# Primary Alternatives for Closure of Anvil Range Mining Complex

DRAFT

**Prepared for** 

**Faro Mine Closure Planning Office** 



December 2005

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## **List of Attachments**

- Attachment A: Construction Details and Cost Estimate
- Attachment B: Water and Load Balance Calculations Primary Alternatives
- Attachment C: Water and Load Balance Calculations Sensitivity Analyses
- Attachment D: SENES Draft Human Health & Ecological Risk Assessment
- Attachment E: Water Treatment Cost Estimates

#### Page 1

# **1** Introduction

This document describes the primary alternatives for the closure of the Anvil Range Mining Complex. It is intended for two uses. The first use will be to provide basic information on each of the primary alternatives to the group of people who will assess the residual technical risks associated with each alternative. The second use will be to provide a basis for presenting the alternatives, and their associated risks and costs, to the Faro Mine Closure Oversight Committee.

The remainder of the document presents:

- An overview of the process leading up to this report, and the expected process for finalizing and presenting the results;
- A presentation of three primary alternatives for closure of the Faro Tailings area, two primary alternatives for the Faro Mine area, and two primary alternatives for the Vangorda/Grum Mine area;
- Initial assessments of the primary alternatives (with a section on residual technical risks that remains to be completed); and
- Attachments providing detailed analyses, risk assessments, and cost estimates.

## 2 **Overview of Process**

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 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, 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 ?? of these studies, with a total value of over \$???????

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.

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.

At the time of writing, a set of primary alternatives have been defined, and the water quality, ecological risks, human health risks and costs associated with each have been estimated. The remainder of this report presents those items. For ease of reference, the primary alternatives are listed in Table 2.1.

One significant gap remains, namely the assessment of residual technical risks, i.e. the risks of failure, malfunction, degradation or additional cost, associated with each alternative. The intention is that a series of meetings will be held in early January 2006 to work through each of the primary alternatives and define these residual technical risks. Those meetings will be attended by technical specialists from the FMCPO, the Type II team, First Nations, and SRK.

Finally, once the residual risks have been defined, a complete package will be developed for presentation to the project Oversight Committee. The presentation package will include summary descriptions of each alternative, as well as the associated implications for water quality, ecological risk, human health risk, residual technical risk, and cost. The Oversight Committee will then use that package as a basis for selecting a single set of preferred alternatives that can be taken forward into the final closure plan.

The relationship of this project to other ongoing projects is worth noting. More detailed studies of components of the primary alternatives are still underway at the time of writing. The latest information available from such projects has been brought into this work, but the ongoing work will undoubtedly result in further modification of the alternatives presented herein. Future studies, up to and including final design and implementation, will result in additional modifications. However, after lengthy consideration, it is the opinion of SRK and the FMCPO that the current state of technical knowledge is sufficient to support the definition of the primary alternatives and to provide the technical information needed to support the selection of a single set of preferred alternatives.

### Table 2.1: Primary Alternatives

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

# **3** Primary Alternatives for Faro Mine Area

### 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 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.

The Faro Pit will be used for passive treatment by seasonal phosphate addition. A plug dam will be constructed to elevation 1170 m. A berm will be constructed around the rim of the pit to prevent inadvertent access.

Faro Creek will be routed into the pit via an HDPE-lined ditch cut through or around the Faro Valley Dump. The ditch will include a rip-rapped overflow point, from which the water will cascade into the pit lake. Water will leave the Pit Lake via a set of siphons or pumps installed in a cut 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.

Water will be pumped by a well from the Zone II pit and discharged to the Faro Pit lake. Outwash material at the toe of the slope below the Zone II pit will be excavated and placed on the Intermediate Dump.

The oxide fines and low grade ore stockpiles will be consolidated and covered with a very low infiltration covers, herein assumed to be a combination geomembrane and soil cover, consisting of a bedding layer, HDPE geomembrane, and 1.0 m of lightly compacted till. A variant 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 ETA tailings will be relocated to the tailings impoundment or to the Faro Pit if the remainder of the Rose Creek tailings are re-located there.

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 surface will be seeded and fertilized.

Groundwater collection systems will be installed below the Zone II Pit and in the S-well area. Where necessary, the north fork of Rose Creek will be routed into a constructed and lined channel, to facilitate collection of contaminated groundwater from the base of the valley. The ditch will be continued through the rock and, if necessary, below the S-wells. A groundwater collection system will also be installed in the ETA area. All collected groundwater will be pumped to the Faro Pit.

Unnecessary roads will be scarified, seeded and fertilized. All buildings will be demolished and disposed in an unlined landfill area in the waste rock. Hydrocarbon-contaminated soils will be excavated and bio-remediated.

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 Faro Pit lake;
- Seasonal discharge of water from the Faro Pit lake, via siphon, to a ditch leading to Rose Creek;
- 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;
- 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.

## 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 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.

A water treatment plant will constructed to treat the Faro Pit water, which will be discharged into Rose Creek. A berm will be constructed around the rim of the pit to prevent inadvertent access.

Faro Creek will be diverted to the east of the pit via an geosynthetic clay lined channel. The east interceptor will be constructed upstream of the present Faro Creek diversion and discharge into the present diversion north of the Northeast Waste Rock Dump before flowing into North Fork Rose Creek. The channel includes 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 is included to collect additional runoff.

Water will be pumped by a well from the Zone II pit and discharged to the Faro Pit Lake. Outwash material at the toe of the slope below the Zone II pit will be excavated and placed on the Intermediate Dump.

The oxide fines and low grade ore stockpiles will be consolidated and covered with a combination geomembrane and soil cover, consisting of a bedding layer, HDPE geomembrane, and 1.0 m of

The ETA tailings will be relocated to the tailings impoundment or to the Faro Pit if the remainder of the Rose Creek tailings are re-located there.

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.

Groundwater collection systems will be installed below the Zone II Pit and in the S-well area. Where necessary, the north fork of Rose Creek will be routed into a constructed and lined channel, to facilitate collection of contaminated groundwater from the base of the valley. The ditch will be continued through the rock and, if necessary, below the S-wells.

Unnecessary roads will be scarified, seeded and fertilized. All buildings will be demolished and disposed in an unlined landfill area in the waste rock. Hydrocarbon-contaminated soils will be excavated and bio-remediated.

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;
- Year-round 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;
- 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.

## 4 Primary Alternatives for Rose Creek Tailings

### 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 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.

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 be stabilized through ground densification with vibro-replacement stone columns.

The Intermediate and Secondary Tailing 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. The tailings covers will be seeded and fertilized.

The Rose Creek Diversion Channel will be upgraded to the PMF by deepening and widening the channel along its current alignment. The alignment will be re-routed to enter Rose Creek downstream of the Intermediate Dam where the channel is cut through bedrock. The North Fork Rock Drain will be breached with the material hauled to the Faro Waste Dump or used as tailing cover material.

Groundwater collection systems 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.

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;
- 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.

## 4.2 Tailings Alternative 2 – Complete Relocation

The "Complete Relocation" alternative for the Rose Creek Tailings is illustrated in Figure 4.2. 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.

All dams will be kept in place to control water and sediment during tailings monitoring. The dams will be breached after basin cleanup is completed.

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 is added to the slurry during pumping. Excess water is treated through a HDS system in a new treatment plant and discharged. The remaining contaminated material in the impoundments will be removed by truck and shovel to the Faro Pit. The impoundments will be graded for drainage and all surfaces will be seeded and fertilized.

The Rose Creek Diversion Channel will be maintained during the period of tailings relocation and groundwater cleanup. Fish habitat along the thalweg of the valley will be enhanced by installing riffles and excavating pools. The Rose Creek Diversion will be breached into the thalweg once the basin cleanup is completed. 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 slops and be breached where streams enter the channel from the south. The North Fork Rock Drain will be breached with the material hauled to the Faro Waste Dump.

A groundwater collection system will be installed below the Cross-Valley Dam. The collected groundwater will be pumped to a water treatment plant. An adaptive medium-term groundwater collection system consisting of multiple shallow extraction and monitoring wells will be implemented where necessary along Rose Creek.

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;
- 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 twenty year, and in Rose Creek above and below the site for several hundred years;
- Relocation or installation of additional extraction and monitoring wells during the twenty year period;
- Annual inspections of all earthworks for twenty years.

## 4.3 Tailings Alternative 3 – Partial Relocation

The "Partial Relocation" alternative for the Rose Creek Tailings is illustrated in Figure 4.3. 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.

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 and breached after basin cleanup is completed. The east and west limbs of the Secondary Dam will be stabilized through ground densification with vibro-replacement stone columns. A compacted toe berm will also be constructed along the west limb.

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 is added to the slurry during pumping. Excess water is treated through a HDS system in a new treatment plant and discharged. The remaining contaminated material in the intermediate impoundment will be removed by truck and shovel to the Faro Pit. The impoundment will be graded for drainage and all surfaces will be seeded and fertilized.

The Secondary Tailing Impoundment 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 upper portion of the Rose Creek Diversion Channel will be upgraded to the PMF by deepening and widening the channel along its current alignment. The alignment will be re-routed to enter Rose Creek downstream of the Secondary Dam once the basin cleanup is completed. 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 seeded and fertilized. The lower portion of the Rose Creek Diversion channel will then be regraded to create stable slops and be breached where streams enter the channel from the south. The North Fork Rock Drain will be breached with the material hauled to the Faro Waste Dump or used as tailing cover material.

An adaptive medium-term groundwater collection system consisting of multiple shallow extraction and monitoring wells will be implemented where necessary along the restored Rose Creek Valley. For the purposes of the cost estimate, it is assumed that a groundwater collection system will be installed below the Cross Valley Dam. A system of seepage and groundwater collection will also be constructed along the toe of the Secondary Dam. The collected groundwater and seepage will be pumped to a water treatment plant.

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.

# 5 Primary Alternatives for Vangorda/Grum Mine Area

## 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 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.

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 Water Rock Dump, the ore transfer pad the high sulphide area west 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. 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. The creek will include a series of rip rapped drop sections and will be designed to include no artificial materials.

The footprint of the Vangorda Waste Rock Dump, after the completion of the relocation of materials 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 drain structure will be constructed at the mouth of the outlet channel at the slot cut on the south end of the pit. The outlet channel will be excavated to a elevation of 1230, at the Grum Pit Lake and will discharge either into Vangorda Creek Tributary B or directly along its previous channel. In the latter 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 the completion of the relocation of acidic materials to the Vangorda Pit, will be graded to ensure runoff as well as seeded and fertilized.

A groundwater collection system will be installed below the Grum Waste Dump. A contingency groundwater collection system maybe required 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 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 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.

### 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 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.

A water treatment plant will constructed to treat the Vangorda Pit water, which will be discharged into Vangorda Creek. A berm will be constructed around the rim of the pit to prevent inadvertent access. The waste rock piles located to the southeast of the Vangorda Pit will be regraded to 3H:1V. The waste rock piles will be covered with 0.5m of lightly compacted till, seeded and fertilized.

The Vangorda Waste Dump will be regraded to 3H:1V. The dump 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 widened and deepened as well as have a minor realignment. 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.

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 drain structure will be constructed at the

mouth of the outlet channel at the slot cut on the south end of the pit. The outlet channel will be excavated to a elevation of 1230, at the Grum Pit Lake and will discharge either into Vangorda Creek Tributary B or directly along its previous channel. In the latter 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.

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 ensure runoff, covered with 0.5m of lightly compacted till as well as seeded and fertilized.

A groundwater collection system will be installed below the Grum Waste Dump. A contingency groundwater collection system 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 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 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.

# 6 Assessments of Primary Alternatives

## 6.1 Protection of Water Quality

The site water and load balance developed in the summer of 2005 was used to estimate contaminant concentrations in receiving water under each of the primary alternatives. The calculations were completed for silver, aluminium, arsenic, cadmium, cobalt, copper, iron, manganese, nickel, lead sulphate and zinc. Monthly estimates of concentrations at X2, X14, the mouth of Rose Creek, the mouth of Anvil Creek, as well as at V27 and V8, were developed for each contaminant. A complete set of outputs is included in Attachment B.

In order to complete the estimates, it was necessary to quantify the expected performance of several of the closure measures proposed. Table 6.1 summarizes the assumptions, and further details are provided in Attachment B. The major assumptions have been tested through sensitivity analyses, the results of which are presented in Attachment C.

Table 6.2 provides a summary of estimated contaminant concentrations at X14 in Rose Creek (just downstream of the mine and tailings areas), under the Base Case performance assumptions for all combinations of the Faro Mine Area and Rose Creek Tailings primary alternatives.

Table 6.3 provides a summary of estimated contaminant concentrations in Vangorda Creek under each of the Vangorda/Grum primary alternatives.

Although some of the water quality results shown in Table 6.2 and 6.3 may be acceptable, the work on site specific water quality objectives has not yet progressed to the state where such a determination can be made. Additional runs of the water and load balance were therefore completed, with changes to the performance assumptions, to identify the levels needed to bring the March zinc concentrations within the level of the (hardness dependent) B.C. criteria of 0.24 mg/L. Table 6.4 summarizes the results.

Covers	Infiltration
Rudimentary covers on Faro waste rock	20% of MAP
Low infiltration covers on Faro sulphide cells	5% of MAP
Very low infiltration covers on Faro LGO and Oxide fines	0.5% of MAP
Waste rock and till covers on Rose Creek Tailings	10% of MAP
Rudimentary covers on Grum Dump and Ore Transfer Pad	20% of MAP
Low infiltration cover on Grum Sulphide Cell	5% of MAP
Low infiltration cover on Vangorda Dump and Oxide Fines	5% of MAP
Groundwater collection systems	Seepage Load Escaping Capture
Faro Mine Area below Zone II Pit	10%
Faro Mine Area near S-Wells	10%
Faro Mine Area below ETA	2%
Tailings Area	2%
Vangorda/Grum Waste Dumps	10%
Backfilled Vangorda Pit	2%
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
Lime addition to Vangorda Pit backfill	No contaminants from relocated tailings

### Table 6.1: Performance Assumptions in Base Case Water and Load Balance

	Primary Alternatives <sup>1</sup>			Contaminant Concentrations at X14 <sup>2</sup> (mg/L)								
				Future 1 ARD Sources <sup>3</sup>		Future 2 ARD Sources <sup>4</sup>			Future 3 ARD Sources <sup>5</sup>			
	Mine Area		Tailings Area	As	Cu	Zn	As	Cu	Zn	As	Cu	Zn
1	Flow-Through Pit	1	Stabilize In Place	0.003	0.015	0.55	0.003	0.023	0.85	0.25	1.6	57.3
1	Flow-Through Pit	2	Complete Relocation	0.002	0.013	0.37	0.003	0.017	0.56	0.25	1.6	56.6
1	Flow-Through Pit	3	Partial Relocation	0.002	0.014	0.54	0.003	0.020	0.81	0.25	1.6	57.2
2	Upgrade Faro Ck Diversion	1	Stabilize In Place	0.003	0.012	0.27	0.003	0.017	0.46	0.016	0.11	3.6
2	Upgrade Faro Ck Diversion	2	Complete Relocation	0.002	0.010	0.09	0.002	0.011	0.16	0.015	0.09	2.9
2	Upgrade Faro Ck Diversion	3	Partial Relocation	0.002	0.011	0.26	0.003	0.015	0.41	0.015	0.11	3.5

#### Table 6.2: Summary of Base Case Water Quality Predictions for Faro Mine and Tailings Primary Alternatives

Notes:

1. See Table 6.1 and Attachment B for assumptions used in Base Case water and load balance calculations.

2. Water and load balance estimates were on a monthly basis. The concentrations shown are for March, which is the worst month in all cases.

3. Based on "Current Average" predictions of source chemistry. Represents most likely future case.

4. Based on "Current Maximum" predictions of source chemistry. Represents possible future case if ARD is allowed to develop.

5. Based on "Future Maximum" predictions of source chemistry. Represents pessimistic worst case.

#### Table 6.3: Summary of Water Quality Predictions for Vangorda/Grum Primary Alternatives

Primary Alternatives <sup>1</sup>			Contaminant Concentrations (mg/L)									
		Water Quality Location	Future 1 ARD Sources <sup>3</sup>			Future 2 ARD Sources <sup>4</sup>			Future 3 ARD Sources <sup>5</sup>			
			As	Cu	Zn	As	Cu	Zn	As	Cu	Zn	
1	Backfill Vangorda Pit	V27	0.004	0.008	0.070	0.004	0.012 <sup>b</sup>	0.091 <sup>a</sup>	0.006	0.019	8.2	
1	Backfill Vangorda Pit	V8	0.002	0.007	0.034	0.002	0.0077 <sup>b</sup>	0.029	0.003	0.058	2.3	
2	Stabilize In Place	V27	0.005	0.008	0.27	0.005	0.018	0.68 <sup>ª</sup>	0.005	0.046	1.8 <sup>ª</sup>	
2	Stabilize In Place	V8	0.027	0.007	0.14	0.007	0.013	0.30	0.0027	0.021	0.65 <sup>ª</sup>	

Notes:

1. See Table 6.1 and Attachment B for assumptions used in water and load balance calculations.

2. Water and load balance estimates were on a monthly basis. The concentrations shown are for the worst month, which is March in all cases except:

a. April

b. May, June and July

3. Based on "Current Average" predictions of source chemistry. Represents most likely future case.

4. Based on "Current Maximum" predictions of source chemistry. Represents possible future case if ARD is allowed to develop.

5. Based on "Future Maximum" predictions of source chemistry. Represents pessimistic worst case.

	Primary Alternatives <sup>1</sup>			Maximum Allowable Escape of Seepage Load <sup>2</sup>								
				Future 1 ARD Sources <sup>3</sup>		Future	Future 2 ARD Sources <sup>4</sup>			Future 3 ARD Sources <sup>5</sup>		
	Mine Area		Tailings Area	Waste Rock	ETA	Tailings	Waste Rock	ETA	Tailings	Waste Rock	ETA	Tailings
1	Flow-Through Pit	1	Stabilize In Place				<5%	<1%	<1%			
1	Flow-Through Pit	2	Complete Relocation				5%	<1%	n/a			
1	Flow-Through Pit	3	Partial Relocation				<5%	<1%	<1%			
2	Upgrade Faro Ck Diversion	1	Stabilize In Place				5	1	1			
2	Upgrade Faro Ck Diversion	2	Complete Relocation				10	5	n/a			
2	Upgrade Faro Ck Diversion	3	Partial Relocation				5	~1	~1			

Notes:

1. See Table 6.1 and Attachment B for assumptions used in Base Case water and load balance calculations.

2. "Seepage escape" values showing in Table 6.1 were adjusted upwards or downwards until the March zinc concentrations at X14 fell were 0.24 mg/L.

3. Based on "Current Average" predictions of source chemistry. Represents most likely future case.

4. Based on "Current Maximum" predictions of source chemistry. Represents possible future case if ARD is allowed to develop.

5. Based on "Future Maximum" predictions of source chemistry. Represents pessimistic worst case.

## 6.2 **Protection of Ecological Health**

SENES Consultants Ltd. have completed a draft assessment of ecological and human health risks. The main report from that draft is included as Attachment D.

The primary conclusions from the ecological portion of the risk assessment are as follows:

- Estimated concentrations of zinc in Rose Creek and Anvil Creek exceed the toxicity benchmarks for bottom feeder and predatory fish (0.06 and 0.25 mg/L respectively). The exceedances in Rose Creek and Anvil Creek increase substantially, and estimated concentrations of zinc in Vangorda Creek also exceed the toxicity benchmarks, when the worst case source chemistry (Future 3) is assumed.
- Estimated concentrations of copper in Rose Creek and Anvil Creek exceed the toxicity benchmarks for fish (0.004 mg/L). The exceedances increase and extend also to Vangorda Creek when the worst case source chemistry (Future 3) is assumed.
- Estimated concentrations of zinc under the worst case water chemistry (Future 3) also lead to exceedances of the threshold zinc intake for ducks and mink living in Rose Creek and mink living in Vangorda Creek.

### 6.3 **Protection of Human Health**

The primary conclusions from the human health portion of the risk assessment are as follows:

- Individual who camp in the Rose Creek area are at risk of health effects due to intake of arsenic.
- The primary pathways of arsenic intake are terrestrial, i.e. ingestion of soil and vegetation.
- Although the estimated health risks from arsenic exceed the "essentially negligible" level used as a screening criteria, they remain within the range of risks associated with typical arsenic intakes among the broader Canadian population.

## 6.4 Implementation Risks

To be completed

## 6.5 Residual Risks

To be completed in January 2006

# 7 Estimated Costs

Attachment A presents an estimate of the direct capital costs (excluding water treatment) associated with each primary alternative. Allowances for indirect capital costs, which have not been carefully estimated, are also included. Table 7.1 provides a summary of the capital costs for each alternative.

Attachment E presents estimates of water treatment costs for each of the primary alternatives. Water treatment capital and operating costs are included. The net present value of the water treatment costs, estimated using a net rate of 3%, are summarized in Table 7.2.

Table 7.3 provides summary estimates of capital costs and water treatment NPV costs for each of the combinations for which water quality estimates were provided in Chapter 6.

Table 7.4 shows the estimated total costs of various combination of the Faro Mine Area and Rose creek tailings primary alternatives. The estimates in Tables 7.1 through 7.3 include arbitrary contingencies of 20%. Such contingencies are necessary for budgeting, but they can be confusing for the evaluation of alternatives. Table 7.4 therefore also includes a column showing the estimates without contingencies.

Table 7.5 summarizes the Vangorda/Grum estimates with and without the 20% contingency.

Costs for monitoring, inspection, maintenance and repair are not yet included in these estimates.

Costs associated with the yet to be defined implementation and residual risks are also not included.

Primary Alternative	Direct Capital	Indirect Capital	Total Capital
Faro Mine Area			
Flow-through Faro Pit	\$36,600,000	\$18,300,000	\$54,900,000
Upgrade Faro Ck Diversion	\$45,500,000	\$22,600,000	\$68,000,000
Rose Creek Tailings			
Stabilization in place	\$52,000,000	\$25,700,000	\$77,800,000
Complete Relocation	\$213,200,000	\$82,600,000	\$295,800,000
Partial Relocation	\$130,900,000	\$50,900,000	\$181,800,000
Vangorda/Grum			
Vangorda Pit Backfill	\$77,500,000	\$30,300,000	\$107,800,000
Stabilize Current Situation	\$33,900,000	\$16,900,000	\$50,900,000

Table 7.1:	Estimated Ca	pital Costs for	Each Primary	Alternative
		pilai 00313 ioi		

Primary Alternative	Capital	Annual	NPV Total
Faro Mine Area			
Flow-through Faro Pit	\$0	\$200,000	\$6,600,000
Upgrade Faro Ck Diversion	\$3,590,000	\$570,000	\$22,500,000
Rose Creek Tailings			
Stabilization in place	\$6,198,000	\$1,192,000	\$45,800,000
Complete Relocation	\$4,015,000	\$693,000	\$17,300,000
Partial Relocation	\$4,666,000	\$942,000	\$35,981,000
Vangorda/Grum			
Vangorda Pit Backfill	\$0	\$200,000	\$6,600,000
Stabilize Current Situation	\$2,746,000	\$435,000	\$17,100,000

#### Table 7.2: Estimated NPV Water Treatment Costs for Each Primary Alternative

### Table 7.3: Summary Cost Estimates for Primary Alternatives and Combinations

Primary Alternative	Total Capital	Water Treatment NPV Total	Total NPV
Faro Mine Area			
Flow-through Faro Pit	\$54,900,000	\$6,600,000	\$61,600,000
Upgrade Faro Ck Diversion	\$68,000,000	\$22,500,000	\$90,600,000
Rose Creek Tailings			
Stabilization in place	\$77,800,000	\$45,800,000	\$123,600,000
Complete Relocation	\$295,800,000	\$17,300,000	\$313,100,000
Partial Relocation	\$181,800,000	\$35,981,000	\$217,800,000
Vangorda/Grum			
Vangorda Pit Backfill	\$107,800,000	\$6,600,000	\$114,400,000
Stabilize Current Situation	\$50,900,000	\$17,100,000	\$68,000,000

Combination	With 20%	No
	Contingency	Contingency
Flow-through pit + Complete tailings relocation	\$374,700,000	\$312,200,000
Flow-through pit + Stabilize tailings in place	\$185,200,000	\$154,300,000
Flow-through pit + Partial tailings relocation	\$279,300,000	\$232,800,000
Upgraded Faro Ck. diversion + Complete tailings relocation	\$403,700,000	\$336,400,000
Upgraded Faro Ck. diversion + Stabilize tailings in place	\$214,200,000	\$178,500,000
Upgraded Faro Ck. diversion + Partial tailings relocation	\$308,300,000	\$256,900,000

#### Table 7.4: Summary Cost Estimates for Faro Mine & Tailings Combinations

#### Table 7.5: Summary Cost Estimates for Vangorda/Grum

Combination	With 20%	No		
	Contingency	Contingency		
Backfill Vangorda Pit	\$114,400,000	\$95,400,000		
Stabilize Current Situation	\$68,000,000	\$56,700,000		

Figures

Attachment A Construction Details and Cost Estimate

#### Option 1: Vangorda Pit Backfilling

Contract Work Are Code Code	tterr		task	Estimate Type	Activity	Task	Quantity U	Jnit U	Unit Cost	Activity Total	Subtotals	Source / Comments
LOSURE CO	STS -	DIREC	T CA	PITAL								
Ingorda Pit Iter Manageme	ont										1 \$322,000	1CD003.48_VangordaBackfill
1	1	1	1	610	Pump and treat Vangorda Pit Water	Pump to existing treatment plant	2,300,000 m3		\$0.14	\$322,000		(115mg/L Zn)
t Ramp											\$23,012	
1	2	1	1	430	Upgrade ramp for 777 traffic	LHD (locally) waste rock above present waterline	1,908 m3		\$8.37	\$15,970		
1	2	1	2	430		Grading Ramp	24,000 m2		\$0.29	\$7,042		
ackfill Pit	_										\$52,912,612	
1	3	1	1	430 430	Backfill Pit	Load, Haul and Place Baritic and Oxide Fines Load, Haul and Place high sulphide area west of the dump ramp	286,000 m3 1,300,000 m3		\$4.08 \$4.08	\$1,166,880 \$5,304,000		
1	3	1	2	430 430		Load, Haul and Place nigh sulphide area west of the dump ramp Load, Haul and Place ore transfer pad material	1,500,000 m3	Inc		5,304,000 Tre Transfer Pad	Costs	
1	3	1	4	430		Load, Haul and Place Main Waste Rock Dump	8,787,000 m3		\$4.08	\$35,850,960	00313	
1	3	1	5	430		Load, Haul and Place till from base of Waste Rock Dump	504,150 m3		\$4.08	\$2,056,932		
1	3	2	1	510	Lime Addition	Lime Addition (waste rock)	12,548 tonn	nes	\$320.00	\$4,015,360		
1	3	2	2	510		Lime Addition (Baritic and Oxide Fines)	4,089 tonn	nes	\$320.00	\$1,308,480		
1	3	2	3	010		Survey requirements (grid for testing)	12,840 hrs		\$125.00	\$1,605,000		
1	3	2	4	010		Material testing (to verify lime addition dosage)	12,840 hrs		\$125.00	\$1,605,000		
egrade waste fo	or drain 4	age 1	1	400	De reada		450 has		£450.40	¢c0 770	\$68,778	
over with Low Ir				430	Regrade	Shape to send runoff to ditches	150 hrs		\$459.10	\$68,778	\$1,779,000	
	5	1	יי 1	430	Place Low Infiltration Cover	Load, Haul, Place Compacted Till (0.5m)	150,000 m3		\$4.08	\$612,000	\$1,779,000	
1	5	1	2	430	. AGO LOW ITHINGHOIT COVEL	Load, haul, place loose till (1.0m)	300,000 m3		\$3.89	\$1,167,000		
evegetate	5	•	-			,, p.aoo loooo ilii ( rion)	000,000 110		φ0.00	\$1,101,000	\$135,000	
1	6	1	1	610	Vegetate WR Dumps	Seeding	300,000 m2		\$0.40	\$120,000		
1	6	1	2	610		Fertilization	300,000 m2		\$0.05	\$15,000		
afety Berms											\$65,271	
1	7	1	1	430	Construct access road	Clear access road area	1,281 m2		\$1.40	\$1,796		
1	7	1	2	220		Construct Access road	427 m		\$12.00	\$5,124		
1	7	2	1	430	Place berm materials	Load, haul, dump berm material	4,150 m3		\$10.31 \$18.75	\$42,787 \$15,564		
ubtotal Direc			2	430		Shape Material into berm	830 m		\$18.75	\$15,564	\$55,305,673	
		5 - Vai	igora	1 11								
angorda Dum ttle Creek Dam											1 \$121,125	1CD003.48_VangordaBackfill
2	1	1	1	430	Breach dam	Load, Haul and Dump locally	22,266 m3		\$5.44	\$121,125		/anWasteDumpTillBerm.xls
evegetate	'	'	'	430	Dieach dann	Eoad, Hadi and Dump locally	22,200 113		φ3.44	φ121,12J	\$226,868	vanwastebump milberm.xis
2	2	1	1	610	Revegetate Dump Footprint	Seeding	504,150 m2		\$0.40	\$201,660	<b>\$220,000</b>	
2	2	1	2	610		Fertilization	504,150 m2		\$0.05	\$25,208		
ubtotal Direc	t Cost	s - Var	ngord	a Dum	р						\$347,993	
angorda Cree	ek Div	ersion										1CD003.48_VangordaBackfill
angorda Creek											\$549,980	
3	1	1	1	430	Excavate Channel	5m wide, 2:1 side slopes	26,815 m3		\$3.69	\$98,889		
3	1	2	1	430	Place HDPE Liner	Supply and place HDPE Liner	6,226 m2		\$21.57	\$134,254	(	(or bitumen?)
3	1	3	1	430 430	Place Bedding Layer	Produce and stockpile locally Load, haul, dump to Vangorda Stockpile Area	1,868 m3 1,868 m3		\$7.73 \$2.78	\$14,438 \$5,192		
3	1	3	2	430		Load, haul, place and compact	1,868 m3		\$5.35	\$9,992		
3	1	4	1	430	Place Riprap	Rip-Rap: Drill, blast and stockpile	5,520 m3		\$23.86	\$131,678	, ,	Some rip-rap needs to belarge to disperse energy at bottom of channel
3	1	4	2	430	r labo rapiap	Rip-Rap: Screen and stockpile	5,520 m3		\$15.46	\$85,339		
3	1	4	3	430		Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	5,520 m3		\$2.68	\$14,792		
3	1	4	4	430		Rip-Rap: Load, haul and dump	5,520 m3		\$5.35	\$29,530		
3	1	4	5	430		Rip-Rap: Place and secure	5,520 m3		\$4.69	\$25,875		
ubtotal Direc	t Cost	s - Var	ngord	a Cree	k Diversion						\$549,980	
irum Pit											1	1CD003.46_PitLakesTreat
Vater Treatment												
4	1	1	1	610	Biological treatment	Operational cost of fertilizer application					\$000 cor	
afety Berms	2	4	1	420	Construct oppose road	Clear assess read area	3,750 m2		\$1.40	\$5,259	\$226,465	
4	2	1	1 2	430 220	Construct access road	Clear access road area Construct Access road	3,750 m2 1,250 m		\$1.40 \$12.00	\$5,259 \$15,000		
4	2	2	2	430	Place berm materials	Load, haul, dump berm material	20,000 m3		\$6.56	\$131,200		
4	2	2	2	430		Shape Material into berm	4,000 m		\$18.75	\$75,006		
ubtotal Direc							.,			,	\$226,465	
rum Intercep												1CD003.46 PitLakesTreat
oute into Grum												assumed channel from vangorda creek diversion (1CD003.15
5	1	1	1	430	Access Road	Clear access road area	600 m2		\$1.40	\$841		-
5	1	1	2	220		Construct Access road	200 m		\$12.00	\$2,400		
5	1	2	1	430	Headworks dam	Load, Haul, Dump, Place and Compact Till	24 m3		\$9.57	\$230		
5	1	3	1	430	Excavate Channel	Excavate diversion channel (soils)	2,017 m3		\$3.69	\$7,438		
5	1	3	2	430		Excavate diversion channel (bedrock)	362 m3		\$23.33	\$8,435		
	1	4	1	430	Place bedding layer	Produce and stockpile locally	623 m3		\$7.73	\$4,813		
5												
5	1	4	2	430		Load, haul, dump to Grum Stockpile Area	623 m3		\$2.78	\$1,731		
	1 1 1	4 4 5	2	430 430 430	Place Rip-Rap	Load, haul, dump to Grum Stockpule Area Load , haul, place and compact Rip-Rap: Drill, blast and stockpile	623 m3 1,212 m3		\$2.76 \$11.28 \$23.86	\$7,023 \$28,924		

#### Faro Primary Alternative Cost Estimates

	5.	1 5		430		Rip-Rap: Screen and stockpile	1,212 m3	\$15.46	\$18,745	
5		1 5		430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	1,212 m3	\$2.78	\$3,370	
5	-			430		Rip-Rap: Load, haul and dump	1,212 m3	\$10.74	\$13,021	
	5.	1 5	5	430		Rip-Rap: Place and secure	1,212 m3	\$4.69	\$5,684	
ck Drain										\$24,312
Ę		26		430	Rock Drain at start of slot cut	Rip-Rap: Drill, blast and stockpile	469 m3	\$23.86	\$11,183	
		26		430		Rip-Rap: Screen and stockpile	469 m3	\$15.46	\$7,247	
ę		26		430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	469 m3	\$2.78	\$1,303	
ę		26		430		Rip-Rap: Load, haul and dump	469 m3	\$5.08	\$2,381	
5		26	5	430		Rip-Rap: Place and secure	469 m3	\$4.69	\$2,197	
ute out of P	Pit via slo	ot cui								\$233,203
		31		430	Access Road	Clear access road area	150 m2	\$1.40	\$210	
5		31		220		Construct Access road	50 m	\$12.00	\$600	
	5 3	32		430	Excavate Channel	Excavate diversion channel (soils)	9,222 m3	\$3.69	\$34,010	
		33		430	Place Bedding layer	Produce and stockpile locally	1,736 m3	\$7.73	\$13,422	
		33		430		Load, haul, dump to Grum Stockpile Area	1,736 m3	\$2.78	\$4,827	
5		33		430		Load , haul, place and compact	1,736 m3	\$4.54	\$7,883	
1	5 3	34	1	430	Place Rip-Rap	Rip-Rap: Drill, blast and stockpile	3,375 m3	\$23.86	\$80,519	
ŧ	5 3	34	2	430		Rip-Rap: Screen and stockpile	3,375 m3	\$15.46	\$52,183	
		34		430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	3,375 m3	\$2.78	\$9,383	
ŧ		3 4		430		Rip-Rap: Load, haul and dump	3,375 m3	\$4.25	\$14,344	
ŧ	5 3	3 4	5	430		Rip-Rap: Place and secure	3,375 m3	\$4.69	\$15,822	
btotal Dir	rect Co	sts - (	Grum lı	ntercep	tor Ditch					\$360,171
um Dump										
slope Dump										\$629,554
		1 1	1	430	Regrade	Flattened Surfaces	337 hrs	\$459.10	\$154,872	
6	6 .	1 1	2	430		Flatten Bubble Dump Surfaces	296 hrs	\$459.10	\$136,123	
1	6 .	1 1	3	430		Regrade Slopes	737 hrs	\$459.10	\$338,559	
phide Cell										\$2,415,801
. 6		2 1		430	Low Infiltration Cover	Load, haul, place compacted till (0.5m)	98,725 m3	\$6.26	\$618,019	
		2 1	2	430		Load, haul, place loose till (1.5m)	296,175 m3	\$6.07	\$1,797,782	
ste Rock C										\$5,211,854
	6 3	31	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	858,625 m3	\$6.07	\$5,211,854	
ck Drains				105			0.500 -	<b>60 57</b>	<b>6</b> 40.00 <sup></sup>	\$141,664
6	-	4 1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	3,500 m3	\$3.69	\$12,907	
-	-	4 1	2	430		Rip-Rap: Drill, blast and stockpile	2,604 m3	\$23.86	\$62,123	
-		4 1	-	430		Rip-Rap: Screen and stockpile	2,604 m3	\$15.46	\$40,261	
	•	4 1	4	430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	2,604 m3	\$2.78	\$7,239	
-	•	4 1	-	430		Load Haul and Dump Rip-Rap	2,604 m3	\$2.66	\$6,927	
-	-	4 1	6	430		Place and secure Rip-Rap	2,604 m3	\$4.69	\$12,207	\$103.016
diment Con		<b>hes</b> 5 1	1	430	Sediment Control Ditch	Excavation of Ditch	3.490 m3	\$3.69	\$12,870	\$103,016
		5 1 5 1	2	430 430	Sediment Control Diton	Supply and place geotextile	3,490 m3 5,175 m2	\$3.69 \$4.41	\$12,870	
-			2	430 430		Supply and place geotextile Rip-Rap: Drill, blast and stockpile	5,175 m2 1,215 m3	\$4.41 \$23.86	\$22,830 \$28,982	
-										
-		5 1	4	430 430		Rip-Rap: Screen and stockpile Bip Basil and have dump to Massa Band Stockpile	1,215 m3	\$15.46	\$18,783	
6	· ·	5 1	5			Rip-Rap: Load, haul, dump to Moose Pond Stockpile	1,215 m3	\$4.06	\$4,932	
		51		430		Load Haul and Dump Rip-Rap	1,215 m3	\$2.66	\$3,232	
e		51	7	430	On dimensional Densis	Place and secure Rip-Rap	1,215 m3	\$4.69	\$5,695	
		52		430	Sedimentation Basin	Excavate sedimentation basin	1,117 m3	\$3.69	\$4,119 \$740	
		52 52		430 430		Rip-Rap: Drill, blast and stockpile	31 m3 31 m3	\$23.86 \$15.46	\$740 \$479	
						Rip-Rap: Screen and stockpile				
		52		430		Rip-Rap: Load, haul, dump to Moose Pond Stockpile	31 m3	\$4.06	\$126	
		52		430		Load Haul and Dump Rip-Rap	31 m3	\$2.66	\$82	
-	6 !	52	6	430		Place and secure Rip-Rap	31 m3	\$4.69	\$145	¢670.499
/egetate	6 (	6 1	1	610	Revegetate WR Dumps	Seeding	1,493,750 m2	\$0.40	\$597,500	\$672,188
		6 1		610	Nevegeidle wir Dumps	Fertilization	1,493,750 m2 1,493,750 m2	\$0.40 \$0.05	\$597,500 \$74,688	
btotal Dir						i ciuizauon	1,493,700 MZ	φ <b>0.05</b>	φ14,008	\$9,174,076
erburden			arum L	amp						ψ <b>υ</b> , // <del>τ</del> , <b>υ</b> / υ
erburden ads	Dump									\$157,851
ius .	7.	1 1	1	430	Widen Roads for 777 traffic	Excavate overburden material	22,500 m3	\$6.82	\$153,450	φ107,801
,	7.			430 430	WIGHT NOUS IN /// LIAING	Grade Road	22,500 m3 15,000 m2	\$0.82 \$0.29	\$153,450 \$4,401	
		. '	4	+30		0.000.000	13,000 112	φ0.23	φ4,401	\$196,478
		2 1	1	430	Regrade	Flattened Surfaces	77 hrs	\$459.10	\$35,426	φ190,470
		2 1 2 1		430 430	ivegiaue	Regrade Slopes	351 hrs	\$459.10 \$459.10	\$35,426 \$161,051	
lope Dump	7 /	<u> </u>	2	430		Ivegraue Siches	301 Hrs	a409.10	\$101,031	\$229,613
lope Dump	7 2		1	610	Revegetate WR Dumps	Seeding	510,250 m2	\$0.40	\$204,100	9223,013
slope Dump		<u>م</u>		610	Nevegetate wit Dullps	Fertilization	510,250 m2 510,250 m2	\$0.40 \$0.05	\$204,100 \$25,513	
slope Dump	7 :	3 1	2	010	Imp	1 Grunzauon	310,230 HIZ	φ0.05	φ <b>2</b> 0,010	\$583,942
slope Dump vegetate	7 3	31	-	rdon D.						<i>4</i> J0J,742
slope Dump vegetate btotal Dir	7 7 rect Co	31	-	rden Du	in p					
slope Dump vegetate btotal Dir e Transfe	7 7 rect Cos	3 1 sts - (	-	rden Di	311P					\$0.210.000
slope Dump vegetate btotal Dir e Transfe ocate to Va	7 7 rect Cos er Pad angorda	3 1 sts-( Pi1	Overbu		·	Load Haul and Disco and compact material	1 500 000 ~0	¢c 11	\$0.210.000	\$9,210,000
slope Dump vegetate btotal Dir e Transfe ocate to Va	7 7 rect Cos er Pad angorda 8	3 1 <u>sts - (</u> Pi1 1 1	Overbu	rden Du 430	Relocate to Vangorda Pit	Load, Haul and Place and compact material	1,500,000 m3	\$6.14	\$9,210,000	
slope Dump vegetate btotal Dir e Transfe ocate to Va slope Pad fo	7 rect Co r Pad angorda 8 or draina	3 1 sts-( Pi1 1 1 age	Dverbu	430	Relocate to Vangorda Pit					\$9,210,000 \$52,161
slope Dump regetate btotal Dir e Transfe ocate to Va slope Pad fo	7 rect Cos r Pad angorda 8 for draina 8	3 1 <b>sts - (</b> <b>Pi1</b> 1 1 <b>age</b> 2 1	Dverbu	430 430	·	Flattened Surfaces	52 hrs	\$459.10	\$23,827	
ope Dump egetate ntotal Dir Transfe cate to Va sope Pad f	7 cect Cos rect Cos r Pad angorda 8 or draina 8 8 8	3 1 sts-( Pi1 1 1 age	Dverbu	430	Relocate to Vangorda Pit					

8	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,650 m3	\$5.31	\$391,082	
Sediment Control I	Ditches	s								\$7,534
8	4	1	1	430	Sediment Control Ditch	Excavation of Ditch	1,791 m3	\$3.69	\$6,605	
8	4	2	1	430	Sedimentation Basin	Excavate sedimentation basin	252 m3	\$3.69	\$929	
Revegetate										\$57,827
8	5	1	1	610	Revegetate	Seeding	128,504 m2	\$0.40	\$51,402	
8	5	1	2	610		Fertilization	128,504 m2	\$0.05	\$6,425	
Subtotal Direct										\$9,718,604
Grum Dump Groun	ndwate	er Colle	ction to							\$149,872
9	1	1	1	430	Access Road	Clear access road area	1,950 m2	\$1.40	\$2,735	
9	1	1	1	430		Construct Access roac	650 m	\$12.00	\$7,800	
9	1	2	1	430	Groundwater Wells	Drill Well	7 ea.	\$1,906.43	\$13,345	no prelliminary design done.
9	1	2	2	500 500		Install 4" PVC Well	140 m	\$100.00	\$14,000 \$18,403	
9	1	2	3	500		Install Pump in well Supply Power	7 ea. 1,242 m	\$2,629.00 \$2.53	\$18,403	
9	1	2	4	500 430	Piping System	Excavate Piping Trench	7,452 m3	\$2.53	\$3,142 \$18,632	
9	1	3	2	510	Fiping System	Supply and place 150mm PVC pipe	1,242 m	\$15.50	\$19,251	
9	1	3	3	510		Supply and install heat trace through piping	1,242 m	\$7.87	\$9,775	
9	1	3	4	430		Bedding: Produce and stockpile (screen)	484 m3	\$7.73	\$3,745	
9	1	3	5	430		Bedding: Load, haul, place	484 m3	\$5.28	\$2,558	
9	1	3	6	430		Backfill and compact ditches	7,452 m3	\$4.90	\$36,488	
Grum Dump Groun	ndwate	r Holdi				Baskin and compact atomot	1,102 110	<b>\$</b> 1.00	<i>400,100</i>	\$23,104
9	2	1	1	430	Excavate pond	Excavate Holding Pond	563 m3	\$3.69	\$2.074	φ <u>2</u> 0,101
9	2	2	1	430	Place Liner	Supply and place HDPE Liner	435 m2	\$21.57	\$9,390	
9	2	3	1	430	Place bedding layer	Bedding Material: Produce and stockpile (screen)	201 m3	\$7.73	\$1,551	
9	2	3	2	430		Bedding Material: Load, haul, place and compact	201 m3	\$7.18	\$1,440	
9	2	4	1	500	Place pump	Supply and place pump	1 ea.	\$1,878.00	\$1,878	
9	2	4	2	500		Build and install housing for primary pump	1 ea.	\$5,000.00	\$5,000	
9	2	4	3	500		Provide power to pumping system	700 m	\$2.53	\$1,771	
Groundwater Colle	ection \$	System								\$231,690
9	3	1	1	430	Piping System	Excavate Piping Trench	17,160 m3	\$3.69	\$63,282	
9	3	1	2	510		Supply and place 150mm PVC pipe	2,860 m	\$15.50	\$44,330	
9	3	1	3	510		Supply and install heat trace through piping	2,860 m	\$7.87	\$22,508	
9	3	1	4	500		Supply and place Air valves	1 ea.	\$295.00	\$295	
9	3	1	5	500		Supply and place Drains (blow-offs)	1 ea.	\$620.00	\$620	
9	3	1	6	430		Bedding: Produce and stockpile (screen)	1,115 m3	\$7.73	\$8,623	
9	3	1	7	430		Bedding: Load, haul, place	1,115 m3	\$7.18	\$8,009	
9	3	1	8	430		Backfill and compact ditches	17,160 m3	\$4.90	\$84,023	
/angorda Pit Grou		er (Cor								\$114,930
9	4	1	1	430	Groundwater Wells	Drill Well	3 ea.	\$1,906.43	\$5,719	no prelliminary design done.
9	4	1	2	500		Install 4" PVC Well	270 m	\$100.00	\$27,000	
9	4	1	3	500 500		Install Pump in well	3 ea.	\$2,629.00	\$7,887 \$759	
			4	500		Supply Power	300 m	\$2.53 \$3.69	\$759 \$19.914	
0	4	1		100	<b>B</b> : : <b>B</b> :				\$19,914	
9	4	2	1	430	Piping System	Excavate Piping Trench	5,400 m3		640.050	
9 9	4 4 4	2	2	500	Piping System	Supply and place 150mm PVC pipe	900 m	\$15.50	\$13,950	
9 9 9	4 4 4 4	2 2 2	2 3	500 510	Piping System	Supply and place 150mm PVC pipe Supply and install heat trace through piping	900 m 900 m	\$15.50 \$7.87	\$7,083	
9 9 9 9	4 4 4 4	2 2 2 2	2 3 4	500 510 430	Piping System	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen)	900 m 900 m 351 m3	\$15.50 \$7.87 \$7.73	\$7,083 \$2,713	
9 9 9 9 9	4 4 4 4 4	2 2 2 2 2 2	2 3 4 5	500 510 430 430	Piping System	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area	900 m 900 m 351 m3 351 m3	\$15.50 \$7.87 \$7.73 \$2.78	\$7,083 \$2,713 \$976	
9 9 9 9 9 9	4 4 4	2 2 2 2 2 2 2 2	2 3 4 5 6	500 510 430 430 430	Piping System	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place	900 m 900 m 351 m3 351 m3 351 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32	\$7,083 \$2,713 \$976 \$1,867	
9 9 9 9 9	4 4 4 4 4 4 4 4 4	2 2 2 2 2 2 2 2 2	2 3 4 5	500 510 430 430 430 500	Piping System	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs)	900 m 900 m 351 m3 351 m3 351 m3 1 ea.	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00	\$7,083 \$2,713 \$976 \$1,867 \$620	
9 9 9 9 9 9 9 9	4 4 4 4 4	2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9	500 510 430 430 430 500 430		Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place	900 m 900 m 351 m3 351 m3 351 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32	\$7,083 \$2,713 \$976 \$1,867	\$21.746
9 9 9 9 9 9 9 9	4 4 4 4 4	2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9	500 510 430 430 430 500 430 nd (Cor	ntingency	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441	\$21,746
9 9 9 9 9 9 7angorda Pit Grou	4 4 4 4 4 4 undwate	2 2 2 2 2 2 2 2 2 2 6 r Hold	2 3 4 5 6 8 9	500 510 430 430 430 500 430 md (Cor 430	<b>ttingency</b> Excavate pond	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3 563 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074	\$21,746
9 9 9 9 9 9 9 9 <b>/angorda Pit Grou</b> 9	4 4 4 4 undwate 5	2 2 2 2 2 2 2 2 2 2 2 0 7 1	2 3 4 5 6 8 9 1 1	500 510 430 430 430 500 430 <b>nd (Cor</b> 430 430 430	<b>tingency</b> Excavate pond Place Liner	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390	\$21,746
9 9 9 9 9 9 9 9 9 9 <b>/angorda Pit Grou</b> 9 9	4 4 4 4 undwate 5 5	2 2 2 2 2 2 2 2 2 0 7 0 1 2	2 3 4 5 6 8 9 <b>ling Po</b> 1 1	500 510 430 430 430 500 430 md (Cor 430	<b>ttingency</b> Excavate pond	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074	\$21,746
9 9 9 9 9 9 9 <b>/angorda Pit Grou</b> 9 9 9 9	4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>ling Po</b> 1 1 1	500 510 430 430 500 430 430 430 430 430 430	<b>tingency</b> Excavate pond Place Liner	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551	\$21,746
9 9 9 9 9 9 9 9 <b>/angorda Pit Grou</b> 9 9 9 9 9 9 9	4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>ling Po</b> 1 1 1 2	500 510 430 430 500 430 430 430 430 430 430 430	<b>ttingency</b> Excavate pond Place Liner Place bedding layer	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, place and compact	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73 \$2.78 \$5.32	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558	\$21,746
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 undwate 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 9 1 1 1 1 2 3	500 510 430 430 500 430 430 430 430 430 430 430 500 500	<b>tingency</b> Excavate pond Place Liner	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 455 m2 201 m3 201 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5,000.00	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000	\$21,746
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 undwate 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 9 1 1 1 1 2 3 1	500 510 430 430 500 430 430 430 430 430 430 430 500	<b>ttingency</b> Excavate pond Place Liner Place bedding layer	Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Bedding: Produce and stockpile (screen) Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Froduce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 1 ea.	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878	\$21,746
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 <b>undwat</b> 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>Po</b> 1 1 1 2 3 1 2 3	500 510 430 430 500 430 430 430 430 430 430 430 430 500 500 500	<b>ttingency</b> Excavate pond Place Liner Place bedding layer	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 201 m3 1 ea. 1 ea.	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5,000.00	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000	
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 <b>undwat</b> 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>Po</b> 1 1 1 2 3 1 2 3	500 510 430 430 500 430 430 430 430 430 430 430 430 500 500 500	<b>ttingency</b> Excavate pond Place Liner Place bedding layer	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 201 m3 1 ea. 1 ea.	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5,000.00	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000	\$21,746 \$541,342
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 <b>undwat</b> 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>Po</b> 1 1 1 2 3 1 2 3	500 510 430 430 500 430 430 430 430 430 430 430 430 500 500 500	<b>ttingency</b> Excavate pond Place Liner Place bedding layer	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Produce and stockpile (screen) Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 201 m3 1 ea. 1 ea.	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$3.69 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5,000.00	\$7,083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000	\$541,342
Vangorda Pit Grou 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 <b>undwat</b> 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 <b>Po</b> 1 1 1 2 3 1 2 3	500 510 430 430 500 430 430 430 430 430 430 430 500 500 500 <b>vater</b>	<b>ttingency</b> Excavate pond Place Liner Place bedding layer Place pump	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump Provide power to pumping system	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 201 m3 201 m3 1 ea. 1 ea. 90 m	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5.000.00 \$2.53	\$7 083 \$2,713 \$376 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000 \$228	
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angorda Pit Grou 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 1 1 1 1 2 3 1 2 3 0 000000	500 510 430 430 500 430 430 430 430 430 430 430 500 500 500 <b>vater</b>	<b>ttingency</b> Excavate pond Place Liner Place bedding layer Place pump	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Produce and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump Provide power to pumping system	900 m 900 m 351 m3 351 m3 351 m3 1 ea. 5,400 m3 563 m3 435 m2 201 m3 201 m3 201 m3 201 m3 1 ea. 1 ea. 90 m	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$5.000.00 \$2.53	\$7 083 \$2,713 \$376 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000 \$228	<b>\$541,342</b> \$102,840
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Vangorda Pit Group 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 4 5 6 8 9 9 0 1 1 1 2 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	500 510 430 430 430 500 430 430 430 430 430 430 500 500 500 500 500 500 500 500 430 430 430 430 430 430 430 600	ntingency Excavate pond Place Liner Place bedding layer Place pump Building Demolition Cover Sludge Pond Cover Existing Bioremediation Cell Breach all Dams (2) Breach WTP Settling Pond Remove Contaminated soils	Supply and place 150mm PVC pipe Supply and install heat trace through piping Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place Supply and place Drains (blow-offs) Backfill and compact ditches Excavate Holding Pond Supply and place HDPE Liner Bedding: Load, haul, place and stockpile (screen) Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place and compact Install Primary pump Build and install housing for primary pump Provide power to pumping system Demolish and stockpile building material LHD building material to Grum toe to be regraded over Load, Haul, Place Till Doze material Excavate, haul and dump locally Excavate, haul and dump locally	900 m 900 m 351 m3 351 m3 1 ea. 5,400 m3 201 m3 201 m3 201 m3 201 m3 201 m3 201 m3 1 ea. 90 m 6,902 m3 6,902 m3 6,902 m3 30,000 m3 1,600 m2 1,000 m2 1,491 m3 3,750 m3	\$15.50 \$7.87 \$7.73 \$2.78 \$5.32 \$620.00 \$4.90 \$21.57 \$7.73 \$2.78 \$5.32 \$1.878.00 \$2.253 \$1.878.00 \$5.000.00 \$2.53 \$4.94 \$9.96 \$3.26 \$1.40 \$5.44 \$9.96	\$7.083 \$2,713 \$976 \$1,867 \$620 \$26,441 \$2,074 \$9,390 \$1,551 \$558 \$1,067 \$1,878 \$5,000 \$228 \$34,096 \$68,744 \$97,800 \$2,244 \$5,440 \$8,111 \$37,350	\$541,342 \$102,840 \$97,800 \$2,244 \$5,440 \$8,111
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#### Faro Primary Alternative Cost Estimates

10	7	1	2	430		Place HDPE Liner for remediation Cell		1,600		\$21.57	\$34,504		
10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)		480	m3	\$4.90	\$2,350		
Roads												\$25,607	
10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing		3,920	m3	\$3.69	\$14,456		
10	8	1	2	430		Scarify road surfaces		15,000	m2	\$0.29	\$4,401		
10	8	1	3	610		Seed and fertilize		15,000	m2	\$0.45	\$6,750		
Borrow Sources												\$286,894	
10	9	1	1	600	Develop Borrow Sources	Clear and grub		3,000	m2	\$2.08	\$6,253		
10	9	1	2	600		Construct Haul Road		1,000	m	\$200.00	\$200,000		
10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes		10	hrs	\$459.10	\$4,591		
10	9	2	2	610		Revegetate - Seeding		169,000		\$0.40	\$67,600		
10	9	2	3	610		Revegetate - Fertilizer		169,000	m2	\$0.05	\$8,450		
Subtotal Direct (	Cost	s - Mi	scella	neous								\$623,142	
Subtotal Direct (	Cost	S											
						Subtotal direct costs						\$77,431,386	
LOSURE COST	TS - I	NDIR	ЕСТ										
100	100	1	1		Project Management	2.5% of direct costs	\$ 7	7.431.386	х	2.5%		\$1,935,785	
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	\$ 7	7,431,386	х	10.0%		\$7,743,139	
100	100	4	1		Insurance	0.5% of direct costs	\$ 7	7,431,386	х	0.5%		\$387,157	
100	100	5	1		Bonding	0.5% of direct costs		7,431,386	х	0.5%		\$387,157	
100	100	6	1		Field Engineering and QA	15% of direct costs	\$ 7	7,431,386	х	15.0%		\$11,614,708	
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	
100	100	9	1		Taxes	7% of taxable direct and indirect costs	\$ 8	4,513,054	х	7.0%		\$5,915,914	
Subtotal Indirect	t Cos	sts											
					Subtotal indirect costs							\$28.483.859	
CLOSURE COST	TS - C	CONT	INGEN	ICY								, .,	
					Contingency	20% of direct costs	\$7	7,431,386	х	20.0%		\$15,486,277	
CLOSURE COST	TS - 1	ΟΤΑ	L		• •								
	-				Total direct and indirect costs							\$121,401,522	
												. , . ,===	

#### Option 2: Stabilize Current Situation

Code Co	k Area	Item	Task	Sub- E task	stimate Type	Activity	Task	Quantity Unit	Unit Cost Activity Total	Subtotals	Source / Comments
OSURE O			FCT (								
igorda P			2010								
er Manage											
er manage	1	1	1	1	600	Construct Water Treatment Plant					(preliminary construction cost esti. \$4,670,000)
ety Berm					000	Construct Water Treatment Flant				\$ 439.591	
,	1	2	1	1	430	Construct access road	Clear (grub access road)	4.350 m	\$2.08 \$ 9.067	• ••••	
	1	2	1	2	430		Construct Access road	1,450 m	\$12.00 \$ 17,400		
	1	2	2	1	430	Place berm materials	LHD Material (Haul road material?)	15,000 m3	\$8.79 \$ 131,850		
	1	2	2	2	430		Shape Material into berm	15,000 m3	\$18.75 \$ 281,274		
ngorda Pit V	Waste R	- Rock Pil		-					+···· + -··,-· ·	\$ 313,835	
	1	3	1	1	430	Regrade	Regrade Flattened Surfaces	13 hrs	\$459.10 \$ 5,970	,	
	1	3	1	2	430	-3	Regrade Flat Bubble Dump Surfaces	10 hrs	\$459.10 \$ 4,424		
	1	3	1	3	430		Regrade Slopes (3:1)	28 hrs	\$459.10 \$ 12,718		
	1	3	2	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	64,823 m3	\$3.66 \$ 237,252		
	1	3	3	1	610	Revegetate	Seeding	118,825 m2	\$0.40 \$ 47,530		
	1	3	3	2	610		Fertilization	118,825 m2	\$0.05 \$ 5,941		
ubtotal Dir	irect Co	osts - I	Vango	rda Pi						\$ 753,426	
ingorda D		0010	range	auri						¢ 100,420	
										¢ 000.500	
eslope Dump	ι <del>μ</del>	4	4	4	420	Pagrada	Elettened Surfaces	40 h		\$ 339,522	
	2	1	1	1	430	Regrade	Flattened Surfaces	40 hrs	\$459.10 \$ 18,180		
	2	1	1	2	430		Flat Bubble Dump Surfaces	102 hrs	\$459.10 \$ 46,806		
	2	1	1	3	430		Regrade Slopes (3:1)	598 hrs	\$459.10 \$ 274,536	¢ = 000.450	
aste Rock C		0			400	Low Infiltration Cover		000.000 - 0		\$ 5,889,150	
	2	2	1	1	430	Low Infiltration Cover	Load, haul, place compacted till (0.5m)	320,063 m3	\$6.26 \$ 2,003,591		
	2	2	1	2	430		Load, haul, place loose till (1.0m)	640,125 m3	\$6.07 \$ 3,885,559		
ock Drains	_	-					<b>_</b>			\$ 56,141	
	2	3	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	1,313 Bm3	\$3.69 \$4,840		
	2	3	1	2	430		Rip-Rap: Drill, blast and stockpile	977 Bm3	\$23.86 \$23,296		
	2	3	1	3	430		Rip-Rap: Screen and stockpile	977 Bm3	\$15.46 \$15,098		
	2	3	1	4	430		Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	977 Bm3	\$2.68 \$2,617		
	2	3	1	5	430		Load Haul and Dump Rip-Rap	977 Bm3	\$5.85 \$5,713		
	2	3	1	6	430		Place and secure Rip-Rap	977 Bm3	\$4.69 \$4,578		
ediment Con										\$ 1,438	
	2	4	1	1	430	Vangorda Dump Sediment Control Ditch	Upgrade present Vangorda seepage collection ditch	390 Bm3	\$3.69 \$ 1,438		
evegetate	_	-								\$ 226,868	
	2	5	1	1	610	Revegetate	Seeding	504,150 m2	\$0.40 \$ 201,660		
	2	5	1	2	610		Fertilization	504,150 m2	\$0.05 \$ 25,208		
ubtotal Dir	irect Co	osts - \	Vango	rda Du	ımp					\$ 6,513,119	
angorda C	Creek										1CD003.15 Vangorda Creek Diversion
elocate North										\$ 1,288,695	
	h of Pit				430	Excavate Channel	Rock Excavation: drill, blast, muck, load and haul 1 km	19,346 m3	\$23.33 \$ 451,282		
	h of Pit 3	1	1	1							
		1 1	1 1	1	430		Soil Excavation: load, haul and dump locally	78,061 m3	\$3.69 \$ 287,872		
	3	1 1 1	1 1 2	1 2 1		Place Till	Soil Excavation: load, haul and dump locally Till: Load, haul, place and compact	78,061 m3 290 m3			
	3 3	1 1 1			430	Place Till Place Bedding layer			\$3.69 \$ 287,872		
	3 3 3	1 1 1 1	2	1	430 430		Till: Load, haul, place and compact	290 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855		
	3 3 3 3	1 1 1 1 1	2 3	1 1	430 430 430		Till: Load, haul, place and compact Bedding: Produce and stockpile	290 m3 3,194 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692		
	3 3 3 3 3	1 1 1 1 1 1	2 3 3	1 1 2	430 430 430 430		Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area	290 m3 3,194 m3 3,194 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880		
	3 3 3 3 3 3 3	1 1 1 1 1 1 1	2 3 3 3	1 1 2 3	430 430 430 430 430	Place Bedding layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: load, haul, place and compact	290 m3 3,194 m3 3,194 m3 3,194 m3 3,194 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757		
	3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1	2 3 3 3 4	1 1 2 3 1	430 430 430 430 430 430	Place Bedding layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Ioad, haul, place and compact Rip-Rap. Dill, blast and stockpile	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$23.86 \$ 231,265		
	3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1	2 3 3 3 4 4	1 2 3 1 2	430 430 430 430 430 430 430	Place Bedding layer	Till: Load, haut, place and compact Bedding: Produce and stockpile Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load, haut, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$23.86 \$ 231,265 \$15.46 \$ 149,881		
	3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1	2 3 3 3 4 4 4	1 2 3 1 2 3	430 430 430 430 430 430 430 430	Place Bedding layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: load, haul, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$33.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980		
	3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1	2 3 3 4 4 4 4	1 2 3 1 2 3 4	430 430 430 430 430 430 430 430 430	Place Bedding layer	Till: Load, haut, place and compact Bedding: Droduce and stockpile Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load , haut, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Load, haut and to Wangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3	\$3.69 \$ 287,872 \$13,28 \$ 3.855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$33.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45,444	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 1 1 1 1 1 2	2 3 3 4 4 4 4	1 2 3 1 2 3 4	430 430 430 430 430 430 430 430 430	Place Bedding layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: load, haul, jlace and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul, dump to Vangorda Stockpile Area Rip-Rap: Load, haul and dump Rip-Rap: Place and secure	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3	\$3.69 \$ 287,872 \$13,28 \$ 3.855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$33.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45,444	\$ 57,011	
unge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3		2 3 3 4 4 4 4 4	1 2 3 1 2 3 4 5	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap	Till: Load, haut, place and compact Bedding: Droduce and stockpile Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load , haut, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Load, haut and to Wangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24.692 \$2.78 \$ 8.880 \$4.62 \$ 14,757 \$23.86 \$ 231.265 \$15.46 \$ 149.881 \$2.68 \$ 25.980 \$4.62 \$ 44,786 \$4.69 \$ 45.444	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2	2 3 3 3 4 4 4 4 4 4 4 1	1 2 3 1 2 3 4 5	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: load, haul, place and compact Rip-Rap: Dill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul dump to Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Produce and stockpile locally	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24,692 \$.78 \$ 8,880 \$4.62 \$ 14.757 \$23.86 \$ 21.265 \$15.46 \$ 31.265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45.444 \$2.50 \$ 6,751	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2	2 3 3 3 4 4 4 4 4 4 4 4 1 2	1 2 3 1 2 3 4 5 1 1	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool	Till: Load, haut, place and compact Bedding: Doad, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load , haut, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul, dump to Vangorda Stockpile Area Rip-Rap: Load, haul, and dump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Load, haut, dump to Vangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,694 m3 2,700 m3 2,700 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24.692 \$.78 \$ 24.692 \$.462 \$ 14.757 \$23.86 \$ 231.265 \$15.46 \$ 149.881 \$2.68 \$ 25.900 \$.4.62 \$ 4.786 \$.4.69 \$ 4.5444 \$2.50 \$ 6.751 \$7.73 \$ 2.087	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2	2 3 3 3 4 4 4 4 4 4 4 4 1 2 2	1 1 2 3 1 2 3 4 5 1 1 2	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer	Till: Load, haut, place and compact Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load , haut, glace and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, place and compact	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,700 m3 270 m3 270 m3	\$3.69 \$ 287,872 \$13.28 \$ 3,855 \$7.73 \$ 24,692 \$2.78 \$ 8,880 \$4.62 \$ 14,757 \$23.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45,444 \$2.50 \$ 6,751 \$7.73 \$ 2,087 \$2.78 \$ 751	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2	2 3 3 3 4 4 4 4 4 4 4 4 4 4 2 2 2	1 2 3 1 2 3 4 5 1 1 2 3	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool	Till: Load, haut, place and compact Bedding: Doad, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: load , haut, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul, dump to Vangorda Stockpile Area Rip-Rap: Load, haul, and dump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Load, haut, dump to Vangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,700 m3 270 m3 270 m3 270 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24,692 \$2.78 \$ 8.880 \$4.62 \$ 14,757 \$23.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45,444 \$2.50 \$ 6,751 \$7.73 \$ 2,087 \$2.78 \$ 751 \$4.62 \$ 1,247	\$ 57,011	
nge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2 2 2	2 3 3 4 4 4 4 4 4 4 4 4 4 2 2 3	1 2 3 1 2 3 4 5 1 2 3 1 2 3 1	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer	Till: Load, haul, place and compact Bedding: Doad, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Ioad , haul, dump to Vangorda Stockpile Area Rip-Rap: Drill, blast and stockpile Rip-Rap: Load, haul and toncp file Rip-Rap: Load, haul, dump to Vangorda Stockpile Area Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Produce and stockpile locally Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Drill, blast and stockpile	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,700 m3 270 m3 270 m3 270 m3 900 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24.692 \$2.78 \$ 8.880 \$4.62 \$ 14,757 \$23.86 \$ 231,265 \$15.46 \$ 149,881 \$2.68 \$ 25,980 \$4.62 \$ 44,786 \$4.69 \$ 45,444 \$2.50 \$ 6,751 \$7.73 \$ 2.087 \$2.78 \$ 751 \$4.62 \$ 1,247 \$23.86 \$ 21,471	\$ 57,011	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2 2 2 2 2 2	2 3 3 4 4 4 4 4 4 4 2 2 3 3 3 3	1 2 3 1 2 3 4 5 1 2 3 1 2 3 1 2	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Ioad , haul, jlace and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul and dump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Produce and stockpile locally Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place and compact Rip-Rap: Screen and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Screen and stockpile	290 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,694 m3 2,700 m3 2,700 m3 270 m3 270 m3 270 m3 900 m3 900 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24.692 \$2.78 \$ 8.880 \$4.62 \$ 14.757 \$23.86 \$ 231.265 \$15.46 \$ 149.881 \$2.68 \$ 25.90 \$4.62 \$ 44.786 \$4.69 \$ 45,444 \$2.50 \$ 6,751 \$7.73 \$ 2.087 \$2.78 \$ 751 \$4.62 \$ 1.247 \$2.86 \$ 21.471 \$15.46 \$ 1.3495 \$2.88 \$ 2.412	\$	
inge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2 2 2 2 2 2 2 2	2 3 3 4 4 4 4 4 4 4 4 2 2 3 3	1 1 2 3 1 2 3 4 5 1 2 3 1 2 3	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer	Till: Load, haut, place and compact Bedding: Doad, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: Dill, blast and stockpile Rip-Rap: Dill, blast and stockpile Rip-Rap: Load, haul, and tump to Vangorda Stockpile Area Rip-Rap: Load, haul, and tump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Load, haut, dump to Vangorda Stockpile Area Bedding: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Load, haut, dump to Vangorda Stockpile Area Rip-Rap: Load, haut dump to Vangorda Stockpile Area	290 m3 3,194 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,700 m3 270 m3 270 m3 270 m3 900 m3 900 m3 900 m3 900 m3 900 m3	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	\$ 57,011	
unge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 3 3 4 4 4 4 4 4 4 4 4 1 2 2 3 3 3 3 3 3	1 1 2 3 1 2 3 4 5 1 2 3 1 2 3 4	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer	Till: Load, haul, place and compact Bedding: Produce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Ioad , haul, jlace and compact Rip-Rap: Drill, blast and stockpile Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul and dump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Produce and stockpile locally Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, place and compact Rip-Rap: Screen and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Screen and stockpile	290 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,694 m3 2,700 m3 2,700 m3 270 m3 270 m3 270 m3 900 m3 900 m3	\$3.69 \$ 287.872 \$13.28 \$ 3.855 \$7.73 \$ 24.692 \$2.78 \$ 8.880 \$4.62 \$ 14.757 \$23.86 \$ 231.265 \$15.46 \$ 149.881 \$2.68 \$ 25.90 \$4.62 \$ 44.786 \$4.69 \$ 45,444 \$2.50 \$ 6,751 \$7.73 \$ 2.087 \$2.78 \$ 751 \$4.62 \$ 1.247 \$2.86 \$ 21.471 \$15.46 \$ 1.3495 \$2.88 \$ 2.412		
unge Pool	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 3 3 3 4 4 4 4 4 4 4 4 4 1 2 2 3 3 3 3 3 3	1 1 2 3 1 2 3 4 5 1 2 3 1 2 3 4	430 430 430 430 430 430 430 430 430 430	Place Bedding layer Place Rip-Rap Excavate Pool Place Bedding Layer Place Rip-Rap	Till: Load, haul, place and compact Bedding: Droduce and stockpile Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Ioad, haul, dump to Vangorda Stockpile Area Rip-Rap: Drill, blast and stockpile Rip-Rap: Load, haul, and tump Rip-Rap: Load, haul, and dump Rip-Rap: Place and secure Plunge Pool Excavation Bedding: Load, haul, dump to Vangorda Stockpile Area Bedding: Load, haul, dump to Vangorda Stockpile Area Rip-Rap: Screen and stockpile Rip-Rap: Screen and stockpile Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul dump to Vangorda Stockpile Area Rip-Rap: Load, haul and dump Rip-Rap: Place and secure	290 m3 3,194 m3 3,194 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 9,694 m3 2,700 m3 270 m3 270 m3 270 m3 900 m3 900 m3 900 m3 900 m3	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$		
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4	2	2	2	430		Shape Material into berm	20,000 m3	\$18.75	\$ 375,032	
Subtotal Direct C			Pit							\$ 526,491
Grum Intercepto Route into Grum Pit		h								1CD003.46_PitLakesTreat \$102,655 assumed channel from vangorda creek diversion (1CD003.15
5	• 1	1	1	430	Access Road	Access Road: clearing and grubbing	600 m2	\$1.40	\$841	\$102,000 assumed charmer non varigorda creek diversion (102000.13
5	1	1	2	220		Access Road: construction	200 m	\$12.00	\$2,400	
5	1	2	1	430	Headworks dam	Construct Earth Dam at Headworks (LHD Till)	24 Bm3	\$9.57	\$230	
5	1	3	1	430	Excavate Channel	Excavate diversion channel (soils)	2,017 Bm3	\$3.69	\$7,438	
5	1	3	2	430		Excavate diversion channel (bedrock)	362 Bm3	\$23.33	\$8,435	
5	1	4	1	430	Place bedding layer	Bedding: Produce and stockpile locally	623 Bm3	\$7.73	\$4,813	
5	1	4	2	430	0,	Bedding: Load, haul, dump to Grum Stockpile Area	623 Bm3	\$2.78	\$1,731	
5	1	4	3	430		Bedding: load , haul, place and compact	623 Bm3	\$11.28	\$7,023	
5	1	5	1	430	Place Rip-Rap	Rip-Rap: Drill, blast and stockpile	1,212 Bm3	\$23.86	\$28,924	
5	1	5	2	430		Rip-Rap: Screen and stockpile	1,212 Bm3	\$15.46	\$18,745	
5	1	5	3	430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	1,212 Bm3	\$2.78	\$3,370	
5	1	5	4	430		Rip-Rap: Load, haul and dump	1,212 Bm3	\$10.74	\$13,021	
5	1	5	5	430		Rip-Rap: Place and secure	1,212 Bm3	\$4.69	\$5,684	
Rock Drain										\$24,312
5	2	6	1	430	Rock Drain at start of slot cut	Rip-Rap: Drill, blast and stockpile	469 Bm3	\$23.86	\$11,183	
5	2	6	2	430		Rip-Rap: Screen and stockpile	469 Bm3	\$15.46	\$7,247	
5	2	6	3	430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	469 Bm3	\$2.78	\$1,303	
5	2	6	4	430		Rip-Rap: Load, haul and dump	469 Bm3	\$5.08	\$2,381	
5	2	6	5	430		Rip-Rap: Place and secure	469 Bm3	\$4.69	\$2,197	
Route out of Pit via		1								\$233,203
5	3	1	1	430	Access Road	Access Road: clearing and grubbing	150 m2	\$1.40	\$210	
5	3	1	2	220		Access Road: construction	50 m	\$12.00	\$600	
5	3	2	1	430	Excavate Channel	Excavate diversion channel (soils)	9,222 Bm3	\$3.69	\$34,010	
5	3	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	1,736 Bm3	\$7.73	\$13,422	
5	3	3	2	430		Bedding: Load, haul, dump to Grum Stockpile Area	1,736 Bm3	\$2.78	\$4,827	
5	3	3	3	430		Bedding: load , haul, place and compact	1,736 Bm3	\$4.54	\$7,883	
5	3	4	1	430	Place Rip-Rap	Rip-Rap: Drill, blast and stockpile	3,375 Bm3	\$23.86	\$80,519	
5	3	4	2	430		Rip-Rap: Screen and stockpile	3,375 Bm3	\$15.46	\$52,183	
5	3	4	3	430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	3,375 Bm3	\$2.78	\$9,383	
5	3	4	4	430		Rip-Rap: Load, haul and dump	3,375 Bm3	\$4.25	\$14,344	
5	3	4	5	430		Rip-Rap: Place and secure	3,375 Bm3	\$4.69	\$15,822	
Subtotal Direct C	Costs	- Grum	Interc	eptor	Ditch					\$360,171
Grum Dump										
Reslope Dump										\$629,554
6	1	1	1	430	Regrade	Flattened Surfaces	337 hrs	\$459.10	\$154,872	
6	1	1	2	430	-	Flatten Bubble Dump Surfaces	296 hrs	\$459.10	\$136,123	
6	1	1	3	430		Regrade Slopes	737 hrs	\$459.10	\$338,559	
Sulphide Cell						<b>v</b>				\$2,415,801
. 6	2	1	1	430	Low Infiltration Cover	Load, haul, place compacted till (0.5m)	98,725 Bm3	\$6.26	\$618,019	
6	2	1	2	430		Load, haul, place loose till (1.5m)	296,175 Bm3	\$6.07	\$1,797,782	
Waste Rock Cover										\$5,211,854
6	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	858,625 Bm3	\$6.07	\$5,211,854	
Rock Drains										\$141,664
6	4	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	3,500 Bm3	\$3.69	\$12,907	
6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,604 Bm3	\$23.86	\$62,123	
6	4	1	3	430		Rip-Rap: Screen and stockpile	2,604 Bm3	\$15.46	\$40,261	
6	4	1	4	430		Rip-Rap: Load, haul, dump to Grum Stockpile Area	2,604 Bm3	\$2.78	\$7,239	
6	4	1	5	430		Load Haul and Dump Rip-Rap	2,604 Bm3	\$2.66	\$6,927	
6	4	1	6	430		Place and secure Rip-Rap	2,604 Bm3	\$4.69	\$12,207	
Sediment Control Di	Ditches									\$103,016
6	5	1	1	430	Sediment Control Ditch	Excavation of Ditch	3,490 Bm3	\$3.69	\$12,870	
6	5	1	2	520		Supply and place geotextile	5,175 m2	\$4.41	\$22,830	
6	5	1	3	430		Rip-Rap: Drill, blast and stockpile	1,215 Bm3	\$23.86	\$28,982	
6	5	1	4	430		Rip-Rap: Screen and stockpile	1,215 Bm3	\$15.46	\$18,783	
6	5	1	5	430		Rip-Rap: Load, haul, dump to Moose Pond Stockpile	1,215 Bm3	\$4.06	\$4,932	
6	5	1	6	430		Load Haul and Dump Rip-Rap	1,215 Bm3	\$2.66	\$3,232	
6	5	1	7	430		Place and secure Rip-Rap	1,215 Bm3	\$4.69	\$5,695	
6	5	2	1	430	Sedimentation Basin	Excavate sedimentation basin	1,117 Bm3	\$3.69	\$4,119	
6	5	2	2	430		Rip-Rap: Drill, blast and stockpile	31 Bm3	\$23.86	\$740	
6	5	2	3	430		Rip-Rap: Screen and stockpile	31 Bm3	\$15.46	\$479	
6	5	2	4	430		Rip-Rap: Load, haul, dump to Moose Pond Stockpile	31 Bm3	\$4.06	\$126	
6	5	2	5	430		Load Haul and Dump Rip-Rap	31 Bm3	\$2.66	\$82	
6	5	2	6	430		Place and secure Rip-Rap	31 Bm3	\$4.69	\$145	
Revegetate	-	-	-				5. <u>2</u> 110	+	÷	\$672,188
6	6	1	1	610	Revegetate WR Dumps	Seeding	1,493,750 m2	\$0.40	\$597,500	
ő	6	1	2	610		Fertilization	1,493,750 m2	\$0.05	\$74,688	
Subtotal Direct C	-					· · · · · ·	.,	<i>+1.50</i>	÷,:50	\$9,174,076
Overburden Dun		Jiuli	Dump							wo, ii t, vi o
	πþ									¢457.054
Roads			4	400	Widen Bondo for 777 t#-	Evenuete everburden materi-!	00 F00 D	£0.00	\$450 AFC	\$157,851
7	1	1	1	430 430	Widen Roads for 777 traffic	Excavate overburden material	22,500 Bm3 15,000 m2	\$6.82	\$153,450	
-	1	1	2	430		Grade Road	15,000 m2	\$0.29	\$4,401	····
Reslope Dump										\$196,478

7 2 1		I30 Regrade	Flattened Surfaces	77 hrs	\$459.10	\$35,426	
7 2 1	2	130	Regrade Slopes	351 hrs	\$459.10	\$161,051	\$222 AVA
evegetate 7 3 1		10 Revegetate WR Dumps	Oradian	510,250 m2	¢0.40	\$004 400	\$229,613
7 3 1		610 Revegetate WR Dumps 610	Seeding Fertilization	510,250 m2	\$0.40 \$0.05	\$204,100 \$25,513	
ubtotal Direct Costs - Overl			1 entilization	510,250 112	\$0.05	φ20,010	\$583,942
re Transfer Pad		ump					\$J0J,34Z
elocate to Vangorda Pit							#REF!
eslope Pad for drainage							\$52,161
8 2 1	1	I30 Regrade	Flattened Surfaces	52 hrs	\$459.10	\$23,827	\$52,101
8 2 1		130	Regrade Slopes	62 hrs	\$459.10	\$28,335	
udementary Cover					• • • •	,	\$391,082
8 3 1	1 .	I30 Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,650 Bm3	\$5.31	\$391,082	
ediment Control Ditches							\$7,534
8 4 1		I30 Sediment Control Ditch	Excavation of Ditch	1,791 Bm3	\$3.69	\$6,605	
8 4 2	1 ·	I30 Sedimentation Basin	Excavate sedimentation basin	252 Bm3	\$3.69	\$929	<b>*</b> 57.007
evegetate 8 5 1	1	010 Revegetate	Seeding	128,504 m2	\$0.40	\$51,402	\$57,827
8 5 1		310 Nevegetate	Fertilization	128,504 m2	\$0.05	\$6,425	
ubtotal Direct Costs - Ore T			- or an Education	120,001112	<b>\$0.00</b>	<i>Q</i> 0,120	#REF!
roundwater		44					1CD003.37 Grum Seepage Collection
rum Dump Groundwater Collection	on to Holdi	ng Ponr					\$149,872
9 1 1		I30 Access Road	Clear access road area	1,950 m2	\$1.40	\$2,735	
9 1 1	1 .	130	Construct Access roac	650 m	\$12.00	\$7,800	
9 1 2		I30 Groundwater Wells	Drill Well	7 ea.	\$1,906.43	\$13,345	no prelliminary design done.
9 1 2		500	Install 4" PVC Well	140 m	\$100.00	\$14,000	
9 1 2 9 1 2		500 500	Install Pump in well	7 ea. 1,242 m	\$2,629.00 \$2.53	\$18,403 \$3,142	
9 1 2 9 1 3		130 Piping System	Supply Power Excavate Piping Trench	1,242 m 7,452 m3	\$2.53 \$2.50	\$3,142 \$18,632	
9 1 3		510 Fiping System	Supply and place 150mm PVC pipe	1,242 m	\$15.50	\$19,251	
9 1 3		510	Supply and install heat trace through piping	1,242 m	\$7.87	\$9,775	
9 1 3	4	130	Bedding: Produce and stockpile (screen)	484 m3	\$7.73	\$3,745	
9 1 3		130	Bedding: Load, haul, place	484 m3	\$5.28	\$2,558	
9 1 3		130	Backfill and compact ditches	7,452 m3	\$4.90	\$36,488	
rum Dump Groundwater Holding		100 E 1		500 0	<b>*</b> **		\$23,104
9 2 1 9 2 2		I30 Excavate pond I30 Place Liner	Excavate Holding Pond Supply and place HDPE Liner	563 m3 435 m2	\$3.69 \$21.57	\$2,074 \$9,390	
9 2 3		I30 Place bedding layer	Bedding Material: Produce and stockpile (screen)	201 m3	\$7.73	\$1,551	
9 2 3		I30	Bedding Material: Load, haul, place and compact	201 m3	\$7.18	\$1,440	
9 2 4		500 Place pump	Supply and place pump	1 ea.	\$1,878.00	\$1,878	
9 2 4		500	Build and install housing for primary pump	1 ea.	\$5,000.00	\$5,000	
9 2 4		500	Provide power to pumping system	700 m	\$2.53	\$1,771	
roundwater Collection System to							\$102,101
9 3 1 9 3 1		I30 Piping System 510	Excavate Piping Trench Supply and place 150mm PVC pipe	7,524 Bm3 1,254 m	\$3.69 \$15.50	\$27,747 \$19,437	
9 3 1		510	Supply and install heat trace through piping	1,254 m	\$7.87	\$9,869	
9 3 1		500	Supply and place Air valves	1 ea.	\$295.00	\$295	
9 3 1		500	Supply and place Drains (blow-offs)	1 ea.	\$620.00	\$620	
9 3 1		130	Bedding: Produce and stockpile (screen)	489 Bm3	\$7.73	\$3,781	
9 3 1		130	Bedding: Load, haul, place	489 Bm3	\$7.18	\$3,511	
9 3 1		130	Backfill ditches	7,524 Bm3	\$4.90	\$36,841	\$514,148
angorda Dump Seepage Toe Drai 9 4 1		130 Excavate Ditch	Excavation of Ditch	7,980 Bm3	\$3.69 \$	29,428	φ <del>014,14</del> 8
9 4 1		I30 Place Rip-Rap	Rip-Rap: Drill, blast and stockpile	7,980 Bm3	\$23.86 \$		
9 4 2		130	Rip-Rap: Screen and stockpile	7,980 Bm3	\$15.46 \$		
9 4 2	3	130	Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	7,980 Bm3	\$2.68 \$	21,386	
9 4 2		130	Rip-Rap: Load, haul and dump	7,980 Bm3	\$5.85 \$		
9 4 3		I30 Collection Sump	Excavate sump for manholes	32 Bm3	\$3.69 \$	118	
9 4 3 9 4 3		500 500	Supply and place Precast concrete manhole	1 ea.	\$1,863.00 \$		
9 4 3 9 4 3		500 500	Supply and place pump Provide power to pumping system	1 ea. 1,000 m	\$1,503.00 \$ \$2.53 \$	1,503 2,530	est
9 4 3		I30 Piping System (to Vangorda Pit)	Excavate Piping Trench	7,200 Bm3	\$3.69 \$		uol
9 4 4		520	Supply and place 150mm PVC insulated pipe	1,200 m	\$15.50 \$		
9 4 4		510	Supply and install heat trace through piping	1,200 m	\$7.87 \$	9,444	
9 4 4		130	Bedding: Produce and stockpile (screen)	468 Bm3	\$7.73 \$		
9 4 4		130	Bedding: Load, haul, dump to Vangorda Stockpile Area	468 Bm3	\$2.78 \$		
9 4 4		130	Bedding: Load, haul, place	468 Bm3	\$4.51 \$		
9 4 4		130	Backfill ditches	7,200 Bm3	\$4.90 \$	35,254	\$790.000
ubtotal Direct Costs - Grou	iuwater						\$789,226
iscellaneous uildings							\$102,840
uildings 10 1 1	1	220 Building Demolition	Demolish and stockpile building material	6,902 m3	\$4.94	\$34,096	φ102,640
10 1 1		I30 Building Demolition	LHD building material to Grum toe to be regraded over	6,902 m3 6,902 m3	\$4.94 \$9.96	\$34,096 \$68,744	
udge Pond	-		Line balang matchai to Stuff toe to be regraded over	0,002 110	φ3.30	φ00,/ <del>44</del>	\$97,800
10 2 1	1	I30 Cover Sludge Pond	Load, Haul, Place Till	30,000 Bm3	\$3.26	\$97,800	• • • • • •
cisting Bioremediation Cell		-					\$2,244

#### Faro Primary Alternative Cost Estimates

	10	3	1	1	430	Cover Existing Bioremediation Cell	Doze material	1.60	)0 m2	\$1.40	\$2,244		
Dams		-		-				.,		•	<b>*</b> -,- · ·	\$5,440	
	10	4	1	1	430	Breach all Dams (except Little Creek Dam)	Excavate, haul and dump locally	1,00	00 m2	\$5.44	\$5,440		
VTP Settling	Pond											\$8,111	
	10	5	1	1	430	Breach WTP Settling Pond	Excavate, haul and dump locally	1,49	91 m3	\$5.44	\$8,111		
ontaminated												\$37,350	
	10	6	1	1	600	Remove Contaminated soils	Excavate, haul and place contaminated soils in bio-remediation cell	3,75	50 m3	\$9.96	\$37,350		
Bioremediatio		_										\$56,856	
	10	7	1	1	430	Construct Bioremediation Cell	Excavate and create berms for use as the bioremediation cell		0 m3	\$2.50	\$20,002		
	10	7	1	2	430		Place HDPE Liner for remediation Cell		0 m2	\$21.57	\$34,504		
	10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	48	80 m3	\$4.90	\$2,350		
oads											A	\$25,607	
	10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing		20 m3	\$3.69	\$14,456		
	10	8	1	2	430		Scarify road surfaces	15,00		\$0.29	\$4,401		
	10	8	1	3	610		Seed and fertilize	15,00	JU m2	\$0.45	\$6,750	<b>*</b> ****	
orrow Sourc											00.050	\$286,894	
	10	9	1	1	600	Develop Borrow Sources	Clear ang grub		0 m2	\$2.08	\$6,253		
	10	9	1	2	600		Construct Haul roads	1,00		\$200.00	\$200,000		
	10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes		0 hrs	\$459.10	\$4,591		
	10	9	2	2	610		Revegetate - Seeding	169,00		\$0.40	\$67,600		
	10	9	2	. 3	610		Revegetate - Fertilizer	169,00	00 m2	\$0.05	\$8,450		
Subtotal Di			Misce	llaneo	us							\$623,142	
Subtotal Di	irect Co	osts											
							Subtotal direct costs					#REF!	
LOSURE	COSTS	6 - IND	DIREC	т									
ŕ	100	100	1	1		Project Management	2.5% of direct costs	#REF!	х	2.5%		#REF!	
-	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	#REF!	х	10.0%		#REF!	
	100	100	4	1		Insurance	0.5% of direct costs	#REF!	х	0.5%		#REF!	
	100	100	5	1		Bonding	0.5% of direct costs	#REF!	х	0.5%		#REF!	
	100	100	6	1		Field Engineering and QA	15% of direct costs	#REF!	х	15.0%		#REF!	
-	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	
4	100	100	9	1		Taxes	7% of taxable direct and indirect costs	#REF!	х	7.0%		#REF!	
	direct	Costs											
Subtotal In						· · · · · · · · · · · · · · · · · · ·						#REF!	
Subtotal In						Subtotal indirect costs							
		8 - CO	NTING	SENCI	,	Subtotal indirect costs							
Subtotal Inc		6 - CO	NTING	SENCI	,		20% of direct costs	#REF!	×	20.0%			
	COSTS			GENCI	,	Subtotal indirect costs Contingency	20% of direct costs	#REF!	x	20.0%		#REF!	

# Optionate Filowythnougher Faset Bitimates

Code Code	Item	Task	Sub- Esti task T	nate Activity	Task	Quantity Uni	t Unit Cost	Activity Total	Subtotals Source / Comments
OSURE COST	rs - Dii	RECT	CAPITAL						
ro Pit									1CD003.046
er Treatment									
1 nstruct Plug Dam	1	1	1 6	10 Biological treatment	Operate water treatment system				\$2,343,251
1	2	1	1 4	30 Foundation Preparation	Bulk stripping- Excavate, load, haul, dump overburden	3700 m3	\$7.56	\$27,972	1CD003.052 (BGC) (SRK Library - BKG-254)
1	2	1		30	Rock Excavation: core trench rock	4500 m3	\$23.33	\$104,971	······································
1	2	1	4 4	30	Foudation preparation	1600 m2	\$40.00	\$64,000	
1	2	1		00	Relocate Zone II Pit Pump well discharge pipe	1 LS	\$10,000	\$10,000	
1	2	1		20	Foundation/Abutment Grouting - Drilling of Grout Holes	4664 m	\$225.00	\$1,049,400	
1	2	1		30	Foundation/Abutment Grouting - Water Pressure Testing	350 hrs	\$300.00	\$105,000	
1	2	1 1		00	Foundation/Abutment Grouting - Setting packers	1400 ea.	\$20.00	\$28,000	
1	2 2	2		00 30 Place core material	Foundation/Abutment Grouting - Cement Load, haul, dump, Till to Stockpile B	200000 kg 16540 m3	\$0.50 \$3.81	\$100,000 \$63,017	
1	2	2		30	Load, haul, dump, compact Impervious Core Material (Till)	16540 m3	\$6.63	\$109,660	
1	2	3		30 Place filter material	Produce and screen Fine Filter Material	5740 m3	\$7.73	\$44,374	
1	2	3	2 4	30	Excavate, load, haul, dump, compact Fine Filter Material	5740 m3	\$5.26	\$30,192	
1	2	3		30	Produce and screen Coarse Filter Material	5130 m3		\$0	
1	2	3		30	Excavate, load, haul, dump, compact Coarse Filter Material	5130 m3	\$5.26	\$26,984	
1	2	4		30 Place rockfill	Excavate, load, haul, dump, compact Rockfill Material	48,500 m3	\$11.68	\$566,480	
1	2	5	1 4	30 Compliance testing	Compliance testing - to confirm uncontaminated material used	105.6 hrs	\$125.00	\$13,200	1 Inspector over material placement duration.
ety Berm	3	4				600	\$1.40	6044	\$485,077
1	3	1 1		30 Construct access road 20	Clear access road area Construct Access road	600 m2 200 m	\$1.40 \$12.00	\$841 \$2,400	
1	3	2		30 Place berm materials	Load, haul, dump berm material	22,000 m3	\$3.15	\$69,300	
1	3	2		30	Shape Material into berm	22,000 m3	\$18.75	\$412,535	
btotal Direct C	Costs -	Faro I							\$2,828,327
o Creek									+-;;
te into Faro Pit (I	(East &	West Cl							\$566,653
2	1	1		30 Construct access road	Clear access road area	1,800 m2	\$1.40	\$2,524	
2	1	1		30	Construct Access road	600 m	\$12.00	\$7,200	
2	1	1		30 Headworks dam 30	Load, Haul Dump Till to Stockpile A	54 m3 54 m3	\$5.14 \$6.42	\$278 \$347	
2	1	2		30 Excavate Channel	Load, haul, dump, place and compact till at headworks Soil Excavation: load, haul and dump locally	6,614 m3	\$3.69	\$347 \$24,392	
2	1	2		30	Rock excavation: Drill, blast, muck, load haul dump	4,863 m3	\$23.33	\$113,432	
2	1	3		30 Place HDPE Liner	Supply and place HDPE Liner	3,142 m2	\$21.57	\$67,757	
2	1	4		30 Place bedding layer	Produce and stockpile (screen)	3,992 m3	\$7.73	\$30,864	
2	1	4		30	Load, Haul Dump bedding material to Stockpile A	3,992 m3	\$5.14	\$20,521	
2	1	4	3 4	30	Load, Haul, Place and Compact	3,992 m3	\$5.38	\$21,479	
2	1	5		30 Place Rip-Rap	Rip-Rap: Screen and stockpile	9,726 m3	\$15.46	\$150,374	
2	1	5		30	Load Haul and Dump Rip-Rap	9,726 m3	\$8.42	\$81,892	
2	1	5	3 4	30	Place and secure Rip-Rap	9,726 m3	\$4.69	\$45,594	<b>647.44</b>
rap protection at		et		20 Diago Dia Ban	Din Dans Careen and steelwile	600 m2	\$4E 40	¢0.077	\$17,141
2	2 2	1		30 Place Rip-Rap 30	Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	600 m3 600 m3	\$15.46 \$8.42	\$9,277 \$5,052	
2	2	1		30	Place and secure Rip-Rap	600 m3	\$4.69	\$2,813	
te out of Pit	-		0 7	50		000 110	φ4.00	φ2,010	\$2,377,094
2	3	1	1 4	30 Excavate Channel	Bulk Excavate Soil/Waste Rock (dump locally)	277,181 m3	\$3.69	\$1,022,181	
2	3	1	2 4	30	Rock excavation: Drill, blast, muck, load haul dump	5,584 m3	\$23.33	\$130,250	
2	3	2		30 Place HDPE Liner	Supply and place HDPE Liner	12,089 m2	\$21.57	\$260,700	
0	3	3		30 Place bedding layer	Produce and stockpile (screen) bedding layer	17,569 m3	\$7.73	\$135,818	
2		3		30	Load, Haul, Place and Compact bedding layer	17,569 m3	\$5.30	\$93,115	
2	3			30 Place Rip-Rap	Rip-Rap: Screen and stockpile	29,402 m3	\$15.46 \$3.15	\$454,583	
2 2	3	4						\$92,615	
2 2 2	3 3	4 4	2 4	30	Load Haul and Dump Rip-Rap	29,402 m3			
2 2 2 2	3 3 3	4 4 4	2 4 3 4	30 30	Place and secure Rip-Rap	29,402 m3	\$4.69	\$137,832 \$50,000	
2 2 2 2 2 2	3 3 3 3	4 4 5	2 4	30				\$137,832 \$50,000	\$292,357
2 2 2 2 2 2	3 3 3 3	4 4 5	2 4 3 4 1	30 30	Place and secure Rip-Rap	29,402 m3	\$4.69		\$292,357 assume same upgrade as Improved Creek
2 2 2 2 grade North Wall I	3 3 3 3 Interce	4 4 5 ptor	2 4 3 4 1 1 4	30 30 Syphon	Place and secure Rip-Rap Supply and install Syphon - allowance	29,402 m3 1 ls	\$4.69 \$50,000	\$50,000	
2 2 2 2 grade North Wall I 2	3 3 3 Interce 4	4 4 5 ptor 1 2 2	2 4 3 4 1 1 4 1 4 2 4	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36	\$50,000 \$27,658 \$166,981 \$47,088	assume same upgrade as Improved Creek
2 2 2 rade North Wall I 2 2 2 2 2	3 3 3 Interce 4 4 4 4	4 4 5 ptor 1 2 2 2	2 4 3 4 1 1 4 1 4 2 4 3 4	30 Syphon 30 Excavate Channel 30 Place Rip-Rap	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile	29,402 m3 1 ls 7,500 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46	\$50,000 \$27,658 \$166,981	assume same upgrade as Improved Creek option
2 2 2 rade North Wall I 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3 3 3 Interce 4 4 4 4	4 4 5 ptor 1 2 2 2	2 4 3 4 1 1 4 1 4 2 4 3 4	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36	\$50,000 \$27,658 \$166,981 \$47,088	assume same upgrade as Improved Creek
2 2 2 grade North Wall I 2 2 2 2 btotal Direct C	3 3 3 Interce 4 4 4 4	4 4 5 ptor 1 2 2 2	2 4 3 4 1 1 4 1 4 2 4 3 4	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36	\$50,000 \$27,658 \$166,981 \$47,088	assume same upgrade as Improved Creek option \$3,253,245
2 2 2 rade North Wall I 2 2 2 2 2 0 0 0 1 0 1 0 1 2 2 2 0 0 1 0 1	3 3 3 Interce 4 4 4 4 2 Costs -	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 <b>Creek</b>	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36 \$4.69	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629	assume same upgrade as Improved Creek option
2 2 2 rade North Wall I 2 2 2 2 btotal Direct C ne II Pit wash material 3	3 3 3 Interce 4 4 4 4	4 4 5 ptor 1 2 2 2	2 4 3 4 1 1 4 1 4 2 4 3 4	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36	\$50,000 \$27,658 \$166,981 \$47,088	assume same upgrade as Improved Creek option \$3,253,245 \$266,462
2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit wash material 3 ter Management	3 3 3 Interce 4 4 4 4 <b>Costs</b> -	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 <b>Creek</b>	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30 30 30 Relocate to Intermediate Dump	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36 \$4.69 \$3.49	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 grade North Wall I 2 2 2 btotal Direct C wash material 3 ter Management 3	3 3 3 Interce 4 4 4 4 2 Costs -	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 Creek	30 Syphon 30 Excavate Channel 30 Place Rip-Rap 30 Relocate to Intermediate Dump 30 Groundwater Wells	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3 1 ea.	\$4.69 \$50,000 \$3.69 \$15.46 \$4.69 \$3.49 \$3.49 \$1,906.43	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906	assume same upgrade as Improved Creek option \$3,253,245 \$266,462
2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit wash material 3 ter Management 3 3	3 3 3 Interce 4 4 4 4 4 2 2	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 Creek 1 1 4 2 5	30 Syphon 30 Excavate Channel Place Rip-Rap 30 Relocate to Intermediate Dump 30 Groundwater Wells	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4" PVC Well	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3 1 ea. 90 ea.	\$4.69 \$50,000 \$3.69 \$15.46 \$4.36 \$4.69 \$3.49 \$1,906.43 \$1,906.43	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906 \$9,000	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit twash material 3 ter Management 3 3 3	3 3 3 Interce 4 4 4 4 2 Costs -	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 <b>Creek</b> 1 4 2 5 3 5	30 Syphon 30 Excavate Channel 91 Place Rip-Rap 30 Relocate to Intermediate Dump 30 Groundwater Wells 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4" PVC Well Install PVC Well Install PURP in well	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3 1 ea. 90 ea. 1 ea.	\$4.69 \$50,000 \$15,46 \$4.36 \$4.69 \$3.49 \$1,906,43 \$100,00 \$2,629,00	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906 \$9,000 \$2,629	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit twash material 3 ter Management 3 3	3 3 3 Interce 4 4 4 4 4 2 2	4 4 5 <b>ptor</b> 2 2 2 • <b>Faro</b> ( 1 1 1 1	2 4 3 4 1 4 1 4 2 4 3 4 <b>Creek</b> 1 1 4 2 5 3 5 4 5	30     Syphon       30     Excavate Channel       30     Place Rip-Rap       30     Relocate to Intermediate Dump       30     Groundwater Wells       30     0	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4' PVC Well Install 4' PVC Well Install Pump in well Supply Power	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3 1 ea. 90 ea. 1 ea. 90 ea. 1 ea. 2,200 m	\$4.69 \$50,000 \$15.46 \$4.69 \$3.49 \$1,906.43 \$100.00 \$2,629.00 \$2,53	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906 \$9,000 \$2,629 \$5,566	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 2 grade North Wall I 2 2 btotal Direct C ne II Pit twash material 3 ter Management 3 3 3 3 3	3 3 3 Interce 4 4 4 4 2 2 2 2 2	4 4 5 ptor 1 2 2 2 • Faro (	2 4 3 4 1 4 1 4 2 4 3 4 Creek 1 1 4 2 5 3 5 4 5 1 4	30 Syphon 30 Excavate Channel 91 Place Rip-Rap 30 Relocate to Intermediate Dump 30 Groundwater Wells 30	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4" PVC Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 76,350 m3 1 ea. 90 ea. 1 ea.	\$4.69 \$50,000 \$3.69 \$15.46 \$4.69 \$1,906.43 \$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906 \$9,000 \$2,629 \$5,566 \$15,489	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit twash material s ter Management 3 3 3 3 3	3 3 3 Interce 4 4 4 4 2 2 2 2 2 2 2	4 4 5 <b>ptor</b> 1 2 2 2 <b>Faro</b> 1 1 1 1 1 2	2 4 3 4 1 1 1 4 1 4 2 4 3 4 Creek 1 4 2 5 3 5 4 5 1 4 2 5 4 5 1 4 5 4 5 1 4 5 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 5 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4	30 Syphon 30 Excavate Channel Place Rip-Rap 30 Place Rip-Rap 30 Groundwater Wells 30 Piping system	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4' PVC Well Install 4' PVC Well Install Pump in well Supply Power	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 10,800 m3 10,800 m3 10,800 m3 1 ea. 90 ea. 1 ea. 2,200 m 4,200 m3	\$4.69 \$50,000 \$15.46 \$4.69 \$3.49 \$1,906.43 \$100.00 \$2,629.00 \$2,53	\$50,000 \$27,658 \$166,981 \$47,088 \$50,629 \$266,462 \$1,906 \$9,000 \$2,629 \$5,566	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579
2 2 2 2 grade North Wall I 2 2 2 btotal Direct C ne II Pit twash material 3 ter Management 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	3 3 3 Intercee 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2	4 4 5 ptor 1 2 2 2 • Faro ( 1 1 1 1 1 2 2 2	2 4 3 4 1 1 1 4 2 4 3 4 <b>Creek</b> 1 4 2 5 3 5 1 4 2 5 3 5 1 4 2 5 3 5	30     Syphon       30     Excavate Channel       91ace Rip-Rap       30       30       80       30       80       91       80       92       80       93       93       94       95       96       97       98       90       90       91       92       93       94       94       95       96       96       97       90       90       90       91       91       92       93       94       94       95       96       90       91       91       92       93       94       94       95       95       96       96       97       96       96       97       96       96       97       97       96       97       97       97	Place and secure Rip-Rap Supply and install Syphon - allowance Soil Excavation: load, haul and dump locally Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap Place and secure Rip-Rap Place and secure Rip-Rap Load, Haul, Dump Outwash Material Drill Well Install 4" PVC Well Install 4" PVC Well Install PUC Well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe	29,402 m3 1 ls 7,500 m3 10,800 m3 10,800 m3 10,800 m3 10,800 m3 10,800 m3 1 ea. 90 ea. 1 ea. 2,200 m 4,200 m3 700 m	\$4.69 \$50,000 \$15.46 \$4.36 \$4.69 \$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3.69 \$15.50	\$50,000 \$27,658 \$166,981 \$47,088 \$266,462 \$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850	assume same upgrade as Improved Creek option \$3,253,245 \$266,462 \$76,579

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check of Free / Loss         Journal Independence / Loss         Journ	3											
Mark Mark         Mark Mark <t< td=""><td>btotal Direct C</td><td></td><td></td><td></td><td>430</td><td></td><td>Backilli ditches</td><td>4,200 113</td><td>\$4.90</td><td>\$20,565</td><td>\$343.040</td><td></td></t<>	btotal Direct C				430		Backilli ditches	4,200 113	\$4.90	\$20,565	\$343.040	
$ \begin the large interview of the large in$			- Zone	II FIL							\$343,040	
d + 1       1       1       4       4       4       1       4       10       4       10       4       10 <td></td> <td>\$3,246,855</td> <td></td>											\$3,246,855	
4         2         1         1         40         Register         Petered barres         7         5         4         50         50           4         2         1         2         4         4         5         5         50           4         2         2         4         40         Peter UPC Corr         Beneficial Line "Content Hail Line Content (Entry Content Hail Line Content (Entry Hail Line Content (Entry Hail Line Conten (Entry Hail Line Conten (Entry Hail Line Content (Entry	4	1	1	1	430	Relocate to Low Grade Stockpile C	Load, Haul, Place and Compact Oxide Materials	683,549 m3	\$4.75	\$3,246,855		
4         2         1         2         4         4         4         5         1         5         1         5         1         5         1	w Grade Stockpile										\$1,119,787	
4         2         2         1         400         Phase ILOPE Cover         Besing Laper - Photoce and Sociale Based Part - Photoce Part - Photoce Part - Photoce Part - Photoce Part - P	4					Regrade						
4         2         2         2         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         3         4         6         6         6         6         6         7         6         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7         6         7	4					Place HDPE Cover						
4       2       3       4       4       2       3       4       2       3       4       3       4       2       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       3       4       4       4       3       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4	4	-	-									
•         ·	4	2	2									
d         2         3         1         2         3         10         3         11.22         3         3           d         3         1         2         4         3         1         1.2         3         3         3         3         3         3         3         3         3         3         3         3         4         3         3         4         3         3         4         3         3         4         3         3         4         3         3         4         3         3         4         3         3         3         4         3         3         3         4         3         3         3         4         4         3         3         4         4         3         3         4         4         3         4         4         3         4         4         3         4         4         4         3         4<	4	2	2	4	430		Load, haul, place loose till (1.0m)	36,139 Bm3	\$4.79	\$173,105		
v Books Deline T         V Interview D	4					Revegetate						
4       3       1       1       3       1       1       3       1       1       3       1       1       3       1       1       1       3       1       1       1       3       1	4	-	3	2	610		Fertilization	36,150 m2	\$0.05	\$1,808	¢0.775.500	
4         3         1         2         43         1         2         43         1         2         43         1         2         43         1 <th1< th="">         1         1         1</th1<>	A Grade Stockpile		1	1	430	Regrade	Flattened Surfaces	27 brs	\$459.10	\$12 327	\$3,775,598	
4         3         2         1         40         Pace triple Cover         Bedding Laye: Produce and Stepchyle         54.70         63         57.73         8123.080           4         3         2         4         40         Pace triple Cover         Bedding Laye: Produce and Stepchyle         57.71         8123.080           4         3         2         4         40         Pace triple Cover         Bedding Laye: Produce and Stepchyle         57.71         8123.080           4         3         2         4         40         Pace triple Cover         Bedding Laye: Produce and Stepchyle         100.51         83         55.70           4         3         3         4         40         3         40         20         Cover and Stepchyle         44         33         54.41         552.70           4         3         4         2         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         30         40         40         30	4		1			Regidue						
4       3       2       2       40       36       2       40       36 </td <td>4</td> <td>3</td> <td>2</td> <td></td> <td></td> <td>Place HDPE Cover</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	4	3	2			Place HDPE Cover						
4       3       2       4       40       40       100       100,100       100,00	4	3	2	2				54,770 m3				
4       3       3       1       4.0       Nota Parka       Exceeder almost for rock dumine       610       3.5.6       3.2.20         4       3       3       2       4.0       Nota Parka       5.6.4       3.1.28         4       3       3       2       4.0       3.0       4.0.1       4.	4	•										
4         3         3         2         400         Number of state of	4	-										
4       3       3       4       3       3       4       4       5       6       6       7       7       5       5       7       6       6       7	4	-	-			Rock Drains						
4       3       3       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       4       30       4       6       400       70       55.00       57.33       77.12 <td< td=""><td>4</td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	4	-										
4       3       4       1       4.3       4.1       3.4	4	-										
4       3       4       2       4.30       Second Juni and Durg Ry-Rg-Second at social intermation of the Rg-Rg-Second at social intermation of Rg-Rg-Rg-Second at social intermatintermaticity intermation of	4	•				Surface Runoff Collection						
4       3       4       3       4.3       4.3       4.3       4.43       3.4.30       Auto Mail And Dump Re-Rap       1.400 m3       \$15.64       \$20.05         4       3       4       4.43       3.4.44       4.43       3.4.44       \$40.40       \$	4		4									
4         3         4         3         5         1         3         5         4         3         5         4         3         5         4         3         5         4         3         5         1	4	3		3			Rip-Rap: Screen and stockpile			\$23,035		
A         3         5         1         6         10         6         80.0         83.0.0         83.0.0           Attal IP         Filt ison         100.550 m2         50.0         80.00         83.0.0           Attal IP         Filt ison         100.550 m2         50.0         83.00         83.0.0           Sp Jamuel IP         Filt ison         Paramel IN         Mathematic Incoments         80.0         83.00         83.00           Sp Jamuel IP         Filt ison         Paramel IN         Mathematic Incoments         80.0         80.0         80.0	4	3										
A       3       5       2       6       6       100,550 m2       50.00       \$0.00       \$0.77         A Tailings to Fore /r prilangs to Fore /r 5       1 <th1< th=""> <th1< th=""> <th1< th=""> <t< td=""><td>4</td><td>•</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<></th1<></th1<></th1<>	4	•										
bitchal Direct Costs - Octae         Site 2.40           A Tailings           To a Tailings           mp Tailings to Faro         Site 2.40           Site 2.40           Site 2.40         Site 2.40           Site 2.40         Site 2.40           Site 2.40         Outerate and install hydraulic monitoring system         Purchase and install hydraulic monitoring and printing         ea.         Site 2.40           Site 2.40         Outerate and printing and print	4	-				Revegetate						
A Tailings         Partiliangs         S0           5         1         1         1         Hydraulic monitoring system         Purchase and install Hydraulic monitors         e.a.         50           5         1         2         0         Calcelion Sumps         e.a.         50           5         1         2         0         Calcelion Sumps         mail         30           5         1         2         2         Calcelion Sumps         mail         30           5         1         2         3         Construct collection sumps         mail         30           5         1         2         3         Booster Station         e.a.         30           5         1         3         2         Purchase grave pie to prest         m         50           5         1         4         2         Purchase difference         50         50           5         1         4         3         Purchase difference         50         50           5         1         4         2         Purchase difference         50         50           5         1         6         1         Tailings Relocation Operation         Fores <td></td> <td>0</td> <td>-</td> <td></td> <td></td> <td></td> <td>Fertilization</td> <td>109,550 m2</td> <td>\$0.05</td> <td>\$5,478</td> <td>¢0.4.40.040</td> <td></td>		0	-				Fertilization	109,550 m2	\$0.05	\$5,478	¢0.4.40.040	
np Tailing Vorticity       Vertake and install hydraulic monitoring system       Purchase and install hydraulic monitoring       is       Solution         S       1       1       2       Purchase and install hydraulic monitoring       is       Solution         S       1       2       2       Collection Sump       mol       Solution       Solution         S       1       2       2       2       Collection Sump       mol       Solution       Solution         S       1       3       2       Solution       Mol       Construct observation       Solution       Solution         S       1       3       3       Paint Solution       Mol       Solution       Solu		OSIS		e Fines							\$8,142,240	
s       1       1       1       1       4		Dit									¢0,	
5         1         1         2         1         1         2         1         1         2         1 <th1< th="">         1         <th1< th=""> <th1< th=""></th1<></th1<></th1<>		1	1	1		Hydraulic monitoring system	Purchase and install hydraulic monitors	ea		\$0	φυ	
5 1 1 1 3 4 5 1 2 3 3   5 1 2 2 2 2 2 2 3 3   6 1 3 2 3 3 3 4 4 3		1	1			Tyuluule monitoring system						
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5       1       5       2       Procure and install line addition system       is       \$0         5       1       6       2       S0       \$0       \$0       \$0       \$0         5       1       6       2       Comparing system       \$0	5	1	4	4				m				
5       1       6       1       Tailings Relocation Operation       Operate bydraulic monitoring system       \$0         5       1       6       3       Operate booster pumping system       \$0         5       1       6       3       Operate booster pumping system       \$0         5       1       6       3       Operate booster pumping system       \$0         5       1       6       3       Operate booster pumping system       \$0         6       1       6       4       Vertable poster pumping system       \$0         Stemode       \$0         Stemode       \$0         Stemode       \$0         Stemode       \$0         Stemode       \$0         Stemode       \$1       \$1       \$3       \$20       \$1       \$1       \$3       \$30       \$30       \$1       \$30       \$30       \$1       \$1       \$30       \$1       \$1       \$3       \$30       \$1       \$1       \$30       \$1       \$1       \$1       \$30       \$1       \$1       \$30       \$1       \$1       \$30       \$1       \$30       \$1       \$30       \$1<	5	1	5	1		Lime addition System	Construct Lime addition System					
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5       1       6       3       3       3       3       5	0	1	-			Tailings Relocation Operation						
5       1       6       4       4       9       Purchase line and operate line addition system       \$0         5       1       6       4       5       5       5       5       50         bioper values reset       \$0         ster Rock       \$10       \$10       \$10       \$10       1       1       430       Regrade       Flattend Surfaces       57       57       57       \$459.10       \$255.57       \$2,148,775         6       1       1       2       430       Regrade Slopes       773 hrs       \$459.10       \$255.57       \$2,148,775         6       2       1       3       430       Low Infiltration Cover       Load, haul, place compacted III (0.5m) (South cells)       86,823 m3       \$5.78       \$501,839         6       2       1       3       430       Low Infiltration Cover       Load, haul, place loose till (1.5m) (South cells)       260,470 m3       \$5.78       \$501,839       \$2,148,775         6       2       1       3       430       Load, haul, place loose till (0.5m) (East cell)       260,470 m3       \$5.78       \$501,483       \$3,847,113       \$3,847,113       \$3,847,113	-	1	-									
5       1       6       5       System decommissioning and removal       System decompace       System decommissioning and removal       System decontextem decontextem decontextem decommissind and perco	0	1	-									
Solution of the set	5	1										
site Rock         lope Waste Rock       \$3,988,137         6       1       430       Regrade       Flattened Surfaces       557       hrs       \$459,10       \$255,551         6       1       2       430       Flatten Bubble Dump Surfaces       773       hrs       \$459,10       \$3377,510         9       1       3       430       Regrade Slopes       773       hrs       \$459,10       \$3377,510         9       2       1       1       430       Low Infiltration Cover       Load, haul, place compacted till (0.5m) (South cells)       86,823       m3       \$5,78       \$501,839         6       2       1       3       430       Load, haul, place loose till (1.5m) (South cells)       260,470       m3       \$5,77       \$1,450,818         6       2       1       3       430       Load, haul, place loose till (0.5m) (East cell)       8,700       3       \$5,77       \$1,450,818         6       2       1       3       430       Load, haul, place loose till (0.5m) (East cell)       8,700       3       \$5,77       \$1,450,818         6       2       1       4       430       Load, haul, place loose till (0.5m) (East cell)       26,161       m3	btotal Direct Co	osts	-							+2	\$0	
bit												
6       1       1       4.30       Regrade       Flattened Surfaces       557       hrs       \$459.10       \$255.551         6       1       1       2       430       Flattened Bubble Dump Surfaces       773       hrs       \$459.10       \$335.775         hide Cell       -       -       Regrade Slopes       7,357       hrs       \$459.10       \$33,377,51         hide Cell       -       -       -       -       \$2,148,775       \$2,148,775         6       2       1       4.30       Low Infiltration Cover       Load, haul, place compacted till (0.5m) (South cells)       86,823       m3       \$5.75       \$5,643         6       2       1       4.30       Cow Infiltration Cover       Load, haul, place compacted till (0.5m) (East cell)       87,720       m3       \$5.75       \$50,403         6       2       1       4       430       -       Load, haul, place loose till (1.5m) (East cell)       8,720       m3       \$5.75       \$50,403         6       2       1       4.30       Place Rudimentary Cover       Load, haul, place loose till (0.5m) (East cell)       8,713       m3       \$5.57       \$9,887,713         6       3       1       1.30       Place Ru		c .									\$3,988,137	
6       1       1       3       430       Regrade Slopes       7,357       hrs       \$459.10       \$3,377,510         bhde Cell	6	1				Regrade						
phide Cell       \$2,148,775         6       2       1       430       Low Infiltration Cover       Load, haul, place compacted till (0.5m) (South cells)       86,823 m3       \$5,78       \$501,839         6       2       1       3       430       Load, haul, place compacted till (0.5m) (South cells)       260,470 m3       \$5,57       \$1,450,818         6       2       1       3       430       Load, haul, place compacted till (0.5m) (East cell)       8,720 m3       \$5,57       \$1,450,818         6       2       1       4       430       Load, haul, place compacted till (0.5m) (East cell)       8,720 m3       \$5,57       \$145,715         ste Rock Cover		1	1									
6       2       1       1       430       Low Infiltration Cover       Load, haul, place compacted till (0.5m) (South cells)       86,823       m3       \$5,78       \$501,839         6       2       1       2       430       Load, haul, place loose till (1.5m) (South cells)       260,470       m3       \$5,78       \$51,450,818         6       2       1       3       430       Load, haul, place compacted till (0.5m) (East cell)       8,720       m3       \$5,78       \$50,403         6       2       1       4       30       Load, haul, place compacted till (0.5m) (East cell)       26,161       m3       \$5,57       \$145,715         terket Cover       Load, haul, place loose till (0.5m) (East cell)       26,161       m3       \$5,57       \$9,887,713         terket Cover       Load, haul, place loose till (0.5m)       Load, haul, place loose till (0.5m)       1,775,173       m3       \$5,57       \$9,887,713         terket Cover       Load, haul, place loose till (0.5m)       Load, haul, place loose till (0.5m)       1,775,173       m3       \$5,57       \$9,887,713         terket Cover       Load, haul, place loose till (0.5m)       Load, haul, place loose till (0.5m)       1,775,173       m3       \$5,57       \$9,887,713       \$	-	1	1	3	430		Regrade Slopes	7,357 hrs	\$459.10	\$3,377,510	¢0.4.40.775	
6       2       1       2       430       Load, haul, place loose till (1.5m) (South cells)       260,470 m3       \$5.57       \$1,450,818         6       2       1       3       430       Load, haul, place compacted till (0.5m) (East cell)       8,720 m3       \$5.78       \$50,403         6       2       1       4       30       Load, haul, place loose till (1.5m) (East cell)       260,470 m3       \$5.78       \$50,403         6       3       1       4       30       Load, haul, place loose till (0.5m)       1,775,173 m3       \$5.57       \$9,887,713         6       3       1       1       430       Place Rudimentary Cover       Load, haul, place loose till (0.5m)       1,775,173 m3       \$5.57       \$9,887,713         6       4       1       430       Intall rock drains (runoff management)       Excavate channel for rock drains       4,375 m3       \$3.69       \$16,134         6       4       1       2       430       Intall rock drains (runoff management)       Rip-Rap: Screen and stockpile       3,255 m3       \$15.46       \$50,326		2		1	420	Low Infiltration Cover	Load bout place composted (III (0 Em) (Couth aclin)	00.000	¢E 70	\$E04 000	\$2,148,775	
6       2       1       3       430       Load, haul, place compacted till (0.5m) (East cell)       8,720       m3       \$5.78       \$50,403         6       2       1       4       430       Load, haul, place loose till (1.5m) (East cell)       26,161       m3       \$5.78       \$50,403         te Rock Cover         6       3       1       1       430       Place Rudimentary Cover       Load, haul, place loose till (0.5m)       1,775,173       m3       \$5.57       \$9,887,713         k Drains         6       4       1       430       Intall rock drains (runoff management)       Excavate channel for rock drains       4,375       m3       \$3.69       \$16,134         6       4       1       2       430       Rip-Rap: Screen and stockpile       3,255       m3       \$15,46       \$50,326	-											
6     2     1     4     430     Load, haul, place loose till (1.5m) (East cell)     26,161 m3     \$5.57     \$145,715       te Rock Cover     \$9,887,713       6     3     1     1     430     Place Rudimentary Cover     Load, haul, place loose till (0.5m)     1,775,173 m3     \$5.57     \$9,887,713       6     4     1     430     Intall rock drains (runoff management)     Excavate channel for rock drains     4,375 m3     \$3.69     \$16,14       6     4     1     2     430     Intall rock drains (runoff management)     Excavate channel for rock drains     4,375 m3     \$3.69     \$16,14       6     4     1     2     430     Intall rock drains (runoff management)     Excavate channel for rock drains     3,255 m3     \$15,46     \$50,326	-	-	•									
inter Rock Cover       \$9,887,713         6       3       1       430       Place Rudimentary Cover       Load, haul, place loose till (0.5m)       1,775,173       m3       \$5.57       \$9,887,713         k Drains       ***********************************												
k Drains         \$97,278           6         4         1         430         Intall rock drains (runoff management)         Excavate channel for rock drains         4,375         m3         \$3.69         \$16,134           6         4         1         2         430         Rip-Rap: Screen and stockpile         3,255         m3         \$15.46         \$50,326	te Rock Cover										\$9,887,713	
6       4       1       430       Intall rock drains (runoff management)       Excavate channel for rock drains       4,375       m3       \$3.69       \$16,134         6       4       1       2       430       Rip-Rap: Screen and stockpile       3,255       m3       \$15.46       \$50,326		3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	1,775,173 m3	\$5.57	\$9,887,713		
6 4 1 2 430 Rip-Rap: Screen and stockpile 3,255 m3 \$15.46 \$50,326											\$97,278	
	-	4	1			Intall rock drains (runoff management)						
	-	4	1									
		4	1									
		4 tches	1	4	430		i iace allu secule rip-rap	3,200 1113	\$4.0 <del>9</del>	φ10,209	\$572,788	
		5	1	1	430	Construct access road	Clear access road area	9.195 m2	\$1.40	\$12,895	ψ012,100	
liment Control Ditches \$572,788	b	5	1	2	430		Construct Access road	3,065 m	\$12.00	\$36,780		
diment Control Ditches         \$572,788           6         5         1         430         Construct access road         Clear access road area         9,195         m2         \$1.40         \$12,895	-					SE_SW Sediment Ditches						
Space         Space <th< td=""><td>6 6</td><td></td><td></td><td></td><td></td><td></td><td>Excardation of Britin</td><td>14,0411113</td><td>φ0.00</td><td></td><td></td><td>001/ 0</td></th<>	6 6						Excardation of Britin	14,0411113	φ0.00			001/ 0
	<b>ck Drains</b> 6 6 6 6 6 6	4 4 4 4	1 1 1 1 1	1	430		Excavate channel for rock drains	4,375 m3	\$3.69	\$16,134		
											\$572,788	
ment Control Ditches \$572,788		-				Construct access road						
ment Control Diches         \$572,788           6         5         1         430         Construct access road         area         9,195         m2         \$1.40         \$12,895	-	5				SE SW Sodimont Ditabas						
ment Control Ditches         \$572,788           6         5         1         430         Construct access road         9,195 m2         \$1.40         \$12,895           6         5         1         2         430         Construct Access road         3,065 m         \$12.00         \$36,780           6         5         2         1         430         SE SW Segriment Ditches         Evaluation of Ditch         14.841 m3         \$3.69         \$54.732	6	5	2									
space         \$572,788           6         5         1         4.30         Construct access road area         9,195         \$1.40         \$12,895           6         5         1         2         430         Construct Access road         3,065         m         \$12,00         \$36,780           6         5         2         1         430         SE, SW Sediment Ditches         Excavation of Ditch         14,841         \$3.69         \$54,732           6         5         2         3         430         Brow Server and technice         \$16,16         \$370,90         SRK Cor	6 6						Bin Bon: Scroon and stocknile					SRK Con Decembe

Faro Prima					430		Load Haul and Dump Rip-Rap	5,166 m3	\$7.61	\$39,317		
	6	5	2	5	430		Place and secure Rip-Rap	5,166 m3	\$4.69	\$24,220		
	6	5	3	1	430	NW Sediment Ditch	Excavation of Ditch	4,276 m3	\$3.69	\$15,769		
	6	5	3	2	430		Supply and place geotextile	6,341 m2	\$4.41	\$27,973		
	6	5	3	3	430		Rip-Rap: Screen and stockpile	1,489 m3	\$15.46	\$23,014		
	6	5	3	4	430		Load Haul and Dump Rip-Rap	1,489 m3	\$3.44	\$5,121		
	6	5	3	5	430		Place and secure Rip-Rap	1,489 m3	\$4.69	\$6,978		
	6	5	4	1	430	Faro Crk. Out Sediment Ditch	Excavation of Ditch	11,045 m3	\$3.69	\$40,731		
	6	5	4			Talo Cik. Out Sediment Ditch						
	-	-		2	430		Supply and place geotextile	16,379 m2	\$4.41	\$72,254		
	6	5	4	3	430		Rip-Rap: Screen and stockpile	3,845 m3	\$15.46	\$59,445		
	6	5	4	4	430		Load Haul and Dump Rip-Rap	3,845 m3	\$3.15	\$12,111		
	6	5	4	5	430		Place and secure Rip-Rap	3,845 m3	\$4.69	\$18,024		
	6	5	5	1	430	SE, SW Sediment Basin	Excavate sedimentation basin	5,184 m3	\$3.69	\$19,117		
	6	5	5	2	430		Rip-Rap: Screen and stockpile	104 m3	\$15.46	\$1,608		
	6	5	5	3	430		Load Haul and Dump Rip-Rap	104 m3	\$7.61	\$791		
	6	5	5	4	430		Place and secure Rip-Rap	104 m3	\$4.69	\$488		
	6	5	6	1	430	Faro Crk. Out Sediment Basin				\$19,117		
	-	5	-			Faro Crk. Out Sediment Basin	Excavate sedimentation basin	5,184 m3	\$3.69			
	6	5	6	2	430		Rip-Rap: Screen and stockpile	104 m3	\$15.46	\$1,608		
	6	5	6	3	430		Load Haul and Dump Rip-Rap	104 m3	\$3.15	\$328		
	6	5	6	4	430		Place and secure Rip-Rap	104 m3	\$4.69	\$488		
regetate											\$1,999,980	
	6	6	1	1	610	Revegitate WR Dumps	Seeding	4,444,400 m2	\$0.40	\$1,777,760		
	6	6	1	2	610	<b>S</b>	Fertilization	4,444,400 m2	\$0.05	\$222,220		
btotal Di	irect C	oste -	Wast								\$18,694,671	
											÷.0,004,011	
oundwat											\$4 EE4 007	
rade Nort	III FORK F	Kose Ci	eek					0.000 -	<b>A</b> 4 ···	<b>AA AC-</b>	\$1,551,887	
	<u>′</u>	1	1	1	430	Construct access road	Clear access road area	6,600 m2	\$1.40	\$9,256		
	7	1	1	2	430		Construct Access road	2,200 m	\$12.00	\$26,400		
	7	1	2	1	430	Contruct Channel	Load, Haul, Dump granular material along channel thalwag.	16,500 m3	\$7.52	\$124,080		
	7	1	2	2	430		Load, Haul, Dump till to create channel berms	26,782 m3	\$7.52	\$201,401		
	7	1	3	1	430	Place HDPE Liner	Supply and place HDPE Liner	32,502 m2	\$21.57	\$700,910		
	7	1	4	1	430	Place bedding layer	Produce and stockpile (screen) bedding layer	9,751 m3	\$7.73	\$75,381		
	7	1	4	2	430	boading layor	Load, haul, place and compact bedding layer	9,751 m3	\$7.52	\$73,328		
	7	1	5	1	430	Place Rip-Rap		12,289 m3	\$15.46	\$190,003		
	7	1	5	1		i lave nip-nap	Rip-Rap: Screen and stockpile					
	7	1	5		430		Load Haul and Dump Rip-Rap	12,289 m3	\$7.61	\$93,519		
		I Det	-	3	430		Place and secure Rip-Rap	12,289 m3	\$4.69	\$57,610	¢44.000	
th Fork Re	use Cree			rond	400	Everyote Basin	Evenuete endimentation hasis	0.5000	<b>*</b> 0.00	00 550	\$11,002	
	<u>′</u>	2	1	1	430	Excavate Basin	Excavate sedimentation basin	2,592 m3	\$3.69	\$9,559		
	7	2	2	1	430	Place Rip-Rap	Rip-Rap: Screen and stockpile	52 m3	\$15.46	\$804		
	7	2	2	2	430		Load Haul and Dump Rip-Rap	52 m3	\$7.61	\$396		
	7	2	2	3	430		Place and secure Rip-Rap	52 m3	\$4.69	\$244		
rth Fork Ro	ose Cree	ek Colle	ection	System	(to Pit)						\$181,444	
	7	3	1	1	430	Place Manholes	Excavate sump for manholes	32 m3	\$3.69	\$118		
	7	3	1	2	500		Supply and place Precast concrete manhole	1 ea.	\$1,863.00	\$1,863		
	7	3	1	3	500		Install Primary pump	1 ea.	\$1,503.00	\$1,503		
	7	3	1	4	500			400 m	\$2.53	\$1,012		
	7	3	2	1		O	Provide power to pumping system					
	_	-			430	Groundwater Wells	Drill Well	3 ea.	\$1,906.43	\$5,719		
	1	3	2	2	500		Install 4" PVC Well	60 m	\$100.00	\$6,000		
	7	3	2	3	500		Install Pump in well	3 ea.	\$2,629.00	\$7,887		
	7	3	2	4	500		Supply Power	400 m	\$2.53	\$1,012		
	7	3	3	1	430	Piping system	Excavate Piping Trench	11,400 m3	\$3.69	\$42,041		
	7	3	3	2	510		Supply and place 150mm PVC pipe	1,900 m	\$15.50	\$29,450		
	7	3	3	3	510		Supply and install heat trace through piping	1,900 m	\$7.87	\$14,953		
	7	3	3	4	500		Supply and place Air valves	2 ea.	\$295.00	\$590		
	, 7	3	3									
	1	-		5	500		Supply and place Drains (blow-offs)	1 ea.	\$620.00	\$620		
	7	3	3	6	430		Produce and stockpile (screen) bedding layer	741 m3	\$7.73	\$5,728		
	7	3	3	7	430		Load, haul, place and compact bedding layer	741 m3	\$9.62	\$7,128		
	7	3	3	8	430		Backfill ditches	11,400 m3	\$4.90	\$55,820		
Colletion	n System	n (to Pit	t)								\$207,061	
	7	4	1	1	430	Place Manholes	Excavate sump for manholes	32 m3	\$3.69	\$118		
	7	4	1	2	500		Supply and place Precast concrete manhole	1 ea.	\$1,863.00	\$1,863		
	7	4	1	3	500		Install Primary pump	1 ea.	\$1,503.00	\$1,503		
	7	4	1	4	500		Provide power to pumping system	300 m	\$2.53	\$759		
	. 7	4	2	1	500	Install Wells	Drill Well	3 ea.	\$1,906.43	\$5,719		
	, 7	4	2	2	500	Install WEIIS	Install 4" PVC Well	5 ea. 60 m	\$1,906.43	\$6,000		
	7	4	2	2	500 500							
		4					Install Pump in well	3 ea.	\$2,629.00	\$7,887		
	7	4	2	4	500	Disis a sustain	Supply Power	300 m	\$2.53	\$759		
	7	4	3	1	430	Piping system	Excavate Piping Trench	13,200 m3	\$3.69	\$48,679		
	7	4	3	2	510		Supply and place 150mm PVC pipe	2,200 m	\$15.50	\$34,100		
	7	4	3	3	510		Supply and install heat trace through piping	2,200 m	\$7.87	\$17,314		
	7	4	3	4	500		Supply and place Air valves	2 ea.	\$295.00	\$590		
	7	4	3	5	500		Supply and place Drains (blow-offs)	1 ea.	\$620.00	\$620		
	7	4	3	6	430		Produce and stockpile (screen) bedding layer	858 m3	\$7.73	\$6,633		
	7	4	3	7	430		Load, haul, place and compact bedding layer	858 m3	\$11.52	\$9,884		
		4	3	8	430		Backfill ditches	13,200 m3	\$4.90	\$64,633		
	7	-	-					13,200 113	φ <del>4</del> .90	ψ0 <del>4</del> ,033	\$1 051 204	
	7	oct-	טסוט	nuwate	71						\$1,951,394	
btotal Di	7 irect Co	osts -										
	7 irect Co	osts -										
ototal Di cellane	7 irect Co	osts -									\$16,066	
ototal Di cellane ds	irect Co ous	1	1	1		Reclaim unnecssary roads	Remove culverts and breach stream crossing	2,240 m3	\$3.69	\$8,260.60	\$16,066	
ototal Di cellane ds	irect Co ous	1	1			Reclaim unnecssary roads 9/Faro Flow-through Pit/12/7/2005	Remove culverts and breach stream crossing Scarify road surfaces 11 of 21	2,240 m3 10,500 m2	\$3.69 \$0.29	\$8,260.60 \$3,080.84	\$16,066	SRK Co Decemb

Faro Prima	a By Alte	rnative C	cost Est	imates	610		Seed and fertilize	10,500 m2		\$0.45	\$4,725.00		
Buildings												\$840,360	
	8	2	1	1	220	Building Demolition	Demolish and stockpile building material	56,400 m3		\$4.94	\$278,616		
	8	2	1	2	430		LHD building material to Faro WR Dump toe to be regraded ove	56,400 m3		\$9.96	\$561,744		
Borrow Sour	ces											\$387,585	
	8	3	1	1	600	Develop Borrow Sources	Clear (grub access road)	1,500 m2		\$2.08	\$3,126		
	8	3	1	2	600		Construct Access road	500 m		\$200.00	\$100,000		
	8	3	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	11 hrs		\$459.10	\$5,009		
	8	3	2	2	610		Revegetate - Seeding	621,000 m2		\$0.40	\$248,400		
	8	3	2	3	610		Revegetate - Fertilizer	621,000 m2		\$0.05	\$31,050		
Subtotal D	irect C	osts -	Misce	ellaneo	ous							\$1,244,012	
Subtotal D	irect C	osts											
							Subtotal direct costs					\$36,456,929	
CLOSURE	COST	S - INC	DIREC	Т									
	100	100	1	1		Project Management	2.5% of direct costs	\$ 36,456,929	х	2.5%		\$911,423	
	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	\$ 36,456,929	х	10.0%		\$3,645,693	
	100	100	4	1		Insurance	0.5% of direct costs	\$ 36,456,929	х	0.5%		\$182,285	
	100	100	5	1		Bonding	0.5% of direct costs	\$ 36,456,929	х	0.5%		\$182,285	
	100	100	6	1		Field Engineering and QA	15% of direct costs	\$ 36,456,929	х	15.0%		\$5,468,539	
	100	100	7	1		Mob - Demob		1 lum	р	\$500,000		\$500,000	
	100	100	8	1		Living out allowances	(included in heavy equipment costs)					\$0	
	100	100	9	1		Taxes	7% of taxable direct and indirect costs	\$ 40,055,768	х	7.0%		\$2,803,904	
Subtotal In	direct	Costs											
						Subtotal indirect costs		 				\$13,694,129	
CLOSURE	COST	s - CO	NTING	GENC	Y								
						Contingency	20% of direct costs	\$36,456,929	х	20.0%		\$7,291,386	
CLOSURE	COST	S - TO	TAL					 					
						Total direct and indirect costs						\$57,442,443	

## Option approved Fatioe Creek Diversion

Code Code	ea Iter	n Tasl		Estimate	Activity	Task	Quantity	Unit	Unit Cost	Activity Total	Subtotals	Source / Comments
LOSURE COS			task	Туре			,			-		
o Pit												
ater Treatment											\$191,632	
1	1	1	1	600	Construct Plant							
1	1	3	1	430	Place Pipeline	Excavation of Ditch	15,000		\$3.69	\$55,317		
1	1	3	2	500		Supply and place pump		ea.	\$1,878.00	\$1,878		
1	1	3	3 4	500		Build and install housing for primary pump		ea.	\$5,000.00	\$5,000		
1	1	3 3	4	500 500		Provide power to pumping system Supply and place Air valves	100	m ea.	\$2.53 \$295.00	\$253 \$295		
1	1	3	6	510		Supply and place 150 mm PVC Pipe	2,500		\$15.50	\$38,750		
1	1	3	8	430		Produce and stockpile (screen) bedding layer		m3	\$7.73	\$7,537		
1	1	3	9	430		Load, Haul, Place bedding layer		m3	\$9.39	\$9,155		
1	1	3	10	430		Backfill ditches	15,000	m3	\$4.90	\$73,447		
fety Berm											\$508,953	
1	2	1	1	430	Construct access road	Clear (grub access road)		m2	\$1.40	\$841		
1	2		2	430	Discusto seconda da la	Construct Access road	200		\$12.00	\$2,400		
1	2	2	1 2	430 430	Place berm materials	LHD Material Shape Material into berm	22,000 20,000		\$5.94 \$18.75	\$130,680 \$375,032		
ubtotal Direct		-		430		Shape Material Into bern	20,000	1113	\$10.75	\$375,03Z	\$700,585	
	COSIS	- Fai 0 i	าเ								\$700,565	Golder report (Feb. 2004)
ro Creek nstruct East Inte	torconto										\$4,501,753	Golder Teport (Feb. 2004)
2	1 1	. 1	1	430	Excavate Channel	Clear and Grub	135,000	m2	\$2.08	\$281,377		2700m * 50m avg
2	1	1	2	430		Excavate channel	230,000		\$2.08	\$848,187		2. com dom avg
2	1	2	1	430	Construct access road	Construct Access road	3,057		\$12.00	\$36,684		
2	1	3	1	430	Place Thermal Blanket	Produce and stockpile Granular Fill	81,000		\$7.73	\$626,179		2700m * 20m avg. * 1.5m
2	1	3	2	430		Load, Haul and Dump Granular Fill to Stockpile A	81,000		\$5.66	\$458,460		
2	1	3	3	430	<b>B</b> I <b>BB</b> I	Load, Haul, Place and compact Granular Fillon uphill cut slope	81,000		\$7.16	\$579,960		
2	1	4	1	430	Place GCL	Supply and Place GCL	27,000		\$24.80	\$669,469		2700m * 10m avg.
2 2	1	5 5	1 2	430 430	Place bedding layer	Produce and stockpile (screen)	8,100		\$7.73 \$5.66	\$62,618 \$45,846		
2	1	5	2	430 430		Load Haul and Dump bedding to Stockpile A Load, Haul, Place and Compact bedding layer	8,100 8,100		\$5.66 \$7.16	\$45,846 \$57,996		
2	1	6	1	430	Place Rip-Rap	Rip-Rap: Screen and stockpile	29,402		\$15.46	\$454,583		2700m * 10m avg. * 0.25m
2	1	6	2	430	riace rup-rup	Load Haul, Dump Rip-Rap	29,402		\$8.25	\$242,563		2700m Tomavg. 0.25m
2	1	6	3	430		Place and secure Rip-Rap	29,402		\$4.69	\$137,832		
tional Extension	on across	s west of	Faro Valle								\$634,296	
2	2	1	1	430	Excavate Channel	Clear and Grub	20,300	m2	\$2.08	\$42,311		
2	2	1	2	430		Excavate channel in soil	93,076	m3	\$3.69	\$343,241		
2	2	2	1	430	Construct access road	Construct Access road	2,100		\$12.00	\$25,200		
2	2	3	1	430	Place bedding layer	Produce and stockpile (screen)	4,263		\$7.73	\$32,956		
2	2	3	2	430		Load Haul and Dump bedding to Stockpile A	4,263		\$5.66	\$24,129		
2 2	2	3 4	3 1	430 430	Place Rip-Rap	Load, Haul, Place and Compact bedding layer Rip-Rap: Screen and stockpile	4,263 3,553		\$10.69 \$15.46	\$45,571 \$54,926		
2	2		2	430	riace Rip-Rap	Load Haul and Dump Rip-Rap	3,553		\$13.88	\$49,309		
2		4	3	430		Place and secure Rip-Rap	3,553		\$4.69	\$16,654		
	2					· · · · · · · · · · · · · · · · · · ·	-,		•		\$5,136,049	
-	-	- Faro (	Creek								++,,	
ubtotal Direct	-	- Faro (	Creek									
ubtotal Direct	t Costs	- Faro (	Creek								\$266,462	
ubtotal Direct	t Costs	- Faro (	2reek		Relocate to Intermediate Dump	Load, Haul, Dump Outwash Material	76,350	) m3	\$3.49	\$266,462	\$266,462	
ubtotal Direct one II Pit utwash material 3 ater Managemen	t Costs	- Faro (				·					\$76,579	
ubtotal Direct one II Pit ttwash material 3 ater Managemen 3	t Costs	- Faro ( 1	1	430	Relocate to Intermediate Dump Groundwater Wells	Drill Well	1	ea.	\$1,906.43	\$1,906	\$76,579	Pump and treat Zone II Pit water
btotal Direct ne II Pit twash material 3 ter Managemen 3 3	t Costs I I I I I I I I I I I I I I I I I I	- Faro ( 1 1	1 1 2	500		Drill Well Install 4" PVC Well	1 90	ea. ) ea.	\$1,906.43 \$100.00	\$1,906 \$9,000	\$76,579	
ibtotal Direct one II Pit twash material ater Managemen 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1	1 1 2 3	500 500		Drill Well Install 4" PVC Well Install Pump in well	1 90 1	ea. ) ea. ea.	\$1,906.43 \$100.00 \$2,629.00	\$1,906 \$9,000 \$2,629	\$76,579	
Ibtotal Direct one II Pit itwash material ater Managemen 3 3 3 3 3 3 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1 1	1 1 2 3 4	500 500 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power	1 90 1 2,200	ea. ) ea. ea. ) m	\$1,906.43 \$100.00 \$2,629.00 \$2.53	\$1,906 \$9,000 \$2,629 \$5,566	\$76,579	
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1 1 2	1 1 2 3 4 1	500 500 500 430		Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench	1 90 1 2,200 4,200	ea. ) ea.   ea. ) m ) m3	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489	\$76,579	
btotal Direct ne II Pit twash material ter Managemen 3 3 3 3 3 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1 1	1 1 2 3 4	500 500 500 430 510	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe	1 90 1 2,200 4,200 700	ea. ) ea. ea. ) m ) m3 ) m	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850	\$76,579	
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1 1 2 2	1 2 3 4 1 2	500 500 500 430	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping	1 90 1 2,200 4,200 700 700 700	ea. ) ea. ea. ) m ) m3 ) m	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489	\$76,579	
btotal Direct ne II Pit twash material ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I I I 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2	1 2 3 4 1 2 3	500 500 430 510 510 430 430	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe	1 90 1 2,200 4,200 700 700 273	ea. ) ea. ) ea. ) m ) m3 ) m	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039	\$76,579	
htotal Direct ne II Pit twash material atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I Int 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2	1 12 3 4 12 3 4 5 6	500 500 430 510 510 430 430 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves	1 90 1 2,200 4,200 700 700 273 273 273	ea. ea. m m3 m m m m3 m	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295	\$76,579	
ibtotal Direct ne II Pit twash material 3 iter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I I I I I I I I I I I I I I I I I I	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7	500 500 430 510 510 430 430 500 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs)	1 90 1 2,200 4,200 700 700 273 273 1 1	ea. ) ea. ) m ) m3 ) m ) m 3 m3 3 m3 ea. ea.	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295 \$620	\$76,579	
Ibtotal Direct Inne II Pit Itwash material 3 atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs I I 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8	500 500 430 510 510 430 430 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves	1 90 1 2,200 4,200 700 700 273 273 1	ea. ) ea. ) m ) m3 ) m ) m 3 m3 3 m3 ea. ea.	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295	\$76,579	
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8	500 500 430 510 510 430 430 500 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs)	1 90 1 2,200 4,200 700 700 273 273 1 1	ea. ) ea. ) m ) m3 ) m ) m 3 m3 3 m3 ea. ea.	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295 \$620	\$76,579	
Ibtotal Direct ine II Pit twash material atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8	500 500 430 510 510 430 430 500 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs)	1 90 1 2,200 4,200 700 700 273 273 1 1	ea. ) ea. ) m ) m3 ) m ) m 3 m3 3 m3 ea. ea.	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295 \$620	\$76,579	
Ibtotal Direct Ine II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8	500 500 430 510 510 430 430 500 500 430	Groundwater Wells Piping system	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches	1 90 1 2,200 700 700 273 273 1 1 1 4,200	ea. ) ea.   ea. ) m ) m ) m ) m 3 m3   ea.   ea.   ea.	\$1,906.43 \$100.00 \$2,629.00 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00 \$4.90	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295 \$620 \$20,565	\$76,579	Pump and treat Zone II Pit water
Ibtotal Direct ine II Pit twash material 3 atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8	500 500 430 510 510 430 430 500 500	Groundwater Wells	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs)	1 90 1 2,200 4,200 700 700 273 273 1 1	ea. ) ea.   ea. ) m ) m ) m ) m 3 m3   ea.   ea.   ea.	\$1,906.43 \$100.00 \$2,629.00 \$2.53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$295 \$620	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
ubtotal Direct nne II Pit ttwash material a ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 2 3 4 5 6 7 8 <b>II Pit</b>	500 500 430 510 430 430 430 500 500 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Load, Haul, Place and Compact Oxide Materials	1 90 1 2,200 700 700 273 273 1 1 4,200 683,549	ea. ) ea. (ea. ) m ) m ) m 3 m3 3 m3 (ea. (ea. ) m3 m3	\$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3.69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00 \$4.90 \$4.75	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$2,215 \$620 \$20,565 \$3,246,855	\$76,579 \$343,040	Pump and treat Zone II Pit water
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 2 3 4 1 2 3 4 5 6 7 8 8 <b>I Pit</b> 1	500 500 500 430 510 430 430 500 500 430 430	Groundwater Wells Piping system	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place alf compact bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches	1 90 1 2,200 700 770 273 273 1 1 4,200 683,549	ea. ) ea. ) m ) m ) m 3 m3 ) m 3 m3 ea. (ea. ) m3 m3 m3 hrs	\$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3,69 \$15.50 \$7.87 \$7.73 \$7.47 \$295.00 \$4.90 \$4.90 \$4.75 \$4.75 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,110 \$2,039 \$2295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,246,855	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
Ibtotal Direct Ibitotal Direct twash material 3 iter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 <b>I Pit</b> 1 2	500 500 430 510 510 430 430 500 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes	1 90 1 2,200 700 273 273 273 1 1 4,200 683,549 7 7 5	ea. ) ea. ) ea. ) m ) m ) m 3 m3 8 m3 ea. ) m3 m3 m3 hrs hrs	\$1,906.43 \$100.00 \$2,629.00 \$3,53 \$3,69 \$15.50 \$7.87 \$7.73 \$7.73 \$7.73 \$7.73 \$7.74 \$295.00 \$620.00 \$4.90 \$4.75 \$459.10 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$2295 \$620 \$20,565 \$3,246,855 \$3,122 \$7,110	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 <b>I Pit</b> 1 2 1	500 500 500 430 510 510 430 430 500 500 430 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Produce and Stockpile	1 90 1 2,200 700 700 273 273 1 1 4,200 683,549 7 15 10,842	ea. ) ea. ) ea. ) m ) m 3 m3 ea. ) ea. ) ea. ) m3 hrs hrs m3	\$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3,69 \$15.00 \$7.87 \$7.73 \$7.47 \$295.00 \$620.00 \$4.90 \$4.75 \$4.75 \$459.10 \$459.10 \$7.73	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$5,509 \$2,210 \$2,2039 \$2,955 \$620 \$20,565 \$3,226,855 \$3,226,855 \$3,122 \$7,110 \$83,813	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
ubtotal Direct ubtotal Direct titwash material a ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 2 3 4 1 2 3 4 5 6 7 8 <b>II Pit</b> 1 2 1 2	500 500 500 430 510 510 430 430 500 430 430 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Load, Haul, Place (0.3m)	1 90 1 2,200 700 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842	ea. ) ea. ) m ) m ) m ) m ) m ) m ) m ) m	\$1,906.43 \$100.00 \$2,629.00 \$3,69 \$15.50 \$7.87 \$7.73 \$7.73 \$7.73 \$7.73 \$7.73 \$295.00 \$620.00 \$4.90 \$4.90 \$4.90 \$4.95 \$4.75	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$2295 \$620 \$20,565 \$3,246,855 \$3,122 \$7,110 \$83,813 \$77,027	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
ubtotal Direct ubtotal Direct titwash material a ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 8 <b>I Pit</b> 1 2 1 2 3	500 500 500 430 510 510 430 500 500 430 430 430 430 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Produce and Stockpile Bedding Layer - Produce and Stockpile Bedding Layer - Load, Haul, Place (0.5m) Supply and place HDE Liner	1 90 1 2,200 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842 36,139	ea. ) ea. ) m3 ) m3 ) m3 ) m3 ) m3 ea. ) m3 ea. ) m3 hrs hrs m3 m3 m3 m3	\$1,906.43 \$100.00 \$2,629.00 \$15.50 \$7.73 \$7.73 \$7.77 \$2295.00 \$620.00 \$4.90 \$4.75 \$459.10 \$7.73 \$459.10 \$7.73 \$5.26 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,210 \$2,203 \$2,255 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$779,343	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
btotal Direct ne II Pit twash material 3 ter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 2 3 4 1 2 3 4 5 6 7 8 <b>II Pit</b> 1 2 1 2	500 500 500 430 510 510 430 500 500 430 430 430 430 430 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade Place HDPE Cover	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Produce and Stockpile Bedding Layer - Load, Haul, Place (0.3m) Supply and place HDPE Liner Load, haul, place loose till (1.0m)	1 90 1 2,200 700 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842	ea. ) m3 ) m3 ] m3	\$1,906.43 \$100.00 \$2,629.03 \$3,69 \$16.50 \$7.87 \$7.73 \$7.74 \$295.00 \$620.00 \$4.90 \$4.75 \$4.75 \$459.10 \$459.10 \$459.10 \$7.73 \$5.26 \$2.157 \$4.79	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,246,855 \$3,246,855 \$3,122 \$7,110	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
Ibtotal Direct Inne II Pit Itwash material 3 atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t Costs 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 8 <b>II Pit</b> 1 2 3 4	500 500 500 430 510 510 430 500 500 430 430 430 430 430 430 430	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Produce and Stockpile Bedding Layer - Produce and Stockpile Bedding Layer - Load, Haul, Place (0.5m) Supply and place HDE Liner	1 90 1 2,200 700 273 273 273 1 1 4,200 683,549 7 15 10,842 36,139 36,139	ea. ) m3 ) m3 ) m3 ) m3 ) m3 ) m3 ea. ea. ) m3 hrs hrs m3 hrs m3 m2 Bm3 m2 Bm3 m2 Bm3 m3	\$1,906.43 \$100.00 \$2,629.00 \$15.50 \$7.73 \$7.73 \$7.77 \$2295.00 \$620.00 \$4.90 \$4.75 \$459.10 \$7.73 \$459.10 \$7.73 \$5.26 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$779,343 \$173,105 \$14,460	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
ubtotal Direct pne II Pit ttwash material 3 ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t t costs 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 <b>II Pit</b> 1 2 3 4 1 2 3 4 1	500 500 500 510 510 430 510 430 500 500 500 500 500 430 430 430 430 430 430 610	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade Place HDPE Cover	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place 150mm PVC pipe Toduce and stockpile (screen) bedding layer Load, hau, place and compact bedding layer Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Slopes Bedding Layer - Load, Haul, Place (0.5m) Supply and place loose till (1.0m) Supply and place loose till (1.0m) Seeding Fertilization	1 90 1 2,200 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842 36,139 36,139 36,150	ea. ) ea. ) m3 ) m3 ) m3 ) m3 ) m3 ) m3 ) ea. ) ea. ) m3 hrs hrs hrs m3 m3 m3 m3 m3 m3 m3 m3 m3 m3	\$1,906.43 \$100.00 \$2,629,00 \$15.50 \$7.87 \$7.73 \$7.47 \$255.00 \$620.00 \$4.90 \$4.90 \$4.90 \$4.75 \$459.10 \$450.10\$\$450.10\$\$	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$2,110 \$2,039 \$225 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$7779,343 \$173,105 \$14,460 \$1,808	\$76,579 <b>\$343,040</b> \$3,246,855	Pump and treat Zone II Pit water
ubtotal Direct Jone II Pit utwash material a ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t costs 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 <b>II Pit</b> 1 2 3 4 1 2 3 4 1 2 1	500 500 500 430 510 510 510 510 430 430 430 430 430 430 430 430 430 610 610 610	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade Place HDPE Cover	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Stopes Bedding Layer - Produce and Stockpile Bedding Layer - Produce and Stockpile Bedding Layer - Load, Haul, Place (0.5m) Supply and place HDE Liner Load, haul, place loose till (1.0m) Seeding Fertilization	1 90 1 2,200 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842 10,842 36,139 36,150 36,150	ea. ) ea. ) ea. ) m ) m ) m ) m ) m 3 m3 ea. ea. ) m3 hrs hrs m3 m2 Bm3 m2 Bm3 m2 Bm3 m3 m3 hrs hrs hrs hrs hrs hrs hrs hrs	\$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3,69 \$15,50 \$7,87 \$7,77 \$295.00 \$4.90 \$4.90 \$4.90 \$4.90 \$4.90 \$4.75 \$459.10 \$7,73 \$5,26 \$21,57 \$4,79 \$0.05 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,210 \$2,2039 \$295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$779,343 \$1173,105 \$1173,105 \$1173,105 \$14,460 \$1,808	\$76,579 <b>\$343,040</b> \$3,246,855 \$1,119,787	Pump and treat Zone II Pit water
ubtotal Direct Jone II Pit utwash material 3 ater Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t costs 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 8 <b>II Pit</b> 1 2 3 4 1 2 3 4 1 2 2	500 500 500 430 510 430 430 500 500 500 430 430 430 430 430 430 430 610 610 610	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade Place HDPE Cover Revegetate Regrade	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and place Air compact bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Regrade Slopes Supply and place HDPE Liner Load, haul, place loses till (1.0m) Seeding Fertilization Flattened Surfaces Regrade Slopes	1 90 1 2,200 700 273 273 1 1 4,200 683,549 7 15 10,842 36,139 36,139 36,150 36,150 36,150 27 46	ea. ) ea. ) ea. ) m ) m ) m ) m 3 m3 ea. (ea. ) m ) m 8 m3 (ea. ) m M Bm3 m3 m3 m3 m3 hrs hrs Bm3 m3 m3 hrs hrs hrs hrs hrs hrs hrs hrs	\$1,906.43 \$100.00 \$2,629.00 \$2,629.53 \$3,69 \$15.50 \$7.73 \$7.77 \$295.00 \$620.00 \$4.90 \$4.90 \$4.90 \$4.95 \$4.75 \$4.75 \$4.79 \$5.26 \$2.26 \$2.157 \$4.79 \$0.40\$0.40	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,110 \$2,039 \$295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$779,343 \$173,105 \$14,460 \$1,808 \$173,105	\$76,579 <b>\$343,040</b> \$3,246,855 \$1,119,787	Pump and treat Zone II Pit water
Ibtotal Direct Ine II Pit Itwash material 3 atter Managemen 3 3 3 3 3 3 3 3 3 3 3 3 3	t costs 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1 2 3 4 1 2 3 4 5 6 7 8 <b>II Pit</b> 1 2 3 4 1 2 3 4 1 2 1	500 500 500 430 510 430 430 500 500 500 430 430 430 430 430 430 430 610 610 610	Groundwater Wells Piping system Relocate to Low Grade Stockpile C Regrade Place HDPE Cover Revegetate	Drill Well Install 4" PVC Well Install Pump in well Supply Power Excavate Piping Trench Supply and place 150mm PVC pipe Supply and install heat trace through piping Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer Supply and place Air valves Supply and place Air valves Supply and place Air valves Supply and place Drains (blow-offs) Backfill ditches Load, Haul, Place and Compact Oxide Materials Flattened Surfaces Regrade Stopes Bedding Layer - Produce and Stockpile Bedding Layer - Produce and Stockpile Bedding Layer - Load, Haul, Place (0.5m) Supply and place HDE Liner Load, haul, place loose till (1.0m) Seeding Fertilization	1 90 1 2,200 700 273 273 1 1 4,200 683,549 7 15 10,842 10,842 10,842 36,139 36,150 36,150	ea. ea. 0 m m m m m m m m m m m m m m m m m m m	\$1,906.43 \$100.00 \$2,629.00 \$2,53 \$3,69 \$15,50 \$7,87 \$7,77 \$295.00 \$4.90 \$4.90 \$4.90 \$4.90 \$4.90 \$4.75 \$459.10 \$7,73 \$5,26 \$21,57 \$4,79 \$0.05 \$459.10	\$1,906 \$9,000 \$2,629 \$5,566 \$15,489 \$10,850 \$2,210 \$2,2039 \$295 \$620 \$20,565 \$3,246,855 \$3,246,855 \$3,122 \$7,110 \$83,813 \$57,027 \$779,343 \$1173,105 \$1173,105 \$1173,105 \$14,460 \$1,808	\$76,579 <b>\$343,040</b> \$3,246,855 \$1,119,787	Pump and treat Zone II Pit water

		a		10.5				· · · · -	<b>*</b> •• ••• •••			
Faro Prima		/e Costesti 2	ima®tes 4	430 430		Supply and place HDPE Liner Load, haul, place loose till (1.0m)	109,541 m2 109,541 m3		\$2,362,267 \$524,700			
4	3	2	4	430 430	Rock Drains	Excavate channel for rock drains	610 m3		\$524,700 \$2,250			
4	3	3	2	430	NOCK Drains	Rip-Rap: Screen and stockpile	454 m3		\$7,017			
4	3	3	3	430		Load Haul and Dump Rip-Rap	454 m3		\$2,015			
4	3	3	4	430		Place and secure Rip-Rap	454 m3		\$2,128			
4	3	4	1	430	Surface Runoff Collection	Excavation of ditch	4,280 m3		\$15,783			
4	3	4	2	430		Supply and place geotextile	6,347 m2	\$4.41	\$27,998			
4	3	4	3	430		Rip-Rap: Screen and stockpile	1,490 m3	\$15.46	\$23,035			
4	3	4	4	430		Load Haul and Dump Rip-Rap	1,490 m3		\$7,122			
4	3	4	5	430		Place and secure Rip-Rap	1,490 m3		\$6,984			
4	3	5	1		Revegetate	Seeding	109,550 m2		\$43,820			
4	3	5	2	610		Fertilization	109,550 m2	\$0.05	\$5,478			
Subtotal Dire	ct Costs	- Oxide F	ines							\$8,142,240		
ETA Tailings												
Pump Tailings to 5	o Faro Pit		1		I hadroadie en eniterie e evetere	Purchase and install hydraulic monitors	ea		\$0	\$0		
5	1	1	2		Hydraulic monitoring system	Install Power Supply	ea Is		\$0 \$0			
5		1	3			Excavate trenches to sump	mä		\$0			
5		2	1		Collection Sumps	Purchase sump pumps and piping	ea		\$0			
5		2	2			Construct collection sump	mä		\$0			
5	1	2	3			Install sump pumps and piping	ea		\$0			
5	1	3	1		Booster Station	Install power supply	ls		\$0			
5		3	2			Purchase booster station	ea		\$0			
5		3	3			Construct booster station	ls		\$0			
5		4	1		Piping System	Purchase pressure pipe to crest	m		\$0			
5		4	2			Purchase gravity pipe to pit	m		\$0			
5		4	3			Install Pipeline	ls		\$0 \$0			
5 5		4	4		Lime addition System	Purchase and install return water pipe	m		\$0 \$0			
5		5	1		Lime addition System	Construct Lime addition System Procure and install lime addition system	ls Is		\$0 \$0			
5		5	2		Tailings Relocation Operation	Operate hydraulic monitoring system	IS		\$0 \$0			
5		6	2		. amigo relocation Operation	Operate sump pumping system			\$0 \$0			
5		6	3			Operate booster pumping system			\$0			
5	1	6	4			Purchase lime and operate lime addition system			\$0			
5	1	6	5			System decommissioning and removal			\$0			
Subtotal Dire	ct Costs	- ETA								\$0		
Waste Rock												
Reslope Waste I	ROCK	1	1	430	Regrade	Flattened Surfaces	557 hrs	\$459.10	\$255,551	\$3,988,137		
6	1	1	2	430	Regrade	Flatten Bubble Dump Surfaces	773 hrs		\$355,075			
6	1	1	3	430		Regrade Slopes	7,357 hrs		\$3,377,510			
Sulphide Cell			-			5 - 1 · ·	.,501 110	,		\$2,148,775		
6	2	1	1	430	Low Infiltration Cover	Load, haul, place compacted till (0.5m) (South cells)	86,823 m3		\$501,839			
6	2	1	2	430		Load, haul, place loose till (1.5m) (South cells)	260,470 m3		\$1,450,818			
6			3	430		Load, haul, place compacted till (0.5m) (East cell)	8,720 m3		\$50,403			
6	2	1	4	430		Load, haul, place loose till (1.5m) (East cell)	26,161 m3	\$5.57	\$145,715	¢0 007 710		
Waste Rock Cov	/er 3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	1,775,173 m3	\$5.57	\$9,887,713	\$9,887,713		
Rock Drains	0		•	100			1,110,110	¢0.01	\$0,001,110	\$97,278		
6	4	1	1	430	Intall rock drains (runoff management)	Excavate channel for rock drains	4,375 m3		\$16,134			
6	4	1	2	430		Rip-Rap: Screen and stockpile	3,255 m3		\$50,326			
6	4	1	3	430		Load Haul and Dump Rip-Rap	3,255 m3		\$15,559			
6	4	1	4	430		Place and secure Rip-Rap	3,255 m3	\$4.69	\$15,259	6000 001		
Sediment Contro			1	420	Construct coccos read	Clear access read area	0.405	P4 40	\$10.00F	\$669,391		
6	5	1	1	430 430	Construct access road	Clear access road area Construct Access road	9,195 m2 3,065 m	\$1.40 \$12.00	\$12,895 \$36,780			
6		2	2	430 430	SE, SW Sediment Ditches	Excavation of Ditch	3,065 m 14,841 m3		\$36,780 \$54,732			
6	5	2	2	430	SE, SW OCUMEN DIGIES	Supply and place geotextile	22,010 m2		\$97,091			
6	5	2	3	430		Rip-Rap: Screen and stockpile	5,166 m3		\$79,880			
6	5	2	4	430		Load Haul and Dump Rip-Rap	5,166 m3		\$39,317			
6	5	2	5	430		Place and secure Rip-Rap	5,166 m3		\$24,220			
6	5	3	1	430	NW Sediment Ditch	Excavation of Ditch	4,276 m3		\$15,769			
6	5	3	2	430		Supply and place geotextile	6,341 m2		\$27,973			
6	5	3	3	430		Rip-Rap: Screen and stockpile	1,489 m3		\$23,014			
6	5	3	4	430		Load Haul and Dump Rip-Rap	1,489 m3		\$5,121			
6	5	3	5	430		Place and secure Rip-Rap	1,489 m3		\$6,978			
6	5	4	1	430	Faro Crk. Out Sediment Ditch	Excavation of Ditch	11,045 m3		\$40,731			
6	5	4	2 3	430 430		Supply and place geotextile	16,379 m2		\$72,254			
6	5	4	3	430 430		Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	3,845 m3 3,845 m3		\$59,445 \$12,111			
6	5	4	4 5	430 430		Place and secure Rip-Rap	3,845 m3		\$12,111 \$18,024			
6	5	4 5	1	430	SE, SW Sediment Basin	Excavate sedimentation basin	5,184 m3		\$19,117			
6	5	5	2	430	E_, Str Counter Basin	Rip-Rap: Screen and stockpile	104 m3		\$1,608			
6	5	5	3	430		Load Haul and Dump Rip-Rap	104 m3		\$791			
6	5	6	1	430	Faro Crk. Out Sediment Basin	Excavate sedimentation basin	5,184 m3		\$19,117			
6	5	6	2	430		Rip-Rap: Screen and stockpile	104 m3		\$1,608			
6	5	6	3	430		Load Haul and Dump Rip-Rap	104 m3		\$328			
6	5	6	4	430		Place and secure Rip-Rap	104 m3	\$4.69	\$488	£4.000.000		
Revegetate 6	6	1	1	610	Revegitate WR Dumps	Seeding	4,444,400 m2	\$0.40	\$1,777,760	\$1,999,980		
6	6	1	2	610	Novogitate wit Dullips	Fertilization	4,444,400 m2 4,444,400 m2		\$222,220			
Subtotal Dire	-	- Waste F					.,,	÷0		\$18,791,274		
Groundwater											1CD003.053	SRK Consulting
	Foorla Ross @	6seelkstima	ites pm dh	n rev09/	Improved Faro Creek Diversion/12/7/200	05 14 of	21			\$1,551,887		December 2005

Upgradientiortik Forla Rose Cosed stimates pm dh rev09/Improved Faro Creek Diversion/12/7/2005

					Total direct and indirect costs					\$56,917,178	SRK Consu
CLOSURE COS	STS - TOT	AL					ψ00, 120, <del>1</del> 20 Χ	20.070			
CLOSURE COS	313-00	NIINGE	NUY		Contingency	20% of direct costs	\$36,120,425 x	20.0%		\$7,224,085	
	OTO 001	TIMO	NOV		Subtotal indirect costs					\$13,572,667	
Subtotal Indire		-									
100 100		8 9	1 1		Living out allowances Taxes	(included in heavy equipment costs) 7% of taxable direct and indirect costs	\$ 39,690,661 x	7.0%		\$0 \$2,778,346	
100		7	1		Mob - Demob	(included in backy actionment secto)	1 lump	\$500,000		\$500,000	
100	100	6	1		Field Engineering and QA	15% of direct costs	\$ 36,120,425 x	15.0%		\$5,418,064	
100		5	1		Bonding	0.5% of direct costs	\$ 36,120,425 x	0.5%		\$180,602	
100 100		3 4	1			0.5% of direct costs	\$ 36,120,425 x \$ 36,120,425 x	0.5%		\$3,612,043 \$180,602	
100	100	2	1 1		Field Supervision Contractor profit and home office overh	(included in major tasks)	\$ 36 400 405	10.0%		\$0 \$3,612,043	
100		1	1		Project Management	2.5% of direct costs	\$ 36,120,425 x	2.5%		\$903,011	
CLOSURE COS	STS - IND	IRECT			···· · · · · · · · · · · · · · · · · ·					, .,	
					Subtotal direct costs					\$36,120,425	
Subtotal Direct		macelli	aneous							¥1,244,012	
8 Subtotal Direct	3 t Costs - I	2 Miscell:	3 aneous	610		Revegetate - Fertilizer	621,000 m2	\$0.05	\$31,050	\$1,244,012	
8	3	2	2	610		Revegetate - Seeding	621,000 m2	\$0.40	\$248,400		
8	3	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	11 hrs	\$459.10	\$5,009		
8	3	1	2	600		Construct Haul road	500 m	\$200.00	\$100,000		
orrow Sources	3	1	1	600	Develop Borrow Sources	Clear and grub	1,500 m2	\$2.08	\$3,126	\$387,585	
8	2	1	2	430		LHD building material to Faro WR Dump toe to be regraded over	56,400 m3	\$9.96	\$561,744	\$207 FOF	
8	2	1	1	220	Building Demolition	Demolish and stockpile building material	56,400 m3	\$4.94	\$278,616		
uildings o	1	1	5	010			10,000 112		ψ4,720.00	\$840,360	
8	1	1	2 3	430 610		Scarify road surfaces Seed and fertilize	10,500 m2 10,500 m2	\$0.29 \$0.45	\$3,080.84 \$4,725.00		
8	1	1	1	430	Reclaim unnecssary roads	Remove culverts and breach stream crossing	2,240 m3	\$3.69	\$8,260.60		
oads										\$16,066	
iscellaneous										÷.,. ••,==+	
ubtotal Direct	t Costs - (			500		r rovide power to pumping system	1,000 111	ψ2.00	ψ4,00 Ι	\$1,763,224	
7	4	3 3	8 9	430 500		Backfill ditches Provide power to pumping system	11,100 m3 1,850 m	\$4.90 \$2.53	\$54,351 \$4,681		
7	4	3	7	430		Load, haul, place and compact bedding layer	722 m3	\$11.52	\$8,312		
7	4	3	6	430		Produce and stockpile (screen) bedding layer	722 m3	\$7.73	\$5,578		
7	4	3	4 5	500 500		Supply and place Air valves Supply and place Drains (blow-offs)	2 ea. 1 ea.	\$295.00 \$620.00	\$590 \$620		
7 7	4	3 3	3 4	510 500		Supply and install heat trace through piping	1,850 m 2 ea.	\$7.87 \$295.00	\$14,560 \$590		
7	4	3	2	510		Supply and place 150mm PVC insulated pipe	1,850 m	\$15.50	\$28,675		
7	4	3	1	430	Piping system	Excavate Piping Trench	11,100 m3	\$3.69	\$40,934		
7	4	2	4	500 500		Supply Power	3 ea. 300 m	\$2,629.00 \$2.53	\$7,887 \$759		
7 7	4	2 2	2 3	500 500		Install 4" PVC Well Install Pump in well	60 m	\$100.00 \$2,629.00	\$6,000 \$7,887		
7	4	2	1	500	Install Wells	Drill Well	3 ea.	\$1,906.43	\$5,719		
7	4	1	4	500		Install Primary pump Provide power to pumping system	1 ea. 300 m	\$1,503.00 \$2.53	\$1,503 \$759		
7 7	4	1 1	2 3	500 500		Supply and place Precast concrete manhole	1 ea.	\$1,863.00 \$1,503.00	\$1,863 \$1,503		
7	4	1	1	430	Place Manholes	Excavate sump for manholes	32 m3	\$3.69	\$118		
7 TA Colletion Sys			'	500		r tovide power to puttipling system	1,080 11	φ2.53	φ2,132	\$182,907	
7 7	3 3	3 3	6 7	430 500		Backfill ditches Provide power to pumping system	1,080 m3 1,080 m	\$4.90 \$2.53	\$5,288 \$2,732		
7	3	3	5	430		Load, haul, place and compact bedding layer	70 m3	\$9.62	\$675		
7	3	3	4	430		Produce and stockpile (screen) bedding layer	70 m3	\$7.73	\$543		
7	3	3	2	510 510		Supply and place 150mm PVC pipe Supply and install heat trace through piping	180 m 180 m	\$15.50 \$7.87	\$2,790 \$1,417		
7 7	3	3 3	1 2	430 510	Piping system	Excavate Piping Trench Supply and place 150mm PVC pipe	1,080 m3 180 m	\$3.69 \$15.50	\$3,983 \$2,790		
7	3	2	4	500		Supply Power	400 m	\$2.53	\$1,012		
7	3	2	3	500		Install Pump in well	3 ea.	\$2,629.00	\$7,887		
7 7	3	2 2	1 2	430 500	Groundwater Wells	Drill Well Install 4" PVC Well	3 ea. 60 m	\$1,906.43 \$100.00	\$5,719 \$6,000		
7	3	1	4	500		Provide power to pumping system	400 m	\$2.53	\$1,012		
7	3	1	3	500		Install Primary pump	1 ea.	\$1,503.00	\$1,503		
7	3	1	1 2	430 500	Place Manholes	Excavate sump for manholes Supply and place Precast concrete manhole	32 m3 1 ea.	\$3.69 \$1,863.00	\$118 \$1,863		
lorth Fork Rose			stem (to	Plant)	Disco Maria la la					\$17,428	
7	2	2	2	430 430		Place and secure Rip-Rap	52 m3 52 m3	\$7.61 \$4.69	\$396 \$244		
7 7	2	2 2	1 2	430 430	Place Rip-Rap	Rip-Rap: Screen and stockpile Load Haul and Dump Rip-Rap	52 m3 52 m3	\$15.46 \$7.61	\$804 \$396		
7	2	1	1	430	Excavate Basin	Excavate sedimentation basin	2,592 m3	\$3.69	\$9,559		
orth Fork Rose (	Creek Deter	-		430		Place and secure Rip-Rap	12,209 113	\$4.09	φ07,010	\$11,002	
7 7	1	5 5	2 3	430 430		Load Haul and Dump Rip-Rap	12,289 m3 12,289 m3	\$7.61 \$4.69	\$93,519 \$57,610		
7	1	5	1	430	Place Rip-Rap	Rip-Rap: Screen and stockpile	12,289 m3	\$15.46	\$190,003		
7	1	4	1	430 430	Place bedding layer	Produce and stockpile (screen) bedding layer Load, haul, place and compact bedding layer	9,751 m3 9,751 m3	\$7.73 \$7.52	\$75,381 \$73,328		
7	1	3 4	1 1	430	Place HDPE Liner	Supply and place HDPE Liner Produce and stockpile (screen) bedding laver	32,502 m2	\$21.57 \$7.73	\$700,910 \$75,381		
7	1	2	2	430		Load, Haul, Dump till to create channel berms	26,782 m3	\$7.52	\$201,401		
7	1	1 2	2 1	430 430	Contruct Channel	Construct Access road Load, Haul, Dump granular material along channel thalwag.	2,200 m 16,500 m3	\$12.00 \$7.52	\$26,400 \$124,080		
						Construct Assess road	2 200 m	¢12.00	COC 400		

## Option 1: Stabilization

Code Code	Item T	ask t	iub- Estimate ask Type	Task	Activity	Quantity	Unit	Unit Cost	Activity Total	Subtotals	Source / Comments
OSURE COSTS	S - DIR	ECT	CAPITAL								
ams										¢0.000.007	
oss Valley Dam	1	1	1	Remove Pond	Pump Pond water to discharge	1	ls	\$50,000	\$50,000.00	\$2,309,667	
1	1	2	1	Remove Impounded Sludge	Excavate and create berms for use as sludge cell ontop of tailings	1,445		\$3.69	\$5,328.83		
1			2	Remote impediate cladge	Load, haul and place sludge material	1,600		\$7.46	\$11,936		1CD003.45_SludgeManagement
1	1	3	1	Remove Contaminated Soil	Excavate, load, haul and place contaminated soils to mill area	322,650		\$4.81	\$1,551,947		
1	1	4	1	Prepare spoil area	Clear and Grub	5,000		\$2.08	\$10,421		
1			2		prepare access roads	200		\$12.00	\$2,400		
1		5	1	Remove Dam	Excavate, load, haul and place dam material not used for Int. Dam toe bern	87,588		\$3.75	\$328,455		
1		6	1	Create Channel	Excavate channel	3900		\$3.69	\$14,382		
1		-	2		Supply and place geotextile Liner	1300 500		\$4.41 \$7.73	\$5,735 \$3.865		
1		-	3		Bedding Layer: Screen and stockpile Bedding Layer: Load, haul, dump and place	500		\$7.73 \$5.78	\$2,890		
1		-	5		Rip-Rap: Drill, blast and stockpile	4600		\$23.86	\$2,890		
1			6		Rip-Rap: Screen and stockpile	4600		\$15.46	\$71,122		
1			7		Load Haul and Dump Rip-Rap	4600		\$5.03	\$23,138		
1	1	6	8		Place and secure Rip-Rap	4600		\$4.69	\$21,564		
1		7	1	Revegetate Dam footprint and impoundmen		214,983		\$0.45	\$96,742		
ermediate Dam										\$3,080,492	1CD003.59_Rose_Creek_Dam_Upgrades
1	2	1	1	Ground Densification	Gravel: supply and stockpile locally	6,493		\$7.73	\$50,191.89		
1	-		2		Gravel: load , haul, place (3km)	6,493		\$6.24	\$40,513.98		
1	-	-	2		Drill vibro-replacement stone columns	74,400		\$25.00	\$1,860,000.00		
1	-		2		Verification testing	1		\$50,000	\$50,000.00		
1	-	-	1	Construct Berm at Toe	Excavate, load, haul and place Material From Cross Valley Dam	247,500		\$3.75	\$928,125		
1		•	1	Install pond level control	Install pumping system to manage pond levels	1		\$5,000.00	\$5,000.00		
1	-		2	Construct channel - spillway to Rose Cr.	Modify spillway - lower or add stop logs Excavate and create berms	1 8,030		\$2,500.00 \$3.69	\$2,500.00 \$29,612.79		
1	-		2	Construct charmer - spillway to Rose Cr.	Bedding Layer: Screen and stockpile	1.452		\$3.69	\$11,224.60		
1	-		3		Bedding Layer: Load, haul, dump and place	1,452		\$5.78	\$8,392.39		
1	-		4		Rip-Rap: Drill, blast and stockpile	1,936		\$23.86	\$46,185.42		
1			5		Rip-Rap: Screen and stockpile	1,936		\$15.46	\$29.932.26		
1		4	6		Load Haul and Dump Rip-Rap	1,936		\$5.03	\$9,737.88		
1	2	4	7		Place and secure Rip-Rap	1,936	m3	\$4.69	\$9,075.59		
econdary Dam										\$750,826	i
1	3	1	1	Ground Densification (East Limb)	Gravel: supply and stockpile locally	2,339		\$7.73	\$18,079.87		
1	-		2		Gravel: load , haul, place (3km)	2,339		\$5.45	\$12,746.14		
1	-		3		Drill vibro-replacement stone columns	26,800		\$25.00	\$670,000.00		
1	3		4		Verification testing	1	IS	\$50,000	\$50,000.00		
ubtotal Direct Co	osts -	Dams								\$6,140,984	
ailings											
termediate Tailings 2	4	4	4	Densify Tailings	Gravel: supply and stockpile locall	6.938		\$7.73	\$53,632.46	\$20,810,996	
2	1	1	2	Density failings	Gravel: load , haul, place (3km)	6,938		\$6.24	\$43,291.15		
2			2		Drill vibro-replacement stone column:	79,500		\$25.00	\$1,987,500.00		
2	1		4		Verification testing	1		\$50,000	\$50,000.00		
2		2	1	Dewater	Pump pond water to Faro Pit or water treatment facility	1		\$50,000	\$50,000.00		
2		3	1	Upgrade Roads	Upgrade road from tailings area to waste rock source	1,350		\$200.00	\$270,000.00		
2		-	2	o <b>T</b> "	Construct new acccess road where necessar	1,000		\$12.00	\$12,000.00		
2			1	Cover Tailings	Load, haul, and place waste rock	504,665			\$2,538,464.95		
2			2	Revegetate till-covered areas	Load, haul, and place Till Seed	1,009,330 1,009,330		\$15.21 \$0.40	\$15,351,909.30 \$403,732		
2			2	Nevegeiale III-cuvereu areas	Fertilize	1,009,330		\$0.40 \$0.05	\$403,732 \$50,467		
condary Tailings		-	-		- STUES	1,000,000		φ0.00	ψ00, <del>+</del> 07	\$6,628,768	
2	2	1	1	Upgrade Roads	Upgrade road from tailings area to waste rock source	935	m	\$200.00	\$187,000.00	φ0,020,700	
2			2	-1.0	Construct new access road where necessar	1,000		\$12.00	\$12,000.00		
2			1	Cover Tailings	Load, haul, and place waste rock	187,075	m3	\$5.03	\$940,987.25		
2			2		Load, haul, and place Till	374,150		\$14.22	\$5,320,413.00		
2		-	1	Revegetate till-covered areas	Seed	374,150		\$0.40	\$149,660.00		
2		-	2		Fertilize	374,150	m2	\$0.05	\$18,707.50		
ubtotal Direct Co	osts -	<u>Tai</u> lin	gs							\$27,439,764	
ose Creek Divers	sion C	hann	el								
grade to PMF (475r	m3/s)									\$15,808,865	i
3	1	1	1	Clear and Grub	Dozer: D10R/N	78,250	m2	\$2.08	\$163,094.63	,,	
3	1	2	1	Excavate Channel	Bulk excavate soil (dump locally)	795,719		\$3.69	\$2,934,428.66		
3	1	2	2		Rock excavation: Drill, blast, muck, load haul dump (locally)	337,301			\$7,868,203.56		
	1	3	1	Place bedding Layer	Bedding: Produce and stockpile	46,703	m3	\$7.73	\$361,042.21		
3		-	0		Redding load, houl place and compact	46,703	m 2	\$11.65	\$544,089.95		
3 3	1	3	2		Bedding: load , haul, place and compact	40,703	1113	ψ11.00	\$344,005.55		
3	1	4	1	Place HDPE Liner	Supply and place HDPE Liner	46,311	m3	\$21.57	\$998,703.33		
3	1 1	4 5		Place HDPE Liner Place Rip-Rap			m3 m3	\$21.57 \$15.46			

Contract Work Area Code Code Item Task Sub- Estima task Type		Activity	Quantity Unit	Unit Cost	Activity Total	Subtotals	Source / Comments
Iorth Fork Rock Drain						\$2,182,829	
3 2 1 1	Construct Ramp up to haul road	Excavate and doze WR material	22,500 m3	\$6.82	\$153,450.00	+-,,	
3 2 1 2		Grade Road	15,000 m2	\$0.29	\$4,401.20		
3 2 2 1	Breach Drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357 m3	\$4.16	\$1,923,403.73		
3 2 3 1	Create Channel	Excavate channel	6,104 m3	\$3.69	\$22,510.15		
3 2 3 2		Supply and place geotextile	3.924 m2	\$4.41	\$17,310.02		
3 2 3 3		Bedding Layer: Screen and stockpile	1,177 m3	\$7.73	\$9,100.46		
3 2 3 4		Bedding Layer: Load, haul, dump and place	1,177 m3	\$3.75	\$4,414.50		
3 2 3 6		Rip-Rap: Screen and stockpile (from NFRD)	1,962 m3	\$15.46	\$30,334.87		
3 2 3 7		Load Haul and Dump Rip-Rap	1,962 m3	\$3.69	\$7,235.40		
3 2 3 8		Place and secure Rip-Rap	1,962 m3	\$4.69	\$9,197.66		
3 2 4 1	Revegetate disturbed areas	Seed and Fertilize	3270 m2	\$0.45	\$1,471.50		
Subtotal Direct Costs - Rose Creek Div	version Channel					\$17,991,694	
Froundwater Collection							
ollect groundwater below CVD						\$467,767	
	Place Manhole	Excavate sump for manholes	32 m3	\$3.69	\$118	<i>\(\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	
4 1 1 2		Supply and place Precast concrete manhole	1 ea.	\$1,863.00	\$1,863		
4 1 1 3		Install Primary pump	1 ea.	\$1,503.00	\$1,503		
4 1 1 4		Provide power to pumping system	3,000 m	\$2.53	\$7,590		
4 1 2 1	Groundwater Wells	Drill Well	7 ea.	\$1,906.43	\$13,345		
4 1 2 2		Install 4" PVC Well	140 m	\$100.00	\$14,000		
4 1 2 3		Install Pump in well	7 ea.	\$2,629.00	\$18,403		
4 1 2 4		Supply Power	3.000 m	\$2.53	\$7.590		
4 1 3 1	Piping system	Excavate Piping Trench	30,000 m3	\$3.69	\$110,633		
4 1 3 2	·	Supply and place 150mm PVC pipe	5.000 m	\$15.50	\$77.500		
4 1 3 3		Supply and install heat trace through piping	5,000 m	\$7.87	\$39,350		
4 1 3 4		Produce and stockpile (screen) bedding layer	1.950 m3	\$7.73	\$15,075		
4 1 3 5		Load, haul, place and compact bedding layer	1,950 m3	\$7.13	\$13,904		
4 1 3 6		Backfill ditches	30,000 m3	\$4.90	\$146,893		
Subtotal Direct Costs - Groundwater C	ollection		,	•		\$467,767	
Aiscellaneous						<b>v</b> ,	
						<b>A</b> 4 400	
eclaim unnecssary roads	<b>_</b>					\$4,460	
6 1 1 1 6 1 1 2	Reclaim unnecssary roads	Scarify road surfaces	6,000 m2	\$0.29	\$1,760.48		
0 1 1 2		Seed and fertilize	6,000 m2	\$0.45	\$2,700.00		
Subtotal Direct Costs - Miscellaneous						\$4,460	
Subtotal Direct Costs	Subtotal direct costs					\$52,044,670	
	Subtotal direct costs					\$52,044,670	
LOSURE COSTS - INDIRECT							
100 100 1 1	Project Management	2.5% of direct costs	\$ 52,044,670 x	2.5%		\$1,301,117	
100 100 2 1	Field Supervision	(included in major tasks)				\$0	
100 100 3 1	Contractor profit and home office overhead		\$ 52,044,670 x	10.0%		\$5,204,467	
100 100 4 1	Insurance	0.5% of direct costs	\$ 52,044,670 x	0.5%		\$260,223	
100 100 5 1	Bonding	0.5% of direct costs	\$ 52,044,670 x	0.5%		\$260,223	
100 100 6 1	Field Engineering and QA	15% of direct costs	\$ 52,044,670 x	15.0%		\$7,806,700	
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	
100 100 9 1	Taxes	7% of taxable direct and indirect costs	\$ 56,968,467 x	7.0%		\$3,987,793	
Subtotal Indirect Costs						\$40,220,524	
CLOSURE COSTS - CONTINGENCY	Subtotal indirect costs					\$19,320,524	
LUGUNE CUGIO - CUNTINGENCI						***	
	Contingency	20% of direct costs	\$52 044 670 v	20.0%			
CLOSURE COSTS - TOTAL	Contingency	20% of direct costs	\$52,044,670 x	20.0%		\$10,408,934	

## Option 2: Complete Relocation

Code	n rask ta	ub- Estimat ask Type		Activity	Quantity	Unit	Unit Cost	Activity Total	Subtotals	Source / Comments
URE COSTS - DI	RECT CA	PITAL								
/alley Dam									\$2,249,544	4
1 1	1	1	Remove Pond	Pump Pond water to discharge	1 ls		\$50,000	\$50,000.00	+=,=,	
1 1	2	1	Remove Impounded Sludge	Excavate and create berms for use as sludge cell ontop of tailings	1,445 m		\$3.69	\$5,328.83		
1 1		2		Load, haul and place sludge material	1,600 m		\$7.46	\$11,936		1CD003.45_SludgeManagement
1 1	3	1	Remove Contaminated Soil	Excavate, load, haul and place contaminated soils to mill area	322,650 m		\$4.81	\$1,551,947		
1 1	4	1	Prepare spoil area	Clear and Grub	1,000 m		\$2.08	\$2,084		
1 1		2		Prepare access roads	200 m		\$12.00	\$2,400		
1 1	5	1	Breach Dam	Excavate, load, haul and place breach material	72,500 m		\$3.75	\$271,875		
1 1	6	1	Create Channel	Excavate channel	5200 m		\$3.69	\$19,176		
1 1		2		Supply and place geotextile	1300 m		\$4.41	\$5,735		
1 1		3		Bedding Layer: Screen and stockpile	500 m		\$7.73	\$3,865		
1 1	-	4		Bedding Layer: Load, haul, dump and place	500 m		\$5.78	\$2,890		
1 1	-	5		Rip-Rap: Drill, blast and stockpile	4600 m		\$23.86	\$109,740		
1 1	0	6		Rip-Rap: Screen and stockpile	4600 m		\$15.46	\$71,122		
1 1	-	7		Load Haul and Dump Rip-Rap	4600 m		\$5.03	\$23,138		
1 1	6	8	Barrier Barrier and income	Place and secure Rip-Rap	4600 m		\$4.69	\$21,564		
1 1 Intermediate Dam	7	1	Revegetate Dam footprint and impou	ndment Seed and fertilize	214,983 m	2	\$0.45	\$96,742	\$538.255	-
Intermediate Dam	4	4	Brenere Seil Aree	Clear and Crub	1000 -	2	£2.00	\$2.004.20	\$538,255	D
1 2	1	1 2	Prepare Soil Area	Clear and Grub Prepare access roads	1000 m 300 m		\$2.08 \$12.00	\$2,084.28 \$3,600.00		
1 2	-	2	Breach Dam	Excavate, load, haul and dump breach material	300 m 72.500 m		\$12.00	\$3,600.00		
1 2	2	1	Create Channel	Excavate, load, naul and dump breach material Excavate channel	72,500 m 5,200 m		\$3.75 \$3.69	\$271,875.00 \$19,176.40		
1 2		2	Oreate Oridinitei	Supply and place geotextile	1,300 m		\$3.69 \$4.41	\$5,734.72		
1 2		2		Bedding Layer: Screen and stockpile	500 m		\$4.41 \$7.73	\$3,865.30		
1 2		4		Bedding Layer: Load, haul, dump and place	500 m		\$5.78	\$2,890.00		
1 2	-	5		Rip-Rap: Drill, blast and stockpile	4,600 m		\$23.86	\$109,740.36		
1 2		6		Rip-Rap: Screen and stockpile	4,600 m		\$15.46	\$71.121.52		
1 2	3	7		Load Haul and Dump Rip-Rap	4.600 m		\$5.03	\$23,138.00		
1 2	3	8		Place and secure Rip-Rap	4,600 m		\$4.69	\$21,564.34		
1 2	4	1	Revegetate disturbed areas	Seed and Fertilize breach slopes	7700 m		\$0.45	\$3,465.00		
Secondary Dam									\$550,485	5
1 3	1	1	Prepare Soil Area	Clear and Grub	1000 m	2	\$2.08	\$2,084.28		
1 3	1	2		Prepare access roads	500 m		\$12.00	\$6,000.00		
1 3	2	1	Breach Dam	Excavate, load, haul and dump breach material	72,500 m	3	\$3.75	\$271,875.00		
1 3	3	1	Create Channel	Excavate channel	5,200 m	3	\$3.69	\$19,176.40		
1 3	3	2		Supply and place geotextile	1,300 m	2	\$4.41	\$5,734.72		
1 3	3	3		Bedding Layer: Screen and stockpile	500 m	3	\$7.73	\$3,865.30		
1 3	3	4		Bedding Layer: Load, haul, dump and place	500 m	3	\$6.12	\$3,060.00		
1 3	3	5		Rip-Rap: Drill, blast and stockpile	4,600 m	3	\$23.86	\$109,740.36		
1 3	3	6		Rip-Rap: Screen and stockpile	4,600 m	3	\$15.46	\$71,121.52		
1 3	3	7		Load Haul and Dump Rip-Rap	4,600 m	3	\$7.13	\$32,798.00		
1 3	3	8		Place and secure Rip-Rap	4,600 m	3	\$4.69	\$21,564.34		
1 3	4	1	Revegetate disturbed areas	Seed and Fertilize breach slopes	7700 m	2	\$0.45	\$3,465.00		
Original Dam									\$552,367	7
1 3	1	1	Prepare Soil Area	Clear and Grub	1000 m		\$2.08	\$2,084.28		
1 3		2		Prepare access roads	540 m		\$12.00	\$6,480.00		
1 3		1	Breach Dam	Excavate, load, haul and dump breach material	72,500 m		\$3.75	\$271,875.00		
1 3	3	1	Create Channel	Excavate channel	5,200 m		\$3.69	\$19,176.40		
1 3		2		Supply and place geotextile	1,300 m		\$4.41	\$5,734.72		
1 3		3		Bedding Layer: Screen and stockpile	500 m		\$7.73	\$3,865.30		
1 3	0	4		Bedding Layer: Load, haul, dump and place	500 m		\$6.90	\$3,450.00		
1 3	0	5		Rip-Rap: Drill, blast and stockpile	4,600 m	0	\$23.86	\$109,740.36		
1 3		6		Rip-Rap: Screen and stockpile	4,600 m		\$15.46	\$71,121.52		
1 3	0	7		Load Haul and Dump Rip-Rap	4,600 m		\$7.35	\$33,810.00		
1 3	3 4	8	Developetate disturbed areas	Place and secure Rip-Rap	4,600 m		\$4.69	\$21,564.34		
1 3		1	Revegetate disturbed areas	Seed and Fertilize breach slopes	7700 m	2	\$0.45	\$3,465.00	Ar	
al Direct Costs -	- Dams								\$3,890,650	U
IS										
ntermediate Tailings	s to Faro Pit								\$213,749,195	5
2 Ī	1	1	Hydraulic monitoring system	Pumps: Supply and intall Vertical Turbine Pump	3 ea		\$100,000	\$300,000.00		
2 1		2		Pipelines: Supply and Install piping system	1 ls		\$1,763,669	\$1,763,669.29		1CD003.041
2 1	1	3		Hydraulic Monitors: Supply and Install	1 ls		\$1,255,000	\$1,255,000.00		
2 1	1	4		Mobile Equipment: Purchase	1 ls		\$1,020,000	\$1,020,000.00		
2 1	1	5		Supply Power	1 ls		\$100,000	\$100,000.00		
2 1	2	1	Slurry Pumping System	Pumps and Support: Supply and Install	1 ls		\$1,793,000	\$1,793,000.00		
2 1		2		Pipelines: Supply and Install	1 ls		\$3,299,200	\$3,299,199.69		
2 1		3		Supply Power	1 ls		\$500,000	\$500,000.00		
2 1	-	1	Lime addition system	Procure and install lime addition system - Allowance	1 ls		\$300,000.00	\$300,000.00		
2 1		1	Tailings relocation operation	Operate hydraulic monitoring system	12.5 yr			\$37,708,013.94		
2 1	4	2		Operate slurry pumping system	12.5 yr	s	\$2,416,824	\$30,210,299.53		
						nnes				
	4	4		Purchase Lime and operate lime addition system	478,723 C		\$282.00	\$135,000,013		Need new estimates of lime requirements from JTC/DD
2 1	4									
2 1 2 1 te comtaminated ma		5		System decommissioning and removal	1 ls		\$500,000	\$500,000.00	\$14,504,088	

### Faro Primary Alternative Cost Estimates

2 2 1 1	Truck contaminated soils to Faro Pit	Construct local access roads	3500 m	\$12.00	\$42,000.00	
2 2 1 2		Load, haul, dump remaining contaminated material to Faro Pit	2.766.960 m3		\$14,056,156.80	
2 2 1 3		Regrade stripped areas for drainage	1,383,480 m2	\$0.29	\$405,931.08	Use remaining dam materials for fill where necessary
egetate		Regiduo onippod diodo for didinago	1,000,100 112	\$0. <u>2</u> 0	\$100,001.00	\$622,566
2 3 1 1	Revegetate disturbed areas	Seed	1,383,480 m2	\$0.40	\$553,392.00	<i>4022,000</i>
2 3 1 2	Revegetate disturbed areas	Fertilize	1,383,480 m2	\$0.05	\$69,174.00	
		Fertilize	1,383,480 m2	\$0.05	\$69,174.00	
btotal Direct Costs - Tailings						\$228,875,849
se Creek						
store Rose Creek						\$0
3 1 1 1	Maintain RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1 ls	\$0.00	\$0.00	<i>\$</i> 0
3 1 2 1	Redirect flow into thalweg	Breach RCDC at Original Dam	1 15	\$0.00	\$0.00	
	Redirect now into thatwey				\$0.00	
		Breach diversion where stream enter from south				
3 1 2 3		Regrade channel and dykes to create stable slopes			\$0.00	
3 1 3 1	Fish habitat enhancement	Install riffles along restored channel			\$0.00	
3 1 3 2		Excavate pools	m3	\$3.69	\$0.00	
3 1 4 1	Reclamation	Plant willows along restored stream channel	m2		\$0.00	
3 1 4 2		Seed and fertilize	m2	\$0.45	\$0.00	
rth Fork Rock Drain						\$2,182,829
3 2 1 1	Construct Ramp up to haul road	Excavate and doze WR material	22,500 m3	\$6.82	\$153,450.00	
3 2 1 2		Grade Road	15,000 m2	\$0.29	\$4,401.20	
3 2 2 1	Breach Drain	Excavate, load, haul and place breach material in Faro WR Dump	462.357 m3	\$4.16	\$1,923,403,73	
3 2 3 1	Create Channel	Excavate channel	6,104 m3	\$3.69	\$22,510.15	
3 2 3 2	oreate orianner	Supply and place geotextile	3.924 m2	\$4.41	\$17.310.02	
3 2 3 3		Bedding Layer: Screen and stockpile	1,177 m3	\$7.73	\$9,100.46	
3 2 3 4		Bedding Layer: Load, haul, dump and place	1,177 m3	\$3.75	\$4,414.50	
3 2 3 6		Rip-Rap: Screen and stockpile (from NFRD)	1,962 m3	\$15.46	\$30,334.87	
3 2 3 7		Load Haul and Dump Rip-Rap	1,962 m3	\$3.69	\$7,235.40	
3 2 3 8		Place and secure Rip-Rap	1,962 m3	\$4.69	\$9,197.66	
3 2 4 1	Revegetate disturbed areas	Seed and Fertilize	3270 m2	\$0.45	\$1,471.50	
ubtotal Direct Costs - Rose Creek	-					\$2,182,829
						¥1,·21,010
roundwater						
ollect groundwater below CVD						\$467,767
4 1 1 1	Place Manhole	Excavate sump for manholes	32 m3	\$3.69	\$118	
4 1 1 2		Supply and place Precast concrete manhole	1 ea.	\$1,863.00	\$1,863	
4 1 1 3		Install Primary pump	1 ea.	\$1,503.00	\$1,503	
4 1 1 4		Provide power to pumping system	3,000 m	\$2.53	\$7,590	
4 1 2 1	Groundwater Wells	Drill Well	7 ea.	\$1,906.43	\$13.345	
4 1 2 2		Install 4" PVC Well	140 m	\$100.00	\$14,000	
4 1 2 3		Install Pump in well	7 ea.	\$2,629.00	\$18,403	
4 1 2 4		Supply Power	3,000 m	\$2.53	\$7,590	
4 1 2 4 4 4 1 3 1	Distance		30.000 m3	\$3.69	\$110.633	
	Piping system	Excavate Piping Trench				
4 1 3 2		Supply and place 150mm PVC pipe	5,000 m	\$15.50	\$77,500	
4 1 3 3		Supply and install heat trace through piping	5,000 m	\$7.87	\$39,350	
4 1 3 4		Produce and stockpile (screen) bedding layer	1,950 m3	\$7.73	\$15,075	
4 1 3 5		Load, haul, place and compact bedding layer	1,950 m3	\$7.13	\$13,904	
4 1 3 6		Backfill ditches	30,000 m3	\$4.90	\$146,893	
daptive Management						\$0
4 2 1 1	Adaptive management Phase 1	Install multiple shallow extraction and monitoring wells			\$0.00	Assume first 3 years after footprint cleanup
4 2 1 2	3	Operate seasonal groudwater extraction			\$0.00	
4 2 1 3		Treatment extracted water in mine area treatment plant			\$0.00	
4 2 2 1	Adaptive management Phase 2	Relocate or install additional extraction and monitoring wells			\$0.00	Assume years 4-10 after footprint cleanup
	Adaptive management Phase 2					Assume years 4-10 alter tootprint cleanup
4 2 2 2		Operate seasonal groudwater extraction			\$0.00	
4 2 2 3		Treatment extracted water in mine area treatment plant			\$0.00	
4 2 3 1	Adaptive management Phase 3	Relocate or install additional extraction and monitoring wells			\$0.00	Assume years 11-20 after footprint cleanup
4 2 3 2		Operate seasonal groudwater extraction			\$0.00	
4 2 3 3		Treatment extracted water in mine area treatment plant			\$0.00	
ubtotal Direct Costs - Groundwater Col	ection					\$467,767
iscellaneous						
						\$4.460
eclaim unnecssary roads	Dealaim unnessan t-	Castily read surfaces	0.0000	<b>60.00</b>	64 700 40	\$4,460
6 1 1 1	Reclaim unnecssary roads	Scarify road surfaces	6,000 m2	\$0.29	\$1,760.48	
6 1 1 2		Seed and fertilize	6,000 m2	\$0.45	\$2,700.00	
ubtotal Direct Costs - Miscellaneous						\$4,460
ubtotal Direct Costs						
	Subtotal direct costs					\$235,421,556
	Cabiotal UIICCI CUSIS					¥£00,7£1,000
LOSURE COSTS - INDIRECT						
100 100 1 1	Project Management	2.5% of direct costs	\$ 235,421,556 x	2.5%		\$5,885,539
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	\$ 235,421,556 x	10.0%		\$23,542,156
100 100 4 1	Insurance	0.5% of direct costs	\$ 235,421,556 x	0.5%		\$1,177,108
100 100 5 1	Bonding	0.5% of direct costs	\$ 235,421,556 x	0.5%		\$1,177,108
100 100 6 1	Field Engineering and QA	15% of direct costs	\$ 235,421,556 x	15.0%		\$35,313,233
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
	Taxes	7% of taxable direct and indirect costs	\$ 255,932,389 x	7.0%		\$17,915,267
100 100 9 1						
						¢95 510 /11
100 100 9 1 ubtotal Indirect Costs	<b>A</b> 1					\$85,510,411
btotal Indirect Costs	Subtotal indirect costs					+
btotal Indirect Costs	Subtotal indirect costs					<b>***</b> ,****
	Subtotal indirect costs	20% of direct costs	\$235,421,556 x	20.0%		\$47,084,311

## Option 3: Partial Relocation

#### **CLOSURE COSTS - DIRECT CAPITAL**

Code Code	rea Item	Task	Sub- Estimate task Type	Task	Activity	Quantity	Unit	Unit Cost	Activity Total	Subtotals	Source / Comments
SURE COS	STS - DI	RECT	CAPITAL								
is .											
s Valley Dam	n 1	1	1	Remove Pond	Pump Pond water to discharge	1	ls	\$50,000	\$50,000.00	\$2,244,749	
1	1	2	1	Remove Impounded Sludge	Excavate and create berms for use as sludge cell ontop of tailings	1,445		\$3.69	\$5,328.83		
1	1	2	2	ricinete impediada eladge	Load, haul and place sludge material	1,600		\$7.46	\$11,936	10	CD003.45_SludgeManagement
1	1	3	1	Remove Contaminated Soil	Excavate, load, haul and place contaminated soils to mill area	322,650		\$4.81	\$1,551,947		
1	1	4	1	Prepare spoil area	Clear and Grub	1,000		\$2.08	\$2,084		
1	1	4	2		prepare access roads	200		\$12.00	\$2,400		
1	1	5	1	Breach Dam	Excavate, load, haul and place breach material	72,500		\$3.75	\$271,875		
1	1	6 6	1	Create Channel	Excavate channel	3900 1300		\$3.69 \$4.41	\$14,382		
1	1	ь 6	2		Supply and place geotextile Liner Bedding Layer: Screen and stockpile	500		\$4.41 \$7.73	\$5,735 \$3,865		
1	1	6	3		Bedding Layer: Load, haul, dump and place	500		\$7.73	\$2,890		
1	1	6	5		Rip-Rap: Drill, blast and stockpile	4600		\$23.86	\$109,740		
1	1	6	6		Rip-Rap: Screen and stockpile	4600		\$15.46	\$71,122		
1	1	6	7		Load Haul and Dump Rip-Rap	4600	m3	\$5.03	\$23,138		
1	1	6	8		Place and secure Rip-Rap	4600		\$4.69	\$21,564		
1	1	7	1	Revegetate Dam footprint and impoundr	nent Seed and fertilize	214,983	m2	\$0.45	\$96,742		
ach Intermedia										\$538,255	
1	2	1	1	Prepare Soil Area	Clear and Grub Prepare access roads	1000 300		\$2.08 \$12.00	\$2,084.28 \$3.600.00		
1	2	1 2	2	Breach Dam	Prepare access roads Excavate, load, haul and dump breach material	300 72,500		\$12.00 \$3.75	\$3,600.00 \$271,875.00		
1	2	2	1	Create Channel	Excavate, load, haul and dump breach material	72,500 5,200		\$3.75 \$3.69	\$19,176.40		
1	2	3	2	Groate Ontainer	Supply and place geotextile Liner	1,300		\$3.69	\$5,734.72		
1	2	3	3		Bedding Layer: Screen and stockpile	500		\$7.73	\$3,865.30		
1	2	3	4		Bedding Layer: Load, haul, dump and place	500		\$5.78	\$2,890.00		
1	2	3	5		Rip-Rap: Drill, blast and stockpile	4,600	m3	\$23.86	\$109,740.36		
1	2	3	6		Rip-Rap: Screen and stockpile	4,600		\$15.46	\$71,121.52		
1	2	3	7		Load Haul and Dump Rip-Rap	4,600		\$5.03	\$23,138.00		
1	2	3	8		Place and secure Rip-Rap	4,600		\$4.69	\$21,564.34		
1	2	4	1	Revegetate disturbed areas	Seed and Fertilize breach slopes	7700	m2	\$0.45	\$3,465.00	\$6,212,005	
condary Dam	3	1	1	Ground Densification (East Limb)	Gravel: supply and stockpile locally	2,339	m2	\$7.73	\$18,079.87	\$6,212,005	
1	3	1	2	Ground Densilication (East Eimb)	Gravel: load , haul, place (3km)	2,339		\$5.45	\$12,746.14		
1	3	1	3		Drill vibro-replacement stone columns	26,800		\$25.00	\$670.000.00		
1	3	1	4		Verification testing	1		\$50,000	\$50,000.00		
1	3	2	1	Ground Densification (West Limb)	Construct Workpad	88,075	m3	\$6.82	\$600,671.50		
1	3	2	2		Gravel: supply and stockpile locally	15,963		\$7.73	\$123,405.25		
1	3	2	3		Gravel: load , haul, place (3km)	15,963		\$7.14	\$113,977.37		
1	3	2	4		Drill vibro-replacement stone columns	182,925		\$25.00	\$4,573,125.00		
1	3	2	5		Verification testing	1	ls	\$50,000	\$50,000.00		
ubtotal Direct	CT COSTS -	- Dam	5							\$8,995,010	
ilings											
mp Intermediat 2	ate Tailings	s to Fai	o Pit	Hydraulic monitoring system	Pumps: Supply and intall Vertical Turbine Pump	2	ea.	\$100,000	\$300,000.00	\$95,626,993	
2	1	1	2	Thydraulic monitoring system	Pipelines: Supply and Install piping system		ls	\$1.763.669	\$1,763,669.29	10	CD003.041
2	1	1	3		Hydraulic Monitors: Supply and Install		ls	\$1,255,000	\$1,255,000.00	i c	50003.041
2	1	1	4		Mobile Equipment: Purchase		ls	\$1,020,000	\$1,020,000.00		
2	1	1	5		Supply Power		ls	\$100,000	\$100.000.00		
2	1	2	1	Slurry Pumping System	Pumps and Support: Supply and Install	1	ls	\$1,793,000	\$1,793,000.00		
2	1	2	2		Pipelines: Supply and Install	1	ls	\$3,299,200	\$3,299,199.69		
2	1	2	3		Supply Power		ls	\$500,000	\$500,000.00		
2					Durahase Lime and energie lime addition surface	004 500	tonnes	e000 00	REC 040 400		
2	1	4 4	4 1	Tailings relocation operation	Purchase Lime and operate lime addition system Operate hydraulic monitoring system	201,568		\$282.00	\$56,842,106 \$15,686,533.80		
2	1	4	2	ганнуз теюсаноп ореганоп	Operate nydraulic monitoring system Operate slurry pumping system	5.2 5.2			\$12,567,484.60		
2	1	4	4		Purchase Lime and operate lime addition system	5.2		ψ2,710,024	\$12,567,484.60		
	1	4	5		System decommissioning and removal	1		\$500,000.00	\$500,000.00		
2	ninatod m	aterial (	o Faro Pit		· · ·					\$10,574,943	
2	minateu ma	1	1	Truck contaminated soils to Faro Pit	Construct local access roads	2000		\$12.00	\$24,000.00		
2 cavate comtam 2	2		2		Load, haul, dump remaining contaminated material to Faro Pit	2,018,660			\$10,254,792.80		
2 cavate comtam 2 2	2 2	1			Regrade stripped areas for drainage	1,009,330	m2	\$0.29	\$296,150.59		se remaining dam materials for fill where necessary
2 cavate comtam 2 2 2 2	2 2 2	1	3		· · · ·			\$0.40	\$403,732.00	\$454,199	
2 cavate comtam 2 2 2 vegetate Intern	2 2 2 mediate Ta	1 ailings	3	Deve getete dieturk - d	Poord	1 000 000					
cavate comtam 2 2 2 vegetate Intern 2	2 2 mediate Ta 3	1 ailings 1	1	Revegetate disturbed areas	Seed Fertilize	1,009,330					
2 cavate comtam 2 2 2 evegetate Intern 2 2	2 2 mediate Ta 3 3	1 ailings	3 1 2	Revegetate disturbed areas	Seed Fertilize	1,009,330 1,009,330		\$0.40	\$50,466.50	\$6,628,768	
2 ccavate comtam 2 2 2 evegetate Intern 2 2	2 2 mediate Ta 3 3	1 ailings 1	1	-	Seed Fertilize Upgrade road from tailings area to waste rock source		m2			\$6,628,768	
2 ccavate comtam 2 2 2 evegetate Interm 2 2 ccondary Tailing	2 2 mediate Ta 3 3 ugs Cover	1 ailings 1 1	1	Upgrade Roads	Fertilize	1,009,330 935 1,000	m2 m m	\$0.05	\$50,466.50 \$187,000.00 \$12,000.00	\$6,628,768	
2 xcavate comtam 2 2 2 evegetate Intern 2 econdary Tailing 2 2 2 2 2 2	2 2 mediate Ta 3 ags Cover 4 4	1 ailings 1 1 1 1 2	1 2 1 2 1	-	Fertilize Upgrade road from tailings area to waste rock source Construct new access road where necessary Load, haul, and place waste rock	1,009,330 935 1,000 187,075	m2 m m3	\$0.05 \$200.00 \$12.00 \$5.03	\$50,466.50 \$187,000.00 \$12,000.00 \$940,987.25	\$6,628,768	
z xcavate comtam 2 z z evegetate Intern 2 acondary Tailing 2 z 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 mediate Ta 3 ogs Cover 4 4 4	1 ailings 1 1 1 1 2 2	1 2 1 2 1 2	Upgrade Roads Cover Tailings	Fertilize Upgrade road from tailings area to waste rock source Construct new accesss road where necessary Load, haul, and place waste rock Load, haul, and place Til	1,009,330 935 1,000 187,075 374,150	m2 m m3 m3	\$0.05 \$200.00 \$12.00 \$5.03 \$14.22	\$50,466.50 \$187,000.00 \$12,000.00 \$940,987.25 \$5,320,413.00	\$6,628,768	
ccavate comtam 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 mediate Ta 3 ogs Cover 4 4 4 4	1 ailings 1 1 1 1 2 2 3	1 2 1 2 1 2 1	Upgrade Roads	Fertilize Upgrade road from tailings area to waste rock source Construct new acccess road where necessary Load, haul, and place waste rock Load, haul, and place Till Seed	1,009,330 935 1,000 187,075 374,150 374,150	m2 m m3 m3 m2	\$0.05 \$200.00 \$12.00 \$5.03 \$14.22 \$0.40	\$50,466.50 \$187,000.00 \$12,000.00 \$940,987.25 \$5,320,413.00 \$149,660.00	\$6,628,768	
2 cavate comtam 2 2 vegetate Intern 2 2 condary Talling 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 mediate Ta 3 ogs Cover 4 4 4 4 4 4 4 4	1 ailings 1 1 1 1 2 2 3 3 3	1 2 1 2 1 2 1 2 1 2	Upgrade Roads Cover Tailings	Fertilize Upgrade road from tailings area to waste rock source Construct new accesss road where necessary Load, haul, and place waste rock Load, haul, and place Til	1,009,330 935 1,000 187,075 374,150	m2 m m3 m3 m2	\$0.05 \$200.00 \$12.00 \$5.03 \$14.22	\$50,466.50 \$187,000.00 \$12,000.00 \$940,987.25 \$5,320,413.00		
avate comtam 2 2 egetate Intern 2 2 ondary Tailing 2 2 2 2 2 2 2 2 2 2 2	2 2 mediate Ta 3 ogs Cover 4 4 4 4 4 4 4 4	1 ailings 1 1 1 1 2 2 3 3 3	1 2 1 2 1 2 1 2 1 2	Upgrade Roads Cover Tailings	Fertilize Upgrade road from tailings area to waste rock source Construct new acccess road where necessary Load, haul, and place waste rock Load, haul, and place Till Seed	1,009,330 935 1,000 187,075 374,150 374,150	m2 m m3 m3 m2	\$0.05 \$200.00 \$12.00 \$5.03 \$14.22 \$0.40	\$50,466.50 \$187,000.00 \$12,000.00 \$940,987.25 \$5,320,413.00 \$149,660.00	\$6,628,768 \$113,284,903	

### Faro Primary Alternative Cost Estimates

3 1 1 1	Clear and Grub	Dozer: D10R/N	25,000 m2	\$2.08	\$52,106.91	
3 1 2 1	Excavate Channel	Bulk excavate soil (dump locally)	143,721 m3	\$3.69	\$530,009.99	
3 1 2 2		Rock excavation: Drill, blast, muck, load haul dump (locally)	110,900 m3	\$23.33	\$2,586,958.76	
3 1 3 1	Place bedding Layer	Bedding: Produce and stockpile	24,421 m3	\$7.73	\$188,788.98	
3 1 3 2	<b>3</b> , <b>,</b>	Bedding: load , haul, place and compact	24,421 m3	\$11.65	\$284,504.65	
3 1 4 1	Place HDPE Liner	Supply and place HDPE Liner	46,311 m3	\$21.57	\$998,703.33	
3 1 5 1	Place Rip-Rap	Rip-Rap: Screen and stockpile (from locally blasted material)	28,490 m3	\$15.46	\$440,489.59	
3 1 5 2	Tiade Rip-Rap	Load, haul, dump and place Rip-Rap	28,490 m3		\$1,083,759.60	
estore Lower Portion Rose Creek		Load, nadi, dump and place Rip-Rap	20,490 1113	\$30.0 <del>4</del>	\$1,003,735.00	\$0
3 1 2 1	Maintain antira DCDC	Maintain BCDC during paried of tailings releastion and groundwater elegance	1 10	£0.00	£0.00	40
	Maintain entire RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1 ls	\$0.00	\$0.00	
0 1 0 1	Redirect flow into thalweg	Breach RCDC downstream of Secondary Dam			\$0.00	
3 1 3 2		Breach diversion where stream enter from south			\$0.00	
3 1 3 3		Regrade channel and dykes to create stable slopes			\$0.00	
3 1 4 1	Fish habitat enhancement	Install riffles along restored channel			\$0.00	
3 1 4 2		Excavate pools			\$0.00	
3 1 5 1	Reclamation	Plant willows along restored stream channel			\$0.00	
orth Fork Rock Drain						\$2,182,829
3 2 1 1	Construct Ramp up to haul road	Excavate and doze WR material	22,500 m3	\$6.82	\$153,450.00	
3 2 1 2		Grade Road	15,000 m2	\$0.29	\$4,401.20	
3 2 2 1	Breach Drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357 m3	\$4.16	\$1,923,403.73	
3 2 3 1	Create Channel	Excavate channel	6.104 m3	\$3.69	\$22,510.15	
3 2 3 2		Supply and place geotextile	3,924 m2	\$4.41	\$17,310.02	
3 2 3 3		Bedding Layer: Screen and stockpile	1,177 m3	\$7.73	\$9,100.46	
3 2 3 4		Bedding Layer: Load, haul, dump and place	1,177 m3	\$3.75	\$4,414.50	
3 2 3 6		Rip-Rap: Screen and stockpile (from NFRD)	1.962 m3	\$15.46	\$30,334.87	
3 2 3 7		Load Haul and Dump Rip-Rap	1,962 m3	\$3.69	\$7,235.40	
3 2 3 8		Place and secure Rip-Rap	1,962 m3	\$4.69	\$9,197.66	
3 2 4 1	Revegetate disturbed areas	Seed and Fertilize	3270 m2	\$0.45	\$9,197.66	
	Nevegetate disturbed aleas	Cood and r CruitZC	3270 112	φ <b>0.4</b> 5	φ1,471.5U	\$0.040.4F4
ubtotal Direct Costs - Rose Creek						\$8,348,151
roundwater						
llect groundwater below Secondary Dam						\$264,720
4 1 1 1	Place Manhole	Excavate sump for manholes	32 m3	\$3.69	\$118	
4 1 1 2		Supply and place Precast concrete manhole	1 ea.	\$1,863.00	\$1,863	
4 1 1 3		Install Primary pump	1 ea.	\$1,503.00	\$1,503	
4 1 1 4		Provide power to pumping system	2,666 m	\$2.53	\$6,745	
4 1 2 1	Groundwater Wells	Drill Well	5 ea.	\$1,906.43	\$9,532	
4 1 2 2	Ciouldwater Wells	Install 4" PVC Well	100 m	\$100.00	\$10,000	
4 1 2 3		Install Pump in well	5 ea.	\$2,629.00	\$13,145	
4 1 2 4		Supply Power	2,666 m	\$2.53	\$6,745	
4 1 2 4	Piping system	Excavate Piping Trench	15,996 m3	\$3.69	\$58,990	
4 1 3 2	Fipling System					
4 1 3 2		Supply and place 150mm PVC pipe	2,666 m 2.666 m	\$15.50 \$7.87	\$41,323 \$20.981	
		Supply and install heat trace through piping				
4 1 3 4		Produce and stockpile (screen) bedding layer	1,040 m3	\$7.73	\$8,038	
4 1 3 5		Load, haul, place and compact bedding layer	1,040 m3	\$7.13	\$7,413	
4 1 3 6		Backfill ditches	15,996 m3	\$4.90	\$78,324	
daptive Management						\$0
4 2 1 1	Adaptive management Phase 1	Install multiple shallow extraction and monitoring wells			\$0.00	Assume first 3 years after footprint cleanup
4 2 1 2		Operate seasonal groudwater extraction			\$0.00	
4 2 1 3		Treatment extracted water in mine area treatment plant			\$0.00	
4 2 2 1	Adaptive management Phase 2	Relocate or install additional extraction and monitoring wells			\$0.00	Assume years 4-10 after footprint cleanup
4 2 2 2		Operate seasonal groudwater extraction			\$0.00	
4 2 2 3		Treatment extracted water in mine area treatment plant			\$0.00	
4 2 3 1	Adaptive management Phase 3	Relocate or install additional extraction and monitoring wells			\$0.00	Assume years 11-20 after footprint cleanup
4 2 3 2		Operate seasonal groudwater extraction			\$0.00	······································
4 2 3 3		Treatment extracted water in mine area treatment plant			\$0.00	
ubtotal Direct Costs - Groundwater						\$264,720
						¥2V7,12V
liscellaneous						<b>A</b> ( ) ( )
eclaim unnecssary roads				<b>6</b> 0.7-	<b>A I I I I I I I I I I</b>	\$4,460
6 1 1 1	Reclaim unnecssary roads	Scarify road surfaces	6,000 m2	\$0.29	\$1,760.48	
6 1 1 2		Seed and fertilize	6,000 m2	\$0.45	\$2,700.00	
ubtotal Direct Costs - Miscellaneous						\$4,460
ubtotal Direct Costs					-	
	Subtotal direct costs					\$130,897,244
	Gubiotal UIIEGE CUSIS					\$100,001,ETT
						•• ••• •••
LOSURE COSTS - INDIRECT	Project Management	2.5% of direct costs	\$ 130,897,244 x	2.5%		\$3,272,431
100 100 1 1						\$0
100 100 1 1 100 100 2 1	Field Supervision	(included in major tasks)				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead	10% of direct costs	\$ 130,897,244 x	10.0%		\$13,089,724
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance	10% of direct costs 0.5% of direct costs	\$ 130,897,244 x	0.5%		\$654,486
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding	10% of direct costs 0.5% of direct costs 0.5% of direct costs	\$ 130,897,244 x \$ 130,897,244 x	0.5% 0.5%		\$654,486 \$654,486
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA	10% of direct costs 0.5% of direct costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x	0.5% 0.5% 15.0%		\$654,486 \$654,486 \$19,634,587
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs	\$ 130,897,244 x \$ 130,897,244 x	0.5% 0.5%		\$654,486 \$654,486 \$19,634,587 \$500,000
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs)	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump	0.5% 0.5% 15.0% \$500,000		\$654,486 \$654,486 \$19,634,587 \$500,000 \$0
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x	0.5% 0.5% 15.0%		\$654,486 \$654,486 \$19,634,587 \$500,000
	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs)	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump	0.5% 0.5% 15.0% \$500,000		\$654,486 \$654,486 \$19,634,587 \$500,000 \$0
	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs)	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump	0.5% 0.5% 15.0% \$500,000		\$654.486 \$654.486 \$19.634.587 \$500,000 \$0 \$9,976,646
100         100         1         1           100         100         2         1           100         100         3         1           100         100         4         1           100         100         5         1           100         100         6         1           100         100         8         1           100         100         9         1           ubtotal Indirect Costs	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs)	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump	0.5% 0.5% 15.0% \$500,000		\$654,486 \$654,486 \$19,634,587 \$500,000 \$0
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes Subtotal indirect costs	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs) 7% of taxable direct and indirect costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump \$ 142,523,509 x	0.5% 0.5% 15.0% \$500,000 7.0%		\$654.486 \$654.486 \$19.634.587 \$500.000 \$0 \$9.976.646 \$47,782,360
100         100         1         1           100         100         2         1           100         100         3         1           100         100         4         1           100         100         5         1           100         100         6         1           100         100         7         1           100         100         8         1           100         100         9         1	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs)	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump	0.5% 0.5% 15.0% \$500,000		\$654.486 \$654.486 \$19.634.587 \$500,000 \$0 \$9,976,646
100       100       1       1         100       100       2       1         100       100       3       1         100       100       4       1         100       100       5       1         100       100       6       1         100       100       6       1         100       100       8       1         100       100       9       1         ubtotal Indirect Costs	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes Subtotal indirect costs	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs) 7% of taxable direct and indirect costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump \$ 142,523,509 x	0.5% 0.5% 15.0% \$500,000 7.0%		\$654.486 \$654.486 \$19.634.587 \$500.000 \$0 \$9.976.646 \$47,782,360
100         100         1         1           100         100         2         1           100         100         3         1           100         100         4         1           100         100         5         1           100         100         6         1           100         100         7         1           100         100         8         1           100         100         9         1           botcal Indirect Costs	Field Supervision Contractor pofit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes Subtotal indirect costs Contingency	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs) 7% of taxable direct and indirect costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump \$ 142,523,509 x	0.5% 0.5% 15.0% \$500,000 7.0%		\$654,486 \$654,486 \$19,634,587 \$500,000 \$0 \$9,976,646 \$47,782,360 \$26,179,449
100 100 1 1 100 100 2 1 100 100 3 1 100 100 4 1 100 100 5 1 100 100 6 1 100 100 7 1 100 100 8 1 100 100 9 1 total Indirect Costs	Field Supervision Contractor profit and home office overhead Insurance Bonding Field Engineering and QA Mob - Demob Living out allowances Taxes Subtotal indirect costs	10% of direct costs 0.5% of direct costs 0.5% of direct costs 15% of direct costs (included in heavy equipment costs) 7% of taxable direct and indirect costs	\$ 130,897,244 x \$ 130,897,244 x \$ 130,897,244 x 1 lump \$ 142,523,509 x	0.5% 0.5% 15.0% \$500,000 7.0%		\$654.486 \$654.486 \$19.634.587 \$500.000 \$0 \$9.976,646 \$47,782,360

Attachment B Water and Load Balance Calculations – Primary Alternatives

# Primary Alternative Base Case Runs

Frinary	Allemative base case Run	15								
	Component	Variants	Method	Orig Footprint (ha)	Increase (%)	Resloped / Final Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltration (mm or % of MAP)	Collection Efficiency
Faro Mine	Area									
FM01 FI	ow-through Faro Pit									
	Faro Creek		direct into pit			1549		341		
	Faro Valley Dumps	Cover in Situ	Rudimentary Cover, seepage to pit	18.0	8%	19.5	400	341	20%	100%
	Low Grade Ore / Oxide Fines	Consolidate and cover	Very Low Infil Cover; seepage to pit	6.8	8%	7.4	400	341	0.5%	100%
	Sulphide Cells Waste Rock Dumps		Low Infil Cover; seepage collection Rudimentary Cover, seepage to pit	20.4 281.3	0% 8%	20.4 303.8	400 400	341 341	5% 20%	90% 90%
	Zone II Pit	Pump to Faro Pit	Rudimentary Cover, seepage to pit	23.0	0%	23.0	400	341	20%	90%
	Emergency Tailings Area		Relocate to pit Lime amended							98%
	Faro Pit	Biological treatment	Flow-through			1720	400	341		100%
	Treatment Plant	Zone II Variant	Lime treatment - contingency							
FM02 In	proved Faro Creek Diversion									
	Faro Creek		Reroute to the west			1549	400	341		
	Faro Valley Dumps	Cover in Situ	Rudimentary Cover, seepage to pit	18.0	8%	19.5	400	341	20%	100%
	Low Grade Ore / Oxide Fines	Consolidate and cover	Very Low Infil Cover; seepage collection	6.8	8%	7.4	400	341	0.5%	90%
	Sulphide Cells Waste Rock Dumps		Low Infil Cover; seepage collection Rudimentary Cover, seepage to pit	20.4 281.3	1% 8%	20.7 303.8	400 400	341 341	5% 20%	90% 90%
	Zone II Pit	Pump to Faro Pit	Rudimentary Cover, seepage to pit	23.0	1%	23.3	400	341	20%	90%
	Emergency Tailings Area		Relocate to pit Lime amended							98%
	Faro Pit	Seepage Storage	Isolated pit			171		341		100%
	Treatment Plant	U/S of RC Tailings Deposit	Lime treatment of Seepage							

# Primary Alternative Base Case Runs

	Component	Variants	Method	Orig Footprint (ha)	Increase (%)	Resloped / Final Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltration (mm or % of MAP)	Collection Efficiency
Rose Creek	Tailings									
RCT01 Stat	bilize Current Situation									
	Original Tailings Secondary Tailings Intermediate Tailings		Waste Rock and Til Cover - 40 mm infiltratio Waste Rock and Til Cover - 40 mm infiltratio Waste Rock and Til Cover - 40 mm infiltratio	n		38.6 57 76.8	400 400 400	341 341 341	45% 45% 45%	98% 98% 98%
	Lime Treatment	U/S of RC Tailings Deposit								
RCT02 Con	nplete Tailings Relocation									
	Original Tailings Secondary Tailings Intermediate Tailings		Lime amend & relocate Lime amend & relocate Lime amend & relocate		Cont	aminated groundwater	only			
	Lime Treatment	U/S of RC Tailings Deposit								
RCT03 Part	ial Tailings Relocation									
	Original Tailings Secondary Tailings Intermediate Tailings		Waste Rock and Til Cover - 40 mm infiltratio Waste Rock and Til Cover - 40 mm infiltratio Lime amend & relocate - separate treatment	n		38.6 57	400 400	341 341	45% 45%	98% 98%
	Lime Treatment	U/S of RC Tailings Deposit								

# Primary Alternative Base Case Runs

		Component	Variants	Method	Orig Footprint (ha)	Increase (%)	Resloped / Final Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltration (mm or % of MAP)	Collection Efficiency
Vango	rda / G	rum Mine Area									
VG01	Vang	orda Pit Backfill									
		Grum Pit		Biological treatment			150		270		100%
		Ore Transfer Pad Grum Waste Dump Sulphide Cell		Rudimentary Cover, seepage to Grum pit Rudimentary Cover, seepage to Grum pit Low Infil Cover; seepage to Grum	12.9 128.1 21.2	8% 3% 1%	13.8 132.1 21.5	450 450 450	270 270 270	20% 20% 5%	90% 90% 90%
		Vangorda Creek		Flow across pit							
		Vangorda Pit		Backfilled with lime added; low infiltration cor	ver; seepage to	Grum	60	380	362	5%	98%
		Vangorda Waste Dump Oxide fines		Backfilled Backfilled							
VG02	Stabi	lize Current Situation									
		Grum Pit		Biological treatment			150		341		100%
		Ore Transfer Pad Grum Waste Dump Sulphide Cell		Rudimentary Cover; seepge to Grum pit Rudimentary Cover; seepge to Grum pit Low Infil Cover; seepage collected	12.9 128.1 21.2	8% 3% 1%	13.8 132.1 21.5	400 400 400	341 341 341	20% 20% 5%	90% 90% 90%
		Vangorda Creek		Diverted around pit							
		Vangorda Pit		Pump and treat			60	380	362	5%	100%
		Vangorda Waste Dump Oxide fines		Low Infil Cover; seepage collection Low Infil Cover; seepage collection	50.415 4.18	8% 1%	54.4 4.2	400 400	341 341	5% 5%	90% 90%
		Water Treatment		HDS at Vangorda Pit							

## Summary of water quality estimates at X14 for combinations of alternatives

"Future 1" Chemistry																		
		Ag	AI	As	Ca	Cd	CI	Co	Cu	Fe	К	Mg	Mn	Na	Ni	Pb	SO4	Zn
Mine Area Alternative	Tailings Alternative																	
1 Flow-Through Pit	1 Stabilize In Place	0.00	0.05	0.003	3.582	0.002	0.004	0.002	0.015	0.68	3.32	1.06	0.03	7.45	0.01	0.01	50.12	0.55
1 Flow-Through Pit	2 Complete Relocation	0.00	0.05	0.002	9.384	0.002	0.004	0.002	0.013	0.58	2.08	2.33	0.03	4.71	0.01	0.01	49.65	0.37
1 Flow-Through Pit	3 Partial Relocation	0.00	0.05	0.002	7.499	0.002	0.004	0.002	0.014	0.61	2.27	1.92	0.03	5.14	0.01	0.01	41.59	0.54
2 Upgrade Faro Creek Diversion	1 Stabilize In Place	0.00	0.04	0.003	8.889	0.003	0.002	0.003	0.012	0.61	4.47	6.12	0.03	10.01	0.01	0.01	89.47	0.27
2 Upgrade Faro Creek Diversion	2 Complete Relocation	0.00	0.04	0.002	14.691	0.002	0.002	0.002	0.010	0.51	3.23	7.39	0.03	7.27	0.01	0.01	89.00	0.09
2 Upgrade Faro Creek Diversion	3 Partial Relocation	0.00	0.04	0.002	12.807	0.002	0.002	0.002	0.011	0.55	3.42	6.98	0.03	7.69	0.01	0.01	80.95	0.26
"Future 2" Chemistry																		
		Ag	AI	As	Ca	Cd	CI	Co	Cu	Fe	К	Mg	Mn	Na	Ni	Pb	SO4	Zn
Mine Area Alternative	Tailings Alternative																	
1 Flow-Through Pit	1 Stabilize In Place	0.00	0.08	0.003	4.638	0.003	0.015	0.003	0.023	1.07	3.34	1.67	0.07	7.57	0.01	0.01	69.78	0.85
1 Flow-Through Pit	2 Complete Relocation	0.00	0.07	0.003	9.691	0.002	0.015	0.002	0.017	0.73	2.09	2.76	0.06	4.83	0.01	0.01	52.73	0.56
1 Flow-Through Pit	3 Partial Relocation	0.00	0.08	0.003	8.376	0.002	0.015	0.002	0.020	0.95	2.29	2.49	0.06	5.25	0.01	0.01	58.36	0.81
2 Upgrade Faro Creek Diversion	1 Stabilize In Place	0.00	0.06	0.003	13.655	0.003	0.006	0.003	0.017	0.90	4.47	11.95	0.04	10.06	0.01	0.01	142.56	0.46
2 Upgrade Faro Creek Diversion	2 Complete Relocation	0.00	0.05	0.002	18.7078	0.0021	0.0056	0.0023	0.011	0.56	3.23	13.03	0.04	7.32	0.01	0.01	125.51	0.16
2 Upgrade Faro Creek Diversion	3 Partial Relocation	0.00	0.06	0.003	17.393	0.002	0.006	0.003	0.015	0.78	3.43	12.76	0.04	7.75	0.01	0.01	131.14	0.41
"Future 3" Chemistry					0	0.1	0	0	0	-					NP.	5	004	-
Mine Area Alternative		Ag	AI	As	Ca	Cd	CI	Co	Cu	Fe	к	Mg	Mn	Na	Ni	Pb	SO4	Zn
	Tailings Alternative 1 Stabilize In Place	0.00	4.00	0.05	45 474	0.000	0.000	0.000	4.0	F7 40	0.07	40.00	7.04	0.00	0.00	0.00	400.07	<b>F7</b> 0
1 Flow-Through Pit	2 Complete Relocation	0.00	4.33 4.24	0.25 0.25	15.171 15.615	0.080 0.079	2.896 2.896	0.092 0.090	1.6 1.6	57.43 55.58	3.97 2.73	19.20 19.15	7.84 7.82	8.60 5.86	0.08 0.08	0.03 0.03	496.87 355.95	57.3 56.6
1 Flow-Through Pit 1 Flow-Through Pit	3 Partial Relocation	0.00 0.00	4.24	0.25	17.699	0.079	2.896	0.090	1.6	55.58 56.91	2.73	19.15	7.84	6.28	0.08	0.03	451.13	56.6
2 Upgrade Faro Creek Diversion	1 Stabilize In Place	0.00	0.34	0.25	19.888	0.080	2.890	0.091	0.11	5.12	4.50	27.57	0.43	10.06	0.08	0.03	451.13 511.50	3.6
2 Upgrade Faro Creek Diversion	2 Complete Relocation	0.00	0.34	0.015	20.331	0.007	0.143	0.008	0.09	3.26	4.50 3.25	27.57	0.43	7.32	0.02	0.01	370.58	2.9
2 Upgrade Faro Creek Diversion	3 Partial Relocation	0.00	0.25	0.015	20.331	0.006	0.143	0.007	0.09	3.20 4.60	3.45	27.52	0.41	7.74	0.01	0.01	465.76	2.9
2 Opgrade Fail Creek Diversion	3 Faria Nelocation	0.00	0.32	0.015	22.415	0.000	0.145	0.007	0.11	4.00	3.45	20.00	0.42	1.14	0.01	0.01	403.76	5.5

Mine Area Flow-through Pit + Tailings Stabilize in Place											
Summary Wa	ter Quality	Bkgd	0.0010	0.0050	0.0011	0.0017	0.0256				
Conditions	FUTURE 1	CCME	0.005	0.002	0.025	0.001	0.03				
Loc X2											
	Flows		As	Cu	Ni	Pb	Zn				
	(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L				
Jan	553		0.0010	0.0048	0.0011	0.0016	0.0418				
Feb	403		0.0010	0.0048	0.0011	0.0016	0.0457				
Mar	407		0.0010	0.0048	0.0012	0.0016	0.0513				
Apr	784		0.0010	0.0050	0.0012	0.0017	0.0443				
May	6991		0.0010	0.0049	0.0011	0.0017	0.0278				
Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0283				
Jul	5013		0.0010	0.0049	0.0011	0.0017	0.0289				
Aug	3506		0.0010	0.0049	0.0011	0.0017	0.0288				
Sep	4720		0.0010	0.0049	0.0011	0.0017	0.0281				
Oct	2460		0.0010	0.0048	0.0011	0.0016	0.0292				
Nov	1115		0.0010	0.0048	0.0011	0.0016	0.0340				
Dec	821		0.0010	0.0049	0.0011	0.0017	0.0379				
Total	33964										

L	.oc X14						
		Flows	As	Cu	Ni	Pb	Zn
		(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1192	0.0024	0.0112	0.0082	0.0082	0.4177
	Feb	912	0.0027	0.0131	0.0098	0.0097	0.4909
	Mar	981	0.0028	0.0151	0.0105	0.0102	0.5452
	Apr	1784	0.0021	0.0115	0.0062	0.0063	0.3506
	May	14480	0.0011	0.0059	0.0017	0.0022	0.1602
	Jun	14796	0.0015	0.0059	0.0040	0.0045	0.2589
	Jul	10302	0.0017	0.0061	0.0053	0.0057	0.0771
	Aug	7268	0.0020	0.0063	0.0067	0.0071	0.0863
	Sep	9748	0.0017	0.0060	0.0053	0.0058	0.0722
	Oct	5108	0.0013	0.0067	0.0028	0.0032	0.1683
	Nov	2303	0.0017	0.0081	0.0047	0.0050	0.2587
	Dec	1705	0.0020	0.0092	0.0060	0.0063	0.3230
	Total	70579					

Loc Mouth of	f Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0020	0.0095	0.0064	0.0065	0.3038
Feb	1230	0.0022	0.0110	0.0076	0.0076	0.3594
Mar	1301	0.0024	0.0125	0.0081	0.0081	0.4039
Apr	2402	0.0018	0.0098	0.0048	0.0050	0.2605
May	19992	0.0011	0.0056	0.0015	0.0021	0.1211
Jun	20466	0.0014	0.0056	0.0032	0.0037	0.1954
Jul	14254	0.0015	0.0058	0.0041	0.0046	0.0633
Aug	10032	0.0017	0.0060	0.0053	0.0057	0.0704
Sep	13469	0.0015	0.0057	0.0042	0.0047	0.0597
Oct	7047	0.0012	0.0062	0.0023	0.0028	0.1271
Nov	3181	0.0015	0.0073	0.0037	0.0041	0.1907
Dec	2352	0.0017	0.0080	0.0047	0.0050	0.2350
Total	97354					

Loc Mouth of Anvil Creek
Flows

LOC MOUTH OF ANVIE Creek											
	Flows	As	Cu	Ni	Pb	Zn					
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L					
Jan	4432	0.0014	0.0067	0.0031	0.0035	0.1228					
Feb	3272	0.0015	0.0072	0.0035	0.0039	0.1443					
Mar	3362	0.0015	0.0078	0.0037	0.0041	0.1633					
Apr	6375	0.0013	0.0067	0.0025	0.0029	0.1100					
May	55468	0.0010	0.0052	0.0013	0.0018	0.0588					
Jun	56957	0.0011	0.0052	0.0019	0.0024	0.0873					
Jul	39693	0.0012	0.0053	0.0022	0.0028	0.0394					
Aug	27824	0.0013	0.0054	0.0027	0.0032	0.0423					
Sep	37419	0.0012	0.0053	0.0022	0.0028	0.0381					
Oct	19528	0.0011	0.0054	0.0015	0.0021	0.0612					
Nov	8835	0.0012	0.0058	0.0020	0.0026	0.0830					
Dec	6515	0.0013	0.0061	0.0024	0.0029	0.0979					
Total	269678										

# Mine Area Flow-through Pit + Tailings Stabilize in Place Summary Tables Conditions FUTURE 2

Loc X2

LUCAZ						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0010	0.0055	0.0015	0.0018	0.1158
Feb	403	0.0011	0.0057	0.0016	0.0019	0.1369
Mar	407	0.0011	0.0060	0.0018	0.0019	0.1655
Apr	784	0.0011	0.0058	0.0016	0.0019	0.1239
May	6991	0.0010	0.0050	0.0012	0.0017	0.0384
Jun	7191	0.0010	0.0050	0.0012	0.0017	0.0415
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0450
Aug	3506	0.0010	0.0050	0.0012	0.0017	0.0456
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0410
Oct	2460	0.0010	0.0050	0.0012	0.0017	0.0481
Nov	1115	0.0010	0.0052	0.0013	0.0017	0.0744
Dec	821	0.0010	0.0054	0.0014	0.0018	0.0936
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0028	0.0162	0.0089	0.0086	0.6210
Feb	912	0.0031	0.0195	0.0106	0.0100	0.7458
Mar	981	0.0033	0.0228	0.0114	0.0107	0.8516
Apr	1784	0.0024	0.0165	0.0068	0.0066	0.5529
May	14480	0.0012	0.0065	0.0018	0.0023	0.1881
Jun	14796	0.0013	0.0154	0.0038	0.0033	0.8772
Jul	10302	0.0014	0.0156	0.0041	0.0036	0.6884
Aug	7268	0.0014	0.0160	0.0045	0.0040	0.6982
Sep	9748	0.0014	0.0159	0.0042	0.0037	0.7059
Oct	5108	0.0015	0.0172	0.0049	0.0043	0.8234
Nov	2303	0.0020	0.0201	0.0070	0.0062	0.9812
Dec	1705	0.0024	0.0221	0.0086	0.0076	1.0922
Total	70579					

L	.oc Mouth c	of Rose Creek					
		Flows	As	Cu	Ni	Pb	Zn
		(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1628	0.0023	0.0131	0.0068	0.0068	0.4484
	Feb	1230	0.0025	0.0155	0.0081	0.0079	0.5426
	Mar	1301	0.0027	0.0181	0.0088	0.0084	0.6270
	Apr	2402	0.0020	0.0134	0.0053	0.0053	0.4067
	May	19992	0.0011	0.0061	0.0016	0.0021	0.1409
	Jun	20466	0.0012	0.0125	0.0031	0.0029	0.6432
	Jul	14254	0.0013	0.0127	0.0033	0.0031	0.5060
	Aug	10032	0.0013	0.0130	0.0036	0.0034	0.5142
	Sep	13469	0.0013	0.0129	0.0033	0.0031	0.5195
	Oct	7047	0.0014	0.0138	0.0039	0.0036	0.6041
	Nov	3181	0.0017	0.0159	0.0054	0.0050	0.7147
	Dec	2352	0.0020	0.0173	0.0066	0.0060	0.7903
	Total	97354					

Loc Mouth of Anvil Creek									
Flows	As	Cu	Ni	Pb	Zn				
(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L				
4432	0.0015	0.0079	0.0032	0.0036	0.1736				
3272	0.0016	0.0088	0.0037	0.0040	0.2096				
3362	0.0016	0.0098	0.0040	0.0042	0.2446				
6375	0.0014	0.0080	0.0026	0.0030	0.1625				
55468	0.0010	0.0054	0.0013	0.0018	0.0658				
56957	0.0011	0.0077	0.0018	0.0021	0.2487				
39693	0.0011	0.0078	0.0019	0.0022	0.1989				
27824	0.0011	0.0079	0.0020	0.0023	0.2026				
37419	0.0011	0.0079	0.0019	0.0022	0.2043				
19528	0.0011	0.0082	0.0021	0.0024	0.2345				
8835	0.0013	0.0089	0.0027	0.0029	0.2722				
6515	0.0014	0.0094	0.0031	0.0033	0.2967				
269678									
	Flows (x 1000 m3) 4432 3272 3362 6375 55468 56957 39693 27824 37419 19528 8835 6515	Flows         As           (x 1000 m3)         mg/L           4432         0.0015           3272         0.0016           3362         0.0016           6375         0.0014           55468         0.0010           56957         0.0011           39693         0.0011           27824         0.0011           37419         0.0011           19528         0.0011           8835         0.0013           6515         0.0014	Flows         As         Cu           (x 1000 m3)         mg/L         mg/L           4432         0.0015         0.0079           3272         0.0016         0.0088           3362         0.0016         0.0088           6375         0.0014         0.0054           55468         0.0010         0.0054           56957         0.0011         0.0079           37419         0.0011         0.0079           19528         0.0011         0.0088           6515         0.0013         0.0089	Flows         As         Cu         Ni           (x 1000 m3)         mg/L         mg/L         mg/L           4432         0.0015         0.0079         0.0032           3272         0.0016         0.0088         0.0037           3362         0.0016         0.0080         0.0026           6375         0.0014         0.0054         0.013           56957         0.0011         0.0077         0.0018           39693         0.0011         0.0079         0.0020           37419         0.0011         0.0079         0.0021           19528         0.0011         0.0089         0.0021           8835         0.0013         0.0089         0.0027           6515         0.0014         0.0094         0.0031	Flows         As         Cu         Ni         Pb           (x 1000 m3)         mg/L         mg/L         mg/L         mg/L         mg/L           4432         0.0015         0.0079         0.0032         0.0036           3272         0.0016         0.0088         0.0037         0.0040           3362         0.0016         0.0088         0.0040         0.0042           6375         0.0014         0.0080         0.0026         0.0030           55468         0.0010         0.0054         0.0013         0.0018           56957         0.0011         0.0077         0.0018         0.0021           39693         0.0011         0.0079         0.0020         0.0022           27824         0.0011         0.0079         0.0020         0.0023           37419         0.0011         0.0079         0.0019         0.0022           19528         0.0011         0.0082         0.0021         0.0024           8835         0.0013         0.0089         0.0027         0.0029           6515         0.0014         0.0094         0.0031         0.0033				

Mine Area Flow-through Pit + Tailings Stabilize in Place Summary Tables Conditions FUTURE 3

Loc X2						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.1389	0.8515	0.0417	0.0138	32.2562
Feb	403	0.1706	1.0460	0.0510	0.0166	39.6618
Mar	407	0.2127	1.3044	0.0634	0.0204	49.4961
Apr	784	0.1494	0.9157	0.0448	0.0148	34.6955
May	6991	0.0210	0.1276	0.0070	0.0034	4.6957
Jun	7191	0.0259	0.1576	0.0084	0.0039	5.8362
Jul	5013	0.0312	0.1902	0.0100	0.0043	7.0796
Aug	3506	0.0326	0.1990	0.0104	0.0044	7.4151
Sep	4720	0.0253	0.1543	0.0082	0.0038	5.7124
Oct	2460	0.0365	0.2229	0.0115	0.0048	8.3259
Nov	1115	0.0768	0.4701	0.0234	0.0083	17.7377
Dec	821	0.1052	0.6447	0.0318	0.0109	24.3824
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.1832	1.1424	0.0614	0.0243	41.3070
Feb	912	0.2173	1.3592	0.0730	0.0288	49.1043
Mar	981	0.2535	1.5886	0.0843	0.0326	57.3437
Apr	1784	0.1790	1.1191	0.0582	0.0220	40.3769
May	14480	0.0263	0.1634	0.0091	0.0045	5.8542
Jun	14796	0.0405	0.2571	0.0143	0.0063	9.6184
Jul	10302	0.0466	0.2953	0.0164	0.0070	10.8040
Aug	7268	0.0480	0.3051	0.0171	0.0075	11.1377
Sep	9748	0.0402	0.2563	0.0146	0.0065	9.3933
Oct	5108	0.0533	0.3389	0.0192	0.0084	12.4306
Nov	2303	0.1026	0.6454	0.0355	0.0145	23.5751
Dec	1705	0.1398	0.8759	0.0478	0.0191	31.9604
Total	70579					

Loc Mouth o	f Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.1289	0.8038	0.0437	0.0178	29.0079
Feb	1230	0.1546	0.9668	0.0524	0.0212	34.8690
Mar	1301	0.1838	1.1520	0.0615	0.0242	41.5318
Apr	2402	0.1294	0.8088	0.0424	0.0164	29.1363
May	19992	0.0189	0.1171	0.0068	0.0037	4.1515
Jun	20466	0.0296	0.1877	0.0107	0.0050	6.9789
Jul	14254	0.0340	0.2152	0.0122	0.0056	7.8294
Aug	10032	0.0351	0.2226	0.0127	0.0059	8.0829
Sep	13469	0.0295	0.1872	0.0109	0.0052	6.8191
Oct	7047	0.0390	0.2473	0.0143	0.0066	9.0292
Nov	3181	0.0744	0.4674	0.0260	0.0110	17.0273
Dec	2352	0.1006	0.6301	0.0347	0.0143	22.9418
Total	97354					

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0448	0.2790	0.0159	0.0074	9.9606
Feb	3272	0.0546	0.3407	0.0192	0.0087	12.1812
Mar	3362	0.0669	0.4185	0.0230	0.0099	14.9810
Apr	6375	0.0470	0.2929	0.0159	0.0070	10.4489
May	55468	0.0072	0.0439	0.0031	0.0024	1.4582
Jun	56957	0.0113	0.0709	0.0046	0.0029	2.5350
Jul	39693	0.0129	0.0807	0.0051	0.0031	2.8366
Aug	27824	0.0133	0.0836	0.0053	0.0032	2.9351
Sep	37419	0.0113	0.0708	0.0046	0.0030	2.4794
Oct	19528	0.0147	0.0927	0.0059	0.0035	3.2823
Nov	8835	0.0273	0.1708	0.0100	0.0051	6.1205
Dec	6515	0.0363	0.2269	0.0131	0.0062	8.1591
Total	269678					

Mine Area Flow-through Pit + Tailings Complete Relocation									
Summary Wa	ter Quality	Bkgd	0.0010	0.0050	0.0011	0.0017	0.0256		
Conditions	FUTURE 1	CCME	0.005	0.002	0.025	0.001	0.03		
Loc X2									
	Flows		As	Cu	Ni	Pb	Zn		
	(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	553		0.0011	0.0051	0.0012	0.0017	0.0433		
Feb	403		0.0011	0.0051	0.0012	0.0017	0.0474		
Mar	407		0.0011	0.0051	0.0012	0.0017	0.0530		
Apr	784		0.0011	0.0051	0.0012	0.0017	0.0447		
May	6991		0.0010	0.0049	0.0011	0.0017	0.0278		
Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0282		
Jul	5013		0.0010	0.0049	0.0011	0.0017	0.0288		
Aug	3506		0.0010	0.0049	0.0011	0.0017	0.0289		
Sep	4720		0.0010	0.0049	0.0011	0.0017	0.0280		
Oct	2460		0.0010	0.0048	0.0011	0.0016	0.0291		
Nov	1115		0.0010	0.0048	0.0011	0.0016	0.0339		
Dec	821		0.0010	0.0048	0.0011	0.0016	0.0377		
Total	33964								

Flows	As	Cu	Ni	Pb	Zn
(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
1192	0.0019	0.0100	0.0051	0.0052	0.3141
912	0.0021	0.0115	0.0060	0.0060	0.3486
981	0.0022	0.0130	0.0063	0.0062	0.3671
1784	0.0017	0.0101	0.0038	0.0040	0.2442
14480	0.0011	0.0057	0.0014	0.0020	0.1460
14796	0.0015	0.0057	0.0037	0.0042	0.2455
10302	0.0017	0.0058	0.0048	0.0053	0.0604
7268	0.0019	0.0060	0.0062	0.0066	0.0616
9748	0.0017	0.0057	0.0049	0.0054	0.0544
5108	0.0012	0.0063	0.0020	0.0024	0.1364
2303	0.0014	0.0074	0.0030	0.0033	0.2072
1705	0.0016	0.0083	0.0037	0.0040	0.2592
70579					
	(x 1000 m3) 1192 912 981 1784 14480 14796 10302 7268 9748 5108 2303 1705	(x 1000 m3)         mg/L           1192         0.0019           912         0.0021           981         0.0022           1784         0.0017           14480         0.0011           14796         0.0015           10302         0.0017           7268         0.0019           9748         0.0017           5108         0.0012           2303         0.0014           1705         0.0016	(x 1000 m3)         mg/L         mg/L           1192         0.0019         0.0100           912         0.0021         0.0115           981         0.0022         0.0100           1784         0.0017         0.0101           14480         0.0011         0.0057           10302         0.0015         0.0057           10302         0.0017         0.0060           9748         0.0012         0.0060           9748         0.0012         0.0063           2303         0.0014         0.0074           1705         0.0016         0.0083	(x 1000 m3)         mg/L         mg/L         mg/L         mg/L           1192         0.0019         0.0100         0.0051           912         0.0021         0.0115         0.0063           981         0.0022         0.0130         0.0033           1784         0.0017         0.0101         0.0038           14480         0.0011         0.0057         0.0037           10302         0.0017         0.0058         0.0048           7268         0.0019         0.0060         0.0062           9748         0.0017         0.0057         0.0049           5108         0.0012         0.0063         0.0020           2303         0.0014         0.0074         0.0030           1705         0.0016         0.0083         0.0037	(x 1000 m3)         mg/L         mg/L         mg/L         mg/L         mg/L           1192         0.0019         0.0100         0.0051         0.0052           912         0.0021         0.0115         0.0063         0.0062           981         0.0022         0.0130         0.0033         0.0062           1784         0.0017         0.0101         0.0038         0.0040           14480         0.0011         0.0057         0.0037         0.0042           10302         0.0017         0.0058         0.0048         0.0053           7268         0.0019         0.0060         0.0062         0.0064           9748         0.0017         0.0057         0.0049         0.0054           5108         0.0012         0.0063         0.0020         0.0024           2303         0.0014         0.0074         0.0033         0.0033           1705         0.0016         0.0083         0.0037         0.0040

Loc Mouth of	Loc Mouth of Rose Creek									
	Flows	As	Cu	Ni	Pb	Zn				
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L				
Jan	1628	0.0016	0.0086	0.0040	0.0042	0.2273				
Feb	1230	0.0018	0.0097	0.0047	0.0048	0.2538				
Mar	1301	0.0018	0.0108	0.0049	0.0050	0.2714				
Apr	2402	0.0015	0.0087	0.0031	0.0034	0.1827				
May	19992	0.0011	0.0055	0.0013	0.0019	0.1108				
Jun	20466	0.0013	0.0055	0.0030	0.0035	0.1856				
Jul	14254	0.0015	0.0056	0.0039	0.0043	0.0512				
Aug	10032	0.0017	0.0057	0.0049	0.0053	0.0525				
Sep	13469	0.0015	0.0055	0.0039	0.0044	0.0469				
Oct	7047	0.0011	0.0059	0.0017	0.0022	0.1040				
Nov	3181	0.0013	0.0067	0.0025	0.0029	0.1531				
Dec	2352	0.0015	0.0073	0.0030	0.0034	0.1883				
Total	97354									

Loc Mouth of	Loc Mouth of Anvil Creek								
	Flows	As	Cu	Ni	Pb	Zn			
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L			
Jan	4432	0.0012	0.0063	0.0021	0.0026	0.0943			
Feb	3272	0.0013	0.0067	0.0024	0.0028	0.1046			
Mar	3362	0.0013	0.0071	0.0025	0.0029	0.1133			
Apr	6375	0.0012	0.0063	0.0018	0.0023	0.0814			
May	55468	0.0010	0.0052	0.0012	0.0018	0.0551			
Jun	56957	0.0011	0.0052	0.0018	0.0024	0.0838			
Jul	39693	0.0012	0.0052	0.0021	0.0027	0.0351			
Aug	27824	0.0012	0.0053	0.0025	0.0031	0.0358			
Sep	37419	0.0012	0.0052	0.0021	0.0027	0.0335			
Oct	19528	0.0010	0.0053	0.0013	0.0019	0.0528			
Nov	8835	0.0011	0.0056	0.0016	0.0021	0.0693			
Dec	6515	0.0012	0.0058	0.0018	0.0023	0.0807			
Total	269678								

# Mine Area Flow-through Pit + Tailings Complete Relocation Summary Tables Conditions FUTURE 2

Loc X2

LUCAL						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0011	0.0058	0.0016	0.0019	0.1173
Feb	403	0.0011	0.0060	0.0017	0.0020	0.1386
Mar	407	0.0012	0.0063	0.0018	0.0020	0.1672
Apr	784	0.0011	0.0059	0.0016	0.0019	0.1243
May	6991	0.0010	0.0050	0.0012	0.0017	0.0384
Jun	7191	0.0010	0.0050	0.0012	0.0017	0.0414
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0449
Aug	3506	0.0010	0.0051	0.0012	0.0017	0.0458
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0410
Oct	2460	0.0010	0.0050	0.0012	0.0017	0.0480
Nov	1115	0.0010	0.0052	0.0013	0.0017	0.0743
Dec	821	0.0010	0.0054	0.0014	0.0018	0.0934
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0022	0.0129	0.0057	0.0055	0.4497
Feb	912	0.0025	0.0149	0.0067	0.0063	0.5101
Mar	981	0.0026	0.0170	0.0072	0.0066	0.5564
Apr	1784	0.0020	0.0129	0.0044	0.0043	0.3768
May	14480	0.0011	0.0060	0.0015	0.0020	0.1647
Jun	14796	0.0013	0.0149	0.0035	0.0031	0.8550
Jul	10302	0.0013	0.0150	0.0037	0.0032	0.6608
Aug	7268	0.0013	0.0152	0.0039	0.0035	0.6573
Sep	9748	0.0013	0.0152	0.0038	0.0033	0.6766
Oct	5108	0.0014	0.0161	0.0041	0.0035	0.7707
Nov	2303	0.0017	0.0183	0.0053	0.0045	0.8965
Dec	1705	0.0020	0.0199	0.0063	0.0053	0.9876
Total	70579					

Loc Mouth o	Loc Mouth of Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0019	0.0106	0.0044	0.0045	0.3220
Feb	1230	0.0020	0.0121	0.0052	0.0051	0.3677
Mar	1301	0.0022	0.0137	0.0056	0.0053	0.4075
Apr	2402	0.0017	0.0107	0.0035	0.0036	0.2779
May	19992	0.0011	0.0057	0.0014	0.0019	0.1240
Jun	20466	0.0012	0.0122	0.0029	0.0027	0.6271
Jul	14254	0.0012	0.0123	0.0030	0.0028	0.4860
Aug	10032	0.0013	0.0124	0.0032	0.0030	0.4845
Sep	13469	0.0012	0.0124	0.0030	0.0029	0.4983
Oct	7047	0.0013	0.0130	0.0033	0.0030	0.5659
Nov	3181	0.0015	0.0146	0.0042	0.0038	0.6529
Dec	2352	0.0017	0.0157	0.0048	0.0043	0.7136
Total	97354					

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0013	0.0070	0.0023	0.0027	0.1265
Feb	3272	0.0014	0.0075	0.0026	0.0029	0.1439
Mar	3362	0.0014	0.0082	0.0027	0.0030	0.1618
Apr	6375	0.0013	0.0070	0.0020	0.0024	0.1153
May	55468	0.0010	0.0053	0.0012	0.0018	0.0597
Jun	56957	0.0011	0.0076	0.0017	0.0021	0.2429
Jul	39693	0.0011	0.0076	0.0018	0.0021	0.1918
Aug	27824	0.0011	0.0077	0.0018	0.0022	0.1918
Sep	37419	0.0011	0.0077	0.0018	0.0021	0.1966
Oct	19528	0.0011	0.0079	0.0019	0.0022	0.2207
Nov	8835	0.0012	0.0084	0.0022	0.0024	0.2496
Dec	6515	0.0012	0.0088	0.0025	0.0027	0.2684
Total	269678					

# Mine Area Flow-through Pit + Tailings Complete Relocation Summary Tables Conditions FUTURE 3

Loc X2

Flows	As	Cu	Ni	Pb	Zn
(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
553	0.1390	0.8518	0.0417	0.0139	32.2577
403	0.1707	1.0463	0.0511	0.0167	39.6635
407	0.2128	1.3047	0.0635	0.0205	49.4978
784	0.1494	0.9158	0.0448	0.0149	34.6959
6991	0.0210	0.1276	0.0070	0.0034	4.6957
7191	0.0259	0.1576	0.0084	0.0039	5.8361
5013	0.0312	0.1902	0.0100	0.0043	7.0795
3506	0.0326	0.1990	0.0104	0.0045	7.4153
4720	0.0253	0.1543	0.0082	0.0038	5.7123
2460	0.0365	0.2229	0.0115	0.0048	8.3258
1115	0.0768	0.4701	0.0234	0.0083	17.7376
821	0.1052	0.6447	0.0317	0.0109	24.3823
33964					
	(x 1000 m3) 553 403 407 784 6991 7191 5013 3506 4720 2460 1115 821	(x 1000 m3)         mg/L           553         0.1390           403         0.1707           407         0.2128           784         0.1494           6991         0.0210           7191         0.0259           5013         0.0312           3506         0.0326           4720         0.0253           2460         0.0365           1115         0.0768           821         0.1052	(x 1000 m3)         mg/L         mg/L           553         0.1390         0.8518           403         0.1707         1.0463           407         0.2128         1.3047           784         0.1494         0.9158           6991         0.0210         0.1276           7191         0.0259         0.1576           5013         0.0312         0.1902           3506         0.0326         0.1930           4720         0.0253         0.1543           2460         0.0365         0.2229           1115         0.0768         0.4701           821         0.1052         0.6447	(x 1000 m3)         mg/L         mg/L         mg/L           553         0.1390         0.8518         0.0417           403         0.1707         1.0463         0.0511           407         0.2128         1.3047         0.0635           784         0.1494         0.9158         0.0448           6991         0.0210         0.1276         0.0070           7191         0.0259         0.1576         0.0084           5013         0.0312         0.1902         0.0100           3506         0.0326         0.1990         0.0104           4720         0.0253         0.1543         0.0082           2460         0.0365         0.2229         0.0115           1115         0.0768         0.4701         0.0234           821         0.1052         0.6447         0.0317	(x 1000 m3)         mg/L         mg/L         mg/L         mg/L         mg/L           553         0.1390         0.8518         0.0417         0.0139           403         0.1707         1.0463         0.0511         0.0167           407         0.2128         1.3047         0.0635         0.0207           784         0.1494         0.9158         0.0448         0.0149           6991         0.0210         0.1276         0.0070         0.0034           7191         0.0259         0.1576         0.0084         0.0039           5013         0.0312         0.1902         0.0100         0.0043           3506         0.0326         0.1990         0.0144         0.0048           4720         0.0253         0.1543         0.0082         0.0038           2460         0.0365         0.2229         0.0115         0.0048           1115         0.0768         0.4701         0.0234         0.0083           821         0.1052         0.6447         0.0317         0.0109

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.1825	1.1261	0.0581	0.0212	40.8918
Feb	912	0.2165	1.3368	0.0689	0.0250	48.5322
Mar	981	0.2525	1.5604	0.0798	0.0284	56.6265
Apr	1784	0.1784	1.1021	0.0557	0.0197	39.9496
May	14480	0.0262	0.1611	0.0088	0.0042	5.7973
Jun	14796	0.0404	0.2549	0.0140	0.0060	9.5645
Jul	10302	0.0465	0.2927	0.0160	0.0066	10.7372
Aug	7268	0.0479	0.3012	0.0165	0.0069	11.0382
Sep	9748	0.0401	0.2534	0.0141	0.0061	9.3223
Oct	5108	0.0531	0.3338	0.0184	0.0076	12.3031
Nov	2303	0.1022	0.6372	0.0337	0.0129	23.3707
Dec	1705	0.1393	0.8659	0.0453	0.0168	31.7085
Total	70579					

Loc Mouth of	Loc Mouth of Rose Creek									
	Flows	As	Cu	Ni	Pb	Zn				
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L				
Jan	1628	0.1284	0.7918	0.0412	0.0155	28.7015				
Feb	1230	0.1539	0.9501	0.0493	0.0183	34.4449				
Mar	1301	0.1831	1.1310	0.0581	0.0211	40.9988				
Apr	2402	0.1290	0.7964	0.0405	0.0147	28.8237				
May	19992	0.0189	0.1155	0.0066	0.0035	4.1103				
Jun	20466	0.0296	0.1862	0.0105	0.0048	6.9398				
Jul	14254	0.0340	0.2133	0.0119	0.0053	7.7811				
Aug	10032	0.0350	0.2198	0.0123	0.0055	8.0108				
Sep	13469	0.0294	0.1852	0.0106	0.0049	6.7677				
Oct	7047	0.0388	0.2436	0.0136	0.0060	8.9367				
Nov	3181	0.0741	0.4614	0.0247	0.0098	16.8780				
Dec	2352	0.1002	0.6227	0.0329	0.0126	22.7571				
Total	97354									

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0446	0.2745	0.0149	0.0065	9.8467
Feb	3272	0.0543	0.3345	0.0180	0.0076	12.0220
Mar	3362	0.0666	0.4105	0.0217	0.0087	14.7801
Apr	6375	0.0468	0.2883	0.0152	0.0064	10.3343
May	55468	0.0072	0.0433	0.0030	0.0023	1.4434
Jun	56957	0.0113	0.0704	0.0045	0.0028	2.5209
Jul	39693	0.0129	0.0800	0.0050	0.0030	2.8192
Aug	27824	0.0133	0.0825	0.0051	0.0031	2.9090
Sep	37419	0.0113	0.0701	0.0045	0.0029	2.4609
Oct	19528	0.0147	0.0913	0.0056	0.0033	3.2488
Nov	8835	0.0272	0.1686	0.0096	0.0046	6.0660
Dec	6515	0.0362	0.2242	0.0124	0.0056	8.0911
Total	269678					

Mine Area Fl	ow-through Pi	t + Tailing	s Partia	Relocation	n		
Summary Wa		Bkgd	0.0010			0.0017	0.0256
Conditions	FUTURE 1	CCME	0.005	0.002	0.025	0.001	0.03
Loc X2							
LOUAL	Flows	As		Cu	Ni	Pb	Zn
	(x 1000 m3)	mį	g/L	mg/L	mg/L	mg/L	mg/L
Jan	553		0.0010	0.0048		0.0016	0.0416
Feb Mar	403 407		0.0010	0.0047		0.0016	0.0455
Apr	784		0.0010	0.0048 0.0050			0.0511 0.0440
May	6991		0.0010	0.0049		0.0017	0.0277
Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0282
Jul	5013		0.0010	0.0049		0.0017	0.0288
Aug	3506		0.0010			0.0017	0.0289
Sep Oct	4720 2460		0.0010			0.0017 0.0016	0.0280 0.0290
Nov	1115		0.0010			0.0016	0.0338
Dec	821		0.0010	0.0048	0.0011	0.0016	0.0376
Total	33964						
Loc X14	-						_
	Flows	As		Cu ma/l	Ni ma/l	Pb mg/l	Zn mg/l
Jan	(x 1000 m3) 1192	mį	g/L 0.0020	mg/L 0.0104	mg/L 0.0056	mg/L 0.0057	mg/L 0.4147
Feb	912		0.0020	0.0119			0.4874
Mar	981		0.0023	0.0136	0.0070	0.0069	0.5415
Apr	1784		0.0018	0.0106			0.3484
May Jun	14480 14796		0.0011	0.0057	0.0015		0.1600
Jul	14790		0.0015	0.0058 0.0059			0.2586 0.0767
Aug	7268		0.0019	0.0062			0.0861
Sep	9748		0.0017	0.0058	0.0050	0.0055	0.0718
Oct	5108		0.0012				0.1675
Nov Dec	2303 1705		0.0015	0.0077			0.2571
Total	70579		0.0017	0.0087	0.0043	0.0045	0.3208
Loc Mouth of	Rose Creek						
Loc Mouth of	Rose Creek Flows	As		Cu	Ni	Pb	Zn
	Flows (x 1000 m3)	As	g/L	mg/L	mg/L	mg/L	mg/L
Jan	Flows (x 1000 m3) 1628		g/L 0.0017	mg/L 0.0089	mg/L 0.0044	mg/L 0.0047	mg/L 0.3016
Jan Feb	Flows (x 1000 m3) 1628 1230		p/L 0.0017 0.0018	mg/L 0.0089 0.0101	mg/L 0.0044 0.0052	mg/L 0.0047 0.0053	mg/L 0.3016 0.3567
Jan Feb Mar	Flows (x 1000 m3) 1628		g/L 0.0017	mg/L 0.0089	mg/L 0.0044	mg/L 0.0047 0.0053 0.0056	mg/L 0.3016
Jan Feb	Flows (x 1000 m3) 1628 1230 1301		g/L 0.0017 0.0018 0.0019	mg/L 0.0089 0.0101 0.0114	mg/L 0.0044 0.0052 0.0055	mg/L 0.0047 0.0053 0.0056 0.0037	mg/L 0.3016 0.3567 0.4011
Jan Feb Mar Apr May Jun	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952
Jan Feb Mar Apr May Jun Jul	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630
Jan Feb Mar Apr May Jun Jul Aug	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703
Jan Feb Mar Apr May Jun Jul	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0045	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 14032 13469 7047 3181		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0056 0.0056	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0054 0.0024	mg/L 0.3016 0.3667 0.4011 0.2869 0.1209 0.1952 0.0630 0.0703 0.0703 0.0594 0.1266 0.1895
Jan Feb Apr May Jun Jul Aug Sep Oct Nov Dec	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0054 0.0024	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 14032 13469 7047 3181		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0056 0.0056	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0054 0.0024	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895
Jan Feb Apr May Jun Jul Aug Sep Oct Nov Dec	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0056 0.0056	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0054 0.0024	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b>	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 14032 13469 7047 3181 2352 97354		y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0056 0.0056	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0054 0.0024	mg/L 0.3016 0.3667 0.4011 0.2869 0.1209 0.1952 0.0630 0.0703 0.0703 0.0594 0.1266 0.1895
Jan Feb Apr May Jun Jul Aug Sep Oct Nov Dec	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek	m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0015 0.0017 0.0015 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0091 0.0055 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0070	mg/L 0.0044 0.0052 0.0035 0.0035 0.0014 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027 0.0034	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0045 0.0024 0.0032 0.0038	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b>	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 14032 13469 7047 3181 2352 97354	Μ	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0015	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0056 0.0056	mg/L 0.0044 0.0052 0.0035 0.0035 0.0014 0.0039 0.0050 0.0040 0.0049 0.0027 0.0034	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0044 0.0054 0.0024 0.0032 0.0038	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b>	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows	της As της	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0015 0.0017 0.0015 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0114 0.0055 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0076	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0045 0.0045 0.0024 0.0032 0.0038	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Jan Feb	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272	μ As m	y/L 0.0017 0.0018 0.0016 0.0016 0.0011 0.0015 0.0015 0.0012 0.0015 0.0015	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0056 0.0056 0.0061 0.0070 0.0070 0.0076	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0024 0.0032 0.0038 Pb mg/L 0.0028 0.0031	mg/L 0.3016 0.3667 0.4011 0.2689 0.1209 0.1952 0.0630 0.0703 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Feb Mar	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0015 0.0012 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0091 0.0055 0.0055 0.0055 0.0056 0.0056 0.0061 0.0070 0.0076	mg/L 0.0044 0.0052 0.0035 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0045 0.0024 0.0032 0.0038 Pb mg/L 0.0028 0.0031 0.0032	mg/L 0.3016 0.3667 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1622
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> <b>Loc Mouth of</b> Feb Mar Apr	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362 6375	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0076 Cu mg/L 0.0064 0.0064 0.0069 0.0074 0.0065	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0031 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0028 0.0028 0.0028 0.0028	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0024 0.0032 0.0038 Pb mg/L 0.0028 0.0028 0.0028 0.0031 0.0032 0.0032	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1433 0.1422 0.1094
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> <b>Loc Mouth of</b> Jan Feb Mar Apr May	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362 6375 55468	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0015 0.0017 0.0015 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0056 0.0061 0.0070 0.0076 Cu mg/L 0.0064 0.0074 0.0065 0.0074	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028 0.0028 0.0020 0.0021	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0024 0.0032 0.0032 0.0038 Pb mg/L 0.0028 0.0031 0.0032 0.0032 0.0034 0.0032	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1622 0.1094 0.0588
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> <b>Loc Mouth of</b> Feb Mar Apr	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362 6375	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0017 0.0015 0.0012 0.0014 0.0015	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0076 Cu mg/L 0.0064 0.0064 0.0069 0.0074 0.0065	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028 0.0020 0.0022 0.0012 0.0012	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0024 0.0032 0.0032 0.0038 Pb mg/L 0.0028 0.0031 0.0032 0.0032 0.0034 0.0032	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1433 0.1422 0.1094
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec <b>Total</b> <b>Loc Mouth of</b> Jan Feb Mar Apr May Jun Jul Aug	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362 6375 55468 56957 39693 27824	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0015 0.0012 0.0014 0.0015 0.0015 0.0012 0.0013 0.0013 0.0013 0.0013 0.0012 0.0010 0.0011 0.0012	mg/L 0.0089 0.0101 0.0114 0.0091 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0076 0.0076 0.0072 0.0064 0.0065 0.0052 0.0052 0.0052 0.0052	mg/L 0.0044 0.0052 0.0055 0.0035 0.0035 0.0030 0.0030 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028 0.0028 0.0022 0.0018 0.0021 0.0018	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0045 0.0024 0.0032 0.0038 Pb mg/L 0.0028 0.0031 0.0024 0.0024 0.0024 0.0024 0.0024	mg/L 0.3016 0.3667 0.4011 0.2869 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 0.2335 Zn mg/L 0.1220 0.1433 0.1622 0.194 0.0588 0.0872 0.0393 0.0422
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Feb Mar Apr May Jun Jul Aug Sep	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3272 3362 6375 55468 56957 39693 27824 37419	μ As m	y/L 0.0017 0.0018 0.0019 0.0016 0.0011 0.0014 0.0015 0.0015 0.0012 0.0014 0.0015 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0012 0.00101 0.0011 0.0012	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0050 0.0061 0.0070 0.0076 0.0064 0.0064 0.0065 0.0052 0.0052 0.0052 0.0052 0.0053 0.0052	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028 0.0028 0.0028 0.0021 0.0012 0.0012 0.0012 0.0012 0.0012 0.0012 0.0023	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0045 0.0024 0.0032 0.0038 Pb mg/L 0.0028 0.0028 0.0028 0.0024 0.0021 0.0024 0.0024 0.0024 0.0024	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1422 0.1094 0.0588 0.0872 0.0393 0.0422 0.0380
Jan Feb Mar Apr Jun Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3362 6375 55468 56957 39693 27824 37419 19528	μ As m	y/L 0.0017 0.0018 0.0016 0.0016 0.0011 0.0015 0.0017 0.0015 0.0012 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0011 0.0012 0.0011 0.0012 0.0011	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0059 0.0061 0.0070 0.0076 0.0076 0.0064 0.0065 0.0052 0.0052 0.0052 0.0052 0.0052 0.0052 0.0052	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 Ni mg/L 0.0023 0.0026 0.0028 0.0020 0.0012 0.0018 0.0021 0.0026 0.0022 0.0014	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0054 0.0024 0.0032 0.0032 0.0038 Pb mg/L 0.0032 0.0031 0.0024 0.0024 0.0027 0.0021 0.0027 0.0019	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1622 0.1094 0.0588 0.0872 0.0393 0.0422 0.0380 0.0610
Jan Feb Mar Apr Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3372 3362 3362 55468 56957 39693 27824 37419 19528 8835	μ As m	y/L 0.0017 0.0018 0.0016 0.0016 0.0011 0.0015 0.0015 0.0015 0.0015 0.0012 0.0013 0.0013 0.0013 0.0013 0.0013 0.0011 0.0011 0.0011	mg/L 0.0089 0.0101 0.0055 0.0055 0.0057 0.0059 0.0056 0.0061 0.0070 0.0076 0.0076 0.0076 0.0065 0.0052 0.0052 0.0052 0.0052 0.0052 0.0054 0.0054 0.0052	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 0.0023 0.0026 0.0028 0.0022 0.0012 0.0021 0.0022 0.0014 0.0022 0.0014	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0024 0.0032 0.0038 0.0038 0.0032 0.0038 0.0032 0.0031 0.0028 0.0024 0.0024 0.0027 0.0021 0.0027	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1622 0.1433 0.1622 0.1433 0.1622 0.0380 0.0872 0.0380 0.0422 0.0380 0.0610 0.0826
Jan Feb Mar Apr Jun Jun Jul Aug Sep Oct Nov Dec <b>Total</b> Loc Mouth of Jan Feb Mar Apr May Jun Jul Aug Sep Oct	Flows (x 1000 m3) 1628 1230 1301 2402 19992 20466 14254 10032 13469 7047 3181 2352 97354 Anvil Creek Flows (x 1000 m3) 4432 3362 6375 55468 56957 39693 27824 37419 19528	Μς As Μς	y/L 0.0017 0.0018 0.0016 0.0016 0.0011 0.0015 0.0017 0.0015 0.0012 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0011 0.0012 0.0011 0.0012 0.0011	mg/L 0.0089 0.0101 0.0055 0.0055 0.0055 0.0057 0.0059 0.0061 0.0070 0.0076 0.0076 0.0064 0.0065 0.0052 0.0052 0.0052 0.0052 0.0052 0.0052 0.0052	mg/L 0.0044 0.0052 0.0055 0.0035 0.0014 0.0039 0.0050 0.0040 0.0019 0.0027 0.0034 0.0023 0.0026 0.0028 0.0022 0.0012 0.0021 0.0022 0.0014 0.0022 0.0014	mg/L 0.0047 0.0053 0.0056 0.0037 0.0019 0.0036 0.0044 0.0045 0.0024 0.0032 0.0038 0.0038 0.0032 0.0038 0.0032 0.0031 0.0028 0.0024 0.0024 0.0027 0.0021 0.0027	mg/L 0.3016 0.3567 0.4011 0.2589 0.1209 0.1952 0.0630 0.0703 0.0594 0.1266 0.1895 0.2335 Zn mg/L 0.1220 0.1433 0.1622 0.1094 0.0588 0.0872 0.0393 0.0422 0.0380 0.0610

# Mine Area Flow-through Pit + Tailings Partial Relocation Summary Tables Conditions FUTURE 2

Loc X2						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0010	0.0055	0.0015	0.0018	0.1156
Feb	403	0.0010	0.0056	0.0016	0.0018	0.1366
Mar	407	0.0011	0.0059	0.0018	0.0019	0.1653
Apr	784	0.0011	0.0058	0.0016	0.0019	0.1237
May	6991	0.0010	0.0050	0.0011	0.0017	0.0383
Jun	7191	0.0010	0.0050	0.0012	0.0017	0.0414
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0448
Aug	3506	0.0010	0.0050	0.0012	0.0017	0.0457
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0409
Oct	2460	0.0010	0.0050	0.0012	0.0017	0.0479
Nov	1115	0.0010	0.0052	0.0013	0.0017	0.0742
Dec	821	0.0010	0.0054	0.0014	0.0018	0.0934
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0023	0.0148	0.0063	0.0060	0.5933
Feb	912	0.0026	0.0176	0.0074	0.0069	0.7083
Mar	981	0.0028	0.0204	0.0080	0.0073	0.8053
Apr	1784	0.0021	0.0151	0.0050	0.0048	0.5253
May	14480	0.0011	0.0063	0.0016	0.0021	0.1845
Jun	14796	0.0013	0.0152	0.0036	0.0031	0.8737
Jul	10302	0.0013	0.0154	0.0038	0.0033	0.6840
Aug	7268	0.0014	0.0157	0.0041	0.0036	0.6922
Sep	9748	0.0013	0.0156	0.0039	0.0034	0.7013
Oct	5108	0.0014	0.0168	0.0043	0.0037	0.8151
Nov	2303	0.0018	0.0194	0.0057	0.0049	0.9676
Dec	1705	0.0021	0.0213	0.0068	0.0058	1.0752
Total	70579					

Loc Mouth of	Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0019	0.0121	0.0049	0.0049	0.4280
Feb	1230	0.0021	0.0141	0.0058	0.0056	0.5147
Mar	1301	0.0023	0.0163	0.0062	0.0059	0.5925
Apr	2402	0.0018	0.0123	0.0039	0.0039	0.3865
May	19992	0.0011	0.0060	0.0014	0.0020	0.1383
Jun	20466	0.0012	0.0124	0.0029	0.0027	0.6407
Jul	14254	0.0012	0.0125	0.0031	0.0029	0.5028
Aug	10032	0.0013	0.0128	0.0033	0.0031	0.5098
Sep	13469	0.0012	0.0127	0.0031	0.0029	0.5161
Oct	7047	0.0013	0.0135	0.0034	0.0032	0.5981
Nov	3181	0.0016	0.0154	0.0045	0.0040	0.7048
Dec	2352	0.0018	0.0167	0.0053	0.0047	0.7778
Total	97354					

Loc Mouth of Anvil Creek
Flows

Loc moduli of Alivii Cleek							
	Flows	As	Cu	Ni	Pb	Zn	
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	
Jan	4432	0.0013	0.0075	0.0025	0.0029	0.1659	
Feb	3272	0.0014	0.0083	0.0028	0.0032	0.1991	
Mar	3362	0.0015	0.0092	0.0030	0.0033	0.2315	
Apr	6375	0.0013	0.0077	0.0021	0.0025	0.1551	
May	55468	0.0010	0.0053	0.0012	0.0018	0.0649	
Jun	56957	0.0011	0.0077	0.0017	0.0021	0.2478	
Jul	39693	0.0011	0.0077	0.0018	0.0021	0.1978	
Aug	27824	0.0011	0.0078	0.0019	0.0022	0.2009	
Sep	37419	0.0011	0.0078	0.0018	0.0021	0.2031	
Oct	19528	0.0011	0.0081	0.0019	0.0022	0.2323	
Nov	8835	0.0012	0.0087	0.0023	0.0026	0.2685	
Dec	6515	0.0013	0.0092	0.0026	0.0028	0.2921	
Total	269678						

Mine Area Flow-through Pit + Tailings Partial Relocation Summary Tables Conditions FUTURE 3

Loc X2	Flows	4.0	<u></u>	NI	Dh	7.
	Flows (x 1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	(x 1000 m3) 553	0.1389	0.8514	0.0417	•	32.2560
Feb	403	0.1706		0.0510		39.6616
Mar	407	0.2127				
Apr	784	0.1494		0.0448		34.6953
May	6991	0.0210		0.0070		4.6956
Jun	7191	0.0259	0.1575	0.0084		5.8361
Jul	5013	0.0312	0.1902	0.0100	0.0043	7.0795
Aug	3506	0.0326	0.1990	0.0104	0.0045	7.4152
Sep	4720	0.0253			0.0038	5.7123
Oct	2460	0.0365				8.3258
Nov	1115	0.0768		0.0234		
Dec	821	0.1052	0.6446	0.0317	0.0109	24.3822
Total	33964					
Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.1827				41.2292
Feb	912	0.2167				
Mar	981	0.2528				
Apr	1784	0.1786				
May Jun	14480 14796	0.0263 0.0404		0.0089 0.0141		5.8436 9.6084
Jul	10302	0.0404				10.7915
Aug	7268	0.0480				11.1199
Sep	9748	0.0402		0.0143		
Oct	5108	0.0532				
Nov	2303	0.1024	0.6430	0.0342	0.0133	23.5367
Dec	1705	0.1394	0.8730	0.0460	0.0174	31.9130
Total	70579					
Loc Mouth of	Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.1285				
Feb	1230	0.1541				
Mar	1301	0.1833		0.0589		41.4329
Apr May	2402 19992	0.1291 0.0189		0.0410 0.0066		29.0781 4.1439
Jun	20466	0.0296				6.9716
Jul	14254	0.0340		0.0119		7.8204
Aug	10032	0.0351	0.2218	0.0124	0.0056	8.0699
Sep	13469	0.0294	0.1866	0.0106	0.0050	6.8096
Oct	7047	0.0389		0.0138		9.0120
Nov	3181	0.0742		0.0250		16.9992
Dec	2352	0.1003	0.6279	0.0333	0.0130	22.9070
Total	97354					
Loc Mouth of		<b>A</b> -	0	NI	Dh	7.
	Flows (x 1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	(x 1000 m3) 4432	0.0447	•	0.0151	0.0067	9.9392
Feb	3272	0.0544		0.0183		12.1513
Mar	3362	0.0667		0.0220		14.9435
Apr	6375	0.0469		0.0154		10.4276
May	55468	0.0072	0.0438	0.0030	0.0023	1.4554
Jun	56957	0.0113		0.0045		2.5324
Jul	39693	0.0129		0.0050		2.8333
Αυσ	27824	0.0133	0.0833	0.0052	0.0031	2 9303

0.0129 0.0133 0.0113

0.0147

0.0272

0.0363

Aug Sep

Oct Nov

Dec

Total

27824

37419

19528

8835

6515

269678

0.0805 0.0833

0.0706

0.0923

0.1701

0.2261

0.0031

0.0029

0.0033

0.0047

0.0057

0.0052

0.0045

0.0057

0.0097

0.0126

2.9303

2.4760

3.2760

6.1103

8.1462

Mine Area Stabilize in Place + Tailings Stabilize in Place								
Summary Wa	ter Quality	Bkgd	0.0010	0.0050	0.0011	0.0017	0.0256	
Conditions	FUTURE 1	CCME	0.005	0.002	0.025	0.001	0.03	
Loc X2								
	Flows		As	Cu	Ni	Pb	Zn	
	(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L	
Jan	553		0.0010	0.0048	0.0012	0.0016	0.0457	
Feb	403		0.0010	0.0048	0.0012	0.0016	0.0504	
Mar	407		0.0011	0.0049	0.0012	0.0017	0.0573	
Apr	784		0.0011	0.0050	0.0012	0.0017	0.0484	
May	6991		0.0010	0.0049	0.0011	0.0017	0.0283	
Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0290	
Jul	5013		0.0010	0.0049	0.0011	0.0017	0.0297	
Aug	3506		0.0010	0.0049	0.0011	0.0017	0.0297	
Sep	4720		0.0010	0.0049	0.0011	0.0017	0.0288	
Oct	2460		0.0010	0.0048	0.0011	0.0016	0.0302	
Nov	1115		0.0010	0.0048	0.0011	0.0016	0.0361	
Dec	821		0.0010	0.0049	0.0011	0.0017	0.0408	
Total	33964							

Lo	c X14						
		Flows	As	Cu	Ni	Pb	Zn
		(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1192	0.0026	0.0091	0.0110	0.0111	0.1748
	Feb	912	0.0029	0.0107	0.0131	0.0131	0.2223
	Mar	981	0.0030	0.0122	0.0139	0.0137	0.2669
	Apr	1784	0.0021	0.0094	0.0079	0.0081	0.1757
	May	14480	0.0011	0.0056	0.0019	0.0025	0.0458
	Jun	14796	0.0011	0.0055	0.0019	0.0024	0.0463
	Jul	10302	0.0012	0.0057	0.0023	0.0028	0.0514
	Aug	7268	0.0012	0.0059	0.0027	0.0032	0.0601
	Sep	9748	0.0012	0.0057	0.0023	0.0028	0.0507
	Oct	5108	0.0013	0.0062	0.0034	0.0039	0.0687
	Nov	2303	0.0018	0.0070	0.0060	0.0064	0.1015
	Dec	1705	0.0021	0.0075	0.0080	0.0082	0.1231
	Total	70579					

Loc Mouth o	Loc Mouth of Rose Creek							
	Flows	As	Cu	Ni	Pb	Zn		
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	1628	0.0021	0.0080	0.0084	0.0086	0.1355		
Feb	1230	0.0024	0.0092	0.0100	0.0101	0.1714		
Mar	1301	0.0025	0.0104	0.0106	0.0107	0.2054		
Apr	2402	0.0018	0.0082	0.0061	0.0064	0.1358		
May	19992	0.0011	0.0054	0.0017	0.0023	0.0402		
Jun	20466	0.0011	0.0054	0.0017	0.0022	0.0406		
Jul	14254	0.0011	0.0055	0.0019	0.0025	0.0442		
Aug	10032	0.0012	0.0057	0.0023	0.0028	0.0506		
Sep	13469	0.0011	0.0055	0.0020	0.0025	0.0438		
Oct	7047	0.0013	0.0059	0.0028	0.0033	0.0569		
Nov	3181	0.0016	0.0064	0.0047	0.0051	0.0809		
Dec	2352	0.0018	0.0069	0.0061	0.0065	0.0969		
Total	97354							

Loc Mouth of Anvil Creek
Flows

LOC WOUTH O	Loc mouth of Anvil Greek							
	Flows	As	Cu	Ni	Pb	Zn		
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	4432	0.0014	0.0061	0.0038	0.0043	0.0663		
Feb	3272	0.0015	0.0066	0.0044	0.0049	0.0803		
Mar	3362	0.0016	0.0070	0.0047	0.0051	0.0937		
Apr	6375	0.0013	0.0062	0.0029	0.0034	0.0663		
May	55468	0.0010	0.0051	0.0013	0.0019	0.0309		
Jun	56957	0.0010	0.0051	0.0013	0.0019	0.0310		
Jul	39693	0.0010	0.0052	0.0014	0.0020	0.0323		
Aug	27824	0.0011	0.0052	0.0015	0.0021	0.0346		
Sep	37419	0.0010	0.0052	0.0014	0.0020	0.0322		
Oct	19528	0.0011	0.0053	0.0017	0.0023	0.0369		
Nov	8835	0.0012	0.0055	0.0024	0.0029	0.0457		
Dec	6515	0.0013	0.0057	0.0029	0.0034	0.0517		
Total	269678							

# Mine Area Stabilize in Place + Tailings Stabilize in Place Summary Tables Conditions FUTURE 2

Loc X2

LOCAZ						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0011	0.0057	0.0016	0.0019	0.1279
Feb	403	0.0011	0.0058	0.0017	0.0019	0.1518
Mar	407	0.0011	0.0061	0.0019	0.0020	0.1842
Apr	784	0.0011	0.0059	0.0017	0.0020	0.1369
May	6991	0.0010	0.0051	0.0012	0.0017	0.0401
Jun	7191	0.0010	0.0051	0.0012	0.0017	0.0436
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0476
Aug	3506	0.0010	0.0050	0.0012	0.0017	0.0483
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0431
Oct	2460	0.0010	0.0051	0.0012	0.0017	0.0512
Nov	1115	0.0010	0.0053	0.0014	0.0018	0.0810
Dec	821	0.0011	0.0055	0.0015	0.0018	0.1027
Total	33964					

Lo	c X14						
		Flows	As	Cu	Ni	Pb	Zn
		(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1192	0.0027	0.0120	0.0113	0.0112	0.2967
	Feb	912	0.0030	0.0145	0.0135	0.0132	0.3793
	Mar	981	0.0031	0.0170	0.0143	0.0139	0.4588
	Apr	1784	0.0022	0.0124	0.0082	0.0082	0.3007
	May	14480	0.0011	0.0060	0.0020	0.0025	0.0632
	Jun	14796	0.0011	0.0059	0.0019	0.0024	0.0652
	Jul	10302	0.0012	0.0062	0.0023	0.0028	0.0746
	Aug	7268	0.0013	0.0066	0.0028	0.0032	0.0891
	Sep	9748	0.0012	0.0062	0.0023	0.0028	0.0722
	Oct	5108	0.0014	0.0071	0.0035	0.0039	0.1039
	Nov	2303	0.0018	0.0085	0.0062	0.0064	0.1656
	Dec	1705	0.0022	0.0094	0.0082	0.0083	0.2064
	Total	70579					

Loc Mouth of	Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0022	0.0102	0.0086	0.0087	0.2251
Feb	1230	0.0025	0.0121	0.0103	0.0103	0.2878
Mar	1301	0.0026	0.0139	0.0109	0.0108	0.3488
Apr	2402	0.0019	0.0104	0.0063	0.0065	0.2278
May	19992	0.0011	0.0057	0.0017	0.0023	0.0528
Jun	20466	0.0011	0.0057	0.0017	0.0022	0.0543
Jul	14254	0.0011	0.0059	0.0020	0.0025	0.0610
Aug	10032	0.0012	0.0062	0.0023	0.0028	0.0717
Sep	13469	0.0011	0.0059	0.0020	0.0025	0.0593
Oct	7047	0.0013	0.0065	0.0028	0.0033	0.0824
Nov	3181	0.0016	0.0075	0.0048	0.0052	0.1275
Dec	2352	0.0019	0.0082	0.0063	0.0065	0.1576
Total	97354					

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0015	0.0069	0.0039	0.0043	0.0995
Feb	3272	0.0016	0.0076	0.0046	0.0049	0.1240
Mar	3362	0.0016	0.0084	0.0048	0.0052	0.1483
Apr	6375	0.0013	0.0070	0.0030	0.0035	0.1004
May	55468	0.0010	0.0053	0.0013	0.0019	0.0354
Jun	56957	0.0010	0.0052	0.0013	0.0019	0.0359
Jul	39693	0.0011	0.0053	0.0014	0.0020	0.0383
Aug	27824	0.0011	0.0054	0.0015	0.0021	0.0422
Sep	37419	0.0011	0.0053	0.0014	0.0020	0.0377
Oct	19528	0.0011	0.0055	0.0017	0.0023	0.0461
Nov	8835	0.0012	0.0059	0.0025	0.0030	0.0626
Dec	6515	0.0013	0.0062	0.0030	0.0035	0.0738
Total	269678					

# Mine Area Stabilize in Place + Tailings Stabilize in Place Summary Tables Conditions FUTURE 3

Loc X2						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0163	0.0992	0.0058	0.0030	3.6565
Feb	403	0.0198	0.1212	0.0069	0.0034	4.5025
Mar	407	0.0246	0.1506	0.0084	0.0038	5.6333
Apr	784	0.0175	0.1066	0.0062	0.0032	3.9358
May	6991	0.0032	0.0185	0.0018	0.0019	0.5465
Jun	7191	0.0037	0.0218	0.0019	0.0019	0.6740
Jul	5013	0.0043	0.0254	0.0021	0.0020	0.8131
Aug	3506	0.0045	0.0263	0.0021	0.0020	0.8504
Sep	4720	0.0037	0.0214	0.0019	0.0019	0.6600
Oct	2460	0.0049	0.0289	0.0023	0.0020	0.9524
Nov	1115	0.0093	0.0564	0.0036	0.0024	2.0104
Dec	821	0.0125	0.0760	0.0046	0.0027	2.7620
Total	33964					

Loc X14						
200714	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0116	0.0792	0.0139	0.0119	2.5457
Feb	912	0.0135	0.0961	0.0165	0.0141	3.0702
Mar	981	0.0155	0.1142	0.0179	0.0149	3.6478
Apr	1784	0.0113	0.0810	0.0108	0.0090	2.5957
May	14480	0.0025	0.0158	0.0023	0.0026	0.3961
Jun	14796	0.0028	0.0178	0.0024	0.0026	0.4721
Jul	10302	0.0032	0.0206	0.0029	0.0030	0.5701
Aug	7268	0.0034	0.0226	0.0034	0.0034	0.6216
Sep	9748	0.0028	0.0183	0.0028	0.0030	0.4797
Oct	5108	0.0038	0.0254	0.0042	0.0041	0.7102
Nov	2303	0.0069	0.0458	0.0077	0.0068	1.4291
Dec	1705	0.0091	0.0597	0.0102	0.0089	1.9227
Total	70579					

Loc Mouth of Rose Creek								
	Flows	As	Cu	Ni	Pb	Zn		
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	1628	0.0088	0.0594	0.0105	0.0092	1.8735		
Feb	1230	0.0103	0.0725	0.0125	0.0109	2.2839		
Mar	1301	0.0119	0.0870	0.0136	0.0116	2.7486		
Apr	2402	0.0086	0.0613	0.0083	0.0070	1.9301		
May	19992	0.0021	0.0128	0.0020	0.0023	0.2939		
Jun	20466	0.0023	0.0142	0.0020	0.0023	0.3484		
Jul	14254	0.0026	0.0163	0.0024	0.0026	0.4192		
Aug	10032	0.0027	0.0177	0.0028	0.0029	0.4574		
Sep	13469	0.0023	0.0146	0.0023	0.0026	0.3543		
Oct	7047	0.0030	0.0198	0.0033	0.0034	0.5220		
Nov	3181	0.0053	0.0346	0.0059	0.0054	1.0429		
Dec	2352	0.0069	0.0447	0.0077	0.0069	1.4029		
Total	97354							

Flows	As	Cu	Ni	Pb	Zn
(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
4432	0.0039	0.0251	0.0046	0.0045	0.7058
3272	0.0045	0.0304	0.0054	0.0052	0.8739
3362	0.0052	0.0365	0.0059	0.0054	1.0740
6375	0.0039	0.0260	0.0038	0.0037	0.7399
55468	0.0014	0.0078	0.0014	0.0019	0.1223
56957	0.0015	0.0083	0.0014	0.0019	0.1416
39693	0.0016	0.0091	0.0016	0.0020	0.1670
27824	0.0016	0.0096	0.0017	0.0021	0.1814
37419	0.0015	0.0085	0.0015	0.0020	0.1439
19528	0.0017	0.0103	0.0019	0.0023	0.2048
8835	0.0025	0.0157	0.0028	0.0031	0.3927
6515	0.0031	0.0194	0.0035	0.0036	0.5241
269678					
	(x 1000 m3) 4432 3272 3362 6375 55468 56957 39693 27824 37419 19528 8835 6515	(x 1000 m3)         mg/L           4432         0.0039           3272         0.0045           3362         0.0052           6375         0.0039           55468         0.0014           56957         0.0015           39693         0.0016           27824         0.0016           37419         0.0015           19528         0.0017           8835         0.0025           6515         0.0031	(x 1000 m3)         mg/L         mg/L           4432         0.0039         0.0251           3272         0.0045         0.0304           3362         0.0052         0.0365           6375         0.0039         0.0260           55468         0.0014         0.0078           56957         0.0015         0.0083           39693         0.0016         0.0091           27824         0.0016         0.0096           37419         0.0015         0.0083           19528         0.0017         0.1033           8835         0.0025         0.0157           6515         0.0031         0.0194	(x 1000 m3)         mg/L         mg/L         mg/L         mg/L           4432         0.0039         0.0251         0.0046           3272         0.0045         0.0304         0.0054           3362         0.0052         0.0365         0.0059           6375         0.0039         0.0260         0.0038           55468         0.0014         0.0078         0.0014           39693         0.0016         0.0091         0.0016           27824         0.0016         0.0095         0.0017           37419         0.0015         0.0085         0.0019           8835         0.0025         0.1157         0.0028           6515         0.0031         0.0194         0.0035	(x 1000 m3)         mg/L         mg/L         mg/L         mg/L         mg/L           4432         0.0039         0.0251         0.0046         0.0045           3272         0.0045         0.0304         0.0054         0.0052           3362         0.0052         0.0365         0.0039         0.0261           6375         0.0039         0.0260         0.0038         0.0037           55468         0.0014         0.0078         0.0014         0.0019           39693         0.0016         0.0091         0.0016         0.0020           27824         0.0016         0.0085         0.0017         0.0021           137419         0.0015         0.0085         0.0019         0.023           8835         0.0025         0.0157         0.0028         0.0031           6515         0.0031         0.0194         0.0035         0.0036

Mine Area Stabilize in Place + Tailings Complete Relocation								
Summary Wa	ter Quality	Bkgd	0.0010	0.0050	0.0011	0.0017	0.0256	
Conditions	FUTURE 1	CCME	0.005	0.002	0.025	0.001	0.03	
Loc X2								
	Flows		As	Cu	Ni	Pb	Zn	
	(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L	
Jan	553		0.0011	0.0051	0.0012	0.0017	0.0472	
Feb	403		0.0011	0.0051	0.0012	0.0018	0.0522	
Mar	407		0.0011	0.0052	0.0013	0.0018	0.0589	
Apr	784		0.0011	0.0051	0.0012	0.0018	0.0488	
May	6991		0.0010	0.0049	0.0011	0.0017	0.0283	
Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0289	
Jul	5013		0.0010	0.0049	0.0011	0.0017	0.0297	
Aug	3506		0.0010	0.0049	0.0011	0.0017	0.0298	
Sep	4720		0.0010	0.0049	0.0011	0.0017	0.0287	
Oct	2460		0.0010	0.0048	0.0011	0.0016	0.0301	
Nov	1115		0.0010	0.0048	0.0011	0.0016	0.0360	
Dec	821		0.0010	0.0048	0.0011	0.0017	0.0406	
Total	33964							

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0020	0.0079	0.0078	0.0080	0.0712
Feb	912	0.0022	0.0091	0.0093	0.0094	0.0800
Mar	981	0.0023	0.0101	0.0097	0.0097	0.0888
Apr	1784	0.0017	0.0080	0.0056	0.0058	0.0694
May	14480	0.0011	0.0054	0.0016	0.0022	0.0316
Jun	14796	0.0011	0.0053	0.0016	0.0021	0.0329
Jul	10302	0.0011	0.0054	0.0019	0.0024	0.0346
Aug	7268	0.0011	0.0056	0.0022	0.0027	0.0354
Sep	9748	0.0011	0.0054	0.0019	0.0024	0.0330
Oct	5108	0.0012	0.0057	0.0026	0.0031	0.0368
Nov	2303	0.0015	0.0062	0.0043	0.0047	0.0500
Dec	1705	0.0017	0.0066	0.0056	0.0059	0.0594
Total	70579					

Loc Mouth of Rose Creek								
	Flows	As	Cu	Ni	Pb	Zn		
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	1628	0.0018	0.0071	0.0060	0.0063	0.0590		
Feb	1230	0.0019	0.0080	0.0071	0.0073	0.0658		
Mar	1301	0.0020	0.0087	0.0075	0.0076	0.0729		
Apr	2402	0.0015	0.0072	0.0044	0.0047	0.0580		
May	19992	0.0011	0.0053	0.0015	0.0020	0.0300		
Jun	20466	0.0011	0.0052	0.0015	0.0020	0.0309		
Jul	14254	0.0011	0.0053	0.0016	0.0022	0.0321		
Aug	10032	0.0011	0.0054	0.0019	0.0024	0.0327		
Sep	13469	0.0011	0.0053	0.0017	0.0022	0.0310		
Oct	7047	0.0012	0.0055	0.0022	0.0027	0.0338		
Nov	3181	0.0014	0.0059	0.0035	0.0039	0.0433		
Dec	2352	0.0015	0.0062	0.0044	0.0048	0.0502		
Total	97354							

Loc Mouth of Anvil Creek
Flows

Loc wouth of	LOC MOUTH OF ANVII Greek							
	Flows	As	Cu	Ni	Pb	Zn		
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L		
Jan	4432	0.0013	0.0058	0.0029	0.0034	0.0378		
Feb	3272	0.0013	0.0061	0.0033	0.0038	0.0406		
Mar	3362	0.0014	0.0064	0.0035	0.0039	0.0436		
Apr	6375	0.0012	0.0058	0.0023	0.0028	0.0377		
May	55468	0.0010	0.0051	0.0012	0.0018	0.0272		
Jun	56957	0.0010	0.0051	0.0012	0.0018	0.0275		
Jul	39693	0.0010	0.0051	0.0013	0.0019	0.0279		
Aug	27824	0.0010	0.0052	0.0014	0.0020	0.0282		
Sep	37419	0.0010	0.0051	0.0013	0.0019	0.0275		
Oct	19528	0.0011	0.0052	0.0015	0.0021	0.0285		
Nov	8835	0.0011	0.0053	0.0020	0.0025	0.0320		
Dec	6515	0.0012	0.0054	0.0023	0.0028	0.0345		
Total	269678							

Mine Area Stabilize in Place + Tailings Complete Relocation Summary Tables Conditions FUTURE 2

Loc X2

LOCAZ						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0011	0.0059	0.0017	0.0020	0.1294
Feb	403	0.0012	0.0062	0.0018	0.0020	0.1535
Mar	407	0.0012	0.0065	0.0020	0.0021	0.1858
Apr	784	0.0011	0.0060	0.0017	0.0020	0.1373
May	6991	0.0010	0.0051	0.0012	0.0017	0.0401
Jun	7191	0.0010	0.0051	0.0012	0.0017	0.0436
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0475
Aug	3506	0.0010	0.0051	0.0012	0.0017	0.0485
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0431
Oct	2460	0.0010	0.0050	0.0012	0.0017	0.0511
Nov	1115	0.0010	0.0052	0.0014	0.0018	0.0809
Dec	821	0.0011	0.0055	0.0015	0.0018	0.1026
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0021	0.0087	0.0081	0.0082	0.1254
Feb	912	0.0023	0.0100	0.0096	0.0095	0.1436
Mar	981	0.0024	0.0112	0.0101	0.0099	0.1636
Apr	1784	0.0018	0.0088	0.0059	0.0059	0.1246
May	14480	0.0011	0.0055	0.0017	0.0022	0.0397
Jun	14796	0.0011	0.0055	0.0017	0.0022	0.0430
Jul	10302	0.0011	0.0056	0.0019	0.0024	0.0470
Aug	7268	0.0012	0.0058	0.0022	0.0027	0.0482
Sep	9748	0.0011	0.0056	0.0019	0.0024	0.0429
Oct	5108	0.0012	0.0059	0.0027	0.0031	0.0512
Nov	2303	0.0015	0.0067	0.0045	0.0048	0.0809
Dec	1705	0.0018	0.0072	0.0059	0.0061	0.1018
Total	70579					

Loc Mouth o	f Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0018	0.0077	0.0062	0.0064	0.0986
Feb	1230	0.0020	0.0086	0.0074	0.0074	0.1130
Mar	1301	0.0020	0.0096	0.0078	0.0078	0.1292
Apr	2402	0.0016	0.0078	0.0046	0.0048	0.0990
May	19992	0.0011	0.0053	0.0015	0.0021	0.0358
Jun	20466	0.0011	0.0053	0.0015	0.0020	0.0382
Jul	14254	0.0011	0.0054	0.0017	0.0022	0.0411
Aug	10032	0.0011	0.0056	0.0019	0.0024	0.0420
Sep	13469	0.0011	0.0054	0.0017	0.0022	0.0381
Oct	7047	0.0012	0.0057	0.0023	0.0027	0.0442
Nov	3181	0.0014	0.0062	0.0036	0.0040	0.0656
Dec	2352	0.0016	0.0066	0.0046	0.0049	0.0809
Total	97354					

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0013	0.0060	0.0030	0.0034	0.0524
Feb	3272	0.0014	0.0063	0.0034	0.0038	0.0583
Mar	3362	0.0014	0.0067	0.0036	0.0040	0.0655
Apr	6375	0.0012	0.0060	0.0024	0.0028	0.0532
May	55468	0.0010	0.0051	0.0013	0.0018	0.0293
Jun	56957	0.0010	0.0051	0.0012	0.0018	0.0301
Jul	39693	0.0010	0.0052	0.0013	0.0019	0.0311
Aug	27824	0.0010	0.0052	0.0014	0.0020	0.0315
Sep	37419	0.0010	0.0051	0.0013	0.0019	0.0301
Oct	19528	0.0011	0.0052	0.0015	0.0021	0.0323
Nov	8835	0.0011	0.0055	0.0020	0.0025	0.0400
Dec	6515	0.0012	0.0056	0.0024	0.0029	0.0456
Total	269678					

Mine Area Stabilize in Place + Tailings Complete Relocation Summary Tables Conditions FUTURE 3

Conditions	FUTURE 3	

Loc X2
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LOCKE						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0163	0.0995	0.0058	0.0031	3.6580
Feb	403	0.0199	0.1215	0.0070	0.0035	4.5043
Mar	407	0.0247	0.1509	0.0084	0.0039	5.6350
Apr	784	0.0175	0.1067	0.0062	0.0033	3.9362
May	6991	0.0032	0.0185	0.0018	0.0019	0.5465
Jun	7191	0.0037	0.0218	0.0019	0.0019	0.6739
Jul	5013	0.0043	0.0254	0.0021	0.0020	0.8130
Aug	3506	0.0045	0.0263	0.0021	0.0020	0.8506
Sep	4720	0.0037	0.0214	0.0019	0.0019	0.6599
Oct	2460	0.0049	0.0289	0.0023	0.0020	0.9523
Nov	1115	0.0093	0.0564	0.0036	0.0024	2.0103
Dec	821	0.0125	0.0760	0.0046	0.0027	2.7618
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0109	0.0629	0.0105	0.0088	2.1305
Feb	912	0.0127	0.0736	0.0124	0.0103	2.4981
Mar	981	0.0145	0.0860	0.0134	0.0108	2.9306
Apr	1784	0.0107	0.0640	0.0083	0.0066	2.1684
May	14480	0.0024	0.0136	0.0020	0.0023	0.3392
Jun	14796	0.0027	0.0156	0.0021	0.0023	0.4182
Jul	10302	0.0031	0.0179	0.0025	0.0026	0.5033
Aug	7268	0.0032	0.0186	0.0028	0.0029	0.5221
Sep	9748	0.0027	0.0154	0.0024	0.0025	0.4087
Oct	5108	0.0036	0.0203	0.0033	0.0033	0.5827
Nov	2303	0.0065	0.0376	0.0059	0.0052	1.2248
Dec	1705	0.0086	0.0496	0.0077	0.0066	1.6708
Total	70579					

Loc Mouth o	f Rose Creek		•			-
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.0083	0.0474	0.0080	0.0069	1.5671
Feb	1230	0.0096	0.0558	0.0094	0.0080	1.8598
Mar	1301	0.0112	0.0659	0.0102	0.0084	2.2155
Apr	2402	0.0082	0.0488	0.0064	0.0053	1.6175
May	19992	0.0020	0.0112	0.0018	0.0021	0.2527
Jun	20466	0.0023	0.0127	0.0018	0.0021	0.3094
Jul	14254	0.0025	0.0143	0.0021	0.0023	0.3708
Aug	10032	0.0026	0.0149	0.0023	0.0025	0.3853
Sep	13469	0.0022	0.0126	0.0020	0.0023	0.3029
Oct	7047	0.0029	0.0161	0.0027	0.0029	0.4294
Nov	3181	0.0050	0.0286	0.0046	0.0042	0.8937
Dec	2352	0.0065	0.0374	0.0059	0.0053	1.2182
Total	97354					

	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0037	0.0206	0.0036	0.0036	0.5918
Feb	3272	0.0042	0.0241	0.0042	0.0040	0.7147
Mar	3362	0.0049	0.0285	0.0046	0.0042	0.8730
Apr	6375	0.0037	0.0215	0.0031	0.0030	0.6253
May	55468	0.0014	0.0072	0.0013	0.0019	0.1075
Jun	56957	0.0014	0.0078	0.0014	0.0019	0.1276
Jul	39693	0.0016	0.0084	0.0015	0.0019	0.1496
Aug	27824	0.0016	0.0086	0.0015	0.0020	0.1553
Sep	37419	0.0014	0.0077	0.0014	0.0019	0.1254
Oct	19528	0.0017	0.0090	0.0017	0.0021	0.1713
Nov	8835	0.0024	0.0135	0.0024	0.0026	0.3382
Dec	6515	0.0030	0.0167	0.0029	0.0030	0.4561
Total	269678					

Mine Area Stabilize in Place + Tailings Partial Relocation								
;	Summary Wat	ter Quality	Bkgd	0.0010	0.0050	0.0011	0.0017	0.0256
	Conditions	FUTURE 1	CCME	0.005	0.002	0.025	5 0.001	0.03
I	Loc X2							
		Flows		As	Cu	Ni	Pb	Zn
		(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	553		0.0010	0.0048	0.0011	0.0016	0.0455
	Feb	403		0.0010	0.0048	0.0012	0.0016	0.0502
	Mar	407		0.0011	0.0048	0.0012	0.0016	0.0570
	Apr	784		0.0011	0.0050	0.0012	0.0017	0.0482
	May	6991		0.0010	0.0049	0.0011	0.0017	0.0283
	Jun	7191		0.0010	0.0049	0.0011	0.0017	0.0289
	Jul	5013		0.0010	0.0049	0.0011	0.0017	0.0296
1	Aug	3506		0.0010	0.0049	0.0011	0.0017	0.0298
	Sep	4720		0.0010	0.0049	0.0011	0.0017	0.0287
	Oct	2460		0.0010	0.0048	0.0011	0.0016	0.0300
	Nov	1115		0.0010	0.0048			
	Dec	821		0.0010	0.0048			
	Total	33964						
	Loc X14	Flows		As	Cu	Ni	Pb	Zn
		(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1192		0.0021	0.0083	0.0084	0.0086	0.1718
	Feb	912		0.0023	0.0095	0.0099	0.0100	0.2188
	Mar	981		0.0024	0.0107	0.0104	0.0104	0.263
	Apr	1784		0.0018	0.0085			
	May	14480		0.0011	0.0054			
	Jun	14796		0.0011	0.0054	0.0017	0.0022	
	Jul	10302		0.0011	0.0055	0.0019	0.0025	0.0510
	Aug	7268		0.0012	0.0058	0.0023	3 0.0028	0.0599
	Sep	9748		0.0011	0.0055	0.0020	0.0025	0.0503
	Oct	5108		0.0012				
	Nov	2303		0.0016	0.0066	0.0047	0.0051	0.0999
	Dec	1705		0.0018	0.0070	0.0062	2 0.0065	0.1210
	Total	70579						
	Loc Mouth of	Rose Creek						
1		Flows		As	Cu	Ni	Pb	Zn
		(x 1000 m3)		mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	1628		0.0018	0.0074	0.0065	5 0.0067	0.1332

	(x 1000 m3)	mg/∟	mg/∟	mg/∟	mg/L	mg/∟
Jan	1628	0.0018	0.0074	0.0065	0.0067	0.1332
Feb	1230	0.0020	0.0083	0.0077	0.0078	0.1687
Mar	1301	0.0020	0.0093	0.0081	0.0082	0.2025
Apr	2402	0.0016	0.0076	0.0048	0.0051	0.1342
May	19992	0.0011	0.0053	0.0015	0.0021	0.0400
Jun	20466	0.0011	0.0053	0.0015	0.0021	0.0404
Jul	14254	0.0011	0.0054	0.0017	0.0023	0.0440
Aug	10032	0.0011	0.0056	0.0020	0.0025	0.0504
Sep	13469	0.0011	0.0054	0.0017	0.0023	0.0435
Oct	7047	0.0012	0.0057	0.0023	0.0028	0.0564
Nov	3181	0.0014	0.0061	0.0037	0.0042	0.0797
Dec	2352	0.0016	0.0065	0.0048	0.0052	0.0953
Total	97354					

l	Loc Mouth o	f Anvil Creek					
		Flows	As	Cu	Ni	Pb	Zn
		(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
	Jan	4432	0.0013	0.0059	0.0031	0.0036	0.0655
	Feb	3272	0.0014	0.0062	0.0036	0.0040	0.0793
	Mar	3362	0.0014	0.0066	0.0037	0.0042	0.0925
	Apr	6375	0.0012	0.0059	0.0025	0.0029	0.0657
	May	55468	0.0010	0.0051	0.0013	0.0018	0.0308
	Jun	56957	0.0010	0.0051	0.0012	0.0018	0.0309
	Jul	39693	0.0010	0.0051	0.0013	0.0019	0.0322
	Aug	27824	0.0010	0.0052	0.0014	0.0020	0.0345
	Sep	37419	0.0010	0.0051	0.0013	0.0019	0.0321
	Oct	19528	0.0011	0.0052	0.0015	0.0021	0.0367
	Nov	8835	0.0011	0.0054	0.0021	0.0026	0.0453
	Dec	6515	0.0012	0.0055	0.0025	0.0030	0.0511
	Total	269678					

#### Mine Area Stabilize in Place + Tailings Partial Relocation Summary Tables Conditions FUTURE 2

Loc X2						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0011	0.0056	0.0016	0.0019	0.1277
Feb	403	0.0011	0.0058	0.0017	0.0019	0.1516
Mar	407	0.0011	0.0061	0.0019	0.0020	0.1840
Apr	784	0.0011	0.0059	0.0017	0.0020	0.1367
May	6991	0.0010	0.0051	0.0012	0.0017	0.0401
Jun	7191	0.0010	0.0051	0.0012	0.0017	0.0435
Jul	5013	0.0010	0.0051	0.0012	0.0017	0.0475
Aug	3506	0.0010	0.0051	0.0012	0.0017	0.0485
Sep	4720	0.0010	0.0050	0.0012	0.0017	0.0430
Oct	2460	0.0010	0.0050	0.0012	0.0017	0.0510
Nov	1115	0.0010	0.0052	0.0013	0.0018	0.0808
Dec	821	0.0010	0.0055	0.0015	0.0018	0.1025
Total	33964					

Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0022	0.0107	0.0087	0.0087	0.2691
Feb	912	0.0024	0.0126	0.0103	0.0101	0.3418
Mar	981	0.0025	0.0146	0.0108	0.0106	0.4125
Apr	1784	0.0018	0.0110	0.0064	0.0064	0.2731
May	14480	0.0011	0.0058	0.0017	0.0023	0.0595
Jun	14796	0.0011	0.0058	0.0017	0.0022	0.0618
Jul	10302	0.0011	0.0060	0.0020	0.0025	0.0702
Aug	7268	0.0012	0.0063	0.0024	0.0028	0.0831
Sep	9748	0.0011	0.0059	0.0020	0.0025	0.0676
Oct	5108	0.0013	0.0066	0.0029	0.0033	0.0956
Nov	2303	0.0016	0.0078	0.0049	0.0052	0.1519
Dec	1705	0.0019	0.0086	0.0064	0.0066	0.1894
Total	70579					

Loc Mo	outh of Rose Creek		_			_
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Ja	n 1628	0.0019	0.0092	0.0067	0.0068	0.2046
Fe	b 1230	0.0021	0.0107	0.0079	0.0080	0.2599
Ma	ar 1301	0.0021	0.0122	0.0084	0.0083	0.3142
Ap	or 2402	0.0016	0.0094	0.0050	0.0052	0.2076
Ma	ay 19992	0.0011	0.0056	0.0016	0.0021	0.0502
Ju	n 20466	0.0011	0.0056	0.0015	0.0021	0.0517
Ju	l 14254	0.0011	0.0057	0.0018	0.0023	0.0579
Au	ig 10032	0.0011	0.0060	0.0020	0.0025	0.0672
Se	p 13469	0.0011	0.0057	0.0018	0.0023	0.0560
Oc	t 7047	0.0012	0.0062	0.0024	0.0029	0.0764
No	ov 3181	0.0014	0.0070	0.0039	0.0042	0.1175
De	ec 2352	0.0016	0.0076	0.0050	0.0053	0.1451
То	tal 97354					

Loc Mouth o	f Anvil Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0013	0.0065	0.0032	0.0036	0.0918
Feb	3272	0.0014	0.0071	0.0037	0.0040	0.1135
Mar	3362	0.0014	0.0077	0.0039	0.0042	0.1352
Apr	6375	0.0012	0.0066	0.0025	0.0030	0.0930
May	55468	0.0010	0.0052	0.0013	0.0018	0.0344
Jun	56957	0.0010	0.0052	0.0013	0.0018	0.0350
Jul	39693	0.0010	0.0052	0.0013	0.0019	0.0372
Aug	27824	0.0011	0.0053	0.0014	0.0020	0.0406
Sep	37419	0.0010	0.0052	0.0013	0.0019	0.0365
Oct	19528	0.0011	0.0054	0.0016	0.0021	0.0439
Nov	8835	0.0012	0.0057	0.0021	0.0026	0.0590
Dec	6515	0.0012	0.0060	0.0025	0.0030	0.0692
Total	269678					

Mine Area Stabilize in Place + Tailings Partial Relocation Summary Tables Conditions FUTURE 3

Loc X2						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0163	0.0992	0.0058	0.0030	3.6563
Feb	403	0.0198	0.1211	0.0069	0.0034	4.5023
Mar	407	0.0246	0.1505	0.0084	0.0038	5.6331
Apr	784	0.0175	0.1066	0.0062	0.0032	3.9355
May	6991	0.0032	0.0185	0.0018	0.0019	0.5465
Jun	7191	0.0037				
Jul	5013	0.0043				
Aug	3506	0.0045				
Sep	4720	0.0037	0.0214	0.0019		
Oct	2460	0.0049	0.0289	0.0023	0.0020	0.9522
Nov	1115	0.0093				
Dec	821	0.0125	0.0760	0.0046	0.0027	2.7617
Total	33964					
Loc X14						
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.0111				
Feb	912	0.0129				
Mar	981	0.0149				
Apr	1784	0.0109				
May	14480	0.0024				
Jun	14796	0.0028				
Jul	10302	0.0032				
Aug	7268	0.0033				
Sep	9748	0.0028				
Oct Nov	5108	0.0036				
-	2303	0.0067				
Dec <b>Total</b>	1705	0.0088	0.0568	0.0084	0.0071	1.8753
Total	70579					
Loc Mouth of	Rose Creek					
	Flows	As	Cu	Ni	Pb	Zn
	( 1000 0)					

mg/L 4 1.8160 6 2.2048
2 2 2 0 4 9
) Z.ZU48
1 2.6496
7 1.8719
2 0.2862
2 0.3412
4 0.4102
6 0.4444
4 0.3447
0.5047
5 1.0148
7 1.3681
0 5

Loc Mouth of	f Anvil Creek					
	Flows	As	Cu	Ni	Pb	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.0037	0.0237	0.0038	0.0038	0.6843
Feb	3272	0.0043	0.0285	0.0045	0.0043	0.8441
Mar	3362	0.0050	0.0341	0.0049	0.0045	1.0365
Apr	6375	0.0038	0.0247	0.0033	0.0032	0.7185
May	55468	0.0014	0.0077	0.0014	0.0019	0.1195
Jun	56957	0.0015	0.0082	0.0014	0.0019	0.1390
Jul	39693	0.0016	0.0088	0.0015	0.0020	0.1637
Aug	27824	0.0016	0.0093	0.0016	0.0020	0.1766
Sep	37419	0.0015	0.0082	0.0015	0.0019	0.1405
Oct	19528	0.0017	0.0100	0.0017	0.0022	0.1986
Nov	8835	0.0025	0.0151	0.0025	0.0027	0.3825
Dec	6515	0.0030	0.0186	0.0030	0.0031	0.5112
Total	269678					

# VG01 - Backfill Vangorda Pit

# Concentrations Estimates for Vangorda Creek Catchments

Note: Revision - Vangorda Pit loads removed - assume that backfill is limed; pit la Loading Future 1

LoadingFutu	ire 1					
	Bkgc	0.0037	0.002	0.0039	0.0037	0.0137
	CCME	0.005	0.002	0.025	0.001	0.03
Concentratio	ons at V27					
Flow	/	As	Cu	Ni	Pb	Zn
(x10	00 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	87	0.004	0.009	0.016	0.012	0.069
Feb	73	0.004	0.009	0.016	0.013	0.068
Mar	85	0.004	0.008	0.017	0.014	0.070
Apr 1	21	0.004	0.009	0.017	0.013	0.072
May 4	63	0.004	0.012	0.012	0.008	0.068
Jun 5	25	0.004	0.012	0.012	0.008	0.066
Jul 3	92	0.004	0.012	0.012	0.008	0.065
Aug 2	84	0.004	0.012	0.012	0.008	0.064
Sep 3	44	0.004	0.012	0.012	0.008	0.066
Oct 2	12	0.004	0.011	0.012	0.008	0.063
Nov 1	30	0.004	0.010	0.014	0.010	0.065
Dec 1	05	0.004	0.009	0.015	0.012	0.070

	Flow	As	Cu	Ni	Pb	Zn
	(x1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	380	0.0020	0.0072	0.0047	0.0039	0.0196
Feb	284	0.0021	0.0070	0.0052	0.0043	0.0213
Mar	296	0.0022	0.0069	0.0058	0.0048	0.0236
Apr	543	0.0021	0.0072	0.0049	0.0040	0.0202
May	4356	0.0017	0.0077	0.0026	0.0021	0.0122
Jun	4500	0.0017	0.0076	0.0027	0.0022	0.0125
Jul	3152	0.0017	0.0076	0.0028	0.0023	0.0129
Aug	2207	0.0017	0.0076	0.0029	0.0023	0.0129
Sep	2952	0.0017	0.0076	0.0027	0.0022	0.0125
Oct	1553	0.0018	0.0075	0.0029	0.0024	0.0132
Nov	728	0.0019	0.0074	0.0037	0.0030	0.0158
Dec	549	0.0019	0.0073	0.0042	0.0034	0.0176

# VG01 - Backfill Vangorda Pit Loading Future 2

**Concentrations at V27** 

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	87	0.004		0.017		0.086
Feb	73	0.004	0.009	0.017	0.013	0.086
Mar	85	0.004	0.008	0.018	0.014	0.089
Apr	121	0.004	0.009	0.018	0.013	0.091
May	463	0.004	0.012	0.013	0.008	0.085
Jun	525	0.004	0.012	0.013	0.008	0.082
Jul	392	0.004	0.012	0.013	0.008	0.081
Aug	284	0.004	0.012	0.013	0.008	0.079
Sep	344	0.004	0.012	0.013	0.008	0.081
Oct	212	0.004	0.011	0.013	0.008	0.078
Nov	130	0.004	0.010	0.015	0.010	0.081
Dec	105	0.004	0.009	0.017	0.012	0.088

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	380	0.0020	0.0072	0.0050	0.0039	0.0236
Feb	284	0.0021	0.0070	0.0056	0.0043	0.0260
Mar	296	0.0022	0.0069	0.0062	0.0048	0.0289
Apr	543	0.0021	0.0072	0.0052	0.0040	0.0245
May	4356	0.0017	0.0077	0.0028	0.0021	0.0139
Jun	4500	0.0017	0.0076	0.0029	0.0022	0.0143
Jul	3152	0.0017	0.0076	0.0030	0.0023	0.0148
Aug	2207	0.0017	0.0076	0.0030	0.0023	0.0149
Sep	2952	0.0017	0.0076	0.0029	0.0022	0.0143
Oct	1553	0.0018	0.0075	0.0031	0.0024	0.0153
Nov	728	0.0019	0.0074	0.0039	0.0030	0.0187
Dec	549	0.0019	0.0073	0.0044	0.0034	0.0210

# VG01 - Backfill Vangorda Pit Loading Future 3

Concentrations at V27

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	87	0.006	0.177	0.051	0.012	7.640
Feb	73	0.006	0.180	0.052	0.013	7.777
Mar	85	0.006	0.188	0.055	0.013	8.173
Apr	121	0.006	0.189	0.055	0.013	8.194
May	463	0.005	0.145	0.040	0.009	6.019
Jun	525	0.005	0.142	0.039	0.009	5.909
Jul	392	0.005	0.143	0.040	0.009	5.977
Aug	284	0.005	0.141	0.039	0.009	5.883
Sep	344	0.005	0.141	0.039	0.009	5.882
Oct	212	0.005	0.140	0.039	0.009	5.852
Nov	130	0.005	0.156	0.045	0.011	6.647
Dec	105	0.006	0.175	0.051	0.012	7.547

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan Feb Mar Apr May Jun Jul Aug	380 284 296 543 4356 4500 3152 2207 2052	0.0024 0.0025 0.0027 0.0024 0.0019 0.0019 0.0019 0.0019	0.0511 0.0583 0.0474 0.0218 0.0228 0.0240 0.0243	0.0146 0.0168 0.0134 0.0056 0.0059 0.0063 0.0064	0.0039 0.0043 0.0048 0.0040 0.0023 0.0023 0.0024 0.0024	1.7439 2.0082 2.3417 1.8323 0.6453 0.6947 0.7482 0.7626
Sep Oct Nov Dec	2952 1553 728 549	0.0019 0.0019 0.0021 0.0023	0.0251 0.0334	0.0066	0.0023 0.0025 0.0030 0.0035	0.6894 0.8014 1.1893 1.4494

# VG02 - Stabilize in Place Concentrations Estimates for Vangorda Creek Catchments

		Bkgd	0.0037	0.002	0.0039	0.0037						
		CCME	0.005	0.002	0.025	0.001	0.0					
Concentrations at V27												
	Flow		As	Cu	Ni	Pb	Zn					
	(x1000	m3)	mg/L	mg/L	mg/L	mg/L	mg/L					
la n	407		0.005	0.000	0.000	0.004	0.0					
Jan Tah	137		0.005	0.008	0.023	0.021	0.2					
Feb	120		0.005	0.008		0.022						
Mar	131		0.005	0.008		0.022						
Apr	145		0.005	0.009	0.023	0.020	0.3					
May	428		0.003	0.012	0.014	0.010	0.1					
Jun	434		0.004	0.013	0.014	0.010	0.1					
Jul	339		0.004	0.012	0.015	0.012	0.2					
Aug	271		0.004	0.011	0.017	0.013	0.1					
Sep	322		0.004	0.012	0.015	0.012	0.1					
Oct	223		0.004	0.010	0.018	0.015	0.1					
Nov	159		0.005	0.009	0.021	0.019						
Dec	149		0.005	0.009	0.022	0.020	-					

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
	(x1000 110)	iiig/ E	mg/ L	iiig/ E	mg/ L	iiig/ E
Jan	430	0.0025	0.0073	0.0085	0.0077	0.1039
Feb	331	0.0026	0.0072	0.0097	0.0088	0.1199
Mar	342	0.0027	0.0073	0.0102	0.0093	0.1423
Apr	566	0.0023	0.0077	0.0070	0.0062	0.1140
May	4313	0.0017	0.0077	0.0028	0.0024	0.0259
Jun	4401	0.0017	0.0077	0.0028	0.0023	0.0296
Jul	3093	0.0017	0.0076	0.0031	0.0026	0.0340
Aug	2189	0.0018	0.0076	0.0034	0.0029	0.0354
Sep	2925	0.0017	0.0076	0.0031	0.0026	0.0295
Oct	1562	0.0018	0.0075	0.0039	0.0034	0.0387
Nov	756	0.0021	0.0074	0.0057	0.0050	0.0678
Dec	592	0.0022	0.0075	0.0068	0.0061	0.0852

# VG02 - Stabilize in Place Loadings: Future 2

Concentrations at V27

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	137	0.005	0.016	0.024	0.021	0.485
Feb	120	0.005	0.016	0.025	0.022	0.495
Mar	131	0.005	0.018	0.026	0.022	0.566
Apr	145	0.005	0.021	0.024	0.020	0.675
May	428	0.003	0.017	0.015	0.011	0.310
Jun	434	0.004	0.019	0.015	0.010	0.375
Jul	339	0.004	0.018	0.016	0.012	0.401
Aug	271	0.004	0.017	0.017	0.013	0.372
Sep	322	0.004	0.017	0.016	0.012	0.333
Oct	223	0.004	0.016	0.019	0.015	0.358
Nov	159	0.005	0.017	0.022	0.019	0.465
Dec	149	0.005	0.017	0.023	0.020	0.497

	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	430	0.0025	0.0110	0.0090	0.0078	0.2149
Feb	331	0.0026	0.0116	0.0102	0.0089	0.2496
Mar	342	0.0027	0.0126	0.0109	0.0093	0.3009
Apr	566	0.0023	0.0120	0.0076	0.0062	0.2427
May	4313	0.0017	0.0084	0.0029	0.0024	0.0460
Jun	4401	0.0017	0.0085	0.0029	0.0023	0.0548
Jul	3093	0.0017	0.0086	0.0032	0.0026	0.0643
Aug	2189	0.0018	0.0086	0.0035	0.0029	0.0668
Sep	2925	0.0017	0.0084	0.0032	0.0026	0.0539
Oct	1562	0.0018	0.0086	0.0040	0.0034	0.0735
Nov	756	0.0021	0.0097	0.0060	0.0051	0.1374
Dec	592	0.0022	0.0105	0.0072	0.0061	0.1754

# VG02 - Stabilize in Place Loadings: Future 3

Concentrations at V27

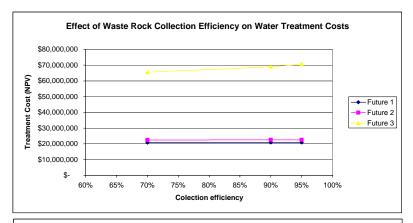
	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	137	0.005				-
Feb Mar	120 131	0.005 0.005				
Apr	145	0.005				
May	428	0.003	0.027	0.016	0.011	0.743
Jun	434	0.004	0.031	0.017	0.010	0.922
Jul	339	0.004	0.032	0.018	0.012	0.993
Aug	271	0.004	0.030	0.019	0.014	0.917
Sep	322	0.004	0.028	0.018	0.012	0.807
Oct	223	0.004	0.028	0.021	0.015	0.879
Nov	159	0.005	0.033	0.025	0.019	1.173
Dec	149	0.005	0.035	0.026	0.020	1.263

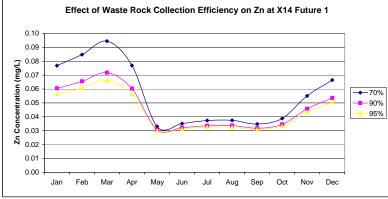
	Flow (x1000 m3)	As mg/L	Cu mg/L	Ni mg/L	Pb mg/L	Zn mg/L
Jan	430	0.0025	0.0168	0.0098	0.0078	0.4623
Feb	331	0.0026	0.0183	0.0112	0.0090	0.5386
Mar	342	0.0027	0.0209	0.0121	0.0094	0.6545
Apr	566	0.0023	0.0187	0.0086	0.0063	0.5294
May	4313	0.0017	0.0094	0.0031	0.0024	0.0907
Jun	4401	0.0017	0.0098	0.0031	0.0024	0.1109
Jul	3093	0.0017	0.0102	0.0034	0.0026	0.1319
Aug	2189	0.0018	0.0102	0.0038	0.0030	0.1368
Sep	2925	0.0017	0.0097	0.0034	0.0026	0.1081
Oct	1562	0.0018	0.0104	0.0043	0.0034	0.1508
Nov	756	0.0021	0.0133	0.0065	0.0051	0.2924
Dec	592	0.0022	0.0152	0.0079	0.0062	0.3762

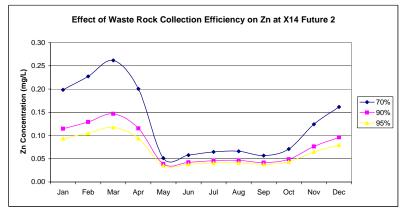
Attachment C Water and Load Balance Calculations – Sensitivity Analyses

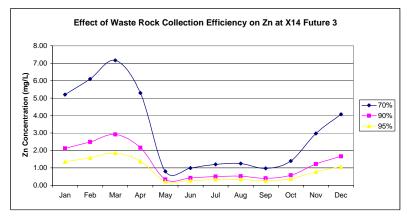
#### Sensitivity Runs

		Base	Capture Eff	%		Cover % Infil		Load Incr %	1	Source	Maximum Zinc	Water Treatment
	Run	Case	WR	ETA	TAILS	Rudimentary	Low Infil	Rudiment	Low Infiltr		at X14 (mg/L)	Cost (NPV)
Mining Area	Base	FM02	90	98	n/a	20	5	0	0	F2	0.15	\$22,539,000
	SF01	FM02	70	98	n/a	20	5	0	0	F2	0.26	\$22,419,000
	SF02	FM02	95	98	n/a	20	5	0	0	F2	0.12	\$22,607,000
	SF03	FM02	90	90	n/a	20	5	0	0	F2	0.38	\$22,348,000
	SF04	FM02	90	99	n/a	20	5	0	0	F2	0.12	\$22,605,000
	SF05	FM02	90	98	n/a	15	3	0	0	F2	0.11	\$21,850,000
	SF06	FM02	90	98	n/a	25	8	0	0	F2	0.18	\$23,344,000
	SF07	FM02	90	98	n/a	15	5	0	0	F2	0.12	\$22,087,000
	SF08	FM02	90	98	n/a	25	5	0	0	F2	0.17	\$23,019,000
	SF09	FM02	90	98	n/a	20	3	0	0	F2	0.14	\$22,328,000
	SF10	FM02	90	98	n/a	20	8	0	0	F2	0.16	\$22,816,000
	SF11	FM02	90	98	n/a	20	5	50	100	F2	0.22	\$24,065,000
	SF12	FM02	90	98	n/a	20	5	50	0	F2	0.20	\$23,515,000
	SF13	FM02	90	98	n/a	20	5	0	100	F2	0.17	\$22,987,000
Tailings Area	Base	RCT01	n/a	n/a	98	10	n/a	n/a	n/a	F2	0.33	\$45,824,000
_	SF15	RCT01	n/a	n/a	97	10	n/a	n/a	n/a n/a		0.49	\$45,514,000
	SF16	RCT01	n/a	n/a	99	10	n/a	n/a	n/a n/a		0.19	\$46,159,000
	SF17	RCT01	n/a	n/a	98	20	n/a	n/a n/a		F2	0.64	\$36,720,000
	SF18	RCT01	n/a	n/a	98	5	n/a	n/a	n/a	F2	0.19	\$59,312,000







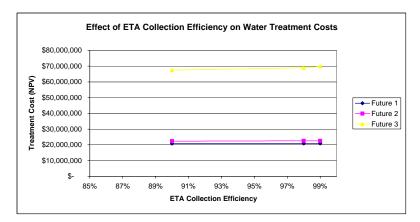


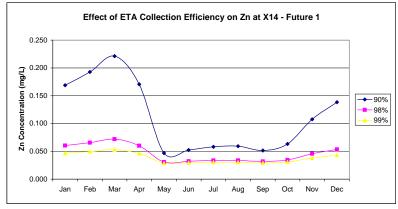
Rur		SF01	FM	02	SF02	T	SF01	FMC	12	SF02	SF01		FM02	SF02
Description	•	SF01 WR 70%	SF01 WF	-	SF02 WR 95 %	SEO		SF01 WR		SF02 WR 95 %	SF01 WR 70%	QE	-	SF02 WR 95 %
Source		Future 1	Futu		Future 1		ure 2	Futur			Future 3	5		Future 3
Source			Fulu	le l		Full	lie z	Fulur	ez		Future 5		Future 5	Future 5
Operating	days/year	36	5	365	365	5	365		365	365	36	5	365	365
Design Flow	m3/s	0.12	5	0.126	0.12		0.125		0.126	0.127	0.12	5	0.126	0.127
Surge Capacity Required	m3	322,00		326,000	327,000		322,000	3	26,000	327,000	322,000	)	326,000	327,000
Annual Treatment	m3	2,014,00		037,000	2,042,000		2,014,000		37,000	2,042,000	2,014,000		2,037,000	2,042,000
Reagents	tonne/year	7		74	76		162	, -	163	166	3,000		3,232	3,342
	g/L	0.03	7	0.036	0.037		0.080		0.080	0.081	1.493		1.587	1.637
Sludge Production	m3/year	1,26	6	1,281	1,298		2,166		2,205	2,242	37,070		40,767	42,599
	m3/year	39		399	404		675		687	698	11,540		12,698	13,268
											7-		,	-,
Costs														
Capital Cost		\$ 3,504,00	)\$3,	519,000	\$ 3,526,000	\$	3,570,000	\$ 3,5	90,000	\$ 3,592,000	\$ 4,786,000	) \$	4,880,000	\$ 4,923,000
Operating Cost		\$ 522,00	) \$	525,000	\$ 525,000	\$	567,000	\$ 5	70,000	\$ 572,000	\$ 1,829,000	) \$	1,931,000	\$ 1,982,000
1 0	\$/m3	0.2	6	0.26	0.20	5	0.28		0.28	0.28	0.9	1	0.95	0.97
Net Present Value														
Discount Rate	)	3	%	3%	3%	6	3%		3%	3%	39	%	3%	3%
Capital Costs	6	\$ 3,504,00	)\$3,	519,000	\$ 3,526,000	\$	3,570,000	\$ 3,5	90,000	\$ 3,592,000	\$ 4,786,000	) \$	4,880,000	\$ 4,923,000
NPV Annual Operating Costs	6	\$ 17,353,00	) \$ 17,	453,000	\$ 17,453,000	\$	18,849,000	\$ 18,9	49,000	\$ 19,015,000	\$ 60,802,000	) \$	64,192,000	\$ 65,888,000
1 0					. , ,	Ľ		. ,			, , ,		. ,	/
Total NPV	1	\$ 20,857,00	) \$ 20,	972,000	\$ 20,979,000	\$	22,419,000	\$ 22,5	39,000	\$ 22,607,000	\$ 65,588,000	)\$	69,072,000	\$ 70,811,000

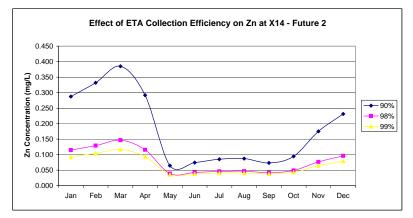
95%

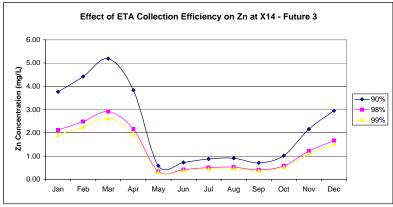
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90%





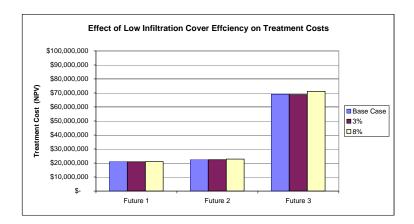


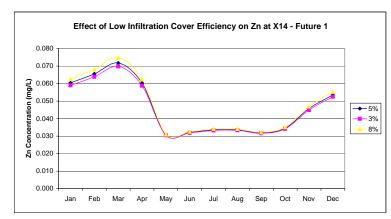


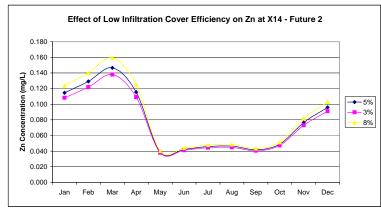
Run			SF03	FM02		SF04
Description		SF03	ETA 90 %	ETA 98 %	SF04 ETA 99%	
Source		Futur	e 1	Future 1		ure 1
Operating	days/year		365	365		365
Design Flow	m3/s		0.125	0.126		0.126
Surge Capacity Required	m3		323,000	326,000		326,000
Annual Treatment	m3		2,016,000	2,037,000		2,039,000
Reagents	tonne/year		72	74		76
	g/L		0.035	0.036		0.037
Sludge Production	m3/year		1,251	1,281		1,297
	m3/year		390	399		404
Costs						
Capital Cost		\$	3,499,000	\$ 3,519,000	\$	3,524,000
Operating Cost		\$	521,000	\$ 525,000	\$	525,000
	\$/m3		0.26	0.26		0.26
Net Present Value						
Discount Rate	)		3%	3%		3%
Capital Costs	6	\$	3,499,000	\$ 3,519,000	\$	3,524,000
NPV Annual Operating Costs	\$	17,320,000	\$ 17,453,000	\$	17,453,000	
Total NPV	1	\$	20,819,000	\$ 20,972,000	\$	20,977,000

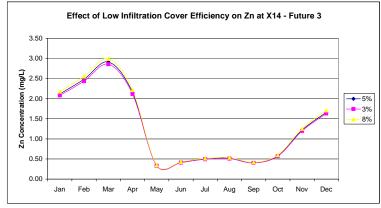
Run			SF03	FM02		SF04
Description		SF03	ETA 90 %	ETA 98 %	SF04 ETA 99%	
Source		Futur	e 2	Future 2	Future 2	
Operating	days/year		365	365		365
Design Flow	m3/s		0.125	0.126		0.126
Surge Capacity Required	m3		323,000	326,000		326,000
Annual Treatment	m3		2,016,000	2,037,000		2,039,000
Reagents	tonne/year		158	163		166
, s	g/L		0.078	0.080		0.081
Sludge Production	m3/year		2,146	2,205		2,237
ő	m3/year		668	687		697
	-					
Costs						
Capital Cost		\$	3,566,000	\$ 3,590,000	\$	3,590,000
Operating Cost		\$	565,000	\$ 570,000	\$	572,000
	\$/m3		0.28	0.28		0.28
Net Present Value						
Discount Rate	2		3%	3%		3%
Capital Costs		\$	3,566,000	\$ 3,590,000	\$	3,590,000
NPV Annual Operating Costs		\$	18,782,000	\$ 18,949,000	\$	19,015,000
Total NPV	,	\$	22,348,000	\$ 22,539,000	\$	22,605,000

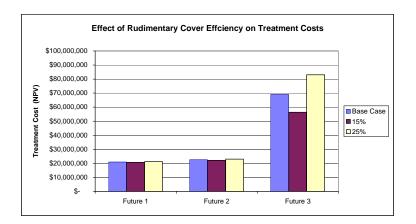
Run			SF03		FM02		SF04
Description		SF03	ETA 90 %		ETA 98 %	SF	04 ETA 99%
Source		Futur	e 3		Future 3	re 3 Future 3	
Operating	days/year		365		365		365
Design Flow	m3/s		0.125		0.126		0.126
Surge Capacity Required	m3		323,000		326,000		326,000
Annual Treatment	m3		2,016,000		2,037,000		2,039,000
Reagents	tonne/year		3,129		3,232		3,293
	g/L		1.552		1.587		1.615
Sludge Production	m3/year		39,150		40,767		41,786
ů,	m3/year		12,194		12,698		13,015
Costs		<u>^</u>		•		<b>^</b>	
Capital Cost		\$	4,825,000	\$	4,880,000	\$	4,907,000
Operating Cost	• ( -	\$	1,884,000	\$	1,931,000	\$	1,959,000
	\$/m3		0.93		0.95		0.96
Net Present Value							
Discount Rate	)		3%		3%		3%
Capital Costs	5	\$	4,825,000	\$	4,880,000	\$	4,907,000
NPV Annual Operating Costs			62,630,000	\$	64,192,000	\$	65,123,000
Total NPV	,	\$	67,455,000	\$	69,072,000	\$	70,030,000

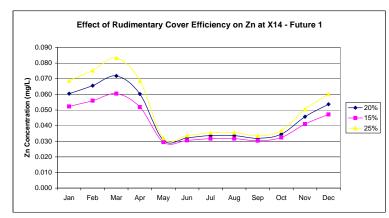


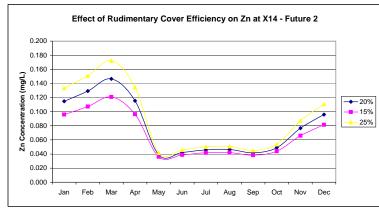


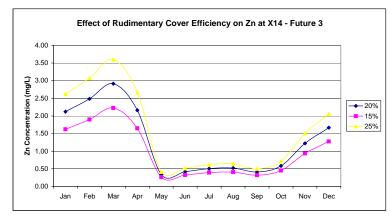


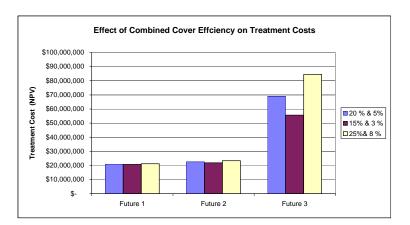


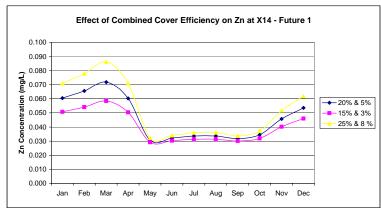


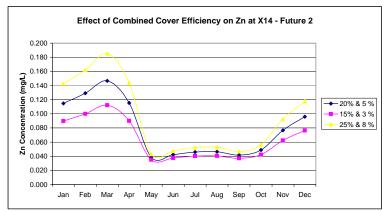


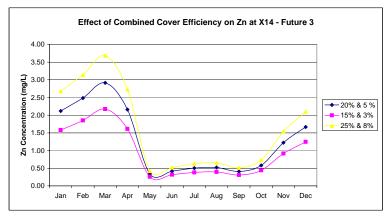








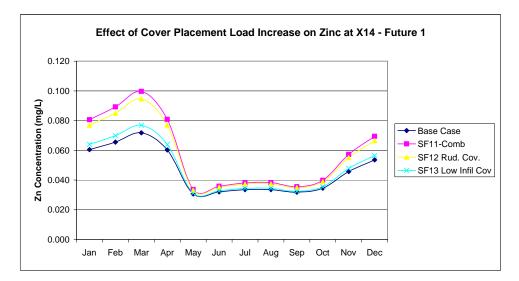


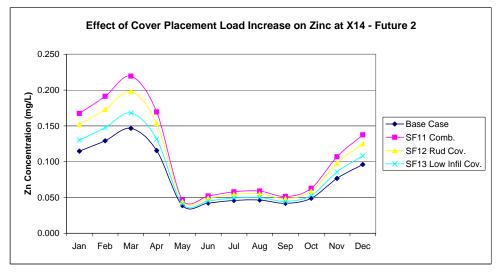


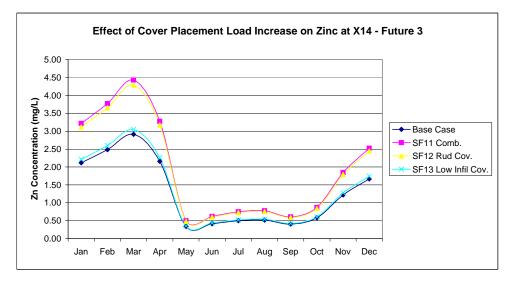
Site Description		FM02 Future 1	FM02 Future 2	FM02 Future 3	SF05 15 % and 3 % Future 1	SF05 15 % and 3 % Future 2	SF05 15 % and 3 % Future 3
Operating	days/year	365	365	365	365	365	365
Design Flow	m3/s	0.126	0.126	0.126	0.126	0.126	0.126
Surge Capacity Required	m3	326,000	326,000	326,000	326,000	326,000	326,000
Annual Treatment	m3	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000
Reagents	tonne/year	74	163	3,232	61	127	2,332
	g/L	0.036	0.080	1.587	0.030	0.062	1.145
Sludge Production	m3/year	1,281	2,205	40,767	1,102	1,787	25,178
	m3/year	399	687	12,698	343	557	7,842
Costs							
Capital Cost		\$ 3,519,000	\$ 3,590,000	\$ 4,880,000	\$ 3,505,000	\$ 3,566,000	\$ 4,551,000
Operating Cost		\$ 525,000	\$ 570,000	\$ 1,931,000	\$ 517,000	\$ 550,000	\$ 1,537,000
	\$/m3	0.26	0.28	0.95	0.25	0.27	0.75
Net Present Value							
Discount Rate		3%	3%	3%	3%	3%	3%
Capital Costs		\$ 3,519,000	\$ 3,590,000	\$ 4,880,000	\$ 3,505,000	\$ 3,566,000	\$ 4,551,000
NPV Annual Operating Costs		\$ 17,453,000	\$ 18,949,000	\$ 64,192,000	\$ 17,187,000	\$ 18,284,000	\$ 51,095,000
Total NPV		\$ 20,972,000	\$ 22,539,000	\$ 69,072,000	\$ 20,692,000	\$ 21,850,000	\$ 55,646,000
Cost Increase / (Decrease) on E	Sase Case				\$ (280,000)	\$ (689,000)	\$ (13,426,000)

Site Description		SF06 25 % and a Future 1			SF06 2 Future 3	5 % and 8 % 3	SF07 15 % and 5 % Future 1	SF07 15 % and 5 % Future 2	SF07 15 % and 5 % Future 3
Operating	days/year		365	365		365	365	365	365
Design Flow	m3/s	(	).126	0.126		0.126	0.126	0.126	0.126
Surge Capacity Required	m3	326	,000	326,000		326,000	326,000	326,000	326,000
Annual Treatment	m3	2,037	,000	2,037,000		2,037,000	2,037,000	2,037,000	2,037,000
Reagents	tonne/year		92	209		4,289	64	139	2,380
	g/L	0	.045	0.103		2.105	0.031	0.068	1.168
Sludge Production	m3/year	1	,491	2,709		58,952	1,123	1,873	26,005
	m3/year		464	844		18,362	350	583	8,100
Costs		¢ 0.500	000	¢ 0.004.000	¢	5 404 000	¢ 0.500.000	¢ 0.574.000	¢ 4 500 000
Capital Cost		\$ 3,530		\$ 3,631,000	\$	5,184,000	\$ 3,509,000	. , ,	
Operating Cost	¢ / 0	\$ 533		\$ 593,000	\$	2,384,000	\$ 517,000	. ,	
	\$/m3		0.26	0.29		1.17	0.25	0.27	0.76
Net Present Value									
Discount Rate	)		3%	3%		3%	3%	3%	3%
Capital Costs	5	\$ 3,530	,000	\$ 3,631,000	\$	5,184,000	\$ 3,509,000	\$ 3,571,000	\$ 4,589,000
NPV Annual Operating Costs	5	\$ 17,719	,000	\$ 19,713,000	\$	79,252,000	\$ 17,187,000	\$ 18,516,000	\$ 51,759,000
Total NP\	1	\$ 21,249	,000	\$ 23,344,000	\$	84,436,000	\$ 20,696,000	\$ 22,087,000	\$ 56,348,000
Cost Increase / (Decrease) on I	Base Case	\$ 277	,000	\$ 805,000	\$	15,364,000	\$ (276,000)	\$ (452,000)	) \$ (12,724,000)

Site Description		SF08 25 % and 5 % Future 1	SF08 25 % and 5 % Future 2	and 5 %	SF09 20 % and 3 % Future 1	SF09 20 % and 3 % Future 2	and 3 %	SF10 20 % and 8 % Future 1	SF10 20 % and 8 % Future 2	SF10 20 % and 8 % Future 3
Operating	days/year	365	365	365	365	365	365	365	365	365
Design Flow	m3/s	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126	0.126
Surge Capacity Required	m3	326,000	326,000	326,000	326,000	326,000	326,000	326,000	326,000	326,000
Annual Treatment	m3	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000	2,037,000
Reagents	tonne/year	87	192	4,199	72	154	3,215	80	183	3,365
	g/L	0.043	0.094	2.061	0.036	0.075	1.578	0.039	0.090	1.652
Sludge Production	m3/year	1,461	2,581	57,426	1,271	2,141	40,476	1,322	2,356	43,019
	m3/year	455	804	17,887	396	667	12,607	412	734	13,399
Costs Capital Cost Operating Cost	\$/m3	\$ 3,528,000 \$ 531,000 0.26	\$ 3,605,000 \$ 584,000 0.29	\$ 5,155,000 \$ 2,344,000 1.15	\$ 3,518,000 \$ 524,000 0.26	\$ 3,579,000 \$ 564,000 0.28	\$ 4,880,000 \$ 1,924,000 \$ 0.94	. , ,	\$ 3,601,000 \$ 578,000 0.28	\$ 4,926,000 \$ 1,992,000 \$ 0.98
Net Present Value										
Discount Rate	•	3%	3%	3%	3%	3%	3%	3%	3%	3%
Capital Costs	;	\$ 3,528,000	\$ 3,605,000	\$ 5,155,000	\$ 3,518,000	\$ 3,579,000	\$ 4,880,000	\$ 3,524,000	\$ 3,601,000	\$ 4,926,000
NPV Annual Operating Costs		\$ 17,652,000	\$ 19,414,000	\$77,922,000	\$ 17,419,000	\$ 18,749,000	\$ 63,960,000	\$ 17,519,000	\$ 19,215,000	\$66,220,000
Total NPV	,	\$ 21,180,000	\$ 23,019,000	\$ 83,077,000	\$ 20,937,000	\$ 22,328,000	\$ 68,840,000	\$ 21,043,000	\$ 22,816,000	\$ 71,146,000
Cost Increase / (Decrease) on E	Base Case	\$ 208,000	\$ 480,000	\$ 14,005,000	\$ (35,000)	\$ (211,000)	\$ (232,000)	\$ 71,000	\$ 277,000	\$ 2,074,000







Rur	า		FM02		SF11		SF12		SF13
				SF	11 50 % for Rud;			SF1	2 100 % for Low
Description		Ba	ase Case		100 % for Low	SF12 5	0 % for Rud		Infiltr.
Source		F	uture 1		Future 1	Fu	uture 1		Future 1
Operating	days/year		365		365		365		365
Design Flow	m3/s		0.126		0.126		0.126		0.126
Surge Capacity Required	m3		326,000		326,000		326,000		326,000
Annual Treatment	m3		2,037,000		2,037,000		2,037,000		2,037,000
0	tonne/year		74		106		99		83
	g/L		0.036		0.052		0.048		0.041
Sludge Production	m3/year		1,281		1,680		1,630		1,342
	m3/year		399		523		508		418
Costs									
Capital Cost		\$	3,519,000	\$	3,547,000	\$	3,542,000	\$	3,526,000
Operating Cost		\$	525,000	\$	541,000	\$	537,000	\$	528,000
	\$/m3		0.26		0.27		0.26		0.26
Net Present Value									
Discount Rate	e		3%		3%		3%		3%
Capital Costs	6	\$	3,519,000	\$	3,547,000	\$	3,542,000	\$	3,526,000
NPV Annual Operating Costs	6	\$	17,453,000	\$	17,985,000	\$	17,852,000	\$	17,552,000
Total NP	Total NPV		20,972,000	\$	21,532,000	\$	21,394,000	\$	21,078,000

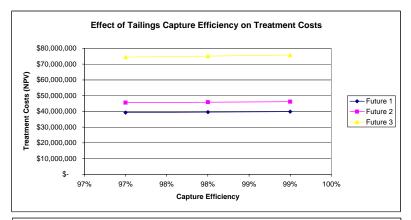
Effect of load increase from cover placement on Water Treatment Costs

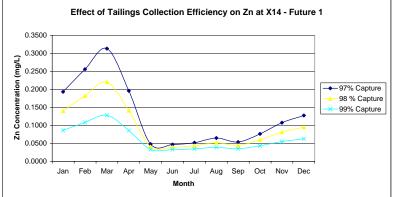
### Effect of load increase from cover place

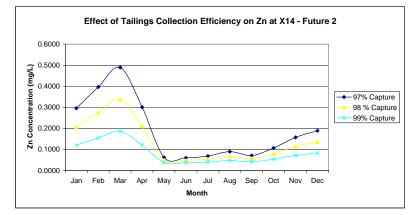
Run	1		FM02		SF11		SF12		SF13
				S	F11 50 % for Rud;			SF	12 100 % for Low
Description			Base Case		100 % for Low	S	F12 50 % for Rud		Infiltr.
Source			Future 2		Future 2		Future 2		Future 2
Operating	days/year		365		365		365		365
Design Flow	m3/s		0.126		0.126		0.126		0.126
Surge Capacity Required	m3		326,000		326,000		326,000		326,000
Annual Treatment	m3		2,037,000		2,037,000		2,037,000		2,037,000
0	tonne/year		163		255		222		194
	g/L		0.080		0.125		0.109		0.095
Sludge Production	m3/year		2,205		3,155		2,937		2,441
	m3/year		687		983		915		760
Costs									
Capital Cost		\$	3,590,000	\$	3,654,000	\$	3,636,000	\$	3,606,000
Operating Cost		\$	570,000	\$	614,000	\$	598,000	\$	583,000
	\$/m3		0.28		0.30		0.29		0.29
Net Present Value									
Discount Rate	•		3%		3%		3%		3%
Capital Costs	5	\$	3,590,000	\$	3,654,000	\$	3,636,000	\$	3,606,000
NPV Annual Operating Costs	5	\$	18,949,000	\$	20,411,000	\$	19,879,000	\$	19,381,000
Total NPV	Total NPV		22,539,000	\$	24,065,000	\$	23,515,000	\$	22,987,000

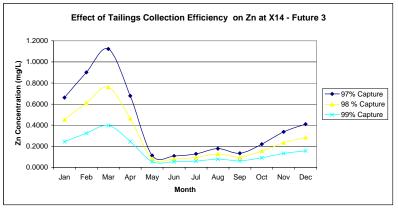
### Effect of load increase from cover place

Run			FM02		SF11		SF12		SF13
				S	F11 50 % for Rud;			SF	F12 100 % for Low
Description			Base Case		100 % for Low	SI	F12 50 % for Rud		Infiltr.
Source			Future 3		Future 3		Future 3		Future 3
Operating	days/year		365		365		365		365
Design Flow	m3/s		0.126		0.126		0.126		0.126
Surge Capacity Required	m3		326,000		326,000		326,000		326,000
Annual Treatment	m3		2,037,000		2,037,000		2,037,000		2,037,000
0	tonne/year		3,232		5,510		5,151		3,425
	g/L		1.587		2.705		2.529		1.681
Sludge Production	m3/year		40,767		76,073		73,379		44,036
	m3/year		12,698		23,695		22,856		13,716
Costs									
Capital Cost		\$	4,880,000	\$	5,474,000	\$	5,416,000	\$	4,943,000
Operating Cost		\$	1,931,000	\$	2,883,000	\$	2,738,000	\$	2,018,000
	\$/m3		0.95		1.42		1.34		0.99
Net Present Value									
Discount Rate	•		3%		3%		3%		3%
Capital Costs		\$	4,880,000	\$	5,474,000	\$	5,416,000	\$	4,943,000
NPV Annual Operating Costs	6	\$	64,192,000	\$	95,840,000	\$	91,020,000	\$	67,085,000
Total NPV	Total NPV		69,072,000	\$	101,314,000	\$	96,436,000	\$	72,028,000

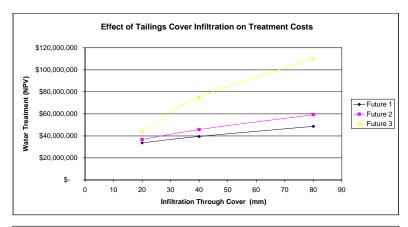


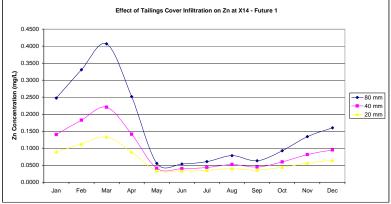


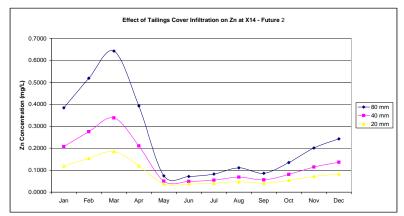


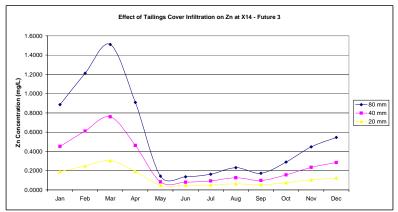


RUN		SF15	SF15	SF15	RCT01	RCT01	RCT01	SF16	SF16	SF16
Capture	%	97%	98%	99%	97%	98%	99%	97%	98%	99%
		Rose Creek		Rose Creek	Rose Creek		Rose Creek	Rose Creek		Rose Creek
		Tailings Faro	Rose Creek	Tailings Faro	Tailings Faro	Rose Creek	Tailings Faro	Tailings Faro	Rose Creek	Tailings Faro
Site		97%	Tailings Faro	99%	97%	Tailings Faro	99%	97%	Tailings Faro	99%
Description		Future 1	Future 1	Future 1	Future 2	Future 2	Future 2	Future 3	Future 3	Future 3
Operating	days/year	365	365			365	365	365	365	
Design Flow	m3/s	0.266	0.268	-	0.266	0.268	0.271	0.266	0.268	
Surge Capacity Required	m3	685,000	692,000	699,000	685,000	692,000	699,000	685,000	692,000	699,000
Annual Treatment	m3	4,282,000	4,326,000	4,370,000	4,282,000	4,326,000	4,370,000	4,282,000	4,326,000	4,370,000
Reagents	tonne/year	644	650	657	1,049	1,060	1,071	2,991	3,022	3,052
	g/L	0.150	0.150	0.150	0.245	0.245	0.245	0.698	0.698	0.698
Sludge Production	m3/year	3,945	3,986	4,027	5,821	5,881	5,941	15,933	16,097	16,261
	m3/year	1,229	1,242	1,254	1,813	1,832	1,851	4,963	5,014	5,065
0										
Costs		• • • • • • • • • • • • • • • • • • •	<b>•</b> • • • • • • • •	<b>•</b> • • = = • • • •	<b>•</b> • • <b>-</b> • • • • • •	<b>•</b> • • • • • • • • •	<b>•</b> • • • • • • • • •	<b>•</b> • • • • • • • • •	<b>•</b> • • • • • • • •	<b>• - - - - - - - - - -</b>
Capital Cost		\$ 5,969,000	\$ 6,006,000	\$ 6,055,000	\$ 6,154,000	\$ 6,198,000	\$ 6,234,000	\$ 6,941,000	\$ 6,989,000	\$ 7,039,000
Operating Cost	<b>•</b> / •	\$ 1,002,000	\$ 1,009,000	\$ 1,016,000	\$ 1,184,000	\$ 1,192,000	\$ 1,201,000	\$ 2,033,000	\$ 2,051,000	\$ 2,069,000
	\$/m3	0.23	0.23	0.23	0.28	0.28	0.27	0.47	0.47	0.47
Net Present Value										
Discount Rate	<b>`</b>	3%	3%	3%	3%	3%	3%	3%	3%	3%
Capital Costs		\$ 5,969,000	\$ 6,006,000	\$ 6,055,000		\$ 6,198,000	\$ 6,234,000	\$ 6,941,000	\$ 6,989,000	\$ 7,039,000
NPV Annual Operating Costs		\$ 33,310,000	\$ 33,542,000	\$ 33,775,000		\$ 39,626,000	\$ 39,925,000	\$ 67,583,000	\$ 68,182,000	\$ 7,039,000 \$ 68,780,000
NF V Annual Operating Costs	)	φ 33,310,000	φ 33,542,000	φ 33,775,000	φ 39,360,000	φ 39,020,000	φ 39,925,000	φ 07,363,000	φ 00, 102,000	φ 00,7 00,000
Total NPV	/	\$ 39,279,000	\$ 39,548,000	\$ 39,830,000	\$ 45,514,000	\$ 45,824,000	\$ 46,159,000	\$74,524,000	\$ 75,171,000	\$ 75,819,000









		20	40	80						
Description										
Run		SF18	RCT01	SF17	SF18	RCT01	SF17	SF18	RCT01	SF17
		Rose Creek	Rose Creek	Rose Creek	Rose Creek	Rose Creek	Rose Creek	Rose Creek	Rose Creek	Rose Creek
		Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro	Tailings Faro
Site		20 mm Infil.	40 mm Infil.	80 mm Infil.	20 mm Infil.	40 mm Infil.	80 mm Infil.	20 mm Infil.	40 mm Infil.	80 mm Infil.
Description		Future 1	Future 1	Future 1	Future 2	Future 2	Future 2	Future 3	Future 3	Future 3
Operating	days/year	365	365	365	365	365	365	365	365	365
Design Flow	m3/s	0.268	0.268	0.268		0.268	0.268		0.268	0.268
Surge Capacity Required	m3	692,000	692,000	692,000	692,000	692,000	692,000	692,000	692,000	692,000
Annual Treatment	m3	4,326,000	4,326,000	4,326,000	4,326,000	4,326,000	4,326,000	4,326,000	4,326,000	4,326,000
	-	, ,	4,320,000	4,320,000	4,320,000 483	4,328,000	4,328,000	4,328,000 965		
Reagents	tonne/year		0.150	,	0.112	,	,		3,022 0.698	5,283 1.221
Obselara Das dos tiera	g/L	0.069		0.280	-	0.245	0.444	0.223		
Sludge Production	m3/year	1,915	3,986	7,820	2,882	5,881	11,808	5,227	16,097	37,774
	m3/year	597	1,242	2,436	898	1,832	3,678	1,628	5,014	11,766
Costs										
Capital Cost		\$ 5,800,000	\$ 6,006,000	\$ 6,348,000	\$ 5,904,000	\$ 6,198,000	\$ 6,622,000	\$ 6,135,000	\$ 6,989,000	\$ 7,893,000
Operating Cost		\$ 838,000	\$ 1,009,000		\$ 927,000	\$ 1,192,000	\$ 1,585,000	\$ 1,146,000	\$ 2,051,000	\$ 3,076,000
	\$/m3	0.19	0.23	0.29	0.21	0.28	0.37	0.26	0.47	0.71
Net Present Value										
Discount Rate	•	3%	3%	3%	3%	3%	3%	3%	3%	3%
Capital Costs		\$ 5,800,000	\$ 6,006,000	\$ 6,348,000	\$ 5,904,000	\$ 6,198,000	\$ 6,622,000	\$ 6,135,000	\$ 6,989,000	\$ 7,893,000
NPV Annual Operating Costs	6	\$27,858,000	\$33,542,000	\$42,285,000	\$30,816,000	\$39,626,000	\$52,690,000	\$38,097,000	\$68,182,000	\$ 102,256,000
Total NPV	1	\$ 33,658,000	\$ 39,548,000	\$48,633,000	\$36,720,000	\$45,824,000	\$ 59,312,000	\$44,232,000	\$75,171,000	\$ 110,149,000

Attachment D SENES Draft Human Health & Ecological Risk Assessment

# Hockley, Daryl

From:Harriet Phillips - SENES Consultants Limited [hphillips@senes.ca]Sent:Wednesday, December 07, 2005 3:31 PMTo:Hockley, DarylSubject:Re: Anvil Range Water Quality

Daryl,

Runs are completed and I am now working on revising the sections of the report with the new results.

Harriet

At 05:14 PM 12/6/2005 -0800, you wrote:

Harriet,

John and I have gone through the numbers and he will create a new file that reflects the assumptions. You will need to change your text to say that The assumed infiltration through the covered tailings is 40 mm per year, as in the current condition. In other words the cover does not increase or decrease current infiltration rates.

John will also change the background copper concentrations. He will use 0.002 mg/L in Vangorda and 0.005 in Rose. Those are the maxima of the detected values in the gooddata from Leslies memo.

Harriet Phillips Ph.D. Senior Specialist Risk Assessment/Toxicology

SENES Consultants Limited 121 Granton Drive, Unit 12 Richmond Hill, Ontario Canada L4B 3N4 Tel: (905) 764-9380 X305 Fax: (905) 764-9386 Email Address: hphillips@senes.ca Web Site: http://www.senes.ca/

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Attachment E Water Treatment Cost Estimates

### FM02 - Stabilize in Place

### CONSTANT OPERATING COSTS

Site Description			FM02 Future 1		FM02 Future 2		FM02 Future 3
Operating	days/year		365		365		365
Design Flow	m3/s		0.126		0.126		0.126
Surge Capacity Required	m3		326,000		326,000		326,000
Annual Treatment	m3		2,037,000		2,037,000		2,037,000
Reagents	tonne/year		74		163		3,232
	g/L		0.036		0.080		1.587
Sludge Production	m3/year		1,281		2,205		40,767
	m3/year		399		687		12,698
Costs Capital Cost Operating Cost	\$/m3	\$ \$	3,519,000 525,000 0.26	\$ \$	3,590,000 570,000 0.28	\$ \$	4,880,000 1,931,000 0.95
Net Present Value							
Discount Rate			3%		3%		3%
Capital Costs		\$	3,519,000	\$	3,590,000	\$	4,880,000
NPV Annual Operating Costs		\$	17,453,000	\$	18,949,000	\$	64,192,000
Total NPV		\$ 2	20,972,000	\$	22,539,000	\$	69,072,000

### STAGED ASCENDING OPERATING COSTS

Site Description	Units		FM02 Future 1		FM02 Future 2		FM02 Future 3
Operating Design Flow	days/year m3/s		365 0.126		365 0.126		365 0.126
Surge Capacity Required Annual Treatment Quicklime	m3 m3 tonne/year		326,000 2,037,000 74		326,000 2,037,000 163		326,000 2,037,000 3,232
Sludge Production	g/L m3/year		0.036 1,281		0.080 2,205		1.587 40,767
	m3/year		399		687		12,698
Costs Capital Cost		¢	3,519,000	¢	2 500 000	\$	4,880,000
Operating Cost	Stage 1	\$ \$	525,000	\$ \$	3,590,000 525,000	э \$	4,880,000
operaning ever	Stage 2	\$	525,000	\$	570,000	\$	570,000
	Stage 3	\$	525,000	\$	570,000	\$	1,931,000
Net Present Value							
Discount Rate Capital Costs NPV Annual Operating Costs	;		3% 3,519,000 17,451,000		3% 3,714,000 18,302,000	\$ \$2	3% 5,693,000 23,267,000
Total NPV		\$2	20,970,000	\$2	22,016,000	\$2	28,960,000
Treatment Costs							
Year Commence	Stage 2 Stage 3		200 200		20 200		20 75

### **RCT 1 Stabilize in Place**

#### CONSTANT OPERATING COSTS

Site Description		Ro Ta	<b>CT01</b> se Creek ilings Faro ture 1	Ro Ta	<b>T01</b> ose Creek ilings Faro Future 2	R Ta	<b>T01</b> ose Creek ailings Faro Future 3
Operating Design Flow Surge Capacity Required Annual Treatment 0 Sludge Production	days/year m3/s m3 tonne/year g/L m3/year m3/year		365 0.268 692,000 4,326,000 650 0.150 3,986 1,242		365 0.268 692,000 4,326,000 1,060 0.245 5,881 1,832		365 0.268 692,000 4,326,000 3,022 0.698 16,097 5,014
Costs Capital Cost Operating Cost	\$/m3	\$ \$	6,006,000 1,009,000 0.23	•	6,198,000 1,192,000 0.28	\$ \$	6,989,000 2,051,000 0.47
Net Present Value Discount Rate Capital Costs NPV Annual Operating Costs Total NPV	5	\$:	3% 6,006,000 33,542,000 <b>39,548,000</b>	\$3	3% 6,198,000 9,626,000 <b>5,824,000</b>	,	3% 6,989,000 68,182,000 <b>75,171,000</b>

STAGED ASCENDING OPERATING COSTS										
			CT01	RC	T01	RCT01				
			se Creek		ose Creek	Rose Cree				
Site			ilings Faro		ailings Faro	Tailings Fa				
Description	Units	Fu	ture 1		Future 2	Future 3	3			
Operating	days/year		365		365	3	365			
Design Flow	m3/s		0.268		0.268	0.2	268			
Surge Capacity Required	m3		692,000		692,000	692,0	00			
Annual Treatment	m3		4,326,000		4,326,000	4,326,0	00			
Quicklime	tonne/year		650		1,060	3,0	22			
	g/L		0.150		0.245	0.6	98			
Sludge Production	m3/year		3,986		5,881	16,0	97			
C C	m3/year		1,242		1,832	5,0	14			
Costs										
Capital Cost		\$	6,006,000	\$	6,198,000	\$ 6,989,0	00			
Operating Cost	Stage 1	\$	1,009,000	\$	1,009,000	\$ 1,009,0	00			
	Stage 2	\$	1,009,000	\$	1,192,000	\$ 1,192,0	00			
	Stage 3	\$	1,009,000	\$	1,192,000	\$ 2,051,0	00			
Net Present Value										
Discount Rate	9		3%		3%		3%			
Capital Costs	3	\$	6,006,000	\$	3,714,000	\$ 5,693,0	00			
NPV Annual Operating Costs	6	\$	33,540,000	\$3	38,198,000	\$47,159,0	00			
Total NPV	/	\$	39,546,000	\$4	41,912,000	\$ 52,852,0	00			
Treatment Costs										
Year Commence	e Stage 2	n/a	a		10		10			
	Stage 3	n/a	a	n/a			40			

Note: Plateau extends > 200 years -i.e. no stage 4

### **RCT02 - Complete Relocation**

### Constant - indefinite treatment

Site Description		Faro Tailings Relocated Future 1			
Operating Design Flow Surge Capacity Required Annual Treatment Reagents Sludge Production	days/year m3/s m3 tonne/year g/L m3/year m3/year		365 0.142 366,000 2,286,000 371 0.162 2,315 721		
Costs Capital Cost Operating Cost	\$/m3	\$ \$	4,015,000 693,000 0.30		
Net Present Value Discount Rate Capital Costs NPV Annual Operating Costs	i	\$ \$	3% 4,015,000 23,037,000		
Total NPV		\$	27,052,000		

Treat for 30 years only

Site Description	Units	Faro Tailings Relocated Future 1			
Operating	days/year		365		
Design Flow	m3/s		0.142		
Surge Capacity Required	m3		366,000		
Annual Treatment	m3		2,286,000		
Quicklime	tonne/year		371		
Observer, Das duss tis a	g/L		0.162		
Sludge Production	m3/year m3/year		2,315 721		
Costs Capital Cost Operating Cost	Stage 1 Stage 2 Stage 3	\$\$\$\$	4,015,000 693,000 - -		
Net Present Value					
Discount Rate		•	3%		
Capital Costs		\$	4,015,000		
NPV Annual Operating Costs	i	\$	13,298,000		
Total NPV		\$	17,313,000		

#### **RCT03 - Partial Relocation**

### CONSTANT OPERATING COSTS

Site Description		Tailir	e Creek ngs Partial cation re 1	Tai Re	se Creek lings Partial location rure 2	Rose Creek ailings Partial Relocation Future 3
Operating	days/year		365		365	365
Design Flow	m3/s		0.171		0.171	0.171
Surge Capacity Required	m3		441,000		441,000	441,000
Annual Treatment	m3		2,759,000		2,759,000	2,759,000
0	tonne/year		534		822	2,222
	g/L		0.194		0.298	0.805
Sludge Production	m3/year		3,416		4,787	12,354
	m3/year		1,064		1,491	3,848
Costs						
Capital Cost		\$	4,544,000	\$	4,666,000	\$ 5,279,000
Operating Cost		\$	812,000	\$	942,000	\$ 1,558,000
	\$/m3		0.29		0.34	0.56
Net Present Value						
Discount Rate	9		3%		3%	3%
Capital Costs		\$	4,544,000	\$	4,666,000	\$ 5,279,000
NPV Annual Operating Costs	6	\$	26,993,000	\$	31,315,000	\$ 51,793,000
Total NPV	1	\$	31,537,000	\$	35,981,000	\$ 57,072,000

#### STAGED ASCENDING OPERATING COSTS

		Rose Creek Tailings Partial		Taili	e Creek ngs Partial	Rose Creek Tailings Partial		
Site					ocation	Relocation		
Description	Units	Futu	iture 1 Futu		ire 2	Future 3		
Operating	days/year		365		365		365	
Design Flow	m3/s		0.171		0.171		0.171	
Surge Capacity Required	m3		441,000		441,000		441,000	
Annual Treatment	m3		2,759,000		2,759,000		2,759,000	
Quicklime	tonne/year		534		822		2,222	
	g/L		0.194		0.298		0.805	
Sludge Production	m3/year		3,416		4,787		12,354	
	m3/year		1,064		1,491		3,848	
Costs								
Capital Cost		\$	4,544,000	\$	4,666,000	\$	5,279,000	
Operating Cost	Stage 1	\$ \$	812,000	\$	812,000	\$	812,000	
	Stage 2	\$	812,000	\$	942,000	\$	942,000	
	Stage 3	\$	812,000	\$	942,000	\$	1,558,000	
Net Present Value								
Discount Rate			3%		3%		3%	
Capital Costs		\$	4,544,000	\$	3,714,000	\$	5,693,000	
NPV Annual Operating Costs	6	\$	26,991,000	\$	30,300,000	\$	36,726,000	
Total NPV	1	\$	31,535,000	\$	34,014,000	\$	42,419,000	
Treatment Costs								
Year Commence	e Stage 2 Stage 3	n/a n/a		n/a	10		10 40	

# VG02 - Stabilize in Place

Site Description			angorda/Gr um VG01 Future 1		angorda/Gr um VG01 Future 2		angorda/Gr um VG01 Future 3
Operating	days/year		365		365		365
Design Flow	m3/s		0.081		0.081		0.081
Surge Capacity Required	m3		208,000		208,000		208,000
Annual Treatment	m3		1,298,000		1,298,000		1,298,000
Reagents	tonne/year		19		57		89
-	g/L		0.015		0.044		0.068
Sludge Production	m3/year		147		394		894
	m3/year		46		123		279
Costs Capital Cost Operating Cost	\$/m3	\$ \$	2,688,000 414,000 0.32	\$ \$	2,746,000 435,000 0.34	\$ \$	2,781,000 455,000 0.35
Net Present Value							
Discount Rate	•		3%		3%		3%
Capital Costs	5	\$	2,610,000	\$	2,666,000	\$	2,700,000
NPV Annual Operating Costs	5	\$	13,763,000	\$	14,461,000	\$	15,126,000
Total NPV	,	\$	16,373,000	\$	17,127,000	\$	17,826,000