 1.61	$ 88,106	$ 1.13	47,583	$ 61,858	$ -	$ -	$ 3.10	$170,009		
		Bedding layer: Load, haul, place (0.3m)	54,770	m3	R.067	0.040	2190.8	$ 1.46	$ 80,184	$ -	$ -	$ 3.03	$ 166,188	$ 1.40	58,805	$ 76,446	$ -	$ -	$ 5.89	$322,818		
		Supply and place HDPE liner	109,541	m2	C.4.10	0.143	15648.7	$ 6.33	$ 693,551	$ 12.77	$ 1,398,839	$ 1.63	$ 178,606	$ 1.06	89,005	$ 115,707	$ -	$ -	$ 21.79	$2,386,703		
		Load, haul, place till (1.0m)	109,541	m3	R.064	0.050	5520.9	$ 1.84	$ 202,063	$ -	$ -	$ 6.95	$ 760,872	$ 4.49	378,192	$ 491,650	$ -	$ -	$ 13.28	$1,454,585		
	Surface runoff management: Rock drains	Excavate channel for rock drains	610	m3	C.2.12	0.024	14.4	$ 0.86	$ 525	$ -	$ -	$ 2.00	$ 1,218	$ 0.93	438	$ 569	$ -	$ -	$ 3.79	$2,312		
		Rip-rap (rounded, low quality): Screen and stockpile	454	m3	C.2.24	0.040	18.2	$ 1.46	$ 664	$ -	$ -	$ 6.43	$ 2,920	$ 4.52	1,577	$ 2,050	$ -	$ -	$ 12.42	$5,635		
		Rip-rap: Load, haul, dump	454	m3	R.069	0.021	9.6	$ 0.78	$ 352	$ -	$ -	$ 1.88	$ 853	$ 0.89	310	$ 404	$ -	$ -	$ 3.54	$1,609		
		Rip-rap: Place and secure	454	m3	C.2.26	0.013	5.7	$ 0.46	$ 208	$ -	$ -	$ 0.89	$ 404	$ 0.47	164	$ 213	$ -	$ -	$ 1.82	$824		
	Revegetate	Seed/Fertilize, helicopter low application rate	109,550	m2	C.5.02	0.000	13.7	$ 0.00	$ 492	$ 0.05	$ 4,980	$ 0.05	$ 5,971	$ 0.00	56	$ 73	$ -	$ -	$ 0.11	$11,515		
Subtotal Direct Costs - Oxide Fines							**40,904**		**$1,688,180**		**$2,220,664**		**$2,303,826**		**1,118,208**	**$1,453,671**		**$0**			**$7,666,340**	

ETA Tailings																					
Option 1: Pump Tailings to Faro Pit																				$662,124	
Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$ 0.89	$ 57,163	$ 0.26	$ 16,473	$ 0.02	$ 1,014	$ 0.01	496	$ 645	$ 0.27	$ 17,145	$ 1.44	$92,439		
	Operate Slurry Pumping System	64,000	m3	C.7.18	0.008	540.8	$ 0.42	$ 27,042	$ 0.32	$ 20,756	$ -	$ -	$ -	0	$ -	$ 0.54	$ 34,479	$ 1.29	$82,278		
	lime addition - qnty in tonnes per CaOH	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$ 1.92	$ 24,595	$ -	$ -	$ 5.31	$ 68,008	$ 2.59	25,547	$ 33,211	$ -	$ -	$ 9.83	$125,814		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
Option 2: Haul Tailings to Rose Creek Tailings Deposit																				$725,144	
Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$ 0.95	$ 61,011	$ -	$ -	$ 2.54	$ 162,621	$ 1.24	61,021	$ 79,327	$ -	$ -	$ 4.73	$302,959		
Lime addition	Add lime to waste rock (qnty= tonnes CaOH)	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings Imp.	12,800	m3	R.074	0.026	333.4	$ 0.95	$ 12,202	$ -	$ -	$ 2.54	$ 32,524	$ 1.24	12,204	$ 15,865	$ -	$ -	$ 4.73	$60,592		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
Groundwater Collection System (to Plant)																				$727,673	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	Install protective housing (shack)	100	m	C.3.13	20.000	2000.0	$ 1,300.00	$ 130,000	$ 445.00	$ 44,500	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$174,500		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	3	ea.	C.2.09	2.000	6.0	$ 102.13	$ 306	$ -	$ -	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 225.07	$675		
	Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping system	Excavate piping trench	11,100	m3	C.2.13	0.020	222.0	$ 0.73	$ 8,125	$ -	$ -	$ 1.42	$ 15,796	$ 0.75	6,407	$ 8,329	$ -	$ -	$ 2.91	$32,250		
	Supply and install insulated 150mm HDPE pipe	1,850	m	C.3.03	0.250	462.5	$ 8.75	$ 16,188	$ 155.84	$ 288,304	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$304,492		
	Bedding layer: Produce, screen and stockpile	722	m3	C.2.02	0.010	7.2	$ 0.37	$ 264	$ -	$ -	$ 1.61	$ 1,161	$ 1.13	627	$ 815	$ -	$ -	$ 3.10	$2,240		
	Bedding layer: Load, haul, place and compact	722	m3	R.073	0.031	22.0	$ 1.12	$ 807	$ -	$ -	$ 2.32	$ 1,672	$ 1.07	592	$ 769	$ -	$ -	$ 4.50	$3,248		
	Backfill ditches	11,100	m3	C.2.01	0.030	333.0	$ 1.08	$ 12,010	$ -	$ -	$ 0.74	$ 8,189	$ 0.40	3,377	$ 4,390	$ -	$ -	$ 2.22	$24,589		
Heat tracing	Supply and install heat trace in HDPE pipe	1,850	m	C.3.04	0.250	462.5	$ 12.50	$ 23,125	$ 21.32	$ 39,442	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$62,567		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951		
	Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)						**5,955**		**$286,377**		**$808,764**		**$241,022**		**89,734**	**$116,655**		**$0**			**$1,452,818**	
Waste Rock																					
Reslope Waste Rock																				$3,687,791	
Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$ 0.53	$ 31,942	$ -	$ -	$ 0.94	$ 56,103	$ 0.62	28,478	$ 37,021	$ -	$ -	$ 2.08	$125,066		
Regrade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
	Regrade slopes	769	hrs	C.2.22	1.000	769.0	$ 36.60	$ 28,146	$ -	$ -	$ 173.28	$ 133,252	$ 149.18	88,246	$ 114,720	$ -	$ -	$ 359.06	$276,117		
	Regrade Slopes	7,329	hrs	C.2.22	1.000	7329.4	$ 36.60	$ 268,255	$ -	$ -	$ 173.28	$ 1,270,021	$ 149.18	841,074	$ 1,093,397	$ -	$ -	$ 359.06	$2,631,673		
Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	146,250	m3	R.077	0.012	1821.2	$ 0.46	$ 66,657	$ -	$ -	$ 1.80	$ 263,129	$ 1.17	131,619	$ 171,104	$ -	$ -	$ 3.42	$500,890		
Sulphide Cell																				$3,851,716	
Low infiltration cover	Load, haul, place compacted till (0.5m) (South cells)	86,823	m3	R.075	0.056	4862.1	$ 2.05	$ 177,953	$ -	$ -	$ 7.09	$ 616,001	$ 4.61	307,977	$ 400,370	$ -	$ -	$ 13.76	$1,194,325		
	Load, haul, place loose till (1.5m) (South cells)	173,647	m3	R.076	0.050	8751.8	$ 1.84	$ 320,316	$ -	$ -	$ 6.95	$ 1,206,153	$ 4.49	599,520	$ 779,376	$ -	$ -	$ 13.28	$2,305,845		
	Load, haul, place compacted till (0.5m) (East cell)	8,720	m3	R.075	0.056	488.3	$ 2.05	$ 17,873	$ -	$ -	$ 7.09	$ 61,869	$ 4.61	30,932	$ 40,212	$ -	$ -	$ 13.76	$119,954		
	Load, haul, place loose till (1.5m) (East cell)	17,441	m3	R.076	0.050	879.0	$ 1.84	$ 32,171	$ -	$ -	$ 6.95	$ 121,142	$ 4.49	60,214	$ 78,278	$ -	$ -	$ 13.28	$231,592		
Waste Rock Cover																				$23,572,431	
Place rudimentary cover	Load, haul, place loose till (0.5m)	1,775,173	m3	R.076	0.050	89468.7	$ 1.84	$ 3,274,555	$ -	$ -	$ 6.95	$ 12,330,389	$ 4.49	6,128,836	$ 7,967,487	$ -	$ -	$ 13.28	$23,572,431		
Steep Runoff Channels																				$77,316	
Install rock drains (runoff management)	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$ 0.73	$ 3,203	$ -	$ -	$ 1.42	$ 6,226	$ 0.75	2,525	$ 3,283	$ -	$ -	$ 2.91	$12,711		
	Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$ 1.46	$ 4,765	$ -	$ -	$ 6.43	$ 20,944	$ 4.52	11,311	$ 14,705	$ -	$ -	$ 12.42	$40,415		
	Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$ 1.28	$ 4,159	$ -	$ -	$ 2.99	$ 9,726	$ 1.35	3,380	$ 4,394	$ -	$ -	$ 5.62	$18,280		
	Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$ 0.46	$ 1,489	$ -	$ -	$ 0.89	$ 2,895	$ 0.47	1,174	$ 1,527	$ -	$ -	$ 1.82	$5,911		
Revegetate																				$467,177	
Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$ 0.00	$ 19,952	$ 0.05	$ 202,042	$ 0.05	$ 242,231	$ 0.00	2,270	$ 2,951	$ -	$ -	$ 0.11	$467,177		
Note: Removal of North Fork Rock Drain included in Tailings Alternatives																					
Subtotal Direct Costs - Waste Rock						**116,599**		**$4,267,138**		**$202,042**		**$16,414,423**		**8,286,790**	**$10,772,827**		**$0**			**$31,656,430**	
Groundwater																					1CD003.053
Upgrade North Fork Rose Creek																				$1,294,796	
Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$ 0.13	$ 878	$ -	$ -	$ 0.62	$ 4,120	$ 0.36	1,847	$ 2,401	$ -	$ -	$ 1.12	$7,399		
	Construct access road	2,200	m	C.2.27	0.131	288.8	$ 4.80	$ 10,568	$ -	$ -	$ 10.14	$ 22,315	$ 5.33	9,013	$ 11,717	$ -	$ -	$ 20.27	$44,600		
Construct channel	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$ 1.03	$ 22,477	$ -	$ -	$ 2.75	$ 59,910	$ 1.34	22,480	$ 29,224	$ -	$ -	$ 5.13	$111,611		
	Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$ 1.15	$ 41,481	$ -	$ -	$ 2.82	$ 101,628	$ 1.41	39,006	$ 50,708	$ -	$ -	$ 5.39	$193,817		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$ 1.02	$ 13,176	$ -	$ -	$ 2.38	$ 30,596	$ 1.11	11,014	$ 14,318	$ -	$ -	$ 4.52	$58,090		
	Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$ 0.57	$ 7,364	$ -	$ -	$ 0.02	$ 270	$ 0.02	161	$ 209	$ -	$ -	$ 0.61	$7,843		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
Place bedding layer	Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$ 0.37	$ 4,706	$ -	$ -	$ 1.61	$ 20,682	$ 1.13	11,170	$ 14,521	$ -	$ -	$ 3.10	$39,909		
	Load, haul, place and compact bedding layer	12,857	m3	R.084	0.029	374.4	$ 1.07	$ 13,702	$ -	$ -	$ 2.21	$ 28,392	$ 1.04	10,246	$ 13,320	$ -	$ -	$ 4.31	$55,413		
Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	15,914	m3	C.2.25	0.057	909.4	$ 2.09	$ 33,283	$ -	$ -	$ 9.19	$ 146,285	$ 6.45	79,003	$ 102,704	$ -	$ -	$ 17.74	$282,272		
	Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$ 1.18	$ 18,818	$ -	$ -	$ 2.81	$ 44,714	$ 1.30	15,857	$ 20,614	$ -	$ -	$ 5.29	$84,146		
	Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$ 0.46	$ 7,281	$ -	$ -	$ 0.89	$ 14,154	$ 0.47	5,741	$ 7,464	$ -	$ -	$ 1.82	$28,898		
Outwash material																				$287,728	
Relocate to Intermediate Dump	Load, Haul, Dump Outwash Material	76,350	m3	R.062	0.023	1758.1	$ 0.84	$ 64,345	$ -	$ -	$ 2.00	$ 152,895	$ 0.92	54,222	$ 70,488	$ -	$ -	$ 3.77	$287,728		
North Fork Rose Creek Detention Pond																				$10,883	
Excavate Basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$ 0.86	$ 2,232	$ -	$ -	$ 2.00	$ 5,176	$ 0.93	1,859	$ 2,417	$ -	$ -	$ 3.79	$9,825		
Place Rip-Rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$ 1.46	$ 76	$ -	$ -	$ 6.43	$ 335	$ 4.52	181	$ 235	$ -	$ -	$ 12.42	$646		
	Rip-rap: Load, Haul, Dump	52	m3	R.086	0.037	1.9	$ 1.37	$ 71	$ -	$ -	$ 3.25	$ 169	$ 1.50	60	$ 78	$ -	$ -	$ 6.11	$318		
	Rip-Rap: Place and Secure	52	m3	C.2.26	0.013	0.7	$ 0.46	$ 24	$ -	$ -	$ 0.89	$ 46	$ 0.47	19	$ 24	$ -	$ -	$ 1.82	$94		
North Fork Rose Creek Collection System (to Plant)																				$139,439	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
	Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
	Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping system	Excavate piping trench	1,080	m3	C.2.13	0.020	21.6	$ 0.73	$ 791	$ -	$ -	$ 1.42	$ 1,537	$ 0.75	623	$ 810	$ -	$ -	$ 2.91	$3,138		
	Supply and install insulated 150mm HDPE pipe	180	m	C.3.03	0.250	45.0	$ 8.75	$ 1,575	$ 155.84	$ 28,051	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$29,626		
	Bedding layer: Produce, screen and stockpile	70	m3	C.2.02	0.010	0.7	$ 0.37	$ 26	$ -	$ -	$ 1.61	$ 113	$ 1.13	61	$ 79	$ -	$ -	$ 3.10	$218		
	Bedding layer: Load, haul, place and compact	70	m3	R.089	0.029	2.0	$ 1.07	$ 75	$ -	$ -	$ 2.21	$ 155	$ 1.04	56	$ 73	$ -	$ -	$ 4.31	$303		
	Backfill ditches	1,080	m3	C.2.01	0.030	32.4	$ 1.08	$ 1,169	$ -	$ -	$ 0.74	$ 797	$ 0.40	329	$ 427	$ -	$ -	$ 2.22	$2,392		
Heat tracing	Supply and install heat trace in HDPE pipe	180	m	C.3.04	0.250	45.0	$ 12.50	$ 2,250	$ 21.32	$ 3,838	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$6,088		
Provide electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
	Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Plant)																				$283,543	
Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		
	Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		

Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
	Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
	Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
	Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping	Excavate piping trench	4,200	m3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	Bedding layer: Produce, screen and stockpile	273	m3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	Bedding Layer: Load, haul, place and compact	273	m3	R.090	0.029	7.9	$ 1.07	$ 291	$ -	$ -	$ 2.21	$ 603	$ 1.04	218	$ 283	$ -	$ -	$ 4.31	$1,177		
	Backfill and compact ditches	3,927	m3	C.2.01	0.030	117.8	$ 1.08	$ 4,249	$ -	$ -	$ 0.74	$ 2,897	$ 0.40	1,195	$ 1,553	$ -	$ -	$ 2.22	$8,699		
Heat Tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide Electricity from WTP to pumps	Supply/Install treated power poles	1	ea.	C.4.03	4.545	4.5	$ 297.88	$ 298	$ 325.96	$ 326	$ 85.85	$ 86	$ 28.17	22	$ 28	$ -	$ -	$ 737.86	$738		
	Supply/Install overhead conductor	20	m	C.4.02	0.032	0.6	$ 2.21	$ 44	$ 1.41	$ 28	$ 0.45	$ 9	$ 0.15	2	$ 3	$ -	$ -	$ 4.22	$84		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater						**9,595**		**$367,833**		**$585,472**		**$693,591**		**284,226**	**$369,494**		**$0**			**$2,016,390**	
Miscellaneous																					
Roads																				$12,639	
Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
	Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ 0.29	$3,044.27		
	Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																				$4,980,737	
Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	67,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
	Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
	Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
	Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,295	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																				$125,599	
Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in landfarm	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
	Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
	Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																				$45,657	
Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
Decommision landfarm	Excavate soils for use as cover	1	m3	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elswhere
	Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																				$101,017	
Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
	Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
	Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous						**62,361**		**$2,490,390**		**$28,708**		**$1,767,867**		**752,833**	**$978,683**		**$0**			**$5,265,648**	
Subtotal Direct Costs																					
Subtotal direct costs						**266,886**		**$10,311,230**		**$4,957,453**		**$23,766,004**		**11,470,561**	**$14,911,729**		**$0**			**$53,946,416**	
CLOSURE COSTS - INDIRECT																					
Project Management	5.0% of direct costs															$ 53,946,416	x	5.0%		$2,697,321	
Field Supervision	(included in major tasks)																			$0	
Contractor profit and home office overhead	10% of direct costs															$ 53,946,416	x	10.0%		$5,394,642	
Insurance	0.5% of direct costs															$ 53,946,416	x	0.5%		$269,732	
Bonding	0.5% of direct costs															$ 53,946,416	x	0.5%		$269,732	
Field Engineering and QA	10% of direct costs															$ 53,946,416	x	10.0%		$5,394,642	
Mob - Demob																1	lump	$500,000		$500,000	
Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																					
Subtotal indirect costs																				**$14,526,068**	
CLOSURE COSTS - CONTINGENCY																					
Contingency	20% of direct costs															$53,946,416	x	20.0%		**$10,789,283**	
CLOSURE COSTS - TOTAL																					
Total direct and indirect costs																				**$79,261,768**	

Faro Mine Area Alternative 3 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Faro Pit																											
Water Treatment																										$613,450	
1	1	1	1	430	Construct Water Treatment Plant		Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
1	1	2	1	430	Place pipeline from pit to treatment plant		Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
1	1	2	2	500			Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
1	1	2	3	500			Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
1	1	2	4	510			Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
1	1	2	5	430			Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
1	1	2	6	430			Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
1	1	2	7	430			Backfill ditches	15,000	Bm3	C.2.01	0.030	450.0	$ 1.08	$ 16,230	$ -	$ -	$ 0.74	$ 11,067	$ 0.40	4,563	$ 5,933	$ -	$ -	$ 2.22	$33,229		
1	1	3	1	510	Heat tracing		Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
1	1	3	2	510			Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
1	1	3	3	510			Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
1	1	4	1	510	Provide electricity from WTP to pump		Supply/Install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
1	1	4	2	510			Supply/Install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 149	$ -	$ -	$ 4.22	$4,225		
1	1	4	3	510			Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Safety Berm																										$130,159	
1	2	1	1	430	Construct access road		Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$7,296		
1	2	1	2	430			Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$14,191		
1	2	2	1	430	Place berm materials		Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
1	2	2	2	430			Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit												**2,933**		**$118,988**		**$462,462**		**$107,296**		**42,202**	**$54,863**		**$0**			**$743,609**	
Faro Creek																											Golder report (Feb. 2004)
Improve/Maintain Faro Creek Diversion																										$64,437	
2	1	1	1	430	Widen channel		Soil excavation: Load, haul and dump locally	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,856	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$25,776		
2	1	2	1	430	Place bedding layer		Bedding layer: Produce, screen and stockpile	1,000	Bm3	C.2.02	0.010	10.0	$ 0.37	$ 366	$ -	$ -	$ 1.61	$ 1,609	$ 1.13	869	$ 1,129	$ -	$ -	$ 3.10	$3,104		
2	1	2	2	430			Bedding layer: Load, haul, place and compact	1,000	Bm3	R.053	0.076	75.9	$ 2.78	$ 2,777	$ -	$ -	$ 5.75	$ 5,755	$ 2.65	2,036	$ 2,647	$ -	$ -	$ 11.18	$11,178		
2	1	3	1	430	Place rip-rap		Rip-Rap (angular, high quality): Screen and Stockpile	1,000	Bm3	C.2.25	0.057	57.1	$ 2.09	$ 2,091	$ -	$ -	$ 9.19	$ 9,192	$ 6.45	4,964	$ 6,454	$ -	$ -	$ 17.74	$17,737		2700m * 10m avg. * 0.25m
2	1	3	2	430			Rip-rap: Load, haul, dump	1,000	Bm3	R.054	0.030	30.0	$ 1.10	$ 1,098	$ -	$ -	$ 2.57	$ 2,568	$ 1.16	892	$ 1,160	$ -	$ -	$ 4.83	$4,826		
2	1	3	3	430			Rip-rap: Place and secure	1,000	Bm3	C.2.26	0.013	12.5	$ 0.46	$ 458	$ -	$ -	$ 0.89	$ 889	$ 0.47	361	$ 469	$ -	$ -	$ 1.82	$1,816		
Subtotal Direct Costs - Faro Creek												**346**		**$12,645**		**$0**		**$33,592**		**14,000**	**$18,200**		**$0**			**$64,437**	
Zone II Pit																											
Water Management																										$343,698	
3	1	1	1	430	Groundwater Wells		Drill wells (Air Rotary Drill Rig, ~15m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
3	1	1	2	500			Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
3	1	1	3	500			Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
3	1	1	4	500			Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
3	1	2	1	500	Monitoring wells		Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
3	1	2	2	500			Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
3	1	2	3	500			Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 48.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 336.27	$673		
3	1	3	1	430	Piping system		Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
3	1	3	2	510			Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
3	1	3	3	430			Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
3	1	3	4	430			Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
3	1	3	7	430			Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
3	1	4	1	510	Heat tracing		Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
3	1	4	2	510			Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
3	1	4	3	510			Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
3	1	5	1	510	Provide electricity from WTP to pumps		Supply/Install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
3	1	5	2	510			Supply/Install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
3	1	5	3	510			Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit												**1,414**		**$69,756**		**$217,341**		**$43,412**		**10,145**	**$13,188**		**$0**			**$343,698**	
Oxide Fines / LGSP																											
Covered In Place																										$0	
4	1	1	1	430	Covered in place (included under Waste Rock Section)			1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Subtotal Direct Costs - Oxide Fines												**0**		**$0**		**$0**		**$0**			**$0**		**$0**			**$0**	
ETA Tailings																											
Left in Place																										$0	
5	1	1	1	430	GW collection dependent on Cross-Valley Dam system			1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Subtotal Direct Costs - ETA												**0**		**$0**		**$0**		**$0**			**$0**		**$0**			**$0**	
Waste Rock																											
Regrade Waste Rock																										$154,045	
6	1	2	1	430	Regrade		Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
Waste Rock Cover																										$16,409,276	
6	3	1	1	430	Place cover on flattened surfaces		Load, haul, place loose till (0.5m)	1,235,736	m3	R.076	0.050	62281.1	$ 1.84	$ 2,279,488	$ -	$ -	$ 6.95	$ 8,583,449	$ 4.49	4,266,415	$ 5,546,339	$ -	$ -	$ 13.28	$16,409,276		
Revegetate																										$259,791	
6	6	1	1	610	Revegetate WR dumps		Seed/Fertilize, helicopter low application rate	2,471,472	m2	C.5.02	0.000	308.9	$ 0.00	$ 11,095	$ 0.05	$ 112,353	$ 0.05	$ 134,702	$ 0.00	1,262	$ 1,641	$ -	$ -	$ 0.11	$259,791		
					Note: Removal of North Fork Rock Drain included in Tailings Alternatives																						
Subtotal Direct Costs - Waste Rock												**63,019**		**$2,306,286**		**$112,353**		**$8,792,491**		**4,316,909**	**$5,611,982**		**$0**			**$16,823,112**	
Groundwater																											1CD003.053
North Fork Rose Creek Collection System (to Plant)																										$139,439	
7	4	1	1	430	Groundwater wells		Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
7	4	1	2	500			Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
7	4	1	3	500			Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
7	4	1	4	500			Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
7	4	2	1	430	Pumping station		Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
7	4	2	2	500			Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
7	4	2	3	430			Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
7	4	2	4	500			Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	4	3	1	430	Piping system		Excavate piping trench	1,080	m3	C.2.13	0.020	21.6	$ 0.73	$ 791	$ -	$ -	$ 1.42	$ 1,537	$ 0.75	623	$ 810	$ -	$ -	$ 2.91	$3,138		
7	4	3	2	510			Supply and install insulated 150mm HDPE pipe	180	m	C.3.03	0.250	45.0	$ 8.75	$ 1,575	$ 155.84	$ 28,051	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$29,626		
7	4	3	6	430			Bedding layer: Produce, screen and stockpile	70	m3	C.2.02	0.010	0.7	$ 0.37	$ 26	$ -	$ -	$ 1.61	$ 113	$ 1.13	61	$ 79	$ -	$ -	$ 3.10	$218		
7	4	3	7	430			Bedding layer: Load, haul, place and compact	70	m3	R.089	0.029	2.0	$ 1.07	$ 75	$ -	$ -	$ 2.21	$ 155	$ 1.04	56	$ 73	$ -	$ -	$ 4.31	$303		
7	4	3	8	430			Backfill ditches	1,080	m3	C.2.01	0.030	32.4	$ 1.08	$ 1,169	$ -	$ -	$ 0.74	$ 797	$ 0.40	329	$ 427	$ -	$ -	$ 2.22	$2,392		
7	4	4	1	510	Heat tracing		Supply and install heat trace in HDPE pipe	180	m	C.3.04	0.250	45.0	$ 12.50	$ 2,250	$ 21.32	$ 3,838	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$6,088		
0 7	4	5	1	510	Provide electricity from WTP to pumps		Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
7	4	5	2	510			Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690		
7	4	5	3	510			Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Plant)																										$283,543	
7	5	1	1	430	Construct access roads		Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		
7	5	1	2	430			Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		
7	5	2	1	430	Pumping wells		Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
7	5	2	2	500			Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
7	5	2	3	500			Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
7	5	2	4	500			Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
7	5	4	1	430	Monitoring wells		Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
7	5	4	2	500			Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
7	5	4	3	500			Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
7	5	5	1	430	Pumping Station		Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
7	5	5	2	500			Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
7	5	5	3	430			Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
7	5	5	4	500			Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	5	6	1	430	Piping		Excavate piping trench	4,200	m3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
7	5	6	2	510			Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
7	5	6	3	430			Bedding layer: Produce, screen and stockpile	273	m3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
7	5	6	4	430			Bedding Layer: Load, haul, place and compact	273	m3	R.090	0.029	7.9	$ 1.07	$ 291	$ -	$ -	$ 2.21	$ 603	$ 1.04	218	$ 283	$ -	$ -	$ 4.31	$1,177		

7	5	6	5	430		Backfill and compact ditches	3,927	m3	C.2.01	0.030	117.8	$ 1.08	$ 4,249	$ -	$ -	$ 0.74	$ 2,897	$ 0.40	1,195	$ 1,553	$ -	$ -	$ 2.22	$8,699		
7	5	7	1	510	Heat Tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
7	5	7	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
7	5	7	3	510		Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	5	8	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	1	ea.	C.4.03	4.545	4.5	$ 297.88	$ 298	$ 325.96	$ 326	$ 85.85	$ 86	$ 28.17	22	$ 28	$ -	$ -	$ 737.86	$738		
7	5	8	2	510		Supply/Install overhead conductor	20	m	C.4.02	0.032	0.6	$ 2.21	$ 44	$ 1.41	$ 28	$ 0.45	$ 9	$ 0.15	2	$ 3	$ -	$ -	$ 4.22	$84		
7	5	8	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater											**1,648**		**$78,802**		**$285,466**		**$42,338**		**12,597**	**$16,376**		**$0**			**$422,982**	
Miscellaneous																										
Roads																									$12,639	
8	1	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
8	1	1	2	430		Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ 0.29	$3,044.27		
8	1	1	3	610		Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																									$4,980,737	
8	2	1	1	220	Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	67,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
8	2	2	1	220	Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
8	2	2	2	430		Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
8	2	2	3	430		Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
8	2	2	4	430		Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,295	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																									$125,599	
8	3	1	1	600	Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in landfarm	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
8	3	1	2	600		Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
8	3	1	3	600		Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																									$45,657	
8	4	1	1	430	Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
8	4	2	1	430	Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
8	4	3	1	430	Decommision landfarm	Excavate soils for use as cover	1	m3	$0.00	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elswhere
8	4	3	2	430		Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																									$101,017	
8	5	1	1	600	Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
8	5	1	2	600		Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
8	5	2	1	600	Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
8	5	2	2	610		Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous											**62,361**		**$2,490,390**		**$28,708**		**$1,767,867**		**752,833**	**$978,683**		**$0**			**$5,265,648**	
Subtotal Direct Costs																										
					Subtotal direct costs						**131,721**		**$5,076,867**		**$1,106,330**		**$10,786,997**		**5,148,686**	**$6,693,292**		**$0**			**$23,663,486**	
CLOSURE COSTS - INDIRECT																										
100	100	1	1		Project Management	5.0% of direct costs															$ 23,663,486	x	5.0%		$1,183,174	
100	100	2	1		Field Supervision	(included in major tasks)																			$0	
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 23,663,486	x	10.0%		$2,366,349	
100	100	4	1		Insurance	0.5% of direct costs															$ 23,663,486	x	0.5%		$118,317	
100	100	5	1		Bonding	0.5% of direct costs															$ 23,663,486	x	0.5%		$118,317	
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 23,663,486	x	10.0%		$2,366,349	
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																										
					Subtotal indirect costs																				**$6,652,506**	
CLOSURE COSTS - CONTINGENCY																										
					Contingency	20% of direct costs															$23,663,486	x	20.0%		**$4,732,697**	
CLOSURE COSTS - TOTAL																										
					Total direct and indirect costs																				**$35,048,690**	

Faro Mine Area Alternative 4 - Minimize Water Treatment

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Faro Pit																											1CD003.046
Water Treatment																										$585,759	
1	1	1	1	430	Construct Water Treatment Plant	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
1	1	2	1	430	Place pipeline from pit to treatment plant	Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
1	1	2	2	500		Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
1	1	2	3	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
1	1	2	4	510		Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
1	1	2	5	430		Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
1	1	2	6	430		Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
1	1	2	7	430		Backfill ditches	2,500	Bm3	C.2.01	0.030	75.0	$ 1.08	$ 2,705	$ -	$ -	$ 0.74	$ 1,844	$ 0.40	761	$ 989	$ -	$ -	$ 2.22	$5,538		
1	1	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
1	1	3	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
1	1	3	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
1	1	4	1	510	Provide electricity from WTP to pump	Supply/Install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
1	1	4	2	510		Supply/Install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 149	$ -	$ -	$ 4.22	$4,225		
1	1	4	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Construct Plug Dam																										$1,971,893	
1	2	1	1	430	Foundation preparation	Bulk stripping: Excavate, load, haul, dump overburden	3700	Bm3	R.040	0.030	110.1	$ 1.09	$ 4,030	$ -	$ -	$ 3.04	$ 11,257	$ 1.54	4,380	$ 5,694	$ -	$ -	$ 5.67	$20,982		1CD003.052 (BGC) (SRK Library - BKG-254)
1	2	1	2	430		Rock excavation: Core trench rock	4500	Bm3	C.2.15	0.173	780.0	$ 6.34	$ 28,548	$ -	$ -	$ 9.13	$ 41,074	$ 3.69	12,770	$ 16,601	$ -	$ -	$ 19.16	$86,223		
1	2	1	4	430		Foundation preparation	1600	m2	C.2.17	0.318	509.1	$ 13.47	$ 21,556	$ -	$ -	$ 17.95	$ 28,715	$ 8.86	10,910	$ 14,183	$ -	$ -	$ 40.28	$64,455		
1	2	1	5	600		Relocate Zone II Pit pump well discharge pipe	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
1	2	1	6	520		Foundation/Abutment grouting: Drilling of grout holes	4664	m	C.2.09	2.000	9328.0	$ 102.13	$ 476,350	$ -	$ -	$ 100.85	$ 470,376	$ 22.08	79,216	$ 102,981	$ -	$ -	$ 225.07	$1,049,707		
1	2	1	7	430		Foundation/Abutment grouting: Water pressure testing	350	hrs	C.3.16	3.500	1225.0	$ 170.70	$ 59,745	$ -	$ -	$ 92.28	$ 32,298	$ 36.34	9,784	$ 12,719	$ -	$ -	$ 299.32	$104,762		
1	2	1	8	600		Foundation/Abutment grouting: Setting packers	1400	ea.	C.2.19	0.214	300.0	$ 10.94	$ 15,320	$ -	$ -	$ 6.59	$ 9,228	$ 2.60	2,795	$ 3,634	$ -	$ -	$ 20.13	$28,182		
1	2	1	9	600		Foundation/Abutment grouting: Cement	200000	kg	M.04	0.000	0.0	$ -	$ -	$ 0.50	$ 100,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 0.50	$100,000		
1	2	2	1	430	Place core material	Load, haul, dump, compact impervious core material (Till)	16540	Bm3	R.041	0.054	890.6	$ 1.97	$ 32,597	$ -	$ -	$ 4.75	$ 78,644	$ 2.32	29,555	$ 38,421	$ -	$ -	$ 9.05	$149,661		
1	2	3	1	430	Place filter material	Produce, screen and stockpile fine and coarse filter materials	10870	Bm3	C.2.02	0.010	108.7	$ 0.37	$ 3,978	$ -	$ -	$ 1.61	$ 17,486	$ 1.13	9,444	$ 12,277	$ -	$ -	$ 3.10	$33,741		
1	2	3	2	430		Load, haul, dump, compact fine filter material	5740	Bm3	R.042	0.039	221.5	$ 1.41	$ 8,109	$ -	$ -	$ 3.41	$ 19,563	$ 1.67	7,352	$ 9,557	$ -	$ -	$ 6.49	$37,229		
1	2	3	3	430		Load, haul, dump, compact coarse filter material	5130	Bm3	R.042	0.039	198.0	$ 1.41	$ 7,247	$ -	$ -	$ 3.41	$ 17,484	$ 1.67	6,571	$ 8,542	$ -	$ -	$ 6.49	$33,272		
1	2	4	1	430	Place rockfill	Load, haul, dump, and compact	48,500	Bm3	R.043	0.032	1569.1	$ 1.18	$ 57,430	$ -	$ -	$ 2.86	$ 138,557	$ 1.40	52,071	$ 67,692	$ -	$ -	$ 5.44	$263,679		
Safety Berm																										$130,159	
1	3	1	1	430	Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$7,296		
1	3	1	2	220		Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$14,191		
1	3	2	1	430	Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
1	3	2	2	430		Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit												17,798		$820,373		$562,462		$962,756		263,246	$342,220		$0			**$2,687,811**	
Faro Creek																											
Route into Faro Pit (East & West Channel)																										$510,560	
2	1	1	1	430	Construct access road	Clear access road area	1,800	m2	C.2.04	0.004	6.5	$ 0.13	$ 240	$ -	$ -	$ 0.62	$ 1,124	$ 0.36	504	$ 655	$ -	$ -	$ 1.12	$2,018		
2	1	1	2	430		Construct access road	600	m	C.2.27	0.131	78.8	$ 4.80	$ 2,882	$ -	$ -	$ 10.14	$ 6,086	$ 5.33	2,458	$ 3,195	$ -	$ -	$ 20.27	$12,164		
2	1	2	1	430	Head-works dam	Load, haul, dump, place and compact till at headworks	54	Bm3	R.046	0.088	4.7	$ 3.20	$ 173	$ -	$ -	$ 7.52	$ 406	$ 3.60	150	$ 194	$ -	$ -	$ 14.32	$773		
2	1	3	1	430	Excavate channel	Soil excavation: Load, haul and dump locally	6,614	Bm3	C.2.10	0.032	211.7	$ 1.17	$ 7,747	$ -	$ -	$ 2.72	$ 17,963	$ 1.27	6,452	$ 8,388	$ -	$ -	$ 5.16	$34,097		
2	1	3	2	430		Rock excavation: Drill, blast, load, haul and dump	4,863	Bm3	C.2.15	0.173	842.9	$ 6.34	$ 30,849	$ -	$ -	$ 9.13	$ 44,385	$ 3.69	13,799	$ 17,939	$ -	$ -	$ 19.16	$93,172		
2	1	3	1	430	Fill material	Placed as part of soil excavation, compact by hand	1,365	m2	C.2.06	0.016	21.8	$ 0.57	$ 782	$ -	$ -	$ 0.02	$ 29	$ 0.02	17	$ 22	$ -	$ -	$ 0.61	$833		
2	1	4	1	430	Place till	Till: Load, haul, dump place, compact	3,992	Bm3	R.046	0.088	349.3	$ 3.20	$ 12,786	$ -	$ -	$ 7.52	$ 30,010	$ 3.60	11,057	$ 14,374	$ -	$ -	$ 14.32	$57,170		
2	1	5	1	430	Place geotextile	Supply and place geotextile	3,142	m2	C.4.07	0.071	224.4	$ 2.52	$ 7,927	$ 3.50	$ 10,997	$ 0.82	$ 2,561	$ 0.53	1,276	$ 1,659	$ -	$ -	$ 7.37	$23,144		
2	1	6	1	430	Place bedding layer	Produce, screen and stockpile	3,992	Bm3	C.2.02	0.010	39.9	$ 0.37	$ 1,461	$ -	$ -	$ 1.61	$ 6,422	$ 1.13	3,468	$ 4,509	$ -	$ -	$ 3.10	$12,393		
2	1	6	2	430		Load, haul, place and compact	3,992	Bm3	R.047	0.069	274.5	$ 2.52	$ 10,046	$ -	$ -	$ 5.22	$ 20,821	$ 2.40	7,367	$ 9,578	$ -	$ -	$ 10.13	$40,444		
2	1	7	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	9,726	Bm3	C.2.25	0.057	555.8	$ 2.09	$ 20,341	$ -	$ -	$ 9.19	$ 89,403	$ 6.45	48,283	$ 62,768	$ -	$ -	$ 17.74	$172,512		
2	1	7	2	430		Rip-rap: Load, haul, dump	9,726	Bm3	R.048	0.028	274.6	$ 1.03	$ 10,051	$ -	$ -	$ 2.42	$ 23,507	$ 1.09	8,169	$ 10,620	$ -	$ -	$ 4.54	$44,178		
2	1	7	3	430		Rip-rap: Place and secure	9,726	Bm3	C.2.26	0.013	121.6	$ 0.46	$ 4,450	$ -	$ -	$ 0.89	$ 8,650	$ 0.47	3,509	$ 4,561	$ -	$ -	$ 1.82	$17,661		
Rip rap protection at pit inlet																										$14,457	
2	2	1	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	600	Bm3	C.2.25	0.057	34.3	$ 2.09	$ 1,255	$ -	$ -	$ 9.19	$ 5,515	$ 6.45	2,979	$ 3,872	$ -	$ -	$ 17.74	$10,642		
2	2	1	2	430		Rip-rap: Load, haul, dump	600	Bm3	R.048	0.028	16.9	$ 1.03	$ 620	$ -	$ -	$ 2.42	$ 1,450	$ 1.09	504	$ 655	$ -	$ -	$ 4.54	$2,725		
2	2	1	3	430		Rip-rap: Place and secure	600	Bm3	C.2.26	0.013	7.5	$ 0.46	$ 275	$ -	$ -	$ 0.89	$ 534	$ 0.47	216	$ 281	$ -	$ -	$ 1.82	$1,090		
Route out of Pit																										$2,721,925	
2	3	1	1	430	Excavate channel	Bulk excavate soil/waste rock (dump locally)	277,181	Bm3	C.2.10	0.032	8869.8	$ 1.17	$ 324,635	$ -	$ -	$ 2.72	$ 752,758	$ 1.27	270,393	$ 351,510	$ -	$ -	$ 5.16	$1,428,903		
2	3	1	2	430		Rock excavation: Drill, blast, muck, load haul dump	5,584	Bm3	C.2.15	0.173	967.8	$ 6.34	$ 35,423	$ -	$ -	$ 9.13	$ 50,966	$ 3.69	15,845	$ 20,599	$ -	$ -	$ 19.16	$106,987		
2	3	2	1	430	Place till	Till: Load, haul, dump place, compact	17,569	Bm3	R.049	0.074	1294.5	$ 2.70	$ 47,380	$ -	$ -	$ 5.59	$ 98,200	$ 2.57	34,748	$ 45,172	$ -	$ -	$ 10.86	$190,752		
2	3	3	1	430	Place geotextile	Supply and place geotextile	12,089	m2	C.4.07	0.071	863.5	$ 2.52	$ 30,499	$ 3.50	$ 42,311	$ 0.82	$ 9,856	$ 0.53	4,911	$ 6,385	$ -	$ -	$ 7.37	$89,050		
2	3	4	1	430	Place bedding layer	Produce and stockpile (screen) bedding layer	17,569	Bm3	C.2.02	0.010	175.7	$ 0.37	$ 6,430	$ -	$ -	$ 1.61	$ 28,262	$ 1.13	15,263	$ 19,842	$ -	$ -	$ 3.10	$54,534		
2	3	4	2	430		Load, Haul, Place and Compact bedding layer	17,569	Bm3	R.050	0.067	1171.3	$ 2.44	$ 42,868	$ -	$ -	$ 5.06	$ 88,848	$ 2.33	31,438	$ 40,870	$ -	$ -	$ 9.82	$172,585		
2	3	5	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		
2	3	5	2	430		Rip-rap: Load, haul, dump	29,402	Bm3	R.051	0.021	622.6	$ 0.78	$ 22,788	$ -	$ -	$ 1.88	$ 55,285	$ 0.89	20,110	$ 26,143	$ -	$ -	$ 3.54	$104,216		
2	3	5	3	430		Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Siphon allowance																										$296,509	
2	4	1	1	430	Siphon for creek 'Out of pit'	Piping: Supply and install steel piping	1,130	m	C.3.14	0.300	339.0	$ 16.66	$ 18,826	$ 237.06	$ 267,878	$ 1.40	$ 1,586	$ 1.67	1,450	$ 1,885	$ -	$ -	$ 256.79	$290,175		
2	4	1	2	500		Pumps: supply and install	2	ea.	C.3.10	12.000	24.0	$ 600.00	$ 1,200	$ 1,829.00	$ 3,658	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$4,858		
2	4	1	3	500		Install protective housing (shack)	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 596	$ 325.96	$ 652	$ 85.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ 737.86	$1,476		
Upgrade North Wall Interceptor																										$293,508	
2	4	1	1	430	Excavate channel	Soil Excavation: load, haul and dump locally	7,500	Bm3	C.2.10	0.032	240.0	$ 1.17	$ 8,784	$ -	$ -	$ 2.72	$ 20,368	$ 1.27	7,316	$ 9,511	$ -	$ -	$ 5.16	$38,663		assume same upgrade as Improved Creek option
2	4	2	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	10,800	Bm3	C.2.25	0.057	617.1	$ 2.09	$ 22,587	$ -	$ -	$ 9.19	$ 99,276	$ 6.45	53,615	$ 69,700	$ -	$ -	$ 17.74	$191,564		
2	4	2	2	430		Rip-rap: Load, haul, dump	10,800	Bm3	R.052	0.025	266.8	$ 0.90	$ 9,766	$ -	$ -	$ 2.15	$ 23,205	$ 0.99	8,229	$ 10,698	$ -	$ -	$ 4.04	$43,669		
2	4	2	3	430		Rip-rap: Place and secure	10,800	Bm3	C.2.26	0.013	135.0	$ 0.46	$ 4,941	$ -	$ -	$ 0.89	$ 9,605	$ 0.47	3,896	$ 5,065	$ -	$ -	$ 1.82	$19,612		
Subtotal Direct Costs - Faro Creek												20,709		$763,548		$325,496		$1,793,667		734,037	$954,247		$0			**$3,836,958**	
Zone II Pit																											
Water Management																										$343,698	
3	1	1	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
3	1	1	2	500		Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
3	1	1	3	500		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
3	1	1	4	500		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
3	1	2	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
3	1	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
3	1	2	3	500		Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 48.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 336.27	$673		
3	1	3	1	430	Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
3	1	3	2	510		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
3	1	3	3	430		Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
3	1	3	4	430		Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
3	1	3	7	430		Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
3	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
3	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
3	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
3	1	5	1	510	Provide electricity from WTP to pumps	Supply/Install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
3	1	5	2	510		Supply/Install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
3	1	5	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit												1,414		$69,756		$217,341		$43,412		10,145	$13,188		$0			**$343,698**	
Oxide Fines / LGSP																											

Oxide Fines																									$2,548,012	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact oxide materials	262,315	m3	R.070	0.013	3297.7	$ 0.46	$ 120,695	$ -	$ -	$ 1.60	$ 419,609	$ 1.04	210,839	$ 274,090	$ -	$ -	$ 3.10	$814,394		
4	1	2	1	510	Lime addition	Add lime to oxide fines	4,459	tonnes	C.2.21	0.036	159.3	$ 1.59	$ 7,109	$ 320.00	$ 1,426,994	$ 1.67	$ 7,440	$ 0.98	3,357	$ 4,364	$ -	$ -	$ 324.24	$1,445,907		
4	1	2	2	010		Survey requirements (grid for testing)	525	hrs	P.02	1.000	524.6	$ 35.00	$ 18,362	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$18,362		
4	1	2	3	010		Material testing (to verify lime addition dosage)	525	hrs	P.03	1.000	524.6	$ 100.00	$ 52,463	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$52,463		
4	1	3	4	970	Lime addition contingency	15% contingency	669	tonnes	C.2.21	0.036	23.9	$ 1.59	$ 1,066	$ 320.00	$ 214,049	$ 1.67	$ 1,116	$ 0.98	504	$ 655	$ -	$ -	$ 324.24	$216,886		
Medium-Grade Stockpile																									$6,731,497	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	693,000	m3	R.070	0.013	8712.0	$ 0.46	$ 318,859	$ -	$ -	$ 1.60	$ 1,108,549	$ 1.04	557,007	$ 724,109	$ -	$ -	$ 3.10	$2,151,517		
4	1	2	1	510	Lime addition	Add lime	11,781	tonnes	C.2.21	0.036	420.8	$ 1.59	$ 18,782	$ 320.00	$ 3,769,920	$ 1.67	$ 19,655	$ 0.98	8,869	$ 11,529	$ -	$ -	$ 324.24	$3,819,887		
4	1	2	2	010		Survey requirements (grid for testing)	1,386	hrs	P.02	1.000	1386.0	$ 35.00	$ 48,510	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$48,510		
4	1	2	3	010		Material testing (to verify lime addition dosage)	1,386	hrs	P.03	1.000	1386.0	$ 100.00	$ 138,600	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$138,600		
4	1	3	4	970	Lime addition contingency	15% contingency	1,767	tonnes	C.2.21	0.036	63.1	$ 1.59	$ 2,817	$ 320.00	$ 565,488	$ 1.67	$ 2,948	$ 0.98	1,330	$ 1,729	$ -	$ -	$ 324.24	$572,983		
Low Grade Stockpile "A"																									$2,486,671	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	256,000	m3	R.070	0.013	3218.3	$ 0.46	$ 117,789	$ -	$ -	$ 1.60	$ 409,507	$ 1.04	205,763	$ 267,492	$ -	$ -	$ 3.10	$794,788		
4	1	2	1	510	Lime addition	Add lime	4,352	tonnes	C.2.21	0.036	155.4	$ 1.59	$ 6,938	$ 320.00	$ 1,392,640	$ 1.67	$ 7,261	$ 0.98	3,276	$ 4,259	$ -	$ -	$ 324.24	$1,411,098		
4	1	2	2	010		Survey requirements (grid for testing)	512	hrs	P.02	1.000	512.0	$ 35.00	$ 17,920	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$17,920		
4	1	2	3	010		Material testing (to verify lime addition dosage)	512	hrs	P.03	1.000	512.0	$ 100.00	$ 51,200	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$51,200		
4	1	3	4	970	Lime addition contingency	15% contingency	653	tonnes	C.2.21	0.036	23.3	$ 1.59	$ 1,041	$ 320.00	$ 208,896	$ 1.67	$ 1,089	$ 0.98	491	$ 639	$ -	$ -	$ 324.24	$211,665		
Low Grade Stockpile "C"																									$6,352,668	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	654,000	m3	R.070	0.013	8221.7	$ 0.46	$ 300,915	$ -	$ -	$ 1.60	$ 1,046,163	$ 1.04	525,660	$ 683,358	$ -	$ -	$ 3.10	$2,030,436		
4	1	2	1	510	Lime addition	Add lime	11,118	tonnes	C.2.21	0.036	397.1	$ 1.59	$ 17,725	$ 320.00	$ 3,557,760	$ 1.67	$ 18,549	$ 0.98	8,370	$ 10,881	$ -	$ -	$ 324.24	$3,604,915		
4	1	2	2	010		Survey requirements (grid for testing)	1,308	hrs	P.02	1.000	1308.0	$ 35.00	$ 45,780	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$45,780		
4	1	2	3	010		Material testing (to verify lime addition dosage)	1,308	hrs	P.03	1.000	1308.0	$ 100.00	$ 130,800	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$130,800		
4	1	3	4	970	Lime addition contingency	15% contingency	1,668	tonnes	C.2.21	0.036	59.6	$ 1.59	$ 2,659	$ 320.00	$ 533,664	$ 1.67	$ 2,782	$ 0.98	1,255	$ 1,632	$ -	$ -	$ 324.24	$540,737		
Subtotal Direct Costs - Oxide Fines											**32,213**		**$1,420,032**		**$11,669,411**		**$3,044,669**		**1,526,721**	**$1,984,737**		**$0**			**$18,118,849**	
ETA Tailings																										
Option 1: Pump Tailings to Faro Pit																									$662,124	
5	1	1	1	430	Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$ 0.89	$ 57,163	$ 0.26	$ 16,473	$ 0.02	$ 1,014	$ 0.01	496	$ 645	$ 0.27	$ 17,145	$ 1.44	$92,439		
5	1	1	2	430		Operate Slurry Pumping System	64,000	m3	C.7.18	0.008	540.8	$ 0.42	$ 27,042	$ 0.32	$ 20,756	$ -	$ -	$ -	0	$ -	$ 0.54	$ 34,479	$ 1.29	$82,278		
5	1	1	3	430		lime addition - qnty in tonnes per CaOH	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
5	1	2	1	430	Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$ 1.92	$ 24,595	$ -	$ -	$ 5.31	$ 68,008	$ 2.59	25,547	$ 33,211	$ -	$ -	$ 9.83	$125,814		
5	1	2	2	430		Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
5	1	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
Option 2: Haul Tailings to Rose Creek Tailings Deposit																									$725,144	
5	2	1	1	430	Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$ 0.95	$ 61,011	$ -	$ -	$ 2.54	$ 162,621	$ 1.24	61,021	$ 79,327	$ -	$ -	$ 4.73	$302,959		
5	2	2	1	430	Lime addition	Add lime to waste rock (qnty= tonnes CaOH eq)	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
5	2	3	1	430	Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings I	12,800	m3	R.074	0.026	333.4	$ 0.95	$ 12,202	$ -	$ -	$ 2.54	$ 32,524	$ 1.24	12,204	$ 15,865	$ -	$ -	$ 4.73	$60,592		
5	2	3	2	430		Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
5	2	4	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
ETA Collection System (to Pit)																									$655,962	
5	3	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
5	3	1	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
5	3	1	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
5	3	1	4	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
5	3	2	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
5	3	2	2	500		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
5	3	2	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
5	3	3	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
5	3	3	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
5	3	3	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
5	3	3	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
5	3	4	1	430	Piping system	Excavate piping trench	13,200	m3	C.2.13	0.020	264.0	$ 0.73	$ 9,662	$ -	$ -	$ 1.42	$ 18,784	$ 0.75	7,619	$ 9,905	$ -	$ -	$ 2.91	$38,352		
5	3	4	2	510		Supply and install insulated 150mm HDPE pipe	2,200	m	C.3.03	0.250	550.0	$ 8.75	$ 19,250	$ 155.84	$ 342,848	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$362,098		
5	3	4	5	430		Bedding layer: Produce, screen and stockpile	858	m3	C.2.02	0.010	8.6	$ 0.37	$ 314	$ -	$ -	$ 1.61	$ 1,380	$ 1.13	745	$ 969	$ -	$ -	$ 3.10	$2,663		
5	3	4	6	430		Bedding layer: Load, haul, place and compact	858	m3	R.073	0.031	26.2	$ 1.12	$ 960	$ -	$ -	$ 2.32	$ 1,989	$ 1.07	704	$ 915	$ -	$ -	$ 4.50	$3,863		
5	3	4	7	430		Backfill ditches	13,200	m3	C.2.01	0.030	396.0	$ 1.08	$ 14,282	$ -	$ -	$ 0.74	$ 9,739	$ 0.40	4,016	$ 5,221	$ -	$ -	$ 2.22	$29,242		
5	3	5	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,200	m	C.3.04	0.250	550.0	$ 12.50	$ 27,500	$ 21.32	$ 46,904	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$74,404		
5	3	5	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
5	3	5	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
5	3	6	1	510	Provide electricity from WTP to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951		
5	3	6	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267		
5	3	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)											**4,454**		**$180,149**		**$828,495**		**$251,844**		**92,784**	**$120,619**		**$0**			**$1,381,107**	
Waste Rock																										
Faro Valley Dump																									$3,565,757	
6	2	1	1	430	Relocate to Main Sulphide Cell	Load, haul, dump, place, compact	923,760	m3	R.080	0.016	14516.2	$ 0.58	$ 531,294	$ -	$ -	$ 1.99	$ 1,839,124	$ 1.29	919,491	$ 1,195,339	$ -	$ -	$ 3.86	$3,565,757		estimated as AutoCAD outline X2 with a depth c
Re-slope Waste Rock																									$3,857,323	
6	1	1	1	430	Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$ 0.53	$ 31,942	$ -	$ -	$ 0.94	$ 56,103	$ 0.62	28,478	$ 37,021	$ -	$ -	$ 2.08	$125,066		
6	1	2	1	430	Re-grade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
6	1	2	2	430		Flatten bubble dump surfaces	769	hrs	C.2.22	1.000	769.0	$ 36.60	$ 28,146	$ -	$ -	$ 173.28	$ 133,252	$ 149.18	88,246	$ 114,720	$ -	$ -	$ 359.06	$276,117		
6	1	2	3	430		Re-grade slopes	7,329	hrs	C.2.22	1.000	7329.4	$ 36.60	$ 268,255	$ -	$ -	$ 173.28	$ 1,270,021	$ 149.18	841,074	$ 1,093,397	$ -	$ -	$ 359.06	$2,631,673		
6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	195,750	m3	R.077	0.012	2437.6	$ 0.46	$ 89,218	$ -	$ -	$ 1.80	$ 352,187	$ 1.17	176,166	$ 229,016	$ -	$ -	$ 3.42	$670,422		
Sulphide Cells																									$25,837,053	
6	2	1	1	430	Relocate east Cell to Main Sulphide Cell	Load, haul, dump, place, compact	1,080,000	m3	R.079	0.014	15274.3	$ 0.52	$ 559,039	$ -	$ -	$ 1.80	$ 1,938,897	$ 1.17	971,536	$ 1,262,997	$ -	$ -	$ 3.48	$3,760,932		estimated as AutoCAD outline X2 with a depth c
6	2	2	1	430	Very Low Infiltration Cover	Load, haul, place compacted till (1.0m) (South cells)	816,583	m3	R.075	0.056	45728.6	$ 2.05	$ 1,673,669	$ -	$ -	$ 7.09	$ 5,793,562	$ 4.61	2,896,558	$ 3,765,526	$ -	$ -	$ 13.76	$11,232,756		
6	2	2	2	430		Load, haul, place loose till (1.0m) (South cells)	816,583	m3	R.076	0.050	41155.8	$ 1.84	$ 1,506,302	$ -	$ -	$ 6.95	$ 5,672,003	$ 4.49	2,819,277	$ 3,665,060	$ -	$ -	$ 13.28	$10,843,364		
Waste Rock Cover																									$55,104,049	
6	3	1	1	430	Place low infiltration cover	Load, haul, place compacted till (0.5m)	1,366,881	m3	R.075	0.056	76545.4	$ 2.05	$ 2,801,560	$ -	$ -	$ 7.09	$ 9,697,865	$ 4.61	4,848,559	$ 6,303,127	$ -	$ -	$ 13.76	$18,802,552		
6	3	1	2	430		Load, haul, place loose till (1.0m)	2,733,763	m3	R.076	0.050	137781.6	$ 1.84	$ 5,042,808	$ -	$ -	$ 6.95	$ 18,988,775	$ 4.49	9,438,396	$ 12,269,914	$ -	$ -	$ 13.28	$36,301,497		
Steep Runoff channels																									$77,316	
6	4	1	1	430	Surface runoff management: Rock drains	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$ 0.73	$ 3,203	$ -	$ -	$ 1.42	$ 6,226	$ 0.75	2,525	$ 3,283	$ -	$ -	$ 2.91	$12,711		
6	4	1	2	430		Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$ 1.46	$ 4,765	$ -	$ -	$ 6.43	$ 20,944	$ 4.52	11,311	$ 14,705	$ -	$ -	$ 12.42	$40,415		
6	4	1	3	430		Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$ 1.28	$ 4,159	$ -	$ -	$ 2.99	$ 9,726	$ 1.35	3,380	$ 4,394	$ -	$ -	$ 5.62	$18,280		
6	4	1	4	430		Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$ 0.46	$ 1,489	$ -	$ -	$ 0.89	$ 2,895	$ 0.47	1,174	$ 1,527	$ -	$ -	$ 1.82	$5,911		
Revegetate																									$467,177	
6	6	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$ 0.00	$ 19,952	$ 0.05	$ 202,042	$ 0.05	$ 242,231	$ 0.00	2,270	$ 2,951	$ -	$ -	$ 0.11	$467,177		
					Note: Removal of North Fork Rock Drain included in Tailings Alternatives																					
Subtotal Direct Costs - Waste Rock											**343,767**		**$12,581,502**		**$202,042**		**$46,098,152**		**23,097,676**	**$30,026,978**		**$0**			**$88,908,675**	
Groundwater																										
Upgrade North Fork Rose Creek																									$1,294,796	
7	1	1	1	430	Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$ 0.13	$ 878	$ -	$ -	$ 0.62	$ 4,120	$ 0.36	1,847	$ 2,401	$ -	$ -	$ 1.12	$7,399		
7	1	1	2	430		Construct access road	2,200	m	C.2.27	0.131	288.8	$ 4.80	$ 10,568	$ -	$ -	$ 10.14	$ 22,315	$ 5.33	9,013	$ 11,717	$ -	$ -	$ 20.27	$44,600		
7	1	2	1	430	Construct channel	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$ 1.03	$ 22,477	$ -	$ -	$ 2.75	$ 59,910	$ 1.34	22,480	$ 29,224	$ -	$ -	$ 5.13	$111,611		
7	1	2	2	430		Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$ 1.15	$ 41,481	$ -	$ -	$ 2.82	$ 101,628	$ 1.41	39,006	$ 50,708	$ -	$ -	$ 5.39	$193,817		
7	1	3	1	430	Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
7	1	4	1	430	Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$ 1.02	$ 13,176	$ -	$ -	$ 2.38	$ 30,596	$ 1.11	11,014	$ 14,318	$ -	$ -	$ 4.52	$58,090		
7	1	4	2	430		Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$ 0.57	$ 7,364	$ -	$ -	$ 0.02	$ 270	$ 0.02	161	$ 209	$ -	$ -	$ 0.61	$7,843		
7	1	5	1	430	Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
7	1	6	1	430	Place bedding layer	Bedding layer: Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$ 0.37	$ 4,706	$ -	$ -	$ 1.61	$ 20,682	$ 1.13	11,170	$ 14,521	$ -	$ -	$ 3.10	$39,909		
7	1	6	2	430		Bedding layer: Load, haul, place and compact	12,857	m3	R.084	0.029	374.4	$ 1.07	$ 13,702	$ -	$ -	$ 2.21	$ 28,392	$ 1.04	10,246	$ 13,320	$ -	$ -	$ 4.31	$55,413		
7	1	7	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	15,914	m3	C.2.25	0.057	909.4	$ 2.09	$ 33,283	$ -	$ -	$ 9.19	$ 146,285	$ 6.45	79,003	$ 102,704	$ -	$ -	$ 17.74	$282,272		
7	1	7	2	430		Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$ 1.18	$ 18,818	$ -	$ -	$ 2.81	$ 44,714	$ 1.30	15,857	$ 20,614	$ -	$ -	$ 5.29	$84,146		
7	1	7	3	430		Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$ 0.46	$ 7,281	$ -	$ -	$ 0.89	$ 14,154	$ 0.47	5,741	$ 7,464	$ -	$ -	$ 1.82	$28,898		
Outwash material																									$287,728	
7	2	1	1	430	Relocate to Intermediate Dump	Load, haul, dump outwash material	76,350	m3	R.062	0.023	1758.1	$ 0.84	$ 64,345	$ -	$ -	$ 2.00	$ 152,895	$ 0.92	54,222	$ 70,488	$ -	$ -	$ 3.77	$287,728		

North Fork Rose Creek Detention Pond																									$10,883	
7	3	1	1	430	Excavate basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$ 0.86	$ 2,232	$ -	$ -	$ 2.00	$ 5,176	$ 0.93	1,859	$ 2,417	$ -	$ -	$ 3.79	$9,825		
7	3	2	1	430	Place rip-rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$ 1.46	$ 76	$ -	$ -	$ 6.43	$ 335	$ 4.52	181	$ 235	$ -	$ -	$ 12.42	$646		
7	3	2	2	430		Rip-rap: Load, haul, dump	52	m3	R.086	0.037	1.9	$ 1.37	$ 71	$ -	$ -	$ 3.25	$ 169	$ 1.50	60	$ 78	$ -	$ -	$ 6.11	$318		
7	3	2	3	430		Rip-rap: Place and secure	52	m3	C.2.26	0.013	0.7	$ 0.46	$ 24	$ -	$ -	$ 0.89	$ 46	$ 0.47	19	$ 24	$ -	$ -	$ 1.82	$94		
North Fork Rose Creek Collection System (to Pit)																									$541,110	
7	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
7	4	1	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
7	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
7	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
7	4	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
7	4	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
7	4	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
7	4	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	4	3	1	430	Piping system	Excavate piping trench	11,400	m3	C.2.13	0.020	228.0	$ 0.73	$ 8,345	$ -	$ -	$ 1.42	$ 16,223	$ 0.75	6,580	$ 8,555	$ -	$ -	$ 2.91	$33,122		
7	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,900	m	C.3.03	0.250	475.0	$ 8.75	$ 16,625	$ 155.84	$ 296,096	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$312,721		
7	4	3	6	430		Bedding layer: Produce, screen and stockpile	741	m3	C.2.02	0.010	7.4	$ 0.37	$ 271	$ -	$ -	$ 1.61	$ 1,192	$ 1.13	644	$ 837	$ -	$ -	$ 3.10	$2,300		
7	4	3	7	430		Bedding layer: Load, haul, place and compact	741	m3	R.087	0.037	27.6	$ 1.36	$ 1,011	$ -	$ -	$ 2.83	$ 2,096	$ 1.30	742	$ 964	$ -	$ -	$ 5.49	$4,071		
7	4	3	8	430		Backfill ditches	11,400	m3	C.2.01	0.030	342.0	$ 1.08	$ 12,335	$ -	$ -	$ 0.74	$ 8,411	$ 0.40	3,468	$ 4,509	$ -	$ -	$ 2.22	$25,254		
7	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,900	m	C.3.04	0.250	475.0	$ 12.50	$ 23,750	$ 21.32	$ 40,508	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$64,258		
7	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
7	4	4	3	510		Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	4	5	1	510	Provide electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
7	4	5	2	510		Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690		
7	4	5	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Pit)																									$315,565	
7	5	1	1	430	Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		
7	5	1	2	430		Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		
7	5	2	1	430	Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
7	5	2	2	500		Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
7	5	2	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
7	5	2	4	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
7	5	4	1	430	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
7	5	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
7	5	4	3	500		Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
7	5	5	1	430	Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
7	5	5	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
7	5	5	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
7	5	5	4	500		Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	5	6	1	430	Piping	Excavate piping trench	4,800	m3	C.2.13	0.020	96.0	$ 0.73	$ 3,514	$ -	$ -	$ 1.42	$ 6,831	$ 0.75	2,771	$ 3,602	$ -	$ -	$ 2.91	$13,946		
7	5	6	2	510		Supply and install insulated 150mm HDPE pipe	800	m	C.3.03	0.250	200.0	$ 8.75	$ 7,000	$ 155.84	$ 124,672	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$131,672		
7	5	6	3	430		Bedding layer: Produce, screen and stockpile	312	m3	C.2.02	0.010	3.1	$ 0.37	$ 114	$ -	$ -	$ 1.61	$ 502	$ 1.13	271	$ 352	$ -	$ -	$ 3.10	$968		
7	5	6	4	430		Bedding Layer: Load, haul, place and compact	312	m3	R.088	0.037	11.4	$ 1.34	$ 419	$ -	$ -	$ 2.78	$ 868	$ 1.28	307	$ 399	$ -	$ -	$ 5.40	$1,686		
7	5	6	5	430		Backfill and compact ditches	4,488	m3	C.2.01	0.030	134.6	$ 1.08	$ 4,856	$ -	$ -	$ 0.74	$ 3,311	$ 0.40	1,365	$ 1,775	$ -	$ -	$ 2.22	$9,942		
7	5	7	1	510	Heat Tracing	Supply and install heat trace in HDPE pipe	800	m	C.3.04	0.250	200.0	$ 12.50	$ 10,000	$ 21.32	$ 17,056	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$27,056		
7	5	7	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
7	5	7	3	510		Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	5	8	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	9	ea.	C.4.03	4.545	40.9	$ 297.88	$ 2,681	$ 325.96	$ 2,934	$ 85.85	$ 773	$ 28.17	195	$ 254	$ -	$ -	$ 737.86	$6,641		
7	5	8	2	510		Supply/Install overhead conductor	650	m	C.4.02	0.032	20.8	$ 2.21	$ 1,438	$ 1.41	$ 917	$ 0.45	$ 295	$ 0.15	74	$ 97	$ -	$ -	$ 4.22	$2,746		
7	5	8	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater											11,147		$431,663		$912,821		$721,478		295,477	$384,120		$0			$2,450,082	
Miscellaneous																										
Roads																									$12,639	
8	1	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
8	1	1	2	430		Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ 0.29	$3,044.27		
8	1	1	3	610		Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																									$4,980,737	
8	2	1	1	220	Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	67,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
8	2	2	1	220	Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
8	2	2	2	430		Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
8	2	2	3	430		Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
8	2	2	4	430		Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,295	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																									$125,599	
8	3	1	1	600	Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in lar	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
8	3	1	2	600		Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
8	3	1	3	600		Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																									$45,657	
8	4	1	1	430	Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
8	4	2	1	430	Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
8	4	3	1	430	Decommission landfarm	Excavate soils for use as cover	1	m3	$0.00	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elswhere
8	4	3	2	430		Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																									$101,017	
8	5	1	1	600	Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
8	5	1	2	600		Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
8	5	2	1	600	Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
8	5	2	2	610		Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous											62,361		$2,490,390		$28,708		$1,767,867		752,833	$978,683		$0			$5,265,648	
Subtotal Direct Costs																										
						Subtotal direct costs					493,865		$18,757,413		$14,746,776		$54,683,846		26,772,918	$34,804,793		$0			$122,992,828	
CLOSURE COSTS - INDIRECT																										
100	100	1	1		Project Management	5.0% of direct costs															$ 122,992,828	x	5.0%		$6,149,641	
100	100	2	1		Field Supervision	(included in major tasks)																			$0	
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 122,992,828	x	10.0%		$12,299,283	
100	100	4	1		Insurance	0.5% of direct costs															$ 122,992,828	x	0.5%		$614,964	
100	100	5	1		Bonding	0.5% of direct costs															$ 122,992,828	x	0.5%		$614,964	
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 122,992,828	x	10.0%		$12,299,283	
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																										
					Subtotal indirect costs																				$32,478,135	
CLOSURE COSTS - CONTINGENCY																										
					Contingency	20% of direct costs															$122,992,828	x	20.0%		$24,598,566	
CLOSURE COSTS - TOTAL																										
					Total direct and indirect costs																				$180,069,529	

of 30m

of 30m

Faro Mine Area Post Closure Costs

Costs in 2006 dollars

Notes:

1 Groundwater pumping costs include maintenance on the pumps

2 Environmental management costs split evenly between the Faro Mine, Tailings Area and Vangorda/Grum Mine site.

3.1 Flow-Through Pit

		Closure Period							Post-Closure Period															
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance	**$2,990,301**	$0	$0	$0	$0	$0	$0	$0	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$75,745	$75,745	$75,745	$75,745	$75,745	$75,745
Water Management and Pumping Costs [1]																								
ETA Groundwater Collection System	$1,241,134	$0	$0	$0	$0	$0	$0	$0	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469
S-Cluster Groundwater Collection System	$716,959	$0	$0	$0	$0	$0	$0	$0	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999
NFRC Groundwater Collection System	$881,403	$0	$0	$0	$0	$0	$0	$0	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421
Zone II Pit Groundwater Collection System	$255,727	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	**$3,095,223**	$0	$0	$0	$0	$0	$0	$0	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875
Water Treatment System Operation	**$6,173,265**	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management [2]																								
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,890	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,176,588	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,400,399**	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$19,659,189**	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$685,619	$685,619	$685,619	$685,619	$685,619	$685,619

3.2 Upgrade Faro Creek Diversion

		Closure Period							Post-Closure Period															
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance	**$2,903,272**	$0	$0	$0	$0	$0	$0	$0	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$73,540	$73,540	$73,540	$73,540	$73,540	$73,540
Water Management and Pumping Costs [1]																								
ETA Groundwater Collection System	$720,423	$0	$0	$0	$0	$0	$0	$0	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134
S-Cluster Groundwater Collection System	$432,110	$0	$0	$0	$0	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$406,478	$0	$0	$0	$0	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$255,727	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	**$1,814,738**	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction	**$3,485,437**	$3,590,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps [1]	$3,651,968	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$17,593,806	$0	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000
Subtotal	**$21,245,774**	$0	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316
Environmental Management [2]																								
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,890	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,176,588	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,400,399**	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$36,849,620**	$3,590,000	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	########	########	########	########	########	########

3.3 Minimize Up-Front Construction

		Closure Period			Post-Closure Period																			
	NPV	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
	3%	2011	2012	2013	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Earthworks Inspection and Maintenance																								
	$1,305,690	$0	$0	$0	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385
Water Management and Pumping Costs [1]																								
S-Cluster Groundwater Collection System	$486,344	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$457,495	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$287,823	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	**$1,231,662**	$0	$0	$0	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735
Water Treatment System Construction																								
	$3,357,282	$3,458,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps [1]	$3,629,751	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$20,523,949	$0	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000
Subtotal	**$24,153,700**	$0	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316
Environmental Management [2]																								
Full-Time Site Manager	$1,008,728	0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$720,520	0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$720,520	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$230,566	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$201,746	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$720,520	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,441,041	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$461,133	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$374,671	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,449,769	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$8,329,214**	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$38,377,548**	$3,458,000	$787,316	$787,316	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,148,436	$1,148,436	$1,148,436	$1,148,436	########	########	########	########	########	########

3.4 Minimize Water Treatment

		Closure Period								Post-Closure Period														
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance																								
	$6,089,473	$0	$0	$0	$0	$0	$0	$0	$0	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$477,167	$159,056	$159,056	$159,056	$159,056	$159,056
Water Management and Pumping Costs [1]																								
ETA Groundwater Collection System	$698,214	$0	$0	$0	$0	$0	$0	$0	$0	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134
S-Cluster Groundwater Collection System	$418,789	$0	$0	$0	$0	$0	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$393,948	$0	$0	$0	$0	$0	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$247,844	$0	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	**$1,758,794**	$0	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction																								
	$2,801,942	$2,886,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps [1]	$3,651,968	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$13,889,847	$0	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000
Subtotal	**$17,541,815**	$0	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316
Environmental Management [2]																								
Full-Time Site Manager	$868,613	0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$620,438	0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$198,540	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$173,723	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,240,875	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$397,080	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$322,628	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,109,488	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,172,260**	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$35,364,283**	$2,886,000	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$1,405,352	$1,405,352	$1,405,352	$1,405,352	$1,405,352	$1,405,352	$1,405,352	$1,405,352	$1,405,352	########	########	########	########	########	########

Summary NPV Calculations for Tailings Area Alternatives

NPV: Tailings Alternative 1 - Stabilize In Place

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Dams	$5,120,206	$1,359,920	$1,024,041	$7,504,167	6%	$7,183,742	$3,902,167	$3,602,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$50,878,524	$13,513,265	$10,175,705	$74,567,495	57%	$69,088,915	$16,777,686	$16,777,686	$20,506,061	$20,506,061	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$31,409,090	$8,342,211	$6,281,818	$46,033,119	35%	$42,875,047	$0	$30,381,859	$12,428,942	$3,222,318	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$1,897,921	$504,085	$379,584	$2,781,590	2%	$2,454,131	$0	$0	$0	$2,114,009	$667,582	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$569	$429	$3,141	0%	$2,710	$0	$0	$0	$0	$3,141	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$89,307,885**	**$23,720,050**	**$17,861,577**	**$130,889,513**		$121,604,544	**$20,679,853**	**$50,761,545**	**$32,935,003**	**$25,842,388**	**$670,723**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$6,087,397	$0	$0	$0	$0	$0	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039
Water Management Pumping Costs						$2,074,791	$0	$0	$0	$0	$0	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646
Water Treatment System Construction						$5,190,727	$0	$0	$0	$0	$0	$6,198,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$31,268,820	$0	$0	$0	$0	$0	$0	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000
Environmental Management						$7,823,148	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$52,444,883	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,000,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**
TOTAL						**$174,049,428**	**$20,679,853**	**$50,761,545**	**$32,935,003**	**$25,842,388**	**$670,723**	**$7,000,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**	**$1,994,685**

NPV: Tailings Alternative 2 - Complete Relocation

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Dams	$3,205,058	$838,912	$641,012	$4,684,982	1%	$4,088,874	$2,342,491	$0	$0	$0	$749,597	$0	$0	$0	$0	$796,447	$796,447	$0	$0	$0	$0
Tailings	$277,999,168	$72,765,278	$55,599,834	$406,364,280	97%	$333,457,405	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$24,381,857	$0	$0
Rose Creek Diversion Channel	$2,234,812	$584,954	$446,962	$3,266,729	1%	$2,153,402	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,940,056	$326,673
Groundwater	$2,863,885	$749,612	$572,777	$4,186,274	1%	$2,838,619	$0	$2,218,725	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,130,294	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$561	$429	$3,133	0%	$2,071	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,133	$0
Closure Costs Subtotal	**$286,305,066**	**$74,939,317**	**$57,261,013**	**$418,505,397**		**$342,540,371**	**$34,174,359**	**$34,050,594**	**$31,831,869**	**$31,831,869**	**$32,581,466**	**$31,831,869**	**$31,831,869**	**$31,831,869**	**$31,831,869**	**$32,628,315**	**$32,628,315**	**$31,831,869**	**$24,381,857**	**$4,073,483**	**$326,673**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$277,995	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Management Pumping Costs						$2,341,250	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Construction						$3,362,499	$0	$0	$0	$0	$0	$4,015,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$12,865,345	$0	$0	$0	$0	$0	$0	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000
Environmental Management						$5,696,620	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Post Closure Costs Subtotal						$24,543,708	**$0**	**$0**	**$0**	**$0**	**$0**	**$4,015,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**	**$693,000**
TOTAL						**$367,084,079**	**$34,174,359**	**$34,050,594**	**$31,831,869**	**$31,831,869**	**$32,581,466**	**$35,846,869**	**$32,524,869**	**$32,524,869**	**$32,524,869**	**$33,321,315**	**$33,321,315**	**$32,524,869**	**$25,074,857**	**$4,766,483**	**$1,019,673**

NPV: Tailings Alternative 3 - Partial Relocation

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Dams	$10,186,897	$2,677,981	$2,037,379	$14,902,257	6%	$11,863,751	$2,235,339	$0	$0	$0	$0	$0	$11,921,806	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$148,657,584	$39,079,826	$29,731,517	$217,468,928	86%	$192,819,740	$33,925,153	$33,925,153	$33,925,153	$33,925,153	$33,925,153	$15,222,825	$28,270,961	$2,174,689	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$11,669,687	$3,067,784	$2,333,937	$17,071,408	7%	$14,858,488	$0	$0	$0	$13,827,840	$0	$0	$512,142	$2,731,425	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,803,056	$736,881	$560,611	$4,100,548	2%	$3,496,309	$0	$0	$2,296,307	$0	$0	$0	$574,077	$738,099	$0	$0	$328,044	$0	$0	$164,022	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$563	$429	$3,136	0%	$2,475	$0	$0	$0	$0	$0	$0	$0	$3,136	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$173,319,367**	**$45,563,036**	**$34,663,873**	**$253,546,276**		**$223,040,762**	**$36,160,491**	**$33,925,153**	**$36,221,460**	**$47,752,993**	**$33,925,153**	**$15,222,825**	**$41,278,985**	**$5,647,349**	**$0**	**$0**	**$328,044**	**$0**	**$0**	**$164,022**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,842,493	$0	$0	$0	$0	$0	$0	$0	$0	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834
Water Management Pumping Costs						$3,068,166	$0	$0	$0	$0	$0	$0	$0	$0	$116,529	$116,529	$116,529	$122,847	$122,847	$122,847	$125,627
Water Treatment System Construction						$3,907,702	$0	$0	$0	$0	$0	$4,666,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$24,710,762	$0	$0	$0	$0	$0	$0	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000
Environmental Management						$7,117,992	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$41,647,115	**$0**	**$0**	**$0**	**$0**	**$0**	**$4,666,000**	**$942,000**	**$942,000**	**$1,571,362**	**$1,571,362**	**$1,571,362**	**$1,577,681**	**$1,577,681**	**$1,577,681**	**$1,580,461**
TOTAL						**$264,687,878**	**$36,160,491**	**$33,925,153**	**$36,221,460**	**$47,752,993**	**$33,925,153**	**$19,888,825**	**$42,220,985**	**$6,589,349**	**$1,571,362**	**$1,571,362**	**$1,899,406**	**$1,577,681**	**$1,577,681**	**$1,741,703**	**$1,580,461**

NPV: Tailings Alternative 4 - Minimize Up-Front Construction

							Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Closure Costs	**Direct Cost**	**Indirect Cost**	**Contingency**	**Total**	**% of Total**	**NPV- 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Dams	$4,650,700	$1,269,269	$930,140	$6,850,108	12%	$6,621,535	$5,822,592	$1,027,516	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$1,180,759	$322,253	$236,152	$1,739,163	3%	$1,639,328	$0	$1,739,163	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$31,409,090	$8,572,166	$6,281,818	$46,263,075	81%	$43,089,226	$0	$30,533,629	$12,491,030	$3,238,415	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$1,457,234	$397,708	$291,447	$2,146,389	4%	$1,851,494	$0	$0	$0	$0	$2,146,389	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$585	$429	$3,157	0%	$2,723	$0	$0	$0	$0	$3,157	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$38,699,926**	**$10,561,981**	**$7,739,985**	**$57,001,892**		**$53,204,306**	**$5,822,592**	**$33,300,309**	**$12,491,030**	**$3,238,415**	**$2,149,546**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,511,334	$0	$0	$0	$0	$0	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299
Tailings Dust Suppression						$3,533,368	$0	$0	$0	$0	$0	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528
Water Management Pumping Costs						$1,872,234	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Water Treatment System Construction						$5,338,125	$0	$0	$0	$0	$0	$6,374,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$35,544,673	$0	$0	$0	$0	$0	$0	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000
Environmental Management						$7,823,148	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$56,622,881	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,042,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**
TOTAL						**$109,827,187**	**$5,822,592**	**$33,300,309**	**$12,491,030**	**$3,238,415**	**$2,149,546**	**$7,042,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**	**$2,023,991**

Tailings Alternative 1 - Stabilize In Place

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,974,281	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	2	1	430	Remove impounded sludge	Excavate and create berms for use as sludge cell on top of tailings	1,445	m3	C.2.12	0.024	34.0	$ 0.86	$ 1,244	$ -	$ -	$ 2.00	$ 2,885	$ 0.93	1,036	$ 1,347	$ -	$ -	$ 3.79	$5,477		
	1	1	2	2	430		Load, haul and place sludge material	1,600	m3	R.093	0.040	64.0	$ 1.46	$ 2,342	$ -	$ -	$ 3.91	$ 6,263	$ 1.92	2,357	$ 3,064	$ -	$ -	$ 7.29	$11,670		1CD003.45_SludgeManagement
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	302,786	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	5,000	m2	C.2.05	0.015	72.7	$ 0.53	$ 2,662	$ -	$ -	$ 0.94	$ 4,675	$ 0.62	2,373	$ 3,085	$ -	$ -	$ 2.08	$10,422		
	1	1	4	2	430		Prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	1	5	1	430	Remove dam	Excavate, load, haul and place dam material not used for Int. Dam toe ber	185,088	m3	R.094	0.020	3653.1	$ 0.72	$ 133,702	$ -	$ -	$ 2.07	$ 382,604	$ 1.06	151,386	$ 196,802	$ -	$ -	$ 3.85	$713,108		
	1	1	7	1	610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	$ 0.00	$ 965	$ 0.09	$ 19,546	$ 0.05	$ 11,717	$ 0.00	110	$ 143	$ -	$ -	$ 0.15	$32,371		
Intermediate Dam																										$2,444,243	1CD003.59_Rose_Creek_Dam_Upgrades
	1	2	1	1	430	Ground densification	Gravel: supply and stockpile locally	6,493	m3	C.2.02	0.010	64.9	$ 0.37	$ 2,376	$ -	$ -	$ 1.61	$ 10,444	$ 1.13	5,641	$ 7,333	$ -	$ -	$ 3.10	$20,153		
	1	2	1	2	430		Gravel: load, haul, dump	6,493	m3	R.097	0.028	178.5	$ 1.01	$ 6,535	$ -	$ -	$ 2.34	$ 15,175	$ 1.09	5,463	$ 7,101	$ -	$ -	$ 4.44	$28,811		
	1	2	1	2	510		Drill vibro-replacement stone columns	74,400	m3	C.9.01	0.267	19840.0	$ 12.55	$ 933,472	$ -	$ -	$ 6.80	$ 506,230	$ 4.37	250,175	$ 325,227	$ -	$ -	$ 23.72	$1,764,929		
	1	2	1	2	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	2	2	1	430	Construct berm at toe	Excavate, load, haul and place material from Cross Valley Dam	150,000	m3	R.094	0.020	2960.5	$ 0.72	$ 108,355	$ -	$ -	$ 2.07	$ 310,072	$ 1.06	122,687	$ 159,493	$ -	$ -	$ 3.85	$577,921		
	1	2	3	1	600	Install pond level control	Install pumping system to manage pond levels	1	ls	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	2	3	2	600		Modify spillway - lower or add stop logs (completed during C&M)	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	2	4	1	600	Construct channel - spillway to Rose Cr.	Completed during care and maintenance	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Secondary Dam																										$701,682	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, dump	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												39,915		$1,779,338		$21,375		$2,088,103		947,223	$1,231,390		$0			$5,120,206	
Tailings																											
Intermediate Tailings																										$27,468,347	
	2	1	2	1	600	De-water	Pump pond water to Faro Pit or water treatment facility	267,000	m3	C.8.01	0.004	1176.2	$ 0.15	$ 41,167	$ 0.02	$ 6,206	$ 0.01	$ 1,533	$ 0.00	841	$ 1,093	$ -	$ -	$ 0.19	$50,000		
	2	1	3	1	600	Upgrade roads	Upgrade road from tailings area to waste rock source	1,350	m	C.2.28	0.225	303.8	$ 8.24	$ 11,117	$ -	$ -	$ 29.67	$ 40,060	$ 19.48	20,232	$ 26,301	$ -	$ -	$ 57.39	$77,478		
	2	1	3	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,804	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	1	4	1	430	Cover tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	504,665	m3	R.105	0.017	8689.0	$ 0.63	$ 318,018	$ -	$ -	$ 2.38	$ 1,199,067	$ 1.63	631,714	$ 821,228	$ -	$ -	$ 4.63	$2,338,313		
	2	1	4	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	504,665	m3	R.106	0.021	10408.7	$ 0.75	$ 380,959	$ -	$ -	$ 1.51	$ 761,877	$ 0.67	258,897	$ 336,566	$ -	$ -	$ 2.93	$1,479,402		
	2	1	4	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,513,995	m3	R.107	0.043	65780.5	$ 1.59	$ 2,407,565	$ -	$ -	$ 6.00	$ 9,077,577	$ 4.11	4,782,409	$ 6,217,132	$ -	$ -	$ 11.69	$17,702,274		
	2	1	4	4	430		Till (1.5m): Use small equipment to place on tailings	1,513,995	m3	R.108	0.026	39742.4	$ 0.96	$ 1,454,571	$ -	$ -	$ 1.92	$ 2,908,986	$ 0.85	988,515	$ 1,285,069	$ -	$ -	$ 3.73	$5,648,626		
	2	1	5	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	1,009,330	m2	C.5.01	0.000	126.2	$ 0.00	$ 4,531	$ 0.09	$ 91,768	$ 0.05	$ 55,011	$ 0.00	515	$ 670	$ -	$ -	$ 0.15	$151,981		
Secondary & Original Impoundment Tailings																										$22,910,177	
	2	2	1	1	600	Upgrade roads	Upgrade road from tailings area to waste rock source	935	m	C.2.28	0.225	210.4	$ 8.24	$ 7,700	$ -	$ -	$ 29.67	$ 27,745	$ 19.48	14,012	$ 18,216	$ -	$ -	$ 57.39	$53,661		
	2	2	1	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,804	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	2	2	1	430	Cover tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	451,150	m3	R.109	0.016	7382.5	$ 0.60	$ 270,198	$ -	$ -	$ 2.26	$ 1,018,764	$ 1.55	536,723	$ 697,740	$ -	$ -	$ 4.40	$1,986,703		
	2	2	2	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	451,150	m3	R.106	0.021	9305.0	$ 0.75	$ 340,562	$ -	$ -	$ 1.51	$ 681,087	$ 0.67	231,443	$ 300,876	$ -	$ -	$ 2.93	$1,322,525		
	2	2	2	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,353,450	m3	R.110	0.039	53292.1	$ 1.44	$ 1,950,491	$ -	$ -	$ 5.43	$ 7,354,205	$ 3.72	3,874,472	$ 5,036,813	$ -	$ -	$ 10.60	$14,341,509		
	2	2	2	4	430		Till (1.5m): Use small equipment to place on tailings	1,353,450	m3	R.108	0.026	35528.1	$ 0.96	$ 1,300,327	$ -	$ -	$ 1.92	$ 2,600,515	$ 0.85	883,692	$ 1,148,800	$ -	$ -	$ 3.73	$5,049,642		
	2	2	3	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	902,300	m2	C.5.01	0.000	112.8	$ 0.00	$ 4,051	$ 0.09	$ 82,037	$ 0.05	$ 49,178	$ 0.00	461	$ 599	$ -	$ -	$ 0.15	$135,865		
Allowance for construction delays from differential settlement/erosion																										$500,000	
	2	3	1	1	600	Cost of mobilization/demobilization		1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Subtotal Direct Costs - Tailings												241,829		$8,942,581		$180,012		$25,826,128		12,253,694	$15,929,803		$0			$50,878,524	
Rose Creek Diversion Channel																											
Upgrade to PMF (670m3/s)																										$11,441,497	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	272,961	m2	C.2.05	0.015	3970.3	$ 0.53	$ 145,315	$ -	$ -	$ 0.94	$ 255,233	$ 0.62	129,555	$ 168,422	$ -	$ -	$ 2.08	$568,969		
	3	1	2	1	430	Excavate channel	Bulk excavate	240,586	m3	C.2.12	0.024	5660.8	$ 0.86	$ 207,187	$ -	$ -	$ 2.00	$ 480,422	$ 0.93	172,569	$ 224,339	$ -	$ -	$ 3.79	$911,948		
	3	1	2	2	430		Pilot Channel: Soil excavation	26,600	m3	C.2.12	0.024	625.9	$ 0.86	$ 22,907	$ -	$ -	$ 2.00	$ 53,117	$ 0.93	19,080	$ 24,804	$ -	$ -	$ 3.79	$100,828		
	3	1	3	1	430	Place till layer	Till: Load, haul, dump, place	94,885	m3	R.112	0.038	3590.2	$ 1.38	$ 131,403	$ -	$ -	$ 2.96	$ 280,945	$ 1.40	101,875	$ 132,437	$ -	$ -	$ 5.74	$544,784		
	3	1	3	2	430		Till: compact with vibrating drum roller	316,283	m2	C.2.06	0.016	5060.5	$ 0.57	$ 181,167	$ -	$ -	$ 0.02	$ 6,642	$ 0.02	3,951	$ 5,136	$ -	$ -	$ 0.61	$192,946		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	7,503	m3	C.2.23	0.045	337.6	$ 1.62	$ 12,177	$ 15.72	$ 117,947	$ 2.64	$ 19,803	$ 1.36	7,871	$ 10,233	$ -	$ -	$ 21.35	$160,160		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	7,503	m3	C.2.07	0.024	180.1	$ 0.88	$ 6,591	$ -	$ -	$ 2.10	$ 15,738	$ 0.90	5,196	$ 6,755	$ -	$ -	$ 3.88	$29,083		186
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	7,503	m3	R.100	0.023	168.8	$ 0.82	$ 6,179	$ -	$ -	$ 2.00	$ 14,990	$ 0.94	5,453	$ 7,088	$ -	$ -	$ 3.77	$28,257		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	11,560	m3	C.2.02	0.010	115.6	$ 0.37	$ 4,231	$ -	$ -	$ 1.61	$ 18,596	$ 1.13	10,043	$ 13,056	$ -	$ -	$ 3.10	$35,883		
	3	1	5	2	430		Gravel: load , haul, place	11,560	m3	R.113	0.039	445.9	$ 1.41	$ 16,319	$ -	$ -	$ 3.24	$ 37,451	$ 1.49	13,221	$ 17,187	$ -	$ -	$ 6.14	$70,958		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	207,668	m3	C.2.02	0.010	2076.7	$ 0.37	$ 76,006	$ -	$ -	$ 1.61	$ 334,063	$ 1.13	180,416	$ 234,540	$ -	$ -	$ 3.10	$644,609		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	207,668	m3	R.113	0.039	8010.1	$ 1.41	$ 293,168	$ -	$ -	$ 3.24	$ 672,791	$ 1.49	237,501	$ 308,752	$ -	$ -	$ 6.14	$1,274,711		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	408,099	m3	R.114	0.049	19951.5	$ 1.79	$ 730,225	$ -	$ -	$ 4.32	$ 1,761,773	$ 2.11	662,083	$ 860,708	$ -	$ -	$ 8.22	$3,352,707		
	3	1	8	1	430	Place rip-rap	Rip-Rap: Screen and stockpile (from locally blasted material)	146,730	m3	C.2.25	0.057	8384.6	$ 2.09	$ 306,875	$ -	$ -	$ 9.19	$ 1,348,774	$ 6.45	728,426	$ 946,953	$ -	$ -	$ 17.74	$2,602,603		
	3	1	8	2	430		Rip-rap: Load, haul, dump	146,730	m3	R.100	0.023	3301.4	$ 0.82	$ 120,832	$ -	$ -	$ 2.00	$ 293,148	$ 0.94	106,632	$ 138,621	$ -	$ -	$ 3.77	$552,602		
	3	1	8	3	430		Rip-rap: Place and secure	146,730	m3	C.2.26	0.013	1834.1	$ 0.46	$ 67,129	$ -	$ -	$ 0.89	$ 130,501	$ 0.47	52,936	$ 68,816	$ -	$ -	$ 1.82	$266,446		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	7,980	m3	C.2.12	0.024	187.8	$ 0.86	$ 6,872	$ -	$ -	$ 2.00	$ 15,935	$ 0.93	5,724	$ 7,441	$ -	$ -	$ 3.79	$30,248		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	7,980	m3	C.2.02	0.010	79.8	$ 0.37	$ 2,921	$ -	$ -	$ 1.61	$ 12,837	$ 1.13	6,933	$ 9,013	$ -	$ -	$ 3.10	$24,770		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	7,980	m3	R.113	0.039	307.8	$ 1.41	$ 11,265	$ -	$ -	$ 3.24	$ 25,853	$ 1.49	9,126	$ 11,864	$ -	$ -	$ 6.14	$48,983		
North Fork Rock Drain																										$1,667,594	
	3	2	1	1	430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,646	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	2	1	2	430		Grade road	15,000	m2	C.2.18	0.002	32.6	$ 0.08	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	2	2	1	430	Breach drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,426	$ -	$ -	$ 1.65	$ 763,943	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		3.85
	3	2	3	1	430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	2	3	2	430		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	446	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	2	3	3	430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	2	3	4	430		Bedding layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.04	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	2	3	6	430		Rip-Rap (angular, high quality): Screen and Stockpile (from NFRD)	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	2	3	7	430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	2	3	8	430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	2	4	1	430	Revegetate disturbed areas	Seed/Fertilize, helicopter low application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Spillway Allowance																										$17,400,000	
	3	3	1	1	600	Construction of spillway		1	ls	C.2.30	16000.000	16000.0	$ 746,400.00	$ 746,400	$ 16,416,591.40	$ 16,416,591	$ 125,888.60	$ 125,889	$ 111,120.00	85,477	$ 111,120	$ -	$ -	$ 17,400,000.00	$17,400,000		NHC-BGC 2004 report (1CD003.35)
Fish By-Pass Allowance																										$900,000	
	3	4	1	1	600	Fish ladder construction	Scenario 1b from NHC report	1	ls	C.2.16	840.000	840.0	$ 34,444.00	$ 34,444	$ 825,252.41	$ 825,252	$ 26,580.99	$ 26,581	$ 13,722.60	10,556	$ 13,723	$ -	$ -	$ 900,000.00	$900,000		
Subtotal Direct Costs - Rose Creek Diversion Channel												87,628		$3,367,380		$17,373,674		$6,797,654		2,977,217	$3,870,382		$0			$31,409,090	
Groundwater Collection																											
Collect groundwater below CVD																										$1,457,234	
	4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
	4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
	4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
	4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
	4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
	4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
	4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
	4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295		
	4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
	4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624		
	4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
	4	1	4	2	510		Supply/Install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
	4	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
	4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
	4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
	4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
	4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Seepage Collection System above Intermediate Dam																										$211,521	
	4	2	1	1	430	Place collection sumps	Excavate sump	600	m3	C.2.11	0.013	8.0	$ 0.49	$ 293	$ -	$ -	$ 0.95	$ 569	$ 0.50	231	$ 300	$ -	$ -	$ 1.94	$1,162		
	4	2	1	2	510		Supply and place perforated HDPE sump	3	ea.	C.3.15	4.000	12.0	$ 186.60	$ 560	$ 1,925.00	$ 5,775	$ 18.12	$ 54	$ 15.73	36	$ 47	$ -	$ -	$ 2,145.45	$6,436		
	4	2	1	3	510		Supply and install pump	3	ea.	C.3.10	12.000	36.0	$ 600.00	$ 1,800	$ 1,829.00	$ 5,487	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$7,287		
	4	2	1	4	510		Supply and install protective houseing for pump	3	ea.	C.3.12	30.000	90.0	$ 1,950.00	$ 5,850	$ 1,730.00	$ 5,190	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$11,040		
	4	2	2	1	430	Piping system to CVD GW collection	Excavate piping trench	3,720	m3	C.2.13	0.020	74.4	$ 0.73	$ 2,723	$ -	$ -	$ 1.42	$ 5,294	$ 0.75	2,147	$ 2,791	$ -	$ -	$ 2.91	$10,808		
	4	2	2	2	510		Supply and install insulated 150mm HDPE pipe	620	m	C.3.03	0.250	155.0	$ 8.75	$ 5,425	$ 155.84	$ 96,621	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$102,046		
	4	2	2	3	430		Bedding layer: Produce, screen and stockpile	242	m3	C.2.02	0.010	2.4	$ 0.37	$ 88	$ -	$ -	$ 1.61	$ 389	$ 1.13	210	$ 273	$ -	$ -	$ 3.10	$751		
	4	2	2	4	430		Bedding Layer: Load, haul, place and compact	242	m3	R.097	0.028	6.6	$ 1.01	$ 243	$ -	$ -	$ 2.34	$ 565	$ 1.09	203	$ 264	$ -	$ -	$ 4.44	$1,073		
	4	2	2	5	430		Backfill and compact ditches	3,478	m3	C.2.01	0.030	104.3	$ 1.08	$ 3,763	$ -	$ -	$ 0.74	$ 2,566	$ 0.40	1,058	$ 1,376	$ -	$ -	$ 2.22	$7,705		
	4	2	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	620	m	C.3.04	0.250	155.0	$ 12.50	$ 7,750	$ 21.32	$ 13,218	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$20,968		
	4	2	3	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	4	2	3	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	2	4	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	8	ea.	C.4.03	4.545	36.4	$ 297.88	$ 2,383	$ 325.96	$ 2,608	$ 85.85	$ 687	$ 28.17	173	$ 225	$ -	$ -	$ 737.86	$5,903		
	4	2	4	2	510		Supply/Install overhead conductor	610	m	C.4.02	0.032	19.5	$ 2.21	$ 1,350	$ 1.41	$ 860	$ 0.45	$ 277	$ 0.15	70	$ 91	$ -	$ -	$ 4.22	$2,577		
	4	2	4	3	510		Supply/Install transformers	3	ea.	C.4.04	20.000	60.0	$ 1,383.00	$ 4,149	$ 8,934.00	$ 26,802	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 10,684.98	$32,055		
Slurry Wall																										$229,167	

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
	4	3	1	1	430	Level and compact a working surface	Clear and grub working surface	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253		
	4	3	1	2	430		Level and compact surface	1,500	m3	C.2.20	0.013	18.8	$ 0.46	$ 686	$ -	$ -	$ 2.15	$ 3,219	$ 1.25	1,443	$ 1,876	$ -	$ -	$ 3.85	$5,781		
	4	3	2	1	600	Slurry wall	Install cut-off wall (all-inclusive)	2,000	m2	C.2.08	0.500	1000.0	$ 26.82	$ 53,640	$ 48.60	$ 97,200	$ 20.47	$ 40,945	$ 12.67	19,498	$ 25,348	$ -	$ -	$ 108.57	$217,133		
Subtotal Direct Costs - Groundwater Collection												**7,076**		**$322,439**		**$1,332,902**		**$160,786**		**62,919**	**$81,794**		**$0**			**$1,897,921**	
Miscellaneous																											
Reclaim unnecessary roads																										$2,143	
	6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
	6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous												**14**		**$504**		**$273**		**$852**		**396**	**$514**		**$0**			**$2,143**	
Subtotal Direct Costs																											
						Subtotal direct costs						**376,462**		**$14,412,244**		**$18,908,235**		**$34,873,523**		**16,241,449**	**$21,113,883**		**$0**			**$89,307,885**	
CLOSURE COSTS - INDIRECT																											
	100	100	1	1		Project Management	5.0% of direct costs															$ 89,307,885	x	5.0%		$4,465,394	
	100	100	2	1		Field Supervision	(included in major tasks)																			$0	
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 89,307,885	x	10.0%		$8,930,789	
	100	100	4	1		Insurance	0.5% of direct costs															$ 89,307,885	x	0.5%		$446,539	
	100	100	5	1		Bonding	0.5% of direct costs															$ 89,307,885	x	0.5%		$446,539	
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 89,307,885	x	10.0%		$8,930,789	
	100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																											
						Subtotal indirect costs																				**$23,720,050**	
CLOSURE COSTS - CONTINGENCY																											
						Contingency	20% of direct costs															$89,307,885	x	20.0%		**$17,861,577**	
CLOSURE COSTS - TOTAL																											
						Total direct and indirect costs																				**$130,889,513**	

Tailings Alternative 2 - Complete Relocation

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,622,884	
1	1	1	1		600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	84.34	11,807	-	-	130.72	18,301	40.72	4,386	5,701	-	-	255.78	$35,810		
1	1	2	1		430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	0.49	159,581	-	-	1.88	608,165	1.22	302,786	393,622	-	-	3.60	$1,161,368		
1	1	3	1		430	Prepare spoil area	Clear and grub	1,000	m2	C.2.05	0.015	14.5	0.53	532	-	-	0.94	935	0.62	475	617	-	-	2.08	$2,084		
1	1	3	2		430		Prepare access roads	200	m	C.2.27	0.131	26.3	4.80	961	-	-	10.14	2,029	5.33	819	1,065	-	-	20.27	$4,055		
1	1	4	1		430	Breach dam	Excavate, load, haul and dump at pit	72,500	m3	R.095	0.020	1469.6	0.74	53,787	-	-	2.79	202,536	1.81	100,671	130,872	-	-	5.34	$387,196		
1	1	5	1		610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	0.00	965	0.09	19,546	0.05	11,717	0.00	110	143	-	-	0.15	$32,371		
Breach Intermediate Dam																										$518,955	
1	2	1	1		430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	0.53	532	-	-	0.94	935	0.62	475	617	-	-	2.08	$2,084		
1	2	1	2		430		Prepare access roads	300	m	C.2.27	0.131	39.4	4.80	1,441	-	-	10.14	3,043	5.33	1,229	1,598	-	-	20.27	$6,082		
1	2	2	1		430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	0.86	62,435	-	-	2.00	144,774	0.93	52,003	67,604	-	-	3.79	$274,813		
1	2	3	1		430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	0.86	4,478	-	-	2.00	10,384	0.93	3,730	4,849	-	-	3.79	$19,711		
1	2	3	2		510		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	0.57	736	3.50	4,550	0.23	297	0.15	148	192	-	-	4.44	$5,775		
1	2	3	3		430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	0.37	183	-	-	1.61	804	1.13	434	565	-	-	3.10	$1,552		
1	2	3	4		430		Bedding layer: Load, haul, dump and place	500	m3	R.099	0.029	14.6	1.07	533	-	-	2.45	1,223	1.12	432	561	-	-	4.63	$2,317		
1	2	3	5		430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	1.62	7,466	15.72	72,312	2.64	12,141	1.36	4,826	6,273	-	-	21.35	$98,192		
1	2	3	6		430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	2.09	9,621	-	-	9.19	42,284	6.45	22,836	29,687	-	-	17.74	$81,592		
1	2	3	7		430		Rip-rap: Load, haul, dump	4,600	m3	R.100	0.023	103.5	0.82	3,788	-	-	2.00	9,190	0.94	3,343	4,346	-	-	3.77	$17,324		
1	2	3	8		430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	0.46	2,105	-	-	0.89	4,091	0.47	1,660	2,157	-	-	1.82	$8,353		
1	2	4	1		610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	0.00	35	0.09	700	0.05	420	0.00	4	5	-	-	0.15	$1,159		
Breach Secondary Dam																										$529,914	
1	3	1	1		430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	0.53	532	-	-	0.94	935	0.62	475	617	-	-	2.08	$2,084		
1	3	1	2		430		Prepare access roads	500	m	C.2.27	0.131	65.6	4.80	2,402	-	-	10.14	5,072	5.33	2,048	2,663	-	-	20.27	$10,136		
1	3	2	1		430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	0.86	62,435	-	-	2.00	144,774	0.93	52,003	67,604	-	-	3.79	$274,813		
1	3	3	1		430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	0.86	4,478	-	-	2.00	10,384	0.93	3,730	4,849	-	-	3.79	$19,711		
1	3	3	2		520		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	0.57	736	3.50	4,550	0.23	297	0.15	148	192	-	-	4.44	$5,775		
1	3	3	3		430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	0.37	183	-	-	1.61	804	1.13	434	565	-	-	3.10	$1,552		
1	3	3	4		430		Bedding layer: Load, haul, dump and place	500	m3	R.101	0.036	18.0	1.32	659	-	-	3.02	1,512	1.39	534	694	-	-	5.73	$2,865		
1	3	3	5		430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	1.62	7,466	15.72	72,312	2.64	12,141	1.36	4,826	6,273	-	-	21.35	$98,192		
1	3	3	6		430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	2.09	9,621	-	-	9.19	42,284	6.45	22,836	29,687	-	-	17.74	$81,592		
1	3	3	7		430		Rip-rap: Load, haul, dump	4,600	m3	R.102	0.032	147.2	1.17	5,388	-	-	2.74	12,600	1.24	4,379	5,693	-	-	5.15	$23,680		
1	3	3	8		430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	0.46	2,105	-	-	0.89	4,091	0.47	1,660	2,157	-	-	1.82	$8,353		
1	3	4	1		610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	0.00	35	0.09	700	0.05	420	0.00	4	5	-	-	0.15	$1,159		
Breach Original Dam																										$533,305	
1	3	1	1		430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	0.53	532	-	-	0.94	935	0.62	475	617	-	-	2.08	$2,084		
1	3	1	2		430		Prepare access roads	540	m	C.2.27	0.131	70.9	4.80	2,594	-	-	10.14	5,477	5.33	2,212	2,876	-	-	20.27	$10,947		
1	3	2	1		430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	0.86	62,435	-	-	2.00	144,774	0.93	52,003	67,604	-	-	3.79	$274,813		
1	3	3	1		430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	0.86	4,478	-	-	2.00	10,384	0.93	3,730	4,849	-	-	3.79	$19,711		
1	3	3	2		520		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	0.57	736	3.50	4,550	0.23	297	0.15	148	192	-	-	4.44	$5,775		
1	3	3	3		430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	0.37	183	-	-	1.61	804	1.13	434	565	-	-	3.10	$1,552		
1	3	3	4		430		Bedding layer: Load, haul, dump and place	500	m3	R.103	0.029	14.6	1.07	533	-	-	2.45	1,223	1.12	432	561	-	-	4.63	$2,317		
1	3	3	5		430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	1.62	7,466	15.72	72,312	2.64	12,141	1.36	4,826	6,273	-	-	21.35	$98,192		
1	3	3	6		430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	2.09	9,621	-	-	9.19	42,284	6.45	22,836	29,687	-	-	17.74	$81,592		
1	3	3	7		430		Rip-rap: Load, haul, dump	4,600	m3	R.104	0.036	166.6	1.33	6,099	-	-	3.10	14,264	1.40	4,957	6,445	-	-	5.83	$26,808		
1	3	3	8		430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	0.46	2,105	-	-	0.89	4,091	0.47	1,660	2,157	-	-	1.82	$8,353		
1	3	4	1		610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	0.00	35	0.09	700	0.05	420	0.00	4	5	-	-	0.15	$1,159		
Subtotal Direct Costs - Dams												14,066		$513,841		$252,233		$1,545,677		687,159	$893,307		$0			$3,205,058	
Tailings																											
Pump Tailings to Faro Pit																										$214,689,551	
2	1	1	1		510	Hydraulic monitoring system	Pumps: Supply and install Vertical Turbine Pum	3	ea.	C.7.15	105.000	315.0	5,483.00	16,449	100,000.00	300,000	224.98	675	143.00	330	429	-	-	105,850.98	$317,553		
2	1	1	2		510		Pipelines: Primary pipeline 24" sched. 20 steel	3,500	m	C.7.09	1.611	5638.9	76.83	268,917	237.06	829,710	4.35	15,235	4.53	12,192	15,849	-	-	322.77	$1,129,710		1CD003.041
2	1	1	3		510		Pipelines: Secondary pipeline 16" sched. 20 steel	2,000	m	C.7.07	0.773	1545.5	35.59	71,182	153.28	306,560	3.56	7,123	3.71	5,700	7,410	-	-	196.14	$392,275		
2	1	1	4		510		Pipelines: Tertiary pipeline 8" sched. 20 steel	2,000	m	C.7.06	0.367	733.3	18.99	37,987	66.95	133,900	1.40	2,808	1.67	2,567	3,337	-	-	89.02	$178,031		
2	1	1	5		510		Hydraulic monitors: Supply and install	9	ea.	C.7.03	55.000	495.0	3,283.00	29,547	139,444.22	1,254,998	159.74	1,438	185.90	1,287	1,673	-	-	143,072.86	$1,287,656		
2	1	1	6		510		Mobile equipment: Purchase	1	ls	M.30	0.000	0.0	-	-	1,020,000.00	1,020,000	-	-	-	0	-	-	-	1,020,000.00	$1,020,000		
2	1	2	1		510	Slurry pumping system	Sump Pump: Supply and install	4	ea.	C.7.14	21.000	84.0	1,096.60	4,386	75,000.00	300,000	5.88	24	18.59	57	74	-	-	76,121.07	$304,484		
2	1	2	2		510		Sump Pump: Supply and install support structure	1	ea.	C.7.16	87.027	87.0	3,892.42	3,892	95,000.00	95,000	678.72	679	428.86	330	429	-	-	100,000.00	$100,000		
2	1	2	3		510		Slurry booster pumps: supply and install	4	ea.	C.7.13	105.000	420.0	5,483.00	21,932	175,000.00	700,000	29.38	118	92.95	286	372	-	-	180,605.33	$722,421		
2	1	2	4		510		Pump station: supply and install	1	ea.	C.7.17	81.769	81.8	4,024.29	4,024	200,000.00	200,000	537.68	538	438.03	337	438	-	-	205,000.00	$205,000		
2	1	2	5		510		Trash screen and support: supply and install	1	ea.	C.7.22	188.679	188.7	10,000.00	10,000	500,000.00	500,000	-	-	-	0	-	-	-	510,000.00	$510,000		
2	1	2	6		510		Booster pump box and support: Supply and install	1	ea.	C.7.01	73.122	73.1	3,675.61	3,676	75,000.00	75,000	867.13	867	457.26	352	457	-	-	80,000.00	$80,000		
2	1	2	7		510		Gland water pumps: supply and install	3	ea.	C.7.12	105.000	315.0	5,483.00	16,449	6,000.00	18,000	29.38	88	92.95	215	279	-	-	11,605.33	$34,816		
2	1	2	8		510		Sump pump pipeline: Supply and install 300mm HDPE	6,000	m	C.7.10	0.325	1950.0	15.92	95,490	140.75	844,500	0.15	882	0.46	2,145	2,789	-	-	157.28	$943,660		
2	1	2	9		510		Booster pump pipeline: Supply and install 550mm standard wall steel	500	m	C.7.08	1.688	843.8	81.86	40,931	463.00	231,500	2.63	1,316	3.13	1,203	1,564	-	-	550.62	$275,311		
2	1	2	10		510		Booster pump pipeline: Supply and install 650mm SDR9 HDPE	2,500	m	C.7.11	1.611	4027.8	76.83	192,083	697.20	1,743,000	4.35	10,882	4.53	8,708	11,321	-	-	782.91	$1,957,286		
2	1	3	1		600	Lime addition system	Procure and install lime addition system - Allowance	1	ea.	C.7.05	1779.000	1779.0	86,701.08	86,701	424,000.00	424,000	5,309.31	5,309	4,223.95	3,249	4,224	-	-	520,234.34	$520,234		
2	1	4	1		510	Tailings relocation operation	Operate hydraulic monitoring system	24,776,740	m3	C.7.04	0.020	497279.6	0.89	22,129,816	0.26	6,377,286	0.02	392,546	0.01	191,932	249,512	0.27	6,637,375	1.44	$35,786,535		Excludes bottom 2.0m of tailings
2	1	4	2		510		Operate slurry pumping system	24,776,740	m3	C.7.18	0.008	209380.9	0.42	10,469,045	0.32	8,035,574	-	-	-	0	-	0.54	13,348,032	1.29	$31,852,651		
2	1	4	4		600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	421,205	tonnes*	C.2.21	0.036	15043.0	1.59	671,520	320.00	134,785,466	1.67	702,732	0.98	317,084	412,209	-	-	324.24	$136,571,927		Need new estimates of lime requirements from JTC/DDS
2	1	4	5		510		System decommissioning and removal	1	ls	C.7.02	9509.524	9509.5	441,717.38	441,717	-	-	30,235.47	30,235	28,047.15	21,575	28,047	-	-	500,000.00	$500,000		
Excavate contaminated material to Faro Pit																										$62,080,948	
2	2	1	1		600	Truck contaminated soils to Faro Pit	Construct local access roads	3500	m	C.2.27	0.131	459.4	4.80	16,813	-	-	10.14	35,501	5.33	14,339	18,640	-	-	20.27	$70,954		
2	2	1	2		430		Load, haul, dump remaining contaminated material to Faro Pit	5,734,890	m3	R.111	0.019	111168.6	0.71	4,068,772	-	-	2.68	15,341,055	1.83	8,082,245	10,506,918	-	-	5.22	$29,916,746		Excavate bottom 2.0m of tailings + 1.0m of foundation soil
2	2	1	3		430		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	97,493	tonnes*	C.2.21	0.036	3481.9	1.59	155,432	320.00	31,197,802	1.67	162,656	0.98	73,393	95,411	-	-	324.24	$31,611,301		
2	2	1	4		430		Regrade stripped areas for drainage	1,911,630	m2	C.2.18	0.002	4155.7	0.08	152,099	-	-	0.09	167,235	0.09	125,087	162,613	-	-	0.25	$481,947		Use remaining dam materials for fill where necessary
Revegetate																										$287,845	
2	3	1	1		610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	1,911,630	m2	C.5.01	0.000	239.0	0.00	8,582	0.09	173,805	0.05	104,189	0.00	976	1,269	-	-	0.15	$287,845		
Slurry Thickener Allowance																										$358,874	
2	4	1	1		610	Construct slurry thickener	Slurry Thickener	1	ls	C.7.19	1178.571	1178.6	67,021.43	67,021	118,600.00	118,600	3,469.24	3,469	2,349.29	1,807	2,349	-	-	191,439.96	$191,440		
2	4	1	2		610		Slurry Thickener O/F Pump Box	2	ea.	C.7.20	300.000	600.0	15,665.71	31,331	50,000.00	100,000	642.79	1,286	408.57	629	817	-	-	66,717.07	$133,434		
2	4	1	3		610		Slurry Thickener O/F Pump	2	ea.	C.7.21	40.000	80.0	2,000.00	4,000	15,000.00	30,000	-	-	-	0	-	-	-	17,000.00	$34,000		
Tailing cleanups and pipline repair allowance																										$81,950	
2	5	1	1		430	Assume 1 pipeline failure per year	Excavate, haul, dump spilled tailings to tailings impoundment	9804	m3	C.2.31	0.067	653.6	2.44	23,922	-	-	2.48	24,305	1.87	14,089	18,315	-	-	6.79	$66,542		qnay= 1hr of slurry spilled at max flow rate x # of seasons
2	5	1	2		600		Repair pipeline	60	m	C.3.14	0.300	18.0	16.66	1,000	237.06	14,224	1.40	84	1.67	77	100	-	-	256.79	$15,408		5m of larges pipeline replaced per yr.
Allowance for short term stop in funding																										$500,000	
2	6	1	1		600	Cost of mobilization/demobilitation		1	ls	C.7.02	9509.524	9509.5	441,717.38	441,717	-	-	30,235.47	30,235	28,047.15	21,575	28,047	-	-	500,000.00	$500,000		
Subtotal Direct Costs - Tailings												881,335		$39,586,436		$189,808,923		$17,043,508		8,903,764	$11,574,894		$19,985,407			$277,999,168	
Rose Creek																											
Restore Rose Creek																										$356,277	
3	1	1	1		600	Maintain entire RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1	ls	-	0.000	0.0	-	-	-	-	-	-	-	0	-	-	-	-	$0		
3	1	2	1		430	Redirect flow into thalweg	Breach RCDC downstream of Secondary Dam	41,052	m3	C.2.12	0.024	965.9	0.86	35,353	-	-	2.00	81,976	0.93	29,446	38,280	-	-	3.79	$155,609		
3	1	2	2		430		Breach diversions where stream enter from south	30,000	m3	C.2.12	0.024	705.9	0.86	25,835	-	-	2.00	59,906	0.93	21,519	27,974	-	-	3.79	$113,716		
3	1	2	3		430		Regrade channel and dykes to create stable slopes	76	hrs	C.2.22	1.000	76.3	36.60	2,792	-	-	173.28	13,216	149.18	8,753	11,378	-	-	359.06	$27,386		
3	1	3	1		430	Fish habitat enhancement	Install riffles along restored channel	1,000	m3	C.2.12	0.024	23.5	0.86	861	-	-	2.00	1,997	0.93	717	932	-	-	3.79	$3,791		
3	1	3	2		430		Excavate pools	5,500	m3	C.2.12	0.024	129.4	0.86	4,736	-	-	2.00	10,983	0.93	3,945	5,129	-	-	3.79	$20,848		
3	1	4	1		600	Reclamation	Plant willows along restored stream channel	55,500	m2	C.5.04	0.004	222.0	0.14	7,770	0.40	22,200	0.05	2,894	0.04	1,587	2,063	-	-	0.63	$34,927		
North Fork Rock Drain																										$1,667,594	
3	2	1	1		430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	1.01	22,646	-	-	2.59	58,267	1.23	21,299	27,689	-	-	4.83	$108,602		
3	2	1	2		430		Grade road	15,000	m2	C.2.18	0.002	32.6	0.08	1,193	-	-	0.09	1,312	0.09	982	1,276	-	-	0.25	$3,782		
3	2	2	1		430	Breach drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	0.43	197,426	-	-	1.65	763,943	1.07	381,124	495,461	-	-	3.15	$1,456,831		
3	2	3	1		430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	0.86	5,257	-	-	2.00	12,189	0.93	4,378	5,692	-	-	3.79	$23,137		
3	2	3	2		520		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	0.57	2,223	3.50	13,734	0.23	896	0.15	446	580	-	-	4.44	$17,433		
3	2	3	3		430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	0.37	431	-	-	1.61	1,894	1.13	1,023	1,330	-	-	3.10	$3,654		
3	2	3	4		430		Bedding layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	1.07	1,255	-	-	2.21	2,600	1.04	938	1,220	-	-	4.31	$5,074		
3	2	3	6		430		Rip-rap (angular, high quality): Screen and stockpile	1,962	m3	C.2.25	0.057	112.1	2.09	4,103	-	-	9.19	18,035	6.45	9,740	12,662	-	-	17.74	$34,801		
3	2	3	7		430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	1.18	2,320	-	-	2.81	5,513	1.30	1,955	2,541	-	-	5.29	$10,374		
3	2	3	8		430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	0.46	898	-	-	0.89	1,745	0.47	708	920	-	-	1.82	$3,563		
3	2	4	1		610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	3270	m2	C.5.02	0.000	0.4	0.00	15	0.05	149	0.05	178	0.00	2	2	-	-	0.11	$344		
Reconstruction of Rose Creek Allowance																										$210,942	
3	3	1	1		430	Access roads	Prepare access roads	500	m	C.2.27	0.131	65.6	4.80	2,402	-	-	10.14	5,072	5.33	2,048	2,663	-	-	20.27	$10,136		
3	3	2	1		430	Construct cofferdam	Cofferdam foundation preparation	500	m2	C.2.17	0.318	159.1	13.47	6,736	-	-	17.95	8,973	8.86	3,409	4,432	-	-	40.28	$20,142		
3	3	2	2		430		Install main cofferdam	1600	m3	R.112	0.038	60.5	1.38	2,216	-	-	2.96	4,737	1.40	1,718	2,233	-	-	5.74	$9,186		
3	3	2	3		610		Seepage collection ditch and berm	2000	m3	R.112	0.038	75.7	1.38	2,770	-	-	2.96	5,922	1.40	2,147	2,792	-	-	5.74	$11,483		
3	3	2	4		600		Supply and operate pumps for removing seepage	14	days	C.3.11	2.410	33.7	84.34	1,181	-	-	130.72	1,830	40.72	439	570	-	-	255.78	$3,581		
3	3	3	1		430	Channel construction	Excavate Channel	2100	m3	C.2.12	0.024	49.4	0.86	1,808	-	-	2.00	4,193	0.93	1,506	1,958	-	-	3.79	$7,960		
3	3	3	2		430		Over excavation for placement of floodplain erosion protection	1800	m3	C.2.12	0.024	42.4	0.86	1,550	-	-	2.00	3,594	0.93	1,291	1,678	-	-	3.79	$6,823		
3	3	3	3		430		Excavation for residual structure erosion protection	1300	m3	C.2.12	0.024	30.6	0.86	1,120	-	-	2.00	2,596	0.93	932	1,212	-	-	3.79	$4,928		
3	3	4	1		430	Place rip-rap	Rip-rap: Drill, blast and stockpile	2600	m3	C.2.23	0.045	117.0	1.62	4,220	15.72	40,872	2.64	6,862	1.36	2,728	3,546	-	-	21.35	$55,500		
3	3	4	2		430		Rip-rap (angular, high quality): Screen and stockpile	2600	m3	C.2.25	0.057	148.6	2.09	5,438	-	-	9.19	23,900	6.45	12,907	16,780	-	-	17.74	$46,117		
3	3	4	3		430		Rip-rap: Load, haul, dump	2600	m3	R.102	0.032	83.2	1.17	3,045	-	-	2.74	7,122	1.24	2,475	3,218	-	-	5.15	$13,385		
3	3	4	4		430		Rip-rap: Place and secure	2600	m3	C.2.26	0.013	32.5	0.46	1,190	-	-	0.89	2,312	0.47	938	1,219	-	-	1.82	$4,721		
3	3	5	1		430	Place gravel substrate	Gravel: Screen and stockpile	500	m3	C.2.02	0.010	5.0	0.37	183	-	-	1.61	804	1.13	434	565	-	-	3.10	$1,552		
3	3	5	2		430		Gravel: Load, haul, dump and place	500	m3	R.113	0.039	19.3	1.41	706	-	-	3.24	1,620	1.49	572	743	-	-	6.14	$3,069		
3	3	6	1		430	Removal of cofferdam	Excavate material and spoil locally	1600	m3	C.2.12	0.024	37.6	0.86	1,378	-	-	2.00	3,195	0.93	1,148	1,492	-	-	3.79	$6,065		
3	3	7	1		600	Revegetation of riparian area	Revegetation	10000	m2	C.5.04	0.004	40.0	0.14	1,400	0.40	4,000	0.05	521	0.04	286	372	-	-	0.63	$6,293		
Subtotal Direct Costs - Rose Creek												9,622		$352,455		$80,955		$1,120,799		523,541	$680,604		$0			$2,234,812	
Groundwater																											
Collect groundwater below CVD																										$1,457,234	
4	1	1	1		500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	102.13	14,299	-	-	100.85	14,119	22.08	2,378	3,091	-	-	225.07	$31,509		
4	1	1	2		500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	7.66	1,072	232.60	32,564	7.56	1,059	1.66	178	232	-	-	249.48	$34,927		
4	1	1	3		500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	600.00	4,200	6,842.00	47,894	-	-	-	0	-	-	-	7,442.00	$52,094		
4	1	1	4		500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	1,300.00	9,100	445.00	3,115	-	-	-	0	-	-	-	1,745.00	$12,215		
4	1	2	1		430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	0.49	98	-	-	0.95	190	0.50	77	100	-	-	1.94	$387		
4	1	2	2		500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	746.40	746	1,344.68	1,345	72.47	72	62.92	48	63	-	-	2,226.47	$2,226		
4	1	2	3		430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	1.08	216	-	-	0.74	148	0.40	61	79	-	-	2.22	$443		

4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429	
4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649	
4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868	
4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295	
4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440	
4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624	
4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864	
4	1	4	2	510		Supply/Install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507	
4	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083	
4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776	
4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674	
4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740	
4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504	
4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969	
4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009	
Adaptive Management Phase 1																									$827,394
4	2	1	1	500	Install shallow extraction wells	Construct Access Roads	1168	m	C.2.27	0.131	153.3	$ 4.80	$ 5,611	$ -	$ -	$ 10.14	$ 11,847	$ 5.33	4,785	$ 6,221	$ -	$ -	$ 20.27	$23,678	
4	2	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507	
4	2	1	3	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948	
4	2	1	4	500		Install 6" Submersible Pump with controls	10	ea.	C.3.07	12.000	120.0	$ 600.00	$ 6,000	$ 6,842.00	$ 68,420	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$74,420	
4	2	1	5	500		Install protective housing (shack)	10	ea.	C.3.13	20.000	200.0	$ 1,300.00	$ 13,000	$ 445.00	$ 4,450	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$17,450	
4	2	2	1	430	Install piping to CVD collection system	Excavate piping trench	11,730	m3	C.2.13	0.020	234.6	$ 0.73	$ 8,586	$ -	$ -	$ 1.42	$ 16,692	$ 0.75	6,771	$ 8,802	$ -	$ -	$ 2.91	$34,081	
4	2	2	2	510		Supply and install insulated 150mm HDPE pipe	1,955	m	C.3.03	0.250	488.8	$ 8.75	$ 17,106	$ 155.84	$ 304,667	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$321,773	
4	2	2	3	430		Bedding layer: Produce, screen and stockpile	762	m3	C.2.02	0.010	7.6	$ 0.37	$ 279	$ -	$ -	$ 1.61	$ 1,227	$ 1.13	662	$ 861	$ -	$ -	$ 3.10	$2,367	
4	2	2	4	430		Bedding Layer: Load, haul, place and compact	762	m3	R.103	0.029	22.2	$ 1.07	$ 813	$ -	$ -	$ 2.45	$ 1,865	$ 1.12	658	$ 856	$ -	$ -	$ 4.63	$3,533	
4	2	2	5	430		Backfill and compact ditches	10,968	m3	C.2.01	0.030	329.0	$ 1.08	$ 11,867	$ -	$ -	$ 0.74	$ 8,091	$ 0.40	3,337	$ 4,338	$ -	$ -	$ 2.22	$24,296	
4	2	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	1,955	m	C.3.04	0.250	488.8	$ 12.50	$ 24,438	$ 21.32	$ 41,681	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$66,118	
4	2	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	100	ea.	C.3.05	4.000	400.0	$ 230.00	$ 23,000	$ 396.84	$ 39,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$62,684	
4	2	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	26	ea.	C.4.03	4.545	118.2	$ 297.88	$ 7,745	$ 325.96	$ 8,475	$ 85.85	$ 2,232	$ 28.17	563	$ 732	$ -	$ -	$ 737.86	$19,184	
4	2	3	2	500		Supply/Install overhead conductor	1,955	m	C.4.02	0.032	62.6	$ 2.21	$ 4,326	$ 1.41	$ 2,757	$ 0.45	$ 886	$ 0.15	224	$ 291	$ -	$ -	$ 4.22	$8,260	
4	2	3	3	500		Supply/Install transformers	10	ea.	C.4.04	20.000	200.0	$ 1,383.00	$ 13,830	$ 8,934.00	$ 89,340	$ 224.98	$ 2,250	$ 143.00	1,100	$ 1,430	$ -	$ -	$ 10,684.98	$106,850	
4	2	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752	
4	2	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484	
4	2	4	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009	
Adaptive Management Phase 2																									$411,156
4	3	1	1	500	Install shallow extraction wells	Construct Access Roads	584	m	C.2.27	0.131	76.7	$ 4.80	$ 2,805	$ -	$ -	$ 10.14	$ 5,924	$ 5.33	2,393	$ 3,110	$ -	$ -	$ 20.27	$11,839	
4	3	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253	
4	3	1	3	500		Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474	
4	3	1	4	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210	
4	3	1	5	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725	
4	3	2	1	430	Install piping to CVD collection system	Excavate piping trench	5,865	m3	C.2.13	0.020	117.3	$ 0.73	$ 4,293	$ -	$ -	$ 1.42	$ 8,346	$ 0.75	3,385	$ 4,401	$ -	$ -	$ 2.91	$17,040	
4	3	2	2	510		Supply and install insulated 150mm HDPE pipe	978	m	C.3.03	0.250	244.4	$ 8.75	$ 8,553	$ 155.84	$ 152,334	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$160,887	
4	3	2	3	430		Bedding layer: Produce, screen and stockpile	381	m3	C.2.02	0.010	3.8	$ 0.37	$ 140	$ -	$ -	$ 1.61	$ 613	$ 1.13	331	$ 431	$ -	$ -	$ 3.10	$1,183	
4	3	2	4	430		Bedding Layer: Load, haul, place and compact	381	m3	R.103	0.029	11.1	$ 1.07	$ 406	$ -	$ -	$ 2.45	$ 932	$ 1.12	329	$ 428	$ -	$ -	$ 4.63	$1,767	
4	3	2	5	430		Backfill and compact ditches	5,484	m3	C.2.01	0.030	164.5	$ 1.08	$ 5,933	$ -	$ -	$ 0.74	$ 4,046	$ 0.40	1,668	$ 2,169	$ -	$ -	$ 2.22	$12,148	
4	3	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	978	m	C.3.04	0.250	244.4	$ 12.50	$ 12,219	$ 21.32	$ 20,840	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$33,059	
4	3	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	50	ea.	C.3.05	4.000	200.0	$ 230.00	$ 11,500	$ 396.84	$ 19,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$31,342	
4	3	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592	
4	3	3	2	500		Supply/Install overhead conductor	978	m	C.4.02	0.032	31.3	$ 2.21	$ 2,163	$ 1.41	$ 1,378	$ 0.45	$ 443	$ 0.15	112	$ 145	$ -	$ -	$ 4.22	$4,130	
4	3	3	3	500		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425	
4	3	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251	
4	3	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495	
4	3	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336	
Adaptive Management Phase 3																									$168,102
4	4	1	1	500	Install shallow extraction wells	Construct Access Roads	234	m	C.2.27	0.131	30.7	$ 4.80	$ 1,122	$ -	$ -	$ 10.14	$ 2,369	$ 5.33	957	$ 1,244	$ -	$ -	$ 20.27	$4,736	
4	4	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	20	m	C.2.09	2.000	40.0	$ 102.13	$ 2,043	$ -	$ -	$ 100.85	$ 2,017	$ 22.08	340	$ 442	$ -	$ -	$ 225.07	$4,501	
4	4	1	3	500		Install 6" stainless steel well casing & screen	20	m	C.3.17	0.150	3.0	$ 7.66	$ 153	$ 232.60	$ 4,652	$ 7.56	$ 151	$ 1.66	25	$ 33	$ -	$ -	$ 249.48	$4,990	
4	4	1	4	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$14,884	
4	4	1	5	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490	
4	4	2	1	430	Install piping to CVD collection system	Excavate piping trench	2,346	m3	C.2.13	0.020	46.9	$ 0.73	$ 1,717	$ -	$ -	$ 1.42	$ 3,338	$ 0.75	1,354	$ 1,760	$ -	$ -	$ 2.91	$6,816	
4	4	2	2	510		Supply and install insulated 150mm HDPE pipe	391	m	C.3.03	0.250	97.8	$ 8.75	$ 3,421	$ 155.84	$ 60,933	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$64,355	
4	4	2	3	430		Bedding layer: Produce, screen and stockpile	152	m3	C.2.02	0.010	1.5	$ 0.37	$ 56	$ -	$ -	$ 1.61	$ 245	$ 1.13	132	$ 172	$ -	$ -	$ 3.10	$473	
4	4	2	4	430		Bedding Layer: Load, haul, place and compact	152	m3	R.103	0.029	4.4	$ 1.07	$ 163	$ -	$ -	$ 2.45	$ 373	$ 1.12	132	$ 171	$ -	$ -	$ 4.63	$707	
4	4	2	5	430		Backfill and compact ditches	2,194	m3	C.2.01	0.030	65.8	$ 1.08	$ 2,373	$ -	$ -	$ 0.74	$ 1,618	$ 0.40	667	$ 868	$ -	$ -	$ 2.22	$4,859	
4	4	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	391	m	C.3.04	0.250	97.8	$ 12.50	$ 4,888	$ 21.32	$ 8,336	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$13,224	
4	4	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	20	ea.	C.3.05	4.000	80.0	$ 230.00	$ 4,600	$ 396.84	$ 7,937	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$12,537	
4	4	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427	
4	4	3	2	500		Supply/Install overhead conductor	391	m	C.4.02	0.032	12.5	$ 2.21	$ 865	$ 1.41	$ 551	$ 0.45	$ 177	$ 0.15	45	$ 58	$ -	$ -	$ 4.22	$1,652	
4	4	3	3	500		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$ 10,684.98	$21,370	
4	4	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251	
4	4	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495	
4	4	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336	
Subtotal Direct Costs - Groundwater Collection											**10,535**		**$486,708**		**$2,081,079**		**$203,819**		**70,984**	**$92,279**		**$0**			**$2,863,885**
Miscellaneous																									
Reclaim unnecessary road:																									$2,143
6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513	
6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631	
Subtotal Direct Costs - Miscellaneous											**14**		**$504**		**$273**		**$852**		**396**	**$514**		**$0**			**$2,143**
Subtotal Direct Costs																									
					Subtotal direct costs						**915,571**		**$40,939,945**		**$192,223,463**		**$19,914,655**		**10,185,844**	**$13,241,597**		**$19,985,407**			**$286,305,066**
CLOSURE COSTS - INDIRECT																									
100	100	1	1		Project Management	5.0% of direct costs															$ 286,305,066	x	5.0%		$14,315,253
100	100	2	1		Field Supervision	(included in major tasks)																			$0
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 286,305,066	x	10.0%		$28,630,507
100	100	4	1		Insurance	0.5% of direct costs															$ 286,305,066	x	0.5%		$1,431,525
100	100	5	1		Bonding	0.5% of direct costs															$ 286,305,066	x	0.5%		$1,431,525
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 286,305,066	x	10.0%		$28,630,507
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0
Subtotal Indirect Costs																									
					Subtotal indirect costs																				**$74,939,317**
CLOSURE COSTS - CONTINGENCY																									
					Contingency	20% of direct costs															$286,305,066	x	20.0%		**$57,261,013**
CLOSURE COSTS - TOTAL																									
					Total direct and indirect costs																				**$418,505,397**

Tailings Alternative 3 - Partial Relocation

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,622,884	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	302,786	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	1,000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	1	4	2	430		Prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	1	5	1	430	Breach Dam	Excavate, load, haul and dump at pit	72,500	m3	R.095	0.020	1469.6	$ 0.74	$ 53,787	$ -	$ -	$ 2.79	$ 202,536	$ 1.81	100,671	$ 130,872	$ -	$ -	$ 5.34	$387,196		
	1	1	7	1	610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	$ 0.00	$ 965	$ 0.09	$ 19,546	$ 0.05	$ 11,717	$ 0.00	110	$ 143	$ -	$ -	$ 0.15	$32,371		
Breach Intermediate Dam																										$518,955	
	1	2	1	1	430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	2	1	2	430		Prepare access roads	300	m	C.2.27	0.131	39.4	$ 4.80	$ 1,441	$ -	$ -	$ 10.14	$ 3,043	$ 5.33	1,229	$ 1,598	$ -	$ -	$ 20.27	$6,082		
	1	2	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	2	3	1	430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	$ 0.86	$ 4,478	$ -	$ -	$ 2.00	$ 10,384	$ 0.93	3,730	$ 4,849	$ -	$ -	$ 3.79	$19,711		
	1	2	3	2	510		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	$ 0.57	$ 736	$ 3.50	$ 4,550	$ 0.23	$ 297	$ 0.15	148	$ 192	$ -	$ -	$ 4.44	$5,775		
	1	2	3	3	430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
	1	2	3	4	430		Bedding layer: Load, haul, dump and place	500	m3	R.099	0.029	14.6	$ 1.07	$ 533	$ -	$ -	$ 2.45	$ 1,223	$ 1.12	432	$ 561	$ -	$ -	$ 4.63	$2,317		
	1	2	3	5	430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	$ 1.62	$ 7,466	$ 15.72	$ 72,312	$ 2.64	$ 12,141	$ 1.36	4,826	$ 6,273	$ -	$ -	$ 21.35	$98,192		
	1	2	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	$ 2.09	$ 9,621	$ -	$ -	$ 9.19	$ 42,284	$ 6.45	22,836	$ 29,687	$ -	$ -	$ 17.74	$81,592		
	1	2	3	7	430		Rip-rap: Load, haul, dump	4,600	m3	R.100	0.023	103.5	$ 0.82	$ 3,788	$ -	$ -	$ 2.00	$ 9,190	$ 0.94	3,343	$ 4,346	$ -	$ -	$ 3.77	$17,324		
	1	2	3	8	430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	$ 0.46	$ 2,105	$ -	$ -	$ 0.89	$ 4,091	$ 0.47	1,660	$ 2,157	$ -	$ -	$ 1.82	$8,353		
	1	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Secondary Dam																										$8,045,058	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, place	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	3	2	1	430	Ground densification (West Limb)	Construct Workpad	88,075	m3	C.2.12	0.024	2072.4	$ 0.86	$ 75,848	$ -	$ -	$ 2.00	$ 175,875	$ 0.93	63,175	$ 82,127	$ -	$ -	$ 3.79	$333,851		
	1	3	2	2	430		Gravel: supply and stockpile locally	24,796	m3	C.2.02	0.010	248.0	$ 0.37	$ 9,075	$ -	$ -	$ 1.61	$ 39,888	$ 1.13	21,542	$ 28,005	$ -	$ -	$ 3.10	$76,968		
	1	3	2	3	430		Gravel: load, haul, place	24,796	m3	R.101	0.036	892.7	$ 1.32	$ 32,671	$ -	$ -	$ 3.02	$ 74,978	$ 1.39	26,468	$ 34,408	$ -	$ -	$ 5.73	$142,057		
	1	3	2	4	510		Drill vibro-replacement stone columns	284,144	m3	C.9.01	0.267	75771.6	$ 12.55	$ 3,565,054	$ -	$ -	$ 6.80	$ 1,933,359	$ 4.37	955,451	$ 1,242,086	$ -	$ -	$ 23.72	$6,740,499		
	1	3	2	5	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												96,058		$4,418,370		$97,108		$3,506,912		1,665,005	$2,164,506		$0			$10,186,897	
Tailings																											
Pump Intermediate Tailings to Faro Pit																										$91,920,929	
	2	1	1	1	510	Hydraulic monitoring system	Pumps: Supply and install Vertical Turbine Pump	3	ea.	C.7.15	105.000	315.0	$ 5,483.00	$ 16,449	$ 100,000.00	$ 300,000	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 105,850.98	$317,553		
	2	1	1	2	510		Pipelines: Primary pipeline 24" sched. 20 steel	3,500	m	C.7.09	1.611	5638.9	$ 76.83	$ 268,917	$ 237.06	$ 829,710	$ 4.35	$ 15,235	$ 4.53	12,192	$ 15,849	$ -	$ -	$ 322.77	$1,129,710		1CD003.041
	2	1	1	3	510		Pipelines: Secondary pipeline 16" sched. 20 steel	2,000	m	C.7.07	0.773	1545.5	$ 35.59	$ 71,182	$ 153.28	$ 306,560	$ 3.56	$ 7,123	$ 3.71	5,700	$ 7,410	$ -	$ -	$ 196.14	$392,275		
	2	1	1	4	510		Pipelines: Tertiary pipeline 8" sched. 20 steel	2,000	m	C.7.06	0.367	733.3	$ 18.99	$ 37,987	$ 66.95	$ 133,900	$ 1.40	$ 2,808	$ 1.67	2,567	$ 3,337	$ -	$ -	$ 89.02	$178,031		
	2	1	1	5	510		Hydraulic monitors: Supply and install	9	ea.	C.7.03	55.000	495.0	$ 3,283.00	$ 29,547	$ 139,444.22	$ 1,254,998	$ 159.74	$ 1,438	$ 185.90	1,287	$ 1,673	$ -	$ -	$ 143,072.86	$1,287,656		
	2	1	1	6	510		Mobile equipment: Purchase	1	ls	M.30	0.000	0.0	$ -	$ -	$ 1,020,000.00	$ 1,020,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,020,000.00	$1,020,000		
	2	1	2	1	510	Slurry pumping system	Sump Pump: Supply and install	4	ea.	C.7.14	21.000	84.0	$ 1,096.60	$ 4,386	$ 75,000.00	$ 300,000	$ 5.88	$ 24	$ 18.59	57	$ 74	$ -	$ -	$ 76,121.07	$304,484		
	2	1	2	2	510		Sump Pump: Supply and install support structure	1	ea.	C.7.16	87.027	87.0	$ 3,892.42	$ 3,892	$ 95,000.00	$ 95,000	$ 678.72	$ 679	$ 428.86	330	$ 429	$ -	$ -	$ 100,000.00	$100,000		
	2	1	2	3	510		Slurry booster pumps: supply and install	4	ea.	C.7.13	105.000	420.0	$ 5,483.00	$ 21,932	$ 175,000.00	$ 700,000	$ 29.38	$ 118	$ 92.95	286	$ 372	$ -	$ -	$ 180,605.33	$722,421		
	2	1	2	4	510		Pump station: supply and install	1	ea.	C.7.17	81.769	81.8	$ 4,024.29	$ 4,024	$ 200,000.00	$ 200,000	$ 537.68	$ 538	$ 438.03	337	$ 438	$ -	$ -	$ 205,000.00	$205,000		
	2	1	2	5	510		Trash screen and support: supply and install	1	ea.	C.7.22	188.679	188.7	$ 10,000.00	$ 10,000	$ 500,000.00	$ 500,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 510,000.00	$510,000		
	2	1	2	6	510		Booster pump box and support: Supply and install	1	ea.	C.7.01	73.122	73.1	$ 3,675.61	$ 3,676	$ 75,000.00	$ 75,000	$ 867.13	$ 867	$ 457.26	352	$ 457	$ -	$ -	$ 80,000.00	$80,000		
	2	1	2	7	510		Gland water pumps: supply and install	3	ea.	C.7.12	105.000	315.0	$ 5,483.00	$ 16,449	$ 6,000.00	$ 18,000	$ 29.38	$ 88	$ 92.95	215	$ 279	$ -	$ -	$ 11,605.33	$34,816		
	2	1	2	8	510		Sump pump pipeline: Supply and install 300mm HDPE	6,000	m	C.7.10	0.325	1950.0	$ 15.92	$ 95,490	$ 140.75	$ 844,500	$ 0.15	$ 882	$ 0.46	2,145	$ 2,789	$ -	$ -	$ 157.28	$943,660		
	2	1	2	9	510		Booster pump pipeline: Supply and install 550mm standard wall steel	500	m	C.7.08	1.688	843.8	$ 81.86	$ 40,931	$ 463.00	$ 231,500	$ 2.63	$ 1,316	$ 3.13	1,203	$ 1,564	$ -	$ -	$ 550.62	$275,311		
	2	1	2	10	510		Booster pump pipeline: Supply and install 650mm SDR9 HDPE	2,500	m	C.7.11	1.611	4027.8	$ 76.83	$ 192,083	$ 697.20	$ 1,743,000	$ 4.35	$ 10,882	$ 4.53	8,708	$ 11,321	$ -	$ -	$ 782.91	$1,957,286		
	2	1	3	1	600	Lime addition system	Procure and install lime addition system - Allowance	1	ea.	C.7.05	1779.000	1779.0	$ 86,701.08	$ 86,701	$ 424,000.00	$ 424,000	$ 5,309.31	$ 5,309	$ 4,223.95	3,249	$ 4,224	$ -	$ -	$ 520,234.34	$520,234		
	2	1	4	1	510	Tailings relocation operation	Operate hydraulic monitoring system	9,881,340	m3	C.7.04	0.020	198322.7	$ 0.89	$ 8,825,707	$ 0.26	$ 2,543,358	$ 0.02	$ 156,553	$ 0.01	76,546	$ 99,509	0.27	$ 2,647,086	$ 1.44	$14,272,213		
	2	1	4	2	510		Operate slurry pumping system	9,881,340	m3	C.7.18	0.008	83504.3	$ 0.42	$ 4,175,214	$ 0.32	$ 3,204,709	$ -	$ -	$ -	0	$ -	0.54	$ 5,323,398	$ 1.29	$12,703,321		
	2	1	4	3	600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	167,983	tonnes*	C.2.21	0.036	5999.4	$ 1.59	$ 267,813	$ 320.00	$ 53,754,490	$ 1.67	$ 280,260	$ 0.98	126,458	$ 164,395	$ -	$ -	$ 324.24	$54,466,957		
	2	1	4	4	510		System decommissioning and removal	1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Excavate contaminated material to Faro Pit																										$32,781,477	
	2	2	1	1	600	Truck contaminated soils to Faro Pit	Construct local access roads	2000	m	C.2.27	0.131	262.5	$ 4.80	$ 9,608	$ -	$ -	$ 10.14	$ 20,286	$ 5.33	8,194	$ 10,652	$ -	$ -	$ 20.27	$40,545		
	2	2	1	2	430		Load, haul, dump remaining contaminated material to Faro Pit	3,027,990	m3	R.111	0.019	58696.4	$ 0.71	$ 2,148,289	$ -	$ -	$ 2.68	$ 8,099,992	$ 1.83	4,267,380	$ 5,547,594	$ -	$ -	$ 5.22	$15,795,875		
	2	2	1	3	600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	51,476	tonnes*	C.2.21	0.036	1838.4	$ 1.59	$ 82,067	$ 320.00	$ 16,472,266	$ 1.67	$ 85,882	$ 0.98	38,751	$ 50,376	$ -	$ -	$ 324.24	$16,690,591		
	2	2	1	4	430		Regrade stripped areas for drainage	1,009,330	m2	C.2.18	0.002	2194.2	$ 0.08	$ 80,308	$ -	$ -	$ 0.09	$ 88,299	$ 0.09	66,045	$ 85,859	$ -	$ -	$ 0.25	$254,466		Use remaining dam materials for fill where necessary
Revegetate Intermediate Tailings																										$151,981	
	2	3	1	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	1,009,330	m2	C.5.01	0.000	126.2	$ 0.00	$ 4,531	$ 0.09	$ 91,768	$ 0.05	$ 55,011	$ 0.00	515	$ 670	$ -	$ -	$ 0.15	$151,981		
Secondary & Original Impoundment Tailings Cover																										$22,910,177	
	2	4	1	1	600	Upgrade Roads	Upgrade road from tailings area to waste rock source	935	m	C.2.28	0.225	210.4	$ 8.24	$ 7,700	$ -	$ -	$ 29.67	$ 27,745	$ 19.48	14,012	$ 18,216	$ -	$ -	$ 57.39	$53,661		
	2	4	1	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,804	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	4	2	1	430	Cover Tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	451,150	m3	R.109	0.016	7382.5	$ 0.60	$ 270,198	$ -	$ -	$ 2.26	$ 1,018,764	$ 1.55	536,723	$ 697,740	$ -	$ -	$ 4.40	$1,986,703		360.92
	2	4	2	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	451,150	m3	R.106	0.021	9305.0	$ 0.75	$ 340,562	$ -	$ -	$ 1.51	$ 681,087	$ 0.67	231,443	$ 300,876	$ -	$ -	$ 2.93	$1,322,525		
	2	4	2	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,353,450	m3	R.110	0.039	53292.1	$ 1.44	$ 1,950,491	$ -	$ -	$ 5.43	$ 7,354,205	$ 3.72	3,874,472	$ 5,036,813	$ -	$ -	$ 10.60	$14,341,509		
	2	4	2	4	430		Till (1.5m): Use small equipment to place on tailings	1,353,450	m3	R.108	0.026	35528.1	$ 0.96	$ 1,300,327	$ -	$ -	$ 1.92	$ 2,600,515	$ 0.85	883,692	$ 1,148,800	$ -	$ -	$ 3.73	$5,049,642		
	2	4	3	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	902,300	m2	C.5.01	0.000	112.8	$ 0.00	$ 4,051	$ 0.09	$ 82,037	$ 0.05	$ 49,178	$ 0.00	461	$ 599	$ -	$ -	$ 0.15	$135,865		
Slurry Thickener Allowance																										$358,874	
	2	5	1	1	610	Construct slurry thickener	Slurry Thickener	1	ls	C.7.19	1178.571	1178.6	$ 67,021.43	$ 67,021	$ 118,600.00	$ 118,600	$ 3,469.24	$ 3,469	$ 2,349.29	1,807	$ 2,349	$ -	$ -	$ 191,439.96	$191,440		
	2	5	1	2	610		Slurry Thickener O/F Pump Box	2	ea.	C.7.20	300.000	600.0	$ 15,665.71	$ 31,331	$ 50,000.00	$ 100,000	$ 642.79	$ 1,286	$ 408.57	629	$ 817	$ -	$ -	$ 66,717.07	$133,434		
	2	5	1	3	610		Slurry Thickener O/F Pump	2	ea.	C.7.21	40.000	80.0	$ 2,000.00	$ 4,000	$ 15,000.00	$ 30,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 17,000.00	$34,000		
Tailing cleanups and pipline repair allowance																										$34,146	
	2	6	1	1	430	Assume 1 pipeline failure per year	Excavate, haul, dump spilled tailings to tailings impoundment	4085	m3	C.2.31	0.067	272.3	$ 2.44	$ 9,967	$ -	$ -	$ 2.48	$ 10,127	$ 1.87	5,870	$ 7,631	$ -	$ -	$ 6.79	$27,726		qnay= 1hr of slurry spilled at max flow rate x # of seasons
	2	6	1	2	600		Repair pipeline	25	m	C.3.14	0.300	7.5	$ 16.66	$ 417	$ 237.06	$ 5,927	$ 1.40	$ 35	$ 1.67	32	$ 42	$ -	$ -	$ 256.79	$6,420		5m of larges pipeline replaced per yr.
Allowance for short term stop in funding																										$500,000	
	2	7	1	1	600	Cost of mobilization/demobilitation		1	ls	C.7.02	9509.524	9509.5	$441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Subtotal Direct Costs - Tailings												496,641		$21,371,485		$85,379,322		$20,651,288			$13,285,005		$7,970,484			$148,657,584	
Rose Creek																											
Upgrade Upstream portion to PMF (670 m3/s)																										$9,457,560	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	265,310	m2	C.2.05	0.015	3859.1	$ 0.53	$ 141,241	$ -	$ -	$ 0.94	$ 248,079	$ 0.62	125,924	$ 163,701	$ -	$ -	$ 2.08	$553,021		
	3	1	2	1	430	Excavate channel	Bulk excavate	205,909	m3	C.2.12	0.024	4844.9	$ 0.86	$ 177,324	$ -	$ -	$ 2.00	$ 411,176	$ 0.93	147,695	$ 192,004	$ -	$ -	$ 3.79	$780,504		
	3	1	2	2	430		Pilot Channel: Soil excavation	15,014	m3	C.2.12	0.024	353.3	$ 0.86	$ 12,930	$ -	$ -	$ 2.00	$ 29,982	$ 0.93	10,770	$ 14,000	$ -	$ -	$ 3.79	$56,912		
	3	1	3	1	430	Place till layer	Till: Load, haul, dump, place	88,345	m3	R.112	0.038	3342.8	$ 1.38	$ 122,346	$ -	$ -	$ 2.96	$ 261,580	$ 1.40	94,853	$ 123,309	$ -	$ -	$ 5.74	$507,235		
	3	1	3	2	430		Till: compact with vibrating drum roller	294,483	m2	C.2.06	0.016	4711.7	$ 0.57	$ 168,680	$ -	$ -	$ 0.02	$ 6,184	$ 0.02	3,679	$ 4,782	$ -	$ -	$ 0.61	$179,647		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	5,984	m3	C.2.23	0.045	269.3	$ 1.62	$ 9,712	$ 15.72	$ 94,068	$ 2.64	$ 15,794	$ 1.36	6,278	$ 8,161	$ -	$ -	$ 21.35	$127,735		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	5,984	m3	C.2.07	0.024	143.6	$ 0.88	$ 5,256	$ -	$ -	$ 2.10	$ 12,552	$ 0.90	4,144	$ 5,387	$ -	$ -	$ 3.88	$23,195		
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	5,984	m3	R.100	0.023	134.6	$ 0.82	$ 4,928	$ -	$ -	$ 2.00	$ 11,955	$ 0.94	4,349	$ 5,653	$ -	$ -	$ 3.77	$22,536		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	3,091	m3	C.2.02	0.010	30.9	$ 0.37	$ 1,131	$ -	$ -	$ 1.61	$ 4,972	$ 1.13	2,685	$ 3,491	$ -	$ -	$ 3.10	$9,595		
	3	1	5	2	430		Gravel: load , haul, place	3,091	m3	R.113	0.039	119.2	$ 1.41	$ 4,364	$ -	$ -	$ 3.24	$ 10,014	$ 1.49	3,535	$ 4,596	$ -	$ -	$ 6.14	$18,973		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	200,958	m3	C.2.02	0.010	2009.6	$ 0.37	$ 73,551	$ -	$ -	$ 1.61	$ 323,269	$ 1.13	174,586	$ 226,962	$ -	$ -	$ 3.10	$623,781		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	200,958	m3	R.113	0.039	7751.2	$ 1.41	$ 283,695	$ -	$ -	$ 3.24	$ 651,052	$ 1.49	229,827	$ 298,776	$ -	$ -	$ 6.14	$1,233,523		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	344,604	m3	R.114	0.049	16847.3	$ 1.79	$ 616,611	$ -	$ -	$ 4.32	$ 1,487,664	$ 2.11	559,071	$ 726,793	$ -	$ -	$ 8.22	$2,831,068		
	3	1	8	1	430	Place rip-rap	Rip-rap: Screen and stockpile (from locally blasted material)	103,074	m3	C.2.25	0.057	5889.9	$ 2.09	$ 215,572	$ -	$ -	$ 9.19	$ 947,479	$ 6.45	511,700	$ 665,210	$ -	$ -	$ 17.74	$1,828,261		
	3	1	8	2	430		Rip-rap: Load, haul, dump	103,074	m3	R.100	0.023	2319.2	$ 0.82	$ 84,881	$ -	$ -	$ 2.00	$ 205,929	$ 0.94	74,906	$ 97,378	$ -	$ -	$ 3.77	$388,188		
	3	1	8	3	430		Rip-rap: Place and secure	103,074	m3	C.2.26	0.013	1288.4	$ 0.46	$ 47,156	$ -	$ -	$ 0.89	$ 91,673	$ 0.47	37,186	$ 48,342	$ -	$ -	$ 1.82	$187,172		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	6,615	m3	C.2.12	0.024	155.6	$ 0.86	$ 5,697	$ -	$ -	$ 2.00	$ 13,209	$ 0.93	4,745	$ 6,168	$ -	$ -	$ 3.79	$25,074		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	6,615	m3	C.2.02	0.010	66.2	$ 0.37	$ 2,421	$ -	$ -	$ 1.61	$ 10,641	$ 1.13	5,747	$ 7,471	$ -	$ -	$ 3.10	$20,533		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	6,615	m3	R.113	0.039	255.2	$ 1.41	$ 9,338	$ -	$ -	$ 3.24	$ 21,431	$ 1.49	7,565	$ 9,835	$ -	$ -	$ 6.14	$40,604		
Restore Lower Portion Rose Creek																										$333,591	
	3	2	1	1	600	Maintain entire RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	3	2	2	1	430	Redirect flow into thalweg	Breach RCDC downstream of Secondary Dam	41,052	m3	C.2.12	0.024	965.9	$ 0.86	$ 35,353	$ -	$ -	$ 2.00	$ 81,976	$ 0.93	29,446	$ 38,280	$ -	$ -	$ 3.79	$155,609		
	3	2	2	2	430		Breach diversions where stream enter from south	30,000	m3	C.2.12	0.024	705.9	$ 0.86	$ 25,835	$ -	$ -	$ 2.00	$ 59,906	$ 0.93	21,519	$ 27,974	$ -	$ -	$ 3.79	$113,716		
	3	2	2	3	430		Regrade channel and dykes to create stable slopes	65	hrs	C.2.22	1.000	64.8	$ 36.60	$ 2,373	$ -	$ -	$ 173.28	$ 11,234	$ 149.18	7,440	$ 9,672	$ -	$ -	$ 359.06	$23,278		
	3	2	3	1	430	Fish habitat enhancement	Install riffles along restored channel	1,000	m3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
	3	2	3	2	430		Excavate pools	5,500	m3	C.2.12	0.024	129.4	$ 0.86	$ 4,736	$ -	$ -	$ 2.00	$ 10,983	$ 0.93	3,945	$ 5,129	$ -	$ -	$ 3.79	$20,848		
	3	2	4	1	600	Reclamation	Plant willows along restored stream channel	25,980	m2	C.5.04	0.004	103.9	$ 0.14	$ 3,637	$ 0.40	$ 10,392	$ 0.05	$ 1,355	$ 0.04	743	$ 966	$ -	$ -	$ 0.63	$16,350		
North Fork Rock Drain																										$1,667,594	
	3	3	1	1	430	Construct Ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,646	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	3	1	2	430		Grade Road	15,000	m2	C.2.18	0.002	32.6	$ 0.08	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	3	2	1	430	Breach Drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,426	$ -	$ -	$ 1.65	$ 763,943	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		
	3	3	3	1	430	Create Channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	3	3	2	520		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	446	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	3	3	3	430		Bedding Layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	3	3	4	430		Bedding Layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.04	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	3	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	3	3	7	430		Load Haul and Dump Rip-Rap	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	3	3	8	430		Place and secure Rip-Rap	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	3	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Reconstruction of Rose Creek Allowance																										$210,942	
	3	4	1	1	600	Access roads	Prepare access roads	500	m	C.2.27	0.131	65.6	$ 4.80	$ 2,402	$ -	$ -	$ 10.14	$ 5,072	$ 5.33	2,048	$ 2,663	$ -	$ -	$ 20.27	$10,136		
	3	4	2	1	610	Construct cofferdam	Cofferdam foundation preparation	500	m2	C.2.17	0.318	159.1	$ 13.47	$ 6,736	$ -	$ -	$ 17.95	$ 8,973	$ 8.86	3,409	$ 4,432	$ -	$ -	$ 40.28	$20,142		
	3	4	2	2	610		Install main cofferdam	1600	m3	R.112	0.038	60.5	$ 1.38	$ 2,216	$ -	$ -	$ 2.96	$ 4,737	$ 1.40	1,718	$ 2,233	$ -	$ -	$ 5.74	$9,186		
	3	4	2	3	610		Seepage collection ditch and berm	2000	m3	R.112	0.038	75.7	$ 1.38	$ 2,770	$ -	$ -	$ 2.96	$ 5,922	$ 1.40	2,147	$ 2,792	$ -	$ -	$ 5.74	$11,483		
	3	4	2	4	610		Supply and operate pumps for removing seepage	14	days	C.3.11	2.410	33.7	$ 84.34	$ 1,181	$ -	$ -	$ 130.72	$ 1,830	$ 40.72	439	$ 570	$ -	$ -	$ 255.78	$3,581		
	3	4	3	1	610	Channel construction	Excavate Channel	2100	m3	C.2.12	0.024	49.4	$ 0.86	$ 1,808	$ -	$ -	$ 2.00	$ 4,193	$ 0.93	1,506	$ 1,958	$ -	$ -	$ 3.79	$7,960		

3	4	3	2	610		Over excavation for placement of floodplain erosion protection	1800	m3	C.2.12	0.024	42.4	0.86	1,550	-	-	2.00	3,594	0.93	1,291	1,678	-	-	3.79	$6,823	
3	4	3	3	610		Excavation for residual structure erosion protection	1300	m3	C.2.12	0.024	30.6	0.86	1,120	-	-	2.00	2,596	0.93	932	1,212	-	-	3.79	$4,928	
3	4	4	1	610	Place rip-rap	Rip-rap: Drill, blast and stockpile	2600	m3	C.2.23	0.045	117.0	1.62	4,220	15.72	40,872	2.64	6,862	1.36	2,728	3,546	-	-	21.35	$55,500	
3	4	4	2	610		Rip-rap (angular, high quality): Screen and stockpile	2600	m3	C.2.25	0.057	148.6	2.09	5,438	-	-	9.19	23,900	6.45	12,907	16,780	-	-	17.74	$46,117	
3	4	4	3	610		Rip-rap: Load, haul, dump	2600	m3	R.102	0.032	83.2	1.17	3,045	-	-	2.74	7,122	1.24	2,475	3,218	-	-	5.15	$13,385	
3	4	4	4	610		Rip-rap: Place and secure	2600	m3	C.2.26	0.013	32.5	0.46	1,190	-	-	0.89	2,312	0.47	938	1,219	-	-	1.82	$4,721	
3	4	5	1	610	Place gravel substrate	Gravel: Screen and stockpile	500	m3	C.2.02	0.010	5.0	0.37	183	-	-	1.61	804	1.13	434	565	-	-	3.10	$1,552	
3	4	5	2	610		Gravel: Load, haul, dump and place	500	m3	R.113	0.039	19.3	1.41	706	-	-	3.24	1,620	1.49	572	743	-	-	6.14	$3,069	
3	4	6	1	610	Removal of cofferdam	Excavate material and spoil locally	1600	m3	C.2.12	0.024	37.6	0.86	1,378	-	-	2.00	3,195	0.93	1,148	1,492	-	-	3.79	$6,065	
3	4	7	1	610	Revegetation of riparian area	Revegetation	10000	m2	C.5.04	0.004	40.0	0.14	1,400	0.40	4,000	0.05	521	0.04	286	372	-	-	0.63	$6,293	
Subtotal Direct Costs - Rose Creek											**63,884**		**$2,334,739**		**$163,215**		**$5,881,914**			**$3,289,818**		**$0**			**$11,669,687**
Groundwater																									
Collect groundwater below CVD																									$1,457,234
4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	102.13	14,299	-	-	100.85	14,119	22.08	2,378	3,091	-	-	225.07	$31,509	
4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	7.66	1,072	232.60	32,564	7.56	1,059	1.66	178	232	-	-	249.48	$34,927	
4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	600.00	4,200	6,842.00	47,894	-	-	-	0	-	-	-	7,442.00	$52,094	
4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	1,300.00	9,100	445.00	3,115	-	-	-	0	-	-	-	1,745.00	$12,215	
4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	0.49	98	-	-	0.95	190	0.50	77	100	-	-	1.94	$387	
4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	746.40	746	1,344.68	1,345	72.47	72	62.92	48	63	-	-	2,226.47	$2,226	
4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	1.08	216	-	-	0.74	148	0.40	61	79	-	-	2.22	$443	
4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	600.00	600	1,829.00	1,829	-	-	-	0	-	-	-	2,429.00	$2,429	
4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	0.73	22,838	-	-	1.42	44,399	0.75	18,010	23,412	-	-	2.91	$90,649	
4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	8.75	45,500	155.84	810,368	-	-	-	0	-	-	-	164.59	$855,868	
4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	0.37	742	-	-	1.61	3,262	1.13	1,762	2,290	-	-	3.10	$6,295	
4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	1.17	2,375	-	-	2.74	5,555	1.24	1,931	2,510	-	-	5.15	$10,440	
4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	1.08	31,564	-	-	0.74	21,522	0.40	8,875	11,538	-	-	2.22	$64,624	
4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	12.50	65,000	21.32	110,864	-	-	-	0	-	-	-	33.82	$175,864	
4	1	4	2	510		Supply/Install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	230.00	920	396.84	1,587	-	-	-	0	-	-	-	626.84	$2,507	
4	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	57.50	58	1,025.00	1,025	-	-	-	0	-	-	-	1,082.50	$1,083	
4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	297.88	11,617	325.96	12,712	85.85	3,348	28.17	845	1,099	-	-	737.86	$28,776	
4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	2.21	6,638	1.41	4,230	0.45	1,360	0.15	343	446	-	-	4.22	$12,674	
4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	1,383.00	5,532	8,934.00	35,736	224.98	900	143.00	440	572	-	-	10,684.98	$42,740	
4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	102.13	6,128	-	-	100.85	6,051	22.08	1,019	1,325	-	-	225.07	$13,504	
4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	7.66	460	232.60	13,956	7.56	454	1.66	76	99	-	-	249.48	$14,969	
4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	48.80	146	164.54	494	100.85	303	22.08	51	66	-	-	336.27	$1,009	
Collect groundwater below Secondary Dam																									$521,892
4	2	2	1	500	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	102.13	10,213	-	-	100.85	10,085	22.08	1,698	2,208	-	-	225.07	$22,507	
4	2	2	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	7.66	766	232.60	23,260	7.56	756	1.66	127	166	-	-	249.48	$24,948	
4	2	2	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	600.00	3,000	6,842.00	34,210	-	-	-	0	-	-	-	7,442.00	$37,210	
4	2	2	4	500		Install protective housing (shack)	100	ea.	C.3.13	20.000	2000.0	1,300.00	130,000	445.00	44,500	-	-	-	0	-	-	-	1,745.00	$174,500	
4	2	1	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	0.49	98	-	-	0.95	190	0.50	77	100	-	-	1.94	$387	
4	2	1	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	746.40	746	1,344.68	1,345	72.47	72	62.92	48	63	-	-	2,226.47	$2,226	
4	2	1	3	430		Backfill and compact around manhole	200	ea.	C.2.01	0.030	6.0	1.08	216	-	-	0.74	148	0.40	61	79	-	-	2.22	$443	
4	2	1	4	500		Install primary pump	1	m	C.3.10	12.000	12.0	600.00	600	1,829.00	1,829	-	-	-	0	-	-	-	2,429.00	$2,429	
4	2	3	1	610	Piping to CVD collection system	Excavate piping trench	5,400	m3	C.2.12	0.024	127.1	0.86	4,650	-	-	2.00	10,783	0.93	3,873	5,035	-	-	3.79	$20,469	
4	2	3	2	510		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	8.75	7,875	155.84	140,256	-	-	-	0	-	-	-	164.59	$148,131	
4	2	3	4	430		Bedding layer: Produce, screen and stockpile	351	m3	C.2.02	0.010	3.5	0.37	128	-	-	1.61	565	1.13	305	396	-	-	3.10	$1,090	
4	2	3	5	430		Bedding layer: Load, haul, place and compact	351	m3	R.102	0.032	11.2	1.17	411	-	-	2.74	961	1.24	334	434	-	-	5.15	$1,807	
4	2	3	6	430		Backfill ditches	4,500	m3	C.2.01	0.030	135.0	1.08	4,869	-	-	0.74	3,320	0.40	1,369	1,780	-	-	2.22	$9,969	
4	2	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	12.50	11,250	21.32	19,188	-	-	-	0	-	-	-	33.82	$30,438	
4	2	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	230.00	230	396.84	397	-	-	-	0	-	-	-	626.84	$627	
4	2	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	12	ea.	C.4.03	4.545	54.5	297.88	3,575	325.96	3,912	85.85	1,030	28.17	260	338	-	-	737.86	$8,854	
4	2	5	2	510		Supply/Install overhead conductor	900	m	C.4.02	0.032	28.8	2.21	1,992	1.41	1,269	0.45	408	0.15	103	134	-	-	4.22	$3,802	
4	2	5	3	510		Supply/Install transformers	3	ea.	C.4.04	20.000	60.0	1,383.00	4,149	8,934.00	26,802	224.98	675	143.00	330	429	-	-	10,684.98	$32,055	
Adaptive Management Phase 1																									$506,549
4	3	1	1	500	Install shallow extraction wells	Construct Access Roads	1153	m	C.2.27	0.131	151.3	4.80	5,539	-	-	10.14	11,695	5.33	4,724	6,141	-	-	20.27	$23,374	
4	3	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	60	m	C.2.09	2.000	120.0	102.13	6,128	-	-	100.85	6,051	22.08	1,019	1,325	-	-	225.07	$13,504	
4	3	1	3	500		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	7.66	460	232.60	13,956	7.56	454	1.66	76	99	-	-	249.48	$14,969	
4	3	1	4	500		Install 6" Submersible Pump with controls	6	ea.	C.3.07	12.000	72.0	600.00	3,600	6,842.00	41,052	-	-	-	0	-	-	-	7,442.00	$44,652	
4	3	1	5	500		Install protective housing (shack)	6	ea.	C.3.13	20.000	120.0	1,300.00	7,800	445.00	2,670	-	-	-	0	-	-	-	1,745.00	$10,470	
4	3	2	1	430	Install piping to CVD collection system	Excavate piping trench	6,918	m3	C.2.13	0.020	138.4	0.73	5,064	-	-	1.42	9,845	0.75	3,993	5,191	-	-	2.91	$20,100	
4	3	2	2	510		Supply and install insulated 150mm HDPE pipe	1,153	m	C.3.03	0.250	288.3	8.75	10,089	155.84	179,684	-	-	-	0	-	-	-	164.59	$189,772	
4	3	2	3	430		Bedding layer: Produce, screen and stockpile	450	m3	C.2.02	0.010	4.5	0.37	165	-	-	1.61	723	1.13	391	508	-	-	3.10	$1,396	
4	3	2	4	430		Bedding Layer: Load, haul, place and compact	450	m3	R.103	0.029	13.1	1.07	479	-	-	2.45	1,100	1.12	388	505	-	-	4.63	$2,084	
4	3	2	5	430		Backfill and compact ditches	6,468	m3	C.2.01	0.030	194.0	1.08	6,999	-	-	0.74	4,772	0.40	1,968	2,558	-	-	2.22	$14,329	
4	3	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	1,153	m	C.3.04	0.250	288.3	12.50	14,413	21.32	24,582	-	-	-	0	-	-	-	33.82	$38,994	
4	3	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	60	ea.	C.3.05	4.000	240.0	230.00	13,800	396.84	23,810	-	-	-	0	-	-	-	626.84	$37,610	
4	3	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	15	ea.	C.4.03	4.545	68.2	297.88	4,468	325.96	4,889	85.85	1,288	28.17	325	423	-	-	737.86	$11,068	
4	3	3	2	500		Supply/Install overhead conductor	1,153	m	C.4.02	0.032	36.9	2.21	2,551	1.41	1,626	0.45	523	0.15	132	171	-	-	4.22	$4,871	
4	3	3	3	500		Supply/Install transformers	6	ea.	C.4.04	20.000	120.0	1,383.00	8,298	8,934.00	53,604	224.98	1,350	143.00	660	858	-	-	10,684.98	$64,110	
4	3	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	30	m	C.2.09	2.000	60.0	102.13	3,064	-	-	100.85	3,026	22.08	510	662	-	-	225.07	$6,752	
4	3	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	7.66	230	232.60	6,978	7.56	227	1.66	38	50	-	-	249.48	$7,484	
4	3	4	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	48.80	146	164.54	494	100.85	303	22.08	51	66	-	-	336.27	$1,009	
Adaptive Management Phase 2																									$220,217
4	4	1	1	500	Install shallow extraction wells	Construct Access Roads	577	m	C.2.27	0.131	75.7	4.80	2,769	-	-	10.14	5,847	5.33	2,362	3,070	-	-	20.27	$11,687	
4	4	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	20	m	C.2.09	2.000	40.0	102.13	2,043	-	-	100.85	2,017	22.08	340	442	-	-	225.07	$4,501	
4	4	1	3	500		Install 6" stainless steel well casing & screen	20	m	C.3.17	0.150	3.0	7.66	153	232.60	4,652	7.56	151	1.66	25	33	-	-	249.48	$4,990	
4	4	1	4	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	600.00	1,200	6,842.00	13,684	-	-	-	0	-	-	-	7,442.00	$14,884	
4	4	1	5	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	1,300.00	2,600	445.00	890	-	-	-	0	-	-	-	1,745.00	$3,490	
4	4	2	1	430	Install piping to CVD collection system	Excavate piping trench	3,459	m3	C.2.13	0.020	69.2	0.73	2,532	-	-	1.42	4,922	0.75	1,997	2,596	-	-	2.91	$10,050	
4	4	2	2	510		Supply and install insulated 150mm HDPE pipe	577	m	C.3.03	0.250	144.1	8.75	5,044	155.84	89,842	-	-	-	0	-	-	-	164.59	$94,886	
4	4	2	3	430		Bedding layer: Produce, screen and stockpile	225	m3	C.2.02	0.010	2.2	0.37	82	-	-	1.61	362	1.13	195	254	-	-	3.10	$698	
4	4	2	4	430		Bedding Layer: Load, haul, place and compact	225	m3	R.103	0.029	6.5	1.07	240	-	-	2.45	550	1.12	194	252	-	-	4.63	$1,042	
4	4	2	5	430		Backfill and compact ditches	3,234	m3	C.2.01	0.030	97.0	1.08	3,499	-	-	0.74	2,386	0.40	984	1,279	-	-	2.22	$7,165	
4	4	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	577	m	C.3.04	0.250	144.1	12.50	7,206	21.32	12,291	-	-	-	0	-	-	-	33.82	$19,497	
4	4	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	20	ea.	C.3.05	4.000	80.0	230.00	4,600	396.84	7,937	-	-	-	0	-	-	-	626.84	$12,537	
4	4	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	8	ea.	C.4.03	4.545	36.4	297.88	2,383	325.96	2,608	85.85	687	28.17	173	225	-	-	737.86	$5,903	
4	4	3	2	500		Supply/Install overhead conductor	577	m	C.4.02	0.032	18.4	2.21	1,276	1.41	813	0.45	261	0.15	66	86	-	-	4.22	$2,436	
4	4	3	3	500		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	1,383.00	2,766	8,934.00	17,868	224.98	450	143.00	220	286	-	-	10,684.98	$21,370	
4	4	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	102.13	1,021	-	-	100.85	1,009	22.08	170	221	-	-	225.07	$2,251	
4	4	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	7.66	77	232.60	2,326	7.56	76	1.66	13	17	-	-	249.48	$2,495	
4	4	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	48.80	49	164.54	165	100.85	101	22.08	17	22	-	-	336.27	$336	
Adaptive Management Phase 3																									$97,165
4	5	1	1	500	Install shallow extraction wells	Construct Access Roads	231	m	C.2.27	0.131	30.3	4.80	1,108	-	-	10.14	2,339	5.33	945	1,228	-	-	20.27	$4,675	
4	5	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	102.13	1,021	-	-	100.85	1,009	22.08	170	221	-	-	225.07	$2,251	
4	5	1	3	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	7.66	77	232.60	2,326	7.56	76	1.66	13	17	-	-	249.48	$2,495	
4	5	1	4	500		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	600.00	600	6,842.00	6,842	-	-	-	0	-	-	-	7,442.00	$7,442	
4	5	1	5	500		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	1,300.00	1,300	445.00	445	-	-	-	0	-	-	-	1,745.00	$1,745	
4	5	2	1	430	Install piping to CVD collection system	Excavate piping trench	1,384	m3	C.2.13	0.020	27.7	0.73	1,013	-	-	1.42	1,969	0.75	799	1,038	-	-	2.91	$4,020	
4	5	2	2	510		Supply and install insulated 150mm HDPE pipe	231	m	C.3.03	0.250	57.7	8.75	2,018	155.84	35,937	-	-	-	0	-	-	-	164.59	$37,954	
4	5	2	3	430		Bedding layer: Produce, screen and stockpile	90	m3	C.2.02	0.010	0.9	0.37	33	-	-	1.61	145	1.13	78	102	-	-	3.10	$279	
4	5	2	4	430		Bedding Layer: Load, haul, place and compact	90	m3	R.103	0.029	2.6	1.07	96	-	-	2.45	220	1.12	78	101	-	-	4.63	$417	
4	5	2	5	430		Backfill and compact ditches	1,294	m3	C.2.01	0.030	38.8	1.08	1,400	-	-	0.74	954	0.40	394	512	-	-	2.22	$2,866	
4	5	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	231	m	C.3.04	0.250	57.7	12.50	2,883	21.32	4,916	-	-	-	0	-	-	-	33.82	$7,799	
4	5	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	10	ea.	C.3.05	4.000	40.0	230.00	2,300	396.84	3,968	-	-	-	0	-	-	-	626.84	$6,268	
4	5	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	3	ea.	C.4.03	4.545	13.6	297.88	894	325.96	978	85.85	258	28.17	65	85	-	-	737.86	$2,214	
4	5	3	2	500		Supply/Install overhead conductor	231	m	C.4.02	0.032	7.4	2.21	510	1.41	325	0.45	105	0.15	26	34	-	-	4.22	$974	
4	5	3	3	500		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	1,383.00	1,383	8,934.00	8,934	224.98	225	143.00	110	143	-	-	10,684.98	$10,685	
4	5	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	102.13	1,021	-	-	100.85	1,009	22.08	170	221	-	-	225.07	$2,251	
4	5	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	7.66	77	232.60	2,326	7.56	76	1.66	13	17	-	-	249.48	$2,495	
4	5	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	48.80	49	164.54	165	100.85	101	22.08	17	22	-	-	336.27	$336	
Subtotal Direct Costs - Groundwater											**11,584**		**$565,233**		**$1,948,267**		**$200,392**		**68,587**	**$89,164**		**$0**			**$2,803,056**
Miscellaneous																									
Reclaim unnecessary roads																									$2,143
6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	0.08	477	-	-	0.09	525	0.09	393	510	-	-	0.25	$1,513	
6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	0.00	27	0.05	273	0.05	327	0.00	3	4	-	-	0.11	$631	
Subtotal Direct Costs - Miscellaneous											**14**		**$504**		**$273**		**$852**		**396**	**$514**		**$0**			**$2,143**
Subtotal Direct Costs																									
					Subtotal direct costs						**668,181**		**$28,690,332**		**$87,588,186**		**$30,241,358**		**1,733,988**	**$18,829,007**		**$7,970,484**			**$173,319,367**
CLOSURE COSTS - INDIRECT																									
100	100	1	1		Project Management	5.0% of direct costs															$ 173,319,367	x	5.0%		$8,665,968
100	100	2	1		Field Supervision	(included in major tasks)																			$0
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 173,319,367	x	10.0%		$17,331,937
100	100	4	1		Insurance	0.5% of direct costs															$ 173,319,367	x	0.5%		$866,597
100	100	5	1		Bonding	0.5% of direct costs															$ 173,319,367	x	0.5%		$866,597
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 173,319,367	x	10.0%		$17,331,937
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0
Subtotal Indirect Costs																									
					Subtotal indirect costs																				**$45,563,036**
CLOSURE COSTS - CONTINGENCY																									
					Contingency	20% of direct costs															$173,319,367	x	20.0%		**$34,663,873**

CLOSURE COSTS - TOTAL		
Total direct and indirect costs	**$253,546,276**	

Tailings Alternative 4 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Breach Cross Valley Dam																										$1,504,774	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	2	1	430	Remove Impounded Sludge	Excavate and create berms for use as sludge cell on top of tailings	1,445	m3	C.2.12	0.024	34.0	$ 0.86	$ 1,244	$ -	$ -	$ 2.00	$ 2,885	$ 0.93	1,036	$ 1,347	$ -	$ -	$ 3.79	$5,477		
	1	1	2	2	430		Load, haul and place sludge material	1,600	m3	R.093	0.040	64.0	$ 1.46	$ 2,342	$ -	$ -	$ 3.91	$ 6,263	$ 1.92	2,357	$ 3,064	$ -	$ -	$ 7.29	$11,670		1CD003.45_SludgeManagement
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	302,786	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	5,000	m2	C.2.05	0.015	72.7	$ 0.53	$ 2,662	$ -	$ -	$ 0.94	$ 4,675	$ 0.62	2,373	$ 3,085	$ -	$ -	$ 2.08	$10,422		
	1	1	4	2	430		prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	2	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Intermediate Dam																										$2,444,243	1CD003.59_Rose_Creek_Dam_Upgrades
	1	2	1	1	430	Ground densification	Gravel: supply and stockpile locally	6,493	m3	C.2.02	0.010	64.9	$ 0.37	$ 2,376	$ -	$ -	$ 1.61	$ 10,444	$ 1.13	5,641	$ 7,333	$ -	$ -	$ 3.10	$20,153		
	1	2	1	2	430		Gravel: load, haul, dump	6,493	m3	R.097	0.028	178.5	$ 1.01	$ 6,535	$ -	$ -	$ 2.34	$ 15,175	$ 1.09	5,463	$ 7,101	$ -	$ -	$ 4.44	$28,811		
	1	2	1	2	510		Drill vibro-replacement stone columns	74,400	m3	C.9.01	0.267	19840.0	$ 12.55	$ 933,472	$ -	$ -	$ 6.80	$ 506,230	$ 4.37	250,175	$ 325,227	$ -	$ -	$ 23.72	$1,764,929		
	1	2	1	2	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	2	2	1	430	Construct berm at toe	Excavate, load, haul and place material from Cross Valley Dam	150,000	m3	R.094	0.020	2960.5	$ 0.72	$ 108,355	$ -	$ -	$ 2.07	$ 310,072	$ 1.06	122,687	$ 159,493	$ -	$ -	$ 3.85	$577,921		
	1	2	3	1	600	Install pond level control	Install pumping system to manage pond levels	1	ls	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	2	3	2	600		Modify spillway - lower or add stop logs (completed during C&M)	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	2	4	1	600	Construct channel - spillway to Rose Cr.	Completed during care and maintenance	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Secondary Dam																										$701,682	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, place	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												37,942		$1,707,141		$2,529		$1,838,975		847,734	$1,102,054		$0			$4,650,700	
Tailings																											
Intermediate Tailings																										$146,012	
	2	1	2	1	600	Annually treat water	Pump pond water to Faro Pit or water treatment facility	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		Annual cost included in Post Closure Costs
	2	1	3	1	600	Apply Surface dust suppresant	Purchase and apply	1,009,330	m2	C.4.01	0.002	2018.7	$ 0.07	$ 70,653	$ 0.03	$ 30,280	$ 0.03	$ 26,315	$ 0.02	14,433	$ 18,763	$ -	$ -	$ 0.14	$146,012		Annual cost included in Post Closure Costs
Secondary & Original Impoundment Tailings																										$130,528	
	2	2	1	1	600	Apply Surface dust suppresant	Purchase and apply	902,300	m2	C.4.01	0.002	1804.6	$ 0.07	$ 63,161	$ 0.03	$ 27,069	$ 0.03	$ 23,525	$ 0.02	12,903	$ 16,774	$ -	$ -	$ 0.14	$130,528		
Construct Perimeter Fence																										$904,219	
	2	3	1	1	600	Supply and install fence around tailing perim	7' Galvanized Chain-link Fence	7,900	m	C.4.05	0.175	1382.5	$ 6.13	$ 48,388	$ 106.10	$ 838,190	$ 1.30	$ 10,298	$ 0.93	5,649	$ 7,343	$ -	$ -	$ 114.46	$904,219		
Subtotal Direct Costs - Tailings												5,206		$182,202		$895,539		$60,138		32,985	$42,880		$0			$1,180,759	
Rose Creek Diversion Channel																											
Upgrade to PMF (670m3/s)																										$11,441,497	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	272,961	m2	C.2.05	0.015	3970.3	$ 0.53	$ 145,315	$ -	$ -	$ 0.94	$ 255,233	$ 0.62	129,555	$ 168,422	$ -	$ -	$ 2.08	$568,969		
	3	1	2	1	430	Excavate channel	Bulk excavate	240,586	m3	C.2.12	0.024	5660.8	$ 0.86	$ 207,187	$ -	$ -	$ 2.00	$ 480,422	$ 0.93	172,569	$ 224,339	$ -	$ -	$ 3.79	$911,948		
	3	1	2	2	430		Pilot Channel: Soil excavation	26,600	m3	C.2.12	0.024	625.9	$ 0.86	$ 22,907	$ -	$ -	$ 2.00	$ 53,117	$ 0.93	19,080	$ 24,804	$ -	$ -	$ 3.79	$100,828		
	3	1	3	1	430	Place till layer	Till: Load, haul, dump, place	94,885	m3	R.112	0.038	3590.2	$ 1.38	$ 131,403	$ -	$ -	$ 2.96	$ 280,945	$ 1.40	101,875	$ 132,437	$ -	$ -	$ 5.74	$544,784		
	3	1	3	2	430		Till: compact with vibrating drum roller	316,283	m2	C.2.06	0.016	5060.5	$ 0.57	$ 181,167	$ -	$ -	$ 0.02	$ 6,642	$ 0.02	3,951	$ 5,136	$ -	$ -	$ 0.61	$192,946		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	7,503	m3	C.2.23	0.045	337.6	$ 1.62	$ 12,177	$ 15.72	$ 117,947	$ 2.64	$ 19,803	$ 1.36	7,871	$ 10,233	$ -	$ -	$ 21.35	$160,160		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	7,503	m3	C.2.07	0.024	180.1	$ 0.88	$ 6,591	$ -	$ -	$ 2.10	$ 15,738	$ 0.90	5,196	$ 6,755	$ -	$ -	$ 3.88	$29,083		
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	7,503	m3	R.100	0.023	168.8	$ 0.82	$ 6,179	$ -	$ -	$ 2.00	$ 14,990	$ 0.94	5,453	$ 7,088	$ -	$ -	$ 3.77	$28,257		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	11,560	m3	C.2.02	0.010	115.6	$ 0.37	$ 4,231	$ -	$ -	$ 1.61	$ 18,596	$ 1.13	10,043	$ 13,056	$ -	$ -	$ 3.10	$35,883		
	3	1	5	2	430		Gravel: load , haul, place	11,560	m3	R.113	0.039	445.9	$ 1.41	$ 16,319	$ -	$ -	$ 3.24	$ 37,451	$ 1.49	13,221	$ 17,187	$ -	$ -	$ 6.14	$70,958		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	207,668	m3	C.2.02	0.010	2076.7	$ 0.37	$ 76,006	$ -	$ -	$ 1.61	$ 334,063	$ 1.13	180,416	$ 234,540	$ -	$ -	$ 3.10	$644,609		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	207,668	m3	R.113	0.039	8010.1	$ 1.41	$ 293,168	$ -	$ -	$ 3.24	$ 672,791	$ 1.49	237,501	$ 308,752	$ -	$ -	$ 6.14	$1,274,711		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	408,099	m3	R.114	0.049	19951.5	$ 1.79	$ 730,225	$ -	$ -	$ 4.32	$ 1,761,773	$ 2.11	662,083	$ 860,708	$ -	$ -	$ 8.22	$3,352,707		
	3	1	8	1	430	Place rip-rap	Rip-Rap: Screen and stockpile (from locally blasted material)	146,730	m3	C.2.25	0.057	8384.6	$ 2.09	$ 306,875	$ -	$ -	$ 9.19	$ 1,348,774	$ 6.45	728,426	$ 946,953	$ -	$ -	$ 17.74	$2,602,603		
	3	1	8	2	430		Rip-rap: Load, haul, dump	146,730	m3	R.100	0.023	3301.4	$ 0.82	$ 120,832	$ -	$ -	$ 2.00	$ 293,148	$ 0.94	106,632	$ 138,621	$ -	$ -	$ 3.77	$552,602		
	3	1	8	3	430		Rip-rap: Place and secure	146,730	m3	C.2.26	0.013	1834.1	$ 0.46	$ 67,129	$ -	$ -	$ 0.89	$ 130,501	$ 0.47	52,936	$ 68,816	$ -	$ -	$ 1.82	$266,446		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	7,980	m3	C.2.12	0.024	187.8	$ 0.86	$ 6,872	$ -	$ -	$ 2.00	$ 15,935	$ 0.93	5,724	$ 7,441	$ -	$ -	$ 3.79	$30,248		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	7,980	m3	C.2.02	0.010	79.8	$ 0.37	$ 2,921	$ -	$ -	$ 1.61	$ 12,837	$ 1.13	6,933	$ 9,013	$ -	$ -	$ 3.10	$24,770		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	7,980	m3	R.113	0.039	307.8	$ 1.41	$ 11,265	$ -	$ -	$ 3.24	$ 25,853	$ 1.49	9,126	$ 11,864	$ -	$ -	$ 6.14	$48,983		
North Fork Rock Drain																										$1,667,594	
	3	2	1	1	430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,646	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	2	1	2	430		Grade road	15,000	m2	C.2.18	0.002	32.6	$ 0.08	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	2	2	1	430	Breach drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,426	$ -	$ -	$ 1.65	$ 763,943	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		
	3	2	3	1	430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	2	3	2	430		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	446	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	2	3	3	430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	2	3	4	430		Bedding layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.04	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	2	3	6	430		Rip-Rap (angular, high quality): Screen and Stockpile (from NFRD)	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	2	3	7	430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	2	3	8	430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	2	4	1	430	Revegetate disturbed areas	Seed/Fertilize, helicopter low application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Spillway Allowance																										$17,400,000	
	3	3	1	1	600	Construction of spillway		1	ls	C.2.30	16000.000	16000.0	$ 746,400.00	$ 746,400	$16,416,591.40	$ 16,416,591	$ 125,888.60	$ 125,889	$ 111,120.00	85,477	$ 111,120	$ -	$ -	$ 17,400,000.00	$17,400,000		NHC-BGC 2004 report (1CD003.35)
Fish By-Pass Allowance																										$900,000	
	3	4	1	1	600	Fish ladder construction	Scenario 1b from NHC report	1	ls	C.2.16	840.000	840.0	$ 34,444.00	$ 34,444	$ 825,252.41	$ 825,252	$ 26,580.99	$ 26,581	$ 13,722.60	10,556	$ 13,723	$ -	$ -	$ 900,000.00	$900,000		
Subtotal Direct Costs - Rose Creek Diversion Channel												87,628		$3,367,380		$17,373,674		$6,797,654		2,977,217	$3,870,382		$0			$31,409,090	
Groundwater Collection																											
Collect groundwater below CVD																										$1,457,234	
	4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
	4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
	4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
	4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
	4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
	4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
	4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
	4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295		
	4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
	4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624		
	4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
	4	1	4	2	510		Supply/Install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
	4	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
	4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
	4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
	4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
	4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Subtotal Direct Costs - Groundwater Collection												5,249		$229,851		$1,077,719		$102,742		36,094	$46,922		$0			$1,457,234	
Miscellaneous																											
Reclaim unnecessary roads																										$2,143	
	6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
	6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous												14		$504		$273		$852		396	$514		$0			$2,143	
Subtotal Direct Costs																											
						Subtotal direct costs						136,038		$5,487,078		$19,349,733		$8,800,361		3,894,425	$5,062,753		$0			$38,699,926	
CLOSURE COSTS - INDIRECT																											
	100	100	1	1		Project Management	5.0% of direct costs															$ 38,699,926	x	5.0%		$1,934,996	
	100	100	2	1		Field Supervision	(included in major tasks)																			$0	
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 38,699,926	x	10.0%		$3,869,993	
	100	100	4	1		Insurance	0.5% of direct costs															$ 38,699,926	x	0.5%		$193,500	
	100	100	5	1		Bonding	0.5% of direct costs															$ 38,699,926	x	0.5%		$193,500	
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 38,699,926	x	10.0%		$3,869,993	
	100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																											
						Subtotal indirect costs																				$10,561,981	
CLOSURE COSTS - CONTINGENCY																											
						Contingency	20% of direct costs															$38,699,926	x	20.0%		$7,739,985	
CLOSURE COSTS - TOTAL																											
						Total direct and indirect costs																				$57,001,892	

Tailings Area Post Closure Costs
Costs in 2006 dollars

Notes:
1 Groundwater pumping costs include maintenance on the pumps
2 Environmental management costs split evenly between the Faro Mine, Tailings Area and Vangorda/Grum Mine site.

4.1 Stabilize in Place

		Closure Period					Post-Closure Period														
	NPV 3%	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance	**$6,114,752**	$0	$0	$0	$0	$0	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$145,680	$145,680	$145,680	$145,680	$145,680
Water Management and Pumping Costs[1]																					
CVD Groundwater Collection System	$1,885,221	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Intermediate Dam Seepage Collection System	$203,963	$0	$0	$0	$0	$0	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483
Subtotal	**$2,089,184**	$0	$0	$0	$0	$0	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646
Water Treatment System Construction	**$5,190,727**	$0	$0	$0	$0	$0	$6,198,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	**$31,492,651**	$0	$0	$0	$0	$0	$0	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000
Environmental Management[2]																					
Full-Time Site Manager	$954,012	0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$681,437	0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$218,060	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$190,802	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,362,875	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$436,120	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$354,347	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,316,887	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,877,416**	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$52,764,730**	$0	$0	$0	$0	$0	$7,000,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,703,326	$1,703,326	$1,703,326	$1,703,326	$1,703,326

4.2 Complete Relocation

		Start of Closure																			
	NPV 3%	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 1	Year 2	Year 3	Year 4	Year 5
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance	**$278,871**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$27,199	$27,199	$27,199	$27,199	$27,199
Water Management and Pumping Costs[1]																					
CVD Groundwater Collection System	$1,369,999	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163
Adaptive Management Phase I	$607,124	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$30,650	$30,650	$30,650	$30,650	$30,650
Adaptive Management Phase II	$275,738	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,325	$15,325
Adaptive Management Phase III	$100,110	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal	**$2,352,972**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$99,814	$99,814	$99,814	$115,139	$115,139
Water Treatment System Construction	**$3,362,499**	$0	$0	$0	$0	$0	$4,015,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	**$12,865,345**	$0	$0	$0	$0	$0	$0	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000
Environmental Management[2]																					
Full-Time Site Manager	$686,941	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$490,672	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$490,672	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$157,015	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$137,388	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$490,672	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$981,345	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$314,030	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$255,150	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$1,691,438	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$5,750,888**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$24,610,575**	$0	$0	$0	$0	$0	$4,015,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$1,109,013	$1,109,013	$1,109,013	$1,124,338	$1,124,338

4.3 Partial Relocation

	NPV	Start of Closure Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenanc	**$2,849,705**	$0	$0	$0	$0	$0	$0	$0	$0	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$74,611	$74,611
Water Management and Pumping Costs[1]																					
CVD Groundwater Collection System	$1,710,162	$0	$0	$0	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Secondary Dam Collection System	$796,148	$0	$0	$0	$0	$0	$0	$0	$0	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198
Adaptive Management Phase I	$375,025	$0	$0	$0	$0	$0	$0	$0	$0	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167
Adaptive Management Phase II	$142,118	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318
Adaptive Management Phase III	$56,858	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,780	$2,780	$2,780	$2,780	$2,780	$2,780
Subtotal	**$3,080,310**	$0	$0	$0	$0	$0	$0	$0	$0	$116,529	$116,529	$116,529	$122,847	$122,847	$122,847	$125,627	$125,627	$125,627	$125,627	$125,627	$125,627
Water Treatment System Construction	**$3,907,702**	$0	$0	$0	$0	$0	$4,666,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	**$24,801,819**	$0	$0	$0	$0	$0	$0	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000
Environmental Management[2]																					
Full-Time Site Manager	$868,613	0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$620,438	0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$198,540	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$173,723	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,240,875	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$397,080	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$322,628	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,109,488	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,172,260**	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$41,811,796**	$0	$0	$0	$0	$0	$4,666,000	$942,000	$942,000	$1,571,362	$1,571,362	$1,571,362	$1,577,681	$1,577,681	$1,577,681	$1,580,461	$1,580,461	$1,580,461	$1,580,461	$1,431,238	$1,431,238

4.4 Minimize Up-Front Construction

	NPV	Start of Closure Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenanc	**$2,517,144**	$0	$0	$0	$0	$0	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$60,100	$60,100	$60,100	$60,100	$60,100
Tailings Dust Suppression	**$3,545,985**	$0	$0	$0	$0	$0	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528
Water Management and Pumping Costs[1]																					
CVD Groundwater Collection System	**$1,878,919**	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Water Treatment System Construction	**$5,338,125**	$0	$0	$0	$0	$0	$6,374,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	**$35,675,652**	$0	$0	$0	$0	$0	$0	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000
Environmental Management[2]																					
Full-Time Site Manager	$954,012	0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$681,437	0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$218,060	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Adminitration	$190,802	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,362,875	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$436,120	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$354,347	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,316,887	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	**$7,877,416**	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	**$56,806,908**	$0	$0	$0	$0	$0	$7,042,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$1,903,791	$1,903,791	$1,903,791	$1,903,791	$1,903,791

Summary NPV Calculations for Vangorda/Grum Area Alternatives

NPV: Vangorda/Grum Alternative 1 - Backfill Vangorda Pit

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$43,098,876	$12,655,815	$8,619,775	$64,374,466	75%
Vangorda Dump	$160,311	$47,075	$32,062	$239,448	0%
Vangorda Creek Diversion	$658,791	$193,451	$131,758	$984,001	1%
Grum Pit	$458,708	$134,698	$91,742	$685,148	1%
Grum Dump	$6,856,649	$2,013,428	$1,371,330	$10,241,408	12%
Overburden Dump	$207,299	$60,873	$41,460	$309,631	0%
Ore Transfer Pad	$1,780,568	$522,857	$356,114	$2,659,539	3%
Groundwater	$2,604,028	$764,663	$520,806	$3,889,497	5%
Vangorda Haul Road	$1,106,227	$324,839	$221,245	$1,652,312	2%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$263,778	$179,657	$1,341,719	2%
Closure Costs Subtotal	**$57,829,743**	**$16,981,477**	**$11,565,949**	**$86,377,168**	

	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	Year 9 2019	Year 10 2020	Year 11 2021	Year 12 2022	Year 13 2023	Year 14 2024	Year 15 2025
Vangorda Pit	$59,649,893	$15,449,872	$15,449,872	$15,449,872	$15,449,872	$2,574,979	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Dump	$220,656	$150,852	$0	$0	$0	$0	$88,596	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Creek Diversion	$848,808	$0	$0	$0	$0	$984,001	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grum Pit	$574,568	$0	$0	$171,287	$0	$0	$0	$513,861	$0	$0	$0	$0	$0	$0	$0	$0
Grum Dump	$8,681,346	$0	$1,741,039	$0	$0	$2,867,594	$2,867,594	$2,662,766	$0	$0	$0	$0	$0	$0	$0	$0
Overburden Dump	$251,759	$0	$0	$0	$0	$0	$0	$309,631	$0	$0	$0	$0	$0	$0	$0	$0
Ore Transfer Pad	$3,726,336	$0	$0	$3,670,164	$0	$0	$0	$452,122	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$3,520,904	$0	$0	$1,789,169	$1,478,009	$661,214	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Haul Road	$1,383,785	$0	$0	$0	$0	$0	$1,652,312	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$1,218,361	$0	$925,786	$0	$0	$0	$308,595	$107,338	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$80,076,415**	**$15,600,724**	**$18,116,697**	**$21,080,491**	**$16,927,881**	**$7,087,788**	**$4,917,097**	**$4,045,717**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																
Earthworks Inspection and Maintenance	$837,837	$0	$0	$0	$0	$0	$0	$0	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972
Water Management Pumping Costs	$3,553,526	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797
Water Treatment System Operation	$6,329,885	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management	$6,401,373	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$260,667	$260,667	$260,667
Post Closure Costs Subtotal	$17,122,620	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$692,769**	**$692,769**	**$692,769**	**$692,769**	**$692,769**	**$664,436**	**$664,436**	**$664,436**
TOTAL	**$97,199,035**	**$15,800,724**	**$18,316,697**	**$21,280,491**	**$17,127,881**	**$7,287,788**	**$5,117,097**	**$4,245,717**	**$692,769**	**$692,769**	**$692,769**	**$692,769**	**$692,769**	**$664,436**	**$664,436**	**$664,436**

NPV: Vangorda/Grum Alternative 2 - Stabilize In Place

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$922,948	$283,295	$184,590	$1,390,833	4%
Vangorda Dump	$5,586,312	$1,714,695	$1,117,262	$8,418,269	25%
Vangorda Creek Diversion	$2,590,285	$795,077	$518,057	$3,903,419	11%
Grum Pit	$455,728	$139,884	$91,146	$686,757	2%
Grum Dump	$6,924,555	$2,125,463	$1,384,911	$10,434,929	30%
Overburden Dump	$104,857	$32,185	$20,971	$158,013	0%
Ore Transfer Pad	$1,433,557	$440,024	$286,711	$2,160,293	6%
Groundwater	$2,768,861	$849,890	$553,772	$4,172,524	12%
Vangorda Haul Road	$1,098,044	$337,040	$219,609	$1,654,693	5%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$275,725	$179,657	$1,353,666	4%
Closure Costs Subtotal	**$22,783,432**	**$6,993,278**	**$4,556,686**	**$34,333,397**	

	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	Year 9 2019	Year 10 2020	Year 11 2021	Year 12 2022	Year 13 2023	Year 14 2024	Year 15 2025
Vangorda Pit	$1,343,244	$1,140,483	$250,350	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Dump	$7,940,062	$420,913	$7,828,990	$84,183	$84,183	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Creek Diversion	$3,732,330	$1,873,641	$2,029,778	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grum Pit	$601,783	$0	$0	$178,557	$0	$508,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grum Dump	$9,560,852	$1,773,938	$0	$5,582,687	$2,869,606	$208,699	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Overburden Dump	$136,304	$0	$0	$0	$0	$158,013	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ore Transfer Pad	$2,024,421	$0	$1,728,234	$432,059	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$3,705,977	$0	$0	$1,627,284	$2,211,438	$292,077	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Haul Road	$1,427,353	$0	$0	$0	$0	$1,654,693	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$1,268,807	$934,030	$0	$0	$0	$419,636	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$31,741,133**	**$6,143,005**	**$11,837,352**	**$7,904,770**	**$5,165,226**	**$3,241,318**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																
Earthworks Inspection and Maintenance	$1,320,775	$0	$0	$0	$0	$0	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057
Water Management Pumping Costs	$2,619,604	$0	$0	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140
Water Treatment System Construction	$2,666,019	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	$16,020,401	$0	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953
Environmental Management	$7,793,511	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal	$30,420,310	**$2,746,000**	**$523,953**	**$523,953**	**$523,953**	**$523,953**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**
TOTAL	**$62,161,443**	**$8,889,005**	**$12,361,306**	**$8,428,723**	**$5,689,180**	**$3,765,272**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**	**$1,005,151**

NPV: Vangorda/Grum Alternative 3 - Minimize Up-Front Construction

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$280,077	$96,527	$56,015	$432,619	3%
Vangorda Dump	$1,676,341	$577,741	$335,268	$2,589,350	20%
Vangorda Creek Diversion	$1,305,232	$449,840	$261,046	$2,016,118	16%
Grum Pit	$455,728	$157,064	$91,146	$703,937	5%
Overburden Dump	$104,857	$36,138	$20,971	$161,966	1%
Groundwater	$2,768,861	$954,272	$553,772	$4,276,906	33%
Vangorda Haul Road	$1,098,044	$378,435	$219,609	$1,696,088	13%
Miscellaneous (Demolition, contaminated soils, etc.)	$693,908	$239,151	$138,782	$1,071,841	8%
Closure Costs Subtotal	**$8,383,047**	**$2,889,168**	**$1,676,609**	**$12,948,825**	

	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	Year 9 2019	Year 10 2020	Year 11 2021	Year 12 2022	Year 13 2023	Year 14 2024	Year 15 2025
Vangorda Pit	$414,881	$250,919	$181,700	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Dump	$2,450,293	$414,296	$2,097,373	$77,680	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Creek Diversion	$1,904,946	$161,289	$1,854,829	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grum Pit	$668,704	$183,024	$520,914	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Overburden Dump	$148,222	$0	$0	$161,966	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$4,045,684	$1,667,993	$1,411,379	$1,197,534	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Haul Road	$1,552,160	$0	$0	$1,696,088	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$1,028,872	$739,570	$246,523	$85,747	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$12,213,762**	**$3,417,092**	**$6,312,718**	**$3,219,015**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																
Earthworks Inspection and Maintenance	$355,787	$0	$0	$0	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$8,026	$8,026
Water Management Pumping Costs	$2,789,706	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140
Water Treatment System Construction	$3,866,232	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation	$16,631,921	$0	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953
Environmental Management	$8,299,577	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal	$31,943,224	**$2,746,000**	**$543,953**	**$543,953**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$938,120**	**$938,120**
TOTAL	**$44,156,986**	**$6,163,092**	**$6,856,672**	**$3,762,969**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$954,171**	**$938,120**	**$938,120**

NPV: Vangorda/Grum Alternative 4 - Minimize Water Treatment

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$43,098,876	$12,593,245	$8,619,775	$64,311,896	62%
Vangorda Dump	$160,311	$46,842	$32,062	$239,216	0%
Vangorda Creek Diversion	$658,791	$192,495	$131,758	$983,044	1%
Grum Pit	$458,708	$134,032	$91,742	$684,482	1%
Grum Dump	$18,526,522	$5,413,344	$3,705,304	$27,645,170	27%
Overburden Dump	$207,299	$60,572	$41,460	$309,330	0%
Ore Transfer Pad	$1,780,568	$520,272	$356,114	$2,656,954	3%
Groundwater	$2,604,028	$760,882	$520,806	$3,885,716	4%
Vangorda Haul Road	$1,106,227	$323,233	$221,245	$1,650,706	2%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$262,474	$179,657	$1,340,415	1%
Closure Costs Subtotal	**$69,499,615**	**$20,307,390**	**$13,899,923**	**$103,706,928**	

	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	Year 9 2019	Year 10 2020	Year 11 2021	Year 12 2022	Year 13 2023	Year 14 2024	Year 15 2025
Vangorda Pit	$59,591,915	$15,434,855	$15,434,855	$15,434,855	$15,434,855	$2,572,476	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Dump	$214,141	$0	$0	$148,314	$0	$90,902	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Creek Diversion	$847,983	$0	$0	$0	$0	$983,044	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grum Pit	$574,009	$0	$0	$171,120	$0	$0	$0	$513,361	$0	$0	$0	$0	$0	$0	$0	$0
Grum Dump	$23,372,435	$1,658,710	$0	$0	$0	$7,556,346	$10,597,315	$7,832,798	$0	$0	$0	$0	$0	$0	$0	$0
Overburden Dump	$251,514	$0	$0	$0	$0	$0	$0	$309,330	$0	$0	$0	$0	$0	$0	$0	$0
Ore Transfer Pad	$2,415,201	$0	$0	$2,045,854	$611,099	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$3,520,775	$0	$1,593,144	$0	$1,942,858	$0	$349,714	$0	$0	$0	$0	$0	$0	$0	$0	$0
Vangorda Haul Road	$1,382,440	$0	$0	$0	$0	$0	$1,650,706	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$1,249,583	$0	$1,233,182	$0	$0	$0	$0	$107,233	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$93,419,995**	**$17,093,565**	**$18,261,181**	**$17,800,144**	**$17,988,813**	**$11,202,769**	**$12,597,735**	**$8,762,723**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																
Earthworks Inspection and Maintenance	$1,288,662	$0	$0	$0	$0	$0	$0	$0	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394
Water Management Pumping Costs	$3,553,526	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797
Water Treatment System Operation	$6,329,885	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management	$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal	$18,518,204	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**
TOTAL	**$111,938,200**	**$17,293,565**	**$18,461,181**	**$18,000,144**	**$18,188,813**	**$11,402,769**	**$12,797,735**	**$8,962,723**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**	**$727,191**

Vangorda/Grum Alternative 1 - Backfill Vangorda Pit

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments	
CLOSURE COSTS - DIRECT CAPITAL																												
Vangorda Pit																											1CD003.48_VangordaBackfill	
Water Management																										$430,714		
1	1	1	1	610	Pump and treat Vangorda Pit Water	Pump to existing treatment plant	2,300,000	m3	C.8.01	0.004	10132.2	$ 0.15	$ 354,626	$ 0.02	$ 53,462	$ 0.01	$ 13,208	$ 0.00	7,244	$ 9,418	$ -	$ -	$ 0.19	$430,714		(115mg/L Zn)	
Pit Ramp																										$17,744		
1	2	1	1	430	Upgrade ramp for 777 traffic	Load, haul, dump (locally) waste rock above present waterline	1,908	Bm3	R.001	0.032	61.4	$ 1.18	$ 2,246	$ -	$ -	$ 3.29	$ 6,273	$ 1.66	2,441	$ 3,173	$ -	$ -	$ 6.13	$11,693			
1	2	1	2	430		Grade ramp	24,000	m2	C.2.18	0.002	52.2	$ 0.08	$ 1,910	$ -	$ -	$ 0.09	$ 2,100	$ 0.09	1,570	$ 2,042	$ -	$ -	$ 0.25	$6,051			
Backfill Pit																										$40,877,284		
1	3	1	1	430	Backfill pit	Load, haul and place Baritic and Oxide Fines	286,000	Bm3	R.002	0.013	3595.4	$ 0.46	$ 131,593	$ -	$ -	$ 1.48	$ 422,274	$ 0.97	214,101	$ 278,331	$ -	$ -	$ 2.91	$832,198			
1	3	1	2	430		Load, haul and place high sulphide area west of the dump ramp	1,300,000	Bm3	R.003	0.013	16342.9	$ 0.46	$ 598,149	$ -	$ -	$ 1.48	$ 1,919,428	$ 0.97	973,186	$ 1,265,141	$ -	$ -	$ 2.91	$3,782,718			
1	3	1	3	430		Load, haul and place ore transfer pad material	321,260	Bm3	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		Included in Ore Transfer Pad Costs	
1	3	1	4	430		Load, haul and place Main Waste Rock Dump (over-excavate)	8,787,000	Bm3	R.002	0.013	110465.1	$ 0.46	$ 4,043,024	$ -	$ -	$ 1.48	$ 12,973,859	$ 0.97	6,577,987	$ 8,551,383	$ -	$ -	$ 2.91	$25,568,267			
1	3	1	5	430		Load, haul and place till from base of Waste Rock Dump	504,150	Bm3	R.002	0.013	6337.9	$ 0.46	$ 231,967	$ -	$ -	$ 1.48	$ 744,369	$ 0.97	377,409	$ 490,632	$ -	$ -	$ 2.91	$1,466,967			
1	3	2	1	510	Lime addition	Add lime to waste rock	12,548	tonnes	C.2.21	0.036	448.1	$ 1.59	$ 20,005	$ 320.00	$ 4,015,360	$ 1.67	$ 20,935	$ 0.98	9,446	$ 12,280	$ -	$ -	$ 324.24	$4,068,580			
1	3	2	2	510		Add lime to Baritic and Oxide Fines	4,089	tonnes	C.2.21	0.036	146.0	$ 1.59	$ 6,519	$ 320.00	$ 1,308,480	$ 1.67	$ 6,822	$ 0.98	3,078	$ 4,002	$ -	$ -	$ 324.24	$1,325,823			
1	3	2	3	010		Survey requirements (grid for testing)	22,397	hrs	P.02	1.000	22396.8	$ 35.00	$ 783,889	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$783,889			
1	3	2	4	010		Material testing (to verify lime addition dosage)	22,397	hrs	P.03	1.000	22396.8	$ 100.00	$ 2,239,682	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$2,239,682			
1	3	2	4	970	Lime addition contingency	15% contingency	2,496	tonnes	C.2.21	0.036	89.1	$ 1.59	$ 3,979	$ 320.00	$ 798,576	$ 1.67	$ 4,164	$ 0.98	1,879	$ 2,442	$ -	$ -	$ 324.24	$809,160			
Regrade waste for drainage																										$53,791		
1	4	1	1	430	Regrade	Shape to enhance runoff to ditches	150	hrs	C.2.22	1.000	149.8	$ 36.60	$ 5,483	$ -	$ -	$ 173.28	$ 25,959	$ 149.18	17,191	$ 22,349	$ -	$ -	$ 359.06	$53,791			
Cover with Low Infiltration Cover																										$1,681,950		
1	5	1	1	430	Place low infiltration cover	Load, haul, place and compact till (0.5m)	150,000	Bm3	R.005	0.014	2036.4	$ 0.50	$ 74,531	$ -	$ -	$ 1.59	$ 239,166	$ 1.05	121,262	$ 157,640	$ -	$ -	$ 3.14	$471,337			
1	5	1	2	430		Load, haul, place loose till (1.5m)	450,000	Bm3	R.006	0.010	4581.8	$ 0.37	$ 167,695	$ -	$ -	$ 1.34	$ 602,128	$ 0.88	304,321	$ 395,617	$ -	$ -	$ 2.59	$1,165,440			120
1	5	1	1	610	Vegetate WR dumps	Seed/Fertilize, helicopter high application rate	300,000	m2	C.5.01	0.000	37.5	$ 0.00	$ 1,347	$ 0.09	$ 27,276	$ 0.05	$ 16,351	$ 0.00	153	$ 199	$ -	$ -	$ 0.15	$45,173			
Safety Berms																										$37,393		
1	7	1	1	430	Construct access road	Clear access road area	1,281	m2	C.2.04	0.004	4.7	$ 0.13	$ 170	$ -	$ -	$ 0.62	$ 800	$ 0.36	358	$ 466	$ -	$ -	$ 1.12	$1,436			
1	7	1	2	220		Construct access road	427	m	C.2.27	0.131	56.0	$ 4.80	$ 2,051	$ -	$ -	$ 10.14	$ 4,331	$ 5.33	1,749	$ 2,274	$ -	$ -	$ 20.27	$8,656			
1	7	2	1	430	Place berm materials	Load, haul, dump berm material	4,150	Bm3	R.007	0.056	232.4	$ 2.05	$ 8,506	$ -	$ -	$ 1.73	$ 7,196	$ 1.56	4,985	$ 6,481	$ -	$ -	$ 5.35	$22,183			
1	7	2	2	430		Final Shaping of material with dozer	830	m	C.2.03	0.020	16.6	$ 0.73	$ 608	$ -	$ -	$ 3.43	$ 2,849	$ 2.00	1,277	$ 1,661	$ -	$ -	$ 6.17	$5,118			
Subtotal Direct Costs - Vangorda Pit												199,579		$8,677,977		$6,203,154		$17,012,213		8,619,639	$11,205,531		$0			$43,098,876		
Vangorda Dump																											1CD003.48_VangordaBackfill	
Little Creek Dam																										$84,398		
2	1	1	1	430	Breach dam	Load, haul and dump locally	22,266	Bm3	C.2.12	0.024	523.9	$ 0.86	$ 19,175	$ -	$ -	$ 2.00	$ 44,462	$ 0.93	15,971	$ 20,762	$ -	$ -	$ 3.79	$84,398		VanWasteDumpTillBerm.xls	
Revegetate Dump																										$75,913		
2	2	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$75,913			
Subtotal Direct Costs - Vangorda Dump												587		$21,438		$45,837		$71,939		16,228	$21,097		$0			$160,311		
Vangorda Creek Diversion																											Channel designed to 1:500 yr event (Design flow 31m^3/s)	
Vangorda Creek																										$658,791		
3	1	1	1	430	Excavate channel	5m wide, 2:1 side slopes	26,815	m3	C.2.10	0.032	858.1	$ 1.17	$ 31,406	$ -	$ -	$ 2.72	$ 72,823	$ 1.27	26,158	$ 34,006	$ -	$ -	$ 5.16	$138,235			
3	1	3	1	430	Place till	Till: Load, haul, dump and place	3,740	Bm3	R.015	0.034	125.7	$ 1.23	$ 4,599	$ -	$ -	$ 2.82	$ 10,555	$ 1.30	3,726	$ 4,844	$ -	$ -	$ 5.35	$19,998			
3	1	3	2	430		Till: Compact with vibrating drum roller	12,467	m2	C.2.06	0.016	199.5	$ 0.57	$ 7,141	$ -	$ -	$ 0.02	$ 262	$ 0.02	156	$ 202	$ -	$ -	$ 0.61	$7,605			16.154
3	1	2	1	430	Place geotextile	Supply and place geotextile	6,226	m2	C.4.06	0.016	99.6	$ 0.57	$ 3,526	$ 3.50	$ 21,789	$ 0.23	$ 1,421	$ 0.15	708	$ 921	$ -	$ -	$ 4.44	$27,657		(or bitumen?)	
3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,830	Bm3	C.2.23	0.045	442.4	$ 1.62	$ 15,954	$ 15.72	$ 154,528	$ 2.64	$ 25,945	$ 1.36	10,312	$ 13,406	$ -	$ -	$ 21.35	$209,833		Some rip-rap needs to belarge to disperse energy at bottom of channel	
3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	9,830	Bm3	C.2.25	0.057	561.7	$ 2.09	$ 20,559	$ -	$ -	$ 9.19	$ 90,360	$ 6.45	48,800	$ 63,440	$ -	$ -	$ 17.74	$174,358			
3	1	4	4	430		Rip-Rap: Load, haul and dump	9,830	Bm3	R.014	0.040	393.2	$ 1.46	$ 14,391	$ -	$ -	$ 3.42	$ 33,657	$ 1.55	11,697	$ 15,207	$ -	$ -	$ 6.43	$63,255			
3	1	4	5	430		Rip-Rap: Place and secure	9,830	Bm3	C.2.26	0.013	122.9	$ 0.46	$ 4,497	$ -	$ -	$ 0.89	$ 8,743	$ 0.47	3,546	$ 4,610	$ -	$ -	$ 1.82	$17,850			
Subtotal Direct Costs - Vangorda Creek Diversion												2,803		$102,073		$176,317		$243,765			$136,636		$0			$658,791		
Grum Pit																											1CD003.46_PitLakesTreat	
Water Treatment																										$0		
4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0			
Safety Berms																										$152,739		
4	2	1	1	430	Construct access road	Clear access road area	3,750	m2	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$4,204			
4	2	1	2	220		Construct access road	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$25,341			
4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Bm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.93	$98,531			
4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$24,664			
Subtotal Direct Costs - Grum Pit												1,238		$45,300		$0		$62,429		34,623	$45,010		$0			$152,739		
Grum Interceptor Ditch																											1CD003.46_PitLakesTreat	
Route into Grum Pit																										$86,484	assumed channel from vangorda creek diversion (1CD003.15)	
5	1	1	1	430	Access road	Clear access road area	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673			
5	1	1	2	220		Construct access road	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055			
5	1	2	1	430	Headworks dam	Load, haul, dump, place and compact till	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104			
5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,967	$ 2,558	$ -	$ -	$ 5.16	$10,397			15.21280459
5	1	3	2	430		Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929			
5	1	4	1	430	Place bedding layer	Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933			
5	1	4	2	430		Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485			
5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880			
5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,536	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505			
5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322			
5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202			
Algae Filter																										$2,980		
5	2	6	1	430	Place waste rock from Grum Dump at slot cut	WR: Load, haul, dump	469	Bm3	R.023	0.028	13.2	$ 1.03	$ 484	$ -	$ -	$ 2.42	$ 1,133	$ 1.09	394	$ 512	$ -	$ -	$ 4.54	$2,129			
5	2	6	2	430		WR: Place and secure	469	Bm3	C.2.26	0.013	5.9	$ 0.46	$ 214	$ -	$ -	$ 0.89	$ 417	$ 0.47	169	$ 220	$ -	$ -	$ 1.82	$851			
Route out of Pit via slot cut																										$216,505		
5	3	1	1	430	Access road	Clear access road area	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168			
5	3	1	2	220		Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014			
5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,997	$ 11,696	$ -	$ -	$ 5.16	$47,543			
5	3	3	1	430	Place bedding layer	Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389			
5	3	3	2	430		Load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020			
5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046			
5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,866			
5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,488	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331			
5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129			
Subtotal Direct Costs - Grum Interceptor Ditch												1,266		$46,222		$72,116		$120,120		51,932	$67,512		$0			$305,969		
Grum Dump																												
Reslope Dump																										$1,145,320		
6	1	1	1	430	Clear/grub	Clear/grub forest area around toe	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.94	$ 12,343	$ 0.62	6,265	$ 8,145	$ -	$ -	$ 2.08	$27,515			
6	1	2	1	430	Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.3	$ 36.60	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	38,711	$ 50,324	$ -	$ -	$ 359.06	$121,124			137.1278346
6	1	2	2	430		Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.5	$ 36.60	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460			
6	1	2	3	430		Regrade Slopes	737	hrs	C.2.22	1.000	737.4	$ 36.60	$ 26,990	$ -	$ -	$ 173.28	$ 127,782	$ 149.18	84,624	$ 110,011	$ -	$ -	$ 359.06	$264,784			
6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3882.4	$ 0.86	$ 142,094	$ -	$ -	$ 2.00	$ 329,486	$ 0.93	118,352	$ 153,858	$ -	$ -	$ 3.79	$625,437			
Sulphide Cell																										$1,716,877		
6	2	1	1	430	Low Infiltration Cover	Load, haul, place compacted till (0.5m)	98,725	Bm3	R.026	0.017	1675.3	$ 0.62	$ 61,317	$ -	$ -	$ 2.24	$ 220,700	$ 1.60	121,463	$ 157,902	$ -	$ -	$ 4.46	$439,919			78.98
6	2	1	2	430		Load, haul, place loose till (1.5m)	296,175	Bm3	R.027	0.015	4523.4	$ 0.56	$ 165,556	$ -	$ -	$ 2.19	$ 648,738	$ 1.56	355,895	$ 462,663	$ -	$ -	$ 4.31	$1,276,958			
Waste Rock Cover																										$3,858,977		
6	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	858,625	Bm3	R.027	0.015	13113.5	$ 0.56	$ 479,956	$ -	$ -	$ 2.19	$ 1,880,722	$ 1.56	1,031,756	$ 1,341,283	$ -	$ -	$ 4.31	$3,701,960			470.475
6	6	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	1,493,750	m2	C.5.02	0.000	186.7	$ 0.00	$ 6,706	$ 0.05	$ 67,906	$ 0.05	$ 81,413	$ 0.00	763	$ 992	$ -	$ -	$ 0.11	$157,017			15.6825
Steep Runoff channels																										$123,025		
6	4	1	1	430	Install rock drains (runoff management)	Excavate channel	3,500	Bm3	C.2.12	0.024	82.4	$ 0.86	$ 3,014	$ -	$ -	$ 2.00	$ 6,989	$ 0.93	2,510	$ 3,264	$ -	$ -	$ 3.79	$13,267			
6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,604	Bm3	C.2.23	0.045	117.2	$ 1.62	$ 4,226	$ 15.72	$ 40,935	$ 2.64	$ 6,873	$ 1.36	2,732	$ 3,551	$ -	$ -	$ 21.35	$55,585			
6	4	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	2,604	Bm3	C.2.24	0.040	104.2	$ 1.46	$ 3,812	$ -	$ -	$ 6.43	$ 16,756	$ 4.52	9,049	$ 11,764	$ -	$ -	$ 12.42	$32,332			
6	4	1	4	430		Rip-Rap: Load, haul and dump	2,604	Bm3	R.033	0.041	106.4	$ 1.50	$ 3,893	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113			
6	4	1	5	430		Rip-Rap: Place and secure	2,604	Bm3	C.2.26	0.013	32.6	$ 0.46	$ 1,191	$ -	$ -	$ 0.89	$ 2,316	$ 0.47	939	$ 1,221	$ -	$ -	$ 1.82	$4,729			
Sediment Basins																										$12,450		
6	5	2	1	430	Sedimentation Basins (at bottom of runoff char	Excavate sedimentation basin	2,128	Bm3	C.2.12	0.024	50.1	$ 0.86	$ 1,833	$ -	$ -	$ 2.00	$ 4,249	$ 0.93	1,526	$ 1,984	$ -	$ -	$ 3.79	$8,066			
6	5	2	2	430		Rip-Rap: Drill, blast and stockpile	104	Bm3	C.2.23	0.045	4.7	$ 1.62	$ 169	$ 15.72	$ 1,635	$ 2.64	$ 274	$ 1.36	109	$ 142	$ -	$ -	$ 21.35	$2,220			
6	5	2	3	430		Rip-rap (rounded, low quality): Screen and stockpile	104	Bm3	C.2.24	0.040	4.2	$ 1.46	$ 152	$ -	$ -	$ 6.43	$ 669	$ 4.52	361	$ 470	$ -	$ -	$ 12.42	$1,291			
6	5	2	4	430		Rip-Rap: Load, haul and dump	104	Bm3	R.033	0.041	4.2	$ 1.50	$ 155	$ -	$ -	$ 3.50	$ 364	$ 1.58	126	$ 164	$ -	$ -	$ 6.57	$683			
6	5	2	5	430		Rip-Rap: Place and secure	104	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 48	$ -	$ -	$ 0.89	$ 92	$ 0.47	38	$ 49	$ -	$ -	$ 1.82	$189			
Subtotal Direct Costs - Grum Dump												25,452		$931,339		$110,476		$3,458,702		1,812,409	$2,356,132		$0			$6,856,649		
Overburden Dump																												
Reslope Dump																										$153,664		
7	2	1	1	430	Regrade	Flattened surfaces	77	hrs	C.2.22	1.000	77.2	$ 36.60	$ 2,824	$ -	$ -	$ 173.28	$ 13,371	$ 149.18	8,855	$ 11,511	$ -	$ -	$ 359.06	$27,707			42.8
7	2	1	2	430		Flatten bubble dump surfaces	351	hrs	C.2.22	1.000	350.8	$ 36.60	$ 12,839	$ -	$ -	$ 173.28	$ 60,786	$ 149.18	40,255	$ 52,332	$ -	$ -	$ 359.06	$125,957			
Revegetate																										$53,635		
7	3	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635			
Subtotal Direct Costs - Overburden Dump												492		$17,954		$23,196		$101,967		49,371	$64,182		$0			$207,299		
Ore Transfer Pad																												
Relocate to Vangorda Pit																										$1,429,518		
8	1	1	1	430	Excavate acidic material (over-excavate)	Load, haul, place and compact in pit	321,260	Bm3	R.004	0.019	6112.0	$ 0.70	$ 223,700	$ -	$ -	$ 2.27	$ 729,591	$ 1.48	366,328	$ 476,227	$ -	$ -	$ 4.45	$1,429,518			64.252
Reslope Pad for drainage																										$40,795		
8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 36.60	$ 1,900	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	5,956	$ 7,742	$ -	$ -	$ 359.06	$18,635			
8	2	1	2	430		Flatten bubble dump surfaces	62	hrs	C.2.22	1.000	61.7	$ 36.60	$ 2,259	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	7,082	$ 9,207	$ -	$ -	$ 359.06	$22,160			
Rudementary Cover																										$286,560		
8	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,650	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,459	$ -	$ -	$ 1.99	$ 146,782	$ 1.38	77,937	$ 101,318	$ -	$ -	$ 3.89	$286,560			
Sediment Control Ditches																										$10,188		
8	4	1	1	430	Sediment Control Ditch	Excavation of ditch	1,791	Bm3	C.2.10	0.032	57.3	$ 1.17	$ 2,098	$ -	$ -	$ 2.72	$ 4,864	$ 1.27	1,747	$ 2,271	$ -	$ -	$ 5.16	$9,233			

8	4	2	1	430	Sedimentation Basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.86	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ 3.79	$955			
Revegetate																									$13,508		
8	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	128,504	m2	C.5.02	0.000	16.1	$ 0.00	$ 577	$ 0.05	$ 5,842	$ 0.05	$ 7,004	$ 0.00	66	$ 85	$ -	$ -	$ 0.11	$13,508			
Subtotal Direct Costs - Ore Transfer Pad											7,356		$269,209		$5,842		$908,432		459,297	$597,086		$0			**$1,780,568**		
Groundwater																											
Grum Dump Groundwater Collection to Holding Pond																									$506,884		
9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,186			
9	1	1	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177			
9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		no prelliminary design done.	
9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927			
9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094			
9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215			
9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ 2.91	$21,651			
9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421			
9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504			
9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.8	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.89	332	$ 431	$ -	$ -	$ 3.64	$1,762			
9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$16,508			
9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004			
9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627			
9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083			
9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	368	$ 479	$ -	$ -	$ 737.86	$12,544			
9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247			
9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425			
Grum Dump Groundwater Holding Pond																									$106,157		
9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ 3.79	$41,120			
9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ 7.71	$11,385			
9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ 0.61	$3,002			
9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ 4.44	$13,567			
9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ 3.10	$4,582			
9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ 3.64	$5,371			
9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429			
9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680			
9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ 737.86	$7,379			
9	2	6	2	510		Supply/Install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ 4.22	$2,957			
9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685			
Groundwater Collection System to Grum Pit																									$662,735		
9	3	1	1	430	Piping system	Excavate piping trench	17,160	Bm3	C.2.13	0.020	343.2	$ 0.73	$ 12,561	$ -	$ -	$ 1.42	$ 24,419	$ 0.75	9,905	$ 12,877	$ -	$ -	$ 2.91	$49,857			
9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	2,860	m	C.3.03	0.250	715.0	$ 8.75	$ 25,025	$ 155.84	$ 445,702	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$470,727			
9	3	1	3	430		Bedding: Produce and stockpile (screen)	1,115	Bm3	C.2.02	0.010	11.2	$ 0.37	$ 408	$ -	$ -	$ 1.61	$ 1,794	$ 1.13	969	$ 1,260	$ -	$ -	$ 3.10	$3,462			
9	3	1	4	430		Bedding: Load, haul, place and compact	1,115	Bm3	R.034	0.024	26.5	$ 0.87	$ 971	$ -	$ -	$ 1.80	$ 2,011	$ 0.87	744	$ 967	$ -	$ -	$ 3.54	$3,949			
9	3	1	5	430		Backfill and compact ditches	17,160	Bm3	C.2.01	0.030	514.8	$ 1.08	$ 18,567	$ -	$ -	$ 0.74	$ 12,660	$ 0.40	5,221	$ 6,787	$ -	$ -	$ 2.22	$38,014			
9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,860	m	C.3.04	0.250	715.0	$ 12.50	$ 35,750	$ 21.32	$ 60,975	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$96,725			
Contingency - Vangorda Pit Groundwater System																									$395,299		
9	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	270	m	C.2.09	2.000	540.0	$ 102.13	$ 27,576	$ -	$ -	$ 100.85	$ 27,230	$ 22.08	4,586	$ 5,962	$ -	$ -	$ 225.07	$60,768		no prelliminary design done.	
9	4	1	2	500		Install 6" stainless steel well casing & screen	270	m	C.3.17	0.150	40.5	$ 7.66	$ 2,068	$ 232.60	$ 62,802	$ 7.56	$ 2,042	$ 1.66	344	$ 447	$ -	$ -	$ 249.48	$67,360			
9	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326			
9	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235			
9	4	2	1	510	Provide electricity to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951			
9	4	2	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267			
9	4	2	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685			
9	4	3	1	430	Piping system	Excavate piping trench	5,400	Bm3	C.2.13	0.020	108.0	$ 0.73	$ 3,953	$ -	$ -	$ 1.42	$ 7,684	$ 0.75	3,117	$ 4,052	$ -	$ -	$ 2.91	$15,689			
9	4	3	2	500		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	$ 8.75	$ 7,875	$ 155.84	$ 140,256	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$148,131			
9	4	3	3	430		Bedding: Produce and stockpile (screen)	351	Bm3	C.2.02	0.010	3.5	$ 0.37	$ 128	$ -	$ -	$ 1.61	$ 565	$ 1.13	305	$ 396	$ -	$ -	$ 3.10	$1,090			
9	4	3	4	430		Bedding: Load, haul, place	351	Bm3	R.035	0.031	10.7	$ 1.12	$ 393	$ -	$ -	$ 2.32	$ 814	$ 1.07	288	$ 374	$ -	$ -	$ 4.50	$1,580			
9	4	3	5	430		Backfill and compact ditches	5,049	Bm3	C.2.01	0.030	151.5	$ 1.08	$ 5,463	$ -	$ -	$ 0.74	$ 3,725	$ 0.40	1,536	$ 1,997	$ -	$ -	$ 2.22	$11,185			
9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	$ 12.50	$ 11,250	$ 21.32	$ 19,188	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$30,438			
9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627			
9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083			
9	4	5	1	430	Groundwater holding pond	Excavate holding pond	876	Bm3	C.2.12	0.024	20.6	$ 0.86	$ 754	$ -	$ -	$ 2.00	$ 1,749	$ 0.93	628	$ 817	$ -	$ -	$ 3.79	$3,321			
9	4	5	2	430		Till: Load, haul, dump and place	229	Bm3	R.015	0.034	7.7	$ 1.23	$ 281	$ -	$ -	$ 2.82	$ 646	$ 1.30	228	$ 296	$ -	$ -	$ 5.35	$1,223			
9	4	5	3	430		Till: Compact with vibrating drum roller	229	m2	C.2.06	0.016	3.7	$ 0.57	$ 131	$ -	$ -	$ 0.02	$ 5	$ 0.02	3	$ 4	$ -	$ -	$ 0.61	$140			
9	4	5	4	430		Supply and place geotextile	529	m2	C.4.06	0.016	8.5	$ 0.57	$ 300	$ 3.50	$ 1,853	$ 0.23	$ 121	$ 0.15	60	$ 78	$ -	$ -	$ 4.44	$2,352			
9	4	5	5	430		Bedding layer: Produce, screen and stockpile	229	Bm3	C.2.02	0.010	2.3	$ 0.37	$ 84	$ -	$ -	$ 1.61	$ 368	$ 1.13	199	$ 258	$ -	$ -	$ 3.10	$710			
9	4	5	6	430		Bedding Layer: Load, haul, place and compact	229	Bm3	R.035	0.031	7.0	$ 1.12	$ 256	$ -	$ -	$ 2.32	$ 530	$ 1.07	188	$ 244	$ -	$ -	$ 4.50	$1,030			
9	4	5	7	500		Pump: Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429			
9	4	5	8	500		Pump: Build and install housing for pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680			
Contingency - Grum Dump Cut-off Wall																									$932,954		
9	5	1	1		Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ 2.08	$14,070			
9	5	1	2			Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ 3.85	$13,006			
9	5	2	1		Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ 108.57	$905,877			
Subtotal Direct Costs - Groundwater											10,668		$508,913		$1,558,216		$350,340		143,507	$186,559		$0			**$2,604,028**		
Vangorda Haul Road																											
Remove Culverts																									$1,018,439		
10	1	1	1	430	Remove culverts	Excavate haul road	268,680	m3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ 3.79	$1,018,439			107.472
Reclaim Haul Road																									$87,788		
10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	6,885	$ 8,951	$ -	$ -	$ 359.06	$21,543			
10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ 0.29	$39,141			
10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	180,000	m2	C.5.01	0.000	22.5	$ 0.00	$ 808	$ 0.09	$ 16,366	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ 0.15	$27,104			
Subtotal Direct Costs - Vangorda Haul Road											6,742		$246,737		$16,366		$570,311		209,856	$272,813		$0			**$1,106,227**		
Miscellaneous																											
Buildings																									$569,060		
10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,692	$ -	$ -	$ 28.17	$194,404			
10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	65,858	$ 85,615	$ -	$ -	$ 35.20	$352,250			
10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ 52.80	$18,214			
10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ 40.07	$601			
10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591			
Sludge Pond																									$133,287		
10	2	1	1	430	Cover Sludge Pond	Load, haul, and place till	30,000	Bm3	R.038	0.025	763.6	$ 0.93	$ 27,949	$ -	$ -	$ 2.33	$ 70,005	$ 1.18	27,179	$ 35,332	$ -	$ -	$ 4.44	$133,287			
Existing Bioremediation Cell																									$1,794		
10	3	1	1	430	Cover Existing Bioremediation Cell	Doze material	1,600	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 999	$ 0.36	448	$ 582	$ -	$ -	$ 1.12	$1,794			
Dams																									$3,791		
10	4	1	1	430	Breach all Dams (2)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791			
WTP Settling Pond																									$5,652		
10	5	1	1	430	Breach WTP Settling Pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.86	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,069	$ 1,390	$ -	$ -	$ 3.79	$5,652			
Contaminated soils																									$27,498		
10	6	1	1	600	Remove Contaminated soils	Excavate, haul and place contaminated soils in bio-remediation ce	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ 7.16	$26,868			
10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ 0.25	$630			
Bioremediation Cell																									$51,420		
10	7	1	1	430	Construct Bioremediation Cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496			
10	7	1	2	430		Place HDPE liner for remediation cell	1,600	m2	C.4.10	0.143	228.6	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,300	$ 1,690	$ -	$ -	$ 21.79	$34,861			
10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ 2.22	$1,063			
Roads																									$20,785		
10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ 3.79	$14,859			
10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ 0.29	$4,349			
10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ 0.11	$1,577			
Borrow Sources																									$85,000		
10	9	1	1	600	Develop Borrow Sources	Clear and grub	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253			
10	9	1	2	600		Construct haul road	1,000	m	C.2.28	0.225	225.0	$ 8.24	$ 8,235	$ -	$ -	$ 29.67	$ 29,674	$ 19.48	14,986	$ 19,482	$ -	$ -	$ 57.39	$57,391			
10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591			
10	9	2	2	610		Seed/Fertilize, helicopter low application rate	169,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,683	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ 0.11	$17,765			
Subtotal Direct Costs - Miscellaneous											8,853		$351,534		$28,797		$335,488		140,358	$182,466		$0			**$898,285**		
Subtotal Direct Costs																											
						Subtotal direct costs					265,034		$11,218,697		$8,240,316		$23,235,707		11,537,221	$15,135,023		$0			**$57,829,743**		
CLOSURE COSTS - INDIRECT																											
100	100	1	1		Project Management	5.0% of direct costs															$ 57,829,743	x	5.0%		$2,891,487		
100	100	2	1		Field Supervision	2.5% of direct costs															$ 57,829,743	x	2.5%		$1,445,744		
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 57,829,743	x	10.0%		$5,782,974		
100	100	4	1		Insurance	0.5% of direct costs															$ 57,829,743	x	0.5%		$289,149		
100	100	5	1		Bonding	0.5% of direct costs															$ 57,829,743	x	0.5%		$289,149		
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 57,829,743	x	10.0%		$5,782,974		
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000		
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0		
Subtotal Indirect Costs																											
					Subtotal indirect costs																				**$16,981,477**		
CLOSURE COSTS - CONTINGENCY																											
					Contingency	20% of direct costs															$57,829,743	x	20.0%		**$11,565,949**		
CLOSURE COSTS - TOTAL																											
					Total direct and indirect costs																				**$86,377,168**		

Vangorda/Grum Alternative 2 - Stabilize In Place

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											
Water Treatment																										$316,444	
1	1	1	1	430		Construct Water Treatment Plant	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
1	1	2	1	430		Construct pipeline to and from Treatment Plant	Excavate piping trench	7,950	Bm3	C.2.13	0.020	159.0	$ 0.73	$ 5,819	$ -	$ -	$ 1.42	$ 11,313	$ 0.75	4,589	$ 5,966	$ -	$ -	$ 2.91	$23,098		
1	1	2	2	500			Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
1	1	2	3	500			Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
1	1	2	4	510			Supply and install insulated 150mm HDPE pipe	1,325	m	C.3.03	0.250	331.3	$ 8.75	$ 11,594	$ 155.84	$ 206,488	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$218,082		
1	1	2	5	430			Bedding layer: Produce, screen and stockpile	517	Bm3	C.2.02	0.010	5.2	$ 0.37	$ 189	$ -	$ -	$ 1.61	$ 831	$ 1.13	449	$ 584	$ -	$ -	$ 3.10	$1,604		
1	1	2	6	430			Bedding layer: Load, haul, place and compact	517	Bm3	R.045	0.037	18.9	$ 1.34	$ 693	$ -	$ -	$ 2.78	$ 1,437	$ 1.28	509	$ 661	$ -	$ -	$ 5.40	$2,792		
1	1	2	7	430			Backfill ditches	7,950	Bm3	C.2.01	0.030	238.5	$ 1.08	$ 8,602	$ -	$ -	$ 0.74	$ 5,865	$ 0.40	2,419	$ 3,144	$ -	$ -	$ 2.22	$17,611		
1	1	3	1	510		Heat tracing	Supply and install heat trace in HDPE pipe	1,325	m	C.3.04	0.250	331.3	$ 12.50	$ 16,563	$ 21.32	$ 28,249	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$44,812		
1	1	3	2	510			Supply/Install heat tracing power feed kit	2	ea.	C.3.05	4.000	8.0	$ 230.00	$ 460	$ 396.84	$ 794	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$1,254		
1	1	3	3	510			Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Safety Berm																										$ 137,140	
1	2	1	1	430		Construct access road	Clear access road area	4,350	m	C.2.05	0.015	63.3	$ 0.53	$ 2,316	$ -	$ -	$ 0.94	$ 4,067	$ 0.62	2,065	$ 2,684	$ -	$ -	$ 2.08	$ 9,067		
1	2	1	2	430			Construct access road	1,450	m	C.2.27	0.131	190.3	$ 4.80	$ 6,965	$ -	$ -	$ 10.14	$ 14,707	$ 5.33	5,940	$ 7,722	$ -	$ -	$ 20.27	$ 29,395		
1	2	2	1	430		Place berm materials	Load, haul, dump berm material	15,000	Lm3	R.007	0.056	840.0	$ 2.05	$ 30,744	$ -	$ -	$ 1.73	$ 26,010	$ 1.56	18,020	$ 23,426	$ -	$ -	$ 5.35	$ 80,180		
1	2	2	2	430			Final Shaping of material with dozer	3,000	m	C.2.03	0.020	60.0	$ 0.73	$ 2,196	$ -	$ -	$ 3.43	$ 10,299	$ 2.00	4,617	$ 6,002	$ -	$ -	$ 6.17	$ 18,498		
Vangorda Pit Waste Rock Piles																										$ 469,364	
1	3	1	1	430		Regrade	Flattened surfaces	13	hrs	C.2.22	1.000	13.0	$ 36.60	$ 476	$ -	$ -	$ 173.28	$ 2,253	$ 149.18	1,492	$ 1,940	$ -	$ -	$ 359.06	$ 4,669		30.96336901
1	3	1	2	430			Flatten bubble dump surfaces	10	hrs	C.2.22	1.000	9.6	$ 36.60	$ 353	$ -	$ -	$ 173.28	$ 1,670	$ 149.18	1,106	$ 1,438	$ -	$ -	$ 359.06	$ 3,460		
1	3	1	3	430			Regrade Slopes	28	hrs	C.2.22	1.000	27.7	$ 36.60	$ 1,014	$ -	$ -	$ 173.28	$ 4,800	$ 149.18	3,179	$ 4,132	$ -	$ -	$ 359.06	$ 9,946		
1	3	2	1	430		Place low infiltration cover	Load, haul, place compacted till (0.5m)	32,412	Bm3	R.009	0.014	453.8	$ 0.51	$ 16,608	$ -	$ -	$ 1.79	$ 57,916	$ 1.17	29,204	$ 37,965	$ -	$ -	$ 3.47	$ 112,489		
1	3	2	2	430			Load, haul, place loose till (1.5m)	97,235	Bm3	R.008	0.012	1166.8	$ 0.44	$ 42,705	$ -	$ -	$ 1.73	$ 168,580	$ 1.13	84,325	$ 109,622	$ -	$ -	$ 3.30	$ 320,907		
1	3	3	1	610		Revegetate	Seed/Fertilize, helicopter high application rate	118,825	m2	C.5.01	0.000	14.9	$ 0.00	$ 533	$ 0.09	$ 10,804	$ 0.05	$ 6,476	$ 0.00	61	$ 79	$ -	$ -	$ 0.15	$ 17,892		
Subtotal Direct Costs - Vangorda Pit												**3,974**		**$150,438**		**$250,918**		**$316,227**		**157,973**	**$205,365**		**$0**			**$ 922,948**	
Vangorda Dump																											
Reslope Dump																										$ 265,537	
2	1	1	1	430		Regrade (shape to enhance runoff to ditches)	Flattened surfaces	40	hrs	C.2.22	1.000	39.6	$ 36.60	$ 1,449	$ -	$ -	$ 173.28	$ 6,862	$ 149.18	4,544	$ 5,907	$ -	$ -	$ 359.06	$ 14,218		73.95384859
2	1	1	2	430			Flatten bubble dump surfaces	102	hrs	C.2.22	1.000	102.0	$ 36.60	$ 3,731	$ -	$ -	$ 173.28	$ 17,666	$ 149.18	11,699	$ 15,209	$ -	$ -	$ 359.06	$ 36,607		
2	1	1	3	430			Regrade slopes	598	hrs	C.2.22	1.000	598.0	$ 36.60	$ 21,886	$ -	$ -	$ 173.28	$ 103,618	$ 149.18	68,621	$ 89,208	$ -	$ -	$ 359.06	$ 214,712		
Waste Rock Cover																										$ 5,197,878	
2	2	1	1	430		Place low infiltration cover	Load, haul, place compacted till (0.5m)	320,063	Bm3	R.010	0.017	5431.4	$ 0.62	$ 198,788	$ -	$ -	$ 2.15	$ 688,123	$ 1.40	344,035	$ 447,246	$ -	$ -	$ 4.17	$ 1,334,157		256.05
2	2	1	2	430			Load, haul, place loose till (1.5m)	960,188	Bm3	R.011	0.015	14664.7	$ 0.56	$ 536,727	$ -	$ -	$ 2.10	$ 2,021,055	$ 1.36	1,004,568	$ 1,305,939	$ -	$ -	$ 4.02	$ 3,863,722		
Rock Drains																										$ 44,973	
2	3	1	1	430		Install rock drains (runoff management)	Excavate channel for rock drains	1,313	Bm3	C.2.13	0.020	26.3	$ 0.73	$ 961	$ -	$ -	$ 1.42	$ 1,868	$ 0.75	758	$ 985	$ -	$ -	$ 2.91	$3,813		
2	3	1	2	430			Construct access road	977	Bm3	C.2.23	0.045	43.9	$ 1.62	$ 1,585	$ 15.72	$ 15,351	$ 2.64	$ 2,577	$ 1.36	1,024	$ 1,332	$ -	$ -	$ 21.35	$20,845		
2	3	1	3	430			Rip-rap (rounded, low quality): Screen and stockpile	977	Bm3	C.2.24	0.040	39.1	$ 1.46	$ 1,430	$ -	$ -	$ 6.43	$ 6,283	$ 4.52	3,393	$ 4,411	$ -	$ -	$ 12.42	$12,124		
2	3	1	4	430			Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	977	Bm3	R.012	0.041	39.9	$ 1.50	$ 1,460	$ -	$ -	$ 3.50	$ 3,415	$ 1.58	1,187	$ 1,543	$ -	$ -	$ 6.57	$6,417		
2	3	1	5	430			Rip-Rap: Place and secure	977	Bm3	C.2.26	0.013	12.2	$ 0.46	$ 447	$ -	$ -	$ 0.89	$ 868	$ 0.47	352	$ 458	$ -	$ -	$ 1.82	$1,773		
Sediment Control Ditches																										$ 2,010	
2	4	1	1	430		Vangorda dump sediment control ditch	Load, haul and dump locally	390	Bm3	C.2.10	0.032	12.5	$ 1.17	$ 457	$ -	$ -	$ 2.72	$ 1,059	$ 1.27	380	$ 495	$ -	$ -	$ 5.16	$ 2,010		
Revegetate																										$ 75,913	
2	5	1	1	610		Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$ 75,913		
Subtotal Direct Costs - Vangorda Dump												**21,072**		**$771,184**		**$61,188**		**$2,880,873**		**1,440,821**	**$1,873,067**		**$0**			**$ 5,586,312**	
Vangorda Creek																											1CD003.15_Vangorda Creek Diversion
Relocate North of Pit																										$ 1,259,554	Channel designed to 1:500 yr event (Design flow 31m³/s)
3	1	1	1	430		Excavate channel	Rock Excavation: drill, blast, muck, load, haul and dump	19,346	Bm3	C.2.15	0.173	3353.3	$ 6.34	$ 122,731	$ -	$ -	$ 9.13	$ 176,583	$ 3.69	54,899	$ 71,369	$ -	$ -	$ 19.16	$ 370,682		
3	1	1	2	430			Soil Excavation: Excavate, haul, dump	78,061	Bm3	C.2.10	0.032	2498.0	$ 1.17	$ 91,426	$ -	$ -	$ 2.72	$ 211,996	$ 1.27	76,149	$ 98,994	$ -	$ -	$ 5.16	$ 402,416		
3	1	2	1	430		Place fill material	Placed from soil layer above; compact by hand	968	m2	C.2.06	0.016	15.5	$ 0.57	$ 554	$ -	$ -	$ 0.02	$ 20	$ 0.02	12	$ 16	$ -	$ -	$ 0.61	$ 590		
3	1	3	1	430		Place bedding layer	Bedding: Produce and stockpile locally	3,194	Bm3	C.2.02	0.010	31.9	$ 0.37	$ 1,169	$ -	$ -	$ 1.61	$ 5,138	$ 1.13	2,775	$ 3,607	$ -	$ -	$ 3.10	$ 9,915		
3	1	3	2	430			Bedding layer: Load , haul, place and compact	3,194	Bm3	R.016	0.031	97.6	$ 1.12	$ 3,572	$ -	$ -	$ 2.32	$ 7,403	$ 1.07	2,620	$ 3,406	$ -	$ -	$ 4.50	$ 14,381		
3	1	4	1	430		Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,694	Bm3	C.2.23	0.045	436.2	$ 1.62	$ 15,733	$ 15.72	$ 152,389	$ 2.64	$ 25,586	$ 1.36	10,170	$ 13,221	$ -	$ -	$ 21.35	$ 206,929		
3	1	4	2	430			Rip-rap (angular, high quality): Screen and stockpile	9,694	Bm3	C.2.25	0.057	553.9	$ 2.09	$ 20,274	$ -	$ -	$ 9.19	$ 89,109	$ 6.45	48,125	$ 62,562	$ -	$ -	$ 17.74	$ 171,946		
3	1	4	4	430			Rip-Rap: Load, haul and dump	9,694	Bm3	R.017	0.042	404.6	$ 1.53	$ 14,809	$ -	$ -	$ 3.57	$ 34,635	$ 1.61	12,037	$ 15,648	$ -	$ -	$ 6.71	$ 65,092		
3	1	4	5	430			Rip-Rap: Place and secure	9,694	Bm3	C.2.26	0.013	121.2	$ 0.46	$ 4,435	$ -	$ -	$ 0.89	$ 8,622	$ 0.47	3,497	$ 4,546	$ -	$ -	$ 1.82	$ 17,603		
Plunge Pool																										$ 55,141	
3	2	1	1	430		Excavate pool	Plunge pool excavation	2,700	Bm3	C.2.12	0.024	63.5	$ 0.86	$ 2,325	$ -	$ -	$ 2.00	$ 5,392	$ 0.93	1,937	$ 2,518	$ -	$ -	$ 3.79	$ 10,234		
3	2	2	1	430		Place bedding layer	Bedding: Produce and stockpile locally	270	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 99	$ -	$ -	$ 1.61	$ 434	$ 1.13	235	$ 305	$ -	$ -	$ 3.10	$ 838		
3	2	2	3	430			Bedding: Load, haul, place and compact	270	Bm3	R.016	0.031	8.3	$ 1.12	$ 302	$ -	$ -	$ 2.32	$ 626	$ 1.07	221	$ 288	$ -	$ -	$ 4.50	$ 1,216		
3	2	3	1	430		Place rip-rap	Rip-Rap: Drill, blast and stockpile	900	Bm3	C.2.23	0.045	40.5	$ 1.62	$ 1,461	$ 15.72	$ 14,148	$ 2.64	$ 2,375	$ 1.36	944	$ 1,227	$ -	$ -	$ 21.35	$ 19,212		
3	2	3	2	430			Rip-rap (angular, high quality): Screen and stockpile	900	Bm3	C.2.25	0.057	51.4	$ 2.09	$ 1,882	$ -	$ -	$ 9.19	$ 8,273	$ 6.45	4,468	$ 5,808	$ -	$ -	$ 17.74	$ 15,964		
3	2	3	3	430			Rip-Rap: Load, haul and dump	900	Bm3	R.017	0.042	37.6	$ 1.53	$ 1,375	$ -	$ -	$ 3.57	$ 3,216	$ 1.61	1,118	$ 1,453	$ -	$ -	$ 6.71	$ 6,043		
3	2	3	4	430			Rip-Rap: Place and secure	900	Bm3	C.2.26	0.013	11.3	$ 0.46	$ 412	$ -	$ -	$ 0.89	$ 800	$ 0.47	325	$ 422	$ -	$ -	$ 1.82	$ 1,634		
Diversion to Dixon Creek																										$ 25,776	
3	3	1	1			Upgrade existing diversion to Dixon creek	Excavate channel and spoil locally	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,856	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$ 25,776		
Allowance: Buttress the North Vangorda Pit Wall																										$ 1,249,815	
3	4	1	1			Butress North Vangorda Pit Wall	Load, haul, dump	256,654	Bm3	R.018	0.030	7769.0	$ 1.11	$ 284,345	$ -	$ -	$ 2.59	$ 665,014	$ 1.17	231,120	$ 300,456	$ -	$ -	$ 4.87	$ 1,249,815		
Subtotal Direct Costs - Vangorda Creek												**15,656**		**$572,760**		**$166,537**		**$1,258,801**		**455,528**	**$592,187**		**$0**			**$ 2,590,285**	
Grum Pit																											1CD003.46_PitLakesTreat
Water Management																										$ -	
4	1	1	1	610		Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berm																										$ 152,739	
4	2	1	1	430		Construct access road	Access road: clearing and grubbing	3,750	m	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$ 4,204		
4	2	1	2	220			Access road: construction	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$ 25,341		
4	2	2	1	430		Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.93	$ 98,531		
4	2	2	2	430			Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$ 24,664		
Subtotal Direct Costs - Grum Pit												**1,238**		**$45,300**		**$0**		**$62,429**			**$45,010**		**$0**			**$ 152,739**	
Grum Interceptor Ditch																											1CD003.46_PitLakesTreat
Route into Grum Pit																										$86,484	assumed channel from vangorda creek diversion (1CD003.15)
5	1	1	1	430		Access road	Access road: clearing and grubbing	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
5	1	1	2	220			Access road: construction	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
5	1	2	1	430		Headworks dam	Construct earth dam at headworks (LHD till)	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
5	1	3	1	430		Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,967	$ 2,558	$ -	$ -	$ 5.16	$10,397		
5	1	3	2	430			Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
5	1	4	1	430		Place bedding layer	Bedding: Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
5	1	4	2	430			Bedding: Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
5	1	5	1	430		Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880		
5	1	5	2	430			Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,536	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
5	1	5	3	430			Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
5	1	5	4	430			Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Route out of Pit via slot cut																										$216,505	
5	3	1	1	430		Access road	Access road: clearing and grubbing	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168		
5	3	1	2	220			Access road: construction	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
5	3	2	1	430		Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,997	$ 11,696	$ -	$ -	$ 5.16	$47,543		
5	3	3	1	430		Place bedding layer	Bedding: Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
5	3	3	2	430			Bedding: load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020		
5	3	4	1	430		Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046		
5	3	4	2	430			Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,866		
5	3	4	3	430			Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,488	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331		
5	3	4	4	430			Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												**1,247**		**$45,523**		**$72,116**		**$118,570**			**$66,780**		**$0**			**$302,988**	
Grum Dump																											
Reslope Dump																										$1,145,320	
6	1	1	1	430		Clear/grub	Clear/grub forest area around toe	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.94	$ 12,343	$ 0.62	6,265	$ 8,145	$ -	$ -	$ 2.08	$27,515		
6	1	1	1	430		Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.3	$ 36.60	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	38,711	$ 50,324	$ -	$ -	$ 359.06	$121,124		
6	1	1	2	430			Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.5	$ 36.60	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460		
6	1	1	3	430			Regrade slopes	737	hrs	C.2.22	1.000	737.4	$ 36.60	$ 26,990	$ -	$ -	$ 173.28	$ 127,782	$ 149.18	84,624	$ 110,011	$ -	$ -	$ 359.06	$264,784		
6	1	3	1	430		Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3882.4	$ 0.86	$ 142,094	$ -	$ -	$ 2.00	$ 329,486	$ 0.93	118,352	$ 153,858	$ -	$ -	$ 3.79	$625,437		
Sulphide Cell																										$1,716,877	
6	2	1	1	430		Low infiltration cover	Load, haul, place compacted till (0.5m)	98,725	Bm3	R.026	0.017	1675.3	$ 0.62	$ 61,317	$ -	$ -	$ 2.24	$ 220,700	$ 1.60	121,463	$ 157,902	$ -	$ -	$ 4.46	$439,919		
6	2	1	2	430			Load, haul, place loose till (1.5m)	296,175	Bm3	R.027	0.015	4523.4	$ 0.56	$ 165,556	$ -	$ -	$ 2.19	$ 648,738	$ 1.56	355,895	$ 462,663	$ -	$ -	$ 4.31	$1,276,958		
Waste Rock Cover																										$3,701,960	
6	3	1	1	430		Place rudimentary cover	Load, haul, place loose till (0.5m)	858,625	Bm3	R.027	0.015	13113.5	$ 0.56	$ 479,956	$ -	$ -	$ 2.19	$ 1,880,722	$ 1.56	1,031,756	$ 1,341,283	$ -	$ -	$ 4.31	$3,701,960		
Steep Runoff channels																										$123,025	
6	4	1	1	430		Install rock drains (runoff management)	Excavate channel for rock drains	3,500	Bm3	C.2.12	0.024	82.4	$ 0.86	$ 3,014	$ -	$ -	$ 2.00	$ 6,989	$ 0.93	2,510	$ 3,264	$ -	$ -	$ 3.79	$13,267		
6	4	1	2	430			Rip-Rap: Drill, blast and stockpile	2,604	Bm3	C.2.23	0.045	117.2	$ 1.62	$ 4,226	$ 15.72	$ 40,935	$ 2.64	$ 6,873	$ 1.36	2,732	$ 3,551	$ -	$ -	$ 21.35	$55,585		
6	4	1	3	430			Rip-rap (rounded, low quality): Screen and stockpile	2,604	Bm3	C.2.24	0.040	104.2	$ 1.46	$ 3,812	$ -	$ -	$ 6.43	$ 16,756	$ 4.52	9,049	$ 11,764	$ -	$ -	$ 12.42	$32,332		
6	4	1	4	430			Rip-Rap: Load, haul and dump	2,604	Bm3	R.033	0.041	106.4	$ 1.50	$ 3,893	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113		
6	4	1	5	430			Rip-Rap: Place and secure	2,604	Bm3	C.2.26	0.013	32.6	$ 0.46	$ 1,191	$ -	$ -	$ 0.89	$ 2,316	$ 0.47	939	$ 1,221	$ -	$ -	$ 1.82	$4,729		
Sediment Basins																										$12,450	
6	5	2	1	430		Sedimentation basins (at bottom of rock drains)	Excavate sedimentation basin	2,128	Bm3	C.2.12	0.024	50.1	$ 0.86	$ 1,833	$ -	$ -	$ 2.00	$ 4,249	$ 0.93	1,526	$ 1,984	$ -	$ -	$ 3.79	$8,066		
6	5	2	2	430			Rip-Rap: Drill, blast and stockpile	104	Bm3	C.2.23	0.045	4.7	$ 1.62	$ 169	$ 15.72	$ 1,635	$ 2.64	$ 274	$ 1.36	109	$ 142	$ -	$ -	$ 21.35	$2,220		
6	5	2	3	430			Rip-rap (rounded, low quality): Screen and stockpile	104	Bm3	C.2.24	0.040	4.2	$ 1.46	$ 152	$ -	$ -	$ 6.43	$ 669	$ 4.52	361	$ 470	$ -	$ -	$ 12.42	$1,291		
6	5	2	4	430			Rip-Rap: Load, haul and dump	104	Bm3	R.033	0.041	4.2	$ 1.50	$ 155	$ -	$ -	$ 3.50	$ 364	$ 1.58	126	$ 164	$ -	$ -	$ 6.57	$683		
6	5	2	5	430			Rip-Rap: Place and secure	104	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 48	$ -	$ -	$ 0.89	$ 92	$ 0.47	38	$ 49	$ -	$ -	$ 1.82	$189		

Revegetate																									$224,923	
6	6	1	1	610	Revegetate WR dumps	Seed/Fertilize, helicopter high application rate	1,493,750	m2	C.5.01	0.000	186.7	$ 0.00	$ 6,706	$ 0.09	$ 135,812	$ 0.05	$ 81,413	$ 0.00	763	$ 992	$ -	$ -	$ 0.15	$224,923		
Subtotal Direct Costs - Grum Dump											25,452		$931,339		$178,382		$3,458,702			$2,356,132		$0			$6,924,555	
Overburden Dump																										
Reslope Dump																									$51,221	
7	2	1	1	430	Regrade	Flattened surfaces	26	hrs	C.2.22	1.000	25.7	$ 36.60	$ 941	$ -	$ -	$ 173.28	$ 4,457	$ 149.18	2,952	$ 3,837	$ -	$ -	$ 359.06	$9,236		
7	2	1	2	430		Regrade slopes	117	hrs	C.2.22	1.000	116.9	$ 36.60	$ 4,280	$ -	$ -	$ 173.28	$ 20,262	$ 149.18	13,418	$ 17,444	$ -	$ -	$ 359.06	$41,986		
Revegetate																									$53,635	
7	3	1	1	610	Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump											206		$7,512		$23,196		$52,529		16,631	$21,620		$0			$104,857	
Ore Transfer Pad																										
Relocate to Grum Sulphide Cell																									$1,082,507	
8	1	1	1	430	Excavate acidic material (over-excavate	Load, haul, place and compact	321,260	Bm3	R.029	0.013	4297.9	$ 0.49	$ 157,305	$ -	$ -	$ 1.70	$ 546,349	$ 1.18	291,426	$ 378,854	$ -	$ -	$ 3.37	$1,082,507		
Reslope Pad for drainage																									$40,795	
8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 36.60	$ 1,900	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	5,956	$ 7,742	$ -	$ -	$ 359.06	$18,635		
8	2	1	2	430		Regrade slopes	62	hrs	C.2.22	1.000	61.7	$ 36.60	$ 2,259	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	7,082	$ 9,207	$ -	$ -	$ 359.06	$22,160		
Rudementary Cover																									$286,560	
8	3	1	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	73,650	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,459	$ -	$ -	$ 1.99	$ 146,782	$ 1.38	77,937	$ 101,318	$ -	$ -	$ 3.89	$286,560		
Sediment Control Ditches																									$10,188	
8	4	1	1	430	Sediment control ditch	Excavation of ditch	1,791	Bm3	C.2.10	0.032	57.3	$ 1.17	$ 2,098	$ -	$ -	$ 2.72	$ 4,864	$ 1.27	1,747	$ 2,271	$ -	$ -	$ 5.16	$9,233		
8	4	2	1	430	Sedimentation basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.86	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ 3.79	$955		
Revegetate																									$13,508	
8	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	128,504	m2	C.5.02	0.000	16.1	$ 0.00	$ 577	$ 0.05	$ 5,842	$ 0.05	$ 7,004	$ 0.00	66	$ 85	$ -	$ -	$ 0.11	$13,508		
Subtotal Direct Costs - Ore Transfer Pad											5,542		$202,814		$5,842		$725,189		384,395	$499,713		$0			$1,433,557	
Groundwater																										1CD003.37 Grum Seepage Collection
Grum Dump Groundwater Collection to Holding Pond																									$506,884	
9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,186		
9	1	1	2	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		no preliminary design done.
9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ 2.91	$21,651		
9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421		
9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504		
9	1	3	4	430		Bedding: Load, haul, place	484	Bm3	R.031	0.024	11.8	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.89	332	$ 431	$ -	$ -	$ 3.64	$1,762		
9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$16,508		
9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004		
9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	368	$ 479	$ -	$ -	$ 737.86	$12,544		
9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247		
9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$10,684.98	$53,425		
Grum Dump Groundwater Holding Pond																									$106,157	
9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ 3.79	$41,120		
9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ 7.71	$11,385		
9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ 0.61	$3,002		
9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ 4.44	$13,567		
9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ 3.10	$4,582		
9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ 3.64	$5,371		
9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ 737.86	$7,379		
9	2	6	2	510		Supply/Install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ 4.22	$2,957		
9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$10,684.98	$10,685		
Grum Dump: Groundwater Collection from Holding Pond to Vangorda Pit																									$290,584	
9	3	1	1	430	Piping System	Excavate Piping Trench	7,524	Bm3	C.2.13	0.020	150.5	$ 0.73	$ 5,508	$ -	$ -	$ 1.42	$ 10,707	$ 0.75	4,343	$ 5,646	$ -	$ -	$ 2.91	$21,860		
9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	1,254	m	C.3.03	0.250	313.5	$ 8.75	$ 10,973	$ 155.84	$ 195,423	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$206,396		
9	3	1	6	430		Bedding: Produce and stockpile (screen)	489	Bm3	C.2.02	0.010	4.9	$ 0.37	$ 179	$ -	$ -	$ 1.61	$ 787	$ 1.13	425	$ 552	$ -	$ -	$ 3.10	$1,518		
9	3	1	7	430		Bedding: Load, haul, place	489	Bm3	R.034	0.024	11.6	$ 0.87	$ 426	$ -	$ -	$ 1.80	$ 882	$ 0.87	326	$ 424	$ -	$ -	$ 3.54	$1,731		
9	3	1	8	430		Backfill and compact ditches	7,524	Bm3	C.2.01	0.030	225.7	$ 1.08	$ 8,141	$ -	$ -	$ 0.74	$ 5,551	$ 0.40	2,289	$ 2,976	$ -	$ -	$ 2.22	$16,668		
9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,254	m	C.3.04	0.250	313.5	$ 12.50	$ 15,675	$ 21.32	$ 26,735	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,410		
Vangorda WR Dump Seepage Collection to Pit																									$627,519	
9	4	1	1	430	Access road	Construct access roads	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
9	4	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	70	m	C.2.09	2.000	140.0	$ 102.13	$ 7,149	$ -	$ -	$ 100.85	$ 7,060	$ 22.08	1,189	$ 1,546	$ -	$ -	$ 225.07	$15,755		no preliminary design done.
9	4	2	2	500		Install 6" stainless steel well casing & screen	70	m	C.3.17	0.150	10.5	$ 7.66	$ 536	$ 232.60	$ 16,282	$ 7.56	$ 529	$ 1.66	89	$ 116	$ -	$ -	$ 249.48	$17,464		
9	4	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
9	4	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
9	4	3	1	430	Piping system	Excavate piping trench	10,824	Bm3	C.2.13	0.020	216.5	$ 0.73	$ 7,923	$ -	$ -	$ 1.42	$ 15,403	$ 0.75	6,248	$ 8,122	$ -	$ -	$ 2.91	$31,448		
9	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,804	m	C.3.03	0.250	451.0	$ 8.75	$ 15,785	$ 155.84	$ 281,135	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$296,920		
9	4	3	4	430		Bedding layer: Produce, screen and stockpile	704	Bm3	C.2.02	0.010	7.0	$ 0.37	$ 258	$ -	$ -	$ 1.61	$ 1,132	$ 1.13	611	$ 795	$ -	$ -	$ 3.10	$2,184		
9	4	3	5	430		Bedding Layer: Load, haul, place and compact	704	Bm3	R.036	0.039	27.6	$ 1.44	$ 1,012	$ -	$ -	$ 2.98	$ 2,097	$ 1.37	742	$ 964	$ -	$ -	$ 5.79	$4,073		
9	4	3	6	430		Backfill ditches	10,120	Bm3	C.2.01	0.030	303.6	$ 1.08	$ 10,950	$ -	$ -	$ 0.74	$ 7,467	$ 0.40	3,079	$ 4,003	$ -	$ -	$ 2.22	$22,419		
9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,804	m	C.3.04	0.250	451.0	$ 12.50	$ 22,550	$ 21.32	$ 38,461	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$61,011		
9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	4	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	21	ea.	C.4.03	4.545	95.5	$ 297.88	$ 6,255	$ 325.96	$ 6,845	$ 85.85	$ 1,803	$ 28.17	455	$ 592	$ -	$ -	$ 737.86	$15,495		
9	4	5	2	510		Supply/Install overhead conductor	1,600	m	C.4.02	0.032	51.2	$ 2.21	$ 3,540	$ 1.41	$ 2,256	$ 0.45	$ 725	$ 0.15	183	$ 238	$ -	$ -	$ 4.22	$6,760		
9	4	5	3	510		Supply/Install transformers	7	ea.	C.4.04	20.000	140.0	$ 1,383.00	$ 9,681	$ 8,934.00	$ 62,538	$ 224.98	$ 1,575	$ 143.00	770	$ 1,001	$ -	$ -	$10,684.98	$74,795		
Contingency - Grum Dump Cut-off Wall																									$932,954	
9	5	1	1	430	Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ 2.08	$14,070		
9	5	1	2	430		Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ 3.85	$13,006		
9	5	2	1	600	Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ 108.57	$905,877		
Contingency Vangorda Pit Groundwater Collection																									$304,764	
9	6	1	1	430	Access road	Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
9	6	2	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		no preliminary design done.
9	6	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
9	6	2	3	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$14,884		
9	6	2	4	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
9	6	3	1	430	Piping system	Excavate piping trench	1,638	Bm3	C.2.13	0.020	32.8	$ 0.73	$ 1,199	$ -	$ -	$ 1.42	$ 2,331	$ 0.75	946	$ 1,229	$ -	$ -	$ 2.91	$4,759		
9	6	3	2	510		Supply and install insulated 150mm HDPE pipe	273	m	C.3.03	0.250	68.3	$ 8.75	$ 2,389	$ 155.84	$ 42,544	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$44,933		
9	6	3	3	430		Bedding layer: Produce, screen and stockpile	106	Bm3	C.2.02	0.010	1.1	$ 0.37	$ 39	$ -	$ -	$ 1.61	$ 171	$ 1.13	92	$ 120	$ -	$ -	$ 3.10	$330		
9	6	3	4	430		Bedding Layer: Load, haul, place and compact	106	Bm3	R.035	0.031	3.3	$ 1.12	$ 119	$ -	$ -	$ 2.32	$ 247	$ 1.07	87	$ 114	$ -	$ -	$ 4.50	$479		
9	6	3	5	430		Backfill ditches	1,532	Bm3	C.2.01	0.030	45.9	$ 1.08	$ 1,657	$ -	$ -	$ 0.74	$ 1,130	$ 0.40	466	$ 606	$ -	$ -	$ 2.22	$3,393		
9	6	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	273	m	C.3.04	0.250	68.3	$ 12.50	$ 3,413	$ 21.32	$ 5,820	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$9,233		
9	6	4	2	510		Supply/Install heat tracing power feed kit	180	ea.	C.3.05	4.000	720.0	$ 230.00	$ 41,400	$ 396.84	$ 71,431	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$112,831		
9	6	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 596	$ 325.96	$ 652	$ 85.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ 737.86	$1,476		
9	6	5	2	510		Supply/Install overhead conductor	273	m	C.4.02	0.032	8.7	$ 2.21	$ 604	$ 1.41	$ 385	$ 0.45	$ 124	$ 0.15	31	$ 41	$ -	$ -	$ 4.22	$1,153		
9	6	5	3	510		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$10,684.98	$21,370		
Subtotal Direct Costs - Groundwater											11,480		$564,578		$1,667,187		$350,228		143,745	$186,869		$0			$2,768,861	
Vangorda Haul Road																										
Remove Culverts																									$1,018,439	
10	1	1	1	430	Remove culverts	Excavate haul road	268,680	Bm3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ 3.79	$1,018,439		
Reclaim Haul Road																									$79,605	
10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	6,885	$ 8,951	$ -	$ -	$ 359.06	$21,543		
10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ 0.29	$39,141		
10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	180,000	m2	C.5.02	0.000	22.5	$ 0.00	$ 808	$ 0.05	$ 8,183	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ 0.11	$18,921		
Subtotal Direct Costs - Vangorda Haul Road											6,742		$246,737		$8,183		$570,311		209,856	$272,813		$0			$1,098,044	
Miscellaneous																										
Buildings																									$569,060	
10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,692	$ -	$ -	$ 28.17	$194,404		
10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	65,858	$ 85,615	$ -	$ -	$ 35.20	$352,250		
10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ 52.80	$18,214		
10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ 40.07	$601		
10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591		
Sludge Pond																									$133,287	
10	2	1	1	430	Cover sludge pond	Till: Load, haul, dump and place	30,000	Bm3	R.038	0.025	763.6	$ 0.93	$ 27,949	$ -	$ -	$ 2.33	$ 70,005	$ 1.18	27,179	$ 35,332	$ -	$ -	$ 4.44	$133,287		
Existing Bioremediation Cell																									$1,794	
10	3	1	1	430	Cover existing bioremediation cell	Doze material	1,600	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 999	$ 0.36	448	$ 582	$ -	$ -	$ 1.12	$1,794		
Dams																									$3,791	
10	4	1	1	430	Breach all dams (except Little Creek Dam)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
WTP Settling Pond																									$5,652	
10	5	1	1	430	Breach WTP settling pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.86	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,069	$ 1,390	$ -	$ -	$ 3.79	$5,652		
Contaminated soils																									$27,498	
10	6	1	1	600	Remove contaminated soils	Excavate, haul and place contaminated soils in bio-remediation c	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ 7.16	$26,868		
10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ 0.25	$630		
Bioremediation Cell																									$51,420	
10	7	1	1	430	Construct bioremediation cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
10	7	1	2	430		Place HDPE liner for remediation Cell	1,600	m2	C.4.10	0.143	228.6	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,300	$ 1,690	$ -	$ -	$ 21.79	$34,861		
10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ 2.22	$1,063		
Roads																									$20,785	
10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ 3.79	$14,859		
10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ 0.29	$4,349		

10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ 0.11	$1,577	
Borrow Sources																									$85,000
10	9	1	1	600	Develop borrow sources	Clear ang grub	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253	
10	9	1	2	600		Construct haul roads	1,000	m	C.2.28	0.225	225.0	$ 8.24	$ 8,235	$ -	$ -	$ 29.67	$ 29,674	$ 19.48	14,986	$ 19,482	$ -	$ -	$ 57.39	$57,391	
10	9	2	1	600	Decommission borrow sources	Regrade borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591	
10	9	2	2	610		Seed/Fertilize, helicopter low application rate	169,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,683	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ 0.11	$17,765	
Subtotal Direct Costs - Miscellaneous											**8,853**		**$351,534**		**$28,797**		**$335,488**		**140,358**	**$182,466**		**$0**			**$898,285**
Subtotal Direct Costs																									
						Subtotal direct costs					**101,463**		**$3,889,719**		**$2,462,345**		**$10,129,347**		**2,949,307**	**$6,302,021**		**$0**			**$22,783,432**
CLOSURE COSTS - INDIRECT																									
100	100	1	1		Project Management	5.0% of direct costs															$ 22,783,432	x	5.0%		$1,139,172
100	100	2	1		Field Supervision	2.5% of direct costs															$ 22,783,432	x	2.5%		$569,586
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 22,783,432	x	10.0%		$2,278,343
100	100	4	1		Insurance	0.5% of direct costs															$ 22,783,432	x	0.5%		$113,917
100	100	5	1		Bonding	0.5% of direct costs															$ 22,783,432	x	0.5%		$113,917
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 22,783,432	x	10.0%		$2,278,343
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0
Subtotal Indirect Costs																									
					Subtotal indirect costs																				**$6,993,278**
CLOSURE COSTS - CONTINGENCY																									
					Contingency	20% of direct costs															$22,783,432	x	20.0%		**$4,556,686**
CLOSURE COSTS - TOTAL																									
					Total direct and indirect costs																				**$34,333,397**

Vangorda/Grum Alternative 3 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											
Water Management																										$ -	
1	1	1	1	600	Use existing plant as long as possible	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berm																										$ 137,140	
1	2	1	1	430	Construct access road	Clear access road area	4,350	m	C.2.05	0.015	63.3	$ 0.53	$ 2,316	$ -	$ -	$ 0.94	$ 4,067	$ 0.62	2,065	$ 2,684	$ -	$ -	$ 2.08	$ 9,067		
1	2	1	2	430		Construct access road	1,450	m	C.2.27	0.131	190.3	$ 4.80	$ 6,965	$ -	$ -	$ 10.14	$ 14,707	$ 5.33	5,940	$ 7,722	$ -	$ -	$ 20.27	$ 29,395		
1	2	2	1	430	Place berm materials	Load, haul, dump berm material	15,000	Lm3	R.007	0.056	840.0	$ 2.05	$ 30,744	$ -	$ -	$ 1.73	$ 26,010	$ 1.56	18,020	$ 23,426	$ -	$ -	$ 5.35	$ 80,180		
1	2	2	2	430		Final Shaping of material with dozer	3,000	m	C.2.03	0.020	60.0	$ 0.73	$ 2,196	$ -	$ -	$ 3.43	$ 10,299	$ 2.00	4,617	$ 6,002	$ -	$ -	$ 6.17	$ 18,498		
Vangorda Pit Waste Rock Piles																										$ 142,937	
1	3	1	1	430	Regrade	Flattened surfaces	13	hrs	C.2.22	1.000	13.0	$ 36.60	$ 476	$ -	$ -	$ 173.28	$ 2,253	$ 149.18	1,492	$ 1,940	$ -	$ -	$ 359.06	$ 4,669		
1	3	1	2	430		Flatten bubble dump surfaces	10	hrs	C.2.22	1.000	9.6	$ 36.60	$ 353	$ -	$ -	$ 173.28	$ 1,670	$ 149.18	1,106	$ 1,438	$ -	$ -	$ 359.06	$ 3,460		
1	3	1	3	430		Regrade slopes	28	hrs	C.2.22	1.000	27.7	$ 36.60	$ 1,014	$ -	$ -	$ 173.28	$ 4,800	$ 149.18	3,179	$ 4,132	$ -	$ -	$ 359.06	$ 9,946		
1	3	2	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	32,412	Bm3	R.008	0.012	388.9	$ 0.44	$ 14,235	$ -	$ -	$ 1.73	$ 56,193	$ 1.13	28,108	$ 36,541	$ -	$ -	$ 3.30	$ 106,969		
1	3	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	118,825	m2	C.5.01	0.000	14.9	$ 0.00	$ 533	$ 0.09	$ 10,804	$ 0.05	$ 6,476	$ 0.00	61	$ 79	$ -	$ -	$ 0.15	$ 17,892		
Subtotal Direct Costs - Vangorda Pit												**1,608**		**$58,832**		**$10,804**		**$126,477**		**64,588**	**$83,964**		**$0**			**$ 280,077**	
Vangorda Dump																											
Reslope Dump																										$ 265,537	
2	1	1	1	430	Regrade (shape to enhance runoff to ditches)	Flattened surfaces	40	hrs	C.2.22	1.000	39.6	$ 36.60	$ 1,449	$ -	$ -	$ 173.28	$ 6,862	$ 149.18	4,544	$ 5,907	$ -	$ -	$ 359.06	$ 14,218		
2	1	1	2	430		Flatten bubble dump surfaces	102	hrs	C.2.22	1.000	102.0	$ 36.60	$ 3,731	$ -	$ -	$ 173.28	$ 17,666	$ 149.18	11,699	$ 15,209	$ -	$ -	$ 359.06	$ 36,607		
2	1	1	3	430		Regrade slopes	598	hrs	C.2.22	1.000	598.0	$ 36.60	$ 21,886	$ -	$ -	$ 173.28	$ 103,618	$ 149.18	68,621	$ 89,208	$ -	$ -	$ 359.06	$ 214,712		
Waste Rock Cover																										$ 1,287,907	
2	2	1	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	320,063	Bm3	R.011	0.015	4888.2	$ 0.56	$ 178,909	$ -	$ -	$ 2.10	$ 673,685	$ 1.36	334,856	$ 435,313	$ -	$ -	$ 4.02	$ 1,287,907		
Rock Drains																										$ 44,973	
2	3	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	1,313	Bm3	C.2.13	0.020	26.3	$ 0.73	$ 961	$ -	$ -	$ 1.42	$ 1,868	$ 0.75	758	$ 985	$ -	$ -	$ 2.91	$3,813		
2	3	1	2	430		Construct access road	977	Bm3	C.2.23	0.045	43.9	$ 1.62	$ 1,585	$ 15.72	$ 15,351	$ 2.64	$ 2,577	$ 1.36	1,024	$ 1,332	$ -	$ -	$ 21.35	$20,845		
2	3	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	977	Bm3	C.2.24	0.040	39.1	$ 1.46	$ 1,430	$ -	$ -	$ 6.43	$ 6,283	$ 4.52	3,393	$ 4,411	$ -	$ -	$ 12.42	$12,124		
2	3	1	5	430		Rip-Rap: Load, haul and dump	977	Bm3	R.012	0.041	39.9	$ 1.50	$ 1,460	$ -	$ -	$ 3.50	$ 3,415	$ 1.58	1,187	$ 1,543	$ -	$ -	$ 6.57	$6,417		
2	3	1	6	430		Rip-Rap: Place and secure	977	Bm3	C.2.26	0.013	12.2	$ 0.46	$ 447	$ -	$ -	$ 0.89	$ 868	$ 0.47	352	$ 458	$ -	$ -	$ 1.82	$1,773		
Sediment Control Ditches																										$ 2,010	
2	4	1	1	430	Vangorda dump sediment control ditch	Load, haul and dump locally	390	Bm3	C.2.10	0.032	12.5	$ 1.17	$ 457	$ -	$ -	$ 2.72	$ 1,059	$ 1.27	380	$ 495	$ -	$ -	$ 5.16	$ 2,010		
Revegetate																										$ 75,913	
2	5	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$ 75,913		
Subtotal Direct Costs - Vangorda Dump												**5,865**		**$214,578**		**$61,188**		**$845,379**		**427,073**	**$555,195**		**$0**			**$ 1,676,341**	
Vangorda Creek																											1CD003.15 Vangorda Creek Diversion
Minor Upgrades to Vangorda Creek in Current Alignment																										$ 23,893	
3	1	1	1	430	Widen existing channel	Soil Excavation: Excavate, haul, dump	1,100	Bm3	C.2.10	0.032	35.2	$ 1.17	$ 1,288	$ -	$ -	$ 2.72	$ 2,987	$ 1.27	1,073	$ 1,395	$ -	$ -	$ 5.16	$ 5,671		
3	1	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	330	Bm3	C.2.02	0.010	3.3	$ 0.37	$ 121	$ -	$ -	$ 1.61	$ 531	$ 1.13	287	$ 373	$ -	$ -	$ 3.10	$ 1,024		
3	1	3	2	430		Bedding: load , haul, place and compact	330	Bm3	R.016	0.031	10.1	$ 1.12	$ 369	$ -	$ -	$ 2.32	$ 765	$ 1.07	271	$ 352	$ -	$ -	$ 4.50	$ 1,486		
3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	330	Bm3	C.2.23	0.045	14.9	$ 1.62	$ 536	$ 15.72	$ 5,188	$ 2.64	$ 871	$ 1.36	346	$ 450	$ -	$ -	$ 21.35	$ 7,044		
3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	330	Bm3	C.2.25	0.057	18.9	$ 2.09	$ 690	$ -	$ -	$ 9.19	$ 3,033	$ 6.45	1,638	$ 2,130	$ -	$ -	$ 17.74	$ 5,853		
3	1	4	3	430		Rip-Rap: Load, haul and dump	330	Bm3	R.017	0.042	13.8	$ 1.53	$ 504	$ -	$ -	$ 3.57	$ 1,179	$ 1.61	410	$ 533	$ -	$ -	$ 6.71	$ 2,216		
3	1	4	4	430		Rip-Rap: Place and secure	330	Bm3	C.2.26	0.013	4.1	$ 0.46	$ 151	$ -	$ -	$ 0.89	$ 294	$ 0.47	119	$ 155	$ -	$ -	$ 1.82	$ 599		
Upgrade Plunge Pool																										$ 5,748	
3	2	1	1	430	Excavate pool	Plunge pool excavation	200	Bm3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$ 758		
3	2	2	1	430	Place bedding layer	Bedding: Produce and stockpile locally	30	Bm3	C.2.02	0.010	0.3	$ 0.37	$ 11	$ -	$ -	$ 1.61	$ 48	$ 1.13	26	$ 34	$ -	$ -	$ 3.10	$ 93		
3	2	2	2	430		Bedding: Load, haul, place and compact	30	Bm3	R.016	0.031	0.9	$ 1.12	$ 34	$ -	$ -	$ 2.32	$ 70	$ 1.07	25	$ 32	$ -	$ -	$ 4.50	$ 135		
3	2	3	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	100	Bm3	C.2.23	0.045	4.5	$ 1.62	$ 162	$ 15.72	$ 1,572	$ 2.64	$ 264	$ 1.36	105	$ 136	$ -	$ -	$ 21.35	$ 2,135		
3	2	3	2	430		Rip-rap (angular, high quality): Screen and stockpile	100	Bm3	C.2.25	0.057	5.7	$ 2.09	$ 209	$ -	$ -	$ 9.19	$ 919	$ 6.45	496	$ 645	$ -	$ -	$ 17.74	$ 1,774		
3	2	3	3	430		Rip-Rap: Load, haul and dump	100	Bm3	R.017	0.042	4.2	$ 1.53	$ 153	$ -	$ -	$ 3.57	$ 357	$ 1.61	124	$ 161	$ -	$ -	$ 6.71	$ 671		
3	2	3	4	430		Rip-Rap: Place and secure	100	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 46	$ -	$ -	$ 0.89	$ 89	$ 0.47	36	$ 47	$ -	$ -	$ 1.82	$ 182		
Upgrade Diversion to Dixon Creek																										$ 25,776	
3	3	1	1		Upgrade existing diversion to Dixon creek	Excavate channel and spoil locally	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,856	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$ 25,776		
Allowance: Buttress the North Vangorda Pit Wall																										$ 1,249,815	
3	4	1	1		Butress North Vangorda Pit Wall	Load, haul, dump	256,654	Bm3	R.018	0.030	7769.0	$ 1.11	$ 284,345	$ -	$ -	$ 2.59	$ 665,014	$ 1.17	231,120	$ 300,456	$ -	$ -	$ 4.87	$ 1,249,815		
Subtotal Direct Costs - Vangorda Creek												**8,051**		**$294,647**		**$6,760**		**$690,399**		**241,097**	**$313,426**		**$0**			**$ 1,305,232**	
Grum Pit																											1CD003.46_PitLakesTreat
Water Management																										$ -	
4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berm																										$ 152,739	
4	2	1	1	430	Construct access road	Access road: clearing and grubbing	3,750	m	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$ 4,204		
4	2	1	2	220		Access road: construction	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$ 25,341		
4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.93	$ 98,531		
4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$ 24,664		
Subtotal Direct Costs - Grum Pit												**1,238**		**$45,300**		**$0**		**$62,429**		**34,623**	**$45,010**		**$0**			**$ 152,739**	
Grum Interceptor Ditch																											1CD003.46_PitLakesTreat
Route into Grum Pit																										$86,484	assumed channel from vangorda creek diversion (1CD003.15)
5	1	1	1	430	Access road	Access road: clearing and grubbing	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
5	1	1	2	220		Access road: construction	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
5	1	2	1	430	Headworks dam	Construct earth dam at headworks (LHD till)	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,967	$ 2,558	$ -	$ -	$ 5.16	$10,397		
5	1	3	2	430		Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
5	1	4	1	430	Place bedding layer	Bedding: Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
5	1	4	2	430		Bedding: Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880		
5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,536	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Route out of Pit via slot cut																										$216,505	
5	3	1	1	430	Access road	Access road: clearing and grubbing	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168		
5	3	1	2	220		Access road: construction	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,997	$ 11,696	$ -	$ -	$ 5.16	$47,543		
5	3	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
5	3	3	2	430		Bedding: Load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020		
5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046		
5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,866		
5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,488	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331		
5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												**1,247**		**$45,523**		**$72,116**		**$118,570**		**51,369**	**$66,780**		**$0**			**$302,988**	
Overburden Dump																											
Reslope Dump																										$51,221	
7	2	1	1	430	Regrade	Flattened surfaces	26	hrs	C.2.22	1.000	25.7	$ 36.60	$ 941	$ -	$ -	$ 173.28	$ 4,457	$ 149.18	2,952	$ 3,837	$ -	$ -	$ 359.06	$9,236		
7	2	1	2	430		Regrade slopes	117	hrs	C.2.22	1.000	116.9	$ 36.60	$ 4,280	$ -	$ -	$ 173.28	$ 20,262	$ 149.18	13,418	$ 17,444	$ -	$ -	$ 359.06	$41,986		
Revegetate																										$53,635	
7	3	1	1	610	Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump												**206**		**$7,512**		**$23,196**		**$52,529**		**16,631**	**$21,620**		**$0**			**$104,857**	
Groundwater																											1CD003.37 Grum Seepage Collection
Grum Dump Groundwater Collection to Holding Pond																										$506,884	
9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,186		
9	1	1	2	220		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		no prelliminary design done.
9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ 2.91	$21,651		
9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421		
9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504		
9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.8	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.89	332	$ 431	$ -	$ -	$ 3.64	$1,762		
9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$16,508		
9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004		
9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	368	$ 479	$ -	$ -	$ 737.86	$12,544		
9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247		
9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$10,684.98	$53,425		
Grum Dump Groundwater Holding Pond																										$106,157	
9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ 3.79	$41,120		
9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ 7.71	$11,385		
9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ 0.61	$3,002		
9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ 4.44	$13,567		
9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ 3.10	$4,582		
9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ 3.64	$5,371		
9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ 737.86	$7,379		
9	2	6	2	510		Supply/Install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ 4.22	$2,957		
9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$10,684.98	$10,685		
Grum Dump: Groundwater Collection from Holding Pond to Vangorda Pit																										$290,584	

9	3	1	1	430	Piping System	Excavate Piping Trench	7,524	Bm3	C.2.13	0.020	150.5	$ 0.73	$ 5,508	$ -	$ -	$ 1.42	$ 10,707	$ 0.75	4,343	$ 5,646	$ -	$ -	$ 2.91	$21,860		
9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	1,254	m	C.3.03	0.250	313.5	$ 8.75	$ 10,973	$ 155.84	$ 195,423	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$206,396		
9	3	1	6	430		Bedding: Produce and stockpile (screen)	489	Bm3	C.2.02	0.010	4.9	$ 0.37	$ 179	$ -	$ -	$ 1.61	$ 787	$ 1.13	425	$ 552	$ -	$ -	$ 3.10	$1,518		
9	3	1	7	430		Bedding: Load, haul, place	489	Bm3	R.034	0.024	11.6	$ 0.87	$ 426	$ -	$ -	$ 1.80	$ 882	$ 0.87	326	$ 424	$ -	$ -	$ 3.54	$1,731		
9	3	1	8	430		Backfill and compact ditches	7,524	Bm3	C.2.01	0.030	225.7	$ 1.08	$ 8,141	$ -	$ -	$ 0.74	$ 5,551	$ 0.40	2,289	$ 2,976	$ -	$ -	$ 2.22	$16,668		
9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,254	m	C.3.04	0.250	313.5	$ 12.50	$ 15,675	$ 21.32	$ 26,735	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,410		
Vangorda WR Dump Seepage Collection to Pit (defer as long as possible)																									$627,519	
9	4	1	1	430	Access road	Construct access roads	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
9	4	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	70	m	C.2.09	2.000	140.0	$ 102.13	$ 7,149	$ -	$ -	$ 100.85	$ 7,060	$ 22.08	1,189	$ 1,546	$ -	$ -	$ 225.07	$15,755		no prelliminary design done.
9	4	2	2	500		Install 6" stainless steel well casing & screen	70	m	C.3.17	0.150	10.5	$ 7.66	$ 536	$ 232.60	$ 16,282	$ 7.56	$ 529	$ 1.66	89	$ 116	$ -	$ -	$ 249.48	$17,464		
9	4	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
9	4	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
9	4	3	1	430	Piping system	Excavate piping trench	10,824	Bm3	C.2.13	0.020	216.5	$ 0.73	$ 7,923	$ -	$ -	$ 1.42	$ 15,403	$ 0.75	6,248	$ 8,122	$ -	$ -	$ 2.91	$31,448		
9	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,804	m	C.3.03	0.250	451.0	$ 8.75	$ 15,785	$ 155.84	$ 281,135	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$296,920		
9	4	3	4	430		Bedding layer: Produce, screen and stockpile	704	Bm3	C.2.02	0.010	7.0	$ 0.37	$ 258	$ -	$ -	$ 1.61	$ 1,132	$ 1.13	611	$ 795	$ -	$ -	$ 3.10	$2,184		
9	4	3	5	430		Bedding Layer: Load, haul, place and compact	704	Bm3	R.036	0.039	27.6	$ 1.44	$ 1,012	$ -	$ -	$ 2.98	$ 2,097	$ 1.37	742	$ 964	$ -	$ -	$ 5.79	$4,073		
9	4	3	6	430		Backfill ditches	10,120	Bm3	C.2.01	0.030	303.6	$ 1.08	$ 10,950	$ -	$ -	$ 0.74	$ 7,467	$ 0.40	3,079	$ 4,003	$ -	$ -	$ 2.22	$22,419		
9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,804	m	C.3.04	0.250	451.0	$ 12.50	$ 22,550	$ 21.32	$ 38,461	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$61,011		
9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	4	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	21	ea.	C.4.03	4.545	95.5	$ 297.88	$ 6,255	$ 325.96	$ 6,845	$ 85.85	$ 1,803	$ 28.17	455	$ 592	$ -	$ -	$ 737.86	$15,495		
9	4	5	2	510		Supply/Install overhead conductor	1,600	m	C.4.02	0.032	51.2	$ 2.21	$ 3,540	$ 1.41	$ 2,256	$ 0.45	$ 725	$ 0.15	183	$ 238	$ -	$ -	$ 4.22	$6,760		
9	4	5	3	510		Supply/Install transformers	7	ea.	C.4.04	20.000	140.0	$ 1,383.00	$ 9,681	$ 8,934.00	$ 62,538	$ 224.98	$ 1,575	$ 143.00	770	$ 1,001	$ -	$ -	$10,684.98	$74,795		
Contingency - Grum Dump Cut-off Wall																									$932,954	
9	5	1	1	430	Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ 2.08	$14,070		
9	5	1	2	430		Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ 3.85	$13,006		
9	5	2	1	600	Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ 108.57	$905,877		
Contingency Vangorda Pit Groundwater Collection																									$304,764	
9	6	1	1	430	Access road	Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
9	6	2	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		no prelliminary design done.
9	6	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
9	6	2	3	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$14,884		
9	6	2	4	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
9	6	3	1	430	Piping system	Excavate piping trench	1,638	Bm3	C.2.13	0.020	32.8	$ 0.73	$ 1,199	$ -	$ -	$ 1.42	$ 2,331	$ 0.75	946	$ 1,229	$ -	$ -	$ 2.91	$4,759		
9	6	3	2	510		Supply and install insulated 150mm HDPE pipe	273	m	C.3.03	0.250	68.3	$ 8.75	$ 2,389	$ 155.84	$ 42,544	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$44,933		
9	6	3	3	430		Bedding layer: Produce, screen and stockpile	106	Bm3	C.2.02	0.010	1.1	$ 0.37	$ 39	$ -	$ -	$ 1.61	$ 171	$ 1.13	92	$ 120	$ -	$ -	$ 3.10	$330		
9	6	3	4	430		Bedding Layer: Load, haul, place and compact	106	Bm3	R.035	0.031	3.3	$ 1.12	$ 119	$ -	$ -	$ 2.32	$ 247	$ 1.07	87	$ 114	$ -	$ -	$ 4.50	$479		
9	6	3	5	430		Backfill ditches	1,532	Bm3	C.2.01	0.030	45.9	$ 1.08	$ 1,657	$ -	$ -	$ 0.74	$ 1,130	$ 0.40	466	$ 606	$ -	$ -	$ 2.22	$3,393		
9	6	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	273	m	C.3.04	0.250	68.3	$ 12.50	$ 3,413	$ 21.32	$ 5,820	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$9,233		
9	6	4	2	510		Supply/Install heat tracing power feed kit	180	ea.	C.3.05	4.000	720.0	$ 230.00	$ 41,400	$ 396.84	$ 71,431	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$112,831		
9	6	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 596	$ 325.96	$ 652	$ 85.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ 737.86	$1,476		
9	6	5	2	510		Supply/Install overhead conductor	273	m	C.4.02	0.032	8.7	$ 2.21	$ 604	$ 1.41	$ 385	$ 0.45	$ 124	$ 0.15	31	$ 41	$ -	$ -	$ 4.22	$1,153		
9	6	5	3	510		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$10,684.98	$21,370		
Subtotal Direct Costs - Groundwater											11,480		$564,578		$1,667,187		$350,228		143,745	$186,869		$0			**$2,768,861**	
Vangorda Haul Road																										
Remove Culverts																									$1,018,439	
10	1	1	1	430	Remove culverts	Excavate haul road	268,680	Bm3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ 3.79	$1,018,439		
Reclaim Haul Road																									$79,605	
10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	6,885	$ 8,951	$ -	$ -	$ 359.06	$21,543		
10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ 0.29	$39,141		
10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	180,000	m2	C.5.02	0.000	22.5	$ 0.00	$ 808	$ 0.05	$ 8,183	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ 0.11	$18,921		
Subtotal Direct Costs - Vangorda Haul Road											6,742		$246,737		$8,183		$570,311		209,856	$272,813		$0			**$1,098,044**	
Miscellaneous																										
Buildings																									$569,060	
10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,692	$ -	$ -	$ 28.17	$194,404		
10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	65,858	$ 85,615	$ -	$ -	$ 35.20	$352,250		
10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ 52.80	$18,214		
10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ 40.07	$601		
10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591		
Dams																									$3,791	
10	4	1	1	430	Breach all dams (except Little Creek Dam)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
Contaminated soils																									$27,498	
10	6	1	1	600	Remove contaminated soils	Excavate, haul and place contaminated soils in bio-remediation c	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ 7.16	$26,868		
10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ 0.25	$630		
Bioremediation Cell																									$51,420	
10	7	1	1	430	Construct bioremediation cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
10	7	1	2	430		Place HDPE liner for remediation Cell	1,600	m2	C.4.10	0.143	228.6	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,300	$ 1,690	$ -	$ -	$ 21.79	$34,861		
10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ 2.22	$1,063		
Roads																									$20,785	
10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ 3.79	$14,859		
10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ 0.29	$4,349		
10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ 0.11	$1,577		
Borrow Sources																									$21,355	
10	9	2	1	600	Decommission borrow sources	Regrade borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591		
10	9	2	2	610		Seed/Fertilize, helicopter low application rate	169,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,683	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ 0.11	$17,765		
Subtotal Direct Costs - Miscellaneous											7,780		$312,256		$28,797		$229,028		95,252	$123,828		$0			**$693,908**	
Subtotal Direct Costs																										
						Subtotal direct costs					44,216		$1,789,962		$1,878,229		$3,045,351		1,284,235	$1,669,505		$0			**$8,383,047**	
CLOSURE COSTS - INDIRECT																										
100	100	1	1		Project Management	5.0% of direct costs															$ 8,383,047	x	5.0%		$419,152	
100	100	2	1		Field Supervision	2.5% of direct costs															$ 8,383,047	x	2.5%		$209,576	
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 8,383,047	x	10.0%		$838,305	
100	100	4	1		Insurance	0.5% of direct costs															$ 8,383,047	x	0.5%		$41,915	
100	100	5	1		Bonding	0.5% of direct costs															$ 8,383,047	x	0.5%		$41,915	
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 8,383,047	x	10.0%		$838,305	
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																										
					Subtotal indirect costs																				**$2,889,168**	
CLOSURE COSTS - CONTINGENCY																										
					Contingency	20% of direct costs															$8,383,047	x	20.0%		**$1,676,609**	
CLOSURE COSTS - TOTAL																										
					Total direct and indirect costs																				**$12,948,825**	

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Vangorda/Grum Alternative 4 - Minimize Water Treatment

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	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	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											1CD003.48_VangordaBackfill
Water Management																										$430,714	
	1	1	1	1	610	Pump and treat Vangorda Pit Water	Pump to existing treatment plant	2,300,000	m3	C.8.01	0.004	10132.2	$ 0.15	$ 354,626	$ 0.02	$ 53,462	$ 0.01	$ 13,208	$ 0.00	7,244	$ 9,418	$ -	$ -	$ 0.19	$430,714		(115mg/L Zn)
Pit Ramp																										$17,744	
	1	2	1	1	430	Upgrade ramp for 777 traffic	Load, haul, dump (locally) waste rock above present waterline	1,908	Bm3	R.001	0.032	61.4	$ 1.18	$ 2,246	$ -	$ -	$ 3.29	$ 6,273	$ 1.66	2,441	$ 3,173	$ -	$ -	$ 6.13	$11,693		
	1	2	1	2	430		Grade ramp	24,000	m2	C.2.18	0.002	52.2	$ 0.08	$ 1,910	$ -	$ -	$ 0.09	$ 2,100	$ 0.09	1,570	$ 2,042	$ -	$ -	$ 0.25	$6,051		
Backfill Pit																										$40,877,284	
	1	3	1	1	430	Backfill pit	Load, haul and place Baritic and Oxide Fines	286,000	Bm3	R.002	0.013	3595.4	$ 0.46	$ 131,593	$ -	$ -	$ 1.48	$ 422,274	$ 0.97	214,101	$ 278,331	$ -	$ -	$ 2.91	$832,198		
	1	3	1	2	430		Load, haul and place high sulphide area west of the dump ramp	1,300,000	Bm3	R.003	0.013	16342.9	$ 0.46	$ 598,149	$ -	$ -	$ 1.48	$ 1,919,428	$ 0.97	973,186	$ 1,265,141	$ -	$ -	$ 2.91	$3,782,718		
	1	3	1	3	430		Load, haul and place ore transfer pad material	321,260	Bm3	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -			
	1	3	1	4	430		Load, haul and place Main Waste Rock Dump (over-excavate)	8,787,000	Bm3	R.002	0.013	110465.1	$ 0.46	$ 4,043,024	$ -	$ -	$ 1.48	$ 12,973,859	$ 0.97	6,577,987	$ 8,551,383	$ -	$ -	$ 2.91	$25,568,267		
	1	3	1	5	430		Load, haul and place till from base of Waste Rock Dump	504,150	Bm3	R.002	0.013	6337.9	$ 0.46	$ 231,967	$ -	$ -	$ 1.48	$ 744,369	$ 0.97	377,409	$ 490,632	$ -	$ -	$ 2.91	$1,466,967		
	1	3	2	1	510	Lime addition	Add lime to waste rock	12,548	tonnes	C.2.21	0.036	448.1	$ 1.59	$ 20,005	$ 320.00	$ 4,015,360	$ 1.67	$ 20,935	$ 0.98	9,446	$ 12,280	$ -	$ -	$ 324.24	$4,068,580		
	1	3	2	2	510		Add lime to Baritic and Oxide Fines	4,089	tonnes	C.2.21	0.036	146.0	$ 1.59	$ 6,519	$ 320.00	$ 1,308,480	$ 1.67	$ 6,822	$ 0.98	3,078	$ 4,002	$ -	$ -	$ 324.24	$1,325,823		
	1	3	2	3	010		Survey requirements (grid for testing)	22,397	hrs	P.02	1.000	22396.8	$ 35.00	$ 783,889	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$783,889		
	1	3	2	4	010		Material testing (to verify lime addition dosage)	22,397	hrs	P.03	1.000	22396.8	$ 100.00	$ 2,239,682	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$2,239,682		
	1	3	2	4	970	Lime addition contingency	15% contingency	2,496	tonnes	C.2.21	0.036	89.1	$ 1.59	$ 3,979	$ 320.00	$ 798,576	$ 1.67	$ 4,164	$ 0.98	1,879	$ 2,442	$ -	$ -	$ 324.24	$809,160		
Regrade waste for drainage																										$53,791	
	1	4	1	1	430	Regrade	Shape to enhance runoff to ditches	150	hrs	C.2.22	1.000	149.8	$ 36.60	$ 5,483	$ -	$ -	$ 173.28	$ 25,959	$ 149.18	17,191	$ 22,349	$ -	$ -	$ 359.06	$53,791		
Cover with Low Infiltration Cover																										$1,681,950	
	1	5	1	1	430	Place low infiltration cover	Load, haul, place and compact till (0.5m)	150,000	Bm3	R.005	0.014	2036.4	$ 0.50	$ 74,531	$ -	$ -	$ 1.59	$ 239,166	$ 1.05	121,262	$ 157,640	$ -	$ -	$ 3.14	$471,337		
	1	5	1	2	430		Load, haul, place loose till (1.5m)	450,000	Bm3	R.006	0.010	4581.8	$ 0.37	$ 167,695	$ -	$ -	$ 1.34	$ 602,128	$ 0.88	304,321	$ 395,617	$ -	$ -	$ 2.59	$1,165,440		
	1	5	1	1	610	Vegetate WR dumps	Seed/Fertilize, helicopter high application rate	300,000	m2	C.5.01	0.000	37.5	$ 0.00	$ 1,347	$ 0.09	$ 27,276	$ 0.05	$ 16,351	$ 0.00	153	$ 199	$ -	$ -	$ 0.15	$45,173		
Safety Berms																										$37,393	
	1	7	1	1	430	Construct access road	Clear access road area	1,281	m2	C.2.04	0.004	4.7	$ 0.13	$ 170	$ -	$ -	$ 0.62	$ 800	$ 0.36	358	$ 466	$ -	$ -	$ 1.12	$1,436		
	1	7	1	2	220		Construct access road	427	m	C.2.27	0.131	56.0	$ 4.80	$ 2,051	$ -	$ -	$ 10.14	$ 4,331	$ 5.33	1,749	$ 2,274	$ -	$ -	$ 20.27	$8,656		
	1	7	2	1	430	Place berm materials	Load, haul, dump berm material	4,150	Lm3	R.007	0.056	232.4	$ 2.05	$ 8,506	$ -	$ -	$ 1.73	$ 7,196	$ 1.56	4,985	$ 6,481	$ -	$ -	$ 5.35	$22,183		
	1	7	2	2	430		Final Shaping of material with dozer	830	m	C.2.03	0.020	16.6	$ 0.73	$ 608	$ -	$ -	$ 3.43	$ 2,849	$ 2.00	1,277	$ 1,661	$ -	$ -	$ 6.17	$5,118		
Subtotal Direct Costs - Vangorda Pit												199,579		$8,677,977		$6,203,154		$17,012,213		8,619,639	$11,205,531		$0			$43,098,876	
Vangorda Dump																											1CD003.48_VangordaBackfill
Little Creek Dam																										$84,398	
	2	1	1	1	430	Breach dam	Load, haul and dump locally	22,266	Bm3	C.2.12	0.024	523.9	$ 0.86	$ 19,175	$ -	$ -	$ 2.00	$ 44,462	$ 0.93	15,971	$ 20,762	$ -	$ -	$ 3.79	$84,398		VanWasteDumpTillBerm.xls
Revegetate Dump																										$75,913	
	2	2	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$75,913		
Subtotal Direct Costs - Vangorda Dump												587		$21,438		$45,837		$71,939		16,228	$21,097		$0			$160,311	
Vangorda Creek Diversion																											Channel designed to 1:500 yr event (Design flow 31m³/s)
Vangorda Creek																										$658,791	
	3	1	1	1	430	Excavate channel	5m wide, 2:1 side slopes	26,815	m3	C.2.10	0.032	858.1	$ 1.17	$ 31,406	$ -	$ -	$ 2.72	$ 72,823	$ 1.27	26,158	$ 34,006	$ -	$ -	$ 5.16	$138,235		
	3	1	3	1	430	Place till	Till: Load, haul, dump and place	3,740	Bm3	R.015	0.034	125.7	$ 1.23	$ 4,599	$ -	$ -	$ 2.82	$ 10,555	$ 1.30	3,726	$ 4,844	$ -	$ -	$ 5.35	$19,998		
	3	1	3	2	430		Till: Compact with vibrating drum roller	12,467	m2	C.2.06	0.016	199.5	$ 0.57	$ 7,141	$ -	$ -	$ 0.02	$ 262	$ 0.02	156	$ 202	$ -	$ -	$ 0.61	$7,605		
	3	1	2	1	430	Place geotextile	Supply and place geotextile	6,226	m2	C.4.06	0.016	99.6	$ 0.57	$ 3,526	$ 3.50	$ 21,789	$ 0.23	$ 1,421	$ 0.15	708	$ 921	$ -	$ -	$ 4.44	$27,657		(or bitumen?)
	3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,830	Bm3	C.2.23	0.045	442.4	$ 1.62	$ 15,954	$ 15.72	$ 154,528	$ 2.64	$ 25,945	$ 1.36	10,312	$ 13,406	$ -	$ -	$ 21.35	$209,833		Some rip-rap needs to belarge to disperse energy at bottom of channel
	3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	9,830	Bm3	C.2.25	0.057	561.7	$ 2.09	$ 20,559	$ -	$ -	$ 9.19	$ 90,360	$ 6.45	48,800	$ 63,440	$ -	$ -	$ 17.74	$174,358		
	3	1	4	4	430		Rip-Rap: Load, haul and dump	9,830	Bm3	R.014	0.040	393.2	$ 1.46	$ 14,391	$ -	$ -	$ 3.42	$ 33,657	$ 1.55	11,697	$ 15,207	$ -	$ -	$ 6.43	$63,255		
	3	1	4	5	430		Rip-Rap: Place and secure	9,830	Bm3	C.2.26	0.013	122.9	$ 0.46	$ 4,497	$ -	$ -	$ 0.89	$ 8,743	$ 0.47	3,546	$ 4,610	$ -	$ -	$ 1.82	$17,850		
Subtotal Direct Costs - Vangorda Creek Diversion												2,803		$102,073		$176,317		$243,765		105,104	$136,636		$0			$658,791	
Grum Pit																											1CD003.46_PitLakesTreat
Water Treatment																										$0	
	4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berms																										$152,739	
	4	2	1	1	430	Construct access road	Clear access road area	3,750	m2	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$4,204		
	4	2	1	2	220		Construct access road	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$25,341		
	4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.93	$98,531		
	4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$24,664		
Subtotal Direct Costs - Grum Pit												1,238		$45,300		$0		$62,429			$45,010		$0			$152,739	
Grum Interceptor Ditch																											1CD003.46_PitLakesTreat
Route into Grum Pit																										$86,484	assumed channel from vangorda creek diversion (1CD003.15)
	5	1	1	1	430	Access road	Clear access road area	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
	5	1	1	2	220		Construct access road	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	5	1	2	1	430	Headworks dam	Load, haul, dump, place and compact till	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
	5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,967	$ 2,558	$ -	$ -	$ 5.16	$10,397		
	5	1	3	2	430		Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
	5	1	4	1	430	Place bedding layer	Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
	5	1	4	2	430		Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
	5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880		
	5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,536	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
	5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
	5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Algae Filter																										$2,980	
	5	2	6	1	430	Place waste rock from Grum Dump at slot cut	WR: Load, haul, dump	469	Bm3	R.023	0.028	13.2	$ 1.03	$ 484	$ -	$ -	$ 2.42	$ 1,133	$ 1.09	394	$ 512	$ -	$ -	$ 4.54	$2,129		
	5	2	6	2	430		WR: Place and secure	469	Bm3	C.2.26	0.013	5.9	$ 0.46	$ 214	$ -	$ -	$ 0.89	$ 417	$ 0.47	169	$ 220	$ -	$ -	$ 1.82	$851		
Route out of Pit via slot cut																										$216,505	
	5	3	1	1	430	Access road	Clear access road area	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168		
	5	3	1	2	220		Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
	5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,997	$ 11,696	$ -	$ -	$ 5.16	$47,543		
	5	3	3	1	430	Place bedding layer	Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
	5	3	3	2	430		Load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020		
	5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046		
	5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,866		
	5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,488	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331		
	5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												1,266		$46,222		$72,116		$120,120		51,932	$67,512		$0			$305,969	
Grum Dump																											
Reslope Dump																										$1,145,320	
	6	1	1	1	430	Clear/grub	Clear/grub forest area around toe	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.94	$ 12,343	$ 0.62	6,265	$ 8,145	$ -	$ -	$ 2.08	$27,515		
	6	1	2	1	430	Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.3	$ 36.60	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	38,711	$ 50,324	$ -	$ -	$ 359.06	$121,124		
	6	1	2	2	430		Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.5	$ 36.60	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460		
	6	1	2	3	430		Regrade Slopes	737	hrs	C.2.22	1.000	737.4	$ 36.60	$ 26,990	$ -	$ -	$ 173.28	$ 127,782	$ 149.18	84,624	$ 110,011	$ -	$ -	$ 359.06	$264,784		
	6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3882.4	$ 0.86	$ 142,094	$ -	$ -	$ 2.00	$ 329,486	$ 0.93	118,352	$ 153,858	$ -	$ -	$ 3.79	$625,437		
Sulphide Cell																										$2,156,795	
	6	2	1	1	430	Very low infiltration cover	Load, haul, place compacted till (1.0m)	197,450	Bm3	R.026	0.017	3350.7	$ 0.62	$ 122,634	$ -	$ -	$ 2.24	$ 441,399	$ 1.60	242,926	$ 315,804	$ -	$ -	$ 4.46	$879,837		70.51785714
	6	2	1	2	430		Load, haul, place loose till (1.5m)	296,175	Bm3	R.027	0.015	4523.4	$ 0.56	$ 165,556	$ -	$ -	$ 2.19	$ 648,738	$ 1.56	355,895	$ 462,663	$ -	$ -	$ 4.31	$1,276,958		
Waste Rock Cover																										$15,088,931	
	6	3	1	1	430	Low infiltration cover	Load, haul, place compacted till (0.5m)	858,625	Bm3	R.026	0.017	14570.6	$ 0.62	$ 533,284	$ -	$ -	$ 2.24	$ 1,919,455	$ 1.60	1,056,380	$ 1,373,294	$ -	$ -	$ 4.46	$3,826,033		572.4166667
							Load, haul, place loose till (1.5m)	2,575,875	Bm3	R.027	0.015	39340.6	$ 0.56	$ 1,439,867	$ -	$ -	$ 2.19	$ 5,642,166	$ 1.56	3,095,267	$ 4,023,848	$ -	$ -	$ 4.31	$11,105,881		19.08055556
	6	6	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	1,493,750	m2	C.5.02	0.000	186.7	$ 0.00	$ 6,706	$ 0.05	$ 67,906	$ 0.05	$ 81,413	$ 0.00	763	$ 992	$ -	$ -	$ 0.11	$157,017		
Steep Runoff channels																										$123,025	
	6	4	1	1	430	Install rock drains (runoff management)	Excavate channel	3,500	Bm3	C.2.12	0.024	82.4	$ 0.86	$ 3,014	$ -	$ -	$ 2.00	$ 6,989	$ 0.93	2,510	$ 3,264	$ -	$ -	$ 3.79	$13,267		
	6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,604	Bm3	C.2.23	0.045	117.2	$ 1.62	$ 4,226	$ 15.72	$ 40,935	$ 2.64	$ 6,873	$ 1.36	2,732	$ 3,551	$ -	$ -	$ 21.35	$55,585		
	6	4	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	2,604	Bm3	C.2.24	0.040	104.2	$ 1.46	$ 3,812	$ -	$ -	$ 6.43	$ 16,756	$ 4.52	9,049	$ 11,764	$ -	$ -	$ 12.42	$32,332		
	6	4	1	4	430		Rip-Rap: Load, haul and dump	2,604	Bm3	R.033	0.041	106.4	$ 1.50	$ 3,893	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113		
	6	4	1	5	430		Rip-Rap: Place and secure	2,604	Bm3	C.2.26	0.013	32.6	$ 0.46	$ 1,191	$ -	$ -	$ 0.89	$ 2,316	$ 0.47	939	$ 1,221	$ -	$ -	$ 1.82	$4,729		
Sediment Basins																										$12,450	
	6	5	2	1	430	Sedimentation Basins (at bottom of runoff char	Excavate sedimentation basin	2,128	Bm3	C.2.12	0.024	50.1	$ 0.86	$ 1,833	$ -	$ -	$ 2.00	$ 4,249	$ 0.93	1,526	$ 1,984	$ -	$ -	$ 3.79	$8,066		
	6	5	2	2	430		Rip-Rap: Drill, blast and stockpile	104	Bm3	C.2.23	0.045	4.7	$ 1.62	$ 169	$ 15.72	$ 1,635	$ 2.64	$ 274	$ 1.36	109	$ 142	$ -	$ -	$ 21.35	$2,220		
	6	5	2	3	430		Rip-rap (rounded, low quality): Screen and stockpile	104	Bm3	C.2.24	0.040	4.2	$ 1.46	$ 152	$ -	$ -	$ 6.43	$ 669	$ 4.52	361	$ 470	$ -	$ -	$ 12.42	$1,291		
	6	5	2	4	430		Rip-Rap: Load, haul and dump	104	Bm3	R.033	0.041	4.2	$ 1.50	$ 155	$ -	$ -	$ 3.50	$ 364	$ 1.58	126	$ 164	$ -	$ -	$ 6.57	$683		
	6	5	2	5	430		Rip-Rap: Place and secure	104	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 48	$ -	$ -	$ 0.89	$ 92	$ 0.47	38	$ 49	$ -	$ -	$ 1.82	$189		
Subtotal Direct Costs - Grum Dump												67,925		$2,485,852		$110,476		$9,360,300			$6,569,893		$0			$18,526,522	
Overburden Dump																											
Reslope Dump																										$153,664	
	7	2	1	1	430	Regrade	Flattened surfaces	77	hrs	C.2.22	1.000	77.2	$ 36.60	$ 2,824	$ -	$ -	$ 173.28	$ 13,371	$ 149.18	8,855	$ 11,511	$ -	$ -	$ 359.06	$27,707		
	7	2	1	2	430		Flatten bubble dump surfaces	351	hrs	C.2.22	1.000	350.8	$ 36.60	$ 12,839	$ -	$ -	$ 173.28	$ 60,786	$ 149.18	40,255	$ 52,332	$ -	$ -	$ 359.06	$125,957		
Revegetate																										$53,635	
	7	3	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump												492		$17,954		$23,196		$101,967		49,371	$64,182		$0			$207,299	
Ore Transfer Pad																											
Relocate to Vangorda Pit																										$1,429,518	
	8	1	1	1	430	Excavate acidic material (over-excavate)	Load, haul, place and compact in pit	321,260	Bm3	R.004	0.019	6112.0	$ 0.70	$ 223,700	$ -	$ -	$ 2.27	$ 729,591	$ 1.48	366,328	$ 476,227	$ -	$ -	$ 4.45	$1,429,518		
Reslope Pad for drainage																										$40,795	
	8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 36.60	$ 1,900	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	5,956	$ 7,742	$ -	$ -	$ 359.06	$18,635		
	8	2	1	2	430		Flatten bubble dump surfaces	62	hrs	C.2.22	1.000	61.7	$ 36.60	$ 2,259	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	7,082	$ 9,207	$ -	$ -	$ 359.06	$22,160		
Rudementary Cover																										$286,560	
	8	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,650	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,459	$ -	$ -	$ 1.99	$ 146,782	$ 1.38	77,937	$ 101,318	$ -	$ -	$ 3.89	$286,560		

Sediment Control Ditches																									$10,188	
8	4	1	1	430	Sediment Control Ditch	Excavation of ditch	1,791	Bm3	C.2.10	0.032	57.3	$ 1.17	$ 2,098	$ -	$ -	$ 2.72	$ 4,864	$ 1.27	1,747	$ 2,271	$ -	$ -	$ 5.16	$9,233		
8	4	2	1	430	Sedimentation Basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.86	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ 3.79	$955		
Revegetate																									$13,508	
8	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	128,504	m2	C.5.02	0.000	16.1	$ 0.00	$ 577	$ 0.05	$ 5,842	$ 0.05	$ 7,004	$ 0.00	66	$ 85	$ -	$ -	$ 0.11	$13,508		
Subtotal Direct Costs - Ore Transfer Pad											7,356		$269,209		$5,842		$908,432		459,297	$597,086		$0			**$1,780,568**	
Groundwater																										
Grum Dump Groundwater Collection to Holding Pond																									$506,884	
9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,186		
9	1	1	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		no prelliminary design done.
9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ 2.91	$21,651		
9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421		
9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504		
9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.8	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.89	332	$ 431	$ -	$ -	$ 3.64	$1,762		
9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$16,508		
9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004		
9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	368	$ 479	$ -	$ -	$ 737.86	$12,544		
9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247		
9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425		
Grum Dump Groundwater Holding Pond																									$106,157	
9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ 3.79	$41,120		
9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ 7.71	$11,385		
9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ 0.61	$3,002		
9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ 4.44	$13,567		
9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ 3.10	$4,582		
9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ 3.64	$5,371		
9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ 737.86	$7,379		
9	2	6	2	510		Supply/Install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ 4.22	$2,957		
9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Groundwater Collection System to Grum Pit																									$662,735	
9	3	1	1	430	Piping system	Excavate piping trench	17,160	Bm3	C.2.13	0.020	343.2	$ 0.73	$ 12,561	$ -	$ -	$ 1.42	$ 24,419	$ 0.75	9,905	$ 12,877	$ -	$ -	$ 2.91	$49,857		
9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	2,860	m	C.3.03	0.250	715.0	$ 8.75	$ 25,025	$ 155.84	$ 445,702	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$470,727		
9	3	1	3	430		Bedding: Produce and stockpile (screen)	1,115	Bm3	C.2.02	0.010	11.2	$ 0.37	$ 408	$ -	$ -	$ 1.61	$ 1,794	$ 1.13	969	$ 1,260	$ -	$ -	$ 3.10	$3,462		
9	3	1	4	430		Bedding: Load, haul, place and compact	1,115	Bm3	R.034	0.024	26.5	$ 0.87	$ 971	$ -	$ -	$ 1.80	$ 2,011	$ 0.87	744	$ 967	$ -	$ -	$ 3.54	$3,949		
9	3	1	5	430		Backfill and compact ditches	17,160	Bm3	C.2.01	0.030	514.8	$ 1.08	$ 18,567	$ -	$ -	$ 0.74	$ 12,660	$ 0.40	5,221	$ 6,787	$ -	$ -	$ 2.22	$38,014		
9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,860	m	C.3.04	0.250	715.0	$ 12.50	$ 35,750	$ 21.32	$ 60,975	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$96,725		
Contingency - Vangorda Pit Groundwater System																									$395,299	
9	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	270	m	C.2.09	2.000	540.0	$ 102.13	$ 27,576	$ -	$ -	$ 100.85	$ 27,230	$ 22.08	4,586	$ 5,962	$ -	$ -	$ 225.07	$60,768		no prelliminary design done.
9	4	1	2	500		Install 6" stainless steel well casing & screen	270	m	C.3.17	0.150	40.5	$ 7.66	$ 2,068	$ 232.60	$ 62,802	$ 7.56	$ 2,042	$ 1.66	344	$ 447	$ -	$ -	$ 249.48	$67,360		
9	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
9	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
9	4	2	1	510	Provide electricity to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951		
9	4	2	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267		
9	4	2	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
9	4	3	1	430	Piping system	Excavate piping trench	5,400	Bm3	C.2.13	0.020	108.0	$ 0.73	$ 3,953	$ -	$ -	$ 1.42	$ 7,684	$ 0.75	3,117	$ 4,052	$ -	$ -	$ 2.91	$15,689		
9	4	3	2	500		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	$ 8.75	$ 7,875	$ 155.84	$ 140,256	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$148,131		
9	4	3	3	430		Bedding: Produce and stockpile (screen)	351	Bm3	C.2.02	0.010	3.5	$ 0.37	$ 128	$ -	$ -	$ 1.61	$ 565	$ 1.13	305	$ 396	$ -	$ -	$ 3.10	$1,090		
9	4	3	4	430		Bedding: Load, haul, place	351	Bm3	R.035	0.031	10.7	$ 1.12	$ 393	$ -	$ -	$ 2.32	$ 814	$ 1.07	288	$ 374	$ -	$ -	$ 4.50	$1,580		
9	4	3	5	430		Backfill and compact ditches	5,049	Bm3	C.2.01	0.030	151.5	$ 1.08	$ 5,463	$ -	$ -	$ 0.74	$ 3,725	$ 0.40	1,536	$ 1,997	$ -	$ -	$ 2.22	$11,185		
9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	$ 12.50	$ 11,250	$ 21.32	$ 19,188	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$30,438		
9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
9	4	5	1	430	Groundwater holding pond	Excavate holding pond	876	Bm3	C.2.12	0.024	20.6	$ 0.86	$ 754	$ -	$ -	$ 2.00	$ 1,749	$ 0.93	628	$ 817	$ -	$ -	$ 3.79	$3,321		
9	4	5	2	430		Till: Load, haul, dump and place	229	Bm3	R.015	0.034	7.7	$ 1.23	$ 281	$ -	$ -	$ 2.82	$ 646	$ 1.30	228	$ 296	$ -	$ -	$ 5.35	$1,223		
9	4	5	3	430		Till: Compact with vibrating drum roller	229	m2	C.2.06	0.016	3.7	$ 0.57	$ 131	$ -	$ -	$ 0.02	$ 5	$ 0.02	3	$ 4	$ -	$ -	$ 0.61	$140		
9	4	5	4	430		Supply and place geotextile	529	m2	C.4.06	0.016	8.5	$ 0.57	$ 300	$ 3.50	$ 1,853	$ 0.23	$ 121	$ 0.15	60	$ 78	$ -	$ -	$ 4.44	$2,352		
9	4	5	5	430		Bedding layer: Produce, screen and stockpile	229	Bm3	C.2.02	0.010	2.3	$ 0.37	$ 84	$ -	$ -	$ 1.61	$ 368	$ 1.13	199	$ 258	$ -	$ -	$ 3.10	$710		
9	4	5	6	430		Bedding Layer: Load, haul, place and compact	229	Bm3	R.035	0.031	7.0	$ 1.12	$ 256	$ -	$ -	$ 2.32	$ 530	$ 1.07	188	$ 244	$ -	$ -	$ 4.50	$1,030		
9	4	5	7	500		Pump: Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
9	4	5	8	500		Pump: Build and install housing for pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
Contingency - Grum Dump Cut-off Wall																									$932,954	
9	5	1	1		Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ 2.08	$14,070		
9	5	1	2			Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ 3.85	$13,006		
9	5	2	1		Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ 108.57	$905,877		
Subtotal Direct Costs - Groundwater											10,668		$508,913		$1,558,216		$350,340		143,507	$186,559		$0			**$2,604,028**	
Vangorda Haul Road																										
Remove Culverts																									$1,018,439	
10	1	1	1	430	Remove culverts	Excavate haul road	268,680	m3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ 3.79	$1,018,439		
Reclaim Haul Road																									$87,788	
10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	6,885	$ 8,951	$ -	$ -	$ 359.06	$21,543		
10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ 0.29	$39,141		
10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	180,000	m2	C.5.01	0.000	22.5	$ 0.00	$ 808	$ 0.09	$ 16,366	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ 0.15	$27,104		
Subtotal Direct Costs - Vangorda Haul Road											6,742		$246,737		$16,366		$570,311		209,856	$272,813		$0			**$1,106,227**	
Miscellaneous																										
Buildings																									$569,060	
10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,692	$ -	$ -	$ 28.17	$194,404		
10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	65,858	$ 85,615	$ -	$ -	$ 35.20	$352,250		
10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ 52.80	$18,214		
10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ 40.07	$601		
10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591		
Sludge Pond																									$133,287	
10	2	1	1	430	Cover Sludge Pond	Load, haul, and place till	30,000	Bm3	R.038	0.025	763.6	$ 0.93	$ 27,949	$ -	$ -	$ 2.33	$ 70,005	$ 1.18	27,179	$ 35,332	$ -	$ -	$ 4.44	$133,287		
Existing Bioremediation Cell																									$1,794	
10	3	1	1	430	Cover Existing Bioremediation Cell	Doze material	1,600	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 999	$ 0.36	448	$ 582	$ -	$ -	$ 1.12	$1,794		
Dams																									$3,791	
10	4	1	1	430	Breach all Dams (2)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
WTP Settling Pond																									$5,652	
10	5	1	1	430	Breach WTP Settling Pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.86	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,069	$ 1,390	$ -	$ -	$ 3.79	$5,652		
Contaminated soils																									$27,498	
10	6	1	1	600	Remove Contaminated soils	Excavate, haul and place contaminated soils in bio-remediation ce	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ 7.16	$26,868		
10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ 0.25	$630		
Bioremediation Cell																									$51,420	
10	7	1	1	430	Construct Bioremediation Cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
10	7	1	2	430		Place HDPE liner for remediation cell	1,600	m2	C.4.10	0.143	228.6	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,300	$ 1,690	$ -	$ -	$ 21.79	$34,861		
10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ 2.22	$1,063		
Roads																									$20,785	
10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ 3.79	$14,859		
10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ 0.29	$4,349		
10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ 0.11	$1,577		
Borrow Sources																									$85,000	
10	9	1	1	600	Develop Borrow Sources	Clear and grub	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253		
10	9	1	2	600		Construct haul road	1,000	m	C.2.28	0.225	225.0	$ 8.24	$ 8,235	$ -	$ -	$ 29.67	$ 29,674	$ 19.48	14,986	$ 19,482	$ -	$ -	$ 57.39	$57,391		
10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591		
10	9	2	2	610		Seed/Fertilize, helicopter low application rate	169,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,683	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ 0.11	$17,765		
Subtotal Direct Costs - Miscellaneous											8,853		$351,534		$28,797		$335,488		140,358	$182,466		$0			**$898,285**	
Subtotal Direct Costs																										
						Subtotal direct costs					307,508		$12,773,210		$8,240,316		$29,137,306		9,795,292	$19,348,784		$0			**$69,499,615**	
CLOSURE COSTS - INDIRECT																										
100	100	1	1		Project Management	5.0% of direct costs															$ 69,499,615	x	5.0%		$3,474,981	
100	100	2	1		Field Supervision	2.5% of direct costs															$ 69,499,615	x	2.5%		$1,737,490	
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 69,499,615	x	10.0%		$6,949,962	
100	100	4	1		Insurance	0.5% of direct costs															$ 69,499,615	x	0.5%		$347,498	
100	100	5	1		Bonding	0.5% of direct costs															$ 69,499,615	x	0.5%		$347,498	
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 69,499,615	x	10.0%		$6,949,962	
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																										
					Subtotal indirect costs																				**$20,307,390**	
CLOSURE COSTS - CONTINGENCY																										
					Contingency	20% of direct costs															$69,499,615	x	20.0%		**$13,899,923**	
CLOSURE COSTS - TOTAL																										
					Total direct and indirect costs																				**$103,706,928**	