APPENDIX Y

Reclamation Plan

Report to:

VISTA GOLD CORP.

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Mt Todd Gold Project
Preliminary Feasibility Study
Reclamation Plan
Northern Territory, Australia

PROJECT NO. 114-311285

DATE: JUNE 2013

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LIST OF ACRONYMS

ARD	Acid Rock Drainage
ARD/ML	Acid Rock Drainage and Metal-Laden Leachate
GCL	Geocomposite Clay Liner
H	Horizontal
HDPE	High Density Polyethylene
HLP	Heap Leach Pad
hr	hour
km	kilometer
LGO1	Existing low grade ore stockpile
LGO2	New low grade ore stockpile
LPM	low-permeability materials
m	meter
m^2	square meter
m^3	cubic meter
MDA	Mine Development Associates
Mt	Million tonnes
Mtpy	Million tonnes per year
MWH	Montgomery Watson and Harza
New WTP	Proposed WTP
NNP	Net Neutralizing Potential
NT	Northern Territory of Australia
O&M	Operations and Maintenance
PAG	Potentially Acid Generating
PEA	Preliminary Economic Analysis
Pegasus	Pegasus Gold Australia Pty Ltd
PFSRP	Preliminary Feasibility Study Reclamation Plan
PGM	Plant Growth Medium
PFS	Preliminary Feasibility Study NI 43-101 Technical Report
RP	Retention Pond
RP1	Waste Rock Dump Pond
RP2	LGO Stockpile Pond
RP3	Batman Pit Lake
RP4	Run-of-Mine Pond
RP5	Process Plant Runoff Pond
RP6	Process Plant Pond
RP7	TSF1 Pond
RUSLE	Revised Universal Soil Loss Equation
SWCC	Soil Water Characteristic Curve
TDR	Time-Domain Reflectometers
TPD	tonnes per day
TSF1	Existing Tailings Storage Facility
TSF2	New Tailings Storage Facility
Vista	Vista Gold Corp.
WEPP	Water Erosion Prediction Project
WRD	Waste Rock Dump
WRMP	Waste Rock Management Plan
WTP	Water Treatment Plant

EXECUTIVE SUMMARY

Tetra Tech, Inc. (Tetra Tech) was retained by Vista Gold Corp. (Vista) to develop a Preliminary Feasibility Study Reclamation Plan (PFRP) for the Mt. Todd Project (Mt. Todd) 50,000 (50K) tonne per day (TPD) mine plan in support of the Preliminary Feasibility Study NI 43-101 Technical Report (PFS) for renewed mining operations. This PFSRP assesses select reclamation requirements and associated costs of resumed mining under the PFS mining plan, effective June, 2013.

Mt. Todd is located 56 kilometers (km) by road northwest of Katherine, and approximately 290 km southeast of Darwin in Northern Territory (NT), Australia. In March 2006, Vista gained the rights to explore and develop the mineral resources of Mt. Todd. In January 2007, Vista assumed the obligation to operate, care for and maintain assets held by the NT Government at Mt. Todd. The rights and responsibilities assumed by Vista in 2006 and 2007 continue as of the authoring of this report.

This report focuses on the reclamation earthworks associated with closing existing and future mine features during and following the completion of mining operations. The reclamation plan included in this report is based on the reclamation cover design presented in the Mt. Todd Project Preliminary Feasibility Closure Plan – Appendix J, Northern Territory, Australia, January 11, 2011, Tetra Tech. This report will be referred to here as the 'January 2011 PFCP'. Vista is also conducting studies to address immediate environmental challenges for the Mt Todd site including management of acid rock drainage and metal-laden leachates (ARD/ML) currently contained in several water storage facilities. Current and future water treatment plans; sludge management; surface water management; facility decontamination, decommissioning, demolition and disposal; and baseline studies and permitting are not covered in this report, as they are discussed in detail elsewhere. The costs of selective handling of waste rock and the haulage of waste rock to the Tailings Storage Facility (TSF) 1 and 2 are not covered in this report, as they are discussed in detail elsewhere.

The major facilities that are included in this PFSRP are as follows:

- Batman Pit;
- Waste Rock Dump (WRD);
- Process Plant and Operations Area;
- Heap Leach Pad (HLP);
- Mine roads.
- Existing Tailings Storage Facility (TSF1);
- Proposed TSF (TSF 2);
- Low Grade Ore Stockpile (LGO1);
- Proposed LGO (LGO2) located north of the Process Plant Area; and
- Haul roads to all new and expanded facilities.

Plans and strategies for the reclamation of these existing and proposed facilities are provided in this report.

Purpose and Scope

The primary goals of this PFSRP are:

1. Advance previous closure and reclamation plans by defining reclamation approaches, strategies, and estimated costs at an overall ± 15 percent level of accuracy;
2. Update reclamation cost estimates to reflect utilization of mine employees and mine-owned equipment in reclamation activities;
3. Provide an estimate of the Security Cost for the project utilizing the Northern Territory's (NT) Security Cost estimate protocols;
4. Identify information and functional gaps pertaining to mine reclamation;
5. Summarize future investigations to address the information gaps identified; and
6. Recommend actions to address the functional gaps identified.

Approach

This PFSRP was developed based on input from Vista and their consultants; review of readily available data and information regarding Mt. Todd; and Tetra Tech's technical experts who are familiar with Mt. Todd mine and metallurgic planning. Additional technical support was provided by Tetra Tech geochemists, hydrogeologists, civil engineers, and vadose modeling experts.

Key issues and project drivers were identified during development of the January 2011 PFCP as well as a series of participatory meetings with Vista representatives, Mine Development Associates (MDA), and Tetra Tech staff. The concepts, strategies, and options developed and evaluated during these meetings and subsequent analyses were discussed with and endorsed by Vista and serve as the foundation for this PFSRP.

The reclamation store and release covers presented in the January 2011 PFCP were used as the basis for the store and release cover design in this PFSRP. This PFSRP was developed by modifying and updating the January 2011 PFCP according to the revised mining plan, recent findings and analyses from ongoing investigations, and design and planning efforts. These findings and analyses were incorporated to the extent possible to support specific portions of the PFSRP.

As noted earlier, this PFSRP does not include certain items addressed in the PFCP, such as surface water management, water treatment. These and other matters addressed in the PFCP are dealt with in other Appendices of the PFS.

The reclamation plans developed and their estimated costs are based on the following:

- 18 Million tonnes per year (Mtpy) mine plan and existing engineering and data presented in the PFS;
- Geochemical testing program and results (2013 Geochemistry Program);
- Mine-life (i.e., pre-production phase of two years, production phase of 13 years, reclamation phase of 2 years, and post-reclamation monitoring and maintenance phase of approximately 5 years);
- Estimates of environmental conditions throughout the mine-life;
- NT Government mine closure and environmental protection regulations and guidelines;
- Published unit costing, equipment specification and performance references;

- Australian cost estimates provided by Proteus, Tetra Tech, and Mt. Todd employees in Australia;
- Tetra Tech's recent mine closure costing experience; and
- Best professional judgment.

Goals and Important Project Drivers

The reclamation goals for Mt. Todd include:

1. Control acid-generating conditions;
2. Minimize erosion of facilities containing mine waste;
3. Reduce or eliminate the acid and metal loads of seepage and runoff water;
4. Minimize adverse impacts to the surface and ground water systems surrounding Mt. Todd;
5. Physical and chemical stabilization of mine waste and other mine-related surface disturbances;
6. Protect public safety; and
7. Comply with NT Government regulations governing mine development and closure.

The important project drivers by which the reclamation plan and strategies were developed are as follows:

1. Use standard reclamation practices with the knowledge that design details will be fine-tuned in the future;
2. Use previous investigations, studies, and available data and information;
3. Identify information gaps and future investigations necessary to improve the characterization of site conditions now and through reclamation;
4. Provide Vista with practical development and recommendations to facilitate:
    a. Future closure and design efforts, and
    b. Site-wide integration of closure designs;
5. Exploit 'Mine for Closure' opportunities by reclaiming mine components simultaneously with mining (i.e., concurrent reclamation);
6. Identify strategies to reduce acid/metal loading to water management structures and ground and surface water;
7. Handle materials and water efficiently; and
8. Emphasize low-maintenance or "walk away" reclamation where practical.

Major Reclamation Planning Results

The reclamation plans for each existing and proposed major facility at Mt. Todd are summarized in Table ES1.

Throughout the mine-life, Vista should anticipate, plan, design for, and implement effective plans for:

1. Identification of potentially acid-generating (PAG) and non-PAG materials, as well as materials that have the potential to leach constituents in concentrations above applicable water quality-based effluent standards (metaliferous);
2. Selective handling of PAG and non-PAG material and potentially direct treatment of PAG materials throughout the mine-life to prevent or reduce the generation of ARD/ML;
3. Separation of unimpacted surface and ground water from PAG and metalliferous materials and ARD/ML;
4. Short- and long-term hydrologic isolation of PAG and metalliferous materials from ground and surface water;
5. Facility and site-wide closure; and
6. Control of stormwater to prevent excessive erosion and sedimentation.

Tetra Tech recommends the following specific closure investigations necessary to address the information gaps:

1. Complete an analysis of waste and cover material hydraulic properties;
2. Complete a tailings trafficability study;
3. Complete a precipitation-watershed yield study;
4. Complete a tailings management plan;
5. Complete a site-wide soils, closure cover, and reclamation material inventory and characterization study; and
6. Complete a waste and closure cover erosion and sediment control study.

Tetra Tech estimated reclamation costs. Based on the costing approach discussed in this report, the PFS cost estimate for implementing this closure plan is **AU $154,812,000**. This cost estimate includes reclamation of major facilities at Mt. Todd, utilizes costs for performing reclamation activities with mine employees and mine-owned equipment, and includes indirect costs for an additional environmental supervisor to oversee reclamation activities.

TABLE ES1: RECLAMATION APPROACH

Task	Facility							
	Batman Pit	WRD	HLP	TSF1&2 Impounded Surface	TSF1&2 Dams	Process Plant and Pad	LGO 2	Mine Roads
Surface of Facility at Cessation of Production Composed of Non-PAG		X			X			
Final Overall Slopes > 3H:1V*	X				X			X
Final Overall Slopes < 3H:1V*		X	X	X		X	X	X
Benches Created During Construction	X	X			X			
Install 1.0 meter-Thick non-PAG Material		X		X				
Install 0.8 meter-Thick Store and Release Cover			X	X	X	X	X	X
Install 0.2 meter-Thick Plant Growth Medium (PGM) Cover		X	X	X	X	X	X	X
Revegetate with Native Seed Mix			X	X	X	X	X	X
Install GCL Liner (with under and overlayer of fines)		X						
Install Erosion and Sediment Controls		X	X	X	X	X	X	X
Construct Access Restriction Bund	X							
Additional Remedial Measures (as necessary)	X	X	X	X	X	X	X	X

* > and < indicates slopes are steeper and less steep, respectively.

1.0 INTRODUCTION

Tetra Tech was retained by Vista to develop a PFSRP for Mt. Todd 50K TPD in support of the PFS for renewed mining operations. This PFSRP evaluates the reclamation liabilities that will transfer to Vista should a decision be made to restart mining operations at Mt. Todd and is primarily supported by information and data provided in the 2013 Geochemistry Program, prepared by Tetra Tech. The primary goals of this PFSRP are:

1. Advance previous closure and reclamation plans by defining reclamation approaches, strategies, and cost estimates at an overall ± 15 percent level of accuracy;
2. Update reclamation estimates to reflect utilization of mine employees and mine-owned equipment in reclamation activity;
3. Develop the Northern Territory's (NT) Security Cost estimate;
4. Identify information and functional gaps pertaining to mine reclamation;
5. Summarize future investigations to address the information gaps identified; and
6. Recommend actions to address the functional gaps identified.

To achieve these goals, Tetra Tech developed plans and estimated quantities (e.g., facility dimension, material volumes, surface areas, and disturbance footprints) for the reclamation of major mine facilities at Mt. Todd. These plans and estimates were based on the following:

- 18 Mtpy mine plan;
- The January 2011 PFCP;
- Previously developed reclamation plans and strategies;
- Mine-life (i.e., pre-production phase of two years, production phase of 13 years, reclamation phase of 2 years, and post-reclamation monitoring and maintenance phase of approximately 5 years);
- Estimates of environmental conditions throughout the mine-life;
- NT Government mine closure and environmental protection regulations and guidelines; and
- Best professional judgment.

Vista is presently conducting studies to address immediate environmental challenges for Mt Todd including management of ARD/ML currently contained in several water storage facilities. Current and future water treatment plans; sludge management; surface water management; facility decontamination, decommissioning, demolition and disposal; and baseline studies and permitting are not are not covered in this report, as they are discussed in detail elsewhere. The costs of selective handling and the haulage of non-PAG waste rock to TSF 1 and 2 are not covered in this report, as they are discussed in detail elsewhere. This report focuses on the reclamation earthworks associated with closing existing and future mine features during and following the completion of mining operations. An emphasis in this reclamation plan has been placed on reclaiming features which contain PAG materials. PAG materials are currently located in the TSF1, WRD, Batman Pit, HLP, and other locations at Mt. Todd. Both PAG and non-PAG waste rock and tailings will be produced during the production phase of the project (See Geochemistry Program for additional discussions regarding existing and future waste rock and tailings quality). Tetra Tech believes that these current and anticipated waste management, closure, and water management challenges at Mt. Todd are significant but manageable. To

manage these challenges, a concerted and well-coordinated effort will be necessary. This reclamation plan does not address water management issues or facilities removal and disposal, but rather focuses on the reclamation of facilities involving movement of earth and materials (e.g. TSF 1 and 2, WRD, HLP, roads, processing pad areas and LGO stockpile).

The reclamation plan for existing and proposed major facilities at Mt. Todd is summarized in Table 1 and includes:

1. General grading and capping designs and estimates of cut/fill and cover volumes for the reclamation of mine wastes, roads, the processing area, ponds no longer used at closure, and other mine-related surface disturbance; and
2. Analysis and preliminary numeric modeling of long-term store and release cover hydrologic performance

Throughout the mine-life, Vista should anticipate, design, plan, and implement effective plans for:

1. Identification of PAG and non-PAG materials, as well as materials that have the potential to leach metals in concentrations above applicable water quality-based standards;
2. Selective handling PAG and non-PAG material and potentially direct treatment of PAG materials to prevent the generation of ARD/ML;
3. Continuous collection, containment, and treatment of all ARD/ML prior to release;
4. Separation of unimpacted surface and ground water from ARD/ML;
5. Hydrologic isolation of acidic materials from ground and surface water; and
6. Control of stormwater to prevent excessive erosion and sedimentation.

Specific closure plans and strategies have not been developed in this document for the decommissioning, demolition, and removal of surface facilities. Geotechnical stability analyses of the closure grading and cover plans for the HLP and mine roads were not completed. Instead, the assumption was made that cut and fill slopes with a maximum overall slope gradient of 3 horizontal (H):1 vertical (V) is adequate to ensure long-term geotechnical stability. An evaluation of the geotechnical stability of the TSF1, TSF2, and WRD is provided in the applicable appendices to the PFS. Plans for the establishment of specific post-mining land uses and wildlife habitat were not completed for this PFSRP.

Descriptions of the existing environment at Mt. Todd, including the status of mining infrastructure, water management, and environmental monitoring and compliance are provided in the PEA (Gustavson, 2006) and the January 2011 PFCP.

The major facilities that currently exist on site or that will be constructed as part of the PFS mine plan that are included in this PFSRP are as follows:

- Batman Pit;
- WRD;
- Process Plant and Operations Area (including RP2, RP5 and the Equalization Pond);
- HLP;
- Mine roads;
- TSF 1;
- TSF 2;

- LGO1;
- LGO2 located north of the Process Plant Area; and
- Haul roads to all new and expanded facilities.

1.1 Report and Effective Date

All designs and costs used in the development of this reclamation plan are subject to variability. The reclamation plan enclosed in this report is effective as of June, 2012.

Additionally, the WRD Geosynthetic Clay Liner (GCL) Cover Vadose Model referenced in this report and included as Attachment A will be updated at a future date. The vadose modeling results discussed in the attached summary were completed in February 2012.

2.0 RECLAMATION PLAN ANALYSIS

This PFSRP was developed based on input from Vista and their consultants; review of readily available data and information regarding Mt. Todd; and Tetra Tech's technical experts who are familiar with Mt. Todd mining and mineral processing plans. Additional technical support was provided by Tetra Tech geochemists, hydrogeologists, civil engineers, and water balance modeling experts.

Key issues and project drivers were identified during development of the January 2011 PFCP as well as a series of participatory meetings with Vista representatives, MDA and Tetra Tech staff. The concepts, strategies, and options developed and evaluated during these meetings and subsequent analyses were discussed with and endorsed by Vista and serve as the foundation for this PFSRP. The January 2011 PFCP was used primarily as the basis for this PFSRP. This PFSRP was developed by modifying and updating the January 2011 PFCP according to the 50k TPD mining plan, recent findings and analyses from ongoing investigations, and design and planning efforts.

With the exception of matters such as surface water management, water treatment and other exclusions mentioned above and addressed in the PFCP (discussed in other Appendices of this PFS) these findings and analyses were incorporated to the extent possible to support specific portions of this PFSRP.

The reclamation plans for individual facilities of Mt. Todd were based on predictions of site conditions during the mine-life phases. Available information, numeric modeling, and best professional judgment were used to estimate site conditions such as ARD/ML sources and flow volumes, annual precipitation and runoff variability, extreme flood events, and the hydrologic and physicochemical properties of the mine, tailings, waste rock, and potential closure cover materials.

This section of the report includes a summary of the important elements and approaches used to develop reclamation plans and strategies.

2.1 Reclamation Planning Goals and Important Drivers

The reclamation goals for Mt. Todd include:

1. Control existing acid-generating conditions;
2. Minimize erosion of facilities containing mine waste;
3. Reduce or eliminate the acid and metal loads in seepage and runoff water;
4. Minimize adverse impacts to the surface and ground water systems surrounding Mt. Todd;
5. Physically and chemically stabilize mine waste and other mine-related surface disturbances;
6. Protect public safety; and
7. Comply with NT Government regulations governing mine development and reclamation.

The important project drivers by which reclamation plans and strategies were developed are as follows:

1. Use standard reclamation practices with the knowledge that design details will be fine-tuned in the future;
2. Use previous investigations, studies, and available data and information;
3. Identify information gaps and future investigations necessary to improve the characterization of site conditions now and through reclamation closure;
4. Provide Vista with practical development and reclamation recommendations to facilitate site-wide integration of reclamation designs.
5. Exploit 'Mine for Closure' opportunities by reclaiming mine facilities simultaneously with mining (i.e., concurrent reclamation);
6. Identify strategies to reduce acid/metal loading to water management structures and ground and surface water by emphasizing hydrologic isolation of acidic materials from ground and surface water where plausible.
7. Handle materials efficiently; and
8. Emphasize low-maintenance "walk away" reclamation where practical.

2.2 General Reclamation Planning Strategies

The general planning strategies used in the development of the reclamation plans provided in this PFSRP include the following:

1. Generate the lowest amount of ARD/ML feasible to minimize acid/metal loads that must be handled in the water conveyance and treatment system by:
    a. Isolating mine waste from precipitation and oxygen through the installation of store and release covers, GCLs, erosion control, rapid stormwater conveyance from the surface of graded and capped mine waste (surface water controls are not included in the scope of this reclamation plan, but are addressed in other Appendices), and prevention of surface water ponding;
2. Demolish and remove unnecessary mining facilities and structures, (decommissioning and demolition of facilities and structures are not included in the scope of this reclamation plan, but are addressed in other Appendices).
3. Create stable final configurations of features through regrading, placement of cover and installation of stormwater drainage systems at closure (stormwater drainage systems are not included in the scope of this reclamation plan, but are addressed in other Appendices).

2.3 Major Reclamation Assumptions

A summary of the major assumptions used for the development of this PFSRP is provided below. Estimated quantities (e.g., facility dimension, material volumes, surface areas, and disturbance footprints) used for the development of this PFSRP are discussed further in Sections 3 and 5, as well as in applicable sections of this PFSRP. Future work should be conducted to verify the assumptions presented below.

2.3.1 Reclamation Assumptions

- Sufficient quantities of non-PAG waste rock will be selectively handled during mining so as to be available for the reclamation of the LGO2, WRD, TSF1, TSF2, HLP, process plant pad area, roads, and other mine-related surface disturbance.
- Non-PAG waste rock in combination with low-permeability materials (LPM) will be suitable as a store and release cover material.
- LPM to be used in store and release covers will be imported from a source(s) within 40 to 60 kilometers of Mt Todd to compensate for a lack of such material on-site.
- Imported LPM will consist of non-expansive materials with a compacted hydraulic conductivity equal to or less than 1×10^{-6} cm/sec.
- Plant growth medium (PGM) will be available on-site in existing stockpiles and from material salvage from new disturbance (TSF 2, expanded WRD, etc.).
- Material salvage from construction and expansion of facilities will yield an average of 0.2 m depth of PGM, but no LPM material suitable for store and release covers.
- Supplemental PGM will be provided through crushing of non-PAG waste rock into fines.
- Soil amendments will not be required to facilitate plant growth on the crushed non-PAG waste rock.
- Applying a 1 m thick cover of non-PAG waste rock on the impounded surface of the TSF1 and TSF2 is adequate to bridge thixotropic tailings to permit the installation of the 0.8 m-thick store and release cover and 0.2 m thick PGM cover on the TSF1 and TSF2.
- Attaining final cut and fill slopes no steeper than approximately 3H:1V will be adequate to ensure long-term geotechnical stability of the TSF1, TSF2 and all other plant facilities, excluding the WRD.
- A GCL cover design in addition to placement of non-PAG waste rock around the perimeter of each bench will provide sufficient capping of the WRD to minimize seepage of ARD/ML.
- LGO1 will be eliminated as a result of the Batman Pit expansion, and will not require reclamation.
- The safety berm installed around the perimeter of the Batman Pit will be offset 30 m to account for the minimum 10 m buffer beyond an assumed 20 m “potentially unstable pit edge zone” per the requirements outlined in the guidelines for “Safety Bund Walls around Abandoned Open Pit Mines” from the Department of Industry and Resources in Western Australia.
- Vista will assume the responsibility to reclaim the HLP following the reprocessing of leached ore in the Mill.
- Leached ore in the HLP will be removed and re-processed in the Mill. The current high density polyethylene (HDPE)-liner will be removed and disposed of in TSF 2. The fill below the liner will be tested to determine presence and extent of contamination. Contaminated fill will be excavated and disposed of in TSF 2.
- Weak acid dissociable (WAD) cyanide levels in pore water and seepage from HLP and contaminated fill excavated from below the HLP are below maximum allowable concentration limits. Therefore, the liner or fill below the HLP will not require rinsing or

treatment with oxidants following the reprocessing of leached ore in the Mill and prior to grading and reclamation.

- The equipment fleet used for mining will be used to conduct reclamation activities.
- Mine-owned equipment and mine employees will be available during production to assist with concurrent reclamation activities.

Reclamation plans and strategies for each major facility at Mt. Todd are summarized in Section 3.0.

3.0 RECLAMATION PLAN

This section of the report includes a summary of the important elements of the PFSRP and our recommendations regarding the practical approaches to reclamation at Mt. Todd.

When mining is renewed at Mt. Todd, the plans and designs contained here must be refined based on changes in mine plans and site conditions, unforeseen circumstances, acquisition of additional data, and advancements in site knowledge and closure technologies. Vista personnel should continue to work closely with engineers, technical experts and specialists, scientists, and agencies to implement practical and effective closure, reclamation and water management programs at Mt. Todd. These same staff should work to improve the designs and analyses provided in this report as well the PFS. The success of closure, reclamation, liability reduction, and mine and asset development will depend on these future efforts.

The major facilities that currently exist on site or that will be constructed as part of the PFS mine plan that are included in this PFSRP are as follows:

- Batman Pit;
- WRD;
- Process Plant and Operations Area;
- HLP;
- Mine roads;
- TSF 1;
- TSF 2;
- LGO 1;
- LGO 2 located north of the Process Plant Area; and
- Haul roads to all new and expanded facilities.

Facilities not covered under this reclamation plan include:

- RP1 and pumping system;
- RP2 pumping system;
- RP3 and pumping system;
- RP4;
- RP5 pumping system;
- RP6;
- RP7;
- HLP Ponds and pumping system;
- Existing Water Treatment Plan (WTP) and sludge management facilities;
- New WTP and sludge management facilities; and
- Stormwater and surface water control facilities.

Reclamation approach and strategies for each major facility at Mt. Todd are discussed below and briefly summarized in Table 1. All recommendations for the advancement of reclamation to

a design-level are provided in Section 4.0. The operational status and reclamation schedule of the Mt Todd facilities discussed within this plan is provided in Table 2.

3.1 Reclamation Materials

Limited materials suitable for reclamation are available on the Mt Todd project site. Reclamation materials utilized will include run-of mine non-PAG waste rock, imported LPM, existing PGM stockpiles, salvaged PGM from new facility construction, and crushed non-PAG waste rock as supplemental PGM.

The LPM is required for use in store and release reclamation covers. The requirements of this material are presented in Table 3. As sufficient quantities of suitable LPM have not been identified on-site, LPM material will be imported. A low permeability materials inventory was conducted in October and November 2012 and preliminarily identified potential sources of low permeability materials within 40 to 60 kilometers of the Project area. Samples of material within the potential sources of LPM were subject to laboratory testing to determine their physical properties. Based on preliminary evaluation of the lab and field inventory results the potential LPM source materials are non-expansive with compacted hydraulic conductivity equal to or less than 1×10^{-6} cm/sec and few coarse rock fragments. Additional investigations are necessary to confirm the quality and quantity of low-permeability materials within these and other potential sources of LPM. The LPM material will be used in the reclamation of the HLP, TSF1, TSF2, LGO2, mine roads and the process plant area.

PGM will be used as the top layer of reclamation covers for vegetation establishment. PGM will be obtained from existing stockpiles at the Mt Todd site, as well as through salvaging surficial soils within the footprints of new facility construction, including but not limited to TSF 2 and expansion areas of the WRD. An average of 0.2 m of suitable PGM is assumed to be present beneath the footprints of the salvage areas. PGM suitability guidelines are presented in Table 3. As needed, non-PAG waste rock will be crushed and used as supplemental PGM for revegetation. It is assumed that PGM from existing stockpiles, new salvage and crushed non-PAG waste rock will be of sufficient quality to facilitate plant growth and will not require any additional soil amendments. PGM will be used in the reclamation of the HLP, TSF1, TSF2, LGO2, the process plant and pad area, roads and other mine-related disturbances.

Run-of mine non-PAG waste rock will be used as bridging material over the tailings impoundments, erosion control material on the WRD, and mixed with LPM for store and release covers. Crushed non-PAG rock will be used as bedding and overlying material for the GCL cover on the WRD. Non-PAG waste rock will be handled during mining such that sufficient quantities will be available for concurrent reclamation of the HLP, WRD, TSF1, and TSF2. Additional non-PAG waste rock will be available at mine closure for final closure of the LGO2, WRD, TSF2, process plant and pad areas, roads and other mine-related disturbances.

3.2 Batman Pit

The Batman Pit will be significantly deepened and enlarged from its current depth of 114 m to a final planned depth of over 594 m below the pit rim elevation of 194 m. At closure the pit perimeter will be of approximately 4,500 m. Long term pit water treatment is not covered under this reclamation plan.

Scaling and blasting of select pit benches and walls will be completed during the production phase to reduce the potential of human injury due to rock fall and improve pit wall stability and aesthetics.

A pit safety bund will be constructed around the entire perimeter of the Batman Pit to impede human access to the pit. The pit safety bund will be constructed with a 5 m base and 2 m height with a 10 m offset from the potentially unstable pit edge zone to ensure berm longevity and safety. As such, the pit berm will be approximately 4,300 m in length and utilize nearly 43,000 m^3 of non-PAG material from the Batman Pit. Key reclamation quantities are presented in Table 4.

3.3 Waste Rock Dump

The existing WRD contains approximately 16 Mt of waste rock. The WRD will be significantly enlarged through the addition of approximately 562 Mt of waste rock. Based on the geochemical testing and analysis program conducted for the PFS (2013 Geochemistry Program), approximately 41 percent of the waste rock excavated during renewed mining activities will be non-PAG. As part of the PFS mine plan a Waste Rock Management Plan (WRMP) will be developed that specifies how waste rock is to be handled to minimize the potential for ARD/ML and maximize the beneficial use of non-PAG waste rock for closure. The WRMP will include:

- Routine waste rock testing procedures such as collecting monthly samples for analysis of carbon and sulfur that can be used to confirm data from the blast hole database;
- Staging dump construction to minimize the contact of PAG rock with air and water;
- Selective handling and isolation of the highest sulfide material or blending PAG and non-PAG waste rock;
- Contouring WRD surfaces to shed precipitation and runoff away from PAG materials during production and at closure; and
- Sequential closure of inactive dump areas and faces as mining progresses.

The results of this planning effort will include managing waste rock disposal so the outer layers of the WRD at closure are composed of non-PAG waste rock. The WRMP should also emphasize the implementation of operational techniques and dump designs that encourage clean water diversion, rapid internal surface runoff, and seepage control during operations and at closure.

From its current area of 69 hectares, the WRD will be constructed at an effective angle of 30 degrees with interbench slopes of 34 degrees and will expand to a planned 3D surface area, following closure, of approximately 241 hectares. Each lift will be constructed at 34 degrees with 8 m wide benches at 30 m vertical intervals on the face of the WRD. These benches will function as stormwater drainages and as access for reclamation cover installation, reclamation activities, and maintenance. The WRD will be built to final grade and configuration. Otherwise, the WRD will be benched appropriately to satisfy geotechnical stability constraints.

The WRD design was completed by MDA and is shown on Figures 1 and 2. This design:

- Avoids placing waste rock in RP1;
- Avoids grading of waste rock at the end of the mine-life;
- Incorporates concurrent reclamation throughout the life of the WRD;
- Results in reclamation of the entire WRD by the end of planning year 11; and
- Creates a ‘geomorphic’ final surface that includes:
    - Highly dissected, non-uniform and complex slopes;

- Opportunities for dispersing rather than concentrating runoff from the surface of the WRD; and
- Final WRD configuration similar to the surrounding undisturbed topography.

Concurrent installation of a GCL cover following attainment of final grades is proposed for the closure of the WRD. This cover design will include a 0.3 m thick bedding layer of crushed rock consisting of 750 mm particle size material, followed by placement of the GCL, and capped with a 0.3 m thick protecting layer of finely crushed rock placed over the GCL. The GCL will span approximately 52 m on top of each lift, covering the 8 m bench, and running below the subsequent lift. The GCL will be sloped at a 5 percent angle slopes toward the outside of the WRD. The GCL will be constructed with a 0.5 m berm made with 1:1 side slopes at the interior edge of the GCL layer. This cover will channel seepage toward the outer edge of the dump, toward the non-PAG material, mitigating generation of ARD/ML. A 1 m thick layer of non-PAG waste rock will be placed on the top of all surfaces of the WRD to aid in erosion control. The estimated volume of cover material necessary to close the WRD is approximately 585,000 m^3 of 750 mm particle size bedding material, and 585,000 m^3 of fines to be used as a protective layer over the GCL. Additionally, approximately 2.0 million m^2 of GCL will be applied to the WRD. Key reclamation quantities are presented in Table 4.

Seepage through the WRD with a similar cover configuration (25 m sections of GCL on each bench) has been modeled in the software program VADOSE (Attachment A). Initial modeling results indicate that the GCL cover will restrict seepage to such a degree as to allow for acceptable long-term passive water treatment. It is expected that implementation of 52 m GCL covers on each bench will reduce the quantity of seepage beyond what was established in the modeling of the 25 m sections of GCL. Additional information regarding the seepage modeling is included as Attachment A.

3.4 Tailings Storage Facilities

Approximately 62 and 146 Mt of slurry tailings will be disposed of in the TSF1 and TSF2, respectively. Thickened tailings will be produced at the Process Plant and disposed of in TSF1 and TSF2 as slurry with an average solids content of 50 percent by weight. The particle size of the tailings is anticipated to be fine, with 85 percent passing #100 mesh. Prior to construction of the tailings dam and inundation, PGM will be salvaged from approximately 0.2 m to 1.0 m throughout the footprint of TSF2. Based on this range of excavation depths, approximately 896,000 m3 of PGM will be salvaged from the TSF2 footprint. This salvaged material will be utilized in the closure of TSF1. Initiation of closure activities at TSF1 and TSF2 is anticipated to occur in Production Year 4 and 13, respectively.

Tetra Tech anticipates that the impounded tailings surface conditions in TSF1 and TSF2 at the end of tailings deposition activities will be similar to the current conditions. Currently, beach sands cover only a narrow strip near the inside crest of the existing TSF1 dam and slimes cover the remainder of the surface of TSF1. As such, Tetra Tech has assumed that at closure, the majority of the impounded surface of the TSF1 and TSF2 will be primarily composed of thixotropic tailings (thick like a solid but flows like a liquid when a sideways force is applied) that will maintain a high degree of saturation for many years unless they are actively dewatered and consolidated, covered with material (i.e., increase surcharge), or are chemically treated to increase their strength.

The final planned TSF1 surface area at closure will be approximately 239 hectares (which includes an impounded surface area of 214 hectares and TSF dam surface area of 25 hectares). The final planned TSF2 surface area at closure will be approximately 301 hectares

(which includes an impounded surface area of 179 hectares and dam surface area of 122 hectares).

To close the impounded surfaces of TSF1 and TSF2, a 1 m-thick cover composed of non-PAG waste rock will be installed to bridge thixotropic tailings and allow equipment access for the installation of the 1 m-thick store and release and PGM cover. The estimated volume of non-PAG material necessary to bridge the thixotropic tailings on the impounded surface of TSF1 and TSF2 is approximately 2.1 and 1.8 million m3, respectively. This non-PAG sub-base will be covered with a 0.8 m thick store and release cover composed of 66% imported LPM and 34% non-PAG waste rock, requiring 1.7 and 1.4 million m3 of store and release material to cover the TSF1 and TSF2 impoundment surfaces, respectively. The store and release cover will be topped with a 0.2 m thick cover of PGM, requiring 0.4 million m3 of material each for TSF1 and TSF2 impoundment surfaces.

Tetra Tech assumes that the 2 m cover (Figure 3) would be placed on the entire impounded surface of TSF1 and TSF2.

On the outside slopes of the main dams of TSF1 and TSF2 the 0.8 m-thick store and release cover will be installed requiring approximately 0.2 and 1.0 million m3 of non-PAG waste rock mixed with LPM, respectively. This store and release cover will be capped with 0.2 m thick PGM. The embankment surfaces of TSF1 and TSF2 will require approximately 0.05 and 0.2 million m3 of PGM, respectively. Following capping with PGM, TSF1 and TSF2 will be revegetated with native seed to increase the erosion resistance of the store and release cover. To the degree practicable, the store and release cover will be installed concurrently on the TSF1 and TSF2 dams. A figure showing the TSF cover is included as Figure 3. Key reclamation quantities are presented in Table 4.

At closure, modifications will be made to the TSFs to manage seepage and precipitation. The spillways will be modified to suit the closure design, and seepage collection ditches installed, routing seepage to a modified sump that will collect seepage via gravity feed. The seepage collection ditches will be designed to receive and convey seepage in a lined ditch to a central sump. A pump and pipeline system will then be installed to route the collected water away from the TSF sump. In the case of TSF1, collected seepage will be routed to TSF2. At closure of TSF2, collected seepage from TSF2 (which includes seepage from TSF1) will be routed to the WTP or passive treatment system, depending on the year in question. Closure of TSF1 will also include modifications to the decant system to prevent short circuiting of fluids through the TSF at closure. Closure of TSF2 will include removal of tailings delivery line spigot piping and on-site disposal.

TSF2 will be reclaimed concurrently as opportunity allows, with the impoundment surface reclaimed in Production Year 14, following completion of all processing activities.

3.5 Process Plant and Pad Area

A new processing plant will be built at the current Process Plant and Pad Area. The current plant and pad area is approximately 35 hectares. This area encompasses the Process Plant structures, crushing stockpile, RP2, RP5 and ancillary facilities such as the ANFO storage location. Tetra Tech does not anticipate the area of disturbance will change significantly due to the construction of the new processing plant. Once mineral processing ceases the Process Plant will be decommissioned, decontaminated, demolished and any reusable equipment and materials will be salvaged and resold. Removal of foundations and reclamation of Process Plant areas will occur after the plant has been removed..

The current operating assumption is that the Process Plant (or portions thereof) will be demolished (disassembled), removed (salvaged) or hauled to a solid waste landfill or other suitable locations on-site, capped, and reclaimed. Some buildings will remain to support reclamation operations and maintenance.

Concrete foundations, walls, bridges and other non-reactive, non-combustive, non-corrosive and non-hazardous demolition waste will be broken up and either:

1. Placed in the WRD; and/or
2. Buried in-place or backfilled against cutbanks and highwalls throughout the Process Plant and Pad Area, as well as other areas that will be reclaimed at Mt. Todd.

The Process Plant and Pad Area will be graded to blend into the surrounding topography and drain towards Batman Creek. Closure grading will include pushing approximately 0.35 million m^3 of material. Stormwater drainage controls and erosion and sediment controls will be designed and constructed to minimize erosion and channel scour. The Process Plant Area and Pad will be covered with the 0.8 m-thick store and release cover (described previously) to prevent exposure to the non-reactive, non-combustive, non-corrosive and non-hazardous demolition waste. The store and release cover will be capped with 0.2 m of PGM and revegetated and protected from erosion as described previously. The estimated volume of material necessary to close the Process Plant Area is approximately 0.3 million m^3 of material for the store and release cover and 70,000 m^3 of PGM. Tetra Tech assumes that the Process Plant and Pad Area will no longer be a source of ARD/ML following closure. Key reclamation quantities are presented in Table 4.

Reclamation of the Process Plant vicinity will also include closure of RP2 and RP5 in Year 13. The closure of these retention ponds will include removal of sediments, cutting, folding and disposal of liners in place, and backfilling of the pond utilizing surrounding material. The pond surfaces will be covered and revegetated as described for the Process Plant area.

The Equalization Pond will be closed 5 years after production ceases, coinciding with the closure of the WTP. The equalization pond will be closed following the same methodology as described for RP2 and RP5.

The cost for Process Plant and Pad Area surface water management and Process Plant and WTP decontamination, decommissioning, demolition and disposal are not covered in this report, as these cost are addressed elsewhere.

3.6 Heap Leach Pad and Moat

The HLP covers an area of 39 hectares and is 20 to 25 m thick with side slopes as steep as 1H:1.6V in isolated areas. These slopes are dissected by a dense network of rills and gullies. Due to the extent of exposure to precipitation, Tetra Tech assumes the WAD cyanide concentration of HLP pore water and seepage meet applicable standards. Therefore, Tetra Tech assumes deliberate rinsing of the HLP or fill beneath the HDPE liner prior to initiation of re-processing of the leach ore is not required. While not confirmed by test results, the material in the HLP is likely PAG due to the acidic nature of surface water and seepage stored in the HLP Ponds. These assumptions must be verified prior to reprocessing and closure of the HLP.

Leached ore in the HLP will be removed and re-processed in the Mill in Production Years 12 and 13. Following removal of the leached ore the HDPE liner will be removed and disposed of in TSF 2. The fill below the liner will be tested to determine presence and extent of contamination. We have assumed a 0.5 m –thick layer of contaminated fill exists below the HDPE liner for a total of 195,000 m^3 . This contaminated fill will also be excavated and disposed of in TSF 2.

Approximately 156,000 m^3 of material will be graded to promote surface water drainage from the HLP area. Following grading, the HLP will receive the typical 0.8 m thick store and release cover and 0.2 m thick PGM cap. The estimated volume of material necessary to cap the HLP is approximately 0.3 million m^3 of store and release material and about 80,000 m^3 of PGM. The HLP area will then be revegetated with native seed. Key reclamation quantities are presented in Table 4. A figure showing the HLP reclamation and cover is included as Figure 4.

3.7 Low Grade Ore Stockpiles

LGO1 will be eliminated during the expansion of the Batman Pit. Consequently, it is assumed no reclamation is required for the closure of this facility.

The LGO2 will be located northeast of the Process Plant Area (see Figure 1). Closure of LGO2 will include removal of residual ore from the stockpile areas. Tetra Tech assumed that any remaining ore will be graded to a 3H:1V slope and covered. A nominal quantity of 100,000 m^3 to be regraded has been assumed for closure of the LGO2. In addition, stormwater drainage, erosion, and sediment controls will be designed and constructed to minimize erosion and channel scour. A 0.8 m thick store and release cover will be installed as described previously, topped with 0.2 m of PGM. The estimated total surface area of the LGO2 is approximately 51 hectares. The estimated volume of store and release cover material necessary to close the LGO2 is approximately 0.4 million m^3, which will be covered with approximately 0.1 million m^3 of PGM. The cover will be revegetated as described previously. A figure showing the LGO2 reclamation and cover is included as Figure 5. Key reclamation quantities are presented in Table 4.

We assume that the LGO2 will no longer be a source of ARD/ML following closure.

3.8 Mine Roads

Mine access roads will remain in place to provide post-closure access to the area. Haul roads were assumed to be 35 m wide throughout the site. All haul roads will be closed by grading into surrounding topography, ripping subgrade materials, placing 0.2 m of PGM, and revegetating the areas as described previously. Approximately 24 ha of haul roads area will require closure. A figure showing typical mine road reclamation and cover is included as Figure 6. Key reclamation quantities are presented in Table 4.

4.0 RECLAMATION RECOMMENDATIONS

Throughout the mine-life, Vista should anticipate, plan, design, and implement effective plans for:

1. Identification of PAG and non-PAG materials, as well as metaliferous materials;
2. Selective handling of PAG and non-PAG material and potentially direct treatment of PAG materials throughout the mine-life to prevent or reduce the generation of ARD/ML;
3. Short- and long-term hydrologic isolation of PAG and metaliferous materials from ground and surface water; and
4. Control of stormwater to prevent excessive erosion and sedimentation.

Specific recommendations are provided below to address information gaps and advance the feasibility study, as well as improve the function and performance of on-site water management.

4.1 Reclamation Recommendations

The following information is needed to progress reclamation planning to a design level. The recommended work should be performed strategically so that decisions about closure and reclamation can be made sequentially and at the appropriate phase of the project. The following work items are recommended for further study:

- Waste and cover material hydraulic properties characterization and analysis;
- Tailings trafficability testing;
- Improvement of the watershed hydrologic data collection system to enable an update of precipitation-yield characteristics of the site;
- Development of a Tailings Management Plan;
- Completion of the site-wide soils and closure cover materials inventory and characterization to identify material sources, properties, and balance; and
- Erosion and sediment control analysis.

4.1.1 Waste and Cover Material Hydraulic Properties Characterization and Analysis

The hydraulic properties of waste rock, tailings, and potential cover materials require additional characterization as part of the feasibility study. These results should be used to improve:

- Waste facility and site-wide water balance prediction; and
- Evaluation of closure cover design alternatives and performance.

Samples of waste rock, tailings, and potential cover materials should be collected and analyzed to determine particle size distribution. These particle size distribution data should be compared with available computational databases (e.g., SOILVISION) to estimate variably-saturated hydraulic properties (e.g. soil water characteristic curves [SWCC], saturated and unsaturated permeability). The SWCC describes the water content of a material as a function of soil suction or negative pore-water pressure. The particle size analyses and database query results should be used to select a wide range of samples for further empirical characterization of their saturated and unsaturated hydraulic properties.

Tetra Tech recommends that saturated hydraulic conductivity and SWCC of waste rock, tailings, and potential sources of soil cover materials be tested.

Samples should be collected as follows:

1. Waste Rock - 15 to 25 waste rock samples, each with a mass of 50 kilograms (kg), should be selected to represent the majority of the rock mass lithology anticipated to be deposited in WRDs. Samples should be collected from shallow trenches excavated in the existing waste rock facilities.
2. Tailings - Ten paired tailings material cores should be collected along transects from the tailings deposition zone to the far side of the impoundment or supernatant pond, as practicable. The cores should be collected using core barrels with clear plastic liners so that stratigraphy can be readily assessed. Cores should be collected to a minimum depth of 3 m. One of the paired cores should be used to visually assess stratigraphy. Areas of distinct sandy characteristics should be identified and evaluated for vertical continuity, with the goal of determining if there are large (e.g., greater than 0.5 m in depth) intervals composed solely of sandy material. Material from intervals of interest will be sampled and submitted to a laboratory for analysis (discussed below).

   The second paired core will be sealed to prevent atmospheric oxygen from entering the sample and archived for possible future chemical analysis, depending on whether the particle size analysis indicates a significant possibility that ARD generation could be an issue.
3. Cover Material - 15 to 25 samples of potential cover material sources, each with a mass of 50 kg, should be selected to represent the range of possible cover materials. Samples should be collected from shallow trenches in areas that are representative of the majority of cover material by mass.

Particle size distributions should be determined using the sieve and hydrometer method, in accordance with American Society for Testing and Materials (ASTM) D 422. Material classification should be conducted according to ASTM D 2487. Results will include percentages of cobbles, sand, silt and clay, and the material classification. Saturated hydraulic conductivity tests are most often completed using a triaxial permeameter. A falling head permeameter is more appropriate for coarse textured materials or for the determination of the saturated hydraulic conductivity of cover material following placement. SWCC tests are most often completed using a conventional or modified pressure plate apparatus.

Results of the field characterization should be incorporated into hydrologic models (e.g., GOLDSIM, VADOSE/W, SEEP/W, SOILCOVER, H-SAT, etc.) used to simulate the long-term water balance of tailings and waste rock facilities including the amount of meteoric water that infiltrates through closure covers. Detailed, stochastic models of waste facility and cover design alternatives should be developed using probabilistic analysis of precipitation to represent the range in wet, average, and dry year conditions.

Following the completion of the feasibility study, test plots and fills should be installed. These test plots and fills should be monitored to evaluate and confirm the performance of alternative grading, stormwater drainage and cover designs, and erosion control and revegetation treatments. Conclusions regarding the performance of closure alternatives tested should be used, in part, for the development of final closure plans and designs at Mt. Todd, and to validate vadose zone and water balance models to improve the prediction of long-term water treatment requirements and adverse impacts to surface and ground water in the vicinity of Mt. Todd.

4.1.2 Tailings Trafficability Testing

The minimum cover that will be needed to bridge the thixotropic tailings located on the impounded surface of TSF1 and TSF2 and the trafficability and stability of saturated and

dewatered slimes requires study and should be investigated to adequately define capping techniques and the quantity of cover needed to successfully reclaim TSF1 and TSF2. A tailings consolidation and loading study would be developed to report these findings.

4.1.3 Development of a Tailings Management Plan

A Tailings Management Plan should be developed as part of the feasibility study to specify how tailings are to be handled to minimize the potential for ARD and metals leaching, and facilitate closure and rapid dewatering and consolidation of tailings.

4.1.4 Reclamation Material Inventory and Characterization

In order to maximize the use of on-site material over imported material for reclamation, Tetra Tech recommends that thorough site-wide inventories be conducted for reclamation materials. We recommend inventories (or continuance and completion of ongoing inventories) of the following materials:

- Non-PAG waste rock and other waste materials on site;
- LPM;
- Undisturbed or slightly disturbed soils, stockpiled soils, and regolith;
- Durable rock rip rap and gravels;
- Acid-resistant drain rock; and
- Organic wastes and other soil amendments.

These inventories should be followed by field-tests to determine the material suitability for the anticipated uses. The potential sources of closure materials at Mt. Todd include, but are not limited to:

- Production of waste covers, riprap, drain and low-permeability materials excavated from the pit during mining;
- Production of waste covers, riprap, drain and low-permeability materials excavated from the borrow areas;
- Production of organic soil amendments developed by composting organic waste such as feedlot manure, crop stubble, biosolids, wood waste from logging operations, etc.;
- Uncontaminated fill material in materials storage yards, roads, and ancillary facilities;
- Uncontaminated material excavated for creation of the WRD, RP1, TSF1, and TSF2 diversions; and
- Soil salvage from the footprint of TSF2 (and the expansion of the WRD and Pit).

Inventories should define the location, volume, properties, uniformity, retrievability, and where necessary acid-resistance of all potential sources of reclamation materials on or immediately adjacent to the site. Due to the significant cost associated with the excavation, processing (if necessary), transportation, and distribution of these reclamation materials, Vista should further evaluate approximate haul distance and road grades between each potential closure material source and major closure area. This process will eliminate some potential sources from further consideration.

When the properties, volume, and viability of closure material sources are determined based on site inventories, material balance and costs should be improved and the results should be

integrated into the closure planning process. The suitability of many of the existing on-site sources of durable rock riprap and gravels, acid-resistant drain rock, low-permeability clays, and other material have already been evaluated by Vista and others. However, the scope of these inventories will likely need to be expanded to address the volumes of materials needed for closure.

Material testing discussed previously and standard test references should be used to guide the analysis to assess the suitability of potential sources of durable rock riprap and gravels, acid-resistant drain rock, LPM, and other materials (e.g., ASTM). Based on an initial assessment of materials contained in each potential cover source, representative material samples should be collected and the following material properties should be determined as appropriate for the intended use of the material.

Physical Parameters

- Particle size distribution (dry sieve and hydrometer for < 2 millimeter fraction);
- Atterberg limits;
- Specific gravity;
- Compaction curve (i.e., Proctor curve);
- Saturated hydraulic conductivity;
- Consolidation - saturated hydraulic conductivity tests; and
- SWCC (moisture release curves) tests.

Chemical Parameters

- pH (saturated paste and KCl);
- Electrical Conductivity (saturated paste extract);
- Bulk Density;
- Organic Carbon;
- Sodium absorption ratio;
- Cation (Anion) Exchange Capacity;
- Total Nitrogen;
- Nitrate-Nitrogen;
- Available Phosphorus;
- Soluble cations (K, Ca, Mg, Na);
- Exchangeable Bases (K, Ca, Mg, Na Fe, Mn, and Ti) and Aluminum; and
- Acid Base Accounting (additional analysis may be necessary if net neutralization potential [NNP] < + 20 tonnes $CaCO_3$ equivalent/1,000 tonnes material or NPR (acid net neutralization potential) < 2).

Phase I of the LPM inventory was completed in late October and early November, 2012 and included field work for the preliminary identification and characterization of LPM sources on-site and sources near Mt Todd. Tetra Tech recommends that Phase II field work and associated analyses be completed for completion of the DFS. Completion of Phase II would include estimates of the costs to deliver LPM to the mine and discussions regarding LPM material

properties, estimate volume, factors influencing the feasibility of accessing each source and recommended LPM source selection.

4.1.5 Waste and Cover Material Erosion and Sedimentation Analysis

The erosion from tailings, waste rock, ancillary facility, and closure covers should be evaluated to:

- Predict soil loss from facilities during operations and following closure;
- Develop and evaluate erosion and sediment control options; and
- Predict the rate and magnitude of sediment loads to operational and closure stormwater drainage systems (ponds, channels, sumps, etc.).

Vegetation monitoring data should be collected for the existing (and future) reclamation test plots. These data and data from the characterization of waste and cover hydraulic properties should be used as inputs to empirical or process-based erosion and sedimentation prediction models (RUSLE, Water Erosion Prediction Project (WEPP), Erodibility Index Method, SEDCAD, and others) for the evaluation of facility drainage designs, sediment management plans, and erosion and sediment control alternatives.

5.0 ESTIMATED CLOSURE COSTS

The estimated quantities (e.g., facility dimension, material volumes, surface areas, disturbance footprints) for the reclamation of major facilities at Mt. Todd discussed above are summarized in Table 4. Reclamation costs were estimated at a ± 30 percent level of accuracy based on the following:

- 18 Mtpy mine plan and existing engineering and data presented in the PFS;
- Geochemical testing and analysis program;
- Estimates of environmental conditions throughout the mine-life;
- NT Government mine closure and environmental protection regulations and guidelines;
- Labor rates from The Hays Salary Guide, March 2011;
- Rawlinsons Australian Construction Handbook, Edition 30, 2012 (costs scaled based on location factors);
- Caterpillar Performance Handbook, Edition 40, January 2010;
- Equipment Rates developed by Mine Development Associates (MDA);
- Vendor quotes;
- Tetra Tech, Ausenco, and Tetra Tech - Proteus recent mine closure costing experience; and
- Best professional judgment.

Indirect costs were estimated to include reclamation oversight, monitoring test plots, monitoring concurrent reclamation, monitoring final reclamation, maintenance, and contingency. Maintenance was estimated to be 10 percent of the direct costs by year and includes such costs as maintenance and rehabilitation of reclamation covers and vegetation, weed control, installation of additional erosion control devices, and maintenance of site roads during closure, Contingency was estimated to be 15 percent of the total project cost.

Based on the costing approach described above, the cost estimate for implementing this plan is **AU$ 154,812,000**. As summarized in Table 5, this cost estimate includes closure of major facilities at Mt. Todd.

Table 6 includes the major unit costs used to estimate the closure costs that are provided in Table 5. Additional information used to develop this cost estimate is provided in Attachment B.

No costs were included for the following closure related items:

- Decontamination, demolition, removal and disposal of site infrastructure and structures (other than rubblization of foundations);
- Selective handling of waste rock and the haulage of waste rock to the TSF 1 and 2
- Construction of stormwater control structures;
- Baseline studies and permitting;
- Security cost fees;
- Water treatment (during operations or during closure and post-closure); and
- Amendment of PGM with additional organic matter.

As part of the PFSRP, an estimate was developed of the Security Cost required for the project. In the NT, the government requires that a Security Cost calculation be performed prior to issuing a mining authorization to commence mining. This Security Cost calculation is used to assist in establishing the level of security required to ensure liabilities incurred by mining activities will be addressed. The NT government has specified that the Security Cost calculation must follow the excel workbook developed by the NT government and which is posted on the NT government website. The Security that has been developed for the Mt Todd project has been developed in accordance with the NT Security workbook and associated guidance. The security calculation is reflective of the common mine site rehabilitation procedures and current rehabilitation costs included in the NT Security workbook as of the date of this document.

The Security Calculation addresses the future, end-of-mine state of the project and addresses activities required to close and rehabilitate each functioning facility planned for the Mt Todd project, including TSF1, TSF2, WRD, HLP, LGO2, Site Infrastructure and Process Plant area, Pit area, roads, decommissioning and post closure management and post closure water management. The Security Cost for the Mt Todd project was estimated at $158,000,000. Additional information regarding the Security Cost estimate can be found in Attachment C.

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TABLE 1: RECLAMATION APPROACH
VISTA GOLD CORP. – MT TODD GOLD PROJECT
JUNE 2013

Task	Facility							
	Batman Pit	WRD	HLP	TSF1&2 Impounded Surface	TSF1&2 Dams	Process Plant and Pad	LGO 2	Mine Roads
Surface of Facility at Cessation of Production Composed of Non-PAG		X			X			
Final Overall Slopes > 3H:1V*	X				X			X
Final Overall Slopes < 3H:1V*		X	X	X		X	X	X
Benches Created During Construction	X	X			X			
Install 1.0 meter-Thick non-PAG Material		X		X				
Install 0.8 meter-Thick Store and Release Cover			X	X	X	X	X	X
Install 0.2 meter-Thick Plant Growth Medium (PGM) Cover		X	X	X	X	X	X	X
Revegetate with Native Seed Mix			X	X	X	X	X	X
Install GCL Liner (including underlayer and overlayer fines)		X						
Install Erosion and Sediment Controls		X	X	X	X	X	X	X
Construct Access Restriction Bund	X							
Additional Remedial Measures (as necessary)	X	X	X	X	X	X	X	X

* > and < indicates slopes are steeper and less steep, respectively.

TABLE 2: RECLAMATION FACILITY STATUS AND RECLAMATION SCHEDULE
VISTA GOLD CORP. – MT TODD GOLD PROJECT
June 2013

Facility	Pre-Production (Years -2 and -1)	Production (Years 1 through 13)	Closure Phase (Years 13 through 14)	Post-Closure Phase (Years 15 through 19)	Post-Closure Phase (Years >20)
TAILINGS STORAGE FACILITY 1 (TSF1)					
TSF1 Top (Area of Impounded Tailings)	Inactive	Active to Year 4 Drain/ Install Cover/ Reclaim in Year 5	Reclaim	Reclaimed	Reclaimed
TSF1 Dam Face	Inactive/Construct Dam Raise	Constructed Dam Raises / Reclaim as Practicable Final Reclamation Year 4	Reclaim	Reclaimed	Reclaimed
TAILINGS STORAGE FACILITY 2 (TSF2)					
TSF2 Top (Area of Impounded Tailings)	Nonexistent	Active in Year 4	Drain/ Install Cover/ Reclaim	Reclaimed	Reclaimed
TSF2 Dam Face	Nonexistent	Starting in Year 4 Constructed Dam Raises / Reclaim as Practicable, Final Reclamation in Year 13	Final Reclamation Years	Reclaimed	Reclaimed
HEAP					
Heap Leach Pad	Inactive	Leach Ore Re-Processed in Production Year 12 and 13	Reclaimed	Reclaimed	Reclaimed
PROCESSING PLANT AND PAD AREA					
Processing Plant	Constructed	Active	Demolish	Nonexistent	Nonexistent
Pad Area	Inactive / Upgraded	Active	Regrade / Install Cover / Reclaim	Reclaimed	Reclaimed
RP2 & RP5	Active	Active	Regrade / Install Cover / Reclaim	Reclaimed	Reclaimed
Water Treatment Plant & Equalization Pond	Constructed	Active	Active	Demolish / Reclaim	Reclaimed
BATMAN PIT					
Pit Access Berm	Nonexistent	Nonexistent	Construct	Active	Active
WASTE ROCK DUMP					
Waste Rock Dump	Inactive	Active/ Concurrently Install GCL Cover and Reclaim Final Cover Installation Begin Year 11	Complete Final Cover Installation and Reclaim /Seepage Routed to Passive Treatment System	Reclaimed	Reclaimed
LOW GRADE ORE STOCKPILE 2 (LGO2)					
Low Grade Ore Stockpile	Inactive	Active	Reclaimed	Reclaimed	Reclaimed
MINE ROADS					
Haul and Ancillary Roads	Inactive / Upgraded & Activated as Necessary	Active / Reclaim as Practicable	Reclaim	Reclaim	Reclaim

TABLE 3: PLANT GROWTH MEDIUM AND LOW PERMEABILITY MATERIAL SUITABILITY GUIDELINES[1]
VISTA GOLD CORP. – MT TODD GOLD PROJECT
JUNE 2013

Suitability Parameter	Suitability Rating and Criteria			
	Good (G)	Fair (F)	Poor (P)	Unacceptable (U)
Saturation %	25 to 55	≥56 to 80	<25, >80	
pH	6.5 to 8.1	6.0 to 6.4, 8.2-8.5	5.5 to 6.0, 8.6 to 9.0	<5.5, >9.0
EC (mS/cm 25^0 C)	0 to 4	4 to 8	8 to 15	>15
SAR (Sodium Adsorption Ration)[a,b]	0 to 4	5 to 10	10 to 14	>14[a]
$\%CaCO_3$	<15	15-30	>30	
Texture [c]	sl, l, sil, scl, sc, ls, lfs	cl, c, sicl, sc, ls, lfs	sic, s, sc, cos, fs, vfs	g, vcos
Total Organic Carbon	<10%			≥10%
Available Water Capacity[d]	>0.10, moderate	0.05 to 0.10, low	<0.05, very low	
K factor [e]	<0.37	0.37	>0.37	

[1] Utah Oil Gas and Mining, October, 2005. Guideline for Management of Topsoil and Overburden R645-301-200 Soils - Table 4

[a] For clay textured soils unacceptable SAR > 14. For sandy textured soils unacceptable is >20.

[b] For most Western soils, the SAR to ESP relationship is usually 1:1, up to ESP ≈ 20. If SAR> 20, then determine ESP (Evangelou, 2000).

[c] s=sand, l=loam, si=silt, c=clay, v=very, f=fine, co=coarse, g=gravel

[d] Available Water Capacity is adjusted for texture and SAR

[e] K factor recommendations from the USDA Soil Conservation Service, 1978. National Soils Handbook Notice 24 (3/31/78). NSH Part II-403.6 (a). For prime farmland soils, the K factor times the percent slope should be a value of five or less for minimal erosion hazard.

Low-Permeability Material Suitability Guidelines

Suitability Parameter	Suitability Criteria
Compacted Hydraulic Conductivity - $K_{(sat)}$	≤ 1 x 10^{-6} cm/second
Particles < 0.075 mm (i.e. very fine sand, silt and clay size particles)	> 20 percent by weight
Particles > 4.75 mm (i.e. gravel size particles)	< 10 percent by weight
Particles> 1 inch (i.e. coarse gravel size particles)	0 percent by weight

TABLE 4: MAJOR RECLAMATION QUANTITIES AND DIMENSIONS
VISTA GOLD CORP. – MT TODD GOLD PROJECT
JUNE 2013

Facility	Reclaimed Area (hectares)	Grading Volume (m^3)	Closure Cover Thickness (meters)	Total Closure Cover Volume (m^3)	Closure Cover LPM Volume (m^3)	Plant Growth Medium (PGM) (m^3)
TAILINGS STORAGE FACILITY 1 (TSF1)						
TSF1 Top (Area of Impounded Tailings)	214.2	0	2.0 meters (1 meter bridge, 0.8 meter store and release cover, 0.2 meter PGM)	1,714,000	1,131,000	428,000
TSF1 Dam Face	24.8	0	1.0 meter (0.8 meter store and release cover, 0.2 meter PGM)	198,000	131,000	50,000
TAILINGS STORAGE FACILITY 2 (TSF2)						
TSF2 Top (Area of Impounded Tailings)	178.7	0	2.0 meters (1 meter bridge, 0.8 meter store and release cover, 0.2 meter PGM)	1,430,000	944,000	357,000
TSF2 Dam Face	122.1	0	1.0 meter (0.8 meter store and release cover, 0.2 meter PGM)	980,000	645,000	244,000
HEAP						
Heap Leach Pad	39	156,000	1.0 meter (0.8 meter store and release cover, 0.2 meter PGM)	312,000	206,000	78,000
PROCESSING PLANT AND PAD AREA						
Processing Plant Pad Area	35.1	350,000	1.0 meter (0.8 meter store and release cover, 0.2 meter PGM)	281,000	185,000	70,000
RP2 and RP5		60,000				
BATMAN PIT						
Pit Access Berm	-	45,000	-	-	-	-
WASTE ROCK DUMP						
Waste Rock Dump	241	0	GCL cover (Bedding Layer, Protective Layer, Erosion Control Layer)	2,411,000	-	-
LOW GRADE ORE STOCKPILE 2 (LGO2)						
LGO 2	51	100,000	1.0 meter (0.8 meter store and release cover, 0.2 meter PGM)	409,000	270,000	102,000
MINE ROADS						
Haul and Ancillary Roads	24	48,000	0.2 m plant growth medium cover	-	-	48,000

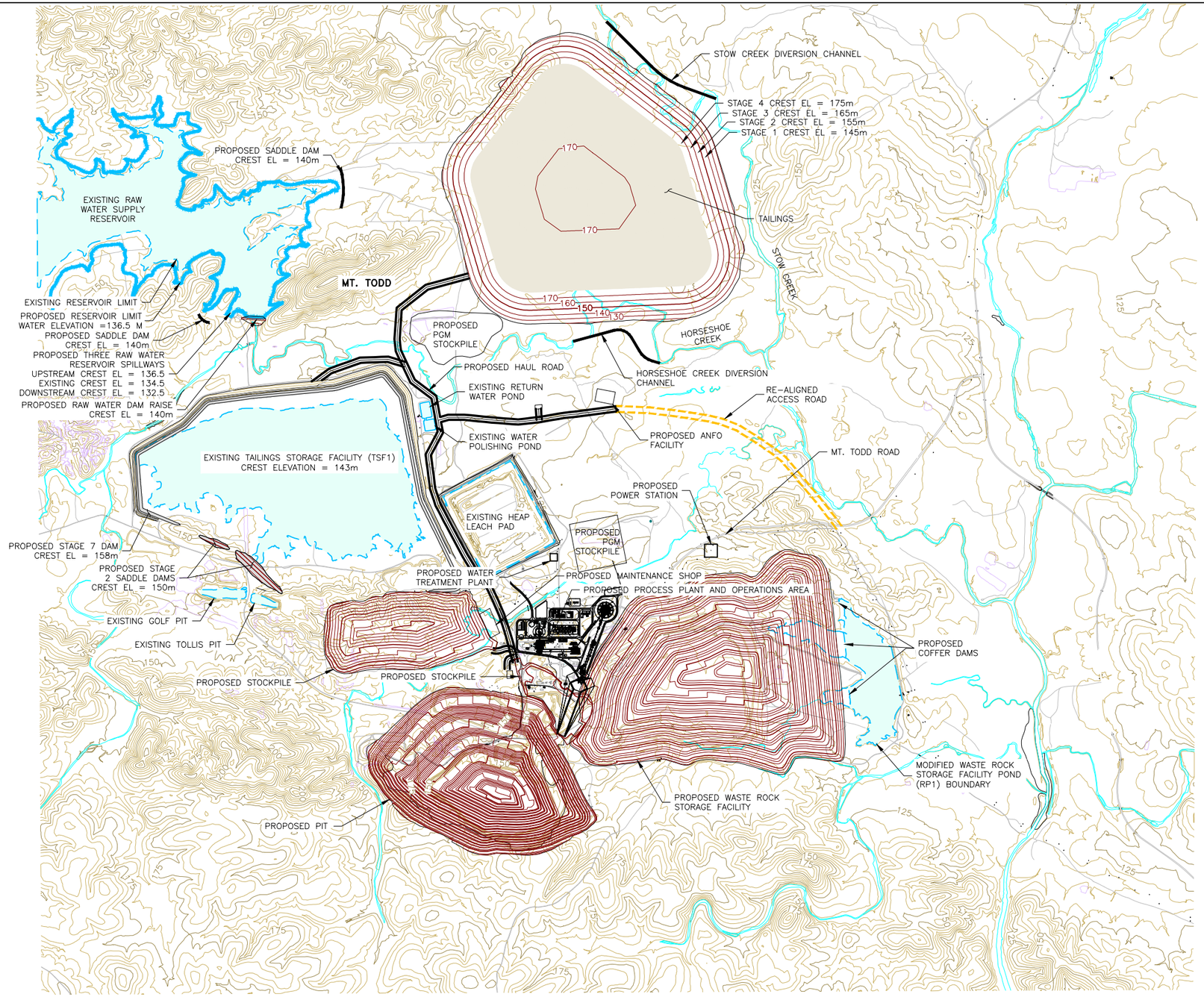
TABLE 5: RECLAMATION COST ESTIMATE
VISTA GOLD CORP. – MT TODD GOLD PROJECT
JUNE 2013

Area	Cost[1]
Tailings Storage Facility 1 (TSF1)	$24,028,000
Tailings Storage Facility 2 (TSF2)	$31,253,000
Heap	$4,777,000
Process Plant And Pad Area	$16,355,000
Batman Pit	$224,000
Waste Rock Dump	$35,038,000
Low Grade Ore Stockpile 2 (LGO2)	$4,883,000
Soil Stockpiles	$807,000
Mine Roads	$680,000
Total Direct Closure Cost	**$117,930,000**
Oversight, Maintenance, Contingency	$36,767,000
Total Indirect Cost [2]	**$36,767,000**
Total Closure Cost	**$154,812,000**
NT Government Security Cost	$158,000,000

[1] Cost rounded to nearest $1,000 in current $.
[2] Includes indirect costs associated with oversight of reclamation activities

TABLE 6: MAJOR RECLAMATION UNIT COSTS
VISTA GOLD CORP. – MT TODD GOLD PROJECT
JUNE 2013

Closure Activity or Material	Unit Cost[1]	Unit
Plant Growth Medium - Stockpile - 1km	$2.53	m3
Plant Growth Medium - Stockpile - 3km	$3.05	m3
Closure Cover and Reveg Test Plots	$250,000.00	LS
Spread / Grade	$0.34	m3
Revegetation	$9,500.00	ha
Erosion/Sediment Control-Fence	$23.13	m
Erosion/Sediment Control-Bales	$33.13	ea
Pit Safety Berm	$0.37	m3
Store and Release LPM - Import	$12.43	m3
Store and Release LPM Placement	$0.82	m3
Store and Release Blending	$0.73	m3
Plant Growth Medium Placement 1 km haul	$1.34	m3
Plant Growth Medium Placement 2 km haul	$1.60	m3
Plant Growth Medium Placement 3 km haul	$1.85	m3
Place Non-PAG Waste Rock	$0.82	m3
GCL Underlayer 750mm max particle size	$13.00	m3
GCL	$7.50	m2
GCL Overlayer - Fines	$16.00	m3
Excavate Seepage Collection Ditch	$0.67	m3
LLDPE Liner	$7.34	m2
Install Closure Spillway (TSF1 or TSF2)	$25,000.00	LS
Concrete	$196.50	m3
haul pipes to WRD	$2.11	m3
Concrete Foundation Rubblization and Haul to WRD	$600.00	m3
Cut and fold liner	$2.15	m2
Excavate Liner and Contaminated Material and Haul to TSF 2	$1.41	m3
Remove and dispose sediments	$2.11	m3
Backfill Pond	$0.34	m3
Environmental Supervisory Staff	$162,500.00	LS
Concurrent Monitoring	$50,000.00	LS
Closure Monitoring	$75,000.00	LS
Maintenance	10%	Of Direct Costs
Contingency	15%	



N

SCALE
150m 0 150m 300m
SCALE IN METERS
CONTOUR INTERVAL 5m

LEGEND:

- 150 — EXISTING CONTOUR – MAJOR
- EXISTING CONTOUR – MINOR
- 150 — PROPOSED CONTOURS – MAJOR
- PROPOSED CONTOURS – MINOR

Scale: As Shown	
Designed by: AH	
Drawn by: MJ	
Checked by: AH	
Approved by: RH	

Issued for:

VISTA GOLD CORP.

Issued by:

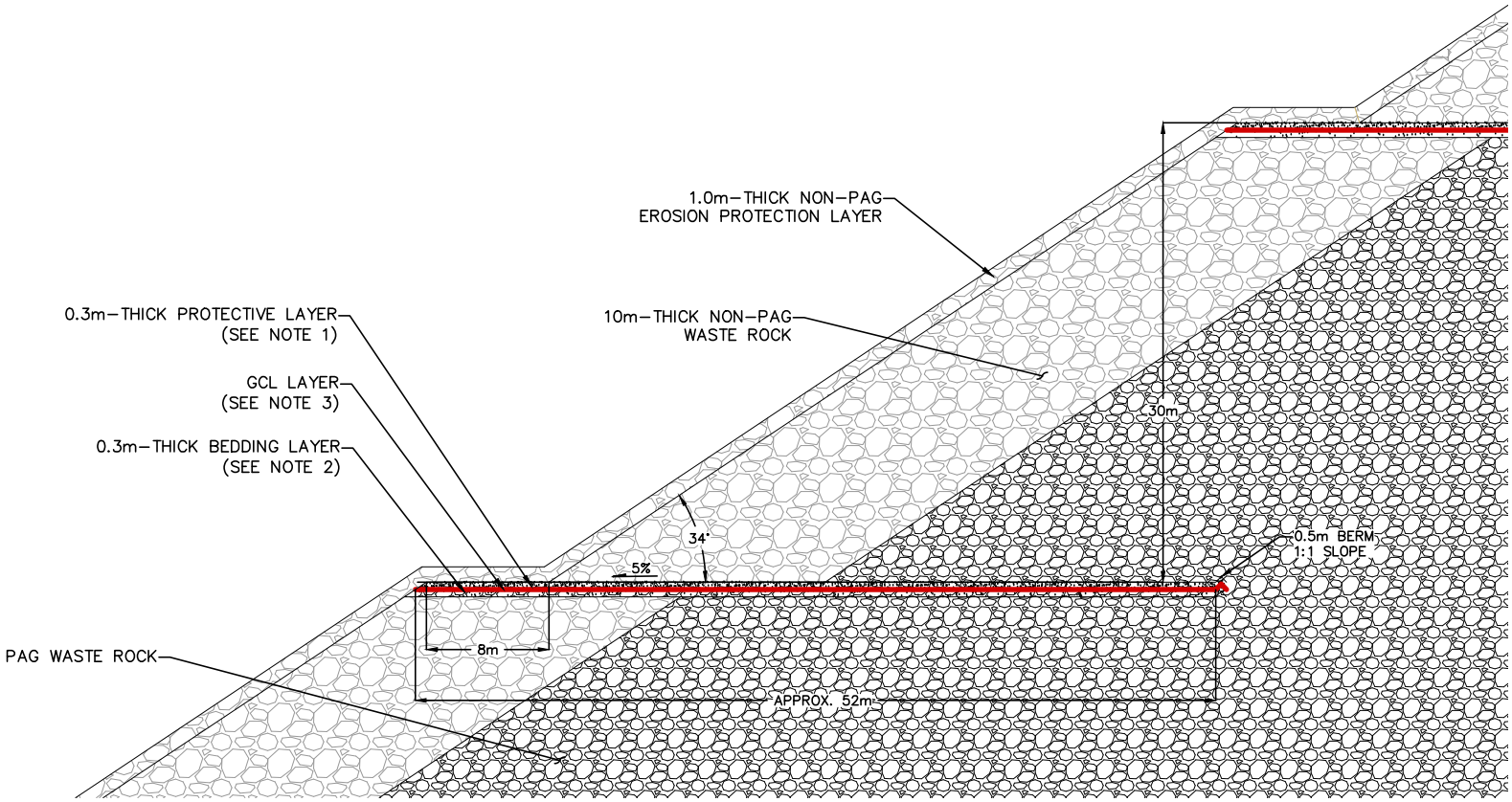
TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

FIGURE 1
GENERAL FACILITY ARRANGEMENT

1 REVISION

Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY	Project no.: 114-311285
Location: NORTHERN TERRITORY, AUSTRALIA	Date: 06/04/13

SHEET 1 OF 6



NOTES:
1. PROTECTIVE LAYER COMPOSED OF NON–PAG WASTE ROCK CRUSHED TO FINE PARTICLE SIZE

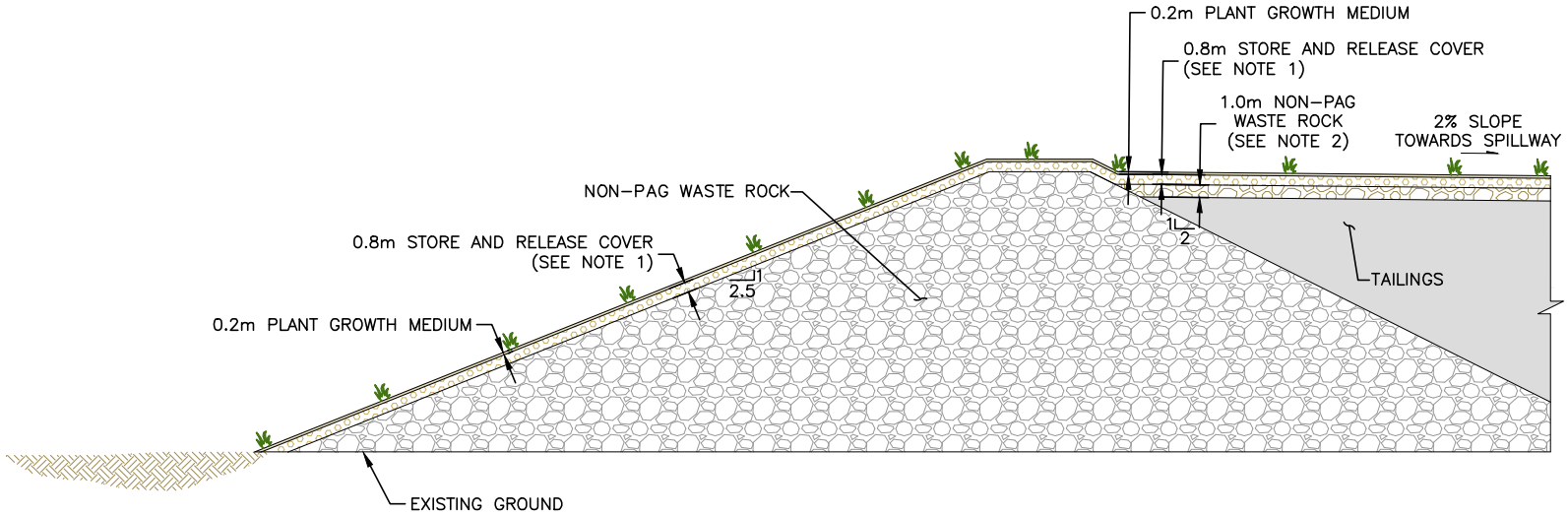
2. BEDDING LAYER COMPOSED OF NON–PAG WASTE ROCK CRUSHED TO 750mm PARTICLE SIZE

3. GCL MATERIAL PLACED ON EACH LIFT EXTENDING HORIZONTALLY TO A DISTANCE ADEQUATE TO REACH JUST BELOW THE OVERLYING BENCH.

NOT TO SCALE

Scale: As Shown Designed by: AH Drawn by: MJ Checked by: AH Approved by: HS	Issued for: VISTA GOLD CORP.	Issued by: TETRA TECH 350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax	FIGURE 2 WASTE ROCK DUMP GENERAL CLOSURE COVER DESIGN Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY Project no.: 114–311285 Location: NORTHERN TERRITORY, AUSTRALIA Date: 06/04/13 SHEET 2 OF 6

1 REVISION

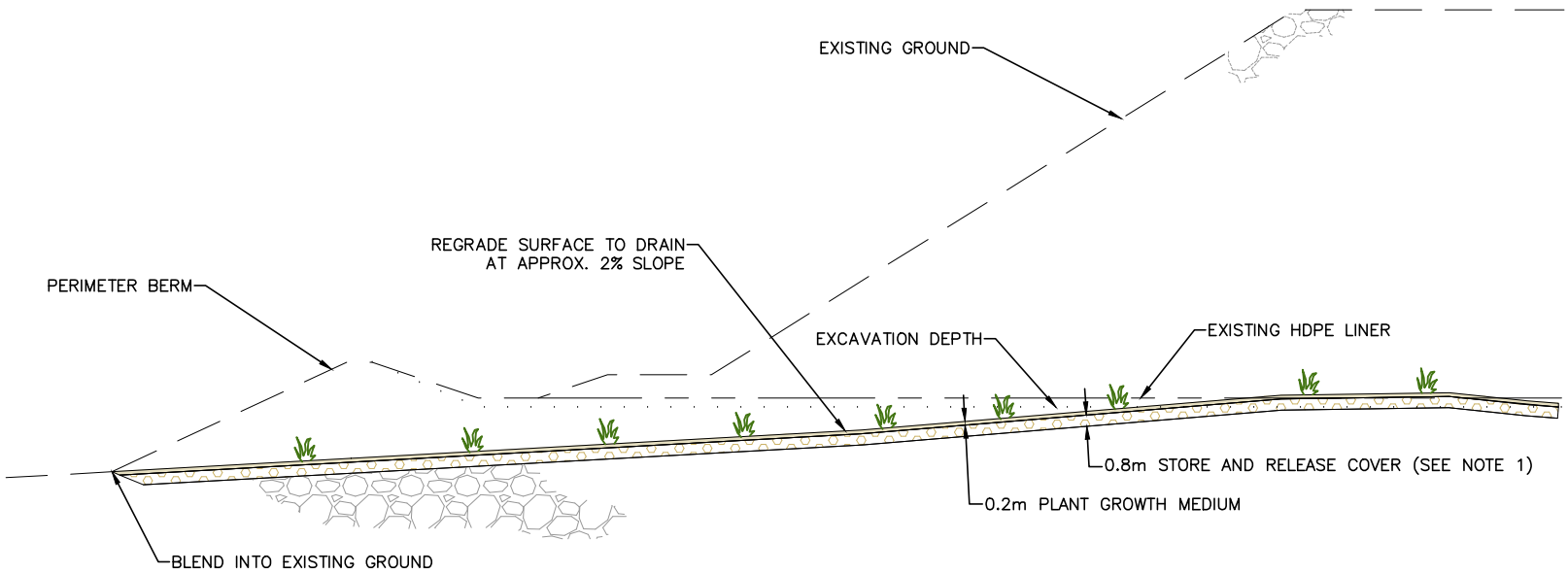


NOT TO SCALE

NOTES:
1. STORE AND RELEASE COVER COMPRISED OF A MIXTURE OF 66% CLAY-LIKE MATERIAL AND 34% NON-PAG WASTE ROCK MATERIAL

2. NON-PAG WASTE ROCK PLACED TO BRIDGE TAILINGS MATERIAL

Scale: As Shown Designed by: AH Drawn by: MJ Checked by: AH Approved by: HS	Issued for: VISTA GOLD CORP.	Issued by: TETRA TECH 350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax	FIGURE 3 TAILINGS STORAGE FACILITY GENERAL CLOSURE COVER DESIGN Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY Project no.: 114-311285 Location: NORTHERN TERRITORY, AUSTRALIA Date: 06/04/13	1 REVISION SHEET 3 OF 6

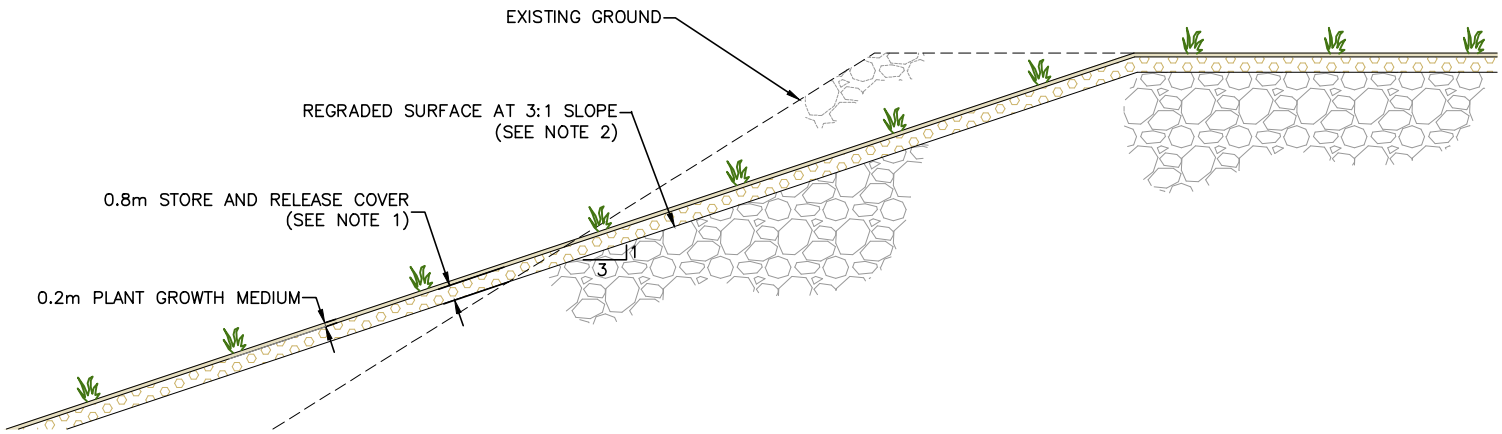


NOT TO SCALE

NOTES:
1. STORE AND RELEASE COVER COMPRISED OF A MIXTURE OF 66% CLAY–LIKE MATERIAL AND 34% NON–PAG WASTE ROCK MATERIAL.

2. IT IS ASSUMED THAT 4000 CU. M./HECTACRE OF FILL MATERIAL WILL BE NEEDED TO ACHIEVE AVERAGE REGRADED SURFACE SLOPE OF 2% TO ALLOW FOR WATER DRAINAGE.

Scale: As Shown Designed by: AH Drawn by: MJ Checked by: AH Approved by: HS	Issued for: VISTA GOLD CORP.	Issued by: TETRA TECH 350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax	FIGURE 4 HEAP LEACH PAD GRADING AND GENERAL CLOSURE COVER DESIGN 1 REVISION Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY Project no.: 114–311285 Location: NORTHERN TERRITORY, AUSTRALIA Date: 06/04/13 SHEET 4 OF 6

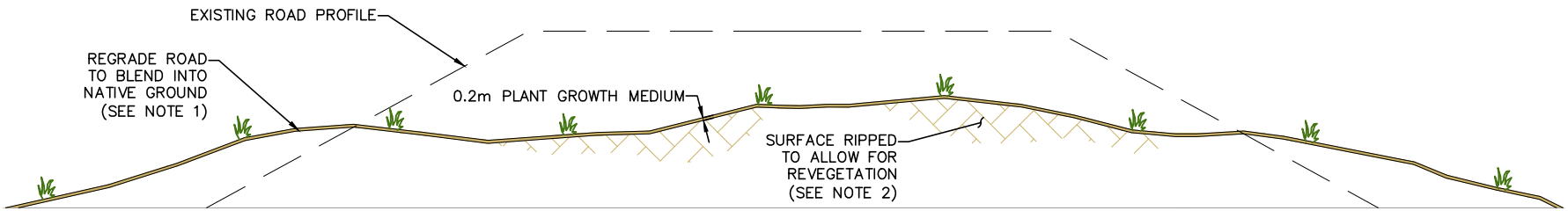


NOT TO SCALE

NOTES:
1. STORE AND RELEASE COVER COMPRISED OF A MIXTURE OF 66% CLAY–LIKE MATERIAL AND 34% NON–PAG WASTE ROCK MATERIAL.

2. GRADING TO 3:1 SLOPE CAN BE ACHIEVED BY PUSHING MATERIAL DOWN–SLOPE TO ACHIEVE FINAL GRADE.

Scale: As Shown Designed by: AH Drawn by: MJ Checked by: AH Approved by: HS	Issued for: VISTA GOLD CORP.	Issued by: TETRA TECH 350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax	FIGURE 5 LOW GRADE ORE PILE GRADING AND GENERAL CLOSURE COVER DESIGN Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY Project no.: 114–311285 Location: NORTHERN TERRITORY, AUSTRALIA Date: 06/04/13	1 REVISION SHEET 5 OF 6



NOT TO SCALE

NOTES:
1. GRADING SHOWN REFLECTS ROAD CLOSURE IN PLACE. CUT SECTION AND FILL SECTION CLOSURES NOT SHOWN.

2. ROAD MATERIAL ASSUMED TO BE SUITABLE PLANT GROWTH MEDIUM FOLLOWING RIPPING OF MATERIAL TO REDUCE COMPACTION AND ENABLE ROOTING.

Scale: As Shown Designed by: AH Drawn by: MJ Checked by: AH Approved by: HS	Issued for: VISTA GOLD CORP.	Issued by: TETRA TECH 350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax	FIGURE 6 MINE ROADS GRADING AND GENERAL CLOSURE COVER DESIGN 1 REVISION Project: MT. TODD GOLD PROJECT FEASIBILITY STUDY Project no.: 114-311285 Location: NORTHERN TERRITORY, AUSTRALIA Date: 06/04/13 SHEET 6 OF 6

TETRA TECH

ATTACHMENT A:
WRD GCL COVER VADOSE MODEL

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Littleton, MA 01460
Tel 978.952.0120 Fax 978.952.0122
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Technical Memorandum

To:	John Rozelle	**From:**	Amy L. Hudson, REM and Patsy Moran, PhD
Company:	Vista Gold Corporation	**Date:**	February 1, 2012
Re:	Waste Rock Dump Design and Drainage Evaluation	**Doc #:**	
CC:	Reese Hastings, Jagrut Jathal (Tetra Tech)		

1.0 Introduction

Vista Gold is proposing a waste rock dump (WRD) with steeper slopes than those originally proposed in the Mt Todd Project Preliminary Feasibility Study (PFS) based on additional geotechnical work and review of other operating mines. As a result, a review of the proposed WRD drainage closure conditions was conducted to provide a technical basis for the revised WRD design.

As detailed in the PFS, the WRD included a store and release cover with 3H:1V slopes consisting of a 0.3 meter (m) clay capillary break, 0.6 m fine non-potentially acid generating (Non-PAG or NAG) rock mixed with clay cover, and a shallow layer of growth medium. The cover would be placed over a mantle of coarser crushed Non-PAG surrounding/covering a potentially acid generating (PAG) material core. The new WRD design under consideration has nine 30 m lifts with eight meter catch benches, a 34 degree interbench slope, and an overall slope of approximately 29 degrees. The proposed closure for the WRD is to place Geosynthetic Clay Liner (GCL) on top of each of the catch benches, and under the next lift. The total width of the GCL would be approximately 24 m, which corresponds to three rolls of the material laid side-by-side. A one foot layer of fines material will be placed on the GCL to provide confining pressure on the material, and to maintain the GCL's moisture content. A one meter layer of Non-PAG material will be placed over the fines layer to prevent erosion.

This Technical Memorandum presents the modeling used to assess the drainage conditions and resulting water quality that would likely exist during closure and post-closure periods. The drainage modeling was completed using the VADOSE/W program from the GeoStudio 2007 software package (GEO-SLOPE, 2007). Modeling was performed on cross-section A-A', which is oriented north-south and cuts through the south facing slope of the WRD (Figure 1). The focus of the modeling is on the interior flow dynamics that could affect the PAG material encapsulated within the interior portion of the facility, and the rate of seepage from the base of the WRD. The geochemical modeling was conducted using the computer code PHREEQC (Parkhurst and Appelo, 1999), a reaction path chemical equilibrium model supplied by the U.S. Geological Survey (USGS).

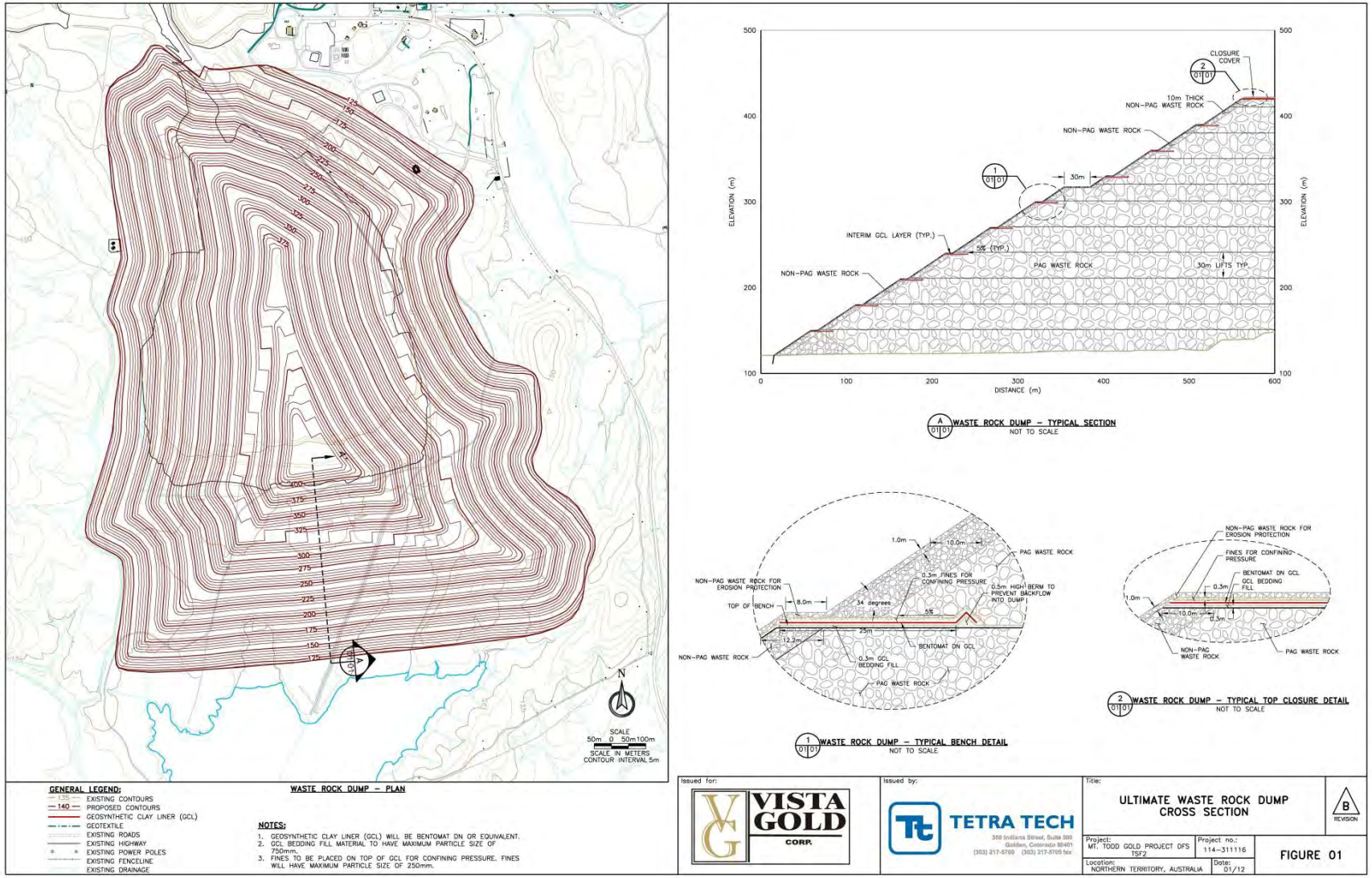
Proper closure of the WRD and seepage management is critical for preventing impacts to local waters, and to minimize long-term treatment and management costs. Acid rock drainage (ARD) commonly occurs in WRDs with sulphide-enriched mine waste through the oxidation of pyrite (or other sulphide minerals) as it is exposed to oxygen and water. The geochemical

characterization program for Mt Todd has determined that 41% of the waste rock will be low sulphur and non-PAG, 18 % of the waste rock is in the uncertain acid generating category, and 41% will be PAG; however, it should be noted that the non-PAG material may not provide excess neutralization capacity. WRDs with significant PAG material and minimal neutralization require further management and control of water to prevent environmental impacts.

2.0 Conceptual Model

The conceptual model provided as Figure 2, shows the system water balance components of the WRD including precipitation, evaporation (from soil surface), runoff, infiltration, and seepage. Seepage includes continued draindown of the residual water trapped in the waste rock, as well as any infiltration that reaches the waste rock through the internal and closure cover material. The internal and top closure covers are composed of a thin Geosynthetic Clay Liner (GCL) layer covered by approximately 305 millimeters (mm) (12 inches) of fines material for confining pressure and moisture retention. Details of the GCL closure cover are shown as Figure 3. The internal covers will be placed on top of each the catch bench of each 30 m lift of waste rock to limit the flow of water into the encapsulated PAG waste rock. The GCL will be placed from the outer edge of the bench along the horizontal surface, and will be under the buttress of non-PAG material for the next lift. The waste rock will be graded to a five degree slope towards the outside of the WRD to ensure drainage of water away from the PAG waste rock material.

Modeling was performed to simulate closure of the facility. The transient conditions simulated the closure and post-closure conditions and include only the fully stacked facility with the cover placed over the top surface of the waste rock. No operational conditions were correlated.


CLOSURE COVER
10m THICK NON-PAG WASTE ROCK
NON-PAG WASTE ROCK
INTERIM GCL LAYER (TYP.)
5% (TYP.)
PAG WASTE ROCK
30m LIFTS TYP.
30m
ELEVATION (m)
DISTANCE (m)
WASTE ROCK DUMP – TYPICAL SECTION
NOT TO SCALE
NON-PAG WASTE ROCK FOR EROSION PROTECTION
TOP OF BENCH
8.0m
34 degrees
1.0m
10.0m
0.3m FINES FOR CONFINING PRESSURE
0.5m HIGH BERM TO PREVENT BACKFLOW INTO DUMP
5%
25m
12.2m
BENTOMAT DN GCL
0.3m GCL BEDDING FILL
WASTE ROCK DUMP – TYPICAL BENCH DETAIL
NOT TO SCALE
FINES FOR CONFINING PRESSURE
BENTOMAT DN GCL
GCL BEDDING FILL
0.3m
WASTE ROCK DUMP – TYPICAL TOP CLOSURE DETAIL
NOT TO SCALE
SCALE
50m 0 50m100m
SCALE IN METERS
CONTOUR INTERVAL 5m
WASTE ROCK DUMP – PLAN
GENERAL LEGEND:
EXISTING CONTOURS
PROPOSED CONTOURS
GEOSYNTHETIC CLAY LINER (GCL)
GEOTEXTILE
EXISTING ROADS
EXISTING HIGHWAY
EXISTING POWER POLES
EXISTING FENCELINE
EXISTING DRAINAGE
NOTES:
1. GEOSYNTHETIC CLAY LINER (GCL) WILL BE BENTOMAT DN OR EQUIVALENT.
2. GCL BEDDING FILL MATERIAL TO HAVE MAXIMUM PARTICLE SIZE OF 750mm.
3. FINES TO BE PLACED ON TOP OF GCL FOR CONFINING PRESSURE. FINES WILL HAVE MAXIMUM PARTICLE SIZE OF 250mm.
Issued for:
VISTA GOLD CORP.
Issued by:
TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax
Title:
ULTIMATE WASTE ROCK DUMP CROSS SECTION
B
REVISION
Project:
MT. TODD GOLD PROJECT DFS TSF2
Project no.:
114-311116
Location:
NORTHERN TERRITORY, AUSTRALIA
Date:
01/12
FIGURE 01

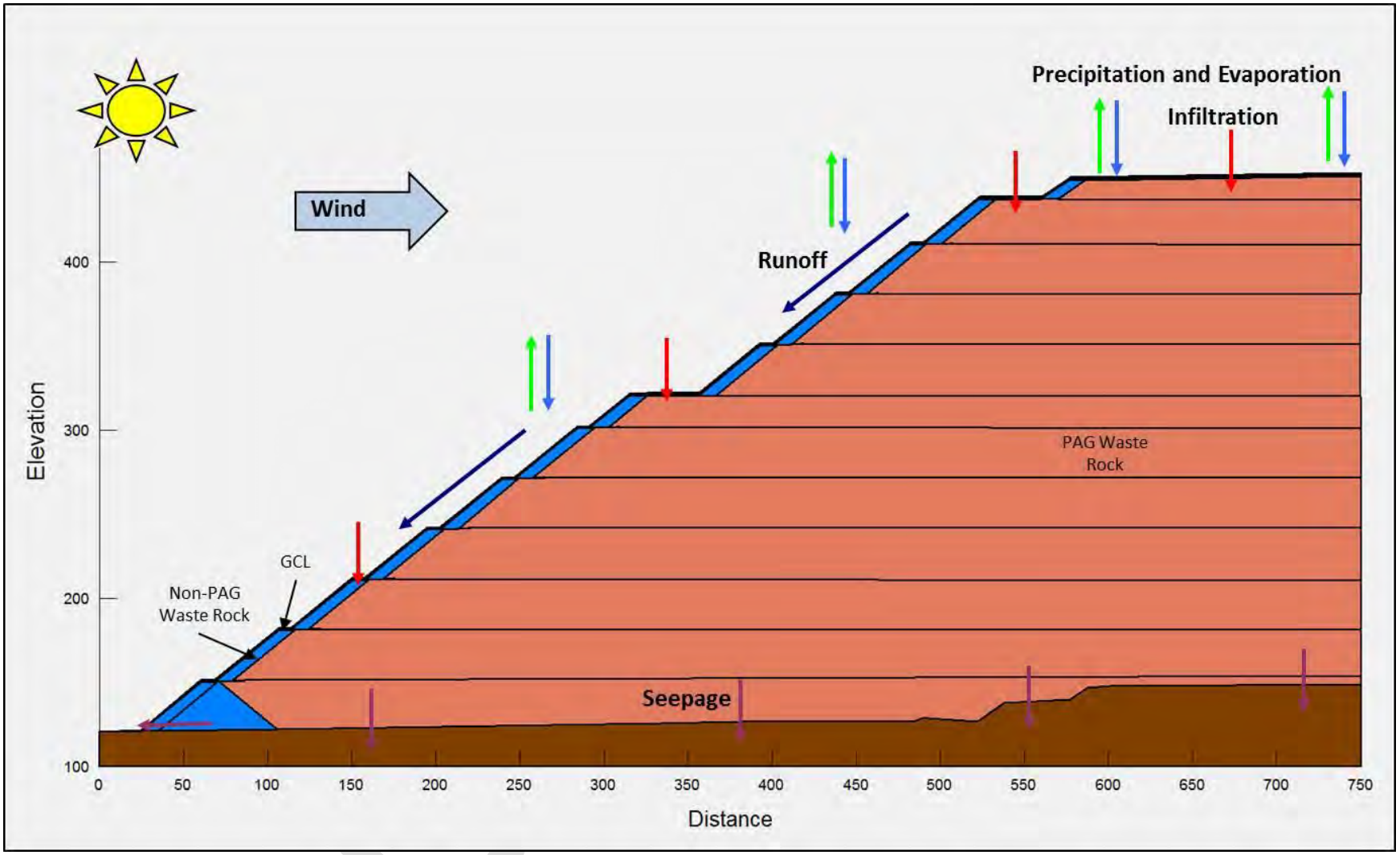


Figure 2 Waste Rock Dump Conceptual Model

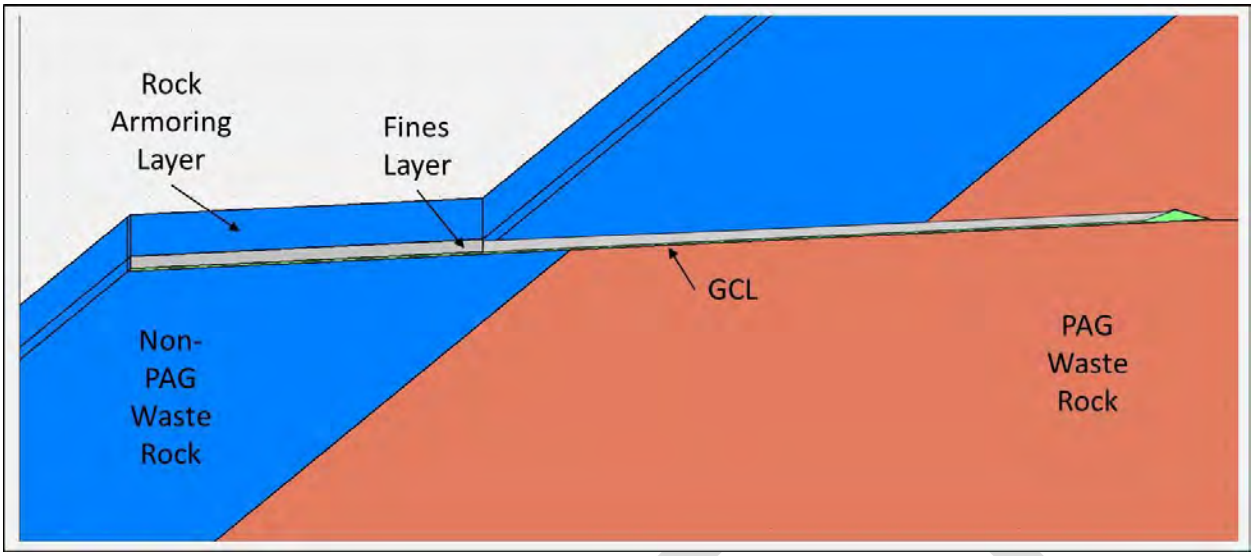


Figure 3 GCL and Fine Layer Details

2.1 Model Input Parameters

The following subsections present the data that was used in the seepage assessment.

2.1.1 Climate Data

Climate data from the Australian Government Bureau of Meteorology Katherine Aviation Museum meteorological station (http://www.bom.gov.au/climate/averages/tables/cw_014903_All.shtml) was used in the model to evaluate the infiltration of precipitation and seepage from the waste rock. The parameters in the climate data file included:

- Minimum and maximum daily temperature;
- Daily precipitation;
- Minimum and maximum daily humidity;
- Daily evaporation or net radiation; and
- Average daily wind speed.

The Katherine Aviation Museum meteorological station is located approximately 50 kilometers south of the mine. The dataset applied to the modeling utilizes the daily data from October 2010 to September 2011. By applying actual daily data versus average data, a more realistic distribution of precipitation events can be applied to the modeling, including the distinct wet and dry seasons of the site. The water balance for the site is net negative (more evaporation than precipitation). The climate file used for the modeling has precipitation of approximately 1,652 mm and an annual pan evaporation of approximately 2,104 mm. The average annual precipitation for this meteorological station is 1,131 mm and the highest rainfall measured for a one year period is 1,773 mm. The data used for this modeling is above average and provides a conservative evaluation of the behavior of the WRD when conditions are most ideal for the formation of potential wetting fronts within the waste rock material. The same model was run

three times, back-to-back, to minimize the "noise" in the model results and to be able to consider three full wet and dry season cycles.

2.2 Material Properties

The most significant difference between saturated and unsaturated flow is the hydraulic conductivity. The hydraulic conductivity in saturated media is a function of the material type. In unsaturated flow, the hydraulic conductivity is a function of the material properties and the moisture content of the material. The equation used to calculate water flow within unsaturated media is:

$$q = -K(\theta)\nabla H$$

Where:

- q = water flow velocity (L^2/t)
- K(θ) = hydraulic conductivity as a function of soil (or rock) moisture content (L/t)
- ∇H = hydraulic head (L)

The relationship between moisture content and hydraulic conductivity is non-linear, which further complicates the flow dynamics. In saturated material, the physics of flow are relatively simple and are driven by Darcy's Law where the flow is proportional to the saturated hydraulic conductivity, gravity, and pressure gradients. In simple terms, water flows downhill (downward pressure gradient) and flows faster through coarse material than fine material. However, in unsaturated flow, additional controlling forces include matric pressure (matric suction), absorption, and electrostatic forces.

Matric pressure (matric suction) is the suction created by capillary forces and the interaction of water, air, and solid surfaces. Matric pressure can be observed by placing a thin straw into a body of water. Driven by the surface tension forces, the water rises inside the straw, defying the force of gravity. The thinner the straw, the stronger the suction force will be and the higher the column of water will rise in the tube. The same process occurs in the voids between material particles in a WRD.

One of the most unusual properties of unsaturated zone flow is that different materials are preferentially conductive with varying moisture contents. Under high moisture conditions, pores are saturated and their suction decreases significantly. In this case, gravity is the strongest force and water will flow downhill from pore space to pore space. At low moisture conditions, the preferential flow changes, and the suction forces become stronger than gravitational forces. In this case, the tight materials are the most conductive with small voids that literally suck water through them. Under low moisture conditions, clay is more conductive than the sandy material.

The material properties used in the VADOSE/W (GEO-SLOPE, 2007) models were based on literature values and functions developed based on past experience of mined materials. The material property used to represent the waste rock was from a similar hard, competent waste rock with a limited amount of fine material. The GCL was simulated as a well graded high clay, and the fines layer was simulated as a uniform silt. Figure 4 presents the hydraulic conductivity functions of the waste rock, GCL, and fines layer materials. Figure 5 presents the water content functions of the same materials. The units used in these figures are those utilized by the modeling software.

The waste rock is expected to be very hard, competent material with a minimal amount of fines. This characterization is based on the current observations of an existing WRD for previous site operations. The function used to simulate this material has a saturated hydraulic conductivity of 4.2 centimeters per second (cm/sec) with a rapid, but smooth decrease with increased matrix suction. The hydraulic conductivity of the GCL layer was simulated as 10^{-6} cm/sec. This is higher than the specifications of this type of material, which is designed to be at 10^{-9} cm/sec. Work completed by Benson and Meer (2009) suggests that GCL that will be subjected to high levels of sodium and/or magnesium in solution will be subject to ion exchange processes. Their research showed that the GCL composition will be altered by exchanging sodium and/or magnesium for the calcium. When also subjected to multiple wetting and drying cycles, the hydraulic conductivity can increase by several orders of magnitude. The leachate from the non-PAG waste rock is estimated to have 20 milligrams per liter (mg/L) sodium (Na) and 200 mg/L magnesium (Mg). The saturated hydraulic conductivity value used in this modeling is higher than the design specs, but lower than the worst case observed by Benson and Meer (2009) and provides a conservative, but reasonable estimate of GCL conditions during closure and post-closure. For this modeling, the fines layer that will be placed over the GCL is assumed to be uniform silt with a saturated hydraulic conductivity of approximately 10^{-5} cm/sec.

2.2.1 Boundary Conditions

The boundary conditions used in this modeling were limited to a zero pressure boundary at the base of the model, initial moisture addition (establish non-zero starting conditions), and the climate file. A climate file was used in this modeling to ensure an evaluation of the long term behavior of the waste rock and the cover under actual climatic conditions.

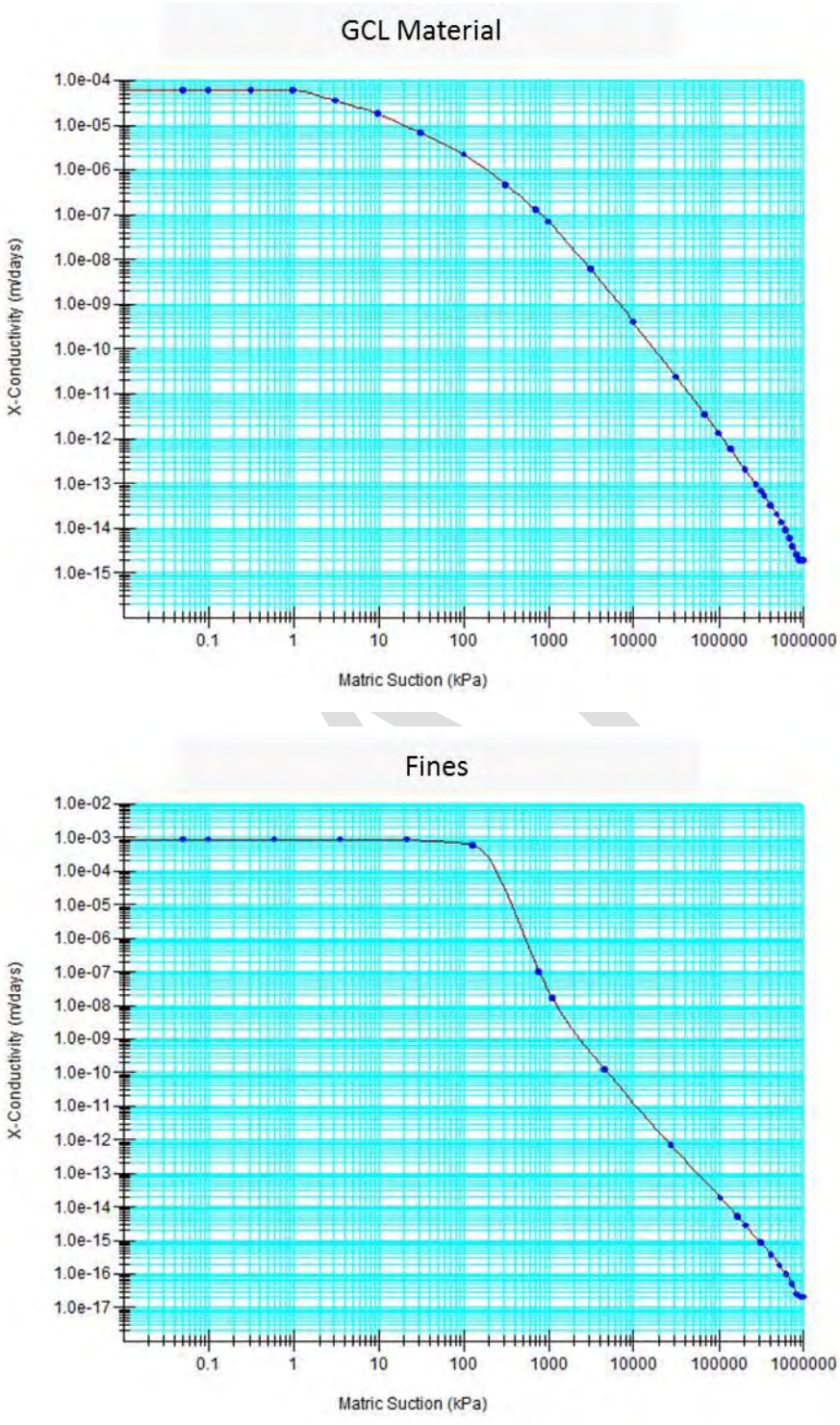
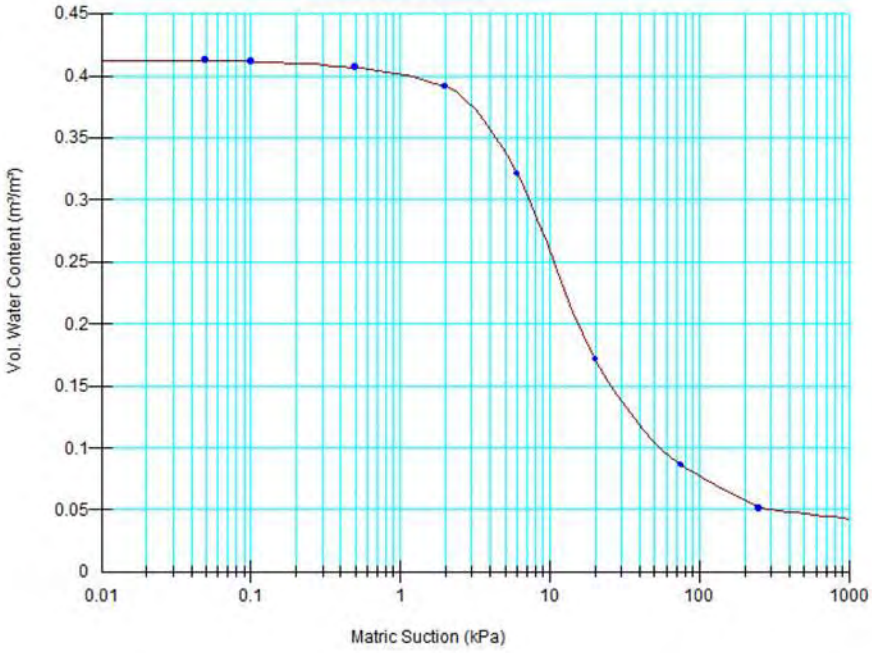
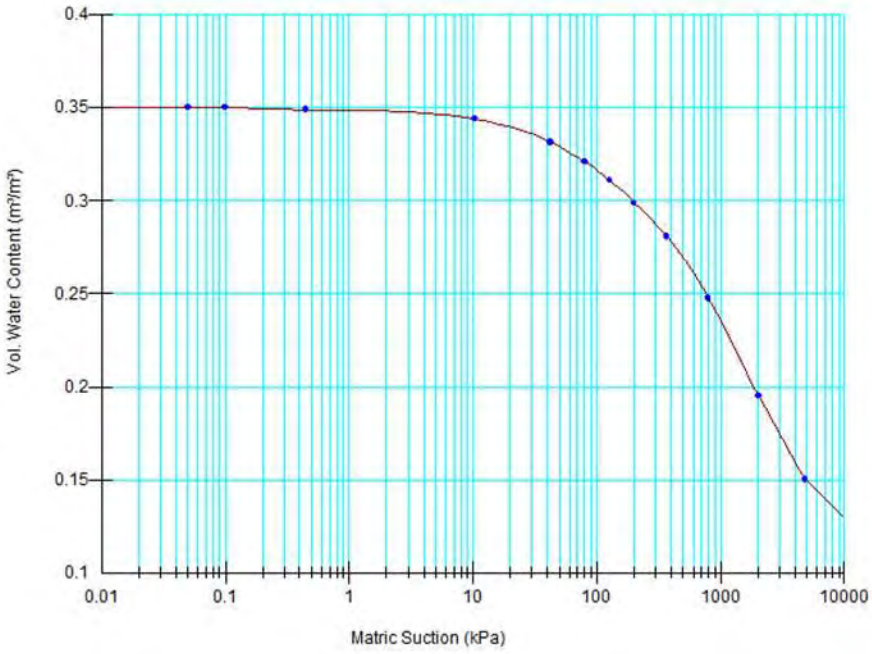


Figure 4 Hydraulic Conductivity Functions

Waste Rock



GCL Material



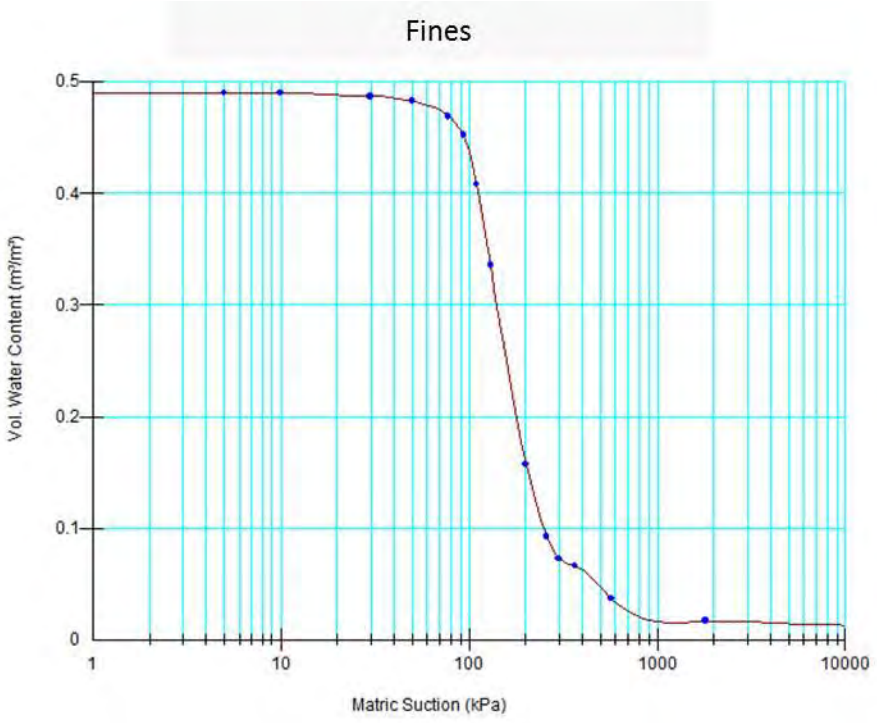


Figure 5 Soil Water Characteristic Curves

2.3 Modeling Technique

The modeling was completed as a steady state model followed by transient models to simulate the climate conditions.

2.3.1 Steady State Modeling

Steady state modeling is challenging when analyzing mining sites because the facilities change quickly and do not reach true steady state conditions until mine closure. To account for this, the WRD was modeled using an initial non-zero moisture condition to define the starting point of the facility at the completion of mining. The moisture content of the steady state model was in the range of 5% to 15% by volume. The results of the steady state model have been generally calibrated to site conditions (flow rates observed at Weirs 1, 2, and 3), but are only intended to offer non-zero starting values for the subsequent transient modeling scenarios and to evaluate the seepage rate from the waste rock.

2.3.2 Transient Modeling

Transient modeling provides a reasonable simulation of flow conditions within the WRD material. The upper most layer of these models is a surface region representing the top surface layer of the facility (the GCL, fines layer, and rock armor cover). It is in this part of the model that atmospheric conditions and soil come in contact, driving the water balance. The water within the facility then moves according to the rules of unsaturated flow physics through the waste rock material. Finally, and if applicable, the water reaches the base of the modeled region, where it moves to the model discharge point.

2.3.2.1 Transient Model Scenarios

This study focused on one transient scenario that represents the preferred construction and closure alternative. The preferred alternative details has interbench slopes of 34 degrees (overall slope of approximately 29 degrees) and the Petticoat cover option – GCL and fines layer on horizontal surfaces between the lifts of waste rock and on the top surface of the WRD.

2.3.2.2 Surface Layer

VADOSE/W (Geo-Slope, 2007) simulates the dynamics of the facility surface by considering climate and soil interactions. VADOSE/W (Geo-Slope, 2007) simulates precipitation using time increments with a maximum size of two (2) hours. The daily precipitation data is distributed according to a sinusoidal function that peaks at noon (normal distribution). This distribution pattern was compared with the constant averaged and the sloped averaged distribution patterns, and it was determined that the sinusoidal pattern resulted in the most mathematically stable calculation of the results. Potential evaporation or net radiation measurements are used to calculate the actual evaporation that is possible based on the conditions provided in the surface layer of the model. Evaporation is calculated from the following climate and soil factors:

- Air temperature;
- Soil temperature and thermal properties;
- Relative humidity;
- Solar intensity (from latitude);
- Soil temperature;
- Soil moisture content;
- Wind speed; and
- Measured pan evaporation.

The combination of the factors listed above provides a reasonable estimate of water lost from the system through evaporative processes. Infiltration is based on the unsaturated hydraulic conductivity of the material at a given time. Excess precipitation that has not evaporated, transpired, or infiltrated is tabulated as runoff. The surface region for the model was constructed with three layers to simulate the materials of the petticoat cover design.

2.3.2.3 Transient Flow within the Facilities

The transient flow dynamics within the tailings material are simulated over time and space. The model accounts for transitions between material types and produces the following data sets:

- Water flux within the model domain;
- Moisture content;
- Water flow velocity; and
- Seepage discharge, if applicable (out of the model domain).

The following sections present the infiltration and seepage model results.

3.0 Model Results

Table 1 presents the key components of the modeled facility water balance as a percentage of total annual precipitation. The petticoat closure cover limits the amount of precipitation that is able to infiltrate to approximately 25% of annual precipitation. The disadvantage with this design is that water infiltrates along the uncovered waste rock slopes. However, a closer investigation of the modeled results show that the precipitation that readily infiltrates into the waste rock slopes, is quickly evaporated back out of the WRD. Any water that infiltrates and is not quickly lost to evaporation travels vertically until it encounters the GCL and fines layer between the waste rock lifts. Once the infiltrated water reaches the GCL and fines layer, it travels laterally. Because the GCL layer is graded away from the center of the facility, the lateral flow is toward the outer edge of the facility and will prevent infiltration of some water into the PAG waste rock.

Table 1 Water Balance of Model Scenarios

	Cumulative Boundary Fluxes	Cumulative Runoff Mesh	Cumulative Water Balance	Cumulative Surface Evaporation
34 degree - Petticoat cover	25%	8%	2%	65%

The draindown rate of the WRD was also considered and is presented in Figure 6. Because the catch bench GCL layers do not overlap from lift to lift, there is some potential for water to travel vertically from the slopes to the base of the facility. The amount of water that will travel through the facility is minimal (reaches a steady state rate of four to five cubic meters per hour [m^3/hr] in year three after closure), and will be captured and treated through a passive engineered wetland system. This type of treatment design requires that some moisture flow into the engineered wetland system on a continuous basis to prevent the system from drying out and to help maintain a healthy bacterial population.

During the wet season, the WRD could have a significant amount of water flushed from the waste rock in response to large storm events. This is illustrated by the spike in flows in Year 1 and a slight increase in Year 2 presented in Figure 6. By Year 3 the facility has reach a steady state condition and does not show any response to the wet season or large storm events.

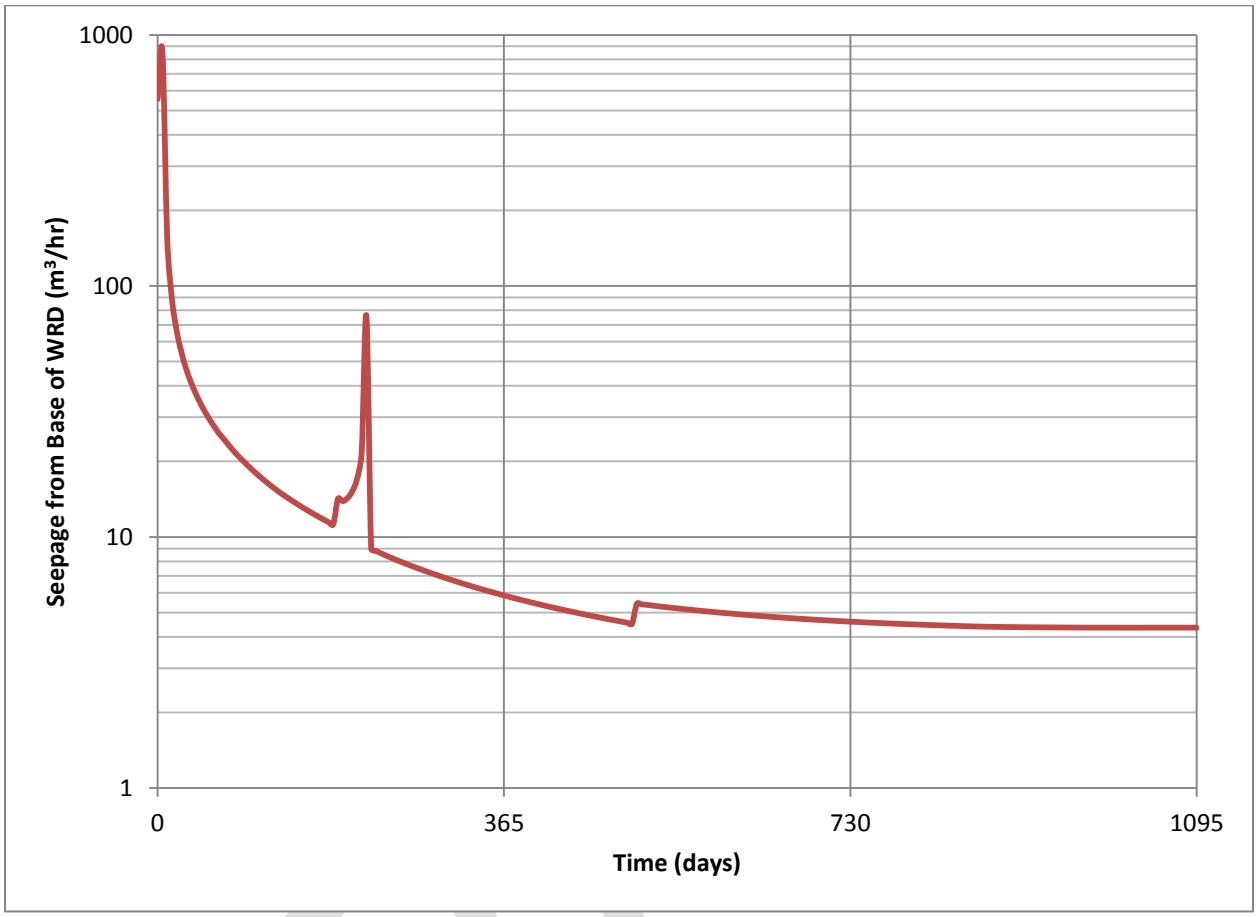


Figure 6 Draindown Flux Rate of WRD

Even though the waste rock material is quite hard and competent, the WRD will still be a dual porosity system. The primary porosity is the spaces between the pieces of rock. The secondary source of porosity is the fractures present in the rock that will "relax" and potentially open once the confining pressure of overlying rocks is removed. The secondary porosity is difficult to define and could allow ARD to happen in isolated fractures, that could be flushed by a passing wetting front, creating significantly impacted drainage water. These conditions need to be further defined as additional data is collected and site observations are made.

4.0 Water Quality Assessments

The water quality modeling approach and results are provided in the following subsections. Input parameters are summarized in Attachment 1.

4.1 Modeling Code and Database

The geochemical modeling was conducted using the computer code PHREEQC (Parkhurst and Appelo, 1999), a reaction path chemical equilibrium model supplied by the U.S. Geological Survey (USGS). PHREEQC is able to process multiple equilibria and mixing reactions to produce the final chemical speciation of a system. In addition to a computer code, geochemical

modeling requires a database of the thermodynamic and kinetic parameters. For this study, the MINTEQ.V5 database (Allison et al, 1991) was chosen. However, this database does not include all of the relevant metals; therefore, to obtain a broad range of metals, data for Ti, Th, Bi were added from the Lawrence Livermore National Laboratory database (llnl.dat).

4.2 Geochemical Conceptual Model

The water quality estimates are based on three probable vertical flow paths that the infiltration water is likely to take within the WRD (Figure 6). In summary:

- Flow Path A represents the optimal scenario with regard to limiting ARD formation such as the scenario that could be envisioned for the outer portion of the lower most lift where water will contact non-PAG rock first (~50%), interact with PAG/uncertain rock within the core (~35%) and contact non-PAG rock again (~15%) before reporting to RP1.
- The horizontal flow induced by the petticoat option would be similar to Flow Path B, and would result in contact with non-PAG rock (~33.3%), followed by PAG/uncertain rock (66.6%).
- Flow Path C represents percolation through the GCL and into the PAG/uncertain rock core only. This worst case scenario represents a scenario without flow through a non-PAG cover.

4.3 Modeling Approach

The geochemical models were constructed as a series of mixing and reaction steps that represent the flow paths shown in Figure 7. The percentages of each waste rock type to be placed in the WRD and the associated potential to generate acid are based on the geochemical characterization program described in Tetra Tech (2011a) and the sulphur cutoffs based on the sulfur block model described in Tetra Tech (2011b).

Tonnages are based on the feasibility study ultimate pit design provided by the project mine planner (Tom Dyer). Micromine software was utilized to cut the pit into the 18 lithologic codes within the block model. Non-PAG, uncertain and PAG criteria were based on the total sulphur concentrations as follows:

- Non-PAG waste rock contains up to 0.25 wt. % total sulphur;
- Uncertain waste rock contains from 0.25 to 0.4 wt. % total sulphur; and
- PAG waste rock contains greater than 0.4 wt. % total sulphur.

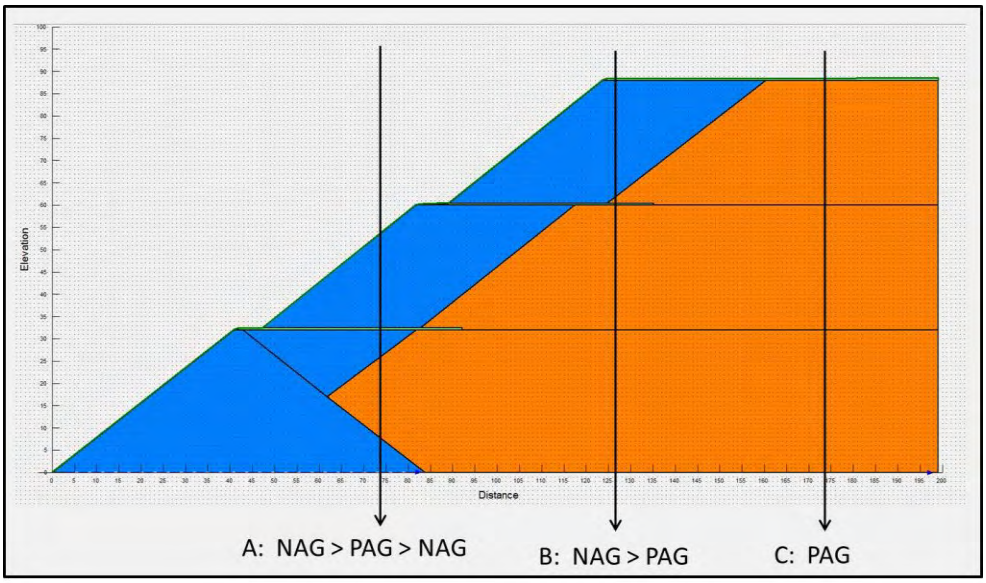


Figure 6 Expected Flow Paths and Material Contacts

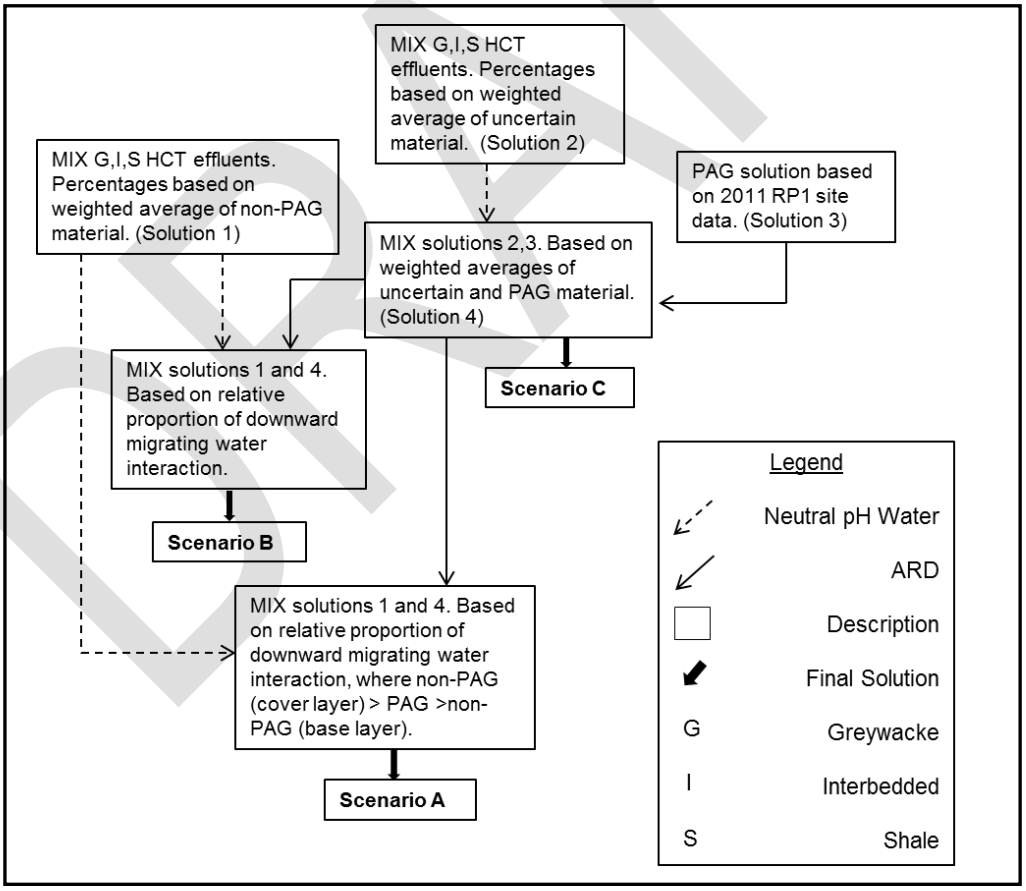


Figure 7 Geochemical Conceptual Model

Tonnages were obtained by querying all waste rock blocks (< 0.4 ppm Au) with 50% in or out of the topographic surface and ultimate pit surface. Tonnages of each rock type were initially compiled based on the 18 lithologic codes and then grouped into the three larger rock types defined as greywacke, interbedded and shale. Finally, the tonnages of non-PAG, uncertain and PAG waste rock from each rock types were determined (Attachment 1, Table A-1). Blocks identified as felsic tuff (~ 2% of the total tonnages) are also presented in Table A-1 but were not included in the geochemical modeling.

Initial solutions (Attachment 1, Table A-2) were based on kinetic humidity cell test (HCT) results including stable long-term concentrations associated with non-PAG and uncertain waste rock samples that generated neutral to alkaline pH for over one year and "first flush" concentrations from uncertain samples that also did not generate acid during the testing period. Alkalinity values less than 30 mg $CaCO_3$/L are commonplace in the HCT leachates. These initial solutions were mixed together based on the percentages of each rock type with the same acid-generating potential characteristics (Attachment 1, Table A-3). For example, stable concentrations from the non-PAG greywacke, shale and interbedded HCT leachates were mixed at a ratio of 0.4:0.18:0.42, to make solution 1. Likewise, solution 2 is comprised of first flush HCT concentrations of greywacke, shale and interbedded HCT leachates at a ratio of 0.35:0.15:0.5. Solution 3 was based on results from the November 2011 RP1 sampling event and represents ARD from PAG rock without consideration of rock type.

The seepage quality is based on stable long-term and first flush concentrations from the laboratory kinetic testing or ARD from RP1. Therefore, the model is considered to approximate water quality at the onset of the wet season when flushing of constituents will be the highest. The water quality predictions to be conducted for the water balance study will include kinetic oxidation of pyrite

4.4 Model Results

The geochemical model scenario results are summarized in Table 2. The results show that even partial encapsulation with non-PAG rock (scenario A) does not result in seepage with acceptable water quality as defined by the interim site specific trigger values (Table 3). The non-PAG rock primarily acts as a source of dilution of the regulated constituents. However, acidic pH remains because the alkalinity emanating from the non-PAG rock is insufficient to neutralize the acidity generated by the PAG rock. The model results show that acceptable pH (6 – 8) and associated decrease in constituent concentrations will require a source of neutralization potential (e.g., limestone).

5.0 Conclusions and Recommendations

The primary conclusions that can be drawn from this preliminary assessment of the drainage conditions and the water quality associated with different configurations of stacking and covering include:

- The petticoat option for both the 35° and 20° slopes limits the amount of precipitation that is able to infiltrate; however, water that infiltrates along the uncovered waste rock slopes interacts with the PAG waste rock unless the GCL layer is graded away from the center of the WRD.

- The beanie option performed the worst of the scenarios considered because only the top surface of the WRD is cover and the uncovered slopes and benches receive a significant amount of infiltration.
- The most protective option investigated is to fully cover the WRD; however, this option does not appear technically feasible for the 35° slopes.
- The non-PAG rock largely acts to dilute the ARD from the PAG rock because it does not contribute much to the regulated constituent load (e.g., metals, sulphate) but also is not a significant source of alkalinity.
- All three scenarios produce acidic pH solutions due to the minimal available alkalinity in the non-PAG rock to neutralize the acidity generated by the PAG rock. Addition of a neutralization potential source will be needed to prevent/minimize ARD.

Based on the findings of this study, the following recommendations should be considered to advance the current understanding of the drainage conditions associated with Vista Gold's preferred WRD closure configuration:

- Confirm that the WRD design chosen for the feasibility study is geotechnically stable.
- Confirm the composition and hydraulic properties of the fines material that will be placed to obtain the confining pressures.
- Quantify the concentrations of sodium and magnesium associated with the fines material and rainwater due to the potential for elevated sodium and magnesium concentrations to increase the GCL permeability these ions to impact the hydraulic permeability of the GCL. The heap leach pad residues have high sodium and magnesium concentrations compared to the non-PAG waste rock.
- Confirm the viability of an engineered wetland to treat ARD emanating from the WRD and prevent impacts to local waters.

Table 2 Summary of Model Results

Description	Scenario C	Scenario B	Scenario A
	PAG/Uncertain Only (100%)	Non-PAG>PAG/ Uncertain (33.3%, 66.6%)	Non-PAG>PAG>Non-PAG (50%, 37%, 13%)
pH	3.79	3.83	3.95
Sulphate	1220	816	448
Al	38.83	22.33	6.73
As	0.0119	0.0097	0.0078
Ca	77.4	52.9	31.0
Cd	0.107	0.071	0.039
Cl	9.21	7.64	6.24
Co	1.52	1.02	0.56
Cr	0.00079	0.00061	0.00045
Cu	8.38	5.59	3.10
Fe	0.000060	0.000040	0.000022
K	5.26	3.68	0.60
Mg	191	127	71
Mn	0.0067	0.0045	0.0022
Mo	0.00025	0.00018	0.00012
Na	22.9	15.8	9.4
Ni	12.9	8.64	4.79
Pb	0.053	0.036	0.020
Zn	25.13	16.76	9.30

Table 3 Proposed Interim Site Specific Trigger Values

Parameter	Units	Interim Trigger Values	Source (See GHD, 2011)
		Edith River	
pH	pH Units	6 - 8	ANZECC & ARMCANZ Table 3.3.4
Electrical Conductivity	uS/cm	20-250	ANZECC & ARMCANZ Table 3.3.5
Magnesium	mg/L	2.5	Van Dam et al 2010 Environ Toxicol Chem 29(2):410-421
Sulphate	mg/L	129	Elphick et al 2011 Environ Toxicol Chem 30 (1):247-253
Aluminum	mg/L	0.149	Site derived 80th %ile
Cadmium	mg/L	0.2	High reliability TV ANZECC & ARMCANZ Table 3.4.1
Cobalt	mg/L	0.09	Moderate reliability TV ANZECC & ARMCANZ pg 8.3 - 118
Chromium(III)	mg/L	0.0033	Low reliability TV ANZECC & ARMCANZ pg 8.3 - 116
Chromium(VI)	mg/L	0.001	High reliability TV ANZECC & ARMCANZ Table 3.4.1
Copper	mg/L	0.0027	ERISS (2005) NOEC Value
Manganese	mg/L	1.9	Moderate reliability TV ANZECC & ARMCANZ Table 3.4.1
Nickel	mg/L	0.011	High reliability TV ANZECC & ARMCANZ Table 3.4.1
Lead	mg/L	0.0034	High reliability TV ANZECC & ARMCANZ Table 3.4.1
Iron	mg/L	0.3	Canadian Guideline ANZECC & ARMCANZ pg 8.3-123
Mercury	mg/L	0.0006	High reliability TV ANZECC & ARMCANZ Table 3.4.1
Zinc	mg/L	0.0095	ERISS (2005) NOEC Value

6.0 References

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TETRA TECH

ATTACHMENT B:
RECLAMATION COST INFORMATION

Attachment B-1
Total Annual Costs by Facility
Vista Gold Corp. - Mt. Todd Project

	Total Closure Cost	Annual Totals	Annual Totals												Annual Totals								
	AU$	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
Heap Leach Pad	$4,777,066	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$4,777,066	-	-	-	-	-	-	-	-
Low Grade Ore Stockpile	$4,883,311	-	$108,440	-	-	-	-	-	-	-	-	-	-	-	$4,774,871	-	-	-	-	-	-	-	-	-
TSF 1	$24,028,056	-	-	$185,762	-	-	$2,254,062	$21,588,231	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TSF 2	$31,252,760	-	-	-	-	$2,266,887	-	-	-	-	-	-	-	-	-	#########	$17,888,251	-	-	-	-	-	-	-
WRD (GCL Cover)	$35,037,758	-	-	$898,420	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,395,312	$3,581,532	-	-	-	-	-	-	-	-	-	-
Process Plant Area	$16,354,568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$30,410	$16,200,600	-	-	-	$123,558	-	-	-
Soil Stockpiles	$806,740	-	$28,702	$82,751	-	$217,467	$27,495	$131,377	-	-	-	-	-	-	$41,192	$104,654	$127,405	-	-	-	$14,589	$31,107	-	-
Mine Roads	$680,357	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$680,357	-	-
Batman Pit	$224,154	-	-	$207,321	-	-	-	-	-	-	-	-	-	$16,834	-	-	-	-	-	-	-	-	-	-
Indirect Costs	$36,767,489	$186,875	$223,218	$608,552	$1,144,133	$1,802,487	$1,748,745	$6,899,829	$1,144,133	$1,144,133	$1,144,133	$1,144,133	$1,144,133	$1,197,942	$1,520,631	$4,486,959	$9,311,683	$273,125	$273,125	$273,125	$309,734	$461,663	$162,500	$162,500
	$154,812,258	$186,875	$360,360	$1,982,806	$4,539,444	$7,682,153	$7,425,615	$32,014,749	$4,539,444	$4,539,444	$4,539,444	$4,539,444	$4,539,444	$4,796,307	$6,336,694	#########	$43,527,939	$273,125	$273,125	$273,125	$447,881	$1,173,127	$162,500	$162,500

Attachment B-2
Annual Equipment Use, Fuel Consumption, Equipment Costs, Labor Costs, and Non-Equipment Costs
Vista Gold Corp. - Mt. Todd Project

	Equipment Use	Annual Totals																					
	Hours	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
D9 Dozer	*85,930*	-	470	3,276	972	10,747	2,775	22,985	972	972	972	972	972	988	3,943	12,558	21,708	-	-	-	174	472	-	-
994 Loader	*14,412*	-	42	296	237	1,119	481	4,510	237	237	237	237	237	281	503	1,780	3,912	-	-	-	18	47	-	-
180 Ton Haul Truck	*6,353*	-	84	711	-	1,763	98	843	-	-	-	-	-	-	302	1,419	934	-	-	-	57	142	-	-
Total Equipment Usage	*106,695*	-	*597*	*4,283*	*1,209*	*13,628*	*3,354*	*28,338*	*1,209*	*1,209*	*1,209*	*1,209*	*1,209*	*1,269*	*4,747*	*15,757*	*26,555*	-	-	-	*249*	*662*	-	-

Assume annual closure work is performed during the dry season.

	Fuel Consumption	Annual Totals																					
	Litres	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
D9 Dozer	*3,866,862*	-	21,159	147,433	43,756	483,604	124,897	1,034,308	43,756	43,756	43,756	43,756	43,756	44,440	177,425	565,123	976,855	-	-	-	7,837	21,242	-	-
994 Loader	*2,161,809*	-	6,325	44,330	35,571	167,796	72,159	676,571	35,571	35,571	35,571	35,571	35,571	42,204	75,390	266,982	586,862	-	-	-	2,656	7,110	-	-
180 Ton Haul Truck	*698,829*	-	9,277	78,213	-	193,931	10,733	92,699	-	-	-	-	-	-	33,172	156,067	102,785	-	-	-	6,310	15,643	-	-
Total Fuel Consumption	*6,727,499*	-	*36,762*	*269,976*	*79,327*	*845,331*	*207,789*	*1,803,579*	*79,327*	*79,327*	*79,327*	*79,327*	*79,327*	*86,644*	*285,987*	*988,172*	*1,666,502*	-	-	-	*16,802*	*43,996*	-	-

Equipment Based Costs		Annual Totals																					
	Usage Based Totals	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
D9 Dozer	*$7,746,484*	$0	$42,389	$295,352	$87,657	$968,805	$250,206	$2,072,030	$87,657	$87,657	$87,657	$87,657	$87,657	$89,027	$355,436	$1,132,112	$1,956,934	$0	$0	$0	$15,700	$42,555	$0	$0
994 Loader	*$4,603,226*	$0	$13,469	$94,393	$75,742	$357,295	$153,651	$1,440,651	$75,742	$75,742	$75,742	$75,742	$75,742	$89,866	$160,531	$568,495	$1,249,629	$0	$0	$0	$5,655	$15,141	$0	$0
180 Ton Haul Truck	*$1,279,299*	$0	$16,983	$143,180	$0	$355,016	$19,648	$169,698	$0	$0	$0	$0	$0	$0	$60,725	$285,702	$188,161	$0	$0	$0	$11,551	$28,636	$0	$0
Equipment Cost Totals	*$13,629,008*	*$0*	*$72,840*	*$532,925*	*$163,398*	*$1,681,115*	*$423,505*	*$3,682,379*	*$163,398*	*$163,398*	*$163,398*	*$163,398*	*$163,398*	*$178,893*	*$576,692*	*$1,986,308*	*$3,394,724*	*$0*	*$0*	*$0*	*$32,905*	*$86,332*	*$0*	*$0*

Labor Based Costs		Annual Totals																					
	Usage Based Totals	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
D9 Dozer	*$5,265,334*	$0	$28,812	$200,753	$59,581	$658,503	$170,067	$1,408,372	$59,581	$59,581	$59,581	$59,581	$59,581	$60,512	$241,592	$769,503	$1,330,141	$0	$0	$0	$10,671	$28,925	$0	$0
994 Loader	*$883,092*	$0	$2,584	$18,109	$14,530	$68,544	$29,477	$276,377	$14,530	$14,530	$14,530	$14,530	$14,530	$17,240	$30,797	$109,061	$239,731	$0	$0	$0	$1,085	$2,905	$0	$0
180 Ton Haul Truck	*$389,276*	$0	$5,168	$43,568	$0	$108,027	$5,979	$51,637	$0	$0	$0	$0	$0	$0	$18,478	$86,936	$57,255	$0	$0	$0	$3,515	$8,714	$0	$0
Labor Cost Totals	*$6,537,702*	*$0*	*$36,563*	*$262,429*	*$74,111*	*$835,074*	*$205,522*	*$1,736,386*	*$74,111*	*$74,111*	*$74,111*	*$74,111*	*$74,111*	*$77,752*	*$290,867*	*$965,500*	*$1,627,127*	*$0*	*$0*	*$0*	*$15,271*	*$40,543*	*$0*	*$0*

Non-Equipment Based Costs		Annual Totals																					
	Task Based Totals	Y-2	Y-1	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21
Crushing-Fines-Ops	*$9,410,945*	$0	$0	$0	$935,645	$935,645	$935,645	$935,645	$935,645	$935,645	$935,645	$935,645	$935,645	$990,139	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crushing-750mm-Ops	*$7,646,393*	$0	$0	$0	$760,212	$760,212	$760,212	$760,212	$760,212	$760,212	$760,212	$760,212	$760,212	$804,488	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crushing-PostOps	*$0*	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GCL Placement	*$14,704,602*	$0	$0	$0	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,461,945	$1,547,093	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
LPM Import	*$43,691,470*	$0	$0	$0	$0	$0	$1,627,634	$14,058,032	$0	$0	$0	$0	$0	$0	$3,353,713	$10,573,057	$14,031,780	$0	$0	$0	$47,254	$0	$0	$0
Environmental Supervisor	*$3,737,500*	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500	$162,500
Revegetation	*$7,051,351*	$0	$13,538	$54,150	$0	$165,799	$245,290	$2,115,531	$0	$0	$0	$0	$0	$0	$504,213	$1,588,163	$2,113,465	$0	$0	$0	$6,840	$244,364	$0	$0
Maintenance	*$11,804,477*	$0	$13,714	$137,425	$339,531	$587,967	$567,687	$2,511,492	$339,531	$339,531	$339,531	$339,531	$339,531	$359,837	$481,606	$1,600,975	$3,421,626	$0	$0	$0	$13,815	$71,146	$0	$0
Contingency	*$20,150,512*	$24,375	$47,003	$258,627	$592,101	$1,002,020	$968,558	$4,175,837	$592,101	$592,101	$592,101	$592,101	$592,101	$625,605	$826,525	$2,673,484	$5,677,557	$35,625	$35,625	$35,625	$58,419	$153,017	$0	$0
Other Costs	*$16,448,297*	$0	$14,202	$574,749	$50,000	$89,876	$67,116	$414,790	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$140,577	$946,723	$13,099,161	$75,000	$75,000	$75,000	$110,877	$415,226	$0	$0
Non-Equip Cost Totals	*$134,645,547*	*$186,875*	*$250,957*	*$1,187,451*	*$4,301,935*	*$5,165,964*	*$6,796,588*	*$26,595,984*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,539,663*	*$5,469,135*	*$17,544,902*	*$38,506,088*	*$273,125*	*$273,125*	*$273,125*	*$399,705*	*$1,046,252*	*$162,500*	*$162,500*
Total Closure Cost	**$154,812,258**	**$186,875**	**$360,360**	**$1,982,806**	**$4,539,444**	**$7,682,153**	**$7,425,615**	**$32,014,749**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,796,307**	**$6,336,694**	**$20,496,710**	**$43,527,939**	**$273,125**	**$273,125**	**$273,125**	**$447,881**	**$1,173,127**	**$162,500**	**$162,500**

Non-Equip Cost Totals	*$134,645,547*	*$186,875*	*$250,957*	*$1,187,451*	*$4,301,935*	*$5,165,964*	*$6,796,588*	*$26,595,984*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,301,935*	*$4,539,663*	*$5,469,135*	*$17,544,902*	*$38,506,088*	*$273,125*	*$273,125*	*$273,125*	*$399,705*	*$1,046,252*	*$162,500*	*$162,500*
Total Closure Cost	**$154,812,258**	**$186,875**	**$360,360**	**$1,982,806**	**$4,539,444**	**$7,682,153**	**$7,425,615**	**$32,014,749**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,539,444**	**$4,796,307**	**$6,336,694**	**$20,496,710**	**$43,527,939**	**$273,125**	**$273,125**	**$273,125**	**$447,881**	**$1,173,127**	**$162,500**	**$162,500**

Attachment B-3
Reclamation Cost Estimate
Vista Gold Corp. - Mt. Todd Project

Feature to Reclaim	Area of Feature	Year	Year No.	Task	Unit	Quantity	Unit Cost	Cost	Details/Comments
Waste Rock Dump								**$35,037,758**	
Expansion Salvage									
Dump Salvage	Plant Growth	Y1	1	Plant Growth Medium - Stockpile - 1km	m3	157,519	$2.53	$398,420	Includes salvage of Soil Stockpile #9A located east of existing WRD
Dump Salvage	Test Plots	Y1	1	Closure Cover and Reveg Test Plots	LS	2	$250,000.00	$500,000	
Closure									
WRD Closure	Side	Y2	2	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	Will complete GCL cover concurrently, however detailed concurrent reclamation schedule not presently available, thus simply assume 10% conducted every year after the first year
WRD Closure	Side	Y2	2	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y2	2	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y2	2	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y2	2	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y2	2	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y3	3	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y3	3	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y3	3	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y3	3	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y3	3	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y3	3	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y4	4	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y4	4	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y4	4	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y4	4	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y4	4	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y4	4	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y5	5	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y5	5	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y5	5	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y5	5	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y5	5	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y5	5	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y6	6	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y6	6	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y6	6	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y6	6	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y6	6	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y6	6	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y7	7	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y7	7	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y7	7	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y7	7	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y7	7	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y7	7	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y8	8	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y8	8	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y8	8	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y8	8	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y8	8	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y8	8	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y9	9	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y9	9	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y9	9	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y9	9	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y9	9	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y9	9	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y10	10	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y10	10	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y10	10	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y10	10	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y10	10	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y10	10	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y10	10	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y10	10	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y10	10	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y10	10	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Side	Y11	11	GCL Underlayer 750mm max particle size	m3	58,478	$13.00	$760,212	
WRD Closure	Side	Y11	11	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y11	11	GCL	m2	194,926	$7.50	$1,461,945	
WRD Closure	Side	Y11	11	GCL Overlayer - Fines	m3	58,478	$16.00	$935,645	
WRD Closure	Side	Y11	11	Spread / Grade	m3	58,478	$0.34	$19,757	
WRD Closure	Side	Y11	11	Place Non-PAG Waste Rock	m3	241,100	$0.82	$197,996	
WRD Closure	Top	Y11	11	GCL Underlayer 750mm max particle size	m3	3,406	$13.00	$44,277	
WRD Closure	Top	Y11	11	Spread / Grade	m3	3,406	$0.34	$1,151	
WRD Closure	Top	Y11	11	GCL	m2	11,353	$7.50	$85,148	
WRD Closure	Top	Y11	11	GCL Overlayer - Fines	m3	3,406	$16.00	$54,494	
WRD Closure	Top	Y11	11	Spread / Grade	m3	3,406	$0.34	$1,151	
Tailings Storage Facility - 1								**$24,028,056**	
Salvage									
TSF1 Salvage	Salvage Footprint	Y1	1	Plant Growth Medium - Stockpile - 3km	m3	60,986	$3.05	$185,762	Salvaged with haul to Stockpile 10
Closure									
TSF1 Closure	Embankment	Y4	4	Place Non-PAG Waste Rock	m3	67,456	$0.82	$55,396	
TSF1 Closure	Embankment	Y4	4	Store and Release LPM - Import	m3	130,944	$12.43	$1,627,634	
TSF1 Closure	Embankment	Y4	4	Store and Release LPM Placement	m3	130,944	$0.82	$107,534	
TSF1 Closure	Embankment	Y4	4	Store and Release Blending	m3	198,400	$0.73	$144,782	
TSF1 Closure	Embankment	Y4	4	Plant Growth Medium Placement 1 km haul	m3	49,600	$1.34	$66,359	From Soil Stockpiles 1-9
TSF1 Closure	Embankment	Y4	4	Spread / Grade	m3	49,600	$0.34	$16,757	Erosion Control grading (i.e. dozer basins)
TSF1 Closure	Embankment	Y4	4	Revegetation	ha	24.80	$9,500.00	$235,600	
Impoundment Surface									
TSF1 Closure	Seepage Collection	Y5	5	Excavate Seepage Collection Ditch	m3	60,000	$0.67	$40,337	
TSF1 Closure	Seepage Collection	Y5	5	LLDPE Liner	m2	14,886	$7.34	$109,263	
TSF1 Closure	Modify for closure	Y5	5	Install Closure Spillway (TSF1 or TSF2)	LS	1	$25,000.00	$25,000	
TSF1 Closure	Decant closure	Y5	5	Excavate Seepage Collection Ditch	m3	750	$0.67	$504	modify sump pond
TSF1 Closure	Decant closure	Y5	5	LLDPE Liner	m2	750	$7.34	$5,505	line pond
TSF1 Closure	Decant closure	Y5	5	Concrete	m3	916	$196.50	$180,011	fill decant pipes with concrete
TSF1 Closure	Impoundment Surface	Y5	5	Place Non-PAG Waste Rock	m3	2,724,624	$0.82	$2,237,519	Cover impoundment to provide footing for equipment
TSF1 Closure	Impoundment Surface	Y5	5	Store and Release LPM - Import	m3	1,130,976	$12.43	$14,058,032	
TSF1 Closure	Impoundment Surface	Y5	5	Store and Release LPM Placement	m3	1,130,976	$0.82	$928,782	
TSF1 Closure	Impoundment Surface	Y5	5	Store and Release Blending	m3	1,713,600	$0.73	$1,250,499	
TSF1 Closure	Impoundment Surface	Y5	5	Plant Growth Medium Placement 1 km haul	m3	428,400	$1.34	$573,146	Material hauled from Stockpiles 1-9 with remaining material coming from Stockpile 11.
TSF1 Closure	Impoundment Surface	Y5	5	Spread / Grade	m3	428,400	$0.34	$144,734	
TSF1 Closure	Impoundment Surface	Y5	5	Revegetation	ha	214	$9,500.00	$2,034,900	
Tailings Storage Facility - 2								**$31,252,760**	
Salvage									
TSF2 Salvage	Salvage Footprint	Y3	3	Plant Growth Medium - Stockpile - 1km	m3	896,233	$2.53	$2,266,887	Salvaged with haul to Stockpile 11
Closure									
Embankment									
TSF2 Closure	Embankment	Y13	13	Place Non-PAG Waste Rock	m3	332,112	$0.82	$272,737	
TSF2 Closure	Embankment	Y13	13	Store and Release LPM - Import	m3	644,688	$12.43	$8,013,472	
TSF2 Closure	Embankment	Y13	13	Store and Release LPM Placement	m3	644,688	$0.82	$529,432	
TSF2 Closure	Embankment	Y13	13	Store and Release Blending	m3	976,800	$0.73	$712,819	
TSF2 Closure	Embankment	Y13	13	Plant Growth Medium Placement 1 km haul	m3	244,200	$1.34	$326,709	Material hauled from Stockpile 8 with remaining material coming from Stockpile 11.
TSF2 Closure	Embankment	Y13	13	Spread / Grade	m3	244,200	$0.34	$82,502	
TSF2 Closure	Embankment	Y13	13	Revegetation	ha	122	$9,500.00	$1,159,950	
Impoundment Surface									
TSF2 Closure	Pipeline Closure	Y14	14	haul pipes to WRD	m3	3,893	$2.11	$8,225	
TSF2 Closure	Sump Modification	Y14	14	Excavate Seepage Collection Ditch	m3	750	$0.67	$504	modify sump pond
TSF2 Closure	Sump Modification	Y14	14	LLDPE Liner	m2	750	$7.34	$5,505	line pond
TSF2 Closure	Seepage Collection	Y14	14	Excavate Seepage Collection Ditch	m3	48,150	$0.67	$32,371	
TSF2 Closure	Seepage Collection	Y14	14	LLDPE Liner	m2	11,946	$7.34	$87,683	
TSF2 Closure	Modify for closure	Y14	14	Install Closure Spillway (TSF1 or TSF2)	LS	1	$25,000.00	$25,000	
TSF2 Closure	Impoundment Surface	Y14	14	Place Non-PAG Waste Rock	m3	2,273,064	$0.82	$1,866,689	
TSF2 Closure	Impoundment Surface	Y14	14	Store and Release LPM - Import	m3	943,536	$12.43	$11,728,152	
TSF2 Closure	Impoundment Surface	Y14	14	Store and Release LPM Placement	m3	943,536	$0.82	$774,852	
TSF2 Closure	Impoundment Surface	Y14	14	Store and Release Blending	m3	1,429,600	$0.73	$1,043,250	
TSF2 Closure	Impoundment Surface	Y14	14	Plant Growth Medium Placement 1 km haul	m3	319,720	$1.34	$427,746	Material hauled from stockpile 11
TSF2 Closure	Impoundment Surface	Y14	14	Plant Growth Medium Placement 3 km haul	m3	37,680	$1.85	$69,878	Material hauled from stockpile 10
TSF2 Closure	Impoundment Surface	Y14	14	Spread / Grade	m3	357,400	$0.34	$120,747	Erosion Control grading (i.e. dozer basins)
TSF2 Closure	Impoundment Surface	Y14	14	Revegetation	ha	179	$9,500.00	$1,697,650	
Heap Leach Pad								**$4,777,066**	
Closure									
HLP Closure	All	Y13	13	Cut and fold liner	m2	390,000	$2.15	$839,280	
HLP Closure	All	Y13	13	Excavate Liner and Contaminated Material and Haul to T	m3	195,000	$1.41	$274,507	Assume portion of material below heap liner is contaminated. Excavate material and haul to TSF 2
HLP Closure	All	Y13	13	Spread / Grade	m3	195,000	$0.34	$65,880	Spread contaminated material and liner from HLP on TSF2
HLP Closure	All	Y13	13	Spread / Grade	m3	156,000	$0.34	$52,704	Grading to promote positive drainage
HLP Closure	All	Y13	13	Place Non-PAG Waste Rock	m3	106,080	$0.82	$87,115	
HLP Closure	All	Y13	13	Store and Release LPM - Import	m3	205,920	$12.43	$2,559,586	
HLP Closure	All	Y13	13	Store and Release LPM Placement	m3	205,920	$0.82	$169,106	
HLP Closure	All	Y13	13	Store and Release Blending	m3	312,000	$0.73	$227,682	
HLP Closure	All	Y13	13	Plant Growth Medium Placement 1 km haul	m3	78,000	$1.34	$104,354	70,000 From Stockpile 9B East of WRD - Less than 1 km; 8,000 from Stockpile 1&2, E of Pit - Less than 1 km
HLP Closure	All	Y13	13	Spread / Grade	m3	78,000	$0.34	$26,352	Erosion Control grading (i.e. dozer basins)
HLP Closure	All	Y13	13	Revegetation	ha	39	$9,500.00	$370,500	
Low Grade Ore Stockpile - 1				**Eliminate closure. LGO1 Area encompassed by expansion of Batman Pit**				**NA**	
Closure									
Low Grade Ore Stockpile - 2								**$4,883,311**	
Salvage									
LGO2 Salvage	Salvage Footprint	Y-1	-1	Plant Growth Medium - Stockpile - 1km	m3	42,873	$2.53	$108,440	Salvaged with haul to Stockpile 10
Closure									
LGO2 Closure	All	Y12	12	Spread / Grade	m3	102,200	$0.34	$34,528	Assume rough grading 0.2m thick over area
LGO2 Closure	All	Y12	12	Place Non-PAG Waste Rock	m3	138,992	$0.82	$114,143	
LGO2 Closure	All	Y12	12	Store and Release LPM - Import	m3	269,808	$12.43	$3,353,713	
LGO2 Closure	All	Y12	12	Store and Release LPM Placement	m3	269,808	$0.82	$221,572	
LGO2 Closure	All	Y12	12	Store and Release Blending	m3	408,800	$0.73	$298,322	
LGO2 Closure	All	Y12	12	Plant Growth Medium Placement 2 km haul	m3	102,200	$1.60	$163,132	
LGO2 Closure	All	Y12	12	Spread / Grade	m3	102,200	$0.34	$34,528	Erosion Control grading (i.e. dozer basins)
LGO2 Closure	All	Y12	12	Revegetation	ha	51.1	$9,500.00	$485,450	
LGO2 Closure	All	Y12	12	Erosion/Sediment Control-Fence	m	3,004	$23.13	$69,483	Accounted for in Process Plant Area Erosion Control

Attachment B-3
Reclamation Cost Estimate
Vista Gold Corp. - Mt. Todd Project

Feature to Reclaim	Area of Feature	Year	Year No.	Task	Unit	Quantity	Unit Cost	Cost	Details/Comments
Process Plant Area								**$16,354,568**	
Closure									
Plant Area Closure	Close RP2	Y13	13	Remove and dispose sediments	m3	1,562	$2.11	$3,300	
Plant Area Closure	Close RP2	Y13	13	Cut and fold liner	m2	2,996	$2.15	$6,446	
Plant Area Closure	Close RP2	Y13	13	Backfill Pond	m3	10,414	$0.34	$3,518	Reveg area included in overall process plant area
Plant Area Closure	Close RP5	Y13	13	Remove and dispose sediments	m3	2,058	$2.11	$4,349	
Plant Area Closure	Close RP5	Y13	13	Cut and fold liner	m2	3,792	$2.15	$8,160	
Plant Area Closure	Close RP5	Y13	13	Backfill Pond	m3	13,721	$0.34	$4,636	
Plant Area Closure	Foundations	Y14	14	Concrete Foundation Rubblization and Haul to WRD	m3	21,432	$600.00	$12,859,200	Rubblize Foundations - All except WTP
Plant Area Closure	Close Equalization Pond	Y18	18	Remove and dispose sediments	m3	10,800	$2.11	$22,819	
Plant Area Closure	Close Equalization Pond	Y18	18	Cut and fold liner	m2	9,900	$2.15	$21,305	
Plant Area Closure	Close Equalization Pond	Y18	18	Backfill Pond	m3	36,000	$0.34	$12,162	
Plant Area Closure	Close Equalization Pond	Y18	18	Spread / Grade	m3	4,320	$0.34	$1,459	Rip subgrade
Plant Area Closure	Close Equalization Pond	Y18	18	Place Non-PAG Waste Rock	m3	1,958	$0.82	$1,608	Place cover
Plant Area Closure	Close Equalization Pond	Y18	18	Store and Release LPM - Import	m3	3,802	$12.43	$47,254	Place cover
Plant Area Closure	Close Equalization Pond	Y18	18	Store and Release LPM Placement	m3	3,802	$0.82	$3,122	Place cover
Plant Area Closure	Close Equalization Pond	Y18	18	Store and Release Blending	m3	5,760	$0.73	$4,203	Place cover
Plant Area Closure	Close Equalization Pond	Y18	18	Plant Growth Medium Placement 2 km haul	m3	1,440	$1.60	$2,299	Place cover
Plant Area Closure	Close Equalization Pond	Y18	18	Spread / Grade	m3	1,440	$0.34	$486	Erosion Control grading (i.e. dozer basins)
Plant Area Closure	Close Equalization Pond	Y18	18	Revegetation	ha	0.7	$9,500.00	$6,840	
Plant Area Closure	All	Y14	14	Spread / Grade	m3	351,000	$0.34	$118,584	Grading to blend plant area into surrounding topography.
Plant Area Closure	All	Y14	14	Place Non-PAG Waste Rock	m3	95,472	$0.82	$78,404	
Plant Area Closure	All	Y14	14	Store and Release LPM - Import	m3	185,328	$12.43	$2,303,627	
Plant Area Closure	All	Y14	14	Store and Release LPM Placement	m3	185,328	$0.82	$152,195	
Plant Area Closure	All	Y14	14	Store and Release Blending	m3	280,800	$0.73	$204,914	
Plant Area Closure	All	Y14	14	Plant Growth Medium Placement 1 km haul	m3	70,200	$1.34	$93,919	
Plant Area Closure	All	Y14	14	Spread / Grade	m3	70,200	$0.34	$23,717	Erosion Control grading (i.e. dozer basins)
Plant Area Closure	All	Y14	14	Revegetation	ha	35.1	$9,500.00	$333,450	
Plant Area Closure	All	Y14	14	Erosion/Sediment Control-Fence	m	1,409	$23.13	$32,590	
Soil Stockpiles								**$806,740**	**NOTE - Costs for Stockpiles will be incurred during mine operations, however complete schedule of stockpile creation has not been developed at this level of design. Costs associated with stockpiles attributed to Y16 at this time.**
Closure									
Stockpiles	SS1-9	Y4	4	Erosion/Sediment Control-Fence	m	740	$23.13	$17,116	Soil Stockpile 1 footprint eliminated during salvage of LGO Stockpile 2 salvage
Stockpiles	SS1-9	Y4	4	Spread / Grade	m3	2,040	$0.34	$689	
Stockpiles	SS1-9	Y4	4	Revegetation	ha	1	$9,500.00	$9,690	
Stockpiles	SS1-9	Y5	5	Erosion/Sediment Control-Fence	m	604	$23.13	$13,971	Soil Stockpile 2 footprint eliminated during salvage of LGO Stockpile 2 salvage
Stockpiles	SS1-9	Y5	5	Spread / Grade	m3	4,560	$0.34	$1,541	
Stockpiles	SS1-9	Y5	5	Revegetation	ha	2	$9,500.00	$21,660	
Stockpiles	SS10	Y-1	-1	Erosion/Sediment Control-Fence	m	614	$23.13	$14,202	
Stockpiles	SS10	Y-1	-1	Spread / Grade	m3	2,850	$0.34	$963	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y-1	-1	Revegetation	ha	1	$9,500.00	$13,538	
Stockpiles	SS10	Y1	1	Erosion/Sediment Control-Fence	m	1,070	$23.13	$24,749	
Stockpiles	SS10	Y1	1	Spread / Grade	m3	11,400	$0.34	$3,851	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y1	1	Revegetation	ha	6	$9,500.00	$54,150	
Stockpiles	SS10	Y12	12	Erosion/Sediment Control-Fence	m	912	$23.13	$21,095	
Stockpiles	SS10	Y12	12	Spread / Grade	m3	3,950	$0.34	$1,334	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y12	12	Revegetation	ha	2	$9,500.00	$18,763	
Stockpiles	SS10	Y13	13	Erosion/Sediment Control-Fence	m	790	$23.13	$18,273	
Stockpiles	SS10	Y13	13	Spread / Grade	m3	3,050	$0.34	$1,030	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y13	13	Revegetation	ha	2	$9,500.00	$14,488	
Stockpiles	SS10	Y14	14	Erosion/Sediment Control-Fence	m	632	$23.13	$14,618	
Stockpiles	SS10	Y14	14	Spread / Grade	m3	3,950	$0.34	$1,334	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y14	14	Revegetation	ha	2	$9,500.00	$18,763	
Stockpiles	SS10	Y18	18	Erosion/Sediment Control-Fence	m	630	$23.13	$14,572	
Stockpiles	SS10	Y18	18	Spread / Grade	m3	50	$0.34	$17	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y18	18	Revegetation	ha	-	$9,500.00	$0	
Stockpiles	SS10	Y19	19	Erosion/Sediment Control-Fence	m	630	$23.13	$14,572	
Stockpiles	SS10	Y19	19	Spread / Grade	m3	3,250	$0.34	$1,098	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS10	Y19	19	Revegetation	ha	2	$9,500.00	$15,438	
Stockpiles	SS11	Y3	3	Erosion/Sediment Control-Fence	m	1,724	$23.13	$39,876	Stockpile construction erosion control
Stockpiles	SS11	Y3	3	Spread / Grade	m3	34,905	$0.34	$11,793	
Stockpiles	SS11	Y3	3	Revegetation	ha	17	$9,500.00	$165,799	grade out disturbed footprint for interim reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS11	Y5	5	Erosion/Sediment Control-Fence	m	1,342	$23.13	$31,040	
Stockpiles	SS11	Y5	5	Spread / Grade	m3	12,415	$0.34	$4,194	grade out disturbed footprint for interim reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS11	Y5	5	Revegetation	ha	6	$9,500.00	$58,971	
Stockpiles	SS11	Y13	13	Erosion/Sediment Control-Fence	m	1,062	$23.13	$24,564	
Stockpiles	SS11	Y13	13	Spread / Grade	m3	9,100	$0.34	$3,074	grade out footprint for final reclamation - assume 0.2 m depth over footprint area
Stockpiles	SS11	Y13	13	Revegetation	ha	5	$9,500.00	$43,225	
Stockpiles	SS11	Y14	14	Erosion/Sediment Control-Fence	m	1,062	$23.13	$24,564	Stockpile construction erosion control
Stockpiles	SS11	Y14	14	Spread / Grade	m3	13,390	$0.34	$4,524	
Stockpiles	SS11	Y14	14	Revegetation	ha	7	$9,500.00	$63,603	grade out disturbed footprint for interim reclamation - assume 0.2 m depth over footprint area
Mine Roads								**$680,357**	
Closure									
Roads Closure	All	Y19	19	Spread / Grade	m3	48,195	$0.34	$16,283	Grade into surrounding topography
Roads Closure	All	Y19	19	Spread / Grade	m3	48,195	$0.34	$16,283	Rip material 0.2m deep prior to PGM placement
Roads Closure	All	Y19	19	Plant Growth Medium Placement 2 km haul	m3	48,195	$1.60	$76,929	
Roads Closure	All	Y19	19	Spread / Grade	m3	48,195	$0.34	$16,283	Erosion Control grading (i.e. dozer basins)
Roads Closure	All	Y19	19	Revegetation	ha	24.1	$9,500.00	$228,926	
Roads Closure	All	Y19	19	Erosion/Sediment Control-Bales	ea	720.0	$33.13	$23,854	
Roads Closure	All	Y19	19	Erosion/Sediment Control-Fence	m	13,048.0	$23.13	$301,800	
Batman Pit								**$224,154**	
Expansion									
Pit Expansion	Expansion	Y1	1	Plant Growth Medium - Stockpile - 1km	m3	81,966	$2.53	$207,321	
Closure									
Pit Closure	Pit Edge	Y11	11	Pit Safety Berm	m3	44,960	$0.37	$16,834	Berm material coming directly from pit. Assume haul costs covered by Pit/WRD Cost Estimate.
Indirect Costs								**$36,767,489**	
Indirect	Oversight	Y-2	-2	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y-1	-1	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y1	1	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y2	2	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y3	3	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y4	4	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y5	5	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y6	6	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y7	7	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y8	8	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y9	9	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y10	10	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y11	11	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y12	12	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y13	13	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y14	14	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y15	15	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y16	16	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y17	17	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y18	18	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y19	19	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y20	20	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
Indirect	Oversight	Y21	21	Environmental Supervisory Staff	LS	1	$162,500.00	$162,500	
	Concurrent Monitoring	Y1	1	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y2	2	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y3	3	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y4	4	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y5	5	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y6	6	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y7	7	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y8	8	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y9	9	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y10	10	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y11	11	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y12	12	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y13	13	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Concurrent Monitoring	Y14	14	Concurrent Monitoring	LS	1	$50,000.00	$50,000	
	Closure Monitoring	Y15	15	Closure Monitoring	LS	1	$75,000.00	$75,000	
	Closure Monitoring	Y16	16	Closure Monitoring	LS	1	$75,000.00	$75,000	
	Closure Monitoring	Y17	17	Closure Monitoring	LS	1	$75,000.00	$75,000	
	Closure Monitoring	Y18	18	Closure Monitoring	LS	1	$75,000.00	$75,000	
	Closure Monitoring	Y19	19	Closure Monitoring	LS	1	$75,000.00	$75,000	
	Maintenance	Y-2	-2	Maintenance	%	10%	$0.00	$0	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y-1	-1	Maintenance	%	10%	$137,142.34	$13,714	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y1	1	Maintenance	%	10%	$1,374,253.45	$137,425	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y2	2	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y3	3	Maintenance	%	10%	$5,879,666.34	$587,967	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y4	4	Maintenance	%	10%	$5,676,869.53	$567,687	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y5	5	Maintenance	%	10%	$25,114,920.14	$2,511,492	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y6	6	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y7	7	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y8	8	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y9	9	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y10	10	Maintenance	%	10%	$3,395,311.75	$339,531	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y11	11	Maintenance	%	10%	$3,598,365.56	$359,837	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y12	12	Maintenance	%	10%	$4,816,062.23	$481,606	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y13	13	Maintenance	%	10%	$16,009,751.32	$1,600,975	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y14	14	Maintenance	%	10%	$34,216,256.39	$3,421,626	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y15	15	Maintenance	%	10%	$0.00	$0	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y16	16	Maintenance	%	10%	$0.00	$0	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y17	17	Maintenance	%	10%	$0.00	$0	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y18	18	Maintenance	%	10%	$138,146.96	$13,815	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Maintenance	Y19	19	Maintenance	%	10%	$711,464.10	$71,146	Assume maintenance required on reclamation activities performed during year (percentage based on direct costs only)
	Contingency	Y-2	-2	Contingency	%	15%	$162,500.00	$24,375	
	Contingency	Y-1	-1	Contingency	%	15%	$313,356.57	$47,003	
	Contingency	Y1	1	Contingency	%	15%	$1,724,178.80	$258,627	
	Contingency	Y2	2	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y3	3	Contingency	%	15%	$6,680,132.98	$1,002,020	
	Contingency	Y4	4	Contingency	%	15%	$6,457,056.48	$968,558	
	Contingency	Y5	5	Contingency	%	15%	$27,838,912.16	$4,175,837	
	Contingency	Y6	6	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y7	7	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y8	8	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y9	9	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y10	10	Contingency	%	15%	$3,947,342.93	$592,101	
	Contingency	Y11	11	Contingency	%	15%	$4,170,702.12	$625,605	
	Contingency	Y12	12	Contingency	%	15%	$5,510,168.45	$826,525	
	Contingency	Y13	13	Contingency	%	15%	$17,823,226.45	$2,673,484	
	Contingency	Y14	14	Contingency	%	15%	$37,850,382.03	$5,677,557	
	Contingency	Y15	15	Contingency	%	15%	$237,500.00	$35,625	
	Contingency	Y16	16	Contingency	%	15%	$237,500.00	$35,625	
	Contingency	Y17	17	Contingency	%	15%	$237,500.00	$35,625	
	Contingency	Y18	18	Contingency	%	15%	$389,461.65	$58,419	
	Contingency	Y19	19	Contingency	%	15%	$1,020,110.51	$153,017	
							Total	**$154,812,258**	

Attachment B-4
Mine Equipment and Mine Labor Costs
Vista Gold Corp. - Mt. Todd Project

Mine Equipment

Primary Mining Equipment	Unit Cost	Freight	Assembly	Total	Source	Fuel l/hr	Fuel $/hr	Lube, Oil $/hr	Tires $/hr	Under-Carriage	R&M Parts	Special Wear Items	Total	Total AU$**
Atlas Copco PV235	$ 1,617,104	$ 91,960	$ 26,026	$ 1,735,090	EMG	70.40	$ 39.43	$ 11.58		$ 5.00	$ 36.24	$ 52.08	$ 144.33	$ 149.38
28m3 Hyd. Shovel (PC 5000))	$ 10,328,429	$ 598,259	$ 361,213	$ 11,287,901	EMG	350.00	$ 196.00	$ 48.48			$ 141.20	$ 13.52	$ 399.20	$ 413.17
18m3 Front End Loader (994)	$ 4,374,700	$ 132,130	$ 39,450	$ 4,546,280	EMG	150.00	$ 118.68	$ 29.29	$ 87.39		$ 71.45	$ 1.79	$ 308.60	$ 319.40
180t Haul Truck	$ 2,665,520	$ 151,580	$ 42,900	$ 2,860,000	EMG	110.00	$ 87.03	$ 21.59	$ 49.59		$ 36.35		$ 194.56	$ 201.37
Support Equipment														$ -
300 Kw Dozer (D9)	$ 869,155	$ 49,426	$ 13,989	$ 932,570	EMG	45.00	$ 35.60	$ 5.64		$ 12.51	$ 19.35	$ 14.00	$ 87.10	$ 90.15
230 Kw Dozer (D8)				$ 685,631		35.00	$ 19.60	$ 3.43		$ 9.38	$ 8.23	$ 10.61	$ 51.25	$ 53.05
4.9 m Motor Grader (16H)	$ 778,652	$ 44,280	$ 12,532	$ 835,464	EMG	21.00	$ 11.76	$ 4.14	$ 13.05		$ 18.83	$ 1.18	$ 48.96	$ 50.67
Water Truck - 70,000 Liter	$ 1,437,500	$ 53,681	$ 14,780	$ 1,505,961	EMG	60.00	$ 33.60	$ 8.28	$ 51.89		$ 32.77		$ 126.54	$ 130.97
RTD Dozer (834H)	$ 889,608	$ 50,589	$ 14,318	$ 954,515	EMG	40.00	$ 22.40	$ 4.57	$ 17.20		$ 18.88		$ 63.05	$ 65.26
Rock Breaker - Impact Hammer (691 Kg m)				$ 39,100	InfoMine	-	$ -	$ 0.22			$ 1.58	$ 0.63	$ 2.43	$ 2.52
Backhoe/Loader (1.5 cu m-446D)	$ 266,552	$ 15,158	$ 4,290	$ 286,000	EMG	15.00	$ 8.40	$ 2.05	$ 2.67		$ 8.70	$ 1.91	$ 23.73	$ 24.56
Pit Pumps (5299 lpm)				$ 25,500	InfoMine	6.46	$ 3.62	$ 0.28			$ 0.77		$ 4.67	$ 4.83
36 ton Crane	$ 298,240	$ 16,960	$ 4,800	$ 320,000	EMG	23.13	$ 12.95	$ 2.38	$ 1.33		$ 4.35		$ 21.02	$ 21.75
2 cm excavator (Cat 392)	$ 333,409	$ 18,164	$ 5,560	$ 177,345	EMG	30.00	$ 16.80	$ 2.78		$ 1.75	$ 14.34	$ 2.22	$ 37.89	$ 39.22
Low Boy	$ 864,000	$ 86,400	$ 43,200	$ 993,600	InfoMine - Gooseneck trailer w/ 60 ton truck	47.02	$ 26.33	$ 6.53	$ 12.99		$ 8.08	$ 0.30	$ 54.23	$ 56.13
Flatbed	$ 53,000	$ 2,650	$ -	$ 55,650	InfoMine	12.85	$ 7.19	$ 0.79	$ 0.80		$ 1.06	$ 0.30	$ 10.14	$ 10.50
Blasting														
Sanding/Stemming Truck					Infomine	24.00	$ 13.44	$ 0.90	$ 0.93		$ 1.51	$ 1.50	$ 18.28	$ 20.36
Explosives Truck	$ 157,110	$ 15,711	$ 7,856	$ 180,677	Tred (from Livengood Quote)	15.00	$ 8.40	$ 2.00	$ 1.12		$ 5.00	$ 0.30	$ 16.82	$ 18.73
Skid Loader	$ 47,800	$ 3,450	$ 3,145	$ 54,395	EMG	7.00	$ 3.92	$ 0.34	$ 1.60		$ 0.85		$ 6.71	$ 7.47
Mine Maintenance														
Lube/Fuel Truck				$ 192,610	EMG	10.00	$ 5.60	$ 0.50	$ 1.68		$ 3.50	$ 0.30	$ 11.58	$ 12.90
Mechanics Truck				$ 187,000	EMG	5.00	$ 2.80	$ 0.20	$ 1.68		$ 3.00	$ 0.30	$ 7.98	$ 8.89
Tire Truck				$ 137,000		3.00	$ 1.68	$ 0.60	$ 0.50		$ 3.00	$ 0.15	$ 5.93	$ 6.60
Other Mine Capital														
Light Plant	$ 12,302	$ 700	$ 198	$ 13,200	EMG	2.00	$ 1.12	$ 0.10	$ 0.12		$ 0.65		$ 1.99	$ 2.22

*Operating Costs updated per TT/MDA Equipment List, April 16, 2012

** AU$ based on factor of 1.035 to convert O&M rates from MDA to AU$

Mine Employees

Operator Hours

Hours per day	12
Days per year	170
Hours worked per Year	**2040**

*Developed based on assumption from Ausenco that operators work 4 day shifts of 12 hours with 4 days off, plus about two weeks of vacation/sick leave (January 9, 2012).

Operator Rates	Base Salary	On Cost	Total
Loader Operator	$100,000	$25,000	$125,000
Dozer Operator	$100,000	$25,000	$125,000
Truck Operator	$100,000	$25,000	$125,000

Environmental Supervision

	Base Salary (AU$)	On Cost	Total	
Environmental Supervisor	$110,000	$27,500	$137,500	
Environmental Vehicle			$25,000	Based on estimate from Proteus (1/5/2012)
		Total Cost	**$162,500**	

- **Operator & Supervisor Labor Rate Development:**
- Labor rates are based on values from TT cost model workbook, effective 4/18/2012.
- These rates replaced rates from Ausenco and the Hays Salary Guide

Attachment B-5
Unit Costs Development
Vista Gold Corp. - Mt. Todd Project

Mine Owned Equipment and Labor

							Dozer (Salvage)						Dozer (Place)						Loader						Truck						Totals				
Cost	**UOM**	**Distance**	**Control Productivity (lcm/hr)**	**Unit Rate (AUS)**	**Equipment Cost ($/lcm)**	**Labor Cost ($/lcm)**	**Qnty**	**Productivity Rate**	**Total Productivity**	**Equipment Rate**	**Operator Wage**	**Qnty**	**Productivity Rate**	**Total Productivity**	**Equipment Rate**	**Operator Wage**	**Qnty**	**Productivity Rate**	**Total Productivity**	**Equipment Rate**	**Operator Wage**	**Qnty**	**Productivity Rate**	**Total Productivity**	**Equipment Rate**	**Operator Wage**	**Total Hourly Equipment Cost**	**Total Hourly Labor Cost**	**Total Hourly Cost**	**Equipment Based Cost**	**Comments/Justification**
Plant Growth Medium - Stockpile - 1km	m3	1 km	1017	**$ 2.53**	$ 1.69	$ 0.84	3	448	1345	$ 90.15	$61.27	8	134	1076	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	2	511	1022	$ 201.37	$61.27	$ 1,713.77	$ 857.84	**$ 2,571.62**	equip	3 Dozer Excavating, 8 Dozer Placing/Grading up the stockpile, Loader to excavate and load truck, 2 Trucks to keep up with Loader productivity
Plant Growth Medium - Stockpile - 2km	m3	2 km	1017	**$ 2.79**	$ 1.88	$ 0.90	3	448	1345	$ 90.15	$61.27	8	134	1076	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	3	395	1186	$ 201.37	$61.27	$ 1,915.14	$ 919.12	**$ 2,834.26**	equip	3 Dozer Excavating, 8 Dozer Placing/Grading up the stockpile, Loader to excavate and load truck, 3 Trucks to keep up with Loader productivity
Plant Growth Medium - Stockpile - 3km	m3	3 km	1017	**$ 3.05**	$ 2.08	$ 0.96	3	448	1345	$ 90.15	$61.27	8	134	1076	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	4	322	1289	$ 201.37	$61.27	$ 2,116.51	$ 980.39	**$ 3,096.91**	equip	3 Dozer Excavating, 8 Dozer Placing/Grading up the stockpile, Loader to excavate and load truck, 4 Trucks to keep up with Loader productivity
Plant Growth Medium - Stockpile - 5km	m3	5 km	1017	**$ 3.30**	$ 2.28	$ 1.02	3	448	1345	$ 90.15	$61.27	8	134	1076	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	5	235	1176	$ 201.37	$61.27	$ 2,317.88	$ 1,041.67	**$ 3,359.55**	equip	3 Dozer Excavating, 8 Dozer Placing/Grading up the stockpile, Loader to excavate and load truck, 5 Trucks to keep up with Loader productivity
Spread / Grade	m3		448	**$ 0.34**	$ 0.20	$ 0.14						1	448	448	$ 90.15	$61.27											$ 90.15	$ 61.27	**$ 151.42**	equip	1 Dozer spreading and distributing material to appropriate grade and depth
Revegetation	ha			**$ 9,500**																								**$ -**			Cost based on revegetation cost estimate from Brian Iley and Keith Ashby in AU
Erosion/Sediment Control-Fence	m			**$ 23.13**																								**$ -**			Cost based on erosion control cost estimate from Brian Iley and Keith Ashby in AU
Erosion/Sediment Control-Bales	ea			**$ 33.13**																								**$ -**			Cost based on erosion control cost estimate from Brian Iley and Keith Ashby in AU
Pit Safety Berm	m3		1017	**$ 0.37**	$ 0.31	$ 0.06											1	1017	1017	$ 319.40	$61.27						$ 319.40	$ 61.27	**$ 380.68**	equip	1 Loader to move and place material from truck end-dump
Store and Release Blending	m3		208	**$ 0.73**	$ 0.43	$ 0.30						1	207.5	208	$ 90.15	$61.27											$ 90.15	$ 61.27	**$ 151.42**	equip	1 Dozer ripping store and release cover to blend material (single shank)
Plant Growth Medium Placement	m3		1017	**$ 0.82**	$ 0.58	$ 0.24						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27						$ 589.85	$ 245.10	**$ 834.94**	equip	Loader to load truck, 3 Dozers Placing/Grading at pace of loader
Plant Growth Medium Placement 1 km haul	m3	1 km	1017	**$ 1.34**	$ 0.98	$ 0.36						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	2	511	1022	$ 201.37	$61.27	$ 992.59	$ 367.65	**$ 1,360.23**	equip	Loader to load truck, 2 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Plant Growth Medium Placement 2 km haul	m3	2 km	1017	**$ 1.60**	$ 1.17	$ 0.42						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	3	395	1186	$ 201.37	$61.27	$ 1,193.96	$ 428.92	**$ 1,622.88**	equip	Loader to load truck, 3 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Plant Growth Medium Placement 3 km haul	m3	3 km	1017	**$ 1.85**	$ 1.37	$ 0.48						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	4	322	1289	$ 201.37	$61.27	$ 1,395.32	$ 490.20	**$ 1,885.52**	equip	Loader to load truck, 4 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Plant Growth Medium Placement 5 km haul	m3	5 km	1017	**$ 2.11**	$ 1.57	$ 0.54						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	5	235	1176	$ 201.37	$61.27	$ 1,596.69	$ 551.47	**$ 2,148.17**	equip	Loader to load truck, 5 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Place Non-PAG Waste Rock	m3		1017	**$ 0.82**	$ 0.58	$ 0.24						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27						$ 589.85	$ 245.10	**$ 834.94**	equip	1 Loader to pull material from local stockpile, 3 Dozers Placing/Grading at pace of loader
Store and Release LPM - Import	m3			**$ 12.43**																											Costs Included in Low Permeability Material Cost Estimate
Store and Release LPM Placement	m3		1017	**$ 0.82**	$0.58	$ 0.24						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27						$ 589.85	$ 245.10	**$ 834.94**	equip	1 Loader to pull material from local stockpile, 3 Dozers Placing/Grading at pace of loader
Environmental Supervisory Staff	LS			**$ 162,500**																											Based on cost for "Screen and Crush in Pit - to max 750mm particle size" and "Spread / Grade"
Post Prod. Crushed PGM	m3	1 km	0	**$ 1.35**																							$ -	$ -	**$ -**		Based on $1.35 for Crushing to Fines
Crushed PGM	m3	1 km	0	**$ 16.00**																							$ -	$ -	**$ -**		Based on $16 for Crushing to Fines
Haul - 1 km	m3	1 km	511	**$0.51**	$0.39	$ 0.12																1	511	511	$ 201.37	$61.27	$ 201.37	$ 61.27	**$ 262.64**	equip	Truck & Labor only costs
Haul - 2 km	m3	2 km	395	**$0.66**	$0.51	$ 0.16																1	395	395	$ 201.37	$61.27	$ 201.37	$ 61.27	**$ 262.64**	equip	Truck & Labor only costs
Haul - 3 km	m3	3 km	322	**$0.82**	$0.63	$ 0.19																1	322	322	$ 201.37	$61.27	$ 201.37	$ 61.27	**$ 262.64**	equip	Truck & Labor only costs
Haul - 4 km	m3	4 km	272	**$0.97**	$0.74	$ 0.23																1	272	272	$ 201.37	$61.27	$ 201.37	$ 61.27	**$ 262.64**	equip	Truck & Labor only costs
Haul - 5 km	m3	5 km	235	**$1.12**	$0.86	$ 0.26																1	235	235	$ 201.37	$61.27	$ 201.37	$ 61.27	**$ 262.64**	equip	Truck & Labor only costs
Concurrent Monitoring	LS			**$ 50,000**																											Best Professional Judgement
Closure Monitoring	LS			**$ 75,000**																											Best Professional Judgement
Maintenance of Reclamation	LS			**$ 100,000**																											Best Professional Judgement
Cut and fold liner	m2			**$2.15**		$ 2.15																									Based on $0.10/SF cost to cut liner (vendor quote - Desert Engineering, Nevada, USA), assume 2 x cost to account for difference in labor between Nevada, USA and NT, Aus.
Excavate Liner and Contaminated Material and Haul	m3	3 km	1017	**$ 1.41**	$ 1.11	$ 0.30											1	1017	1017	$ 319.40	$61.27	4	322	1289	$ 201.37	$61.27	$ 1,124.88	$ 306.37	**$ 1,431.25**	equip	1 Loader excavating contaminated soils, and 4 Trucks hauling soils to TSF2 for disposal
Cut and fold Liner, dispose in place	m2			**$ 0.40**																											Best Professional Judgement
Characterize sediments in ponds	LS			**$ 10,000**																											Best Professional Judgement
Closure Cover and Reveg Test Plots	LS			**$ 250,000**																											Best Professional Judgement
Modify Decant Seepage Pump and Pipeline	LS			**$ 20,000**																											From PFS - Best Professional Judgement, Assume pump and pipeline from Decant Ponds modified to convey TSF Decant and Moat seepage to the Water Treatment Plant. Maintain seepage collection system until long-term seepage from TSF1 = 0 or passive/semi-passive water treatment system installed.
Install Closure Spillway (TSF1 or TSF2)	LS			**$ 25,000**																											From PFS - Best Professional Judgement- Assumes operational spillway will require modification at closure to safely pass a 200-year to probable maximum flood event.
Dewater HLP pond	LS			**$ 10,000**																											Best Professional Judgement, assume can send water to Water Treatment Plant
LLDPE Liner	m2			**$ 7.34**																											Consistent with Tailings Impoundment Estimate - 2012, Fabtech, Wingfield, South Australia
Concrete	m3			**$ 196.50**																											2012 Rawlinsons - concrete delivered to site, 20 MPa, haul less than 15 km (p. 235), adjusted for Katherine location (p. 26)
haul pipes to WRD	m3	5 km	1017	**$ 2.11**	$ 1.57	$ 0.54						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	5	235	1176	$ 201.37	$61.27	$ 1,596.69	$ 551.47	**$ 2,148.17**	equip	Loader to load truck, 5 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Decontaminate and Close HLP Moat	LS			**$ 25,000**																											Best Professional Judgement
Remove and dispose sediments	m3	5 km	1017	**$ 2.11**	$ 1.57	$ 0.54						3	448	1345	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27	5	235	1176	$ 201.37	$61.27	$ 1,596.69	$ 551.47	**$ 2,148.17**	equip	Loader to load truck, 5 Trucks to keep up with Loader productivity, 3 Dozers Placing/Grading at pace of trucks and loader, 1 Dozer Excavating
Backfill pond	m3		448	**$ 0.34**	$ 0.20	$ 0.14						1	448	448	$ 90.15	$61.27											$ 90.15	$ 61.27	**$ 151.42**	equip	1 Dozer spreading and distributing material to appropriate grade and depth
Excavate Seepage Collection Ditch	m3		1017	**$ 0.67**	$ 0.49	$ 0.18						2	448	896	$ 90.15	$61.27	1	1017	1017	$ 319.40	$61.27						$ 499.70	$ 183.82	**$ 683.52**	equip	Assume 5m deep, 5m bottom width, 2:1 side slopes, waste material on downhill side
Concrete Foundation Rubblization and Haul to WRD	m3			**$ 600**																											Based on cost quoted by Proteus - Nov. 2011
GCL Underlayer 750mm max particle size	m3		0	**$ 13.00**																							$ -	$ -	**$ -**		Based on cost for "Screen and Crush in Pit - to max 750mm particle size" from Proteus and "Spread / Grade" unit cost
GCL	m2			**$ 7.50**																											Vendor quote from Joe Kaul for Australia
GCL Overlayer - Fines	m3		0	**$ 16.00**																							$ -	$ -	**$ -**		Based on cost for "Screen and Crush in Pit - to Fines" from Proteus and "Spread / Grade" unit cost

Number of dozers may not reflect actual operations. If the specified number of dozers are not available, fewer dozers may work more hours resulting in an equivalent total unit cost

Crushing During Years of Production with Separate Crusher

Screen and Crush in Pit - to Fines	$16.00	per m3	Max of costs quoted by Proteus for typical screen and crush cost
Screen and Crush in Pit - to max 750mm particle siz	$13.00	per m3	Min of costs quoted by Proteus for typical screen and crush cost

Crushing with Process Plant Crusher

Per Tonne Unit Cost =	$0.75	per tonne	Based on crushing cost estimate from Vista (e-mail, January 19, 2012)
Per m3 Unit Cost =	$1.35	per m3	

Concrete Foundation Rubblization and Haul to WRD

Per m3 unit cost=	$600.00	per m3	Based on cost quoted by Proteus - Nov. 2011

Concurrent Monitoring	$	50,000	Per Year	Best Professional Judgement	
Closure Monitoring	$	75,000	Per Year	Best Professional Judgement	
Maintenance of Reclamation	$	100,000	Per Year	Best Professional Judgement	
Cut and fold Liner, dispose in place	$	0.40	m2	Best Professional Judgement	For TSF Ponds and HLP ponds
Characterize sediments in ponds	$	10,000	Lump Sum	Best Professional Judgement	For TSF Ponds and HLP ponds
Closure Cover and Reveg Test Plots	$	250,000	Lump Sum	Best Professional Judgement	
Modify Decant Seepage Pump and Pipeline	$	20,000	Lump Sum	From PFS - Best Professional Judgement, Assume pump and pipeline from Decant Ponds modified to convey TSF Decant and Moat seepage to the Water Treatment Plant. Maintain seepage collection system until long-term seepage from TSF1 = 0 or passive/semi-passive water treatment system installed.	
Install Closure Spillway (TSF1 or TSF2)	$	25,000	Lump Sum	From PFS - Best Professional Judgement- Assumes operational spillway will require modification at closure to safely pass a 200-year to probable maximum flood event.	
Dewater HLP pond	$	10,000	Lump Sum	Best Professional Judgement	Send to WTP
LLDPE Liner	$	7.34	m2	Consistent with Tailings Impoundment Estimate - 2012, Fabtech, Wingfield, South Australia	
Concrete	$	196.50	m3	2012 Rawlinsons - adjusted for Katherine location (p. 26), concrete delivered to site, 20 MPa, haul less than 15 km (p. 235)	
haul pipes to WRD	$	2.11	m3	assume costs equivalent to loading and hauling topsoil 5km	
Decontaminate and Close HLP Moat	$	25,000.00	Lump Sum	Fold HDPE liner and cover.	
Remove and dispose sediments	$	2.11		assume costs equivalent to loading and hauling topsoil 5km	
Backfill pond	$	0.34	m3	spread/grade cost	
Low Permeability Material Import Cost - 2013 Unit t	$	12.43	m3	From TT Soils group, 2013 - unit cost for borrow development, importing, and borrow closure	

Attachment B-6
Equipment Productivity Rates
Vista Gold Corp. - Mt. Todd Project

Spread/Grade Flat

Equipment

Dozers	**D9 Dozer - Flat**	**D9 Dozer - 3:1 Slope (down)**	**D9 Dozer - 3:1 Slope (up)**	**Source**
Universal Blade, 45 m push (lm^3/hr)	675	675	675	Cat Handbook Volume 40, Chapter 1, p 47
50 min/hr	0.83	0.83	0.83	Cat Handbook Volume 40, Chapter 1, p 50
Dry, Non-cohesive soil	0.8	0.8	0.8	Cat Handbook Volume 40, Chapter 1, p 50
Slope Factor	1	1.6	0.3	Cat Handbook Volume 40, Chapter 1, p 50
Productivity (m^3/hr)	**448.2**	**717.12**	**134.46**	

Dozer - Ripping	**D9 Dozer - Flat**	**Source**
Multi- or Single Shank No. 9 Ripper		
Assumed Seismic Velocity (m/sec)	2300	Cat Handbook Volume 40, Seismic Velocity-D9 Ripper, Sedimentary Rock, Marginal Ripping Conditions; Chapter 1 P. 68
Handbook Productivity Rate, Single Shank (Bcm/hr)	250	Cat Handbook Volume 40, Seismic Velocity of 2300 m/sec, Chapter 1 P. 72
Handbook Productivity Rate, Multi Shank (Bcm/hr)	750	Multiplied Single shank productivity by three for ripping with three shanks
50 min/hr	0.83	
Productivity (m^3/hr)	**207.5**	Based on Single-Shank

Loaders	**994 Loader - 18 m3**	**Source**
Hydraulic Cycle Time (sec)	17.9	Cat Handbook Volume 40, Chapter 12, P. 8
Haul and Scoop Cycle Time (sec)	35	Assume 10 seconds to scoop + 20 seconds to haul + 5 seconds to position for dumping
Bucket Capacity (m^3)	18	Cat Handbook Volume 40, Chapter 12, P. 79; and Tom Dyer
50 min/hr	0.83	
Productivity (m^3/hr)	**1017**	

Trucks	**789 Haul Truck - 1 km flat**	**789 Haul Truck - 2 km flat**	**789 Haul Truck - 3 km flat**	**789 Haul Truck - 4 km flat**	**789 Haul Truck - 5 km flat**	**Source**
Haul	**1 km**	**2 km**	**3 km**	**4 km**	**5 km**	
Capacity (m^3)	105	105	105	105	105	Cat Handbook Volume 40 - Heaped Base Body Chapter 9 P. 7
50 min/hr	0.83	0.83	0.83	0.83	0.83	
Load Time (min)	5.4	5.4	5.4	5.4	5.4	From Tom Dyer
Dump Time (min)	1.5	1.5	1.5	1.5	1.5	From Tom Dyer
Haul Time Loaded (min)	1.71	3.21	4.71	6.21	7.71	Based on travel time calculations below, 1 km haul times provided by MDA w/ 2% Rolling Resistance (R.R. from Tom Dyer)
Haul Time Empty (min)	1.62	3.12	4.62	6.12	7.62	Based on travel time calculations below, 1 km haul times provided by MDA w/ 2% Rolling Resistance (R.R. from Tom Dyer)
Productivity (m^3/hr)	**511**	**395**	**322**	**272**	**235**	

Haul Time Development	**Truck Haul Times (E-mail from Tom Dyer, 1/5/2012)**		**Extrapolated Haul Times based on acceleration, constant speed and deceleration times from Tom Dyer's estimate for 1 km haul**							
100 m Haul Increments	1km - Loaded	1km - Empty	2km - Loaded	2km - Empty	3km - Loaded	3km - Empty	4km - Loaded	4km - Empty	5km - Loaded	5km - Empty
100	0.29	0.22	0.29	0.22	0.29	0.22	0.29	0.22	0.29	0.22
200	0.46	0.37	0.46	0.37	0.46	0.37	0.46	0.37	0.46	0.37
300	0.61	0.52	0.61	0.52	0.61	0.52	0.61	0.52	0.61	0.52
400	0.76	0.67	0.76	0.67	0.76	0.67	0.76	0.67	0.76	0.67
500	0.91	0.82	0.91	0.82	0.91	0.82	0.91	0.82	0.91	0.82
600	1.06	0.97	1.06	0.97	1.06	0.97	1.06	0.97	1.06	0.97
700	1.21	1.12	1.21	1.12	1.21	1.12	1.21	1.12	1.21	1.12
800	1.36	1.27	1.36	1.27	1.36	1.27	1.36	1.27	1.36	1.27
900	1.51	1.42	1.51	1.42	1.51	1.42	1.51	1.42	1.51	1.42
1000	**1.71**	**1.62**	1.66	1.57	1.66	1.57	1.66	1.57	1.66	1.57
1100			1.81	1.72	1.81	1.72	1.81	1.72	1.81	1.72
1200			1.96	1.87	1.96	1.87	1.96	1.87	1.96	1.87
1300			2.11	2.02	2.11	2.02	2.11	2.02	2.11	2.02
1400			2.26	2.17	2.26	2.17	2.26	2.17	2.26	2.17
1500			2.41	2.32	2.41	2.32	2.41	2.32	2.41	2.32
1600			2.56	2.47	2.56	2.47	2.56	2.47	2.56	2.47
1700			2.71	2.62	2.71	2.62	2.71	2.62	2.71	2.62
1800			2.86	2.77	2.86	2.77	2.86	2.77	2.86	2.77
1900			3.01	2.92	3.01	2.92	3.01	2.92	3.01	2.92
2000			**3.21**	**3.12**	3.16	3.07	3.16	3.07	3.16	3.07
2100					3.31	3.22	3.31	3.22	3.31	3.22
2200					3.46	3.37	3.46	3.37	3.46	3.37
2300					3.61	3.52	3.61	3.52	3.61	3.52
2400					3.76	3.67	3.76	3.67	3.76	3.67
2500					3.91	3.82	3.91	3.82	3.91	3.82
2600					4.06	3.97	4.06	3.97	4.06	3.97
2700					4.21	4.12	4.21	4.12	4.21	4.12
2800					4.36	4.27	4.36	4.27	4.36	4.27
2900					4.51	4.42	4.51	4.42	4.51	4.42
3000					**4.71**	**4.62**	4.66	4.57	4.66	4.57
3100							4.81	4.72	4.81	4.72
3200							4.96	4.87	4.96	4.87
3300							5.11	5.02	5.11	5.02
3400							5.26	5.17	5.26	5.17
3500							5.41	5.32	5.41	5.32
3600							5.56	5.47	5.56	5.47
3700							5.71	5.62	5.71	5.62
3800							5.86	5.77	5.86	5.77
3900							6.01	5.92	6.01	5.92
4000							**6.21**	**6.12**	6.16	6.07
4100									6.31	6.22
4200									6.46	6.37
4300									6.61	6.52
4400									6.76	6.67
4500									6.91	6.82
4600									7.06	6.97
4700									7.21	7.12
4800									7.36	7.27
4900									7.51	7.42
5000									**7.71**	**7.62**

Attachment B-7
Cost Estimate Assumptions
Vista Gold Corp. - Mt. Todd Project

Assumptions

General

Unless designs have been updated, the facility quantities reflect the designs in the Preliminary Feasibility Study
All closure activities will occur during the dry season each year
Contingency for PFS Level Costs = **15%**
Exchange Rate **1.035**

Cover Placement Quantities and Assumptions:

Store And Release Cover		
Plant Growth Medium Depth (m)	0.2	
Store And Release Cover Depth (m)	0.8	All facilities except WRD, Roads, HLP Footprint
Sub-base Material for Store and Release Cover Depth (m)	1	Bridging material for TSF Impoundment Surfaces
Store & Release Cover LPM Content	66%	
Store & Release Cover Non-PAG Waste Rock Content	34%	

Pit Berm Construction (Rock and Non-PAG Waste Rock)	
Width (m)	5
Height (m)	2
Length (m)	4,496

Heap Leach Pad	
Liner Area (m2)	390,000
Depth contam. mat. below liner (m)	0.5
Volume Contaminated Material (m3)	195,000

Areas and Borrow/Salvage/Reclamation Characteristics

Facility	Soil Unit	Area (ha)	Regrade Depth (m)	Regrade Volume (m3)	Volume (m3)	Primary Plant Growth Medium Depth (m)	Secondary Plant Growth Medium Depth (m)	Low-Permeability Material Haul Distance	
Waste Rock Dump - Coverage/Recl		208.1							Based on design from MDA, November 2012
Waste Rock Dump - Coverage/Recl - 3D area		241.1							Based on design from MDA, November 2012
Waste Rock Dump - Top Only		1.1							Based on design from MDA, November 2012
Waste Rock Dump - Expansion/Salvage	30C	67.64				0.18	0.00		Based on design from MDA, November 2012 and Soil Data from Henry Sauer, November 2012
Non-PAG Pit Run Waste Rock					111,111,111				200,000,000 tonnes/(1.8 t Based on estimate from MDA, November 2012
TSF 1 - Embankment Reclamation		24.8						4.5	Areas provided by TT Recl Group in Golden - December 2012
TSF 1 - Impoundment Reclamation		214.2						4.5	Areas provided by TT Recl Group in Golden - December 2012
TSF 1 - Salvage	30C	34.3				0.18	0.00		Soil Units from TT Soils Group - November 2012
TSF 2 - Embankment Salvage/Reclamation		122.1						5.5	Provided by TT in Golden, June 2013
TSF 2 - Impoundment Salvage/Reclamation		178.7						5.5	Provided by TT in Golden, June 2013
TSF 2 - Salvage 1	10A	38.9				0.30	0.65		Soil Units from TT Soils Group - November 2012
TSF 2 - Salvage 2	20A	54.7				0.30	0.00		Soil Units from TT Soils Group - November 2012
TSF 2 - Salvage 3	30C	201.4				0.18	0.00		Soil Units from TT Soils Group - November 2012
Heap Leach Pad & Moat		39	0.4	156,000				4.5	
LGO 1		14.6							Overtaken by Batman Pit expansion - no reclamation necessary
LGO 2		51.1	0.2	102,200				5.5	Based on design June 2013
LGO 2	30C	21.87				0.18	0.00		Soil Units from TT Soils Group - November 2012 - Not all of LGO 2 footprint salvaged
LGO 2	13A	3.14				0.13	0.00		Soil Units from TT Soils Group - November 2012 - Not all of LGO 2 footprint salvaged
Processing Plant and Pad Area		35.1	1	351,000				5.5	Includes process plant area, crushing stockpile, RP2 (LGO Pond), RP5 (Process Plant Pond), ANFO
Roads		24.1							Area based on road lay-out lengths with assumed width of 35 meters (12/10/12)
Pit - Salvage & Reclamation	30C	46.1				0.18	0.00		Soil unit data was only available to the extent of the base case pit perimeter.

Map Unit	Primary Limitations	Average Thickness of Salvageable Primary Plant Growth Medium[1]	Average Thickness of Salvageable Primary Plant Growth Medium[1]	Average Thickness of Salvageable Secondary Plant Growth Medium[3]	Salvaged Thickness of Secondary Plant Growth Medium[3]
ID #		inches	m	inches	m
10A	rock	12	0.30	73	1.85
11A	rock	11	0.28	29	0.74
12A	clay/rock	15	0.38	65	1.65
13A	rock	5	0.13	8	0.20
20A	urated (cemented)	12	0.30	0	0.00
30C	rock	7	0.18	0	0.00

Erosion Control	Control Length (m)	
Roads - Fence	13,048	**Based on preliminary layout, both sides of road - 12/11/12**
Stockpile 1	224	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 2	480	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 3	420	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 4	220	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 5	318	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 6	534	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 7	346	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 8	412	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 9	-	**Removed during salvage and expansion of WRD & used for HLP reclamation**
Stockpile 10	740	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Stockpile 11	1,724	**Based on stockpile perimeter as preliminary estimate - 12/11/12**
Plant	1,409	**Based on plant area perimeter up to WRD and Pit as preliminary estimate - 12/11/12**
LGO2	3,004	**LGO2 based on MDA design - November 2012**
Roads - Bales	720	**18 Waterbody crossings counted on road layout - November 2012**

Assumptions:
16 meter offset for erosion control fence around plant, soil stockpiles, and LGO stockpiles
6 meter offset for erosion control fence and bales around roads
Erosion control bales replace fence at intersection of roads and surface water, extending to 10 meters either side of the waterbody centerline

Attachment B-7
Cost Estimate Assumptions
Vista Gold Corp. - Mt. Todd Project

WRD GCL Cover	
Underlayer Depth - 750mm particle size max (m)	0.3
GCL - Bentomat	NA
Overlayer Depth - Fines (m)	0.3

GCL Berm Construction **UPDATED WITH NEW BUILD OUT - 11/29/2012**

Slope = 1:1
Berm Height = 0.5
Berm Length= 1.41

GCL Length each lift (not including berm): Full (to just overlapping) 44.5 m — Horizontal Length each 30m lift at 34deg. (m)

	Elevation *m*	Length *m*	Area *m2*	GCL Area on Lift *m2*	GCL Berm Area *m2*	
Ground Level Lift 0	*134*	*5,873*	*2,080,616*	-	-	No GCL Placed under first lift of WRD
Lift 1	150	5,623	1,859,183	296,992	7,357	
Lift 2	180	5,202	1,562,191	276,867	6,790	
Lift 3	210	4,801	1,285,324	253,433	6,237	
Lift 4	240	4,410	1,031,891	233,221	5,402	
Lift 5	270	3,820	798,670	205,187	4,551	
Lift 6	300	3,218	593,483	172,662	3,874	
Lift 7	330	2,739	420,821	144,601	3,253	
Lift 8	360	2,300	276,220	127,920	2,390	
Lift 9	390	1,690	148,300	136,947	1,788	
Lift 10	420	1,264	59,123	59,123	668	
Cap	*440*	*472*	*11,353*	*11,353*	*Top*	GCL place over entirety of final 10 m lift - assumed final lift may contain PAG material

GCL Material Totals	
Total (m2)	**1,960,614**
Total (ha)	**196.1**
Total Lift Area (ha)	**194.9**
Total Top Area (ha)	**1.1**

Costs Not Included For The Following:
Incorporation of organic matter into top lift of cover
Removal of sediments from ponds
Conducting minor grading around ponds to breach embankments
Water Treatment (Active or Passive)
Stormwater Control Structures
Decontamination, Decommissioning and Demolition of Site Facilities

Preliminary Costs Only Included For The Following:
Plugging of TSF1 decant pipes with concrete
Modification of TSF2 sumps to receive seepage from TSF2 foundation drains and TSF2 collection ditch via gravity
Modification of TSF1 operational spillway to safely convey surface runoff from TSF1 and TSF2 pools to Horseshoe Creek
Break up of concrete foundations/walls/bridges and place in the WRD
Construction of revegetation test plots on HLP following regrading and cover placement
Construction of closure cover (erosion) test plots on HLP following regrading
Seepage collection ditches at toe of TSF1 (lined with LLDPE or equivalent)

TSF 2 Pipe Removal

Distribution Pipe			Spigot Pipes		
Depth:	0.63	m	Depth:	0.315	m
Length:	9,250	m	Length:	4,625	m
Volume	2,883	m3	Volume	360	m3
bulking	20%		bulking	20%	
total volume	3,460	m3	total volume	433	m3

Pipe diameters and lengths provided by J. Jathal, 2/23/12 via email
Bulking factor based on best professional judgement
Assume cost based on haul to WRD for on-site disposal

TSF 1 and 2 Seepage Collection Ditches

TSF 1 Impoundment Perimeter Length	8000	m	Based on June 2013 Design
TSF 2 Impoundment Perimeter Length	6420	m	Based on June 2013 Design
% of Perimeter requiring ditch	10%		
TSF 1 Seepage Ditch Length	800	m	Assume nominal length - length to be revised if seepage fronts identified during operation
TSF 2 Seepage Ditch Length	642	m	
Base width:	5	m	
Depth:	5	m	
Side Slopes	2H:1V		
Volume TSF 1 Ditch	60,000	m3	
Volume TSF 2 Ditch	48,150	m3	
Area Liner - TSF 1 Ditch	14,886	m2	assume only line bottom and downstream edge+15% for overlap/anchor
Area Liner - TSF 2 Ditch	11,946	m2	assume only line bottom and downstream edge+15% for overlap/anchor

Pond Closure

RP1 - No modifications required for closure, per conversation with Dwaine Edington, 2/23/12
RP2 - Closure to occur in dry season.

Volume:	10,414	m3	
Sediment Volume (15% of total)	1,562	m3	
Liner area:	2,996	m2	estimate based on square pond, with pond depth 5m

RP3 - No modification s for water management required for closure
RP5 - Closure to occur in dry season.

Volume:	13,721	m3	
Sediment Volume (15% of total)	2,058	m3	
Liner area:	3,792	m2	estimate based on square pond, with pond depth 5m

TSF1 Decant Pond

Modify volume	750	m3	Assumed breach dimesions: base width = 5m; depth = 5m; 2H:1V side slopes; length = 10 m. Maintain facility until decant pipes are sealed and long-term seepage from TSF1 = 0 or passive/semi-passive water treatment system installed.
Liner area:	750	m2	Assume 0.5*5*(5+25)*10
Decant pipe lenth	7,290	m	PFS
Decant pipe diameter	0.4	m	PFS
Decant pipe volume	916	m3	

Equalization Pond - Closure to occur with decommissioning of WTP.

Volume:	36,000	m3	
Area:	7,200	m2	
Length:	120	m	
Width:	60	m	
Depth:	5	m	
Liner area:	9,900	m2	Assume 10% extra for sloped sides
Sediment Volume (30% of total)	10,800	m3	

Process Plant Area Foundation Demolition

WTP Volume Concrete	294	m3	Accounted for in WTP estimate
All Other Structures Volume Concrete	21,432	m3	Assume decon, decommissioning, and demolition occurs year following end of production, removal of foundations in year following decon, decommissioning, and demolition.

Updated quantities not available at time of PFS Cost estimate - use 2011 volume estimate

Attachment B-8
Reclamation Cover Quantities
Vista Gold Corp. - Mt. Todd Project

Feature	Overall (million tonnes)	hectares (1 hectare = 10,000 m2)	Sub Base Non PAG Waste Rock Depth (m)	Sub Base Non PAG Waste Rock Volume (m^3)	Store and Release depth (m)	Store and Release LPM Volume (m^3)	Store and Release Non PAG Waste Rock Volume (m^3)	Total Store and Release (m3)	Plant Growth Medium Depth (m)	Plant Growth Medium Volume (m^3)	Total Material (m^3)	PFS Estimates	Comments
WRD	233	241.1	1	2,411,000		-	-	-		-	2,411,000	30% waste rock will be non PAG (30% of 233 MT = 69.9MT)	1-m thick erosion control layer
TSF1 - Embankment Stage 1		24.8		-	0.8	130,944	67,456	198,400	0.2	49,600	248,000	use salvaged soil from TSF2 instead of LPM	
TSF1 - Impoundment Surface	60	214.2	1	2,142,000	0.8	1,130,976	582,624	1,713,600	0.2	428,400	4,284,000	use salvaged soil from TSF2 instead of LPM	
TSF2 - Embankment Stage 1	NA	122.1		-	0.8	644,688	332,112	976,800	0.2	244,200	1,221,000		
TSF2 - Impoundment Surface	100	178.7	1	1,787,000	0.8	943,536	486,064	1,429,600	0.2	357,400	3,574,000		
Heap Leach Pad (HLP)		39		-	0.8	205,920	106,080	312,000	0.2	78,000	390,000		side slopes ~1H:2.5V grade to 3:1 close immediately
LGO2		51.1		-	0.8	269,808	138,992	408,800	0.2	102,200	511,000		
Process Plant Area		35.1		-	0.8	185,328	95,472	280,800	0.2	70,200	351,000		
Equalization Pond		0.72			0.8	3,802	1,958	5,760	0.2	1,440	7,200		
Mine Roads		24.1		-	-	-	-	-	0.2	48,195	48,195		recontour and grade into existing topo
Pit Safety Berm				44,960		-	-	-		-	44,960		
Totals				**6,384,960**		**3,515,002**	**1,810,758**			**1,379,635**	**13,090,355**		

		Underlayer (m3)	Overlayer (m3)	GCL (m2)
Area of top covered by GCL (ha)	1.1	3,406	3,406	11,353
Area sides with GCL (ha)	195	584,778	584,778	1,949,261
TOTAL			**1,176,368**	**1,960,614**

TOTALS	**Volume (m^3)**	**Mass (Tonnes)**
Sub-Base Non-PAG Waste Rock	6,384,960	11,492,928
Store and Release LPM	3,515,002	6,327,003
Store and Release Waste Rock	1,810,758	3,259,365
Plant Growth Medium	1,379,635	2,483,343
TOTALS	**Volume (m^3)**	**Mass (Tonnes)**
Total LPM Needed	**3,515,002**	**6,327,003**
Total Non-PAG Waste Rock Needed	**8,195,718**	**14,752,293**
Total Plant Growth Medium Needed	**1,379,635**	**2,483,343**

Attachment B-9
Plant Growth Medium Salvage Quantities
Vista Gold Corp. - Mt. Todd Project

Feature	Area (ha)	Volume (m^3)	Primary Plant Growth Medium Depth (m)	Secondary Plant Growth Medium Depth (m)	Primary Plant Growth Medium Salvage (m^3)	Secondary Plant Growth Medium Salvage (m^3)	Total Plant Growth Medium (m^3)	Comments
WRD - Expansion	67.64		0.2	0.0	120,264	-	120,264	30C
Soil Stockpile - 9A (WRD Stockpile)		37,255	NA				37,255	Placed into Stockpile 10
TSF 1 - Salvage	34.3		0.2	0.0	60,986	-	60,986	30C
TSF 2 - Salvage	38.9		0.3	0.7	118,567	252,850	371,417	10A
TSF 2 - Salvage	54.7		0.3	0.0	166,726	-	166,726	20A
TSF 2 - Salvage	201.4		0.2	0.0	358,090	-	358,090	30C
LGO2	21.87		0.2	0.0	38,885	-	38,885	30C
LGO2	3.14		0.1	0.0	3,988	-	3,988	13A
Batman Pit Expansion - Surface Salvag	46.1		0.2	0.0	81,966	-	81,966	30C
Soil Stockpile - 1		2,283					2,283	
Soil Stockpile - 2		3,598					3,598	
Soil Stockpile - 2		3,673					3,673	
Soil Stockpile - 3		41,569					41,569	
Soil Stockpile - 4		7,233					7,233	
Soil Stockpile - 5		14,214					14,214	
Soil Stockpile - 6		38,494					38,494	
Soil Stockpile - 7		12,784					12,784	
Soil Stockpile - 8		21,839					21,839	
Soil Stockpile - 10 (WRD Expansion)			NA				-	Accounted for in Salvage Numbers
Soil Stockpile - 11			NA				-	Accounted for in Salvage Numbers
				TOTAL	949,472	252,850	1,385,263	

TOTAL SALVAGED MATERIAL	Volume (m^3)
Primary Plant Growth Medium	**949,472**
Secondary Plant Growth Medium	**252,850**
Total Plant Growth Medium	**1,202,322**

Attachment B-10
PGM Stockpiles
Vista Gold Corp. - Mt. Todd Project

Year	Salvaged Plant Growth Medium (m3)	Source	Stockpile	Stockpile Haul	SS10 Volume (m3)	SS1-9 & SS11 Volume (m3)	Placed Plant Growth Medium (m3)	Source	Destination	Haul	SS1-9 Area (m2)	SS10 Area (m2)	SS11 Area (m2)	SS1-9 Reclaim Area (ha)	SS10 Reclaim Area (ha)	SS11 Reclaim Area (ha)
Y-1	145,687	Existing Stockpiles	SS1-9		-	145,687	-									
Y-1	42,873	LGO2	SS10	1 km	42,873	145,687	-					14,250			1.43	
Y1	300,470	Pit, WRD, and TSF 1	SS10		343,343	145,687	-					57,000			5.70	
Y2	-				343,343	145,687	-									
Y3	896,233	TSF 2	SS11	1 km	343,343	1,041,920	-						174,525			17.45
Y4	-				343,343	992,320	49,600	SS1-9	TSF1 Embankment	1 km	10,200			1.02		
Y5	-				343,343	896,233	96,087	SS1-9	TSF1 Impoundment	1 km	22,800			2.28		
Y5	-				343,343	563,920	332,313	SS11	TSF1 Impoundment	1 km			62,075			6.21
Y6	-				343,343	563,920	-									
Y7	-				343,343	563,920	-									
Y8	-				343,343	563,920	-									
Y8	-				343,343	563,920	-									
Y9	-				343,343	563,920	-									
Y10	-				343,343	563,920	-									
Y11	-				343,343	563,920	-									
Y12	-				241,143	563,920	102,200	SS10	LGO2	1 km		19,750			1.98	
Y13	-				241,143	319,720	244,200	SS11	TSF 2 Embankment	1 km			45,500			4.55
Y13	-				163,143	319,720	78,000	SS10	HLP	2 km		15,250			1.53	
Y14	-				163,143	-	319,720	SS11	TSF2 Impoundment	1 km			66,950			6.70
Y14	-				125,463	-	37,680	SS10	TSF2 Impoundment	3 km						
Y14	-				55,263	-	70,200	SS10	Process Plant Pad	1 km		19,750			1.98	
Y15	-				55,263	-	-									
Y16	-				55,263	-	-									
Y17	-				55,263	-	-									
Y18	-				53,823	-	1,440	SS10	Equalization Pond	2 km		250			-	
Y19	-				5,628	-	48,195	SS10	Roads	2 km		16,250			1.63	
Y20	-				5,628	-	-									
Y21	-				5,628	-	-									
Y22	-				5,628	-	-									
Y23	-				5,628	-	-									
Y24	-				5,628	-	-									
Y25	-				5,628	-	-									
Total	*1,385,263*						*1,379,635*									

Attachment B-10
PGM Stockpiles
Vista Gold Corp. - Mt. Todd Project

Stockpile Name	Slope Ratio X(H):1(V)	Height (m)	Length (m)	Width (m)	Underlying Slope %	Swell Factor	Base Area (m2)	Bottom Perimeter (m)	Top Perimeter (m)	Top Length (m)	Top Width (m)	Top Area (m^2)	Gross Storage Capacity (m3)(1)	Less Storage Capacity for Underlying Slope Angle (m3)(2)	Net Storage Capacity (m3)(1)	Net Storage Volume (Accounting for Swell) (m3)
SS1-9	3	7.5	150	220	0%	1.30	33,000	740	560	105	175	18,375	189,999	0	189,999	146,153
SS1-9	3	7.5	150	152	0%	1.30	22,800	604	424	105	107	11,235	125,100	0	125,100	96,231
SSP #10	3	7.5	250	57	0%	1.30	14,250	614	434	205	12	2,460	56,577	0	56,577	43,521
SSP #10	3	7.5	250	285	0%	1.30	71,250	1,070	890	205	240	49,200	449,143	0	449,143	345,495
SSP #10	3	7.5	250	206	0%	1.30	51,500	912	732	205	161	33,005	314,333	0	314,333	241,794
SSP #10	3	7.5	250	145	0%	1.30	36,250	790	610	205	100	20,500	210,026	0	210,026	161,558
SSP #10	3	7.5	250	66	0%	1.30	16,500	632	452	205	21	4,305	73,083	0	73,083	56,217
SSP #10	3	7.5	250	65	0%	1.30	16,250	630	450	205	20	4,100	71,281	0	71,281	54,832
SSP #11	3	7.5	325	537	0%	1.30	174,525	1,724	1,544	280	492	137,760	1,168,354	0	1,168,354	898,734
SSP #11	3	7.5	325	346	0%	1.30	112,450	1,342	1,162	280	301	84,280	735,203	0	735,203	565,541
SSP #11	3	7.5	325	206	0%	1.30	66,950	1,062	882	280	161	45,080	417,418	0	417,418	321,091

Attachment B-11
Total Cost Summary by Facility
Vista Gold Corp. - Mt. Todd Project

Mt Todd Closure Material Salvage and Reclamation Costs

Facility	**Cost**	
Waste Rock Dump	$	35,037,758
Tailings Storage Facility - 1	$	24,028,056
Tailings Storage Facility - 2	$	31,252,760
Heap Leach Pad	$	4,777,066
Low Grade Ore Stockpile - 2	$	4,883,311
Process Plant Area	$	16,354,568
Soil Stockpiles	$	806,740
Mine Roads	$	680,357
Batman Pit	$	224,154
Indirect Costs	$	36,767,489
TOTAL	**$**	**154,812,258**

TETRA TECH

ATTACHMENT C:
NT SECURITY CALCULATION SUMMARY

TETRA TECH

Technical Memorandum

To:	John Rozelle	From:	April Hussey and Benjamin Stewart
Company:	Vista Gold, Corp.	Date:	June 4, 2013
Address:		Project No.:	114-311285
Re:	Security Cost Calculation - Summary		
CC:			

Security Summary

The following table presents a summary of the security calculation developed for the Mt Todd Project. This estimate is preliminary and will be updated and revised as Project planning progresses.

Domains	Calculated Cost
1: Site Infrastructure	$1,932,415.00
2: Extractive Workings - Sand, Clay & Gravel	$432,344.00
3: Hard Rock Pits & Quarries	$135,880.00
4: Underground Workings	$0.00
5: Tailings Storage Facilities and Dams	$85,674,000.00
6: Stockpiles & Waste Rock Dumps	$43,658,600.00
7: Exploration	$0.00
8: Access and Haul Roads	$433,072.50
9: River Diversions	$0.00
Decommissioning & Post Closure Management	$5,120,215.00
Sub-Total - All Domains	$137,386,526.50
CONTINGENCY @15%	$20,607,978.98
TOTAL COST	**$157,884,505.48**

The following sections of this memorandum present background information for the Security Calculation as well as pertinent assumptions used in the development of the security estimate.

Tetra Tech
4900 Pearl East Circle, Suite 300W, Boulder, CO , 80303
Tel 303.447.1823 Fax 303.447.1836 www. tetratech.com

Security Calculation Background

The Northern Territory (NT) government requires that a Security Cost calculation be performed prior to issuing a mining authorization to commence mining. This Security Cost calculation is used to assist in establishing the level of security required to ensure liabilities incurred by mining activities will be addressed. The NT government has specified that the Security Cost calculation must follow the excel workbook developed by the NT government and which is posted on the NT government website. The Security that has been developed for the Mt Todd project has been developed in accordance with the NT Security workbook and associated guidance. The security calculation is reflective of the common mine site rehabilitation procedures and current rehabilitation costs included in the NT Security workbook as of the date of this memorandum.

The Security Calculation addresses the future, end-of-mine state of the project and addresses activities required to close and rehabilitate each functioning facility planned for the Mt Todd project.

Security Requirements

The Security calculation must include a calculation for the cost to rehabilitate 100% of the known environmental liability associated with the life-of-mine plan approved under the mining Authorization. Progressive security development is not approved by the NT, and the security calculation covers all liabilities expected during the planned life-of-mine. The security calculation will be submitted to the NT Department of Resources (NT-DOR) in conjunction with the Mining Management Plan in support of an application for Authorization of a site, or to reflect a change in operational activities. Securities will be reviewed by the Security Assessment Board of the Department of Resources – Minerals and Energy, and adjusted to account for progress in rehabilitation as well as new or expanded facilities.

There is no specified time for re-calculation of securities; however a re-calculation can be triggered by:

- A request from Operator based on changes in potential lease liability
- Findings of periodic audits and inspections, which highlight deviations from an approved Mining Management Plan (MMP)
- Amendments to an approved MMP
- At the time of sale, transfer or mine closure.

Securities will be released when criteria specified in the approved mine closure plan have been met. These criteria include commitments to post closure monitoring and management of potential liabilities at the site. An application for a Certificate of Closure is submitted by the owner/operator to the Department of Resources, Minerals and Energy which triggers assessment of site closure, revocation of the mining authorisation and relinquishment of securities.

Security Calculation Summary

Security Cost Calculation Workbook Explanation:

The Security Cost calculation workbook includes sections to calculate the cost to rehabilitate various mine features. These sections include:

- Summary
- Key Information
- Infrastructure
- Extractive
- Pits
- Underground
- Tailings Storage Facilities (TSF) & Dams
- Waste Rock Dump (WRD)
- Exploration
- Roads
- River Diversion
- Post Closure
- Post Closure Water Worksheet

Portions of the NT Security Calculation workbook did not apply to the Mt Todd Project and were left blank in the Security Cost Calculation workbook. These sections include:

- Underground Workings
- Exploration
- River Diversions

The following discussion explains the assumptions and sources of information used in completing the NT Security Cost Calculation for the Mt Todd Definitive Feasibility Study (DFS). Unless otherwise stated, unit costs were provided by the NT-DOR and remained unchanged in this calculation.

Summary – Total Cost = approximately $157,995,000 (includes $20,608,000 contingency):

The summary tab compiles totals from each category of the Security Calculation. The sub-total from each category is presented, in addition to a 15% contingency multiplier and a final cost.

Key Information:

Footprint areas for all mine-site facilities were entered in the "Key Information" tab and were applied to the "Post Closure" tab for calculation of decommissioning and post-closure costs.

Site Infrastructure – Cost = $1,932,400:

Area-based demolition costs in the "Infrastructure" tab were based on building footprint areas provided by Jigar Sheth, of Vista Gold Corp., for the following structures:

- Administration and Gate House Buildings,
- Process Plant Office and Ablutions,
- Process Plant Control Room,
- Sample Preparation and Laboratory Space,
- Process Plant Workshop and Warehouse,
- Process Plant Reagents Store,
- Mining Office, and
- Mining Heavy Vehicle Workshop.

This section also includes optional costs for the closure of drinking or sewage water treatment plants on site, however as there are no such facilities at Mt Todd, these have been left blank.

Extractive Workings – Sand, Clay & Gravel – Cost: $432,300

The cost for rehabilitation associated with extractive workings is based on the low permeability material (LPM) borrow areas. Costs associated with these facilities are accounted for in the "Extractive" tab. Quantities were based on the largest cell size currently planned for the LPM borrow area. Rehabilitation activities were assumed to include ripping, revegetation, and fertilizer application. It was assumed that all sediment management structures and other surface water management would be constructed as part of the borrow area initial construction during operations, and would therefore not be required at closure.

Hard Rock Pits & Quarries – Cost = $135,900

The cost for rehabilitation associated with pits at the Mt Todd Site is accounted for in the "Pits" tab. The cost for rehabilitation of the Batman pit includes the installation of a safety bund installed to prevent human access and excess inflow of surface water to the pit. The length of the pit safety berm was estimated from AutoCAD drawings of the proposed pit expansion with an additional offset of 30 m. A 30 m offset was determined based on an assumption of a 20 m "potentially unstable pit edge zone", with a minimum additional 10 m offset per Guidelines for "Safety Bund Walls around Abandoned Pit Mines" from the Department of Industry and Resources in Western Australia.

Tailings Storage Facilities and Dams – Cost = $85,674,000

Costs for the rehabilitation of TSF1 and TSF2 were calculated in the "TSF & Dams" tab. Material volumes were based on footprint areas derived from AutoCAD drawings developed by Tetra Tech and the following proposed cover design:

- 1 m thick Non-PAG waste rock sub-base over the thixotropic tailings on the impoundment surfaces of both TSF1 and TSF2;
- 0.8 m thick store and release cover composed of 66% low permeability material (imported) and 34% non-PAG waste rock over the impoundment and embankment surfaces;
- 0.2 m thick plant growth medium cap on impoundment and embankment surfaces; and
- Revegetation by direct seeding.

The following activities account for the majority of the closure costs for TSF1 and TSF2:

- Importing Low Permeability Material makes up 41% of the closure costs for TSF1 and TSF2, based on importing 2.85 million m^3 of low permeability material at a unit cost of $12.43/$m^3$. This results in a total cost of $35.4 million.

- "Source cart and spread suitable material for capping" makes up 34% of the closure costs for TSF1 and TSF2, based on hauling about 3.9 million m^3 of non-PAG sub-base material to the impoundment surface, and about 4.3 million m^3 of store and release cover to the impoundment and embankment surfaces. At a unit cost of $3.50 per m^3, hauling and spreading closure material results in a total cost of $28.9 million.

- "Apply capping design treatment as required e.g. 'store and release'" accounts for 16% of closure costs at TSF1 and TSF2. The NT-DOR provided a unit cost of $36,500 per hectare based on an assumption of a 2 m-thick store and release cover. Because the proposed cover design calls for a 0.8 m-thick store and release layer, a unit cost of $25,000 per ha, the lowest unit cost provided in the suggested range, was utilized. Based on a unit cost of $25,000 per hectare to apply the store and release cover over the 540 ha of impoundment and embankment surfaces of TSF1 and TSF2, the total cost for the store and release cover is about $13.5 million.

- The remaining 9% of closure costs at TSF1 and TSF2 account for placement of plant growth medium, ripping/blending of material, and revegetation by direct seeding, totaling $7.9 million

Stockpiles & Waste Rock Dumps – Cost = $43,659,000

Reclamation activities of the Heap Leach Pad (HLP) and Low Grade Ore stockpile (LGO2) were accounted for in the "Oxide waste rock dumps and extractive product stockpiles" section of the "WRD" tab. Footprint areas of the HLP and LGO2 were based on the existing site-map for Mt. Todd and the proposed design from Tom Dyer of MDA, respectively. Closure material volumes were calculated based on removing an average of 0.5 meter from the footprint of the HLP to TSF2, and the proposed store and release, plant growth medium, and revegetation covers to be placed on both the HLP and LGO2 footprints, discussed above for TSF1 and TSF2. Total closure costs for the HLP and LGO2 were estimated at $5 million.

Closure of the proposed WRD is accounted for in the "Waste rock dumps with AMD or metals" section of the "WRD" tab. The WRD rehabilitation will include a geo-synthetic clay liner (GCL) cover rather than a store and release cover based on a design developed collaboratively by Tetra Tech, MDA, and Vista. The estimated GCL cover cost accounts for material quantities of GCL cover and the GCL bedding and protective layers made up of

crushed non-PAG waste rock. Quantities of these materials were based on a footprint area of the WRD from AutoCAD drawings supplied by Tom Dyer of MDA. The following items present a breakdown of the WRD closure activities and costs:

- "Unshaped requiring minor earthworks" – At a unit cost of $1,600 per ha for minor reshaping of the entire surface area of 241 ha, this activity accounts for placement of 1 m of non-PAG waste rock for erosion prevention, and amounts to approximately $386,000.

- "Source cart and spread suitable material for capping" – To account for the haul costs of the specified bedding and protective layers for the GCL cover, the NT-DOR unit cost of $5 per m^3 was applied to the total volume of material, for a total cost of $5.9 million.

- "Apply capping design treatment e.g. 'store and release'" – This category reflects costs associated with placement of the GCL over 196 ha. This placement area reflects coverage of the entirety of each 30 m lift. To account for the increased costs associated with placing a GCL rather than a store and release cover, the unit cost was increased from the standard $36,500 per ha to $75,000 per ha to reflect the vendor-quoted cost of $7.50/$m^2$ for GCL. The GCL cover over results in a total cost of $14.7 million, accounting for nearly 70% of the total costs associated with closure of the HLP, LGO2, and WRD.

- The estimated security cost for closure of the WRD is lower than the estimated cost in the closure plan. This discrepancy is due to the fact that crushing of non-PAG waste rock for the bedding and protective layer will be completed with the process plant crusher in the case of the security cost, but will be completed with a secondary crushing unit in the proposed closure plan. Thus, unit costs for placing the bedding and protective layers in the security cost calculation are considerably lower than in the proposed closure plan.

The cost for treatment of seepage from the WRD was accounted for in the "WRD" tab. Technologies for seepage treatment listed in this tab include wetland treatment or active recovery and treatment. As wetlands will be developed approximately 5-years after closure, seepage treatment was assumed to be conducted by active recovery and treatment for the first five years, and costs were included for the construction of a new wetland treatment system. Although the cost for active seepage treatment listed in the security workbook is presented as a lump sum ranging from of $20,000 to $200,000, discussion with Tetra Tech engineers designing the water treatment system indicated that operating costs for the plant would run approximately $470,000/year. The cost to construct the new wetland treatment system was based on the cost estimated in the 2011 PFS.

Access and Haul Roads – Cost = $433,000

All activities for closure of haul roads were accounted for in the "Roads" tab. Closure of haul roads involves scarification and revegetation of the roads. Total haul road areas were calculated from AutoCAD plans assuming a 16 m width on all haul roads. Rehabilitation of the main access road was not included in the cost calculations as the main access road will remain in place after closure of the mine per the request of the Jawoyn Association Aboriginal Corporation.

Decommissioning & Post Closure Management – Cost = $5,120,000

The "Post Closure" tab accounts for activities such as mobilization/demobilization, contaminated site assessments, pest and weed management, and earthwork maintenance. Area-based costs developed here are based on the areas input in the "Key Information" tab discussed previously. Mobilization and demobilization costs assume haul to and from Darwin, NT, located 290 km from the mine-site.

Post Closure Water Worksheet – Cost Included in Decommissioning & Post Closure Management

Information in the water monitoring worksheet was provided by Andrew Sawicki, of Vista Gold Corp. The number of wells listed at each location represents the wells that presently exist at the mine. The total cost developed in this worksheet is accounted for in the "Decommissioning & Post Closure Management" cost.

The following comments and assumptions came from Andrew Sawicki (circa 2011) regarding water monitoring on-site:

- Groundwater Monitoring at Mine Site Structures:
    - Discrete infrastructure areas – Currently one well exists near the infrastructure area. Up to four more wells may be installed later.
    - Pit voids/declines – The number entered denotes sampling of bores adjacent to structures. Currently two wells exist. An estimated three extra may be necessary to the east and SSE as the pit expands.
    - Waste Rock Dump - Mixed or sulfide – There are two wells currently in place, with an estimated four to six more as the dump progresses.
    - Tailings dam / residue disposal ponds – 15 wells currently in place at TSF1, some of which need repairs or replacement. The operator will need to establish up to 16 more when the new TSF is constructed.
    - Water containment / retention ponds –
        - Existing bores at RP1 are in need of repair or replacement. Estimate another four will be required after deepening of RP1.
        - Drainage arrangements to be put in place for RP2 and RP5 will require approximately three more bores.
        - Vista will need sufficient bores to monitor the final infrastructure area. May need two to four additional bores to monitor infrastructure area.
    - Four monitoring wells are located up and down gradient of the site for background monitoring
    - Four monitoring wells are located around Quigleys, North of TSF1, that need to be maintained.

- Surface Water Monitoring:
    - Water Retaining Structures with no Discharge – There are currently two monitoring sites at Batman Pit. There may be one more at Quigleys.
    - Water Retaining Structures with Possible Discharge – One monitoring site exists at RP1. RP2 and RP5 currently discharge without monitoring structures. This should be addressed before operation of the mine.

  - Perennial Streams Discharging from Site – There are three sites monitoring discharge from the Edith River
  - Ephemeral Streams Discharging from Site – There are a total of 12 monitoring sites with three on each of the following streams:
    - Western Creek (to Edith River),
    - Batman Creek (to Stow Creek),
    - Horseshoe Creek (to Stow Creek), and
    - Stow Creek (to Edith River).
- Water Quality Interpretation and Reporting:
  - Other Reporting – The Mt. Todd Reference Group, a group of stakeholders who meet annually and compile an annual report on the condition of the area, will most likely require reporting on water quality at Mt Todd. This organization will likely exist post-closure.

Vista Gold Corp. - Mt. Todd

Security Calculation

Security Summary

Details			
Contact Name	John Rozelle	**Authorisation #**	
Project	Vista Gold - Mt Todd PFS	**Date**	12/13/2012
MMP			

NOTE: Operators may use DME Cost per Unit Of Measure as a guide or insert their own cost and UOM - adjust form as necessary. Justification of changes to UOM and cost should be provided if DME units area not used

New Authorisation	MMP Renewal/amendment	Audit Finding	Client Request
X	X	X	X

Domains	Calculated Cost
1: Site Infrastructure	$1,932,415.00
2: Extractive Workings - Sand, Clay & Gravel	$432,344.00
3: Hard Rock Pits & Quarries	$135,880.00
4: Underground Workings	$0.00
5: Tailings Storage Facilities and Dams	$85,674,000.00
6: Stockpiles & Waste Rock Dumps	$43,658,600.00
7: Exploration	$0.00
8: Access and Haul Roads	$433,072.50
9: River Diversions	$0.00
Decommissioning & Post Closure Management	$5,120,215.00
Sub-Total - All Domains	$137,386,526.50
CONTINGENCY @15%	$20,607,978.98
TOTAL COST	$157,994,505.48

DISTURBANCE AREA INVENTORY			
Whole of site summary	**Total Area (ha)**	**Progressively rehabilitated area**	**Remaining area**
Lease surface area			
Disturbed operational area			
Above grade landforms			
Waste rock dump #1	90		
Waste rock dump #2	241		
Waste rock dump #3			
Waste rock dump #4			
Waste rock dump #5			
Tailings Dam #1	540		
Tailings Dam #2			
Tailings Dam #3			
Tailings Dam #4			
Mining area #1			
Mining area #2			
Mining area #3			
Mining area #4			
Mining area #5			
Mining area #6			
Extractive areas	115.60		
haul roads	24		
access roads			
water ponds/dams			
Area of infrastructure	35		
camp area			
area of drill pads and sumps			
costeans/pits			
tracks/roads			
other			
TOTAL	**1045.7**		

Quantities and costs based on June 2013 Update to Mt Todd Project

Domain 1: Infrastructure

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Process Plant, Mill, Crusher area	disconnect and terminate services	@	10000-27500	26700.00	1	26700.00	This item includes disconnecting all services such as power, water and sewer. This is a 'one off' cost for the area.	
	demolish and remove small buildings	m^2	70-90	90.00	254	22860.00	enter the total area of small buildings and offices in the area, including demountables. It does not include workshops.	Process Plant Offices and Control Room
	demolish and remove industrial workshops and sheds	m^2	160-210	210.00	1413	296730.00	enter the total area of workshop facilities in the area.	Workshop, Warehouse, and Reagents Storage
	demolish remove conveyor system	m	100-250	140.00		0.00	Enter the total length of conveyors	
	demolish/remove crusher, process plant and mills	m^2	160-210	210.00	343	72030.00	enter the total surface area of process plant and mills etc. If multi-story the area should be the sum of the surface area of all floors.	Sample Prep and Laboratory
	remove concrete pads and footings	m^2	10-30	15.00	2010	30150.00	enter the total area of buildings, workshops etc. Cost dependent on thickness. Assume $10/m2 for <300mm thick, $30/m2 for >300mm thick. (default $15 if unknown)	Entire Process Plant area
	remove mobile plant	hr	140-300	200.00		0.00	consider distance to remove all mobile plant to the nearest centre or to Darwin.	
	remove contaminated material	m^3	3.00-5.00	5.00		0.00	enter volume of spillage and other contamination for removal to pit or WRD.	
	deconstruct and remove large tanks - eg leach	@	35000-165000	35000.00		0.00	enter the number of tanks	
	deconstruct and remove small tanks	@	10000-30000	10000.00		0.00	enter the number of tanks	
						448470.00		
Main Workshop and Stores area	disconnect and terminate services	@	5000-5500	5000.00	2	10000.00	This item includes disconnecting all services such as power, water and sewer. This is a 'one off' cost for the area.	Process Plant Workshop and Mining Are
	demolish and remove small buildings	m^2	70-90	90.00	396	35640.00	enter the total area of small buildings and offices in the area, including demountables. It does not include workshops.	Mining Area Office
	demolish and remove industrial workshops and sheds	m^2	160-210	210.00	4039	848190.00	enter the total area of workshop facilities in the area. Are there any remote or field based workshops to include	Mining Area Workshop
	remove concrete pads and footings	m^2	10-30	10.00	4435	44350.00	enter the total area of workshops and buildings. Include any areas of carpark and washdown pads, bulk fuel bunding and refuelling areas.	Mining Area Workshop and Office
	remove contaminated material	m^3	3.00-5.00	5.00		0.00	enter volume of spillage and other contamination for removal to pit or WRD.	
	underground tank removal - large hydrocarbon (>5000L)	@	48000-82500	60000.00		0.00	removal of underground tank and all pipework, bunds and any contamination	
	underground tank removal - small hydrocarbon (up to 5000L)	@	20000-21000	20000.00		0.00	removal of underground tank and all pipework, bunds and any contamination	
	above ground tank removal - hydrocarbon	@	200.00	200.00		0.00	enter number of tanks	
	remove hydrocarbon contamination	m^3	3.00-5.00	5.00		0.00	enter the volume to be removed to pit void for appropriate rehabilitation. If the volume is not known assume a volume of 3000m3 per fuel storage facility.	

Domain 1: Infrastructure

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
	remediation on site of hydrocarbon contamination	m^3	30-55	40.00		0.00	enter the volume of material requiring onsite remediation. If the volume is not known assume a volume of 3000m3 per fuel storage facility.	
						938180.00		
Administration	disconnect and terminate services	item	5000-5500	5000.00	2	10000.00	This item includes disconnecting all services such as power, water and sewer. This is a 'one off' cost for the area.	Admin Building and Gatehouse
	demolish and remove small buildings	m^2	70-90	75.00	483	36225.00	enter the total area of small buildings and offices in the area, including demountables. It does not include workshops.	Admin Building and Gatehouse
	demolish and remove industrial workshops and sheds	m^2	160-210	210.00		0.00	enter the total area of workshop facilities in the area.	
	remove bitumen from sealed carparks etc	m^2	12.00-17.00	17.00		0.00	enter total area of carparks. Includes removal offsite to appropriate facility	
	remove concrete pads, footings	m^2	10-30	10.00	483	4830.00	enter the total area of workshops and buildings. (concrete <300mm @ $10/m2, concrete >300mm @ $30/m2)	Admin Building and Gatehouse
	waste disposal offsite	@	650	650.00		0.00	assumes removal offsite to a waste disposal facility. Adjust if disposing at onsite facility	
						51055.00		
Sewerage/Water treatment plant	disconnect and terminate services	item	2500-5000	2500.00		0.00	This item includes disconnecting all services such as power, water and sewer. This is a 'one off' cost for the area.	
	demolish and remove small buildings	m^2	70-90	75.00		0.00	enter the total area of small buildings and tanks.	
	remove contaminated soil	m^3	3.00-5.00	5.00		0.00	removal to pit void for appropriate rehabilitation	
						0.00		
Accommodation Camp	disconnect and terminate services	item	5000-5500	5000.00		0.00	This item includes disconnecting all services such as power, water and sewer. This is a 'one off' cost for the area.	
	demolish and remove small buildings	m^2	70-90	75.00		0.00	enter the total area of small buildings and tanks.	
						0.00		
Airstrip, borefields, other	remove concrete pads footings and bitumen	m^2	10-30	10.00		0.00	enter total area (concrete <300mm @ $10/m2, concrete >300mm @ $30/m2)	
	demolish and remove sheds and storage tanks	m^2	70-90	75.00		0.00	enter area of sheds and tanks	
	production/dewatering bore closure	@	2000-3300	2000.00		0.00	sealing and rehabilitation	
	observation bore closure	@	500	500.00		0.00	includes sealing and rehabilitation to make safe.	
						0.00		
Revegetation Activities - all infrastructure areas	Deep rip	ha	550-1100	1100.00	35	38610.00	Enter all areas disturbed by infrasturcture from above, including laydown areas Assume highly disturbed and compacted areas - see assumptions.	Entire Process Plant area

Domain 1: Infrastructure

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
	source cart and spread topsoil	m^3	2.50-5.50	5.50	70200	386100.00	assume minimum of 10cm depth	0.2 m depth of PGM
	revegetation by tubestock	ha	6000/ha (or 5/ea)	6000.00		0.00	enter total area for revegetation by tubestock. (or enter quantity of tubestock required (<15cm), and density/ha)	
	revegetation by direct seeding	ha	1200-2000	2000.00	35	70000.00	this rate includes acquiring a mix of native tree and shrub species appropriate for the area, mixing and treating the seed and applying by hand at a rate of 4-10kg/ha	
	feriliser application	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						494710.00		
Other	remove powerlines	km	9800-15000	15000.00		0.00	include dismantling and removal of lines and poles from the site	
	remove pipelines	km	1400-1800	1400.00		0.00	remove polypipe >300mm diameter. Assumes removal by 3 persons via truck to nearest location.	
						0.00		
DOMAIN 1 TOTAL						$1,932,415.00		

Domain 2: Extractive Workings - Sand, Clay & Gravel

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Pits	Scaling, battering for stabilisation	m^2	1.21-3.00	3.00		0.00	this includes the area requiring reshaping for stabilisation and preparation for revegetation	
	backfilling of pits	m^3	4.00-5.00	5.00		0.00	enter volume of material to be backfilled into pit	
	abandonment bund and pit access closed	m	20.00-63.25	50.00		0.00	required where final pit includes steep faces. Includes bund around pit and closure of ramp. Bund assumed to be 2m high and 5m wide at base	
	structural works for drainage	ha	700-1500	1500.00		0.00	earthworks for banks and drains to manage surface water .	
	source cart and spread topsoil or growth medium	m^3	2.50-5.50	5.50		0.00	required if it has not been demonstrated that pit material is suitable as a growth medium	
	final trim, deep rip	ha	550-1600	1600.00	115.60	184960.00	to enhance vegetation program as required, dependent on material to be ripped eg sand, gravel, clay. Assume low to medium level disturbance - see assumtpions	Low Permeability Borrow area - largest cell size. Area will be ripped, amended and seeded.
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00	115.6	231200.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	Low Permeability Borrow area - largest cell size. Area will be ripped, amended and seeded.
	fertiliser application	ha	140-744	140.00	115.6	16184.00	includes a single application of fertiliser during the initial seeding program - see assumptions	Low Permeability Borrow area - largest cell size. Area will be ripped, amended and seeded. No cost item for soil amendment - use fertilization as surrogate.
	signage	@	50	50		0.00	enter number of warning signs as approriate	
						432344.00		
Sediment Management	sediment traps/dams	m^3	2.50-2.90	2.90		0.00	enter volume of dam required for sediment traps	
	Rocks or coarse material lined sediment trap	m^3	1.00-5.00	5.00		0.00	condsider distance to cart material	
Other						0.00		
						0.00		
DOMAIN 2 TOTAL						$432,344.00		

Domain 3: Hard Rock Pits and Quarries

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Stabilisation of Pits	Drill and blast faces to make safe OR	m^3	1.20-1.60	1.60		0.00	Volume is worked out be multiplying length of bench by width and height to reduce angle to make it safe.	
	scaling, battering, pushing walls	m^3	1.21-3.00	3.00		0.00	volume requiring reshaping	
	abandonment bund and pit access closed	m	19.00-63.25	30.00	4496	134880.00	required where final pit includes steep faces (>18o). Includes bund (2m high , 5m base) around pit and closure of ramp	30 m offset from Batman Pit perimeter
	final trim, deep rip	ha	550-1600	1600.00		0.00	to enhance vegetation program around pit and pit floors as required	
	structural works for drainage	ha	700-1540	1200.00		0.00	earthworks for banks and drains to manage surface water .	
	source cart and spread topsoil if appropriate	m^3	2.50-5.50	5.50		0.00	includes min of 10cm of topsoil to assist revegetation program.	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program	
	fencing	m	10.0-30.0	30.00		0.00	construct a standard stock fence around the site	
	signage	@	50	50	20	1000.00	enter number of warning signs as appropriate	Assumed value
						135880.00		
Infill of pits	infill with tailings or waste rock	m^3	2.00-4.00	4.00		0.00	haul and dump of waste rock or tailings. Distance needs to be considered.	
	shaping or levelling	ha	550-1100	700.00		0.00	area requiring minor reshaping prior to deep ripping	
	source cart and spread suitable material for growth medium	m^3	2.00-5.00	5.00		0.00	required if it has not been demonstrated that infill material is suitable as a growth medium and only if does not require egineered capping design for ARD/metals mitigation. Assume min thickness of 0.5m	
	source cart and spread topsoil if appropriate	m^3	2.50-5.50	5.50		0.00	includes min of 10cm of topsoil to assist revegetation program.	
	final trim, deep rip	ha	550-1600	1600.00		0.00	to enhance vegetation program over infilled pit as required	
	structural works for drainage	ha	700-1540	1200.00		0.00	earthworks for banks and drains to manage surface water on top of capped pit area if required.	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						0.00		

Sediment Management	sediment traps/dams	m^3	2.5-2.9	2.90		0.00	enter volume of dam required for sediment traps	
	Rocks or coarse material lined sediment trap	m^3	1.00-5.00	5.00		0.00	condsider distance to cart material	
Other						0.00		
						0.00		
DOMAIN 3 TOTAL						$135,880.00		

Domain 4: Underground Workings

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Portals, Declines and Shafts	barricading portal/declines/adits	@	1500-2500	2500.00		0.00	barricading of portal with steel grill to make safe and ensure access cnnot be gained but will allow movement of bats	
	sealing portal/decline	@	15000-25000	25000.00		0.00	OR sealing portal with concrete and backfill to make safe and ensure access cannot be gained	
	capping/sealing shafts	@	10000-25000	10000.00		0.00	cap shafts using reinforced concrete slab. Dependent on size	
	shaft infilling	m^3	8.00-20.0	10.00		0.00	filling of shafts using onsite material	
	seal ventilation fans	@	27500	27500.00		0.00	seal and rehab ventilation fans to make safe.	
	final trim, deep rip	ha	550-1600	1600.00		0.00	to enhance vegetation program in area as required	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						0.00		
DOMAIN 4 TOTAL						$0.00		

Domain 5: Tailings Storage Facilities and Dams

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Water Dams, Ponds	clean water dams - stabilise and make safe	@	2000-2200	2000.00		0.00	minor earthworks	
	or backfill to natural surface	m^3	2.00-5.00	5.00		0.00	backfilled with onsite material. Haul distance sliding scale from $2/m3 for up to 1km, up to $5/m3 for up to 5km or greater.	
	dirty water dams - drain and remove sediment	m^3	5.00-7.50	7.50		0.00	includes draining the dam to the pit or other appropriate place, removing 500mm of potentially contaminated sediments to be buried in the pit or other disposal area. Must consider the distance from dam to disposal area.	
	shaping or levelling	ha	550-1100	700.00		0.00	area requiring minor reshaping prior to deep ripping	
	source cart and spread suitable material for capping/growth medium	m^3	2.00-5.00	5.00		0.00	required if it has not been demonstrated that infill material is suitable as a growth medium Assume min thickness of 0.5m	
	source cart and spread topsoil if appropriate	m^3	2.50-5.50	5.50		0.00	includes min of 10cm of topsoil to assist revegetation program.	
	final trim, deep rip	ha	550-1600	1600.00		0.00	to enhance vegetation program over infilled pit as required	
	structural works for drainage	ha	700-1540	1500.00		0.00	earthworks for banks and drains to manage surface water on top of capped dam area if required.	
	revegetation by tubestock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation be direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser application	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program	
						0.00		
Tailings Dams	source cart and spread suitable material for capping	m^3	2.00-5.00	3.50	8247000	28,864,500	volume of suitable material for capping the TSF. Must have appropriate chemical and physical properites. Required whether for engineered design or growth medium.	All Non-PAG sub-base, and Non-PAG and LPM in Store & Release Cover, used average of costs in range
	apply capping design treatment as required eg 'store and release'	ha	25000-49500	25000.00	540	13,500,000	required to manage AMD or metals leachate from TSF. Capping layer assumed to be no less than 2m thick.	Entire area of both TSF1 and TSF2 (rounded)
	source cart and spread topsoil if appropriate	m^3	2.50-5.50	5.50	1080000	5,940,000	includes min of 10cm of topsoil to assist revegetation program.	All PGM on both TSF1 and TSF2
	reshape walls and surrounds	ha	1400-5500	1400.00		0.00	area requiring stabilisation and reshaping works around the walls of the emplacement	
	fianl trim, deep rip	ha	550-1600	1600.00	540	864,000	to enhance vegetation program over infilled pit as required	Entire area of both TSF1 and TSF2 (rounded)
	structural works for drainage	ha	700-1540	1500.00		0.00	earthworks for banks and drains to manage surface water on top of capped dam area if required.	

	revegetation by tubestock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation be direct seeding	ha	1200-2000	2000.00	540	1,080,000	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	Entire area of both TSF1 and TSF2 (rounded)
	fertiliser application	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
	seepage management - recovery and treatment	@	20000-200000	20000.00		0.00	where seepage is at unacceptable levels and no wetland filter is in place and company has committed to recovery and treatment of seepage. Depends on size.	
	seepage management - wetland filter	ha	5500	5500.00		0.00	assumes wetland filter is in place and functioning	
Other	Low Permeability Material Cost to	m3	12.43	12.43	2850000	35,425,500	Cost based on Tetra Tech Calculations - 2012	Line item added to Security Calculation
						85674000.00		
DOMAIN 5 TOTAL						$85,674,000.00		

Domain 6: Stockpiles & Waste Rock Dumps

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Oxide waste rock dumps and extractive product stockpiles	Recontouring/battering for stabilisation	m^2	2.00-3.60	3.60		0.00	this includes the area requiring reshaping for stabilisation and preparation for revegetation	
	unshaped requiring minor earthworks, trim and deep rip	ha	550-1600	1600.00		0.00	enter the area requiring minor reshaping to 12-18^o slopes and deep ripping to enhance revegetation	
	unshaped requiring major earthworks, trim and deep rip	m^3	1.21-4.00	4.00	721000	2884000.00	include volume of material requiring major reshaping to achieve approriate grades (<18^o Or as specified in MMP) and deep ripping	HLP and LGO2 Store & Release Cover
	structural works for drainage	ha	700-1540	1500.00		0.00	earthworks for banks and drains to manage surface water on top of WRD.	
	source cart and spread topsoil or growth medium	m^3	2.50-5.50	5.50	180000	990000.00	required if it has not been demonstrated that WRD material is suitable as a growth medium	HLP and LGO2 PGM Cover
	or removal of stockpiles	m3/bcm	3.00-5.00	5.00	195000.00	975000.00	carting of stockpiles offsite or WRD to pit. Consider carting distance	remove contaminated material below HLP to TSF2
	trim, deep rip if required	ha	550-1600	1600.00		0.00	ripping stockpiles or surrounds if required.Assume ripping of waste rock dumps undertaken during reshaping.	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00	90	180000.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	HLP and LGO2 Areas
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						5,029,000		
Waste rock dumps with AMD or metals	unshaped requiring major earthworks, trim and deep rip	m^3	4.00-6.00	4.00		0.00	include volume of material requiring major reshaping to achieve approriate grades (<18^o or as specified in MMP) and deep ripping	
	unshaped requiring minor earthworks, trim and deep rip	ha	550-1600	1600.00	241	385,600	enter the are requiring minor reshaping and deep ripping to enhance revegetation	Total WRD 3D Area
	source cart and spread suitable material for capping	m^3	2.00-5.00	5.00	1176000	5,880,000	volume of suitable material for capping the WRD. Must have appropriate chemical and physical properites.	GCL Protective and Bedding Layers
	apply capping design treatment eg 'store and release'	ha	25000-49500	75000.00	196	14,700,000	required to manage AMD or metals leachate from WRD. Capping layer assumed to be no less than 2m thick.	GCL covered area - Increased unit cost for GCL estimated at $7.50/m2 = $75,000/ha
	or removal of stockpiles	m3/bcm	3.00-5.00	5.00		0.00	removal to pit. Haulage distance needs to be considered at an additonal $1/km	
	source cart and spread topsoil if appropriate	m^3	2.50-5.50	5.50		0.00	required if it has not been demonstrated that capping material is suitable as a growth medium	
	final trim, deep rip	ha	550-1600	1600.00		0.00	to enhance vegetation program over infilled pit as required	

	structural works for drainage	ha	700-1540	700.00		0.00	earthworks for banks and drains to manage surface water on top of WRD area if required.	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						20,965,600		
Leachate and sediment management	Active recovery treatment of problem leachate	item	20000-200000	470,000	5	2,350,000	where seepage is at unacceptable levels and no wetland filter is in place and company has committed to recovery and treatment of seepage. Depends on size.	Based on Input From Tt Water Treatment Plant Designers for annual materials requirement for plant. Assume plant runs for five years prior to transition to passive treatment (5 items)
	Wetland filter	ha	5500	5500.00		0.00	assumes wetland filter is in place and functioning	
	Construct New Wetland Filter	item	15,314,000	15,314,000	1	15,314,000	Estimated cost to construct new passive water treatment system	Line Item added to Security Estimate Workbook, Cost based on 2011 PFS
	dams for sediment control	m^3	2.50-2.90	2.90		0.00	enter volume of dam required for sediment traps	
	Rocks or coarse material lined sediment trap	m^3	1.00-5.00	5.00		0.00	condsider distance to cart material	
Other						0.00		
						17,664,000		
DOMAIN 6 TOTAL						$43,658,600.00		

Domain 7: Exploration

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Drillholes, Pads, sumps, costeans	capping drillholes 30cm below ground	@	80-275	150.00		0.00	Cut collar, insert plug and backfill. Assume using, concrete or plastic cone plugs or bridge (no 'occy' plugs) Depends on number of holes	
	grout with concrete	@	1250	1250.00		0.00	Assume total grouting of drillhole	
	empty and remove plastic sample bags	hole	25-235	100.00		0.00	return cuttings to hole and remove plastic bags to a waste disposal facility. Bags cannot be disposed of on site.	
	ripping/scarifying pads	ha	440-2500	1600.00		0.00	Minor ripping/scarifying of pads to depth of 0.3m to assist vegetation in areas of flat/gentle terrain, includes sump infilling. Sumps should not remain open for extended periods of time.	
	reshape drill pads	@	320	320.00		0.00	Required in steep terrain where earthworks required with excavator/dozer to return pad to slope and establish erosion control, includes sump infilling. Using PC650 excavator or equivalent assumes one pad per hour @$320/hr.	
	infilling costeans	m^3	2.00-3.00	3.00		0.00	Backfilling of all costeans/trenches. Assumes material does not have to be carted.	
	bulk sample pits	m^3	2.00-8.00	2.00		0.00	dependent on depth of pit and if battering of walls required to form to 18^o slope	
	contouring for erosion control	ha	700-1540	1500.00		0.00	minor pushing to construct water management structures such as contour banks and diversion drains as required.	
	topsoil replacement if applicable	m^3	2.50-5.50	5.50		0.00	includes min of 10cm of topsoil to assist revegetation program. **this may be carried out when reshaping pads	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha if required. Required where area of disturbance is significant.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program	
						0.00		
Tracks and Gridlines	ripping/scarifying minor tracks and gridlines	km	120-500	500.00		0.00	assume using grader or equivalent to rip to 0.3m and no windrows, establishing erosion control measures (eg bunds) as required	
	ripping major tracks and roads	km	550-1000	1000.00		0.00	pushing in windrows and ripping track and establishing erosion control measures (ie bunds) across tracks as required	
	removal of gridpegs	item	1500	1500.00		0.00	includes removal offsite of all grid pegs in exploration area	
	topsoil replacement if applicable	m^3	2.50-5.50	5.50		0.00	includes min of 10cm of topsoil to assist revegetation program if required	
	revegetation by tube stock	ha	6000/ha (or 5/ea)	6000.00		0.00	includes acquisition of tubestock, fertiliser and guarding as necessary	
	revegetation by direct seeding	ha	1200-2000	2000.00		0.00	includes acquiring and spreading a range of native seed by direct broadcast at a rate of 4-10kg/ha.	
	fertiliser applicataion	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program	
						0.00		
DOMAIN 7 TOTAL						$0.00		

Domain 8: Access and Haul Roads

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Haul Roads	remove ARD material from road	m3/bcm	2.50-5.50	5.50		0.00	where haul road has been constructed with waste rock material that is leaching ARD removal and disposal in pit or similar will be required	
	reshape and deep rip	ha	2000-5000	5000.00	24	120000.00	windrows are pulled back and edges battered, area is deep ripped (road 12mwide)	Road area
	structural works for drainage	ha	700-1540	1500.00		0.00	pushing to construct water management structures such as contour banks and diversion drains as required.	
						120000.00		
Access Roads	breaking and removal of bitumen	m3	12.00-17.00	17.00		0.00	Includes area of bitument in roads car parks etc which needs to be removed and disposed of appropriately	
	reshape and deep rip	ha	2000-5000	2500.00		0.00	windrows are pulled back and edges battered, area is deep ripped	
	structural works for drainage	ha	700-1540	1500.00		0.00	pushing to construct water management structures such as contour banks and diversion drains as required.	
						0.00		
Revegetation activities - all roads	source cart and spread topsoil	m^3	2.50-5.50	5.50	48195	265072.50	assume minimum of 10cm depth	Assume 0.2m PGM placed on ripped and regraded roads
	revegetation by tubestock	ha	6000/ha (or 5/ea)	6000.00		0.00	enter total area for revegetation by tubestock. (or enter quantity of tubestock required (<15cm), and density/ha)	
	revegetation by direct seeding	ha	1200-2000	2000.00	24	48000.00	this rate includes acquiring a mix of native tree and shrub species appropriate for the area, mixing and treating the seed and applying by hand at a rate of 4-10kg/ha	Road area
	feriliser application	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program - see assumptions	
						313072.50		
DOMAIN 8 TOTAL						$433,072.50		

Domain 9: River Diversions

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Creek/River	channel maintenance	m	165.00	165.00		0.00	Includes earthwork repairs and stabilisation following flow events.	
	vegetation by tubestock	ha	6000/ha (or 5/ea)	6000.00		0.00	enter total area for revegetation by tubestock. (or enter quantity of tubestock required (<15cm), and density/ha)	
	vegetation by direct seeding	ha	1200-2000	2000.00		0.00	this rate includes acquiring a mix of native tree and shrub species appropriate for the area, mixing and treating the seed and applying by hand at a rate of 4-10kg/ha	
	vegetation maintenance	ha	140-744	140.00		0.00	includes a single application of fertiliser during the initial seeding program	
						0.00		
DOMAIN 9 TOTAL						$0.00		

Decommissioning & Post Closure Management

Management Area	Technique	Unit of Measure (UOM)	Range per UOM ($)	Cost per UOM ($)	Estimated Quantity	Sub Total ($)	Technique Notes	Comment (eg when $/UOM differs from DME)
Decommissioning and Closure	mobilisation/demobilisation	km	10.00-15.00	15.00	290	21,750.00	determined based on distance to the mine and machinery used ($/km) Assume mob/demob from largest centre unless otherwise stipulated & supported by the operator. Calculation assumes 5 pieces of machinery required per site. Adjust formula if necessary.	Trip from Darwin, NT
	Contaminated site assessment	@	35000	35000.00	1	35,000.00	has a contaminated site assessment been undertaken? If not this should be included for large metalliferous mines.	
	Pest and weed management, monitoring & assessment	ha	200 - 250	250.00	2091	522,850.00	Include total disturbed area , consider for minimum of 2 years during closure for larger sites only. Entry automated form 'Key Information' tab.	
	Contractor accommodation, messing and travel costs	man day	210-320	320.00	1000	320,000.00	Assume 5-9 people required for 2-10 weeks (or more) depending on size of site *quantity = number of days X number of people (eg 9 persons for 50 days = 450 man days)	Assuming crew operating 6-months
	Closure management	yr	110,000 - 300,000	110000.00	1	110,000.00	This includes project manaement team assuming 1 - 3 persons based on the magnitude of the process salaries, oncosts, tender preparation and closure report and coordination of works. Consider part of year only for small sites.	Assume work completed in one year
Post Closure	mobilisation/demobilisation	km	10.00-15.00	15.00	2900	43,500.00	Determined based on distance to the mine and machinery used ($/km) Assume mob/demob from largest centre unless otherwise stipulated & supported by the operator. Calculation assumes 1 piece of machinery required per site.	Trip from Darwin, NT, assume 10 pieces of equipment
	Post closure water monitoring	yr	adjust post closure worksheet - no entry required			1,833,900.00	Monitoring and measurement requirements that may be needed following the closure of the project - use the 'post closure worksheet' Estimated quanity refers to number of years required post closure	
	Pest and weed management, monitoring & assessment	ha	200 - 250	250.00	3137	784,275.00	Include total rehabilitated area , assumed for minimum of 3 years post closure Entry automated form 'Key Information' tab.	
	Earthwork maintenance	ha	1,100	1100.00	348	383,240.00	Assume 20% failure rate for the total areas of contructed landforms (eg WRDS, TSF etc) for a period of 2 years (if not stipulated otherwise) Entry automated form 'Key Information' tab.	
	Revegetation maintenance, monitoring & assessment	ha	1,250 - 2,500	2500.00	418	1,045,700.00	Assume a 20% failure rate for all disturbed areas for a period of 2 years. (if not stipulated otherwise) Entry automated form 'Key Information' tab.	
	Project management	yr	20,000	20000.00	1	20,000.00	This includes tender preparation, financial reporting procurement, contractor management etc. Time frame assumed is 1-10 years depending upon the site & the complexity of the issues present	Assume 1 year
	fire break maintenance	km	50-75	72.00		0.00	Grading of firebreaks during and after closure for a period of 1-10 years depending on site size *quantity = number km x number years	
						5,120,215.00		
POST CLOSURE TOTAL						5,120,215.00		

POST CLOSURE WATER QUALITY MONITORING WORKSHEET

NOTE:

Operators must enter numbers in the blue boxes, to the appropriate timeframes and reflecting the structures present on individual sites.

SUMMARY

Item	Component	Cost ($)
1	Groundwater monitoring - Analytical	$1,050,000
2	Surface water monitoring - Analytical	$182,500
3	Field sampling and Expenses	$76,400
4	Water quality interpretation & reporting	$525,000
	TOTAL	**$1,833,900**

1

GROUNDWATER MONITORING - ANALYTICAL

Analytical & consumables

Assumptions: ICPMS, fields & laboratory consumables @ $250/sample

Mine site structures	Size (ha)	Enter the number of structures	Sampling points	Sampling per year	Enter the number of years 0-10	Subtotal cost ($)
Whole of site	All		3	2	*10*	0
Extraction bores for use after closure		*0*	1	2	*10*	0
Discrete infrastructure areas		*1*	3	2	*10*	15,000
Underground fuel storage areas		*0*	1	2	*10*	0
Pit voids/declines	All	*2*	3	2	*10*	30,000
Waste rock dump - oxide	<5		2	1	*10*	0
	5 - 20		3	2	*10*	0
	>20		4	2	*10*	0
Waste rock dump - mixed or sulfide	<5		2	2	*10*	0
	5 - 20		4	2	*10*	0
	>20	*2*	6	2	*10*	60,000
Tailings dam / residue disposal ponds	0 -20		3	2	*10*	0
	21 - 100		4	2	*10*	0
	100 - 150		6	2	*10*	0
	>150	*15*	10	2	*10*	750,000
Heap leach pad	<10		3	2	*10*	0
	>10	*3*	5	2	*10*	75,000
Water containment/retention ponds (water not suitable for passive release)	<10		2	1	*10*	0
	10 - 20		3	2	*10*	0
	>20	*4*	4	2	*10*	80,000
Waste disposal areas			2	1	*10*	0
Other		*4*	1	2	*10*	20,000
Other		*4*	1	2	*10*	20,000
Other						0
					sub total	***$1,050,000***

Denotes sampling of bores adjacent to structures

2 SURFACE WATER MONITORING - ANALYTICAL

Analytical & consumables
Assumptions: ICPMS, fields & laboratory consumables @ $250/sample

Mine site features	Number of features	Sampling points	Sampling per year	Enter No. of years 1-10	Subtotal cost ($)
Water retaining structures with no discharge	*2*	1	1	*10*	5,000
Water retaining structures with possible discharge	*1*	1	2	*10*	5,000
Bioremediation structures	*1*	1	1	*10*	2,500

PLUS

Mine site features	Number of features	Sampling points	Sampling per year	Enter No. of years 0-10	Subtotal cost ($)
Perenial streams discharging from site	*3*	2	4	*10*	60,000
Ephemeral streams discharging from site	*12*	2	2	*10*	120,000

OR Please note: Fill out either the streams or the site operational complexity, size and climate section, but not both

Site operation complexity & size and climate	Default sampling sites	Sampling per year	Enter No. of years 0-10	Subtotal cost ($)
Arid zone site - small to medium	5	1		0
Arid zone site - large	10	2		0
Wet/dry tropics site - small size, simple issues	10	2		0
Wet/dry tropics site - small size, moderate -complex issues	10	4		0
Wet/dry tropics site - medium size, simple issues	15	2		0
Wet/dry tropics site - medium size, moderate -complex issues	15	4		0
Wet/dry topics site - large size, moderate -simple issues	25	4		0
Wet/dry topics site - large size, moderate -complex issues	30	4		0
			sub total	***$182,500***

3 FIELD SAMPLING & EXPENSES

Assumptions:
Road travel <200km = day trip , 2 people, no accommodation, fuel (300km return) & expenses
Road travel 200 - 500km = minimum of 1 nights accom , 1 day travel + 1 night for each additional sampling day, 2 people , fuel (av 800km return)
Road travel >500km = minimum of 2 nights accom, 2 days travel + 1 night for each additional sampling day, 2 people, fuel (av 1600km return)
Fuel = $1.20/L @ 6km/L Accommodation & meals = $130 per person /per night Personnel = $800 per person per day Air travel = $2000 per person return Expenses (e.g. vehicle/consumables etc

Travel and expenses	Enter No. of years 0-10	Distance from nearest centre eg Darwin	Quantity	Enter est. days each sampling trip	Subtotal cost ($)
Field trips - Road travel		<200km	4	*1*	0
	5	200 - 500km	4	*1*	76,400
		> 500km	4	*1*	0
Field trip - Air travel (Proof of availability & suitability required)			4	*1*	0
				sub total	***$76,400***

4

WATER QUALITY INTERPRETATION AND REPORTING

Item	Site size& water mgmt challenges	Quantity	Enter No. of yrs 0-10	Unit cost ($)	Subtotal cost ($)
Quaterly data collation & interpretation	small	3		2,500	0
	medium	3		5,000	0
	large	3	*10*	10,000	300,000
Annual data collation & interpretation	small	1		1,000	0
	medium	1		5,000	0
	large	1	*10*	20,000	200,000
Other reporting		*1*	*5*	5,000	25,000
				sub total	***$525,000***

Assumptions

Ripping
deep rip low level disturbance - 14G grader or equivalent with multishank ripper to 3m width. At $180/hr and at 3km/hr with 0.83 efficiency will cover 7500m2/hr = $240/ha
Deep rip medium level disturbance- Cat D6 with triple shank rippers ripping to a depth of 0.3m and 3m width covered per pass. At $220/hr and 2km/hr with 0.83 efficiency will cover 4980m2/hr = $441/ha
deep rip high level of disturbance and compaction - using a Cat D9 with multishank
ripper to a width of 2.64m. At $300/hr and 1.6km/hr with 0.83 efficiency will cover 3320m2/hr = $900/ha

tracks
Assume D9 used to rip to depth of 0.3m, which can do 1.36km/hr. Assume $300/hr. Requires 2 passes on track ~5m wide = $440/km.
Windrows - 14G grader will grade in windrows at 3km/hr (2nd gear) and require two passes each side of road = 1500m of road/hr @ $180/hr =$120/km
two passes with grader to rip track <4m wide at 3km/hr =$120/km

grading firebreaks with 14G equivalent grader @$180/hr. Blade width of 14', travelling at ~5km/hr. Two passes required = 24minutes/km=$72/km

drillpads - major reshaping
using a Komatsu PC650 excavator or similar at $320/hr, can move 300bcm/hr assume one pad per hour

haul roads
haulroads assumed to be an average of 12m wide with an additional buffer of 5m each side of the road which has been cleared or significantly disturbed. Surfaces are heavily compacted and constructed of imported fill.
Road fill which may be ARD producing is removed using an excavator ($320/hr) and 3x50t dump truck ($750/hr), watercart @ $140/hr, dozer@$250/hr. Excavator will produce 300bcm/hr = $4.86/bcm

Stockpile/WRD removal/pit infill
Assume load and haul to pit using excavator and 3 dump trucks. Excavator ($320/hr) and 3 trucks ($840/hr total) as above = $3.87/bcm
bund - assume excavator and 3 dump trucks, with minimal haul distance (no greater than 1km.)
As per road fill above using and excavator and 3 trucks = $3.87/bcm. If bund is 5m wide and 2m high = 5m3/m then bund ~$19/m to construct

fertiliser - current (09/01/09) Landmark price per tonne for NPK fertiliser = $1487.50
fertiliser applied at 500kg/ha (best practice) = $743.75/ha
If applied at only 100kg/ha = $148.75/ha
application dependent on growth medium

RC drillpads assume average 10mx10m, DDH pads 10mx20m

post closure cost for pest, fire and weed management comes from contrators estimate for Woodcutters site

contractor costs for meals, accommodation, travel and supervision:
meals & accom @ $150/head/day
travel @$60/head/hr
supervision@$1000/day
so for 10.5hr day daily costs = $1845/hr/300bcm/hr of production = $6.15/bcm
This tool has assumed cost of $210-$320/man/day

Building Footprints From Vista Gold - January, 2012

Area	Drawing	Description	Length (m)	Width (m)	Area (m^2)
Site General Non Process	2131-A-0001	Administration Building	30.1	14.8	443.9
	2131-A-0002	Gatehouse Building	7	5.6	39.2
Sub Total					483.1
Process Plant	2131-A-0003	Process Plant Office and Ablutions	35.6	6.5	232.7
	2131-A-0004	Control Room	7	3	21
	2131-A-0005	Sample Prep and Laboratory	12	12	144
			20	8.4	168
			6.5	4.9	31.3
	2131-A-0008	Workshop and Warehouse	45.6	17.9	814.3
			24.4	5.3	130.4
			18.5	9.7	180
	2131-A-0009	Reagents Store	24	12	288
Sub Total					2,009.70
Mining Area	2131-A-0010	Mining Office	24	16.5	396
	2131-A-0014	Heavy Vehicle Workshop	112.2	36	4,039.20
Sub Total					4,435.20
TOTAL SITE BUILDING AREA					6,928.00