
# APPENDIX H
# Phase IV Decommissioning and Reclamation Plan

**Minto Explorations Ltd.**

**ISSUED FOR USE**

# MINTO MINE EXPANSION – PHASE IV
# DECOMMISSIONING AND RECLAMATION PLAN
# REVISION 3

**W14101068.030**

**November 29, 2010**

ACCESS CONSULTING GROUP

eba

# EXECUTIVE SUMMARY

This closure plan addresses the long-term physical and chemical stability of the site, including reclamation of surface disturbances. A program is presented for site management and monitoring both during implementation of closure and after decommissioning and reclamation measures are completed. Decommissioning and reclamation cost estimates are provided and financial security requirements reviewed.

The Plan has been specifically scoped to fulfill the requirements under the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) for quartz mining projects proposed in the Yukon. The Plan is not intended to address closure of previously permitted infrastructure components which have been addressed in the 2009 Detailed Decommissioning and Closure Plan.

The Minto Project is a copper-gold-silver project located on the west side of the Yukon River approximately 75 km (47 miles) north-northwest of Carmacks, Yukon Territory. The mine site and access road lie within the traditional territory of the SFN and comprises part of land claim settlement parcels R-6A, R-44A (Type A settlement lands) and R-40B. The Company concluded a comprehensive Cooperation Agreement with the SFN on September 16, 1997. This agreement is still in effect, however an amended agreement is being negotiated.

The Minto Property is centered at approximately 62°37'N latitude and 137°15'W longitude (NAD 83, UTM Zone 8 coordinates 6945000N, 384000E). The Minto Project consists of 284 claims. There are 120 pending quartz claims, 99 quartz claims and 65 quartz claims under lease. The 100% registered owner of the claims and leases is Minto Explorations Ltd. (The Company). The property is accessible by crossing the Yukon River at Minto Landing. Barge landings have been constructed for ice-free crossing and an ice bridge is used upon freeze-up of the Yukon River.

The following activities are planned as part of Phase IV:

- Development, mining and milling of materials from the proposed Area 2 open pit which contains 3,192 Kt of ore plus 25,980 Kt of waste;
- Development, mining and milling of materials from the proposed Area 118 open pit which contains 88 Kt of ore plus 639 Kt of waste;
- Development, mining and milling of materials from the proposed Area 2 and Area 118 underground areas which contain approximately 1,541 Kt of ore and 341 kt of waste;
- Expansion of the southwest waste rock and reclamation overburden dumps;
- In-Pit deposition of tailings from Phase IV deposits (Area 2 and Area 118);
- In-Pit deposition of tailings sourced from Main Pit stockpiled ore following completion of mining in Main Pit;
- Construction of the South Wall buttress in Main Pit;

- Construction of the Mill Valley Fill buttress;
- Extension of the camp pad;
- Operational water management; and
- Decommissioning and reclamation of infrastructure components, as and whenever possible to reduce site liability.

A systematic approach to decommissioning and closure reclamation has been developed for the Minto project. Progressive reclamation measures will be implemented where possible during mine construction and operations. This approach will not only provide valuable reclamation success feedback for use in advanced/final closure, but progressive reclamation will reduce final reclamation liability and costs and shorten the overall reclamation implementation schedule. These progressive efforts will also help reduce slope erosion through physical slope stabilization of revegetation efforts, enhancing ultimate reclamation success.

The primary objectives of the closure and reclamation of Minto Mine are:

- To have a closure planning process that seeks input from the SFN, understands the input received and incorporates the input into closure planning decisions;
- To protect the health of people pursuing traditional activities including hunting, fishing, trapping, camping and collection of plants for food, medicinal or cultural purposes;
- To protect people from safety risks when they are pursuing traditional activities including hunting, fishing, trapping, camping and collection of plants for food, medicinal or cultural purposes;
- To protect the environment (including land, air, water, plants, animals fish and other environmental components and their interrelationships) from long term effects caused by the mine activities and facilities;
- To return the mine site and affected areas to a state similar to surrounding lands so that people can pursue traditional activities the same as they did before mining, including hunting, fishing, trapping, camping and the collection of plants for food, medicinal or cultural purposes;
- To protect the environment from long-term effects caused by post-closure access to the mine area;
- To protect the environment from effects of earthquakes, floods, climate change and other natural events on related mine structures;
- To have effective management and control structures in place during operation, closure and post-closure to provide:
  - Adequate financial resources to carry out all closure activities including plan implementation and long-term activities;

  - Adequate flexibility during closure and post-closure to allow adaptation of activities in order to address unexpected performance and events; and
  - Consideration of the Company's long-term desire to "walk away" from the site under conditions acceptable to SFN and with adequate resources provided to address long term requirements.

- To minimize long term activities by ensuring long term chemical and physical stability of mining components and disturbed areas;
- To confirm the effectiveness of closure measures by monitoring the site after closure;
- To undertake mine planning incorporating progressive reclamation;
- To provide short and long term slope stabilization and erosion control on linear and non-linear disturbances;
- To ensure the long-term chemical stability of residual mining components and their effects on water quality draining the property;
- To ensuring the long-term physical stability of key structures such as the waste dumps and the diversion and drainage ditches; and
- To work towards a passive closure scenario for most or all mine components.

The Company has adopted a toolbox approach to reclamation methods in order to ensure that the reclamation objectives identified in the previous section can be met. The toolbox approach to reclamation involves investigation into the use of different reclamation methods depending on the specific issue being addressed. The reclamation toolbox for the site is primarily focussed towards reducing metal loadings from mine infrastructure and passive treatment of water quality.

The Phase IV expansion is expected to result in approximately 6 years of additional mine life with active mining in the open pits ending in the third quarter of 2013 and underground mining scheduled to finish in January 2014. Following the end of the underground production, mining will be from ore stockpiles that will continue into 2016. Reclamation of the disturbed areas will be done in a phased approach to match the overall mining schedule and after closure to reflect the reclamation and monitoring effort required. This phased approach to reclamation planning will assist the company in achieving the overall objectives of progressive and final reclamation at the site.

The closure phase of the Minto mine will commence with the cessation of economic mining of the open pit and the milling of ores and stockpiles from the ore zone. Once all mineable ore reserves have been processed, the mill and concentrator will be flushed and the tailings management facility will be decommissioned. During the active decommissioning phase which is expected to last approximately 3 years, the number of personnel required will vary depending on site activities; however, it is expected that as major decommissioning and reclamation tasks are completed the number of site personnel required will decline.

Cost estimation for implementation of the proposed closure measures is the basis for establishing the financial security that will be required on the project. The Phase IV closure cost estimate has been prepared based on the final extent of disturbance for each of the infrastructure units described in this report. Progressive reclamation for much of the site will assist in offsetting the maximum site liability that will be incurred during the operations phase but does not negate the need for estimation of the closure costs.

A closure cost range from $15,785,000 to $16,040,000 is estimated for final closure, based on three separate scenarios for road decommissioning.

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## APPENDICES

# 1.0 INTRODUCTION

Minto Explorations Ltd. (The Company), a wholly owned subsidiary of Capstone Mining Corporation (Capstone), owns and operates the Minto Project located 240 km (150 miles) northwest of Whitehorse, Yukon. For the purposes of this closure plan, the "Minto Project" means the mining of the Minto deposit as an open-pit mine and related ancillary facilities.

This closure plan addresses the long-term physical and chemical stability of the site, including reclamation of surface disturbances. A program is presented for site management and monitoring both during implementation of closure and after decommissioning and reclamation measures are completed. Decommissioning and reclamation cost estimates are provided and financial security requirements reviewed.

The conceptual closure plan is based on the best information available at the present time. As required in section 14.3 of QML-0001, this plan will be updated again in two years, and submitted to the Chief for review and approval no later than every second anniversary of the startup date.

## 1.1 CLOSURE PHILOSOPHY

In keeping with its high standards for environmental and social responsibility, the Company intends to implement an environmentally sound and technically feasible decommissioning and reclamation plan for the Minto mine. Closure planning and the implementation of this phase at a mine site must be undertaken with appropriate environmental care while respecting local laws, Selkirk First Nation (SFN) agreements, and the public interest and ensuring that the Company's high environmental standards are achieved. Necessary environmental protection measures have been adopted in the development of this Plan to ensure that a healthy environment exists after mine closure. This approach is consistent with the Company's corporate policies.

A principle tenet of the philosophy followed during the development of this Plan was to work towards an eventual passive closure, with eventual walk-away closure after long term chemical and physical stability has been demonstrated. This involved an assessment of the key mine components that should be properly mitigated. Mitigation measures have been incorporated into elements of the Plan to address public safety issues and environmental concerns with post closure monitoring and inspections planned to ensure that this objective is met. Once the effectiveness of each mitigation measure is assured, then management of the site can be safely reduced to a level that is consistent with closure. It is anticipated that final determination of the effectiveness of closure measures for passive and eventual walk-away status will be the subject of review and concurrence with regulatory agencies, SFN and the public. Under the Quartz Mining Act (QMA), the company would then apply for a certificate of closure from Yukon Government (YG).

The Company has entered into a Cooperation Agreement (the Agreement) with the SFN. All activities at the site including closure measures are guided by this Agreement. Therefore, a strong working relationship with the SFN forms a foundation for this

document. To that end, preliminary meetings with SFN were held, and their comments on closure and other issues raised during ongoing dialogue were considered in the development of this Plan.

The principle of progressive reclamation is key to the Company's closure philosophy, and reduces the ongoing risk carried by the company by:

- stabilizing potential sources of erosion and sediment release;
- initiating slope stability measures to enable reclamation;
- replanting and reseeding disturbed areas not scheduled for rework;
- providing sites for reclamation research trials and serving as an early indicator of reclamation success; and
- reducing the total area requiring reclamation at the end of active mining activities.

Resources required for specific progressive reclamation activities will be incorporated into operational planning, and their completion will be scheduled into yearly operational targets. The schedule for progressive reclamation is dependant upon the progress of mining activities, and is therefore not presented in this closure plan.

To ensure that the overall closure philosophy can be achieved, the following objectives were emphasized during the development of this plan:

- protection of public health and safety;
- implementation of environmental protection measures that prevent adverse environmental impact;
- ensuring land use commensurate with surrounding lands;
- ensuring full consultation with the SFN, so that closure measures are appropriate and supported by the local peoples who are most affected;
- recognize mine start-up and construction in the short term and incorporate long term closure measures;
- progressive reclamation measures implemented during mine operations;
- post closure monitoring of the site to assess effectiveness of closure measures for the long term; and
- passive post closure monitoring and management of the site until the former mine presents evidence of an environmentally benign site, in which case a walk-away closure scenario may be realized.

## 1.2 SCOPE OF PLAN

The Plan has been specifically scoped to fulfill the requirements under the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) for quartz mining projects proposed

in the Yukon. The Plan is not intended to address closure of previously permitted infrastructure components which have been addressed in the 2009 Detailed Decommissioning and Closure Plan.

Various closure options were assessed to ensure that closure objectives were met for each mine component. A meeting was held between the company's consultants and SFN to review the closure philosophy and approach and methods to optimize the Closure plan prior to the submission of the YESAA application. The Company intends to undertake ongoing dialogue with SFN members and staff to address issues related to the Agreement, permits currently in place with SFN's Department of Lands and Resources and the eventual closure of the mine.

The approach taken in the presentation of this Closure plan is to provide a brief description of each mine component and the closure issues and measures related to that component. Previous work or reports on the project have been referenced without repeating details so that this document is focused on decommissioning and reclamation. An updated list of prior reports on the Minto Mine is presented in Table 1-1.

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| Initial Environmental Study of the Minto Project. Prepared for Wright Engineers Ltd. | Division of Applied Biology, B.C. Research | 1976 |
| Report to Wright Engineers Ltd. on 1976 Geotechnical Investigations, Minto Project Feasibility Study | Golder and Associates | 1976 |
| An Assessment of the Pre-Development Water Quality and Biological Conditions in the Water Shed Around the Minto Orebody | Fisheries and Environment Canada, Environmental Protection Service | 1977 |
| The Minto Copper Deposit, Yukon Territory: A Metamorphosed Orebody In The Yukon Crystalline Terrane", An M.Sc. Thesis, Queen's University, Kingston, Ontario, Canada | Pearson, W.N., | 1977 |
| The Minto Copper Deposit, Yukon Territory, A Metamorphosed Orebody in the Yukon Crystalline Terrane. In Economic Geology, Vol. 74, p. 1577-1599 | Pearson, W.N., Clark, A.H. | 1979 |
| The Minto Project, Yukon, Mineral Inventory Review Minto Explorations Ltd, Vancouver, BC | H.L. Klingmann and J.S. Proc | 1994 |
| Minto Project, Initial Environmental Evaluation, Supporting Volume I, Development Plan. Prepared for Minto Explorations Ltd. | Hallam Knight Piesold Ltd. | 1994 |
| Minto Project, Initial Environmental Evaluation, Supporting Volume II, Environmental Setting. Prepared for Minto Explorations Ltd. | Hallam Knight Piesold Ltd. | 1994 |
| Minto Project, Initial Environmental Evaluation, Supporting Volume III, Socioeconomic Description and Impact Assessment. Prepared for Minto Explorations Ltd. | Hallam Knight Piesold Ltd. | 1994 |

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| Survey of Firekilled Fuelwood Harvest Potential, Minto Creek, Yukon, Prepared for Minto Explorations Ltd. Vancouver, BC | John Gibson | 1994 |
| "Development of the Minto Project Process Design", Project No. 8553-15 | Kilborn Engineering Pacific Ltd. | 1994 |
| An Impact Assessment of the Minto Project. Memo from the Selkirk First Nations to the Northern Affairs Program. | Magrum | 1994 |
| Minto Project Prospectus prepared for Minto Explorations Ltd. | Pearson, Hofman and Assoc. Ltd. | 1994 |
| Minto Area Archaeology And History - Final Report of the Minto Archaeological Impact Assessment Project | Sheila Greer, Edmonton | 1994 |
| Development of the Minto Project Process Design | Kilborn Engineering Pacific Ltd. | 1994 |
| Geotechnical Evaluation – Minto Core. Internal report submitted to Minto Explorations Ltd. | Steffen, Robertson and Kirsten Ltd. | 1994 |
| Technical Feasibility Study - Thickened Tailings Disposal System - Minto Project - Phase 1. Laboratory Tailings Characterization Tests, Project 94-608 | E.I Robinsky Associates Limited, Consulting Engineers | 1995 |
| Geotechnical Design Tailings/Water Dam, Minto Project, Yukon | EBA Engineering Consultants Ltd., Edmonton, Alberta, 0201-95-11509 | 1995 |
| Metallurgical Test Work And Mill Design Criteria", Minto Project, Yukon | H.L. Klingmann | 1995 |
| The Minto Project, Yukon, Feasibility Study – May 1995 | H.L. Klingmann & J.S. Proc, Vancouver, BC | 1995 |
| Minto Project, Initial Environmental Evaluation, Supporting Volume IV, Environmental Mitigation and Impact Assessment. Prepared for Minto Explorations Ltd. | Hallam Knight Piesold Ltd. | 1995 |
| Minto Project, Application for Land Use Permit YA5F045. Submitted as reference to the YWB | Minto Explorations Ltd. | 1995 |
| Minto Explorations Ltd., Minto Project, Proposed Designs for Big Creek Crossing, Minto Creek Crossing, Yukon River Barge Landings | N.A. Jacobsen, P. Eng., Civil Engineering Consultant Whitehorse, Yukon. | 1995 |
| Minto Explorations Ltd., Access Road Design Report | Yukon Engineering Services, Whitehorse, Yukon | 1995 |
| Evaluation of Grinding Test work for the Minto Deposit and Recommendations for Grinding Equipment Sizing at 1,500 stpd | Fluor Daniel Wright Ltd. | 1995 |
| Environmental Assessment Screening Report and Project Summary: Land Use Permit Application YA5F045 and Water Licence Application MS95-013 | Department of Indian Affairs & Northern Development (DIAND) and YWB | 1996 |
| Minto Waste Rock Stability Evaluation. EBA File 0201-96-11509 | EBA Engineering Consultants Ltd. | 1996 |

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| Environmental Assessment Screening Report and Project Summary: Land Use Permit Application YA5F045 and Water Licence Application MS95-013 | DIAND and Yukon Territory Water Board | 1997 |
| Environmental Assessment Screening Report: Minto Explorations Ltd. Minto Property. Whitehorse, Yukon Territory | DIAND and Regional Environment Review Committee | 1997 |
| Revised Preliminary Dam Design, Minto Project, YT | EBA Engineering Consultants Ltd., Edmonton, Alberta | 1997 |
| Construction Quality Assurance Manual for Waste Dumps, Tailings/Water Dam, Mill Water Pond and Diversion Ditch, Minto Project, Yukon", Project No. 0201-95-11509 | EBA Engineering Consultants Ltd., Whitehorse, Yukon | 1997 |
| Design Brief Tailings/Water Dam, Minto Project, Yukon Project No. 0201-95-11509 | EBA Engineering Consultants Ltd., Whitehorse, Yukon | 1997 |
| Brief to the YWB, re. Water Licence Application QZ96-006 Minto Explorations Ltd. | Environment Canada and Fisheries and Oceans Canada | 1997 |
| Minto Project, Application for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 1997 |
| Review of Hydrology for Minto Project | Remi J.P. Allard Rescan Environmental Services Ltd. | 1997 |
| Geotechnical Evaluation - Proposed Main Waste Dump - Minto Project - Yukon Territory - 0201-95-11509 | EBA Engineering Consultants Ltd., Edmonton, Alberta | 1998 |
| Minto Project, Geology, Ore Reserves & Mine Design | H.L. Klingmann and J.S. Proc | 1998 |
| Mill Water Pond, Minto Project | H.L. Klingmann and J.S. Proc | 1998 |
| Grout Curtain For The Tailings/Water Dam | H.L. Klingmann and J.S. Proc | 1998 |
| Minto Explorations Ltd., Minto Project, 6102-01, Design Progress At June 1998. Vancouver, BC | Rescan Engineering Ltd. | 1998 |
| Minto Project, Yukon Airborne Geophysics Interpretation, Geological Synthesis and Target Generation | Steffen, Robertson and Kirsten (Canada) Ltd., Bartsch, R. | 1999 |
| Cumulative Effects Assessment, Minto Project. Prepared for Minto Explorations Ltd. | Access Consulting Group | 1999 |
| Construction Monitoring Report Grout Curtain for Tailings/Water Dam, Minto Project, Yukon. Prepared for Minto Explorations Ltd. | EBA Engineering Consultants Ltd. | 1999 |
| Revised Construction Specification Tailings/Water Dam Minto Project, Yukon. Prepared for Minto Explorations Ltd. | EBA Engineering Consultants Ltd. | 1999 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 1999 |
| Minto Project, Yukon Airborne Geophysics Interpretation, Geological Synthesis and Target Generation | Steffen, Robertson and Kirsten (Canada) Ltd., Bartsch | 1999 |
| Minto Optimisation Study: SAG Milling Throughput Studies for a Two-Stage Grinding Circuit | Fluor Daniel Wright Ltd. | 1999 |

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| Minto Project, Yukon – Site Inspection & Compilation of Environmental Information. Prepared for DIAND, Renewable Resources Waste Management Program | Access Consulting Group | 2000 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 2000 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 2001 |
| Minto Project, Decommissioning and Reclamation Plan | Minto Explorations Ltd. | 2001 |
| Metallurgical Test Work & Mill Design | Minto Explorations Ltd. | 2001 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 2002 |
| Minto Project Summary | Minto Explorations Ltd. | 2003 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB. | Minto Explorations Ltd. | 2003 |
| Minto Project, Yukon. Care and Maintenance & Interim Closure Plan. Prepared for Minto Explorations Ltd. | Access Consulting Group | 2003 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB. | Minto Explorations Ltd. | 2004 |
| Early Jurassic porphyry (?) copper (-gold) deposits at Minto and Williams Creek, Carmacks Copper Belt, western Yukon. In Yukon Exploration and Geology 2003 | Tafti, R. and Mortensen, J.K. | 2004 |
| Minto Project, Annual Report for Water Licence QZ96-006. Submitted to the YWB | Minto Explorations Ltd. | 2005 |
| Technical Report on the Minto Project, for Sherwood Mining Corporation, July 15, 2005 | Orequest Consultants, Cavey, G., Gunning, D. LeBel, J.L., and Giroux Consultants Ltd., Giroux, G. | 2005 |
| Technical Report on the Carmacks Copper Project, Whitehorse Mining District, Yukon Territory for Western Copper Corp. | Cavey G., Gunning D., Clegg J. | 2006 |
| Report on the Geological Exploration Programs, Results and Perspectives, STU Claims, Hoochekoo Creek Area, Whitehorse Mining District. Internal Minto Explorations report. | Rus, John | 2006 |
| An Assessment of Metallurgical Response - Global & Variability Composites | G&T Metallurgical | 2006 |
| Minto Project: Updated Projections of Mill Throughput with One Additional Ball Mill (ex. Asarco Silverbell) | DJB Consultants, Inc., (June 2005) with Addendum (June 2006) | 2006 |
| Geotechnical Design Ice-Rich Overburden Dump Minto Mine, Minto, YT | EBA Engineering Consultants Ltd. | 2006 |
| Minto Project, 2005 Annual Report for Water Licence QZ96-006. Submitted to the YWB. | Minto Explorations Ltd. | 2006 |
| Minto Geotechnical (Open Pit) Feasibility Study. | EBA Engineering Consultants | 2006 |

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| EBA File: 1200173. | Ltd. | |
| Detailed Feasibility Study for the Minto Project | Minto Explorations Ltd. | 2006 |
| Phase I Water Treatment Contingency Plan | Access Consulting Group | 2006 |
| Minto Mine Flow Monitoring Plan | Access Consulting Group | 2006 |
| Construction/Operation Plan and CQA Manual, Ice-rich Overburden Dump, Minto Mine, Yukon | EBA Engineering Consultants, Ltd. | 2006 |
| Detailed Decommissioning and Reclamation Plan, Minto Project, YT | Access Consulting Group, Minto Explorations Ltd. | 2006 |
| Minto Copper Project – Site Hydrology Update | Clearwater Consultants Ltd. | 2006 |
| Geotechnical Design Report, "Dry" Stack Tailings Storage Facility, Minto Mine, Yukon | EBA Engineering Consultants, Ltd. | 2007 |
| Minto Mine Tailings Management Plan | Access Consulting Group | 2007 |
| Environmental Status Report, Skagway Ore Terminal, Summary of Previous Environmental Reports with Recommendations for Future Work | Access Consulting Group | 2007 |
| Skagway Ore Terminal, Phase II Environmental Baseline Study Report | Access Consulting Group, Gubala, C.P. | 2007 |
| Minto Project, 2006 Annual Report for Water Licence QZ96-006 and QML-0001. Submitted to the YWB and YG EMR | Access Consulting Group, Minto Explorations Ltd. | 2007 |
| Environmental Effects Monitoring, First Study Design, Minto Project, YT | Access Consulting Group, Minnow Environmental Inc. | 2007 |
| Detailed Decommissioning and Reclamation Plan, Rev.1, Minto Project, YT | Access Consulting Group, Minto Explorations Ltd. | 2007 |
| Operation, Maintenance and Surveillance Manual, Dry Stack Tailings Storage Facility, Minto Mine, YT | EBA Engineering Consultants, Ltd. | 2007 |
| Minto Project, 2007 Annual Report for Water Licence QZ96-006 and QML-0001. Submitted to the YWB and YG EMR | Access Consulting Group, Minto Explorations Ltd. | 2008 |
| Project Proposal and QML Amendment Application; Mining and Milling Rate Increase, Minto Project | Access Consulting Group, Minto Explorations Ltd. | 2008 |
| Minto Copper Project - Water Balance Model | Clearwater Consultants Ltd. | 2008 |
| Geotechnical Design, Proposed Reclamation Overburden Dump, Minto Mine, Yukon | EBA Engineering Consultants, Ltd. | 2008 |
| Preliminary Design, Proposed Southwest Waste Dump, Minto Mine, Yukon | EBA Engineering Consultants, Ltd. | 2008 |
| Geotechnical Design, Proposed Southwest Waste Dump, Minto Mine, Yukon | EBA Engineering Consultants, Ltd. | 2008 |
| Pre-feasibility Geotechnical Evaluation, Phase IV, Minto Mine | Steffen, Robertson and Kirsten (Canada) Ltd. | 2009 |
| Tailings Risk Assessment, Minto Project, Yukon Territory | Steffen, Robertson and Kirsten (Canada) Ltd. | 2009 |
| Environmental Effects Monitoring, First Interpretive | Access Consulting Group, | 2009 |

**TABLE 1-1 MINTO PROJECT INFORMATION LIST**

| Report Title / Topic | Author | Date |
|---|---|---|
| Report, Minto Project, YT | Minnow Environmental Inc. | |
| Evaluation of the Background Water Quality of Minto Creek and Options for the Derivation of Site-Specific Water Quality Objectives | Minnow Environmental Inc. | 2009 |
| Minto Copper Project - Water Balance Model | Clearwater Consultants Ltd. | 2009 |
| Reclamation Research Program, 2007 Activities | Access Consulting Group | 2009 |
| Reclamation Research Program, 2008 Activities | Access Consulting Group | 2009 |
| Minto Project, 2008 Annual Report for Water Licence QZ96-006 and QML-0001. Submitted to the YWB and YG EMR | Access Consulting Group, Minto Explorations Ltd. | 2009 |
| Phase IV Waste Management Plan, Minto Mine, YT | EBA Engineering Consultants, Ltd. | 2010 |
| Phase IV Development Fisheries and Aquatic Baseline Study Summary, Minto Mine, YT | EBA Engineering Consultants, Ltd. | 2010 |
| Environmental Baseline Studies Wildlife Report | EBA Engineering Consultants, Ltd. | 2010 |
| Environmental Baseline Ecosystems and Vegetation Report | EBA Engineering Consultants, Ltd. | 2010 |
| Phase IV Tailings Management Plan, Minto Mine, YT. | EBA Engineering Consultants, Ltd. | 2010 |
| Minto Mine – Site Water Balance Update 2010 | Clearwater Consultants Ltd. | 2010 |
| Minto Mine: Groundwater Baseline Conditions | SRK Consulting Inc. | 2010 |
| Minto Mine Expansion – Phase IV, ML/ARD Assessment and Post-closure Water Quality Prediction | SRK Consulting Inc. | 2010 |

## 1.3 STATUTORY AND REGULATORY RESPONSIBILITIES

### 1.3.1 Government Environmental Assessment and Permitting Regime

YESAA requires that companies submit a conceptual closure plan with their environmental assessment application in order to ensure that potential project effects have been considered and that appropriate closure mitigations and methods have been developed for the project.

The Company will apply for amendments to its Water Use Licence following completion of the YESAA process. The amendments will be to include Phase IV into the current permitting. The closure plan will form a part of the information included during the permitting amendments.

The Company has taken a proactive approach towards its regulatory responsibilities by meeting with various government regulatory agencies, boards, and SFN. Periodic meetings are held to provide project updates. A similar approach is planned for the Plan.

## 1.4 REGULATORY APPROVALS

Several government agencies and SFN are involved in reviewing, assessing, authorizing and monitoring the Minto Mine. The relevant legal, regulatory and guideline-based instruments include:

- Selkirk First Nation Cooperation Agreement;
- Metal Mining Effluent Regulations to the federal *Fisheries Act*;
- Effluent Characterization;
- Environmental Effects Monitoring;
- Type A Water Use Licence QZ96-006 ("WUL QZ96-006"), issued in April 1998 and including subsequent amendments, and valid until June 30, 2016;
- Type B Water Use Licence MS04-227 ("WUL-B") issued in August 1996 and valid until June 30, 2016;
- Quartz Mining Licence QML-0001 ("QML-0001") issued in October 1999 and subsequent amendments and valid until June 30, 2016;
- Mining Land Use Permit;
- Fish Collection Permits;
- Waste management facility permits:
- Multi-Use Land Treatment Facility Permit;
- Special Waste Permit;
- Commercial Dump Permit; and
- Air Emissions Permit.

In accordance with these instruments, MintoEx has submitted operational and monitoring plans including but not limited to:

- Engineering Plans and a Construction Quality Assurance Manual for the Water Storage Pond dam;
- Spill Contingency Plan;
- Main Waste Rock Dump Design Plan;
- Southwest Waste Dump Design Plan;
- Reclamation Overburden Dump and Ice-Rich Overburden Dump Design Plans;
- Dry Stack Tailings Storage Facility Design and Management Plans;
- Mill Water Pond Design;

- Flow Monitoring Plan;
- Water Treatment Contingency Plan; and
- Decommissioning and Closure Plan.

## 1.5 DOCUMENT ORGANIZATION

**Section 1** of this document introduces the philosophy and scope for the decommissioning and reclamation plan for the site and the Company's corporate background. Information is provided on the property and its history and a discussion of regulatory responsibilities regarding closure.

**Section 2** provides a brief overview of the history of the Minto mine up until the mine opening in addition to a summary of activities associated with the Phase IV expansion.

**Section 3** provides a brief summary of the environmental setting for the mine.

**Section 4** presents the reclamation strategy for the project, including reclamation objectives and reclamation research planning. The research will focus primarily on revegetation efforts and success.

**Section 5** presents the implementation schedule for the plan.

**Section 6** outlines the details of the Company's decommissioning and closure plan, and the activities to be followed at closure. The information is presented in a format that briefly describes the mine "reclamation component" and then presents closure issues in the context of physical and chemical stability. Closure measures are then presented in detail and in summary form as the basis for the closure cost estimates.

**Section 7** deals with post closure site management plans and activities. This section presents the environmental management measures proposed for the decommissioning and post closure period, and proposes temporary closure issues and measures.

**Section 8** provides an updated cost estimate for implementing the closure plan at different times during the life of mine.

**Section 9** provides the document closure and signatures.

**Section 10** provides report references.

## 1.6 ACKNOWLEDGEMENTS

This report benefited from input by the following companies:

Access Mining Consultants Ltd. – Developed Revision 1 of this report and provided support to Revision 2 including many of the drafting requirements.

Selkirk First Nation – Provide ongoing input into the development of closure objectives based on current and potential future use of the project area.

SRK Consulting Ltd. – Provided input into the project description, groundwater hydrologic conditions, geochemical characterization and predictive water chemistry modeling for closure.

Pelly Construction Ltd. – Provided valuable input to unit costing and overall logistics on how closure methods could be implemented.

# 2.0 PROJECT DESCRIPTION

## 2.1 PROJECT LOCATION AND BACKGROUND

The Minto Project is a copper-gold-silver project located on the west side of the Yukon River approximately 75 km (47 miles) north-northwest of Carmacks, Yukon Territory. The mine site and access road lie within the traditional territory of the SFN and comprises part of land claim settlement parcels R-6A, R-44A (Type A settlement lands) and R-40B. The Company concluded a comprehensive Cooperation Agreement with the SFN on September 16, 1997. This agreement is still in effect, however an amended agreement is being negotiated.

The Minto Property is centered at approximately 62°37'N latitude and 137°15'W longitude (NAD 83, UTM Zone 8 coordinates 6945000N, 384000E). The Minto Project consists of 284 claims. There are 120 pending quartz claims, 99 quartz claims and 65 quartz claims under lease. The 100% registered owner of the claims and leases is MintoEx. The property is accessible by crossing the Yukon River at Minto Landing. Barge landings have been constructed for ice-free crossing and an ice bridge is used upon freeze-up of the Yukon River.

Copper deposits were first discovered in 1970 and claims were staked in 1971. Extensive exploration yielded the first significant drill intersection in July of 1973. The Minto and DEF claims and leases cover an area of approximately 10 square miles. Mineable reserves for the deposit, above a cut-off grade of 0.64% copper, consist of 8,510,000 tonnes at grades of 1.81% copper, 0.57 g/t gold and 7.57 g/t silver.

Preliminary site development was initiated at the property in 1996 and continued during the following decade with the Company commencing operations in October 2007. The ore deposits are mined using conventional open pit truck and loader operations and processed in a mill plant on site. A 200 person camp is presently near capacity with the mine construction management, contractors and support staff.

Figure 2-1 and Figure 2-2 present visual depictions of the general project location with in the Yukon and the project area overview.

Table 2-2 provides on overview of the project area and environmental setting information for the study area. This table provides physical project location information, geographic reference, access route, watershed drainage, special designations, and key environmental features within the study area. The information has been extracted from a number of

documents, including previous CEAA and YEAA screenings, which are all summarized in Table 1-1.

**TABLE 2-2 PROJECT AREA OVERVIEW AND ENVIRONMENTAL SETTING**

| Project Area Attribute | Description |
|---|---|
| Region: | Yukon |
| Topographic Map Sheet: | NTS 115 I/10, 115 I/11 |
| Geographic Location Name Code: | Minto Project |
| Latitude: | 62° 36' N |
| Longitude: | 137° 15' W |
| Drainage Region: | Yukon River |
| Watersheds: | Yukon River, Big Creek, Wolverine Creek, Dark Creek, and Minto Creek. |
| Nearest Community: | Pelly Crossing, Yukon, approx. 33 km north on Klondike Highway. |
| Access: | Klondike Highway, Barge crossing on Yukon River at Minto Landing, Minto mine access road. Airstrip on site. |
| Traditional Territory: | Northern Tutchone, Selkirk First Nation peoples. Traditional use for hunting, trapping and fishing. |
| Surrounding Land Status: | Selkirk First Nation Settlement Lands and Federal Crown Land. |
| Special Designations: | Lhutsaw Wetland Habitat Protection Area located approx. 17 km NE of Minto Landing (outside the project area). |
| Ecoregion: | Yukon Plateau (Central) - Pelly River Ecoregion. |
| Study Area Elevation: | Rolling hills above mine site at 1131 metres to 600 metres at the Yukon River Valley bottom. |
| Site Climate: | Temp. ranges from –30.9°C (Jan. 1994) to 15.7°C (July.2007). Mean annual temp. of approximately -5.2°C based on site data from a weather station processed to date. Mean annual precipitation at site is 341mm. |
| Vegetation Communities: | Riparian, black spruce, white spruce, paper birch, lodgepole pine, buck brush/willow and ericaceous shrubs, feathermoss, sedge, sagewort grassland, mixed, aspen, balsam, and sub-alpine. Discontinuous permafrost is present on site. Site has been subject to recent forest fires. |
| Wildlife Species: | Moose, caribou, Dall sheep, mule deer, grizzly and black bear, varying hare, beaver, lynx, marten, ermine, deer mouse, fox, mink, wolverine, least weasel, wolf, squirrel, porcupine coyote, muskrat, otter and wood frog. Bird species include: spruce, blue, ruffed, and sharptail grouse, waterfowl, raptors, and a variety of smaller birds. |
| Fish Species: | In the Yukon River, chinook, coho, and chum salmon, rainbow trout, lake trout, least cisco, bering cisco, round whitefish, lake whitefish, inconnu, arctic grayling, northern pike, burbot, longnose sucker and slimy sculpin; In Big Creek, Chinook and chum salmon, arctic grayling and whitefish species; In Wolverine Creek, chinook salmon, arctic grayling, and slimy sculpins; In Minto Creek and project area watershed (lower reaches only), slimy sculpin, round whitefish, arctic grayling and Chinook salmon. During research in Fall 2009, it was noted that Chinook salmon use the lower reaches of the Creek, though it is unlikely that the area is used for spawning or overwintering habitat (further discussion in submissions to Environment Canada as part of the Environmental Effects Monitoring program). |
| Known Heritage Resources: | East side of Yukon River in the vicinity of Minto Landing four historic sites designated KdVc-2 (Minto landing), KdVc-3 (Minto Resort), KdVc-4 (Old Tom's Cabin), and KdVD-1 (Minto Creek). |

## 2.2 CURRENT STATUS

The Minto mine is currently in full production. Water quality monitoring is conducted in accordance with Water Use Licence QZ96-006. Figure 2-3 presents an overview of current site conditions which will form the starting point for Phase IV.

## 2.3 PLANNED PHASE IV ACTIVITIES

The following activities are planned as part of Phase IV:

- Development, mining and milling of materials from the proposed Area 2 open pit which contains 3,192 Kt of ore plus 25,980 Kt of waste;
- Development, mining and milling of materials from the proposed Area 118 open pit which contains 88 Kt of ore plus 639 Kt of waste;
- Development, mining and milling of materials from the proposed Area 2 and Area 118 underground areas which contain approximately 1,541 Kt of ore and 341 kt of waste;
- Expansion of the southwest waste rock and reclamation overburden dumps;
- In-Pit deposition of tailings from Phase IV deposits (Area 2 and Area 118);
- In-Pit deposition of tailings sourced from Main Pit stockpiled ore following completion of mining in Main Pit;
- Construction of the South Wall buttress in Main Pit;
- Construction of the Mill Valley Fill buttress;
- Extension of the camp pad;
- Operational water management; and
- Decommissioning and reclamation of infrastructure components, as and whenever possible to reduce site liability.

The open pit mining will be conducted using standard blast and haul open pit mining practices. Milling will be conducted using the existing infrastructure (a conventional crushing, grinding and flotation process plant utilizing standard unit processes and equipment). The plant currently processes 3,600 tpd (metric tonnes per day).

Figure 2-4 through 2-10 show the Phase IV development on an annual basis up until 2017. Additional details and information on the project are contained in the Minto Mine Expansion - Phase IV Project Application submitted to YESAA in August 2010.

# 3.0 ENVIRONMENTAL SETTING

Table 2-2 provides a summary of the key environmental features near the project area. Note that forest fires have affected large parts of the Minto Creek basin and surrounding areas during the past twenty years. Baseline environmental reports have been prepared to

document and describe the existing environmental setting of the site. These baseline reports are listed in Table 1-1 have been appended to the YESAA Project Application. Readers of this document are referred to those reports should additional information be required.

## 3.1 CLOSURE WATER QUALITY PREDICTIONS

The Company has developed a predictive water chemistry model in order to better understand what the potential water quality discharging from the site would be at closure. The predictive water chemistry model is based on site monitoring data and the ongoing geochemical characterization program which includes humidity cells conducted on appropriate material types. A copy of the results of the predictive water quality model for the site is included in Appendix B of this report for both unmitigated and mitigated scenarios. The geochemical characterization (SRK, 2010a) and baseline water quality reports which document source information for the model have been included with the YESAA Project Application. The predictive water quality model suggests that with out mitigations, at closure there will be seasonally elevated metal concentrations for a number of parameters (aluminum, copper and cadmium) with copper being the primary contaminant of concern.

The initial version of the predictive water quality model was developed to predict closure water quality without any closure mitigations applied. This allowed for an understanding of the potential "worst case" water quality that would be seen discharging from the site and also which mine components contributed to the major metal loadings. The water quality model indicated that approximately 79% of the predicted post closure metal loadings were derived from the Southwest Dump (52%), the Main Waste Dump (14%) and the Dry Stack Tailings Storage Facility (13%). This information has been used in the development of the source control closure measures for these facilities that is described in the next sections of this report.

In order to understand the effects of mitigation, the model was revised to simulate the application of engineered covers to the mine infrastructure with significant metal loadings. The long-term performance of the engineered cover systems was assumed to be on the order of an 80% reduction in metal loadings for benches and a 50% reduction in metal loadings for faces. Passive treatment systems were assumed to be seasonally effective with a performance on the order of 75% reduction in metal loadings during the freshet period. A review of literature on wetland and permeable reactive barrier systems indicates that they can be highly effective at removing metals (>90%) provided they are appropriately designed to address flow fluctuations and potential short-circuiting of the flows. The assumed performance targets described above are therefore considered achievable based on a review of the available literature on these types of mitigation treatments.

The predictive model shows that the background water chemistry from the undisturbed catchment has the ability to significantly influence seasonal variations in the receiving environment water quality. All of the predicted exceedances of the site water quality objectives are controlled by undisturbed catchment background water quality

concentrations with the exception of cadmium (May and September) and mercury (July). The magnitude of the cadmium concentration predicted for the months of May and September is below the revised Canadian Council of Ministers' of the Environment (CCME) cadmium criteria that are currently being considered for acceptance by that organization. Mercury is not used in the Minto processing and it is believed that any detections of this element are related to naturally occurring sources of mercury. Additional details on the predictive model and the results of the various scenarios considered for this project are contained in Appendix B.

# 4.0 RECLAMATION PLANNING

This section of the Plan provides reclamation objectives and the overall reclamation strategy for the Minto site. Also provided is information regarding planned reclamation, revegetation research programs and details and observations on reclamation and revegetation to date. The Company is committed to implementation of reclamation methods that will mitigate potential adverse effects to the receiving environment that have been predicted by the water quality model.

A systematic approach to decommissioning and closure reclamation has been developed for the Minto project. Progressive reclamation measures will be implemented where possible during mine construction and operations. This approach will not only provide valuable reclamation success feedback for use in advanced/final closure, but progressive reclamation will reduce final reclamation liability and costs and shorten the overall reclamation implementation schedule. These progressive efforts will also help reduce slope erosion through physical slope stabilization of revegetation efforts, enhancing ultimate reclamation success.

The use of active treatment is discussed at the end of this section. Active treatment is considered a worst-case final fall-back mitigation to potential water quality impacts from the site and should be utilized only if the mitigative measures described in Section 4.2 are not effective in reducing metal loadings to the receiving environment.

## 4.1 RECLAMATION OBJECTIVES

The primary objectives of the closure and reclamation of Minto Mine are:

- To have a closure planning process that seeks input from the SFN, understands the input received and incorporates the input into closure planning decisions;
- To protect the health of people pursuing traditional activities including hunting, fishing, trapping, camping and collection of plants for food, medicinal or cultural purposes;
- To protect people from safety risks when they are pursuing traditional activities including hunting, fishing, trapping, camping and collection of plants for food, medicinal or cultural purposes;

- To protect the environment (including land, air, water, plants, animals fish and other environmental components and their interrelationships) from long term effects caused by the mine activities and facilities;
- To return the mine site and affected areas to a state similar to surrounding lands so that people can pursue traditional activities the same as they did before mining, including hunting, fishing, trapping, camping and the collection of plants for food, medicinal or cultural purposes;
- To protect the environment from long-term effects caused by post-closure access to the mine area;
- To protect the environment from effects of earthquakes, floods, climate change and other natural events on related mine structures;
- To have effective management and control structures in place during operation, closure and post-closure to provide:
  - Adequate financial resources to carry out all closure activities including plan implementation and long-term activities;
  - Adequate flexibility during closure and post-closure to allow adaptation of activities in order to address unexpected performance and events; and
  - Consideration of Minto Exploration Ltd.'s long-term desire to "walk away" from the site under conditions acceptable to SFN and with adequate resources provided to address long term requirements.
- To minimize long term activities by ensuring long term chemical and physical stability of mining components and disturbed areas;
- To confirm the effectiveness of closure measures by monitoring the site after closure;
- To undertake mine planning incorporating progressive reclamation;
- To provide short and long term slope stabilization and erosion control on linear and non-linear disturbances;
- To ensure the long-term chemical stability of residual mining components and their effects on water quality draining the property;
- To ensuring the long-term physical stability of key structures such as the waste dumps and the diversion and drainage ditches; and
- To work towards a passive closure scenario for most or all mine components.

The overall goal of closure at the Minto site is to leave the area as a self-sustaining ecosystem, ensuring that land use after closure is compatible with the surrounding lands, and that the site vegetation returns to a state as near as possible to that in existence prior to mining activities. Operations phase material characterization programs and the application of passive mitigation treatments such as engineered covers to reduce metal loadings from mine infrastructure components are the primary means by which the Company proposes to achieve this goal.

These closure objectives are reflective of the closure objectives laid out for the licensee to achieve in Schedule B of the Quartz Mining Licence QML-0001 *"Terrestrial Reclamation Standards for the Minto Mine"*. These standards were derived from the YG's Reclamation and Closure Policy as well from a submission from the SFN Lands and Resources Department which represents the interests of SFN members.

## 4.2 RECLAMATION TOOLBOX

The Company has adopted a toolbox approach to reclamation methods in order to ensure that the reclamation objectives identified in the previous section can be met. The toolbox approach to reclamation involves investigation into the use of different reclamation methods depending on the specific issue being addressed. Most of the methods in the reclamation toolbox are standard practice (e.g. recontouring, seed and fertilizer application, scarification of compacted surfaces) and do not require detailed explanation of their application.

The remainder of this section describes toolbox techniques and methods that are specific to addressing potential project effects on water quality. These techniques and methods focus primarily on passive methods of reducing metal loadings to the receiving environment. The design and application of these reclamation measures will be dependent on the results of ongoing reclamation research and field trials that are to be conducted during mine operations.

### 4.2.1 Source Control

Source control is intended to be the primary control for the reduction of metal loadings to the receiving environment through limiting the access of water to materials known to have potential acid rock drainage or metal leaching issues. Source control includes such measures as operational characterization and materials handling programs, sub-aqueous disposal, engineered cover systems and encapsulation. Source control measures that are under consideration for Mino Phase IV will primarily be a combination of operational characterization and materials handling programs, sub-aqueous disposal and engineered cover systems.

#### 4.2.1.1 Operational Materials Characterization and Materials Handling Plans

Materials characterization allows mining companies to understand the different rock types present at a site and develop special handling plans based on any identified environmental concerns associated with each rock type. Minto tests all of its development rock in advance of the materials being removed from the active mining face. The waste rocks are characterized based on the acid rock drainage potential and the contained copper content.

The use of copper content for the development of the waste rock classification system is supported by the association of increased abundance of copper sulphide mineralalization with increasing mineralization of the deposit. A review of the geologic database indicates that over 90% of the total contained metals within the geological materials at this site occur within materials with a copper content of greater than 0.1%. It should be noted that the

lack of a materials characterization and handling program had resulted in potential metal leaching material being placed into the waste rock dumps which have a larger surface area.

Material handling plans are then used to instruct the mining operation crews as to where the different rock classes may be placed. Table 4-1 contains the waste rock material classifications and handling plans that are proposed for use during Phase IV with the exception of the Area 1 pit buttress which is required to be constructed at the start of Phase IV.

**TABLE 4-1. WASTE ROCK CLASSIFICATIONS AND HANDLING PLANS**

| Material | Estimated Volume ($Mm^3$) | Handling Plan |
|---|---|---|
| Water rock with no copper content | 8.77 | Material to be used for general construction fill at the site. No neutral metal leaching expected to occur. |
| Waste rock with contained copper content of less than 0.1% | 0.36 | Material to be placed into the waste rock dump or backfilled into the Area 118 pit. Minor neutral metal leaching may result from this material but is not expected to be significant due to the low metals content |
| Waste rock with a contained copper content from 0.1% to 0.64% | 2.55 | Material to be simultaneously disposed with tailings into the Area 1 pit or else stockpiled on the Area 1 pit buttress in the Grade Bin Disposal Area for subsequent sub-aqueous disposal at closure. |
| Waste rock classified as Potentially Acid Generating based on geochemical characterization program | unknown | Material to be simultaneously disposed with tailings into the Area 1 pit or else stockpiled on the Area 1 pit buttress for subsequent sub-aqueous disposal at closure. |

The estimated volume of each material classification is based on the geologic block model for the site. This information shows that the GBDA will receive 2.55 Mm3 of the total estimated 2.91 Mm3 of waste rock with a copper content greater than 0.1%. The implementation of a materials handling program during Phase IV will allow the Company to segregate potential metal leaching material into the GBDA as opposed to the larger southwest waste dump. This will result in a reduced footprint and associated metal loadings during the operations phase.

#### 4.2.1.2 Sub-aqueous Disposal

Sub-aqueous disposal involves the placement of materials underwater in order to their limit exposure to oxygen. This method of source control can be very effective given that the dissolved oxygen content of water is approximately 10,000 times less than for materials that are located above water.

The Company intends to use this method of source control for materials identified in Table 4-1 and also for tailings generated from milling following closure of the Dry Stack Tailings Storage Facility.

Flooding of waste rock in a pit will result in some initial flushing of metals as the materials become wetted but this can be actively treated prior to the water discharging from the pit. Consolidation of the placed tailings will result in pore water once the waste rock has become flooded the movement of water through the flooded materials becomes controlled by diffusive processes which act to limit metal leaching.

Over time, the development of a fine sediment layer on the surface of flooded materials helps to seal off the materials and further limits their ability to contribute to metal loadings.

#### 4.2.1.3 Engineered Cover Systems

Engineered cover systems are designed to reduce water infiltration into materials that are known to have either acid rock drainage or metal leaching potential. Acid rock drainage is not considered to be an issue at the site; however, oxidation of sulphidic mineralization present in non-acid generating waste materials can result in increased metal loadings to the receiving environment due to the presence of copper bearing minerals in the waste.

The need for engineered cover systems at the Minto mine are based on the predictive water quality model developed for the site. The predictive model has been developed using conservative assumptions and as such it is considered to provide an idea of worst-case water quality for the site at closure. The following text describes two different styles of engineered covers that have been successfully applied at minesites and landfills in cold climates.

The infrastructure units that have been considered for source control are identified in Table 4-2 which also contains a summary of the design surface areas for these units at the Minto mine. This table shows that the majority of the surface area of these infrastructure units is associated with benches. The large amount of benches indicates that the application of engineered covers as a means of source control should be effective in reducing metal loadings to the receiving environment. The final surface of the waste rock dump can be controlled to a point through final engineering design during the operations phase to assist in water management. Select portions of the final dump surface may also be recontoured as required in preparation of the cover placement

**TABLE 4-2. MINTO MINE WASTE DUMP AND TAILINGS FACILITY SURFACE AREAS**

| Area | Total Surface Area ($m^2$) | Bench Area ($m^2$) | Dump Face Area ($m^2$) | Percentage Benches |
|---|---|---|---|---|
| Dry Stacked Tailings Storage Facility | 380,000 | 310,000 | 70,000 | 81.6% |
| Southwest Waste Dump | 740,000 | 653,000 | 87,000 | 88.2% |
| Main Waste Dump | 435,000 | 278,100 | 156,900 | 63.9% |
| Mill Valley Fill Expansion | 102,000 | 80,100 | 21,900 | 78.5% |

### Store and Release (Evapotranspiration) Covers

Store and release or evapotranspiration (ET) covers have been successfully installed in the Yukon at the former Brewery Creek mine. The design of this type of cover system is based on water being stored in the soil until it can be transpired by vegetation or evaporated from the surface. There are two primary types of these covers:

- Monolithic – a single vegetated soil layer designed to retain water; and
- Capillary – a fine-grained soil layer overlying a coarse grained layer which acts as a capillary break.

Store and release cover systems have a design thickness determined by the required storage capacity of the soil layer. Higher contents of fine-grained materials within the soil layer increase the water storage capacity of the cover. The reclamation overburden at the Minto mine is primarily silty sand and grain-size information of these materials will be used in the development of the recommended soil cover thickness.

The average and calculated precipitation, lake evaporation and evapotranspiration rates for the Minto mine are shown in Table 4-3 (Clearwater, 2010).

**TABLE 4-3. CLIMATIC INFORMATION FOR COVER SYSTEM EVALUATION AT THE MINTO MINE**

| Parameter | Calculated Average Annual Value | Average 2007 to 2009 |
|---|---|---|
| Precipitation | 341.4 mm | 336.6 mm |
| Lake Evaporation | 430.0 mm | 440.7 mm |
| Evapotranspiration | 215.0 mm | 201.6 mm |
| Site Precipitation - Evapotranspiration | 126.4 mm | 135.0 mm |

Table 4-4 shows the seasonal distribution of precipitation, evapotranspiration and evaporation for the site. This table shows that rainfall accounts for approximately 197.3 mm of the total precipitation occurring at the site.

**TABLE 4-4. SEASONAL DISTRIBUTION FOR RELEVANT CLIMATIC VARIABLES AT THE MINTO MINE**

| Month | Precipitation (mm) | Snowfall (mm) | Rainfall (mm) | Lake Evaporation (mm) | Evapotranspiration (mm) |
|---|---|---|---|---|---|
| April | 16.4 | 13.0 | 3.4 | 12.0 | 6.0 |
| May | 24.2 | 0.0 | 24.2 | 83.0 | 41.5 |
| June | 40.0 | 0.0 | 40.0 | 119.0 | 59.5 |
| July | 57.7 | 0.0 | 57.7 | 112.0 | 56.0 |
| August | 41.7 | 0.0 | 41.7 | 80.0 | 40.0 |
| September | 30.1 | 0.0 | 30.1 | 24.0 | 12.0 |
| October | 29.0 | 29.0 | 0 | 0.0 | 0.0 |
| November | 27.0 | 27.0 | 0 | 0.0 | 0.0 |
| December | 23.6 | 23.6 | 0 | 0.0 | 0.0 |
| January | 21.9 | 21.8 | 0.1 | 0.0 | 0.0 |
| February | 16.4 | 16.4 | 0 | 0.0 | 0.0 |

| TABLE 4-4. SEASONAL DISTRIBUTION FOR RELEVANT CLIMATIC VARIABLES AT THE MINTO MINE | | | | | |
|---|---|---|---|---|---|
| **Month** | **Precipitation (mm)** | **Snowfall (mm)** | **Rainfall (mm)** | **Lake Evaporation (mm)** | **Evapotranspiration (mm)** |
| March | 13.7 | 13.6 | 0.1 | 0.0 | 0.0 |
| Total | 341.7 | 144.4 | 197.3 | 430.0 | 215.0 |

This rainfall value for the site is less than the observed evapotranspiration based on the available record which indicates that water stored within the soil should be able to be successfully transpired by vegetation. The presence of frozen ground conditions which occur in this area from approximately October through May of each year further reduces the amount of rainfall that would infiltrate into the soil cover. Based on this review, the climate data supports the choice of a store and release type of cover system for use as a source control measure at the Minto mine.

For costing purposes it is assumed that a soil cover of approximately 0.5 m will be required for the store and release cover systems. This thickness will be the subject of operational trials under the reclamation research program conducted during Phase IV.

### Low Permeability Covers

Low permeability cover systems make use of a compacted or low permeability layer to minimize infiltration into the underlying media. The former Arctic Gold & Venus minesites are northern examples of these types of cover systems. Water that infiltrates into the cover flows through the soil as shallow groundwater before seeping from the cover system. The use of geosynthetics and other synthetic materials is possible for creating low permeability layers in areas where there is insufficient fine-grained borrow materials. The use of synthetic materials to create a low permeability cover layer at the site is not considered to be feasible for this site due to:

- The large surface area that could potentially require covering under the source control program;
- Logistic concerns associated with placement of these materials onto the surface of the waste rock dumps; and,
- The cost of synthetic liners ranges on the order $9-$10 per square metre of installed liner which is seen as being cost prohibitive.

There is considered an insufficient volume of suitable fine grained materials present at the site to warrant the construction of large areas of low permeability cover systems, however, the surface of the waste dumps are already substantially compacted as a result of trafficking by the heavy mining equipment during dump construction. This operational compaction is considered to be favourable for closure in that it will greatly assist in reducing infiltration into the dumps. At closure, the surface layer of the dumps will not be scarified but instead be retained as a compacted low permeability layer in order to minimize infiltration into the dumps. Additional compaction of dump surfaces would be conducted as required using a

vibratory roller unit based on physical examination of the dump surface for cracks or loose surface material.

### 4.2.2 Passive Treatment Systems

There are a number of areas at the site where passive treatment systems can be installed to provide tertiary treatment of water draining from the minesite. There are a number of means by which passive treatment can be achieved at the site and these are described in greater detail in the sections below.

#### 4.2.2.1 In-pit Treatment

The Area 1 and Area 2 open pits will be flooded at closure and will act as large sedimentation ponds in the post-closure period. The use of the pits for the removal of suspended solids will act to reduce potential total metal loadings to the receiving environment. The open pits will also allow for some natural attenuation and removal of metals from the water column based on the results of investigations on in-pit lakes at other minesites. The potential in-pit treatment of site water has not been included in the current predictive modelling conducted for the closure of the site.

#### 4.2.2.2 Passive Treatment Wetlands

Treatment wetlands are an effective passive water treatment technology that is used in a number of areas to help improve the water quality of impacted systems. Treatment wetlands act as metals sinks through precipitation or complexing of metals under anaerobic conditions. Wetlands are not intended to be a permanent "walk-away" solution to water chemistry issues at a site but can provide effective passive treatment on the timeframe of 100 or more years. The Cone Mine, Kendhill, Mount Washington, Silver Queen and McLean Lake are sites where wetland treatment has been shown to be effective reducing metal lead.

Treatment wetlands require a footprint that is dependent on the volume of flow to be treated. A rule of thumb treatment volume of 3.28 to 6.57 $m^3$/day per square metre of wetland has been found to be acceptable based on a review of documented treatment systems (INAP, 2010). Areas that have been identified as potential locations for construction of passive treatment wetlands include the:

- Area 1 pit discharge area;
- Existing Mill Pond area; and
- Existing Main Water Dam location.

The Area 1 pit will be a shallow lake following backfilling and there is potential to construct a treatment wetland in the discharge channel area. The mill pond area will receive discharge from the Area 1 and Area 2 pits and has sufficient flat ground to allow for construction of a treatment wetland. The existing main water dam is located at the lowest point on Minto Creek and the existing facility could in theory be converted into a treatment wetland,

although, there is insufficient footprint at this location to treat all site flows given the sizing guidance presented above.

The predictive model for the site is based on the construction of passive treatment systems at the sites of the existing Mill Pond and the Main Water Dam. There may be better locations downstream of the minesite for the construction of a passive wetland treatment system; however, these have not been included as potential options since they are located outside of the current SFN Lease Agreement.

#### 4.2.2.3 Permeable Reactive Barriers

Permeable reactive barriers (PRB's) are installed vertically in trenches and may involve cut-off walls for funnelling of groundwater to the permeable barrier. PRB's utilize a variety of different media for the reactive barrier (e.g. limestone, municipal wastes, bauxol, zero valent ion, compost and mollasses) which can influence the construction cost. The design life of the reactive media in a PRB system is typically on the order of 20-30 years depending on the treatment requirements. Refreshing of the reactive media would then be required in order for the system to continue to provide passive treatment in an effective manner.

#### 4.2.2.4 Biologic Reactors

Biologic reactors use the degradation of organic materials for the purposes of treatment and often involve installation of the treatment materials into lined trenches. These systems have been used in mining applications to treat groundwater discharges from underground workings and also for shallow groundwater systems. Treatment media for biologic reactors in the documented studies are often derived from local municipal and industrial waste sources; however, it would be necessary to determine whether these sources exist in the local area or can be sourced and transported to site in a cost effective manner.

Construction of a biologic reactor at the portal would also require that the portal discharge is able to be collected and channelled into the treatment system. This would most probably require installation of impermeable barriers and piping to direct flows to the treatment system. A biologic reactor would not be able to effectively treat any deeper groundwater derived from the portal seepage. The design life of biologic reactors is typically on the order of 20 to 30 years at which time the reactive media needs to be refreshed.

## 4.3 ACTIVE WATER TREATMENT

As per the stated reclamation objectives, the Company is committed to trying to close out the Minto mine in a manner that does not require the long term use of active water treatment to achieve discharge criteria. The application of the source control mitigation measures described in the preceding sections should be successful in reducing metal loadings from the various infrastructure units at the site; however, it is realized that there will be the need to actively treat water during the immediate post-closure period while revegetation of the cover systems and reclaimed areas becomes established. It is currently estimated that a total of 4 years of active treatment will be required following closure of the site.

The Company currently operates a water treatment plant at the site which has been shown to be successful in reducing metal loads to a level where it is possible to directly discharge the treated water into the receiving environment. The existing water treatment plant may be moved from its current location near the Mill Pond to the Water Storage Pond during the post closure period in order to provide the ability to conduct water treatment as close to the final discharge point as possible. Moving the water treatment plant to this location will also eliminate potential post closure period power requirements associated with pumps and minimize the potential for seasonal disruptions to the operation of the treatment plan as a result of cold temperatures.

### 4.3.1 Water Treatment Plant

In July, 2009 MintoEx submitted a Water Management Plan to EMR as required under Amendment 5 to the water use licence (QZ96-006). A water treatment plant design accompanied that application and the plant construction was completed in 2010. No issues related to disposal of the sludge have been identified and any sludge generated from this facility during the closure period will be disposed of into an approved disposal facility.

## 4.4 RECLAMATION TO DATE

There has been little opportunity at the site to conduct final reclamation measures at any of the mine components to date due to the discovery of several new ore deposits that have given way to the Phase IV permit application and uncertainty around the final mine footprint. Progressive reclamation has been conducted to address water management and aesthetic objectives. For example, in 2009 MintoEx conducted reclamation activities on exploration roads and drill pads, particularly in erosion-sensitive areas that can potentially impact surface run-off water quality. Reclamation of disturbed areas along the access road and at Big Creek in the vicinity of the Big Creek Bridge was completed between May 6 and May 10, 2000. This reclamation has been successful when compared against the reclamation objectives, as noted in previous annual reports for the Type B Water Use License, submitted by the Company. Revegetation and fertilizer mixtures for this effort are known and the seeded areas are monitored for revegetation success. This information will be used to assist with planned progressive reclamation measures, reclamation research and measures for final closure.

Overall reclamation is therefore expected to be successful with seeding and natural revegetation complimenting each other.

## 4.5 NATURAL REVEGETATION

The project area was first disturbed by the construction of trails and trenching which was done as part of exploration programs on the property from 1971 to 1976. Natural revegetation has been effective in largely covering these disturbed areas in the 35 years since the area was first disturbed. For example, prior to construction activities in 2006, the airstrip was almost completely re-vegetated and required extensive clearing in preparation of re-commissioning. Other areas that have seen significant natural revegetation on the site

(some of which are now re-disturbed by current construction activities) include areas adjacent to the water dam centerline, old borrow sources and the cleared right-of-way of the main access road.

The primary colonizing plant species now found around the mine site are willows and graminoids. The extent of recolonization at each location is dependent on local conditions, including soil conditions (type and moisture content) and aspect. Generally, revegetation is occurring more extensively next to undisturbed areas and on linear disturbances.

## 4.6 RECLAMATION RESEARCH

An important component of the reclamation planning process is ongoing reclamation research with the objective of developing the methods required to implement a successful reclamation program. Reclamation research will focus primarily on the revegetation aspect of reclamation, as the success of this element of a reclamation plan is closely linked to site specific conditions such as soil characteristics, climatic variables and existing vegetation populations. Other aspects of mine site reclamation including recontouring and erosion stabilization techniques are well established and are less reliant upon site-specific research for success.

Documentation of natural revegetation successes is ongoing during current reclamation research activities as documented in the annual reclamation reports. Information developed on site will be supplemented with information obtained from other mine reclamation programs in the Yukon and other northern jurisdictions. Considerable research has been carried out into the reclamation and revegetation of disturbed lands in the Yukon, including operating and abandoned mines, and mineral exploration sites. Much of this information is in the public domain and is well presented in the guidance document *Mine Reclamation in Northwest Territories and Yukon* (INAC, 1992.)

The true benefits of reclamation research will be realized if the information obtained and knowledge gained is incorporated into larger scale reclamation projects as quickly as possible.

### 4.6.1 Engineered Covers

Investigations into engineered cover systems for application at the Minto mine will be evaluated with field trials conducted under the reclamation research program. The Main Waste Dump is not scheduled to receive any additional materials during Phase IV and it will be possible to progressively reclaim a portion of this facility during the mine operations phase. The proposed reclamation research on engineered covers will involve the assessment of the cover system thickness, the need for organic amendments and whether a monolithic cover system can be used at the site to effectively reduce metal loadings. The results of field trials such as this will be used in developing an appropriate detailed design for cover systems to be installed on other site infrastructure.

### 4.6.2 Growth Media

The natural vegetation found on undisturbed sites around the mine generally indicates the underlying soil properties, including texture, drainage, and pH, and the level of available nutrients that presently occur at the site.

A program of sampling and analysis of soils in the project area was initially conducted in 1994 as described in the original environmental assessment report, which provides the basic information required for reclamation planning. Additional soil sampling on disturbed sites will be completed as part of ongoing reclamation research in order to determine areas of localized nutrient deficiencies.

Plants require, as a minimum, a medium that will allow roots to penetrate, that will retain adequate moisture and that contains levels of nutrients for successful growth. It will therefore be important to determine the characteristics of the overburden from the southern portion of the open pit as this overburden will be the only material readily available to cover the waste rock dumps, the thickened tailings and possibly other areas and thus provide a growth medium.

Diamond drilling done in the 1970's indicated that the orebody is covered by up to 60 m of overburden to the south in an area where permafrost depths are estimated to be approximately 18 m based on borehole logs in the area. The overburden generally consists of silt and fine sand with varying amounts of organic material and occasional layers of peat and gravel. The thickness of overburden required to retain moisture is expected to be 0.25 m. This will be confirmed by trial, as the depth of growth media placed will be varied and soil moisture measurements compared with revegetation success on the various plots will suggest an optimum depth of overburden placement for revegetation measures. Annual summaries of reclamation research and related activities are compiled in the Water Use Licence Annual Report submitted to the Yukon Water Board (YWB) on July 31 of each year beginning in 2007.

### 4.6.3 Revegetation Trials

It is recognized that the key to long term reclamation success is site-specific research on revegetation. In order to establish a successful revegetation program, the Company has initiated a methodical program to assess and provide:

1. A further inventory of available soils around the site (particularly the overburden material) and their physical characteristics;
2. The nutrients in the available soils - while fertilizers will likely be necessary to encourage quick initial establishment of healthy growth, the plant mixtures used must be capable of sustaining long term growth without the aid of artificial fertilizers;
3. Practical seed mixes - while it is known what seed types have been used at the site previously and what types of plants have been naturally re-vegetating the site, further reviews and investigations are necessary to confirm the appropriate seed mixes that should be used. The ultimate seed mixtures will be developed using:

- knowledge of the naturally occurring vegetation and soil conditions;
- an inventory of naturally occurring seed sources on site;
- results from revegetation activities to date;
- existing literature on regional revegetation science; and
- information gained from revegetation test plot trials on site.

4. The effect of slope and aspect on revegetation success, and if necessary the subsequent effect of erosion control measures; and

5. The potential for metals uptake by the plants on the growth media over the tailings - different plant varieties and species, tailings characteristics, cover designs and other environmental conditions are all factors influencing uptake of metals by plant tissues. Sampling of plant tissues from the tailings test plots will be conducted to assist in designing the revegetation program, and existing literature and research regarding plant metal uptake and foraging patterns will be incorporated into the seed mix design.

Different seed mixes are being grown on test plots to develop optimum seed compositions. Consideration is given to ensuring non-invasive species are used. Initial recommended seed mixes have been developed (see Table 4-5 for the seed mixes proposed for specific disturbances.) Results from the test plot trials will also confirm:

- optimum seeding times;
- optimum growth media (overburden) covering depth;
- utility of techniques such as snow seeding;
- fertilizer requirements to amend nutrient content of the overburden; and
- utility of soil amendments such as lime, wood fibre or mulches.

Test plots are typically small and optimum conditions may apply. The information obtained from test plots will therefore be applied in further reclamation trials to areas 1 ha or larger in size which began in September 2009. Overburden will be hauled by truck to the selected sites and will be spread with a dozer or grader. Successes and failures will provide valuable information on alternative approaches to closing reclamation.

The establishment of an initial ground cover of graminoids (all grasses and grass-like plants, including sedges and rushes) has historically been viewed as a desirable objective on most disturbed areas to stabilize slopes and control soil erosion. Reclamation and revegetation efforts on site will ensure that this objective is achieved; however, the establishment of existing or natural vegetative communities and species is also another desirable objective. Based on recent reclamation research, it is noted that there is typically an abundance of natural seed or reproductive seed material available from local surroundings, and that these naturally occurring seed sources should be considered as part of any reclamation programs (Craig, et al., 1998).

Evidence indicates that revegetation by the seeding of sod-forming grass species will inhibit the invasion of the area's natural colonizing species by competing for space, light, nutrients, sunlight and moisture (Craig, et al., 1998). Seeding predominantly with native species

should aid in ensuring that the later successional stages of vegetative cover appear. The creation of shrub willow islands can also enhance natural succession.

The nutrient uptake by northern native seed varieties on nutrient deficient soil is usually more effective than nutrient uptake by southern agronomic species. Seeding with agronomic species at the Minto mine site may be required because of the high cost and limited availability of northern native revegetation species.

In the larger, more open disturbed areas at the mine site (borrow areas, mill and camp site area), where natural seed sources are less available, the seeding/planting of indigenous shrub species (primarily willows, birch and alders) may be required to encourage the later several stages of plant succession on these sites. Shrub species would be planted concurrently with the revegetation plot trial plantings.

The initiation of progressive reclamation measures that see the covering of areas with overburden (toe berm of ice-rich overburden dump, toe of first lift of waste rock dump and toe of starter bench for tailings deposit) will provide areas of different aspect/exposure for the establishment of initial revegetation trial plots. The trial plot locations, design, implementation and monitoring schedule for the revegetation trial program is described in appended reclamation summary reports (Appendix B).

The successes from the trial plot program will be transferred to the progressive reclamation efforts that will provide a large-scale opportunity for refinement of reclamation and revegetation techniques and measures.

**TABLE 4-5 SELECTED SEED MIXTURE FOR INITIAL REVEGETATION TRIALS**

| Native Species | Mix #1 Willow / Sedge kg/ha | Mix #2 Black Spruce kg/ha | Mix #3 Mixed Deciduous / Coniferous kg/ha | Mix #4 Sand / Gravel Cut Slopes Sand / Gravel Cut Slopes |
|---|---|---|---|---|
| Yukon wheatgrass | | | 2 | 4 |
| Violet wheatgrass | | | 6 | 6 |
| Northern fescue | | | 2 | |
| Arctic lupine | | | 2 | |
| Yellow locoweed | | | | 1 |
| Glaucous bluegrass | | | 2 | 3 |
| Meadow foxtail | 3 | 5 | | |
| Tufted hairgrass | 4 | 4 | | |
| Polargrass | | 1 | | |
| Bluejoint reedgrass | 1 | 1 | | |
| Altai fescue | | 6 | | |
| Fowl bluegrass | 8 | | | |
| Sheep fescue | | | 2 | 5 |
| Sweetgrass | | | 1 | |
| **Total (kg/ha)** | **16** | **17** | **17** | **19** |

Native species may be substituted with agronomic species; however, native species are recommended and require approximately one half the weight in seed as the agronomic species (adapted from Kennedy 1993.)

The program was initiated in the spring of 2007, with the establishment and planting of test plots at the ice-rich overburden dump, waste rock dump and borrow area locations. Planting of the test plot on the tailings facility starter bench was conducted in the fall of 2007 and the tailings surface plot will be established in the fall of 2009 when an area of tails at final grade is available.

Monitoring of the plots takes place annually in summer or fall by a vegetation specialist. The following parameters will be monitored at each plot during the annual inspections:

- established photo hubs are documented photographically and growth success and species present will be documented;
- vegetation samples are collected from the plots for ICP metals scan to assess metals uptake; and
- soil samples are collected from plots and analyzed for ICP metals, available nutrients and general parameters such as soil pH and alkalinity.

In addition, natural revegetation success at other locations on the site are tracked and incorporated into the final reclamation revegetation plan.

## 5.0 IMPLEMENTATION SCHEDULE

The Phase IV expansion is expected to result in approximately 6 years of additional mine life with active mining in the open pits ending in the third quarter of 2013 and underground mining scheduled to finish in January 2014. Following the end of the underground production, mining will be from ore stockpiles that will continue into 2016. Reclamation of the disturbed areas will be done in a phased approach to match the overall mining schedule and after closure to reflect the reclamation and monitoring effort required. This phased approach to reclamation planning will assist the company in achieving the overall objectives of progressive and final reclamation at the site. Figure 5-1 depicts a timeline of the proposed closure schedule overlain onto the overall Phase IV schedule.

Some of the key reclamation events are highlighted in the following timeline:

### 2011

- Mining of the Area 1 Pit is completed at the end of February and tailings begin to be placed in pit;
- Simultaneous disposal of higher copper content (Grade Bin 0.2 to 0.64) waste material into Area 1 Pit with tailings; and
- Dry Stack Tailings Storage Facility will no longer be required for tailings and this facility will be reclaimed. Monitoring of the reclaimed DSTSF will commence to verify effectiveness of closure on reductions in source loadings.

### 2012 and 2013

- Simultaneous disposal of higher copper content (Grade Bin 0.2 to 0.64) waste material into Area 1 Pit with tailings.

### 2014

- Commence reclamation of the main waste dump, southwest main dump and the ice rich overburden dump; and
- Commencement of Relocation of Grade Bin Disposal Area materials into Area 1 Pit.

### 2015

- Continued reclamation of the main waste dump, southwest main dump and the ice rich overburden dump; and
- Continued relocation of Grade Bin Disposal Area materials into Area 1 Pit.

### 2016

- Processing of stockpiles is completed and reclamation of ore stockpile footprints begins;
- End of Phase IV milling;
- Continued reclamation of the Area 118 Pit, main waste dump, and southwest waste dump; and
- Flooding of the Area 1 and 2 Pits.

### 2017

- Decommissioning of mill and other site infrastructure not required for closure;
- Construction of passive treatment wetland in the area of the mill pond;
- Ongoing site reclamation activities where still required; and
- Beginning of closure phase active water treatment.

### 2018

- Reclamation of the Mill Valley Fill;
- Continued closure phase active water treatment.
- Final site discharge channel construction;
- Completion of site reclamation activities; and
- Beginning of post-closure period monitoring program

**2019**

- Continued closure phase active water treatment.

**2020**

- Scheduled end of closure period active water treatment

**2030**

- Scheduled end of post closure period monitoring program

Active water treatment at the site is expected to be required for a period of three months per year for a total of four years post closure. During the period of active treatment, metal levels will be treated in the plant and settling time will allow TSS levels to decrease further following treatment and prior to discharge. Monitoring would identify potential issues for the following year and a decision would be made at that time as to whether continued treatment is required.

The water treatment plant will remain at the site until it can be shown that no additional active water treatment is required and that the cover and passive treatment systems are operating effectively. The Company believes that its plan of source reduction and passive treatment will be effective in achieving effluent discharge criteria for the project; however, active treatment of water remains as a final fall-back solution should it be deemed necessary.

## 6.0 CLOSURE MEASURES FOR SITE RECLAMATION UNITS

This section contains the proposed reclamation methodologies that will be applied to the different reclamation units present at the site. Each sub-section contains a description of the area in addition to discussion of the closure issues that help to govern the closure methodologies chosen for that unit. References to previous reports or supporting documentation are also contained in each sub-section.

Figure 2-3 provides a general arrangement plan for current site conditions to the end of July 2010 while Figure 2-10 presents the overall site plan at the end of the Phase IV expansion project. Figure 6-1 provides a general summary of the various closure measures proposed for the reclamation units that will be present at the end of mining under the Phase IV application. This figure also identifies the currently proposed timeline for conducting the reclamation works at the site. Figure 6-2 shows the final site water management plan for the site based on the currently proposed closure plan.

The disturbed area has been divided into reclamation units as follows:

- Waste Rock And Overburden Dumps;
- Ore stockpiles;
- Open Pits;
- Underground Workings;
- Dry Stack Tailings Storage Facility and Diversion Structures;
- Haul Roads;

- Main Water Dam;
- Mill and Ancillary Facilities;
- Mill Pond;
- Access Road; and
- Miscellaneous Components.

Table 6-1 contains a summary of the expected site disturbance associated with each reclamation unit at the end of Phase IV mine life. This table lists the reclamation components and sub-components, the total area expected to be disturbed by each unit during the construction and operations phases and the final surface area of the reclamation unit that will require reclamation. The areas to be reclaimed contained in the table are based on three dimensional models of the facilities and as such reflect the actual areas as opposed to the disturbed footprint which does not account for slope.

The access road has been treated in the same fashion as the 2009 Closure Plan since the final reclamation of that unit is subject to ongoing discussion between the Company and SFN. Three different closure scenarios regarding the access road are considered, and each affects the component and total reclamation areas differently, depending upon the final closure option selected. Section 6.10 discusses these scenarios and associated reclamation measures further.

It is estimated that a total of 316.0 hectares will be disturbed by the end of Phase IV mine development. The scheduling of the reclamation activities during Phase IV allows for a significant amount of the site to be progressively reclaimed during the mine operations phase. Figure 6-1 provides a summary of planned closure activities for various mine components along with the proposed timeline for reclamation of the units.

**TABLE 6-1 ESTIMATED AREA OF DISTURBANCE REQUIRING RECLAMATION**

| Reclamation Component | Total Surface Area Requiring Reclamation (ha) | Area Reclaimed Progressively (ha) | Area Requiring Reclamation at Final Closure (ha) |
|---|---|---|---|
| Main Waste Dump | 43.5 | 0 | 43.5 |
| South West Dump | 74.0 | 0 | 74 |
| Ice-Rich Overburden Dump | 34.5 | 1.2 | 33.3 |
| Reclamation Overburden Dump | 30.0 | 0 | 30 |
| Ore Stockpile Areas | 15.7 | 0 | 15.7 |
| **Overburden and Waste Rock Dumps** | 197.7 | 0 | 196.5 |
| **Open Pit** | 5 | 5 | **0** |
| **Haul Roads** | 13.0 | 0 | **13.0** |
| **Portal Area** | 2.0 | 0 | 2 |
| **Tailings Area** | 41.3 | 10.3 | **31** |
| **Main Water Dam** (including 4.7 ha impacted by impounded water) | 6.0 | 0 | **6.0** |
| **Mill and Ancillary Facilities** | 7.6 | 0 | **7.6** |

| TABLE 6-1 ESTIMATED AREA OF DISTURBANCE REQUIRING RECLAMATION | | | |
|---|---|---|---|
| **Reclamation Component** | **Total Surface Area Requiring Reclamation (ha)** | **Area Reclaimed Progressively (ha)** | **Area Requiring Reclamation at Final Closure (ha)** |
| **Access Road** (extent of access road reclamation to be determined with SFN) | 26.2 | 0 | **Scenario 1** (No Deactivation) |
| | | | **Scenario 2** (Deactivation From Mine Site to Minto Creek Crossing) |
| | | | **Scenario 3** (Complete Access Road Deactivation) |
| **Miscellaneous Components** | **8.3** | **0.6** | **7.7** |
| Mine Camp | 2.2 | 0.6 | 1.6 |
| Air Strip | n/a | n/a | n/a |
| Mine Contractor Laydown | 2.5 | 0 | 2.5 |
| Exploration Sites and Trails | n/a | n/a | n/a |
| Land Treatment & Solid Waste Facilities | 1.0 | 0 | 1.0 |
| Explosives Plant Site | 2.6 | 0 | 2.6 |
| **Total** | **316.0** | **17.5** | **Scenario 1** |
| | | | **Scenario 2** |
| | | | **Scenario 3** |

Table 6-2 contains a summary of the different reclamation components, the identified environmental concern and the mitigation measures that will be applied to the component in order to meet the end land use objectives of the site.

| TABLE 6-2: SUMMARY OF MAIN RECLAMATION COMPONENT MITIGATION MEASURES TO ACHIEVE RECLAMATION OBJECTIVES | | | |
|---|---|---|---|
| **Component** | **Environmental Concern** | **Mitigation Measures** | **Rationale** |
| Main Waste Dump | Metal leaching and nutrient loadings | Compaction to minimize infiltration<br>Engineered soil cover system for source control | Surface compaction and cover system installation to reduce infiltration and subsequent metal loadings in order to achieve receiving environment water quality objectives. |
| Southwest Waste Dump | Metal leaching and nutrient loadings | Compaction to minimize infiltration<br>Engineered soil cover system for source control | Surface compaction and cover system installation to reduce infiltration and subsequent metal loadings in order to achieve receiving environment water quality objectives. |
| Grade Bin Disposal Area | Metal leaching from higher copper content waste rock | Consolidation of high copper content materials into single dump.<br>Sub-aqueous disposal to minimize exposure and reduce metal flux from oxidation of sulphidic mineralization. | Long term metal loadings from these materials associated with oxidation of copper sulphide mineralization. Sub-aqueous disposal will reduce exposure of sulphidic mineralization and prevent increased loadings over the long term. |

**TABLE 6-2: SUMMARY OF MAIN RECLAMATION COMPONENT MITIGATION MEASURES TO ACHIEVE RECLAMATION OBJECTIVES**

| Component | Environmental Concern | Mitigation Measures | Rationale |
|---|---|---|---|
| Ore Stockpiles | Metal leaching | Ore stockpiles to be milled as part of Phase IV milling plan. | Milling of low grade stockpiles eliminates the need for cover systems at these locations. |
| Dry Stacked Tailings Storage Facility | Metal leaching and nutrient loadings | Engineered soil cover system for source control. | Cover system installation to reduce infiltration and subsequent metal loadings in order to achieve receiving environment water quality objectives. |
| Mill Valley Fill | Metal leaching and nutrient loadings | Installation of a soil cover to reduce metal loadings. | Cover system installation to reduce infiltration and subsequent metal loadings in order to achieve receiving environment water quality objectives. |
| Area 1 Pit | Metal leaching | Backfilling with tailings and waste rock. Flooding to reduce metal fluxes. | Minimize exposure to oxygen of sulphidic mineralization exposed in pit from mining. |
| Area 2 Pit | Metal leaching | Backfilling with tailings and flooding to reduce metal fluxes | Minimize exposure to oxygen of sulphidic mineralization exposed in pit from mining. |
| Area 118 Pit | Metal leaching | Backfilling with waste rock and installation of a vegetated soil cover | Minimize exposure to oxygen of sulphidic mineralization exposed from mining. |
| Site Drainage | Metal, TSS and nutrient loadings | Active water treatment for period of 4 years following closure<br>Passive wetland or biologic treatment system construction at location of Mill Pond and Main Water Pond | Active water treatment will be required during initial closure period while cover and passive treatment systems are constructed and commissioned. Passive treatment systems provide additional improvements in water quality while also increasing post closure biodiversity. |
| Contingency in the event that proposed mitigation measures are not effective | | | |
| Site Drainage | Metal, TSS and nutrient loadings | Active water treatment using existing treatment system | Active water treatment system has been shown to be effective at achieving receiving environment water quality objectives. System will remain in place as ultimate site contingency. |

## 6.1 WASTE ROCK AND OVERBURDEN DUMPS

This section addresses the reclamation of the waste rock and overburden dumps at the site which include the following reclamation units:

- main waste dump;
- southwest waste dump;

- ice-rich overburden dump;
- reclamation overburden dump; and
- Bin 0.1 to 0.64 waste stockpile.

The main waste dump and southwest waste dumps are existing mine infrastructure that contain unclassified waste rock generated during earlier mine development. This material was not segregated by copper content and as a result contains some higher copper content materials with metal leaching concerns. Engineered cover systems to reduce metal loadings from these infrastructure units is proposed based on this factor.

### 6.1.1 Main Waste Dump

The main waste dump (MWD) is located immediately northwest of the open pit, and has been constructed in sequential lifts as materials are extracted from the Area 1 pit. Figure 6-3 and Figure 6-4 show plan and profiles for the MWD. The MWD has been constructed according to EBA's Geotechnical Evaluation – Proposed Main Waste Dump, Minto Project, Yukon (EBA, 1998) which addresses physical stability design considerations such as maximum credible earthquake criteria so the likelihood of major failure of the facility is deemed to be low. Annual inspections of the MWD have taken place as per Section 9.3.2 of the Quartz Mining Licence QML-0001 and no physical stability issues have been identified to date. The MWD is not expected to receive any additional waste material as a result of Phase IV.

Waste materials placed into the MWD contain varying copper concentrations (0–0.64%) as the majority of this facility was constructed prior to the development of specific material handling plans based on the copper content. Geochemical characterization of the materials as part of permit requirements has shown that the materials do not present an acid rock drainage concern. The average NP/AP ratio of materials placed into the MWD is 48.5 with an average paste pH of 8.61 (MintoEx, 2009). Neutral metal leaching has been identified as being a potential chemical concern associated with closure of this reclamation unit based on the ongoing geochemical characterization program (SRK, 2010a) for the mine.

The proposed reclamation of the MWD will involve addressing physical stability concerns with geochemical concerns being addressed as part of the site-wide source control program described in Section 4 of this report. The slope of each lift will be reclaimed as per Figure 6-5, which shows typical reclamation measures of a dump slope. Slope crests will be rolled over using a tracked dozer with recontouring conducted in areas where the dump faces are greater than the long term angle of repose.

Geochemical characterization of the waste materials intended to be disposed of in the MWD has shown that the materials do not present an acid rock drainage concern. Neutral pH metal leaching has been identified as being a potential geochemical concern associated with closure of the dump based on the ongoing geochemical characterization program (SRK, 2010) for the mine. Initial estimates from the predictive water quality model suggest that up to 14% of the post closure metal loadings will be associated with the MWD (Appendix B).

Bench surfaces of the MWD will be covered with either a soil cover or an engineered cover with the choice of the final cover being based on the need for source reduction for metal leaching into the environment. Prior closure plans for this unit had proposed a soil cover thicknesses of 0.25 m for placement onto the MWD. The 0.25 m thickness is being re-evaluated based on the results of the predictive closure water quality model and the identified need for implementing source control. The current thickness of the engineered soil cover has been estimated at 0.5 m and will be refined based on reclamation research and operational field trials into the closure cover system.

The surface of the MWD shall not be scarified prior placement of the cover as infiltration into the dump materials is not considered desirable based on the potential for neutral metal leaching of the waste materials. Reclamation overburden will be loaded with an excavator and hauled by trucks from the reclamation overburden dump. Overburden will be placed with the trucks and further spread with a low ground pressure dozer. Compaction of the overburden during spreading will be minimized by the use of low ground pressure equipment, however, areas observed to have compaction will be ripped to reduce compaction effects prior to seed and fertilizer application.

Should portions of the MWD be deemed to not require source control, then these areas will have a growth media layer of approximately 0.25 m thickness applied to cover the waste rock followed by application of an approved reclamation seed mixture and fertilizer. The faces of the MWD will not be subject to source control and will have a soil cover placed at closure to allow for revegetation. The target thickness of the soil cover on the faces of dumps is 0.25 m, however some slope areas may receive less than 0.25 m due to the operational logistics of spreading soil covers on slopes. The current reclamation seed mixture and fertilizer application rates contained in the 2009 Closure Plan for the Minto mine will be followed unless ongoing reclamation research programs show that changes to these are warranted.

A trial reclamation plot was established on a slope of the main waste dump. Direct application of seed onto a trial plot on the first lift of the MWD already graded to final slope was attempted in fall 2008. The amount of fine material and nutrient levels allowed the establishment of a vegetative cover (80%) suggesting that direct seeding onto parts of the final dump will meet the final revegetation objectives for the facility.

### 6.1.2 Southwest Waste Dump

The southwest waste dump (SWD) is located to the south of the MWD and was designed by EBA in 2008 in order to optimize operations and provide additional storage areas for waste rock and non ice-rich overburden material. Construction began shortly after the design approval in October 2008 and is currently being developed as per the EBA report entitled Geotechnical Design, Proposed Southwest Waste Dump (EBA, 2008). The Phase IV expansion of the SWD will be constructed in accordance with the Phase IV Waste Management Plan (EBA, 2010a) which outlines the design criteria for this unit. The dump has been constructed in progressive lifts with ongoing monitoring of the stability of the SWD will be conducted as recommended in the design report through a combination of

visual inspections, deformation surveys and monitoring instrumentation (piezometers, ground temperature cables and survey hubs).

The majority of waste rock scheduled for surface disposal as a result of Phase IV will be placed into the SWD with the exception of higher copper content waste materials which will be stockpiled on the Area 1 pit buttress or placed in the Area 1 open pit. Figure 6-6 and Figure 6-7 show plan and profiles for the proposed SWD following the end of Phase IV. These sections show that some of the original portions of the SWD constructed as part of the currently approved mine workings are covered over as a result of the expansion of this unit. The covering of the older portions of the SWD which are known to potentially contain higher copper content waste rock materials will help to reduce potential metal loadings from these materials.

The SWD is estimated to receive approximately 6.44 Mm3 of waste materials with copper content less than 0.1% from the Phase IV development. Waste materials placed into the portions of the SWD constructed prior to Phase IV contain varying concentrations of copper as this portion of the facility was constructed prior to the development of specific material handling plans based on the copper content of the waste. The portions of the SWD constructed as part of Phase IV will only contain waste rock with less than 0.1% copper content. Segregation and special handling of waste materials with greater than 0.1% copper content will help to reduce and potential geochemical concerns associated with neutral metal leaching.

Geochemical characterization of the waste materials intended to be disposed of into the SWD has shown that the materials do not present an acid rock drainage concern. Neutral pH metal leaching has been identified as being a potential geochemical concern associated with closure of the dump based on the ongoing geochemical characterization program (SRK, 2010a) for the mine, however, exclusion of the higher copper content waste materials will help to reduce the geochemical concerns. Initial estimates from the predictive water quality model suggest that up to 52% of the post closure metal loadings will be associated with the SWD (Appendix B).

Bench surfaces of the SWD will be covered with either a soil cover or an engineered cover with the choice of the final cover being based on the need for source reduction for metal leaching into the environment. Prior closure plans for this unit had proposed a soil cover thicknesses of 0.25 m for placement onto the SWD. The 0.25 m thickness is being re-evaluated based on the results of the predictive closure water quality model and the identified need for implementing source control. The current thickness of the engineered soil cover has been estimated at 0.5 m and will be refined based on reclamation research and operational field trials into the closure cover system.

The surface of the SWD shall not be scarified prior placement of the cover as infiltration into the dump materials is not considered desirable based on the potential for neutral metal leaching of the waste materials. Reclamation overburden will be loaded with an excavator and hauled by trucks from the reclamation overburden dump. Overburden will be placed with the trucks and further spread with a low ground pressure dozer. Compaction of the

overburden during spreading will be minimized by the use of low ground pressure equipment, however, areas observed to have compaction will be ripped to reduce compaction effects prior to seed and fertilizer application.

Should portions of the SWD deemed to not require source control, then a growth media layer of approximately 0.25 m thickness will be applied to those areas to cover the waste rock followed by application seed and fertilizer. The faces of the SWD will not be subject to source control and will have a soil cover placed at closure to allow for revegetation. The target thickness of the soil cover on the faces of dumps is 0.25 m, however some areas may receive than 0.25 m due to the operational logistics of spreading soil covers on slopes. The current reclamation seed mixture and fertilizer application rates contained in the 2009 Closure Plan for the Minto mine will be followed unless ongoing reclamation research programs show that changes to these are warranted.

### 6.1.3 Ice-Rich Overburden Dump

The ice-rich overburden dump (IROD) is the furthest west reclamation unit on the site and has been constructed immediately upgradient of the SWD. A toe berm has been constructed from waste rock to retain the ice-rich overburden and prevent migration of the material downslope as ice in the stockpiled materials melt. The IROD has been constructed according to EBA's Geotechnical Design, Ice-Rich Overburden Dump, Minto Mine, Minto YT (EBA, 2006) and has been inspected since as per the Quartz Mining Licence (QML-0001, Section 9.3.2) with no stability issues identified to date. Physical stability of the IROD is the primary closure concern given the ice-rich nature of the materials placed into this unit.

Materials from the IROD will be used as a source for growth media during reclamation of the SWD. Reclamation of the IROD will involve the placement of a 0.25 m layer of overburden on the toe berm as this unit is not deemed to require source control. This material will cover the uppermost 75% of the slope, leaving the furthest downslope area of the toe berm (where it contacts the original ground surface) uncovered to allow moisture seepage as per the construction design. This will avoid raising the phreatic surface inside the IROD.

Any overburden remaining in the dump after closure and reclamation has been completed will be resloped and revegetated. Revegetation test plots were established on the toe berm in 2007, and the final revegetation seed mixtures and fertilization requirements for the IROD will depend on trial and natural revegetation success in this area.

### 6.1.4 Reclamation Overburden Dump

The reclamation overburden dump (ROD) is located to the west of the MWD and north of the SWD. The ROD will be expanded as a result of Phase IV in order to stockpile reclamation materials stripped during construction and development of site infrastructure (eg. Area 2 and 118 open pits, Mill Valley Fill). The existing portions of the ROD have been constructed in accordance with EBA's Geotechnical Design, Proposed Reclamation

Overburden Dump, Minto Mine, Yukon (EBA, 2008). The proposed expansion of the ROD will be constructed in accordance with the EBA's Phase IV Waste Management Plan (EBA, 2010a) which outlines the design criteria for this unit. It is estimated that a total of 2.78 $Mm^3$ of overburden will be placed into the ROD as part of the Phase IV development activities.

The overburden materials stockpiled in the ROD will be used as a source for growth media during reclamation of other units at the site. Any overburden remaining in the ROD after closure and reclamation has been completed will be resloped and revegetated.

### 6.1.5 Grade Bin 0.1 to 0.64 Disposal Area

Materials characterization is used at the site in order to identify high copper content waste rock materials with all materials with less than 0.64% copper being considered as waste. The Grade Bin 0.1-0.64 Disposal Area (GBDA) will contain waste rock with a copper content of from 0.1% to 0.64% and is located on the Area 1 Buttress to the south of the Area 1 pit. Figure 6-8 and Figure 6-9 show a plan and profile of the GBDA with Figure 6-9 containing addition detail on the Area 1 buttress. Table 6-3 shows a summary of the expected volumes of waste rock in Grade Bin 0.1-0.64 based on copper content as well as the proposed disposal areas for these materials.

**TABLE 6-3: GRADE BIN 0.10 – 0.64 WASTE DISPOSAL LOCATIONS**

| Grade Bin (% Copper) | Disposal Area | Total Expected Volume (M $m^3$) |
|---|---|---|
| 0.10 – 0.20 | GBDA | 0.44 |
| 0.20 – 0.64 | GBDA | 0.49 |
| 0.20 – 0.64 | Area 1 Open Pit | 1.38 |
| **Total** | | **2.55** |

This waste material contains the majority of the copper present within the waste and has been identified as having the potential for neutral metal leaching of copper and other metals. Geochemical characterization of this waste material also indicates that there is some sulphidic mineralization present within the waste and that sub-aqueous disposal of this material would be favourable in order to control its metal leaching potential.

The Phase IV Waste Management Plan (EBA, 2010a) indicates that approximately 1.38 $Mm^3$ of the Bin 0.1 - 0.64 waste rock will be simultaneously disposed with tailings in the Area 1 Pit. The materials that are simultaneously disposed in the Area 1 pit will be the primarily high copper content waste from Grade Bin 0.2-0.64. Simultaneously disposal of these materials will result in a significant volume of this higher copper content waste being encapsulated within the tailings at this location.

At closure the remainder of the materials in the GBDA will be transported into the Area 1 pit for flooding. Some of the relocation of the materials may involve pushing the materials into the pit, however, there will be a need to transport some of the materials to the pit to ensure they are able to be submerged when the pit floods. The rehandling of the remaining GBDA materials into the Area 1 pit may be conducted during winter months when there is

less concern with the trafficking the surface of the deposited tailings due to frozen ground conditions.

The footprint of the GBDA will have a soil cover or placed onto it at closure. The current thickness of an engineered cover at this location has been estimated at 0.25 m.

## 6.2 ORE STOCKPILES AND PADS

The Phase IV mining plan includes the milling of all stockpiled ore prior to final closure. The following stockpiles at the site will be treated in this fashion and therefore are not deemed to be an issue at closure:

- high grade sulphide ore stockpile and pad (located south of the mill); and
- low grade sulphide ore stockpile and oxide ore pad (located between the pit and the MWD).

The low grade sulphide stockpile pad has been constructed from waste rock according to design criteria set out in EBA's Waste Rock Stability Evaluation, Minto Project, Yukon (EBA, 1996). The waste dumps on site are designed in accordance with the recommendations in "Mined Rock and Overburden Piles Investigation and Design Manual" published by the BC Mine Waste Rock Pile Research Committee. In accordance with the above mentioned manual, all waste dumps on site are designed to be stable up to a seismic event which results in peak ground accelerations which have a 10% probability of exceedance in 50 years. The high grade ore stockpile pad has also been constructed on waste rock. The ore stockpiles have been inspected annually as per the Quartz Mining Licence (QML-0001) and there are no issues identified to date that suggest long term stability concerns for these units.

Reclamation of the stockpile pads will be conducted following the completion of milling of stockpiled ore materials. Compacted portions of the pads will not be scarified to promote drainage as the geochemical characterization program indicates that there is potential for neutral metal leaching from these materials. The pads will have a 0.25 m soil layer of growth material applied followed by application of seed and fertilizer.

## 6.3 OPEN PITS

Phase IV will involve the development of the Area 2 and Area 118 open pits. The Area 1 open pit, formerly referred to as the Main Pit, will be mined out during 2011 and has been included in this plan based on the planned deposition of tailings and waste rock into this unit. Figure 6-10 and Figure 6-11 show a plan view and section through the Area 1 Pit and Area 2 Pit along with information on waste rock and tailings deposition into these pits.

### 6.3.1 Area 1 Pit

The Area 1 pit encompasses the original drainage channel for Minto Creek. The Area 1 pit is being excavated according to the Company's Open Pit Design Plans (MintoEx, 2006). The north wall of the pit is benched in competent bedrock while the south wall is

composed of bedrock and ice-rich overburden. Instability in the ice-rich overburden of the south wall is currently being monitored. Despite partial covering of the south wall with a thermal insulating medium during operations, slumping of the south wall was observed during summer 2009. Stability monitoring of the pit is part of ongoing mine operations and is not deemed to be relevant to the post closure phase of the project. Acid-base accounting indicates that the open pit wall rocks are net neutral to slightly acid consuming (non-acid generating). Results to date (SRK, 2010a) indicate that the open pit wall geochemistry is consistent with the initial geochemical predictions put forward in the original geochemical characterization report (Mills, 1997).

The open pit is scheduled to be exhausted of ore during late 2010 and the current Phase IV schedule calls for placement of tailings into the Area 1 pit starting in April 2011. A buttress will be constructed to ensure the stability of the southern wall of the pit. The Area 1 pit buttress was designed by SRK Consulting Inc. (SRK, 2009a) and will be constructed from 1.3 $Mm^3$ of waste rock with copper contents below the 0.64% cut-off grade. Segregation of geological materials to be used in the construction of the buttress is not possible given the need to construct this unit prior to placement of tailings into the Area 1 pit. Figures 6-9 and Figure 6-12 show a profile and plan of the buttress.

Waste rock materials with copper content from 0.2% to 0.64% will be deposited into the Area 1 Pit simultaneously with the thickened tailings. During the operations period the storage capacity of the flooded pit will be sufficient to accommodate the design storm volume of 700,000 $m^3$ which is required by current site permitting. Following the end of the simultaneous waste rock and tailings deposition, the Area 1 pit will be backfilled to less than 8 metres below the final spillway invert elevation.

The completion of tailings deposition into the Area 1 pit occurs while the mine is still in operations and construction of a final discharge channel from the pit to Minto Creek will not be possible until the end of milling activities currently scheduled for early 2016. Excess water accumulated in the Area 1 pit prior to the construction of the discharge channel will be either:

- Subject to treatment in the water treatment with discharged to the receiving environment; or
- Pumped into the Area 2 pit to accelerate flooding of that unit.

Waste materials from the GBDA will be disposed of in the Area 1 pit following the end of milling activities at the site when it has been determined that the design storm storage capacity is no longer required. The pit will then be allowed to flood in order to cover the deposited tailings and waste rock. Water quality in the Area 1 pit will be monitored during flooding and the water treatment plant will be in place so that water can treated prior to release off-site.

At closure, approximately 55% (10.6 ha) of the open pit walls will remain exposed above water following flooding of the Area 1 pit. Prior to flooding, any accessible benches in the pit excavated in overburden will be scarified to encourage natural revegetation, but no

additional reclamation work will be done on the open pit high walls. Boulders, up to 1 m in size, will be placed on all potential access routes to prevent uncontrolled human access to the pit.

Due to local topography the Area 1 pit will daylight on the east side and the pit discharge channel will be constructed in this area. There is not deemed to be a concern with wildlife becoming trapped in the pit as they will be able to exit via the discharge channel. The sides of the discharge channel will be constructed to ensure that wildlife are able to avoid becoming trapped. The discharge channel from the Area 1 pit will be routed to the east through the mill pad and across the MVF. The Area 1 discharge channel will be designed to accommodate the Probable Maximum Flood (PMF) event for the entire catchment area upstream of the Area 1 pit.

### 6.3.2 Area 2 Pit

The Area 2 Pit is located to the west of the Dry Stack Tailings Storage Facility and does not intersect any existing surface drainage channels. The Area 2 open pit will be constructed using standard drill and blast mining techniques with the proposed excavation occurring in competent bedrock. Some of the upper benches will be excavated into overburden and there is the potential for shallow surficial instability to occur in the overburden unit. Any areas of instability noted during operations will be addressed during subsequent updates of this document. Acid-base accounting indicates that the open pit wall rocks are net neutral to slightly acid consuming (non-acid generating).

The Area 2 pit will be used to store tailings once the Area 1 pit has been filled to its design capacity and the final elevation of the tailings will be approximately 765 m (Figure 6-11). Following the cessation of operations, the Area 2 pit will be flooded until it overflows. The Area 2 pit lake will have an approximate depth of 35 m following flooding.

Due to the limited topography in Area 2 pit it is estimated that approximately 20% of the open pit walls will be exposed following flooding of this unit. The proposed Area 2 pit will spill to the north at an elevation of approximately 801 m. The conceptual spillway invert elevation is estimated to be at approximately 800 m but the final invert elevation will be determined following development of that portion of the pit. Prior to flooding, any accessible benches in the pit excavated in overburden will be scarified to encourage natural revegetation, but no additional reclamation work will be done on the open pit high walls. Boulders, up to 1 m in size, will be placed on all potential access routes to prevent uncontrolled human access to the pit. The Area 2 discharge channel will be designed to accommodate the PMF event for the entire upstream catchment area.

The existing Southwest Diversion Ditch will be diverted into the Area 2 Pit at closure rather than attempt to maintain the diversion structure required during operations to route flows around the pit. The Company will evaluate whether pumping water into the Area 2 pit is required in order to accelerate the flooding process at closure. Pumping into the Area 2 pit is currently considered as a favourable measure to submerge non-acid generating sulphidic materials that are exposed as a result of the mining operations in this area. Accelerated

flooding of the pit will act to reduce the oxidation of any exposed materials in the pit walls resulting in lower overall metal loadings due to less soluble secondary weathering products being produced from sulphide oxidation.

Due to local topography the Area 2 pit will daylight on the north side where the discharge channel is to be constructed. There is not deemed to be a concern with wildlife becoming trapped in the pit as they will be able to exit via the discharge channel. The sides of the discharge channel will be constructed to ensure that wildlife are able to avoid becoming trapped.

### 6.3.3 Area 118 Pit

The Area 118 pit is located upslope to the west of the Area 2 pit and will be mined during 2012. The Area 118 open pit will be constructed using standard drill and blast mining techniques with the proposed excavation occurring in competent bedrock. The upper benches will be excavated into overburden and there is the potential for shallow surficial instability to occur in the overburden unit. Any areas of instability noted during operations will be addressed during subsequent updates of this document. Acid-base accounting indicates that the open pit wall rocks are net neutral to slightly acid consuming (non-acid generating).

The Area 118 pit is intended to be backfilled with approximately 0.3 $Mm^3$ of waste rock sourced from the Area 2 Pit and underground workings during the operations phase of the project. The waste rock for backfilling of this unit will have a copper content from 0.0 – 0.64%. Due to topography only a small portion of the overall pit walls will be exposed at closure following backfilling of this unit. The waste rock will be covered with overburden which will be used as the reclamation growth media to revegetate the pit. A thickness of 0.25 m has chosen for the revegetated overburden cover on the waste rock as this area is not deemed to require source control.

A discharge channel will be constructed from the low point of the Area 118 pit to direct flows into the Area 2 pit during the post closure period in the event that there is discharge from the pit during the post closure period. The need for this channel will be reviewed based on hydrogeologic information collected during the mine operations phase and this component will be addressed in subsequent revisions to this plan.

## 6.4 UNDERGROUND WORKINGS

The proposed Phase IV mining plan includes underground mining below the Area 2 and Area 118 open pits as shown on Figure 6-13 and Figure 6-14. The development of the portal (Figure 6-15) will involve some surface excavation in order to expose bedrock for drilling and blasting. The underground mining will involve development of a production ramp on a decline to access the ore resources beneath the Area 2 and Area 118 open pits. The underground mining is expected to result in 1,541 kt of ore and 341 kt of waste being excavated.

All of the waste materials are to be backfilled in the underground workings with the exception of a minor portion of waste materials that will be temporarily stockpiled on surface during development of the production ramp and subsequently deposited back underground workings or into the Area 118 pit based on the results of geochemical characterization.

Geochemical characterization of the underground waste materials from core samples to date has shown that they are similar in nature to the waste rock that will be excavated as a result of the Area 2 and Area 118 open pit mining.

The portal to the underground workings will be sealed at closure to prevent access by people and wildlife to the workings in according with the Yukon Quartz Mining Act. The one ventilation raise associated with the workings will also be sealed to prevent access into the underground. The underground workings will be allowed to flood following the end of underground mining. Hydrogeologic investigations (SRK, 2010b) at the site to date indicate that the groundwater table will not result in water discharging to surface from the underground workings in the post closure period.

The portion of the portal area that is excavated into overburden will have the slopes recontoured to ensure a stable angle followed by application of seed and fertilizer.

## 6.5 HAUL ROADS

The haul roads on the site radiate out from the open pit to the mill, the ore stockpiles, the waste rock dumps and the ice-rich overburden dump. Figure 6-16 shows typical road reclamation measures that will be employed at final closure. These measures will apply to haul roads, site roads and the main access road alike.

Haul roads will be subject to standard road decommissioning and reclamation measures at closure, including culvert excavation, drainage recontouring, slope stabilization and surface scarification. Regrading/contouring of the roads will ensure that runoff sheds off the road surface and does not become ponded. Site reclamation experience indicates that The road surfaces are not expected to require seeding, only surface scarification in order to encourage natural revegetation. Sediment management measures will be installed where drainage channels have been re-established in order to prevent sediment from entering streams while revegetation occurs. Sediment management measures may include installation of silt fencing and enviro-matting at select sites.

## 6.6 DRY STACK TAILINGS STORAGE AREA AND DIVERSION STRUCTURES

Currently, the tailings from the Minto milling process undergo a dewatering process using ceramic filters before being conveyed by truck for spreading and compaction in the Dry Stack Tailings Storage Facility (DSTSF). Construction of the facility is in accordance with EBA's Geotechnical Design Report, Dry Stack Tailings Storage Facility, Minto Mine, Yukon (EBA, 2007). Further details on the tailings handling procedures are available in the Company's current Tailings Management Plan (TMP) and the related Operations, Maintenance and Surveillance plan (OMS) for the facility. The general location of the

DSTSF and associated diversion structures is shown in Figure 5-1. Figure 6-17 and Figure 6-18 show a plan and profile of the DSTSF. The proposed reclamation measures for the DSTSF and diversion structures are presented in Figure 6-19.

The DSTSF is located on a bench to the south of the mill and upslope from the Minto Creek channel. The facility is being constructed as per the specifications provided in the TMP and overseen by the Engineer of Record (EBA). A quality control program is in place wherein field compaction is regularly verified using a nuclear densometer. Monitoring of the stability of the stack has been conducted through daily visual inspections and through monitoring the installed instrumentation (piezometers, ground temperature cables and settlement monuments). Regular field visits and an annual geotechnical inspection are conducted by the Engineer of Record as required under the Quartz Mining Licence QML-0001 (Section 9.3.2).

Monitoring of the DSTSF has shown that there has been recent movement of the facility at an rate of between 3 to 4 mm/day . Monitoring of the movement of the facility will be ongoing during the operations phase and potential revisions to the closure methodology for this reclamation unit will be addressed in subsequent updates of this report. The proposed Mill Valley Fill which is described in the next section has been designed to buttress the DSTSF and mitigate movement of this facility.

The Company submitted a risk assessment report on the DSTSF to the Department of Energy Mines and Resources (EMR) in March 2009 (SRK, 2009b). The report evaluated all conceivable failure modes for the facility using the Failure Modes and Effects Analysis (FMEA) method. The report recognizes the lowered physical risks associated with the DSTSF versus a conventional slurried tailings impoundment and noted that the regulatory requirements necessary to mitigate risks are currently in place.

Existing design components (upstream diversion ditches, finger drains and a toe berm) are currently intercepting and diverting surface runoff from upslope and filtering seepage from below the area. Field observations show that the current diversion structures will need to be enhanced at closure to ensure water is successfully captured and routed around the facility.

Geochemical characterization of the tailings has indicated there is no acid-rock drainage potential with the tailings in this reclamation unit, however, neutral metal leaching of copper and other elements has been identified. Closure measures for the DSTSF will focus on reduction of source loadings from the facility in addition to ensuring the physical stability of the facility. Managing water movement in and around the facility is seen as the key factor in the design of closures measures. The compacted tailings have a low permeability due to the mechanical compaction of the tailings following spreading in the facility. Infiltration of precipitation and run-on water is not expected to have a significant influence on the DSTSF and surface grading will be utilized during the closure phase to assist in shedding water from the surface.

The design of an engineered cover for the flat surface of the facility to prevent water infiltration into the tailings surface will be required based on the identified concern over neutral pH metal leaching from this facility. The cover system will be designed to accommodate some run-on water bypassing the diversion structures which are located upgradient of the DSTSF. If required run-on water will be diverted away from the face of the DSTSF by a run-on diversion ditch to minimize the potential for erosion on the face of the DSTSF. The DSTSF will be subject to source control and will have a soil cover of approximately 0.5 m thickness placed during closure of the facility. The thickness of the soil cover on the face of the DSTSF may, in some areas, be less than 0.5 m due to the operational logistics of spreading soil covers on slopes. The current reclamation seed mixture and fertilizer application rates contained in the 2009 Closure Plan for the Minto mine will be followed unless ongoing reclamation research programs show that changes to these are warranted.

### 6.6.1 DSTSF Diversion Structures

The south diversion ditch (SDD) is the primary diversion structure and is used to convey flow from the original tributary channel that previously ran through the DSTSF into the mill water pond. This SDD is presently constructed to convey the calculated 1 in 200 year flood event for the drainage. During closure the SDD will be widened and deepened to ensure that it has adequate flow capacity for the post closure period. The operations Water Management Plan bypass of the SDD around the Area 2 pit will be decommissioned allowing the SDD to spill into the Area 2 pit. This change in closure water management reduces the post closure length of the SDD by approximately 50% compared with the existing ditch length.

The tailings diversion ditch (TDD) is currently constructed as a surface berm with some portions of the ditch being lined in an attempt to minimize underflow and leakage. The surface berm construction methodology for the TDD is based on the presence of permafrost in that portion of the site. Water that bypasses the TDD is designed to be addressed with the finger drains at the base of the DSTSF. The TDD will divert water to the northeast and into a natural drainage that flows down towards the Water Storage Pond. Refer to Figure 5-2 for the post-closure water management plan.

## 6.7 MILL VALLEY FILL

The Mill Valley Fill (MVF) is located immediately downslope of the DSTSF and has been designed to buttress the DSTSF due to stability concerns identified through the instrumentation monitoring program at the site. The MVF will also allow for expansion of the camp pad and establishment of surface laydown areas during the operations phase. The MVF will be constructed from 1.3 $Mm^3$ of waste materials with Grade Bin 0 waste materials (no copper content) in order to limit the potential for neutral metal leaching into the receiving environment. Figure 6-20 and Figure 6-21 show the design plan and profile for the MVF.

Closure of the MVF will be conducted at the end of Phase IV milling and will involve the removal of any temporary building and materials stored in the laydown areas. The location of the MVF in the main valley of Minto Creek means that it will be necessary to route the main site discharge channel through the footprint of the MVF. The main site discharge channel will be designed to accommodate the PMF event for the entire upstream catchment area. Evaluation of the potential for the main site discharge channel to influence the geotechnical stability of the DSTSF will be evaluated during detailed design. The cost of the spillway design and associated geotechnical stability evaluation has been included in the closure costing for this unit.

Recontouring of areas of the MVF not required for channel construction will be conducted in order to establish final drainage runoff patterns. The surface of the MVF is currently not expected to require source control so it will be covered with 0.25 metres of growth media prior to application of seed and fertilizer. Should it be determined that source control is required for this

## 6.8 MAIN WATER DAM

The location of the main water dam relative to the other site development is shown in Figure 6-1. The water dam on Minto Creek provides water retention for mill processes and various site uses during operations and is considered to be the furthest downstream point for discharge control at the site. The original project proposal initially predicted that excess water would meet the Water Use Licence (WUL) effluent criteria and be discharged passively to Lower Minto Creek over the dam spillway. Operational experience based on heavy precipitation and snowpack years has shown that a water treatment plant, as per the current site Water Management Plan, will be required. The treatment plant was installed and operational during the second quarter of 2010 and will remain in operation until WUL criteria can be achieved.

It is now envisioned that the dam will remain in place until such time that the water quality at the site has stabilized to the satisfaction of stakeholders. In the interim it will act as a settling pond where turbid runoff waters will undergo retention, monitoring and treatment if required. The current water treatment plant located near the Mill Pond will be relocated to this area during closure in order to allow for active treatment as required.

Once the water quality in Minto Creek reaches the acceptable effluent criteria, water will be allowed to move into the creek over the dam spillway for the remainder of the open flow season. The dam would then be decommissioned with any sediments in the facility being excavated and hauled to the waste rock dump for disposal.

Predictive water chemistry modeling has identified a need for ongoing treatment of water at the site. This area will be converted into a passive treatment system such as a treatment wetland, permeable reactive barrier or some combination of these two. The hydrologic design standards for modification of the main water dam will be the Q200 flow unless other standards are found to be warranted during detail design of the wetland.

Physical stability of the main water dam in the period prior to decommissioning will be ensured during post closure by regular geotechnical inspections. In the most recent inspection report, the engineer of record has recommended a review of the surveillance data collected to date in order to assess the dam's performance (EBA, August 2009). It is expected that the dam would be fortified against erosion using rip rap armouring with an annual inspection frequency during the initial post closure period.

## 6.9 MILL AND ANCILLARY FACILITIES

This section addresses the decommissioning measures for the mill and the ancillary facilities in the immediate vicinity that support the milling activities. The facilities addressed in this section include:

- Mill building;
- mill reagents;
- concentrate shed;
- filter press building; and
- mill water pond.

The general location of the milling area is shown in Figure 2-3, and general closure issues and measures are presented for these facilities and are shown in Figure 6-1.

Physical stability concerns for these structures at closure will be mitigated by their disassembly and removal from the site with the exception of the mill water pond which will require earthworks to mitigate physical stability issues. Environmental concerns for these areas will arise primarily from contamination of surrounding soils by fuel, chemicals or other wastes. Such instances will be documented through an environmental audit, conducted upon the completion of milling activities. Any contaminated soils identified will be remediated on site at the site's approved land treatment facility, and any recyclables and/or special wastes will be removed from the solid waste facility. Closure plans will be submitted to YG Environment prior to the final decommissioning of the land treatment facility and the solid waste facility.

A salvage program will be conducted towards the end of mine life to minimize the volume of scrap generated by the decommissioning of these facilities that will require in-situ disposal. It is expected that removal of these facilities, namely the camp and explosives plant site, will be done by auction or contractor for salvage value.

The reclaim line and all above ground power cables and overhead power line gear will be salvaged. Any buried services such as piping and wiring will remain buried. Concrete footings will be broken down to slightly below grade as required and covered with fill. Recontouring of areas will also be conducted as required in order to establish final drainage runoff patterns. Culverts will be removed and pertinent areas will be covered in approximately 0.5 metres (unless otherwise noted) of growth media prior to application of seed and fertilizer.

### 6.9.1 Mill Building

Closure measures for this reclamation unit will include the removal of salvageable mill components, such as the ball and SAG mills and other milling-related equipment within the structure. It is anticipated that the building and steel framework will also be salvageable and that there will be minimal materials requiring disposal onsite. Any recyclable materials will be shipped to an appropriate recycling facility and all wastes will be disposed of either in the site solid waste management facility or an approved off site disposal facility.

The concrete foundations and building footprint will be reclaimed in the manner described at the start of this section. The toe slopes of the fill at both the mill and the campsite pads will be recontoured to assume a more rounded slope, limiting erosion as much as possible. The angle and subsequent stabilization/revegetation measures will be contingent upon reclamation research findings from variable slope trial plots.

### 6.9.2 Generator Buildings

The generator buildings will be removed from the site after the power hook-ups are disassembled. Site reclamation of the area occupied by the generator buildings will be in the same manner described for the camp area.

### 6.9.3 Concentrate Shed

The concentrate shed will be dismantled and removed for sale or salvage at the end of mine life. The remaining concrete footings will be broken down to slightly below grade and covered in fill material. Recontouring will also be conducted as required in order to establish final drainage runoff patterns and areas being reclaimed will be covered in 0.25 metres of growth media and revegetated using the approved reclamation seed mixture.

The southwest corner of the foundation may require complete demolition to facilitate the excavation of the reclaimed drainage channel for Minto Creek in the vicinity of the mill water pond. This section of the foundation would be broken down and pushed into the interior of the remaining footings area, and all footings will be collapsed inward and buried with fill prior to surface reclamation.

### 6.9.4 Tailings Filter Building

The tailings filter building and associated tailings handling infrastructure (conveyors, etc.) will be dismantled and removed for sale or salvage at the end of mine life. Any recyclable materials will be shipped to an appropriate recycling facility and all wastes will be disposed of in an appropriate disposal area, either the site solid waste management facility or an approved off site disposal facility.

Concrete footings will be broken down to slightly below grade and covered in fill material. Recontouring will also be conducted as required in order to establish final drainage runoff patterns and areas being reclaimed will be covered in 0.25 metres of growth media prior to application of seed and fertilizer.

### 6.9.5 Mill Water Pond

The mill water pond is a lined pond, constructed according to EBA's Final Preliminary Design – Mill Water Pond, Minto Property, Yukon Territory (EBA, 1997). Together, the mill water pond and the main dam impoundment retain the water needed for make up process water for milling activities, supplementing water from the pit dewatering wells and mill groundwater well.

The mill pond will be left in place as an interim holding area for water entering the water treatment plant during the initial closure period. Some clean up of the mill pond may be necessary in order to prevent degradation of storm water entering the mill pond from the pit. Current water quality in the mill pond is within federal Metal Mine Effluent Regulations criteria but does not meet the WUL QZ96-006 effluent criteria for discharge.

Figure 6-22 shows the planned reclamation activities for the section of Minto Creek presently entering and exiting the mill water pond. The existing culvert upstream of the mill water pond will be excavated and removed. In order to withstand the Probable Maximum Flood flow, a conveyance channel will be constructed through the present alignment of the mill water pond, with the same approximate dimensions as those utilized for the main water dam spillway construction.

The area of the mill pond will be evaluated to determine whether there is potential for construction of a passive treatment wetland to reduce the potential for water quality effects in the post closure period. The requirement for the passive treatment wetland will be determined based on the results of reclamation research on source control to reduce metal loadings from site infrastructure. Progressive reclamation and post closure monitoring of the DSTSF during Phase IV operations will also be used to help evaluate the need for a passive water treatment facility in this area.

### 6.9.6 Mill Reagents and Chemicals

Following the end of milling operations any unused mill reagent supplies will be returned to the supplier for credit. It is anticipated that all reagent product at the site will be properly contained/stored so that no product will be considered as special waste. A closure inventory/investigation of reagents and hazardous materials on site will be conducted upon the cessation of milling activities. Should some product's containment be deemed suspect upon the closure inspection, that volume of materials will be added to an inventory of special wastes, stored under the Company's Special Waste Permit # 43-040, and removed from the site for disposal in a permitted facility by a licenced contractor with other special wastes on site.

It is expected that the mine's inventory of hydrocarbon products at the Minto site will be consumed during the closure activities. Fuels and lubricants will be required during the implementation period of the closure plan following the end of milling activities. The inventory remaining on site once all activity has ceased will be removed from the site by one of three methods:

- returned to the original supplier for credit wherever possible;
- sold to a third party user; or
- trucked to an authorized disposal agency to be recycled or destroyed.

It should be noted that the operation of diesel powered vehicles and any electrical generators used on site will provide the Company with a method of reducing remaining inventory of diesel fuel as the mining operations cease. Gasoline will be similarly removed, and any remaining inventories of diesel and gasoline will be returned to suppliers or sold based on wide spread local use.

The propane supplier will remove propane tanks. Associated propane delivery lines at the camp will be removed and disposed of in a manner similar to that of the gasoline and diesel fuels.

Other hydrocarbon products that may be present at the mine site are primarily hydraulic fluids, lubricating oils, greases, antifreeze and solvents packaged in either 1000 litre bulk cubitainers, 205 litre drums or smaller packaging. In most cases the remaining inventory of these materials will be returned to the original suppliers for reuse or sold to other third party users in the local area. In certain circumstances, specialized products may have to be disposed of through a licenced waste disposal firm. It is anticipated that the volume of materials requiring disposal as special waste will be limited.

Any fuel storage areas and refueling stations, once decommissioned, will be assessed for hydrocarbon contamination of the underlying soils. A formal site assessment to identify hydrocarbon contaminated soils in other portions of the site will be conducted as part of the closure program and any soils identified by this assessment will be excavated and transported to the company's permitted Land Treatment Facility (LTF).

It is anticipated that landfarming of soils in the LTF will be required for a period of several years following the completion of decommissioning activities at the site.

### 6.9.7 Contractor's Shop and Work Area

The mining contractor's area, constructed on site adjacent to the toe of the MWD, will serve as the base of operations for the mining contractor during active mining activities. At closure, the buildings in this area will be dismantled and removed, and any scrap will be hauled to the on site permitted Solid Waste Facility.

Physical stability will not be a concern at closure for this area. This is a low elevation pad that will only require proper erosion control. Environmental concerns for these areas will arise primarily from contamination of surrounding soils by fuel, chemicals or other wastes. Such instances will be documented through an environmental audit, conducted upon the completion of milling activities. Any contaminated soils identified will be remediated on site at the site's approved land treatment facility, and any recyclables and/or special wastes will be removed from the solid waste facility. Closure plans will be submitted to YG Environment prior to the final decommissioning of the land treatment facility and the solid waste facility.

## 6.10 MAIN ACCESS ROAD

The main access road to the property was constructed in 1996 and 1997. This road was constructed to facilitate traffic from 26-ton ore concentrate trucks. The road was constructed by cut and fill methods with a road width of 8 meters and associated ditch drainage and culvert installations. Figure 2-2 shows the alignment of the main access road. The Company expects that the determination of the extent to which the main access road is deactivated will be made in consultation primarily with SFN and secondarily with local trappers, the community, and government regulators. The closure plan presents three options for road reclamation.

1. No road deactivation;
2. Road deactivation from Minto Creek to the mine site; or
3. Deactivation of the entire road.

In making a final decision about closing the main access road, consideration will also be given to the potential requirement for equipment access. Despite the identified closure timing and schedule, final access road removal (if selected) would only be undertaken once it is concluded that the site is stable and there is no need for heavy equipment access to the site.

The primary consideration for the physical stability of the main access road at closure will be slope stability where culverts have been removed and drainages channels have been established through the road alignments. Siltation of streams could occur during culvert removal and bank stabilization work. The road will be inspected during an environmental audit to take place at the end of mine life to identify any spills or contamination that was not addressed during operations. The results of that audit would be shared with and/or conducted by SFN Lands and Resources Department so that a scope of work for closure could be jointly developed.

Should one of the two options involving deactivation be chosen for the road, then standard road decommissioning and reclamation measures at closure, including culvert excavation, drainage recontouring, slope stabilization and surface scarification will be applied. The typical treatment of the access road for final closure is shown in Figure 6-23.

Culvert removal work will be conducted in the later summer/early fall when flows are low or non-existent. Culvert removals and bank recontouring works at locations where there is still flow will include pump around or flow diversions to ensure that work is done in the dry and silt loads are not added to stream systems. Regrading/contouring the roads will ensure that runoff sheds off the road surface. The road surfaces are not expected to require seeding, only surface scarification to encourage natural revegetation.

The removal of culverts at stream crossings which are fish bearing is of primary concern. At these stream crossings, the roadbed would be cut down to the culvert and original streambed elevation with side slopes brought back to 2H:1V. Material removed during culvert removal will be spread loosely on adjacent road surface to promote revegetation.

The stream channel would be stabilized and slopes revegetated. The Big Creek bridge and all culverts will be removed once all heavy equipment has been removed from the mine and closure activities have been completed in the upper Minto Creek basin.

The disturbed footprint of the access road occupies only a portion of the cleared right-of way. Site experience shows that vegetation should re-establish itself in the 30 m wide right-of-way during the life of mine and only remedial revegetation work will likely be required. The preferred methodology is to encourage natural revegetation to occur, after first preparing the road surface by recontouring and scarifying. Temporary sediment management measures such as silt fencing will be installed as required in order to minimize sediment transport during establishment of a vegetative cover.

## 6.11 MISCELLANEOUS SITES AND FACILITIES

This section addresses the decommissioning measures for miscellaneous facilities and sites around the property. These facilities include:

- mine camp and related infrastructure;
- airstrip,
- exploration sites and trails;
- land treatment facility;
- solid waste facility
- explosives plant site; and
- site roads.

Closure measures will focus on long-term physical stability of these areas following closure and ensuring that any areas of contamination are identified and remediated in an appropriate manner. The physical stability of these structures/areas at closure will be mitigated for the most part by either:

- disassembly and removal from the site; and/or
- recontouring and revegetation of the area.

Environmental concerns for these areas will arise primarily from contamination of surrounding soils by fuel, chemicals or other wastes. Such instances will be documented through an environmental audit, conducted upon the completion of milling activities. Any contaminated soils identified will be remediated on site at the site's approved land treatment facility, and any recyclables and/or special wastes will be removed from the solid waste facility. Closure plans will be submitted to YG Environment prior to the final decommissioning of the land treatment facility and the solid waste facility.

A salvage program will be conducted towards the end of mine life to minimize the volume of scrap generated by the decommissioning of these facilities that will require in-situ disposal. It is expected that removal of these facilities, namely the camp and explosives plant site, will be done by auction or contractor for salvage value.

Buried services such as piping and wiring will remain buried. Concrete footings will be broken down to slightly below grade, where required, and covered with fill. Recontouring of areas will also be conducted as required in order to establish final drainage runoff patterns. Culverts will be removed and pertinent areas will be covered in 0.25 metres of growth media and prior to application of seed and fertilizer.

### 6.11.1 Mine Camp and Related Infrastructure

In 1999 the Company completed construction of a camp for mine staff that included living quarters for 42 persons – a seven-unit accommodation/kitchen/diner/change room complex. In 2006, the camp was expanded by the addition of trailers and other construction to provide capacity for 140 persons, including an office complex. The facility provides a potable water supply (drilled groundwater well, 1998), gas-fired heat, a local power supply, and sewage disposal to two adjacent septic fields. Several structures behind the facility house the fuel supply to the furnaces, relay power from a diesel electrical generator, and pump fresh water.

Upon closure the septic tanks would be pumped out and the waste will be hauled to an approved disposal facility, as during operations. The remaining tanks will be crushed and infilled with general fill material before being covered in 0.25 m of overburden and revegetated. The remaining infrastructure (i.e. piping and related materials, including the septic field) for the two systems would remain buried.

Closure measures for the campsite include disassembly of the camp trailers and related infrastructure. All salvageable material will then be removed from the site. The remaining campsite landing will be scarified and recontoured, as required, to establish drainage patterns and the covered with 0.25 m of growth media and revegetated. Seed mixtures and fertilization specifications will be based on both revegetation trials and natural revegetation observations and success.

### 6.11.2 Airstrip

The airstrip area was noted to be subject to colonization by natural vegetation during a period of project inactivity from 1997 to 2005. Based on these observations reclamation of the airstrip will focus on scarification of compacted surfaces with natural revegetation allowed to occur in order to minimize the introduction of non-native species. Seeding of this reclamation unit is not deemed to be required as there is minimal erosion potential with the airstrip.

### 6.11.3 Exploration Sites and Trails

Current exploration activities being conducted on the site are operating under a Class III Mining Land Use Authorization, and are subject to specific closure measures by the Company as identified in the Class III Authorization. These measures will be implemented as required by the exploration crew, and are not subject to closure planning in this plan.

### 6.11.4 Land Treatment Facility

The Minto land treatment facility (LTF) for the site is located near the airstrip in an area originally excavated from bedrock for an equipment laydown area. This facility is permitted by YG, Department of Environment, and Environmental Programs Branch under Permit #24-204 to treat a maximum volume of 700 $m^3$ of hydrocarbon contaminated soil. Contaminated soils from fuel/oil spills during operations will be treated at the site to appropriate levels of remediation before being used as industrial fill as per permit requirements.

The closure of this facility is subject to the submission of a formal Closure Plan to YG, along with sampling results which demonstrate the final concentrations of contaminants in the soil being treated. It is expected that upon final closure of the entire site, dismantling and decommissioning activities may reveal or result in soil contamination requiring the relocation to the LTF and an undetermined number of months of treatment to achieve desired remediation levels. As such, the LTF Closure Plan and final sampling results will be prepared and submitted some time after final closure of the mine site has begun.

Generally, once the desired contaminant levels have been reached in the final volumes of treated soil, and the Closure Plan has been approved by YG, the soils will be spread over the site, recontoured in place and revegetated. If required, additional overburden may be hauled and used as cover material and growth media for revegetation.

### 6.11.5 Solid Waste Facility

Under Commercial Dump Permit # 81-005, issued to Minto Explorations Ltd. by YG, Department of Environment, Environmental Programs Branch, MintoEx has established a Solid Waste Facility adjacent to the Land Treatment Facility near the airport that includes:

- a burning pit for wood and paper waste;
- construction waste disposal area;
- metal and rubber tire disposal areas; and
- incinerator ash disposal in old exploration trenches.

This solid waste facility will receive construction and operational waste throughout the operation of the mine, as permitted, and will be covered by fill and compacted in 'lifts' as per common landfill practice.

Scrap equipment will be stored in various lay down areas ("bone yards") located on site and along the access road, including primarily scrapped equipment stored to be utilized on the mine site as a source of spare parts or good recyclable scrap material. Salvageable material from these sites will be sold as scrap and removed from the site at closure. Material that has no scrap value will be disposed of in the solid waste facility. Prior to disposal in the landfill, all of this material will be examined to ensure that all hazardous materials have been removed.

Any hazardous materials identified in these areas will be removed and shipped off site to a licenced waste disposal site, along with other stored hazardous or special wastes, permitted under the company's Special Waste Permit # 43-040.

The submission of a formal Closure Plan to YG for the solid waste facility will be required at final closure documenting the conditions and materials at closure. Preceding the final reclamation of this facility, tires and salvageable scrap metal will be hauled off site for salvage/recycling and once the closure plan is approved by YG, the facility will be covered by two compacted layers of 200 mm thick compactable soil material obtained from local borrow sources. The cover material will be graded to prevent pooling of precipitation runoff and to encourage the shedding of water. The site will then be revegetated using a suitable seed mixture.

### 6.11.6 Explosives Plant Site

The ANFO explosives (ammonium nitrate – fuel oil) production area is comprised of the production plant and AN bag storage and powder magazine storage areas, located near the drainage boundary southwest of the main mine site (see Figure 6-1).

At closure, unused explosives that remain on site will be returned for credit and the explosives magazines and other equipment will be returned to the explosives supplier. The septic system at the site will be pumped of contents, broken down and backfilled. Any fuel-contaminated soils identified at this location will be excavated and hauled to the land treatment facility for remediation. Disturbed areas will be recontoured as required and covered with 0.25 m of overburden growth media prior to application of seed and fertilizer. Seed mixtures and fertilization specifications will be based on both revegetation trials and natural revegetation observations and success.

## 6.12 MINE ROADS

All mine roads will be subject to standard road reclamation measures previously described in the haul roads and main access road sections of this report.

## 6.13 ADAPTIVE MANAGEMENT PLANNING

The Minto project is subject to a number of operational monitoring programs, including but not limited to:

- Water Quality Surveillance for site and receiving waters;
- Physical Stability Monitoring of various site structures;
- ABA Testing;
- Water Monitoring;
- Tailings Stability Monitoring; and
- Geotechnical Inspections.

A significant amount of data has been and will continue to be collected under some of these programs and similar requirements during the operational life of the mine. Section 7.0 of

this report proposes the continuation (and progressive scaling back) of the majority of these monitoring initiatives during the period of active reclamation and through the post-closure period when there is minimal site presence.

The closure measures in the previous sections have been developed and proposed based on the most up to date information collected at the site, and the best interpretations of these data with respect to the projected conditions on the site at final closure. Changes to the Plan will be required as conditions continue to change as the site progresses through operations and closure. The periodic revisions to this Plan as per the QML schedule will address these changing conditions moving through operations, but as closure activities progress and monitoring on the site continues, planning mechanisms that can account for and react to changes to the expected conditions governing the closure measures need to be in place.

Adaptive management planning (AMP) is a recognized and effective way to ensure that changing conditions during closure are not subject to static reclamation initiatives, and that closure programs can be adapted to these conditions to achieve desired performance. The Company is committed to AMP in the context of closure of some of the higher risk features on the site. The Company sees the continued application of AMP for the following mine components/conditions:

- **Tailings Storage Facility** – an operational adaptive management program has been proposed for the Tailings Storage Facility in the Tailings Management Plan, based on data collected through the monitoring initiatives proposed in the same document. The AMP for this facility focuses on the physical and chemical stability of the tailings materials. Current monitoring of the DSTSF indicates that the facility is subject to movement and the Mill Valley Fill (MVF) has been designed as a buttress to address this movement. Additional instrumentation being installed to monitor this movement will be installed during 2010. Monitoring wells to allow for sampling of seepage from the DSTSF will be installed when the MVF is constructed.

  The continuation of a monitoring regimen into the post closure period after tailings placement has ceased and closure measures have been applied to the facility will provide further information for the comparison of the closure measures against the expected performance. This evaluation will be used to modify the proposed closure measures for the various site infrastructure.

- **Metals Leachate/Acid Rock Drainage Issues (ML/ARD)** – Acid Base Accounting (ABA) and representative ML testing is currently being conducted under the water license ABA Testing Program. This is a comprehensive testing program that will characterize both the waste rock and tailings materials during the entire mine life. The results of this program will be used to continue to guide the placement of waste materials during operations, ensuring that materials with acid generating or neutral metal leaching potential are not used for general construction materials, unless absolutely necessary, and is confined to the assigned waste placement areas. The Company will specify distinct areas for any such material within the waste storage areas, such that

should alternate closure measures be required for this material, they will be readily accessible and accurately delineated. This operational information collected, coupled with the proposed closure monitoring of the waste storage areas, will be used in preparing and implementing an Adaptive Management Plan for ML/ARD issues site wide, to be prepared and ready for implementation at closure.

- **Groundwater** – The monitoring program for groundwater is intended to provide a better understanding of the groundwater flow regime at the site. The results of groundwater monitoring conducted at existing wells will be evaluated to determine whether there is a need for additional monitoring locations to be installed at the site.

### General Reclamation Measures

- **Reclamation Cover Material** – The tracking of the volumes of materials excavated and placed – specifically overburden materials – conducted in the course of prudent operational management and required under the Water Use License Physical Monitoring Program will provide a running indication of the quantity of overburden available for reclamation growth medium. The Phase IV development involves excavation of a significant volume of overburden which will be adequate for reclamation of the different units at the site. If at any time in the closure process the overburden requirements exceed the stockpiled inventory by more than 100,000 cubic metres, the Company will add the cost of mining overburden to the closure liability estimate. In addition, subsequent versions of this report will consider the results of the reclamation research program, which at the time of closure will have provided significant insight into the quality and quantity of growth medium required to achieve the objectives of the revegetation/reclamation planning.
- **Contaminated Soils** – the Land Treatment Facility on the site is permitted for the treatment of soils to remove hydrocarbon contamination. This process is not effective for the removal of metal contamination, and the nature of the site and the confirmed geochemical signature of area surficial soils make it likely that some of the materials treated will have metal contamination that would designate it as special waste. This has been confirmed by recent testing of materials in the LTF. This material, once successfully treated for hydrocarbons, could be placed in one of the waste storage areas (tailings, waste rock or IROD storage areas) and reclaimed in keeping with the implemented measures at that location, as metal concentrations in materials at these locations will likely be similar or higher. This approach has been approved by YG Environmental Programs in the past at closed sites. This adaptive management plan will refine these measures based on remediation success leading up to and after closure.

These adaptive management plans will be developed and refined over the operational life of the mine with the goal of having them finalized for implementation at closure. They will be modelled on accepted AMP features, such as performance monitoring programs, threshold levels for data from the monitoring programs and associated triggers for action items, and response actions for expanding or refining the monitoring initiatives, implementing

extended closure measures, and/or conducting further studies to develop mitigation measures for conditions that are divergent from those expected.

# 7.0 POST CLOSURE SITE MANAGEMENT

The closure phase of the Minto mine will commence with the cessation of economic mining of the open pit and the milling of ores and stockpiles from the ore zone. Once all mineable ore reserves have been processed, the mill and concentrator will be flushed and the tailings management facility will be decommissioned. During the active decommissioning phase which is expected to last approximately 3 years, the number of personnel required will vary depending on site activities; however it is expected that as major decommissioning and reclamation tasks are completed the number of site personnel required will decline.

It is expected that a Water Use Licence will be required for the decommissioning phase of the operation as water use will continue on a limited basis and wastewater will be released from the water dam in a controlled fashion, either treated or passively depending on the monitoring results. Decommissioning of the Big Creek Bridge along the main access road will be subject to community consultation and this activity may also require a Water Use Licence. The continued need for a Water Use Licence following the decommissioning phase will be dependent on site conditions, performance of closure measures in achieving stated objectives and legislated requirements. Post closure management and monitoring of the site will be guided to some extent by water licence, quartz mining licence or other permit requirements, the performance of physical structures remaining on site and the ability of achieving and demonstrating long-term compliance with existing waste discharge standards.

Once overall closure performance has been demonstrated for all aspects of decommissioning, the necessity of maintaining licences or permits would be re-examined. At that point a Certificate of Closure, under the Quartz Mining Act would be requested. The following section provides a general outline of the site management approach that will be taken at the Minto mine during the closure phase.

## 7.1 ORGANIZATION, SITE ACCESS & SECURITY

A number of personnel will be required on site to implement the various decommissioning and closure tasks. Generally these tasks entail closure of mine workings, regrading of waste rock and overburden piles, decommissioning of the tailings management facility, removal of the water retaining dam, salvage and removal of infrastructure, equipment and reagents, decommissioning of access roads and reclamation and revegetation of disturbed lands. These activities would be undertaken on a seasonal basis and directed by an onsite manager responsible for decommissioning and reclamation of the Minto mine.

During site decommissioning, it is anticipated that at least a portion of the existing camp accommodations would remain on site to support site personnel. It is anticipated that during the initial post closure phase, site security requirements will continue with a caretaker remaining on site following seasonal closure of the site. A site inspection schedule will

continue for the period of closure implementation (3 years) and then move into a post closure monitoring period (12 years) for a total of 15 years. Security personnel will no longer be required once decommissioning and reclamation activities are completed on the property. Once the majority of physical reclamation works are performed on the site, the number of employees or contractors required will be reduced. The Company is committed to having SFN members employed during implementation of the Plan and will continue to work with SFN to optimize long term closure monitoring requirements.

The main access road, barge landings and property security gate will be maintained during implementation of the post closure phase. Site access along the main road, barge support and Big Creek Bridge will be required for personnel and truck haulage requirements to and from the site. The security gate and fencing would be maintained while the main access road is in use. Decommissioning and reclamation of various property haul and site access roads will be completed once closure measures have been completed at each facility and site access is no longer required.

Once decommissioning activities are completed on-site, and following a period of post closure monitoring, a determination will be made about whether to permanently close the main site access road. This determination will be done in conjunction with SFN as the access road lays within SFN Category "A" settlement lands. Closure of the main access road is expected to be consistent with the plan's closure philosophy; however, it is recognized that the performance of physical reclamation of the site must be assured before a final determination of the main access road closure is made. Government regulators and the local trapper will also be consulted regarding decommissioning plans for the road.

## 7.2 SUPERVISION AND DOCUMENTATION OF WORK

All decommissioning and reclamation works will be properly supervised to ensure that works are constructed according to their design and that this work is properly carried out and documented. The project manager or the construction supervisor would supervise all closure works. Daily inspection procedures would be completed to document work progress, deficiencies and completion. Existing plans for spill response or other site internal procedures for fuel handling, waste disposal, fire control and suppression, health and safety and environmental management systems would be used, developed and followed as necessary.

Environmental inspections and tests conducted prior to the implementation of closure measures would be used to confirm areas requiring clean up.

For the water retaining dam and tailings management facility, plans for all earth works and inspections would be prepared and submitted to the YWB and EMR for review prior to construction. These plans would be submitted in a timely manner to facilitate agency review and Board approval prior to implementation. A competent engineer following standard quality control and assurance procedures would inspect and document this construction work. As-built plans and drawings would be completed and the results of the closure work completed on the removed water dam and tailings management facility

documented in a final as-built report. This report would be submitted to the YWB and regulatory agencies upon completion of closure activities.

For the Big Creek Bridge removal and Minto Creek culverts, plans for all restorative works would be prepared and submitted to the YWB prior to construction. A competent environmental practitioner following standard quality control and assurance procedures would also design, direct and document this restoration work. A summary report of the works would be prepared. This report would be submitted to the YWB and regulatory agencies upon completion of closure activities.

Upon completion of the decommissioning and reclamation works, a final site plan report (summary text and drawings) would be prepared which would outline the facilities or works remaining on the site following closure. This plan would identify the location of buried concrete structures or scrap and landfill disposal areas. It is expected that this plan would accompany an Application for a Certificate of Closure under the *Yukon Quartz Mining Act*.

## 7.3 MINE RECORDS

As noted in the previous section, all decommissioning and reclamation works would be documented. Mine records comprising the extent of open pit workings would be retained by the Company. Other site records, files and plans would be archived. Where plans or drawings are required for mine safety reasons, these plans would also be submitted to government mine safety offices. As-built reports for structures completed for closure and the final site closure report would be retained for record and submitted to government agencies and boards.

## 7.4 COMPLIANCE MONITORING AND REPORTING

Environmental compliance monitoring, internal monitoring of earthworks and independent geotechnical inspections are presently ongoing at the property. The environmental monitoring at the Minto mine employs several types of scheduled periodic inspections to ensure that the facility is meeting environmental performance objectives and complying with appropriate regulatory standards. These inspections entail:

- scheduled inspections of the waste rock and overburden storage areas, tailings management facility, water retaining structures and mine components to monitor environmental performance;
- scheduled water quality sampling and flow measurements of effluent streams and local receiving water streams;
- scheduled receiving water programs for benthic invertebrates, stream sediments and fish to monitor downstream environmental quality;
- scheduled piezometric monitoring of water levels in wells and the spillway structure at the water retaining dam;

- monitoring of other instrumentation installed in the DSTSF as per the Tailings Management Plan (thermistors, survey hubs, etc.);
- annual summer inspections by a qualified geotechnical engineer of tailings management facility, diversion channel, waste rock and overburden storage areas, and water retaining dam for structural stability; and
- scheduled environmental tours and audits of the property by the Company staff to look for environmental hazards and site stability. The Company will endeavor to invite various Government agencies' representatives as part of the environmental inspections.

At present, the site personnel undertake the scheduled environmental monitoring and inspection programs with the exception of the annual geotechnical inspection and the benthic invertebrates, stream sediment and fish monitoring programs, which are conducted by qualified professionals. All results from the licenced compliance monitoring programs are reported to the YWB, and YG EMR as monthly or annual reports.

During the active closure phase environmental and physical compliance monitoring and inspections will continue according to the present Water Use Licence or Quartz Mining Licence monitoring programs utilizing site-based personnel. A summary of the current monitoring activities under the present environmental and physical compliance and inspection program is shown in Table 7-1 (as the first 5-year period after milling cessation), with monitoring station locations and descriptions. Figure 7-1 provides the current station locations for the environmental and physical monitoring programs.

It is expected that the amount of environmental and physical monitoring and inspection (frequency and quantity) will decline once all closure measures have been implemented. The approach to closure monitoring has been to continue with the present licence monitoring and inspection programs until decommissioning and reclamation measures have been completed and then reduce the frequency of site monitoring and the number of monitoring stations over time as satisfactory closure performance is confirmed. Revisions to the current Water Use Licence requirements will be required upon closure to authorize them.

The schedule for monitoring programs planned for the 15-year period immediately following cessation of active mining and milling operations are presented in Table 7-1. For the first 5 years following the cessation of mining, routine environmental monitoring will be completed to demonstrate the effectiveness of closure measures and their performance. Thereafter (year 6 to 10) monitoring frequencies would be reduced to periodic inspections, with a further reduction of frequency for years 11 to 15. The purpose of these periodic inspections would be to ensure that waste discharges remain compliant, downstream receiving waters meet current CCME Guidelines for the Protection of Freshwater Aquatic Life, and physical structures are performing as designed. Should these inspections identify issues of concern, then plans would be developed to address the concerns.

Based on the results of site monitoring for the 15-year period and in discussion with the SFN and appropriate regulators, the need for and the frequency of additional site monitoring will be determined at that time. If the results from monitoring indicate that the

site is stable with acceptable geotechnical and environmental performance, then the Company would propose to decrease the frequency of monitoring further. If the results from monitoring indicate there are concerns with either geotechnical conditions at the site or with environmental issues, then the site would continue to require more frequent monitoring than otherwise proposed and possibly additional remedial work would be required.

As previously mentioned, the Company is interested in having the SFN participate actively in both the closure activities and in post-closure monitoring. The Company will work directly with SFN in this regard.

Environmental monitoring and inspections conducted during the post closure period (years 4-15 after cessation of mining) will be undertaken by periodic visits to the site. Access to the property for post closure monitoring would be via ATV, snowmobile, and/or helicopter if the road is decommissioned.

During the post closure period, reporting on all environmental and inspection programs carried out on the property will continue. These reports will be filed with the YWB, and EMR in accordance with conditions contained in the Water Use Licence, and Quartz Mining Licence and other operating permits and approvals as may be.

Company personnel responsible for the management of the Minto mine would continue to meet with regulatory agencies, Selkirk First Nation, and the community on an as-needed basis to appraise interested parties of decommissioning activities and the results of post closure monitoring.

It is expected that a review of the environmental performance of the mine following closure would be made with EMR and or other interested parties. Once this review is completed, the Company would apply to the Minister of EMR for a Certificate of Closure for the Minto mine under the Yukon Quartz Mining Act Mine Production Regulations. The Certificate of Closure will confirm that the Company has fulfilled their closure obligations for the site.

## 7.5 LONG TERM MAINTENANCE

Provisions for maintenance of reclamation tasks such as erosion control and maintenance seeding have been included as part of the long-term closure requirements. Based on physical inspections and monitoring, maintenance works will be planned for and conducted as required to meet closure performance standards and objectives.

## 7.6 TEMPORARY CLOSURE

Temporary closure is defined in both the Quartz Mining License QML-0001 and the Water Use License QZ96-006 as the status of the project if no ore is processed through the mill for six (6) consecutive months after the start-up date.

Accordingly, the following monitoring and "care and maintenance" planning items are focused on a temporary closure scenario occurring after mill start-up. In the unlikely event

that a closure occurs during the Interim Period (as defined in QML-0001 as the intervening time between the license effective date and start-up), these proposed temporary closure plans will still be applied where applicable to maintain the existing site infrastructure in order to enable a timely start-up, as opposed to a resumption of operations.

The Company's priority during any temporary closure scenario is to ensure that the site remain geochemically and physically stable, and monitored in compliance with applicable licenses and legislation. Generally, this will include both initial stabilization and then ongoing routine monitoring and maintenance of the site infrastructure and facilities. The current Water Use Licence QZ96-006 contains a temporary closure monitoring schedule (Part H – Interim Closure) that forms the foundation for the proposed temporary closure monitoring plan. It has been augmented to include planning for project elements that were not in place and therefore not subject to the interim closure period monitoring, such as the mill, water dam, water treatment plant and mill water pond, waste dumps, tailings storage area, and the explosives facility.

Table 7-2 provides a summary of the various project components and the inspection and maintenance activities for use during any temporary cessation of mining activities.

### 7.6.1 Physical Stability and Geochemical Stability

Stabilization of site works during any temporary closure will be based on a continuation of efforts during operations to ensure construction and performance of facilities in accordance with their engineered designs. At this early stage in the mine's life, many operational monitoring and research programs are underway to better understand the site and achieve physical and geochemical stabilization through such measures as:

- resloping and crest rolling to reduce slope angles of repose on the waste dumps;
- grading and contouring to direct surface water away from steeper slopes to reduce erosional impacts;
- planting live willows in appropriate places throughout the site to help control erosion and surface runoff water contamination with sediment;
- covering potentially unstable areas in overburden and revegetating to establish a stable cover, again reducing erosional impacts; and
- augmenting revegetation efforts with bioengineering (planting of live cuttings/seedlings) efforts.

Site infrastructure, including buildings and process machinery, will be emptied/drained of hazardous reagents and process fluids where appropriate and stabilized for temporary closure based on recommendations from mechanical and chemical suppliers, contractors and engineers. This includes the removal of all hazardous wastes, including waste hydrocarbons, coolants, lubricants, mill reagents, and process chemicals. The bulk explosives inventory will be removed from site and explosives storage containers and facilities will inspected regularly.

The significant exception to these activities will be water management and treatment infrastructure and reagents, which will remain in place and operational as required to maintain effluent quality compliance during any temporary closure. Water management and treatment activities will be continued in accordance with the existing Water Management Plan (MintoEx, 2009) for the site.

Temporary decommissioning of the rest of the infrastructure will only be conducted to a level whereby the infrastructure and systems are ensured to be stable in the short term (3 years) and whereby mining and milling operations can be resumed in a timely manner should the decision be made to emerge from temporary closure and transition back into operations. This will include:

- the retention of essential equipment/assets onsite to maintain infrastructure; and
- the storage of reagents and other hazardous materials (not waste) in competent primary and secondary containment, to ensure compliance with applicable legislation.

### 7.6.2 Security and Monitoring

Uncontrolled access to the mine site on the Minto property could pose a risk to the public and to the site assets. As such, a full-time caretaker/monitor (at least 2 individuals trained for cross-shift) will be housed onsite in a serviced portion of the existing camp. Site equipment and vehicles will be kept onsite for caretaker use in care and maintenance activities. Contingency equipment will also be kept onsite should more intensive earthworks be required during the temporary closure period.

A security gate would be installed on the main access road adjacent to the dam in the event of the site being placed into temporary closure. This is a steep cut and fill location that will prohibit vehicle access around the gate. Snowmobile/ATV access can not always be controlled, but warning signs will be erected indicating the risk of entry to the site at the main gate and at key locations around the site. Site buildings will be locked and secured.

The main access road will be maintained for caretaker and emergency access with equipment retained on site (grader/loader). Previous periods of inactivity at the site have shown that the access road remains relatively stable and accessible with little maintenance requirements. In winter, contractors will establish the ice road across the Yukon River at Minto Landing, and the barge will be used only on an as needed basis during temporary closure, with a smaller boat being used when required for ferrying caretakers.

The caretaker(s) will be responsible for:

- regular inspections of the site to observe and document the condition of – and note any changes in – site security and public safety measures, infrastructure, mine works, etc., and to document any newly emerging environmental or public health and safety issues.
- conducting routine physical monitoring activities;
- regular water quality and flow monitoring and treatment if necessary (a skilled operator may be necessary);

- submitting inspection and monitoring reports to managers on a regular basis;
- responding to any security/safety issues as required; and
- conducting routine site maintenance and basic repairs to infrastructure and works as required (snow removal, culvert and road maintenance, building maintenance).

Site inspections and monitoring will be conducted by vehicle when seasonally possible. Some sites may only be accessible by snowmobile in winter, as snow removal will not be reasonable at all locations. Inspection results will be documented in an approved format. Any reports of changes in the physical status of any part of the site may warrant a follow-up investigation by managers and/or professional personnel.

The Company's Water Use Licence contains a comprehensive Physical Monitoring Program which the licensee must conduct and report upon on a regular basis. This includes regular visual and seepage inspections of the following structures at different frequencies, varying from daily to annually:

- Main Water Dam;
- Mill Water Pond;
- Waste Rock and Overburden Dumps; and
- Diversion Ditching.

In addition, the Company's Environmental Monitoring Plan further commits to structural monitoring of these elements. These programs will continue in the event of any temporary closure, with results to be included in annual reporting under the water license.

Should temporary closure occur prior to the reclamation of the tailings facility then the monitoring program for the physical stability of the tailings deposit as presented in The Company's Tailings Management Plan will be followed. Without ongoing tailings placement, the visual inspection elements of the stack stability monitoring will be conducted by the site caretaker, with any stability-related issues reported immediately.

Some elements of the monitoring program (geotechnical and structural inspections and non-routine water quality and biological monitoring) will be conducted by appropriate professional personnel, and results of these inspections will be included in the annual reports and other required submissions.

Monitoring stations for the water quality surveillance program during any temporary closure are the same as those required during operations Figure 7-1.

### 7.6.3 Reporting

All monitoring and inspection data collected during a temporary site closure will be compiled and submitted according to the required annual reporting timeframes for both the Water Use Licence and Quartz Mining Licence.

# 8.0 CLOSURE COSTS

Cost estimation for implementation of the proposed closure measures is the basis for establishing the financial security that will be required on the project. The Phase IV closure cost estimate has been prepared based on the final extent of disturbance for each of the infrastructure units described in this report. Progressive reclamation for much of the site will assist in offsetting the maximum site liability that will be incurred during the operations phase but does not negate the need for estimation of the closure costs. The estimated costs to implement the decommissioning and reclamation measures described in this report are presented in Tables 8-1 through 8-13.

The salvage value of certain components of the mine is expected to offset some of the costs of implementing this closure plan. A salvage value of 50% has been used for the mill and ancillary facilities.

The calculation of rates for determination of closure costs is based in part on those included in the 2009 Detailed Decommissioning and Reclamation Plan for the site.

The costs have been developed using a combination of current unit rates for available Yukon contractors' equipment, and custom unit rates specific to the project. These custom rates were prepared with input from the mine construction heavy equipment contractor and based on their experience on site during the construction activities, considering such factors as:

- haul distance;
- road grade; and
- material handling considerations.

The unit costs have been applied to levels of effort in sufficient detail to allow thorough scrutiny by the reader. As such, equipment rates have been used where the level of effort is well understood, and in other cases, unit area or volume rates have been employed.

An annual inflation rate of 1.5% was applied to all unit rates in order to determine the cost of implementing the conceptual closure measures described in this plan. This inflation rate is consistent with the use of a review of published inflation rates for the Yukon.

- Table 8-1 provides a summary of all cost estimates;
- Table 8-2 sets out unit rates used in the calculations;
- Tables 8-3 to 8-10 provide closure cost estimates for the specific site development reclamation components;
- Table 8-11 provides closure cost estimates reclamation research and revegetation activities;
- Table 8-12 outlines costs associated with the site management during closure implementation and presents post closure costs for compliance monitoring and

maintenance for the entire projected 15 year active closure and post closure monitoring life; and

- Table 8-13 presents costs for various supporting studies as outlined in the closure measures Section 6.

The closure measures presented in this plan have been prepared at a conceptual level of engineering. It is recognized that a certain level of detailed engineering will be required for major closure activities including, dam removal, and conveyance or diversion ditches. The approach is to ensure that closure measures are sound and have undergone review before detailed engineering is undertaken. Detailed engineering is planned for major works prior to implementation.

For the purposes of closure costing an estimate of 7% of the capital cost of each closure measure was used for typical project management and engineering costs.

A closure cost range from $15,785,000 to $16,040,000 is estimated for final closure, based on three separate scenarios for road decommissioning.

## 8.1 FINANCIAL SECURITY UPDATES

YG has developed a policy respecting mine site reclamation and closure with one of the stated principles being "adequate security must be provided by the project proponent at each stage of mine development reclamation and closure consistent with the requirements of relevant legislation and Yukon financial security guidelines" (YG, 2006). Typically requirements for mine security bonding are conditions of the Type A Water Use Licence or Yukon Quartz Mining Production Licence. The Company intends to adhere to the principles for mine reclamation and closure and security requirements in accordance with YG's policy.

The Company and YG will jointly determine a schedule for security payment scheduling.

The Company will discuss road decommissioning requirements with the SFN, which will ultimately refine the final closure costs associated with the access road decommissioning.

# 9.0 LIMITATIONS OF REPORT

This report has been compiled based on information provided by a number of different sources. The report and its contents are intended for the sole use of Minto Explorations Ltd. (Minto) and their agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Minto, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions are provided in Appendix A of this report.

## 10.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

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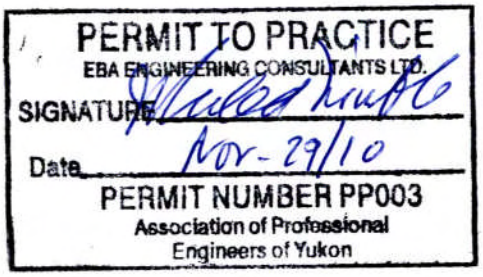


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# TABLES

TABLE 7-1: MINTO MINE – DETAILED DECOMMISSIONING AND RECLAMATION PLAN

| Site | Description | UTM Location (m) Zone 8 | | Year 1-5 Frequency | | | | | | Year 6-10 Frequency | | | | | Year 11-15 Frequency | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Easting | Northing | Surface Water | Ground Water | Sediment | Benthos | Flows | Other | Surface Water | Ground Water | Sediment | Benthos | Other | Surface Water | Ground Water | Sediment | Benthos | Other |
| **Receiving Water Stations** | | | | | | | | | | | | | | | | | | | |
| W-2 | Mainstem Minto Creek directly u/s Access Road Crossing | 392616 | 6948477 | W | | A | BA | DCR, W | | Q | | BA | BA | | A | | A | BA | |
| W-3 | Mainstem Minto Creek 50 m d/s toe of Dam (Final Point of Discharge) | 386747 | 6945682 | W | | A | BA | DCR, W | | M | | BA | BA | | Q | | A | BA | |
| W-6 | Tributary to Minto Creek | 387544 | 6946420 | Q | | A | BA | Q | | Q | | BA | BA | | A | | A | BA | |
| W-7 | Tributary to Minto Creek | 387504 | 6946069 | Q | | A | BA | Q | | Q | | BA | BA | | A | | A | BA | |
| W-10 | Mainstem Minto Creek (south fork at headwaters) | 383348 | 6943654 | M | | | | M | | Q | | | | | A | | | | |
| **Mine Site Stations** | | | | | | | | | | | | | | | | | | | |
| W-11 | Waste Rock Dump Seepage | 384106 | 6944887 | M | | | | | | SA | | | | | A | | | | |
| W-12 | Discharge from Open Pit | 384819 | 6944991 | M | | | | | | SA | | | | | A | | | | |
| W-13 | Mill Water Pond Discharge | 385111 | 6945061 | W2 | | | | | | SA | | | | | A | | | | |
| W-15 | Minto Creek, downstream of the overburden dump, just upstream of Open Pit | 384286 | 6944754 | M | | | | | | SA | | | | | A | | | | |
| W-16 | Main Water Storage Pond Discharge (or Main Water Storage Pond if not discharging) | 386538 | 6945573 | W* | | | | | | | NLA | | | | | NLA | | | |
| W-17 | Main Water Storage Pond Dam Seepage | 386615 | 6945645 | M* | | | | | | | NLA | | | | | NLA | | | |
| W-18 | Low-Grade Ore Pad Seepage | 386615 | 6945071 | M* | | | | | | SA* | | | | | A* | | | | |
| W-8 | Alternate Tailings Area Seepage/Runoff | 384514 | 6945067 | M* | | | | | | SA* | | | | | A* | | | | |
| W-8A | Tailings Seepage/Runoff | 385620 | 69455071 | M* | | | | | | SA* | | | | | A* | | | | |
| **Physical Inspection Elements** | | | | | | | | | | | | | | | | | | | |
| | Water Dam | - | - | | | | | | A* | | | | | NLA | | | | | NLA |
| | Tailings Area | - | - | | | | | | A | | | | | A | | | | | A |
| | Diversion Ditches | - | - | | | | | | A | | | | | A | | | | | A |
| | Waste Rock Dump | - | - | | | | | | A | | | | | A | | | | | A |
| | Ice-Rich Overburden Dump | - | - | | | | | | A | | | | | A | | | | | A |
| **Environmental Inspection Elements** | | | | | | | | | | | | | | | | | | | |
| | Revegetation Inspection | - | - | | | | | | A | | | | | A | | | | | A |
| | Wildlife Use Survey | - | - | | | | | | A | | | | | A | | | | | A |

* Unless structure has been decommissioned / reclaimed

**Frequency Description**

| | | | | | |
|---|---|---|---|---|---|
| W | Weekly | Q | Quarterly | BA | Bi-annually |
| W2 | Every 2 Weeks | SA | Semi-annually | NLA | No longer active |
| M | Monthly | A | Annually | DCR | Daily Continuous Record during open season |

TABLE 7-2. SUMMARY OF CARE AND MAINTENANCE ACTIVITIES AND SURVEILLANCE PROGRAM DURING TEMPORARY CESSATION OF MINING OPERATIONS

| Project Component | | Area of Interest | Care/Maintenance Activities | Monitoring Activities | Monitoring Responsibility | Monitoring Timing/Frequency |
|---|---|---|---|---|---|---|
| Open Pit | | Water Management/Treatment<br>Physical Stability | Maintain creek diversion around pit<br>Treat excess pit water and transfer to WSP<br>Restrict access to hazardous areas with physical barriers<br>Maintain perimeter ground interceptor wells if necessary | WUL Physical Monitoring Program | Caretaker | As per WUL |
| | | | | Water Quality Monitoring for Treatment | Water Treatment Technician | As required |
| | | | | Geotechnical Inspection of Creek diversion | Engineer | Annual |
| Ore Stockpiles | High Grade | Physical Stability | Reduce High Grade Stockpile Inventory | n/a | n/a | n/a |
| | | Geochemical Stability | Monitor for seepage | WUL Water Quality Surveillance Program | Caretaker | As per WUL |
| | Low Grade | Physical Stability | Monitor for stability | WUL Physical Monitoring Program and Annual Geotechnical Inspection | Caretaker | As per WUL |
| | | Geochemical Stability | Monitor for seepage | WUL Water Quality Surveillance Program | Caretaker | As per WUL |
| Waste Rock and Overburden Dumps | | Physical Stability | Runoff/Erosion/Sediment control, as required.<br>(Progressive reclamation will occur during operations) | WUL Physical Monitoring Program | Caretaker | As per WUL |
| | | | | Geotechnical Inspection | Engineer | Annual |
| | | Geochemical Stability | Monitor for seepage | WUL Water Quality Surveillance Program | Caretaker | As per WUL |
| Tailings Storage Facility | | Physical Stability | Surface water diversion structure repair/maintenance, as required<br>Runoff/Erosion/Sediment control, as required.<br>Dust Control, as required.<br>(Progressive reclamation will occur during operations) | Visual inspection elements of Monitoring Program from Tailings Management Plan (TMP)<br>WUL Physical Monitoring Program | Caretaker | As per TMP |
| | | | | Geotechnical Inspection from WUL and TMP | Engineer | Annual |
| | | Geochemical Stability | Monitor for seepage and water quality | WUL Water Quality Surveillance Program and TMP Monitoring Elements | Caretaker | As per WUL |
| Mill and Camp Site | | Buildings, Equipment, and Infrastructure<br>Physical Stability | Concentrate removed from site<br>Secure buildings and maintain necessary equipment onsite for resumption of milling<br>Inspect for site stability | Visual inspection periodically for signs of instability | Caretaker | Monthly |
| | | | | Structural Inspection | Engineer | Twice Annually |
| | | Mill Pond<br>Physical Stability | Maintain pond liner, repair as required.<br>Maintain culverts. | WUL Physical Monitoring Program | Caretaker | As per WUL |
| Water Dam | | Water Management<br>Physical Stability | Maintain spillway and structure as required based on geotechnical inspections.<br>Monitor pond levels and water quality.<br>Maintain spring/early summer pumping drawdown equipment. | WUL Physical Monitoring Program | Caretaker | As per WUL |
| | | | | Geotechnical Inspection | Engineer | Annual |
| | | Geochemical Stability | Monitor for seepage water quality | WUL Water Quality Surveillance Program | Caretaker | As per WUL |
| Explosives Facility | | Physical Stability | Remove bulk explosives from site.<br>As required, repair and replace infrastructure | Visual inspection periodically for signs of instability. | Caretaker | Monthly |
| Barge Landing | | Access to Yukon River | As required, granular upgrade to landing site. | Visual inspection periodically for signs of instability. | Caretaker | Weekly |
| Access Road and Surface Drainage | | Entire Route | As required, surface grading and granular amendments, ditch and culvert maintenance. | Visual inspection periodically for signs of instability/erosion | Caretaker | Weekly and after heavy precipitation events |
| Entire Site | | Physical Stability | Runoff/Erosion/Sediment control, as required.<br>Road/culvert maintenance as required.<br>(Progressive reclamation will occur during operations) | WUL Physical Monitoring Program | Caretaker | As per WUL |
| | | | | Geotechnical Inspection | Engineer | Annual |
| | | Water Quality/Management | Retain Water Treatment Plant and Operators<br>Maintain storm water diversion systems<br>Continue seasonal water treatment as required for excess pit and site water | Undertake expanded temporary closure monitoring and submit to the YWB pursuant to Water Use Licence QZ96-006 (see Tables 7-4 and 7-5 for expanded monitoring program sites and schedule.)<br>Continue required monitoring under Metal Mining Effluent Regulations (MMER) | Caretaker | As per WUL and MMER |
| | | Security | Full time site caretaker will check, repair and replace as required:<br>precautionary signage<br>security gate – installed on Access Road at Main Dam | Site Inspection and Security Monitoring of all infrastructure and site elements | Caretaker | Daily: Inspection Sheets included in Annual Reporting |
| | | Miscellaneous Infrastructure | Shut down and winterize camp, except for caretaker facilities<br>Inspect power line | Site Inspection and Security Monitoring of all infrastructure and site elements – report any changes to stability/condition of miscellaneous infrastructure. | Caretaker | Daily: Inspection Sheets included in Annual Reporting |
| | | Reporting | Prepare and submit annual report to the Yukon Water Board pursuant to Water Use Licence QZ96-006, including details of temporary closure activities and monitoring.<br>Prepare and submit annual report to YG Mineral Resources Branch pursuant to the Quartz Mining License QML-0001, including details of temporary closure activities and monitoring.<br>Prepare and submit quarterly monitoring reports to Environment Canada under MMER. | | Minto Explorations Ltd. | Annually, by July 30<br>Quarterly, Online RISS Registry |

| Table 8-1: Summary Table of Estimated Closure Costs | | |
|---|---|---|
| **Table #** | **Description** | **Total Cost** |
| **3** | **Overburden & Waste Rock Dumps** | $6,592,802 |
| **4** | **Open Pit, Underground and Haul Roads** | $611,264 |
| **5** | **Tailings Area and Diversion Structures** | $1,307,426 |
| **6** | **Main Water Dam** | $599,233 |
| **7** | **Mill and Ancillary Facilities** | $667,219 |
| **8** | **Mill Pond** | $205,516 |
| **9** | **Main Access Road** | |
| | Scenario 1 - No Access Road Deactivation | $2,484 |
| | Scenario 2 - Deactivate Access Road from Minto Creek to Mine Site | $140,880 |
| | Scenario 3 - Deactivate Entire Access Road | $240,170 |
| **11** | **Reclamation Research and Revegetation** | |
| | Scenario 1 - No Access Road Deactivation | $1,545,072 |
| | Scenario 2 - Deactivate Access Road from Minto Creek to Mine Site | $1,550,643 |
| | Scenario 3 - Deactivate Entire Access Road | $1,561,784 |
| **12** | **Post Closure Site Management** | $3,745,682 |
| **13** | **Supporting Studies** | $229,390 |
| **Total Closure Costs** | | |
| | Scenario 1 - No Access Road Deactivation | **$15,691,529** |
| | Scenario 2 - Deactivate Access Road from Minto Creek to Mine Site | **$15,835,496** |
| | Scenario 3 - Deactivate Entire Access Road | **$15,945,927** |
| **Total Closure Costs (Including Percentage Contingency Allowance on Above** | | **12%** |
| | Scenario 1 - No Access Road Deactivation | **$17,574,513** |
| | Scenario 2 - Deactivate Access Road from Minto Creek to Mine Site | **$17,735,755** |
| | Scenario 3 - Deactivate Entire Access Road | **$17,859,438** |

| Table 8-2: Minto Mine Closure Unit Rates for Current Year | | |
|---|---|---|
| **Equipment Rates** | | |
| Equipment | Rates/hr | Rate/mo |
| D9H Dozer | $260 | |
| Haul Truck D250E | $220 | |
| Tandem Haul Truck | $150 | |
| Cat 235 Excavator | $240 | |
| Cat 235 Excavator w hammer | $275 | |
| Cat 16H grader | $220 | |
| 988B Loader | $250 | |
| Tractor Trailer (lowbed) | $130 | |
| 30 ton Crane | $160 | |
| Hiab Flatdeck truck | $125 | |
| Pickup Truck | | $2,500 |
| **Personnel Rates** | | |
| Personnel | Rates/hr | Rate/mo |
| Blaster | $62 | |
| General Labourer | $47 | |
| Trades Labourer | $83 | |
| Site Supervisor | $99 | |
| Design Engineer | $135 | |
| Environmental Scientist | $99 | |
| Project Manager | | $9,700 |
| Camp Labourer | | $4,000 |
| Site Caretaker | | $6,100 |
| Environmental Monitor | | $5,000 |
| **Revegetation Rates** | | |
| Revegetation Seed Mix | $13.00 | per kg |
| Revegetation Seed Mix - 50kg/ha | $510.00 | per ha |
| Fertilizer | $1.00 | per kg |
| Fertilizer - 250kg/ha | $250.00 | per ha |
| Tree Seedlings (1,000 seedlings per ha) | $1,750.00 | per ha |
| Seed/Fertilizer Application | $1,500.00 | per ha |
| Erosion Barrier | $3.00 | per square m |
| **Revegetation cost per ha. Including application cost** | **$2,400.00** | **per ha** |
| **Contractor Unit Rates & Camp Costs** | | |
| Excavation of Soil | $4.50 | cu.m |
| Load, Haul and place soil cover MWD | $5.08 | cu.m |
| Load, Haul and place soil cover SWD | $3.85 | cu.m |
| Load, Haul & Place rock cover | $6.42 | cu.m |
| Custom Rate A (Load, haul and place from IROD - MWD / LGO) | $5.08 | cu.m |
| Custom Rate B (Load, haul and place IROD - HGO/MainWater Dam) | $5.99 | cu.m |
| Custom Rate C (Load, haul and place IROD - CSA) | $5.05 | cu.m |
| Custom Rate D (Push from TFOD - TF) | $2.15 | cu.m |
| Custom Rate E (Push from MWD - U/S MWD) | $2.15 | cu.m |
| Unit Basis (footing burial) | $5.00 | each |
| Load and Haul Rip Rap | $12.50 | cu.m |
| Place Riprap | $12.50 | cu.m |
| Freight run to Whitehorse | $1,000.00 | per load |
| Camp Cost | $70.00 | per day per person |
| Power and Heat | $5,500.00 | per month |
| Employee Transport Costs | $3,000.00 | per month |
| Barge Operating Cost | $10,000.00 | per month |

**Note:**
Custom Unit Rates have been developed specifically for Minto Mine, taking into account such factors as haul distance, grade, machinery required, time required, etc.

| Table 8-3: Waste Rock and Overburden Dumps, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | WASTE ROCK AND OVERBURDEN DUMPS | | | | | | | |
| **3.1** | **Main Waste Dump** | | | | | **6 yrs** | | |
| | Roll crest and recontour | D9H Dozer | hrs | 300 | $260 | $284 | $85,289 | $85,289 |
| | Haul and place overburden for revegetation | Load, Haul and place soil cover MWD | cu.m. | 178275 | $5.08 | $5.55 | $990,263 | $990,263 |
| | Project Management & Engineering | 7% of Total Cost | % | 5065 | 7.00% | | $75,289 | $75,289 |
| | **Sub-Total** | | | | | | **$1,150,840** | **$1,150,840** |
| **3.2** | **Southwest Dump** | | | | | **6 yrs** | | |
| | Roll crest and recontour | D9H Dozer | hrs | 220 | $260 | $284 | $62,545 | $62,545 |
| | Haul and place overburden for revegetation | Load, Haul and place soil cover SWD | cu.m. | 348250 | $5.70 | $6.23 | $2,170,512 | $2,170,512 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $156,314 | $156,314 |
| | **Sub-Total** | | | | | | **$2,389,371** | **$2,389,371** |
| | Roll crest of berm and recontour | D9H Dozer | hrs | 16 | $260 | $293 | $4,686 | $4,686 |
| | Excavate material for placement on berm | Cat 235 Excavator | hrs | 40 | $240 | $270 | $10,814 | $10,814 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,085 | $1,085 |
| | | | | | | | | |
| | **Sub-Total** | | | | | | **$16,586** | **$16,586** |
| **3.4** | **Reclamation Overburden Dump** | | | | | **8 yrs** | | |
| | Final Dump Surface Recontouring | Dozer D6LGP | hrs | 60 | $169 | $191 | **$11,450** | **$11,450** |
| | | | | | | | | |
| **3.5** | **Grade Bin Disposal Area** | | | | | **7 yrs** | | |
| | Move material to Area 1 Pit | 988B Loader | hrs | 3500 | $250 | $277 | $971,114 | $971,114 |
| | | D9H Dozer | hrs | 360 | $260 | $289 | $103,881 | $103,881 |
| | | Haul Truck D250E | hrs | 5500 | $220 | $244 | $1,342,912 | $1,342,912 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $67,978 | $67,978 |
| | **Sub-Total** | | | | | | **$2,485,886** | **$2,485,886** |
| **3.7** | **Contractor's Shop and Work Area** | | | | | **8 yrs** | | |
| | Remove salvageable equipment | General Labourer | hrs | 60 | $47 | $53 | $3,163 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $248 | $4,957 | |
| | | Trades Labourer | hrs | 48 | $83 | $94 | $4,499 | $12,619 |
| | Dismantle buildings | General Labourer | hrs | 60 | $47 | $53 | $3,163 | |
| | | 30 ton Crane | hrs | 10 | $160 | $180 | $1,802 | |
| | | Cat 235 Excavator | hrs | 30 | $240 | $270 | $8,111 | $13,076 |
| | Haul building pieces off site - equipment | Tractor Trailer (lowbed) | hrs | 20 | $130 | $146 | $2,929 | $2,929 |
| | Scrap haul to site landfill | Haul Truck D250E | hrs | 20 | $220 | $248 | $4,957 | $4,957 |
| | Bury footings - haul and place fill, locally sourced | Unit basis (footing burial) | each | 2500 | $5.00 | $5.63 | $14,081 | $14,081 |
| | Recontour | D9H Dozer | hrs | 15 | $260 | $293 | $4,393 | $4,393 |
| | Haul and place overburden for revegetation | Custom Rate C (Load, haul and place IROD - CSA) | cu.m. | 5000 | $5.05 | $5.69 | $28,444 | $28,444 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $5,635 | $5,635 |
| | **Sub-Total** | | | | | | **$86,134** | **$86,134** |
| **3.8** | **Contaminated Soils - Transport to LTF** | | | | | **10 yrs** | | |
| | | Unit basis | l.s. | 1 | $5,000 | $5,803 | **$5,803** | **$5,803** |
| **3.9** | **Mill Valley Fill** | | | | | **8 yrs** | | |
| | Roll crest and recontour | D9H Dozer | hrs | 30 | $260 | $293 | $7,800 | $7,800 |
| | Haul and place overburden for revegetation | Load, Haul and place soil cover MWD | cu.m. | 25500 | $10.63 | $11.97 | $271,065 | $271,065 |
| | Excavation of spillway channel | Cat 235 Excavator | hrs | 120 | $240 | $270 | $32,443 | $32,443 |
| | | D9H Dozer | hrs | 120 | $260 | $293 | $31,200 | $31,200 |
| | Provision for placement of rip rap | Rip rap from local area to MVF | cu.m. | 5000 | $15 | $16.90 | $75,000 | $75,000 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7% | | $29,226 | $29,226 |
| | **Sub-Total** | | | | | | **$446,734** | **$446,734** |
| **Total Estimated Cost in Reclaiming Overburden and Waste Rock Dumps** | | | | | | | **$6,592,802** | **$6,592,802** |

Note:
The Dozer D6LGP (item 3.4) unit rate was obtained from the Canadian Blue Book value and then inflated by 10% for the Yukon, prior to 8 yrs inflation of 1.5% compounded annually.
Item 3.5 quantities were estimated to move 930,000 t using two haul trucks and 1 loader. The material bordering the pit can be moved solely using the loader.

| Table 8-4: Open Pit, Underground and Haul Roads, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **OPEN PIT, UNDERGROUND AND HAUL ROADS** | | | | | | | |
| **4.1** | **Area 1 Pit** | | | | | **10 yrs** | | |
| | Remove pit pumps and pipe column/general cleanup | General Labourer | hrs | 80 | $47 | $54 | $4,345 | |
| | | Trades Labourer | hrs | 20 | $83 | $97 | $1,931 | |
| | | Support equipment | l.s. | | $1,000 | $1,161 | $1,161 | $7,437 |
| | Secure pit access - boulder placement | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $255 | $5,106 | $10,677 |
| | Construct exit channel into Mill Pond system | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | |
| | Riprap shoulder exiting pit | Place Riprap | cu.m | 50 | $15 | $17 | $870 | |
| | Exit Spillway construction | General Labourer | hrs | 10 | $47 | $54 | $543 | |
| | | Load and Haul Rip Rap | cu.m | 50 | $13 | $15 | $725 | $7,709 |
| | **Sub-Total** | | | | | | **$27,631** | **$27,631** |
| **4.2** | **Area 2 Pit** | | | | | **10 yrs** | | |
| | Remove pit pumps and pipe column/general cleanup | General Labourer | hrs | 80 | $47 | $54 | $4,345 | |
| | | Trades Labourer | hrs | 20 | $83 | $97 | $1,931 | |
| | | Support equipment | l.s. | | $1,000 | $1,161 | $1,161 | $7,437 |
| | Secure pit access - boulder placement | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $255 | $5,106 | $10,677 |
| | Construct exit channel into Mill Pond system | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | |
| | Riprap shoulder exiting pit | Place Riprap | cu.m | 50 | $15 | $17 | $870 | |
| | Exit Spillway construction | General Labourer | hrs | 10 | $47 | $54 | $543 | |
| | | Load and Haul Rip Rap | cu.m | 50 | $13 | $15 | $725 | $7,709 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,808 | $1,808 |
| | **Sub-Total** | | | | | | **$27,631** | **$27,631** |
| **4.3** | **Area 118 Pit** | | | | | **6 yrs** | | |
| | Remove pit pumps and pipe column/general cleanup | General Labourer | hrs | 60 | $47 | $51 | $3,070 | |
| | | Trades Labourer | hrs | 15 | $83 | $91 | $1,365 | |
| | | Support equipment | l.s. | | $750 | $820 | $820 | $5,255 |
| | Secure pit access - boulder placement | Cat 235 Excavator | hrs | 15 | $240 | $262 | $3,936 | |
| | | Haul Truck D250E | hrs | 15 | $220 | $241 | $3,608 | $7,545 |
| | Construct exit channel into Mill Pond system | Cat 235 Excavator | hrs | 15 | $240 | $262 | $3,936 | |
| | Riprap shoulder exiting pit | Place Riprap | cu.m | 37.5 | $15 | $16 | $615 | |
| | Exit Spillway construction | General Labourer | hrs | 7.5 | $47 | $51 | $384 | |
| | | Load and Haul Rip Rap | cu.m | 37.5 | $13 | $14 | $513 | $5,448 |
| | Haul and place overburden for revegetation | Load, Haul and place soil cover | cu.m. | 7500 | $4.30 | $4.70 | $35,264 | $35,264 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,277 | $1,277 |
| | **Sub-Total** | | | | | | **$54,789** | **$54,789** |
| **4.4** | **Haul Roads (15 ha)** | | | | | **8 yrs** | | |
| | Remove culverts and haul away | General Labourer | hrs | 55 | $47 | $53 | $2,920 | |
| | | Cat 235 Excavator | hrs | 28 | $240 | $270 | $7,487 | |
| | | Haul Truck D250E | hrs | 28 | $220 | $248 | $6,863 | $17,270 |
| | Recontour slopes | D9H Dozer | hrs | 208 | $260 | $293 | $60,831 | $60,831 |
| | Scarify surfaces | Cat 16H grader | hrs | 208 | $220 | $248 | $51,472 | |
| | | General Labourer | hrs | 28 | $47 | $53 | $1,460 | $52,932 |
| | Stabilize slopes - erosion barriers - material | Unit Cost Basis | sq.m | 2,769 | $3 | $3.38 | $9,359 | $9,359 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $9,827 | $9,827 |
| | **Sub-Total** | | | | | | **$150,218** | **$150,218** |
| **4.5** | **Underground** | | | | | **4 yrs** | | |
| | Backfill underground waste | Load and haul material | cu.m | 70,000 | $4.16 | $4.42 | **$309,069** | **$309,069** |
| | Recontour slopes | D9H Dozer | hrs | 12 | $260 | $276 | **$3,311** | **$3,311** |
| | Seal off underground portal | | l.s. | 1 | $10,000 | $10,614 | **$10,614** | **$10,614** |
| | Seal off ventilation raise | Cat 235 Excavator | hrs | 12 | $240 | $255 | **$3,057** | **$3,057** |
| | | Haul Truck D250E | hrs | 2 | $220 | $233 | **$467** | **$467** |
| | Rip and scarify road | Cat 16H grader | hrs | 8 | $220 | $233 | **$1,868** | **$1,868** |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | **$22,610** | **$22,610** |
| | **Sub-Total** | | | | | | **$350,995** | **$350,995** |
| **Total Estimated Cost in Reclaiming Open Pit and Haul Roads** | | | | | | | **$611,264** | **$611,264** |

**Note:**
Linear disturbances to be scarified / decompacted and allowed to naturally revegetate
Ventilation raise to be sealed by dumping rocks down raise until a bridge is formed and it fills to surface. Portal allowance assumes installation of bulkhead with

| Table 8-5: Tailings Area & Diversion Structures, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **TAILINGS AREA** | | | | | | | |
| **5.1** | **Tailings Deposit - Final Lift** | | | | | **1 yr** | | |
| | Roll crest of starter bench and recontour | D9H Dozer | hrs | 50 | $260 | $264 | $13,195 | $13,195 |
| | Push overburden from TFOD-TF | Material from Area 2 Pit to Dry Stack Tailings Facility | cu.m | 191200 | $5.80 | $5.89 | $1,125,594 | $1,125,594 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $79,715 | $79,715 |
| | **Sub-Total** | | | | | | **$1,218,505** | **$1,218,505** |
| **5.2** | **South Diversion Ditch** | | | | | **8 yrs** | | |
| | Widen south diversion ditch | D9H Dozer | hrs | 50 | $260 | $276 | $13,798 | $13,798 |
| | | Cat 235 Excavator | hrs | 20 | $240 | $255 | $5,095 | $5,095 |
| | Haul and place riprap | Load and Haul Rip Rap | cu.m | 1200 | $13 | $13 | $15,920 | |
| | | Place Riprap | cu.m | 1200 | $15 | $16 | $19,105 | $35,025 |
| | | General Labourer | hrs | 80 | $47 | $50 | $3,974 | $3,974 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $5,557 | $5,557 |
| | **Sub-Total** | | | | | | **$88,921** | **$88,921** |
| **Total Estimated Cost in Reclaiming Tailings Area** | | | | | | | **$1,307,426** | **$1,307,426** |

**Note:**
Material to provide soil cover for the dry stack tailings will be sourced from the Area 2 Pit.

| Table 8-6: Main Water Dam, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **WATER DAM** | | | | | | | |
| **6.1** | **Reclaim System** | | | | | **7 yrs** | | |
| | Remove salvageable equipment - pipeline/pumps | General Labourer | hrs | 48 | $47 | $52 | $2,493 | |
| | | Trades Labourer | hrs | 98 | $83 | $92 | $9,049 | $11,542 |
| | Remove pipeline | Haul Truck D250E | hrs | 100 | $220 | $244 | $24,417 | |
| | | Cat 235 Excavator | hrs | 100 | $240 | $266 | $26,636 | |
| | | General Labourer | hrs | 200 | $47 | $52 | $10,388 | $61,441 |
| | Dismantle Building | Cat 235 Excavator | hrs | 16 | $240 | $266 | $4,262 | |
| | | General Labourer | hrs | 20 | $47 | $52 | $1,039 | $5,301 |
| | Misc. Supplies & Tools | Misc. | l.s. | | $1,000 | $1,110 | $1,110 | $1,110 |
| | Recontour alignment | D9H Dozer | hrs | 16 | $260 | $289 | $4,617 | $4,617 |
| | **Sub-Total** | | | | | | **$89,892** | **$89,892** |
| **6.2** | **Main Dam** | | | | | **10 yrs** | | |
| | Pump down impounded water, over spillway (using reclaim pumps) | General Labourer | hrs | 96 | $47 | $54 | $5,214 | $5,214 |
| | Misc. Supplies & Tools | Misc. | l.s. | | $5,000 | $5,803 | $5,803 | $5,803 |
| | Build coffer dam and install pump-around system<br>Operate system until new structure is ready | Misc. | l.s. | | $10,000 | $11,605 | $11,605 | $11,605 |
| | Stockpile rip rap from downstream shell | Unit Cost Basis | cu.m | 10,000 | $10 | $12 | $116,054 | $116,054 |
| | Breach Dam: push material using dozer into new areas | Custom Rate E (Push from MWD - U/S MWD) | cu.m | 25,000 | $2 | $2 | $62,379 | |
| | and load, haul & dump and contour material in new area | Unit Cost Basis | cu.m | 31,000 | $4.50 | $5 | $161,895 | |
| | | Environmental Scientist | hrs | 60 | $98.80 | $115 | $6,880 | $231,154 |
| | Construct stream channel at original grade - haul and place rip rap | Unit Cost Basis | cu.m | 1,125 | $3 | $3 | $3,917 | |
| | | Unit Cost Basis | cu.m | 1,125 | $9 | $10 | $11,750 | $15,667 |
| | Haul and place overburden on slopes of new area u/s of MWD | Unit Cost Basis | cu.m | 15,000 | $2 | $2 | $34,816 | $34,816 |
| | Stabilize slopes with erosion barriers | Unit Rates | per sq. m | 15,000 | $3 | $3 | $52,224 | $52,224 |
| | Misc. Supplies & Tools | Misc. | l.s. | | $3,000 | $3,482 | $3,482 | $3,482 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $33,321 | $33,321 |
| | **Sub-Total** | | | | | | **$509,341** | **$509,341** |
| **Total Estimated Cost in Reclaiming Water Dam** | | | | | | | **$599,233** | **$599,233** |

| Table 8-7: Mill &Ancillary Facilities, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **MILL AND ANCILLARY FACILITIES** | | | | | | | |
| **7.1** | **Mill Building** | | | | | **8 yrs** | | |
| | Remove salvageable equipment | General Labourer | hrs | 550 | $47 | $53 | $28,996 | |
| | | Trades Labourer | hrs | 600 | $83 | $94 | $56,235 | |
| | | Crane Support | hrs | 40 | $145 | $163 | $6,534 | $91,764 |
| | Decontaminate Building-hosing and clean-up | Trades Labourer | hrs | 160 | $83 | $94 | $14,996 | $14,996 |
| | Dismantle Building | General Labourer | hrs | 1000 | $47 | $53 | $52,720 | |
| | | Trades Labourer | hrs | 600 | $83 | $94 | $56,235 | |
| | | Cat 235 Excavator w hammer | hrs | 120 | $275 | $310 | $37,174 | |
| | | Crane Support | hrs | 60 | $145 | $163 | $9,800 | $155,929 |
| | Concrete Demolition | Blaster | hrs | 30 | $62 | $70 | $2,109 | |
| | | D9H Dozer | hrs | 20 | $260 | $293 | $5,858 | $13,374 |
| | Misc. Supplies & Tools | Misc. | l.s. | | $11,000 | $12,391 | $12,391 | $12,391 |
| | Scrap haul to solid waste facility | Cat 235 Excavator | hrs | 50 | $240 | $270 | $13,518 | |
| | | Haul Truck D250E | hrs | 100 | $220 | $248 | $24,783 | $38,301 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $22,873 | $22,873 |
| | **Subtotal:** | | | | | | **$349,628** | **$349,628** |
| | | | | | | Subtract 50% for Salvage Value | **$174,814** | **$174,814** |
| **7.2** | **Generator & Filter Buildings & Concentrate Shed** | | | | | **8 yrs** | | |
| | Remove salvageable equipment | General Labourer | hrs | 240 | $47 | $53 | $12,653 | |
| | | Trades Labourer | hrs | 240 | $83 | $94 | $22,494 | $35,147 |
| | | Crane Support | hrs | 24 | $145 | $163 | $3,920 | |
| | Salvage and remove powerline and poles | | l.s. | | $27,500 | $30,979 | $30,979 | $34,899 |
| | Dismantle Buildings | General Labourer | hrs | 160 | $47 | $53 | $8,435 | |
| | | Trades Labourer | hrs | 80 | $83 | $94 | $7,498 | |
| | | Cat 235 Excavator w hammer | hrs | 40 | $275 | $310 | $12,391 | |
| | | Crane Support | hrs | 30 | $145 | $163 | $4,900 | $33,225 |
| | Concrete Demolition | Blaster | hrs | 40 | $62 | $70 | $2,812 | |
| | | Cat 235 Excavator | hrs | 20 | $240 | $270 | $5,407 | |
| | | D9H Dozer | hrs | 20 | $260 | $293 | $5,858 | $14,077 |
| | Misc. Supplies & Tools | Misc. | l.s. | | $10,000 | $11,265 | $11,265 | $11,265 |
| | Scrap haul to solid waste facility | Cat 235 Excavator | hrs | 10 | $240 | $270 | $2,704 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $248 | $4,957 | $7,660 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $9,539 | $9,539 |
| | **Subtotal:** | | | | | | **$145,811** | **$145,811** |
| | | | | | | Subtract 50% for Salvage Value | **$72,905** | **$72,905** |
| **7.3** | **Fuel Storage Area** | | | | | **8 yrs** | | |
| | Cleanout tanks-remove sludge, pressure wash | General Labourer | hrs | 60 | $47 | $53 | $3,163 | |
| | | Removal to Licensed facility | l.s. | | $10,000 | $11,265 | $11,265 | $14,428 |
| | Remove bulk fuel storage and piping facilities | General Labourer | hrs | 100 | $47 | $53 | $5,272 | |
| | | Trades Labourer | hrs | 120 | $83 | $94 | $11,247 | |
| | | Crane Support | hrs | 30 | $145 | $163 | $4,900 | |
| | | Support Equipment | l.s. | | $2,500 | $2,816 | $2,816 | |
| | | Cat 235 Excavator | hrs | 40 | $240 | $270 | $10,814 | |
| | | General Labourer | hrs | 40 | $47 | $53 | $2,109 | |
| | | Tractor Trailer (lowbed) | hrs | 30 | $130 | $146 | $4,393 | $41,552 |
| | Fold and Bury Liner | Cat 235 Excavator | hrs | 20 | $240 | $270 | $5,407 | |
| | | D9H Dozer | hrs | 100 | $260 | $293 | $29,289 | $34,696 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $6,347 | $6,347 |
| | **Subtotal:** | | | | | | **$97,023** | **$97,023** |
| **7.4** | **Mill Reagents** | | | | | **8 yrs** | | |
| | Load and return extra reagents/chemicals | General Labourer | hrs | 100 | $47 | $53 | $5,272 | |
| | | Support Equipment | l.s. | | $2,500 | $2,816 | $2,816 | |
| | | Disposal Cost-bulk materials | l.s. | | $5,000 | $5,632 | $5,632 | |
| | | Disposal Cost-lab-pacs | pallets | 2 | $2,000 | $2,253 | $4,506 | $18,227 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,276 | $1,276 |
| | **Subtotal:** | | | | | | **$19,503** | **$19,503** |
| **7.5** | **Reclaim Entire Mill Site Area** | | | | | **8 yrs** | | |
| | Test soils for contamination | Environmental Scientist | hrs | 35 | $99 | $111 | $3,895 | |
| | | Analytical Costs | l.s. | | $6,000 | $6,759 | $6,759 | $10,654 |
| | Haul any contaminated soils to Land Treatment Facility | Cat 235 Excavator | hrs | 15 | $240 | $270 | $4,055 | |
| | | Haul Truck D250E | hrs | 15 | $220 | $248 | $3,717 | $7,773 |
| | Re-contour area and slopes to bury footings and establish drainage | D9H Dozer | hrs | 100 | $260 | $293 | $29,289 | $29,289 |
| | Haul and place overburden cap | Unit Rate | cu.m | 38000 | $5.50 | $6.20 | $235,437 | $235,437 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $19,821 | $19,821 |
| | **Subtotal:** | | | | | | **$302,974** | **$302,974** |
| **Total Estimated Cost in Reclaiming Mill and Ancillary Facilities** | | | | | | | **$667,219** | **$667,219** |

| Table 8-8: Mill Water Pond, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **MILL POND** | | | | | | | |
| **8.1** | **Reclaim Mill Pond** | | | | | **8 yrs** | | |
| | Remove upstream culvert | General Labourer | hrs | 10 | $47 | $53 | $527 | |
| | | Cat 235 Excavator | hrs | 10 | $240 | $270 | $2,704 | $3,231 |
| | Construct channel | Cat 235 Excavator | hrs | 100 | $240 | $270 | $27,036 | |
| | | D9H Dozer | hrs | 20 | $260 | $293 | $5,858 | $32,894 |
| | | Load and Haul Rip Rap | cu.m | 5,000 | $13 | $14 | $70,406 | $70,406 |
| | | General Labourer | hrs | 20 | $47 | $53 | $1,054 | $1,054 |
| | | Place Riprap | cu.m | 5,000 | $15 | $17 | $84,487 | $84,487 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $13,445 | $13,445 |
| | **Subtotal:** | | | | | | **$205,516** | **$205,516** |

**Note:**

## Table 8-9: Main Access Road, Estimated Closure Costs

### Scenario 1 - No Road Deactivation

| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Cost Variance | Total Adjusted |
|---|---|---|---|---|---|---|---|---|---|
| **9.1** | **NO ROAD DECOMMISSIONING REQUIRED** | | | | | | | | |
| **9.1.1** | **Road Surface** | | | | | **10 yrs** | | | |
| | Install road barrier at west side of Minto Creek | Misc | l.s. | | $2,000 | $2,321 | $2,321 | | $2,321 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $162 | | $162 |
| | **Subtotal:** | | | | | | **$2,484** | **$0** | **$2,484** |
| **Total Estimated Cost for Access Road Closure (Scenario 1)** | | | | | | | **$2,484** | **$0** | **$2,484** |

### Scenario 2 - Decommission Access Road From Minto Creek to Mine Site (11 KM)

| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Cost Variance | Total Adjusted |
|---|---|---|---|---|---|---|---|---|---|
| **9.2** | **ACCESS ROAD - 11 KM SECTION** | | | | | | | | |
| | Scarify - 11 km | Cat 16H grader | hrs | 70 | $220 | $255 | $17,872 | | $17,872 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,251 | | $1,251 |
| | **Subtotal:** | | | | | | **$19,123** | **$0** | **$19,123** |
| **9.2.2** | **Culverts** | | | | | **10 yrs** | | | |
| | Culvert excavation (40 small culverts) | Cat 235 Excavator | hrs | 100 | $240 | $279 | $27,853 | | $27,853 |
| | Culvert removal | General Labourer | hrs | 140 | $47 | $54 | $7,604 | | |
| | | Haul Truck D250E | hrs | 100 | $220 | $255 | $25,532 | | $33,136 |
| | Minto Creek Culvert Removal & Streambank Restoration | Trades Labourer | hrs | 40 | $83 | $97 | $3,862 | | |
| | | General Labourer | hrs | 75 | $47 | $54 | $4,073 | | |
| | | Cat 235 Excavator | hrs | 40 | $240 | $279 | $11,141 | | $19,077 |
| | Recontour slopes and drainage | D9H Dozer | hrs | 70 | $260 | $302 | $21,122 | | $21,122 |
| | Stabilize slopes | General Labourer | hrs | 200 | $47 | $54 | $10,863 | | |
| | Erosion barriers | Unit Cost Basis | per sq. m | 500 | $3.00 | $3.48 | $1,741 | | $12,603 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $7,965 | | $7,965 |
| | **Subtotal:** | | | | | | **$121,756** | **$0** | **$121,756** |
| **Total Estimated Cost for Access Road Closure (Scenario 2)** | | | | | | | **$140,880** | **$0** | **$140,880** |

### Scenario 3 - Decommission Entire Access Road (27 KM)

| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | | Cost | Total Cost Variance | Total Adjusted |
|---|---|---|---|---|---|---|---|---|---|
| **9.3** | **ACCESS ROAD - 27 KM SECTION** | | | | | | | | |
| **9.3.1** | **Road Surface** | | | | | **10 yrs** | | | |
| | Scarify - 27 km | Cat 16H grader | hrs | 150 | $220 | $255 | $38,298 | | $38,298 |
| | Recontour slopes and drainage | D9H Dozer | hrs | 50 | $260 | $302 | $15,087 | | $15,087 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $3,737 | | $3,737 |
| | **Subtotal:** | | | | | | **$57,122** | **$0** | **$57,122** |
| **9.3.2** | **Big Creek Bridge** | | | | | **10 yrs** | | | |
| | Remove bridge decking and span | General Labourer | hrs | 50 | $47 | $54 | $2,716 | | |
| | | Crane | hrs | 40 | $145 | $168 | $6,731 | | |
| | | Cat 235 Excavator | hrs | 40 | $240 | $279 | $11,141 | | |
| | | Tractor Trailer (lowbed) | hrs | 20 | $130 | $151 | $3,017 | | $23,605 |
| | Cut off piles | General Labourer | hrs | 50 | $47 | $54 | $2,716 | | $2,716 |
| | Re-contour | Cat 235 Excavator | hrs | 30 | $240 | $279 | $8,356 | | |
| | | D9H Dozer | hrs | 30 | $260 | $302 | $9,052 | | $17,408 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $3,061 | | $3,061 |
| | **Subtotal:** | | | | | | **$46,790** | **$0** | **$46,790** |
| **9.3.3** | **Barge Ramps** | | | | | **10 yrs** | | | |
| | Remove all gravel | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | | $5,571 |
| | Re-countour areas and scarify | D9H Dozer | hrs | 30 | $260 | $302 | $9,052 | | $9,052 |
| | Shoreline restoration | Misc. | l.s. | | $5,000 | $5,803 | $5,803 | | $5,803 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,430 | | $1,430 |
| | **Subtotal:** | | | | | | **$21,855** | **$0** | **$21,855** |
| **9.3.4** | **Culverts** | | | | | **10 yrs** | | | |
| | Culvert excavation (45 small culverts) | Cat 235 Excavator | hrs | 115 | $240 | $279 | $27,600 | | $27,600 |
| | Culvert removal | General Labourer | hrs | 150 | $47 | $54 | $7,020 | | |
| | | Haul Truck D250E | hrs | 115 | $220 | $255 | $25,300 | | $32,320 |
| | Minto Creek Culvert Removal & Streambank Restoration | Trades Labourer | hrs | 40 | $83 | $97 | $3,328 | | |
| | | General Labourer | hrs | 75 | $47 | $54 | $3,510 | | |
| | | Cat 235 Excavator | hrs | 40 | $240 | $279 | $9,600 | | $16,438 |
| | Recontour slopes and drainage | D9H Dozer | hrs | 70 | $260 | $302 | $18,200 | | $18,200 |
| | Stabilize slopes | General Labourer | hrs | 200 | $47 | $54 | $9,360 | | |
| | Erosion barriers | Unit Cost Basis | per sq. m. | 1,000 | $3 | $3.48 | $3,000 | | $12,360 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $7,484 | | $7,484 |
| | **Subtotal:** | | | | | | **$114,402** | **$0** | **$114,402** |
| **Total Estimated Cost for Access Road Closure (Scenario 3)** | | | | | | | **$240,170** | **$0** | **$240,170** |

**Note:**

| Table 8-10: Miscellaneous Sites and Facilities, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **MISCELLANEOUS SITES AND FACILITIES** | | | | | | | |
| **10.1** | **Airstrip** | | | | | **8 yrs** | | |
| | Scarify airstrip | Cat 16H Grader | hrs | 20 | $220 | $248 | $4,957 | $4,957 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $347 | $347 |
| | Natural revegetation | n/a | n/a | | | | | |
| | **Subtotal:** | | | | | | **$5,304** | **$5,304** |
| **10.2** | **Mine Camp and Related Infrastructure** | | | | | **8 yrs** | | |
| | Disconnect Services | Trades Labourer | hrs | 80 | $83 | $94 | $7,498 | $7,498 |
| | Remove salvageable equipment | General Labourer | hrs | 704 | $47 | $53 | $37,115 | $37,115 |
| | Dismantle buildings | General Labourer | hrs | 1200 | $47 | $53 | $63,264 | |
| | | Cat 235 Excavator | hrs | 120 | $240 | $270 | $32,443 | $95,707 |
| | | Cat 235 Excavator | hrs | 10 | $240 | $270 | $2,704 | $7,660 |
| | Reclaim Septic System | General Labourer | hrs | 10 | $47 | $53 | $527 | |
| | | Cat 235 Excavator | hrs | 2 | $240 | $270 | $541 | $1,068 |
| | Site Clean-Up | General Labourer | hrs | 500 | $47 | $53 | $26,360 | $26,360 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $11,754 | $11,754 |
| | **Subtotal:** | | | | | | **$187,161** | **$187,161** |
| | | | | | | Subtract 50% for salvage value | **$93,581** | **$93,581** |
| **10.3** | **Explosives Plant Site** | | | | | **8 yrs** | | |
| | Remove salvageable equipment | General Labourer | hrs | 100 | $47 | $53 | $5,272 | |
| | | Trades Labourer | hrs | 50 | $83 | $94 | $4,686 | $9,958 |
| | Dismantle buildings | General Labourer | hrs | 200 | $47 | $53 | $10,544 | |
| | | Cat 235 Excavator | hrs | 30 | $240 | $270 | $8,111 | $18,655 |
| | Disconnect Services | Trades Labourer | hrs | 20 | $83 | $94 | $1,874 | $1,874 |
| | Crane services | 30 ton Crane | hrs | 5 | $160 | $180 | $901 | $901 |
| | Haul scrap to Solid Waste Facility | Haul Truck D250E | hrs | 30 | $220 | $248 | $7,435 | |
| | | Cat 235 Excavator | hrs | 10 | $240 | $270 | $2,704 | $10,138 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $2,907 | $2,907 |
| | **Subtotal:** | | | | | | **$44,434** | **$44,434** |
| | | | | | | Subtract 50% for salvage value | **$22,217** | **$22,217** |
| **10.4** | **Exploration Sites and Trails** | | | | | **8 yrs** | | |
| | Natural revegetation | n/a | n/a | | | | | |
| | **Subtotal:** | | | | | | **$0** | **$0** |
| **10.5** | **Land Treatment Facility** | | | | | **8 yrs** | | |
| | Prepare and submit closure plan | Misc | l.s. | | $2,000 | $2,253 | $2,253 | $2,253 |
| | Characterize final soil hydrocarbon concentrations | Misc | l.s. | | $3,000 | $3,379 | $3,379 | $3,379 |
| | Recontour | D9H Dozer | hrs | 2 | $260 | $293 | $586 | $586 |
| | Haul and place overburden cap from nearby | Cat 235 Excavator | hrs | 20 | $240 | $270 | $5,407 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $248 | $4,957 | |
| | | D9H Dozer | hrs | 6 | $260 | $293 | $1,757 | $12,121 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,284 | $1,284 |
| | **Subtotal:** | | | | | | **$19,623** | **$19,623** |
| **10.6** | **Solid Waste Facility** | | | | | **10 yrs** | | |
| | Prepare detailed closure plan | Misc | l.s. | | $2,000 | $2,321 | $2,321 | $2,321 |
| | Characterize final waste area | Misc | l.s. | | $2,000 | $2,321 | $2,321 | $2,321 |
| | Remove recyclables and special waste materials | Tractor Trailer (lowbed) | hrs | 40 | $130 | $151 | $6,035 | $6,035 |
| | Recontour | D9H Dozer | hrs | 2 | $260 | $302 | $603 | $603 |
| | Haul and cover with adjacent fill and place overburden cap | Cat 235 Excavator | hrs | 20 | $240 | $279 | $5,571 | |
| | | Haul Truck D250E | hrs | 20 | $220 | $255 | $5,106 | |
| | Compaction of cover | D9H Dozer | hrs | 6 | $260 | $302 | $1,810 | $12,487 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,664 | $1,664 |
| | **Subtotal:** | | | | | | **$25,432** | **$25,432** |
| **10.7** | **Site Roads** | | | | | **8 yrs** | | |
| | Recontour | Cat 235 Excavator | hrs | 30 | $240 | $270 | $8,111 | $8,111 |
| | Scarify | Cat 16H Grader | hrs | 40 | $220 | $248 | $9,913 | $9,913 |
| | Project Management & Engineering | 7% of Total Cost | % | | 7.00% | | $1,262 | $1,262 |
| | **Subtotal:** | | | | | | **$19,286** | **$19,286** |
| **Total Estimated Cost in Reclaiming Miscellaneous Sites and Facilities** | | | | | | | **$185,441** | **$185,441** |

**Note:**
Land treatment facility is a licensed facility and will be reclaimed as per license terms and conditions

| Table 8-11: Reclamation Research and Revegetation, Estimated Closure Costs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| **11.1** | **REVEGETATION ACTIVITIES** | | | | | | |
| **11.1.0** | **Determination of Revegetation Plan for Current Site** | | | | **2 yrs** | | |
| | Issuance of a plan for all site areas for regulatory review and approval | Misc | 1 | $20,000 | $20,605 | $20,605 | $20,000 |
| | **Sub-Total** | | | | | **$20,605** | **$20,000** |
| **11.1.1** | **Main and Southwest Dumps (total surface area of 117.5 ha)** | | | | **6 yrs** | | |
| | Seed and fertilize w/ labour | ha | 117.5 | $2,400 | $2,624 | $308,351 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 58.8 | $2,400 | $2,624 | $154,176 | |
| | Re-forest | ha | 117.5 | $1,750 | $1,914 | $224,839 | $687,366 |
| | **Sub-Total** | | | | | **$687,366** | **$687,366** |
| **11.1.2** | **Ice-Rich Overburden Dump (toe berm surface area of 6.9ha)** | | | | **8 yrs** | | |
| | Seed and fertilize w/ labour | ha | 6.9 | $2,400 | $2,704 | $18,655 | |
| | Re-forest | ha | 6.9 | $1,750 | $1,971 | $13,602 | $41,584 |
| | **Sub-Total** | | | | | **$41,584** | **$41,584** |
| **11.1.3** | **Reclamation Overburden Dump (total surface area of 30 ha)** | | | | **8 yrs** | | |
| | Seed and fertilize w/ labour | ha | 30.0 | $2,400 | $2,704 | $81,107 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 15.0 | $2,400 | $2,704 | $40,554 | |
| | Re-forest | ha | 30.0 | $1,750 | $1,971 | $59,141 | $180,802 |
| | **Sub-Total** | | | | | **$180,802** | **$180,802** |
| **11.1.4** | **Ore Stockpiles and Pads (final total surface area of 15.7 ha)** | | | | **8 yrs** | | |
| | Seed and fertilize w/ labour | ha | 15.7 | $2,400 | $2,704 | $42,446 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 7.9 | $2,400 | $2,704 | $21,223 | |
| | Re-forest | ha | 15.7 | $1,750 | $1,971 | $30,950 | $94,620 |
| | **Sub-Total** | | | | | **$94,620** | **$94,620** |
| **11.1.5** | **Mill Valley Fill (8 ha)** | | | | **8 yrs** | | |
| | Seed and fertilize w/ labour | ha | 8.0 | $2,400 | $2,704 | $21,629 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 4.0 | $2,400 | $2,704 | $10,814 | |
| | Re-forest | ha | 8.0 | $1,750 | $1,971 | $15,771 | $48,214 |
| | **Sub-Total** | | | | | **$48,214** | **$48,214** |
| **11.1.6** | **Contractor's Shop and Office Area (disturbed area of 2.5 ha)** | | | | **10 yrs** | | |
| | Seed and fertilize w/ labour | ha | 2.5 | $2,400 | $2,785 | $6,963 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 1.3 | $2,400 | $2,785 | $3,482 | |
| | Re-fertilize only (1/2 total area - re-seed area) | ha | 0.0 | $1,900 | $2,205 | $0 | |
| | Re-forest | ha | 2.5 | $1,750 | | $0 | $10,445 |
| | **Sub-Total** | | | | | **$10,445** | **$10,445** |
| **11.1.7** | **Tailings Area current disturbed area of 30.2 ha)** | | | | **1 yr** | | |
| | Seed and fertilize w/ labour | ha | 30.2 | $2,400 | $2,436 | $73,567 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 15.1 | $2,400 | $2,436 | $36,784 | |
| | Re-forest | ha | 30.2 | $1,750 | $1,776 | $53,643 | $163,994 |
| | **Sub-Total** | | | | | **$163,994** | **$163,994** |
| **11.1.8** | **Main Water Dam (total dam surface area 3.3 ha)** | | | | **10 yrs** | | |
| | Seed and fertilize w/ labour | ha | 3.3 | $2,400 | $2,785 | $9,191 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 1.7 | $2,400 | $2,785 | $4,596 | |
| | Re-forest | ha | 3.3 | $1,750 | $2,031 | $6,702 | $20,489 |
| | **Sub-Total** | | | | | **$20,489** | **$20,489** |
| **11.1.9** | **Mill Area (total surface area of 7.6 ha)** | | | | **8 yrs** | | |
| | Seed and Fertilize w/ labour | ha | 7.6 | $2,400 | $2,704 | $20,547 | |
| | Re-seed and fertilize (1/2 of total area) | ha | 3.8 | $2,400 | $2,704 | $10,274 | |
| | Re-forest | ha | 7.6 | $1,750 | $1,971 | $14,982 | $45,803 |

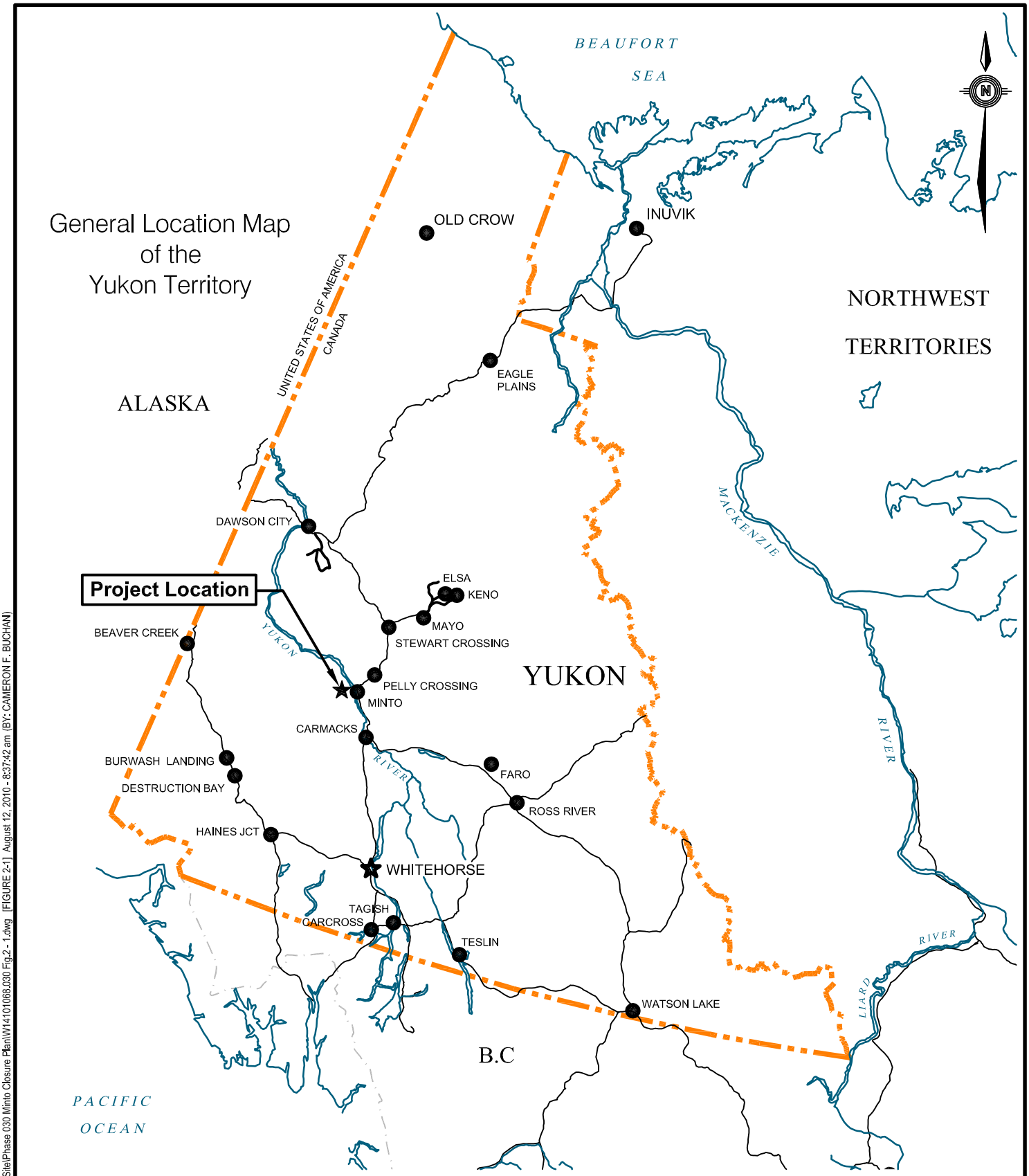
| Table 8-12: Site Management and Monitoring, Estimated Closure Costs | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Adjusted |
| | **SITE MANAGEMENT** | | | | | | | |
| **12.1** | **Onsite Management** | | | | | | | |
| | Project Management and Engineering - Included in PME Costs in each Closure Component | | | | | | | |
| | Pickup truck | Light truck | monthly | 50 | $2,500 | $2,576 | $128,778 | $128,778 |
| | Sundry equipment maintenance | Unit Cost Basis | yearly | 10 | $5,000 | $5,386 | $53,864 | $53,864 |
| | Power and heat | Unit Cost Basis | monthly | 30 | $5,500 | $5,603 | $168,100 | $168,100 |
| | General Administrative expenses | Unit Cost Basis | monthly | 50 | $2,000 | $2,060 | $103,023 | $103,023 |
| | Camp Costs (5 year period) | Unit Cost Basis | man-day | 5130 | $60 | $62 | $319,473 | $319,473 |
| | **Subtotal:** | | | | | | **$773,237** | **$773,237** |
| | | | | | | | | |
| **12.2** | **Transport Costs** | | | | | | | |
| | Barge operating costs | Unit Cost Basis | monthly | 20 | $10,000 | $10,150 | $203,000 | $203,000 |
| | **Subtotal:** | | | | | | **$357,534** | **$357,534** |
| **12.3** | **Water Treatment and Compliance Monitoring incl. Reporting** | | | | | | | |
| | Active - Treatment, operating costs (2 years) incl. staff, reagents | | monthly | 12 | $87,000 | $89,630 | $1,075,555 | $1,075,555 |
| | Cost per cubic metre of compliant water (0.01 ppm Cu) (2 years) | | cu.m | 1440000 | $0.40 | $0.41 | $593,410 | $593,410 |
| | **Subtotal:** | | | | | | **$1,668,965** | **$1,668,965** |
| **12. 4** | **Water Quality Monitoring (Post Mine Closure) (50:50 sampling labour/analyses costs split)** | | | | | | | |
| | Years 1-5 (monthly during open season) | Misc. | monthly | 30 | $3,000 | $3,379 | $101,384 | |
| | Years 6-10 (quarterly - spring/summer/fall) | Misc. | quarterly | 15 | $3,000 | $3,379 | $50,692 | |
| | Years 11-15 (once annually - post spring freshet) | Misc. | yearly | 5 | $3,000 | $3,379 | $16,897 | $168,974 |
| | Disbursements (non-labour/non-analytical) | Misc. | l.s. | 15 | $3,000 | $3,379 | $50,692 | $50,692 |
| | LTF Monitoring and Maintenance (years 1-5) | Misc. | yearly | 5 | $3,500 | $3,943 | $19,714 | $19,714 |
| | Enhanced Groundwater/Foundation monitoring below TF and Waste Rock Dumps | Misc. | yearly | 15 | $5,000 | $5,632 | $84,487 | $84,487 |
| | Geo-technical Inspections (annually yrs 1-5, bi-annual yrs 6-15) | Misc. | l.s. | 10 | $5,000 | $5,632 | $56,325 | $56,325 |
| | Reclamation Inspections (annually yrs 1-5, bi-annual yrs 6-15) | Misc. | l.s. | 10 | $5,000 | $5,632 | $56,325 | $56,325 |
| | Biological Monitoring - Closure implementation | Misc. | l.s. | 1 | $9,000 | $10,138 | $10,138 | |
| | Years 1-5 (Annually) | Misc. | yearly | 5 | $3,000 | $3,379 | $16,897 | |
| | Years 6-10 (Annually) | Misc. | yearly | 5 | $3,000 | $3,379 | $16,897 | |
| | Years 11-15 (Every two years) | Misc. | bi-annual | 3 | $2,500 | $2,816 | $8,449 | $52,382 |
| | **Subtotal:** | | | | | | **$488,898** | **$488,898** |
| **12.5** | **Post Closure Maintenance - Main Dam** | | | | | | | |
| | Monitoring of piezometers, thermistors | | | | | | | |
| | Years 1-5 (quarterly) | Misc. | quarterly | 20 | $3,000 | $3,379 | $67,590 | |
| | Years 6-10 (bi-annually) | Misc. | bi-annually | 8 | $3,000 | $3,379 | $27,036 | |
| | Years 11-15 (annually) | Misc. | annual | 5 | $2,500 | $2,816 | $14,081 | |
| | Annual Inspection + report | Misc. | annual | 15 | $3,000 | $3,379 | $50,692 | |
| | Carry out inspection recommendations/maintenance | Misc. | annual | 15 | $10,000 | $11,265 | $168,974 | $328,373 |
| | Misc. maintenance work related to the site after closure (Yr1-5) | Misc. | yearly | 5 | $10,000 | $10,379 | $51,896 | $51,896 |
| | Misc. maintenance work related to the site after closure (Yr6-15) | Misc. | per year | 10 | $5,000 | $5,803 | $58,027 | $58,027 |
| | **Subtotal:** | | | | | | **$438,296** | **$438,296** |
| **12.6** | **Ulitmate Removal of wells and instrumentation** | Misc. | unit basis | | $15,000 | $18,753 | **$18,753** | **$18,753** |
| **Total Estimated Cost for Post Closure Site Management** | | | | | | | **$3,745,682** | **$3,745,682** |

**Note:**
Camp Costs calculation based on "Table 7-1 Site Decommissioning and Reclamation Seasonal Personnel Requirements" using a 90 day work year
Inflation rates vary per subtask depending upon the year expenses are incurred or the average year over which expenses are incurred

| Table 8-13: Supporting Studies, Estimated Closure Costs | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Item No. | Work Item Description | Equipment / Labour | Units | Quantity | Unit Rates | Inflated Unit Rates | Cost | Total Cost Variance | Total Adjusted |
| **13.1** | **Permafrost Foundation Monitoring** | | | | | | | | |
| **13.1.1** | Enhanced subsurface monitoring program in and below waste rock dumps (WRD) | | | | | **1 yr** | | | |
| | preparing detailed monitoring program | Misc. | l.s. | | $4,000 | $4,060 | $4,060 | | |
| | undertake additional monitoring as per program(covered in T. 12) | Misc. | yearly | | $3,500 | $3,553 | $3,553 | | $7,613 |
| | Enhanced Adaptive Management Plan for WRD | Misc. | l.s. | 1 | $4,000 | $4,060 | $4,060 | $28,000 | $4,060 |
| | | | | | | | | | |
| **13.1.2** | Enhanced subsurface monitoring program in and below Tailings Facility (TF) | | | | | **1 yr** | | | |
| | preparing detailed monitoring program | Misc. | l.s. | | $4,000 | $4,060 | $4,060 | | |
| | undertake additional monitoring as per program (covered in T. 12) | Misc. | yearly | 1 | $3,500 | $3,553 | $3,553 | | $7,613 |
| | Enhanced Adaptive Management Plan for TF | Misc. | l.s. | 1 | $4,000 | $4,060 | $4,060 | $33,000 | $4,060 |
| | **Subtotal:** | | | | | | **$23,345** | **$61,000** | **$23,345** |
| **13.2** | **Kinetic Tailings Testing** | | | | | | | | |
| **13.2.1** | Monitoring program and field test to enhance long term water quality prediction related to drystack tailings facility | | | | | **1 yr** | | | |
| | preparing composite sample over several months of production | Misc. | l.s. | | $2,500 | $2,538 | $2,538 | | $2,538 |
| | undertaking field test | Misc. | l.s. | | $6,000 | $6,090 | $6,090 | | |
| | initiate parallel laboratory analysis | Misc. | l.s. | | $5,000 | $5,075 | $5,075 | | |
| | monitoring field apparatus (columns | Misc. | l.s. | | $2,000 | $2,030 | $2,030 | | $13,195 |
| | reporting | | | | $2,500 | $2,538 | $2,538 | | $2,538 |
| | **Subtotal:** | | | | | | **$18,270** | **$0** | **$18,270** |
| **13.3** | **Other Adaptive Management Plans scheduled for Operating Life or Required Only in Early Shutdown** | | | | | **1 yr** | | | |
| | Changes in WTP input water quality or quantity | Misc. | l.s. | | $15,000 | $15,225 | $15,225 | | $15,225 |
| | Site Testing ML ARD | Misc. | l.s. | | $30,000 | $30,450 | $30,450 | | $30,450 |
| | Long Term Reclamation of Contaminated Soils | Misc. | l.s. | | $15,000 | $15,225 | $15,225 | | $15,225 |
| | Physical Monitoring program prior to closure | Misc. | l.s. | | $40,000 | $40,600 | $40,600 | | $40,600 |
| | Modeling of Pit Lake water quality prior to flooding | Misc. | l.s. | | $15,000 | $15,225 | $15,225 | | $15,225 |
| | **Subtotal:** | | | | | | **$116,725** | **$61,000** | **$116,725** |
| **13.4** | **Closure Specific Studies and Field Trials** | | | | | **1 yr** | | | |
| | Main Site Discharge Channel Geotechnical Design and Stability Evaluation | Engineering/Design | l.s. | 1 | $30,000 | $30,450 | $30,450 | | $30,450 |
| | Passive Treatment Evaluations | Engineering/Design | l.s. | 1 | $15,000 | $15,225 | $15,225 | | $15,225 |
| | Engineered Cover Evaluations | Engineering/Design | l.s. | 1 | $25,000 | $25,375 | $25,375 | | $25,375 |
| | **Subtotal:** | | | | | | **$71,050** | **$61,000** | **$71,050** |
| **Total Estimated Cost for Supporting Studies** | | | | | | | **$229,390** | **$89,000** | **$229,390** |

**Note:**

# FIGURES




CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**LOCATION PLAN**

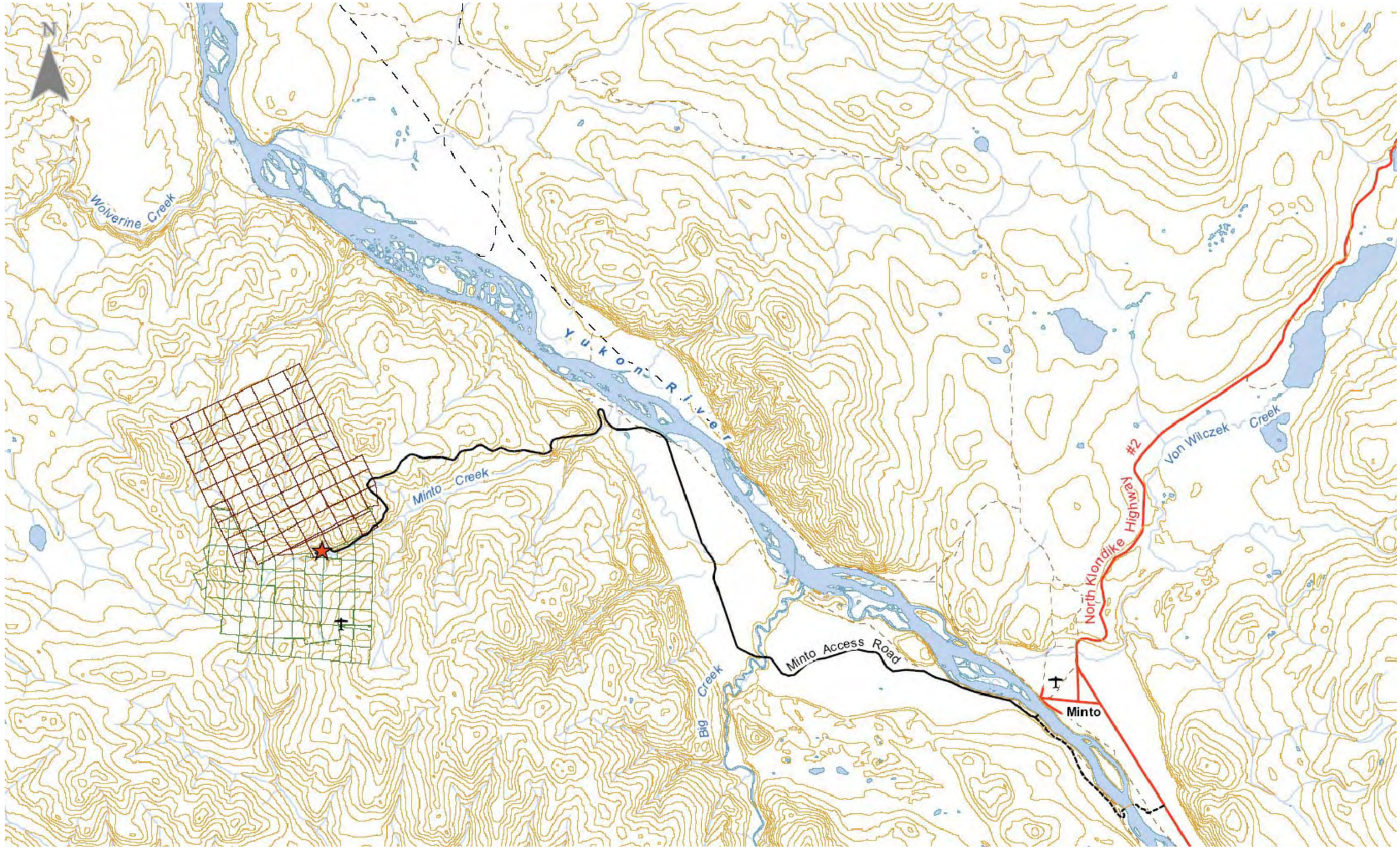
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 2-1**

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 030 Minto Closure Plan\W14101068.030 Fig.2 - 1.dwg [FIGURE 2-1] August 12, 2010 - 8:37:42 am (BY: CAMERON F. BUCHAN)




LEGEND:

- Mine Site
- Airstrip
- Road
- Mine Access Road
- Trail
- Minto Claim -DEF
- Minto Claim - Minto

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED SEPTEMBER 2009

0 50 000

Scale: 1: 100 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**PROJECT AREA OVERVIEW**

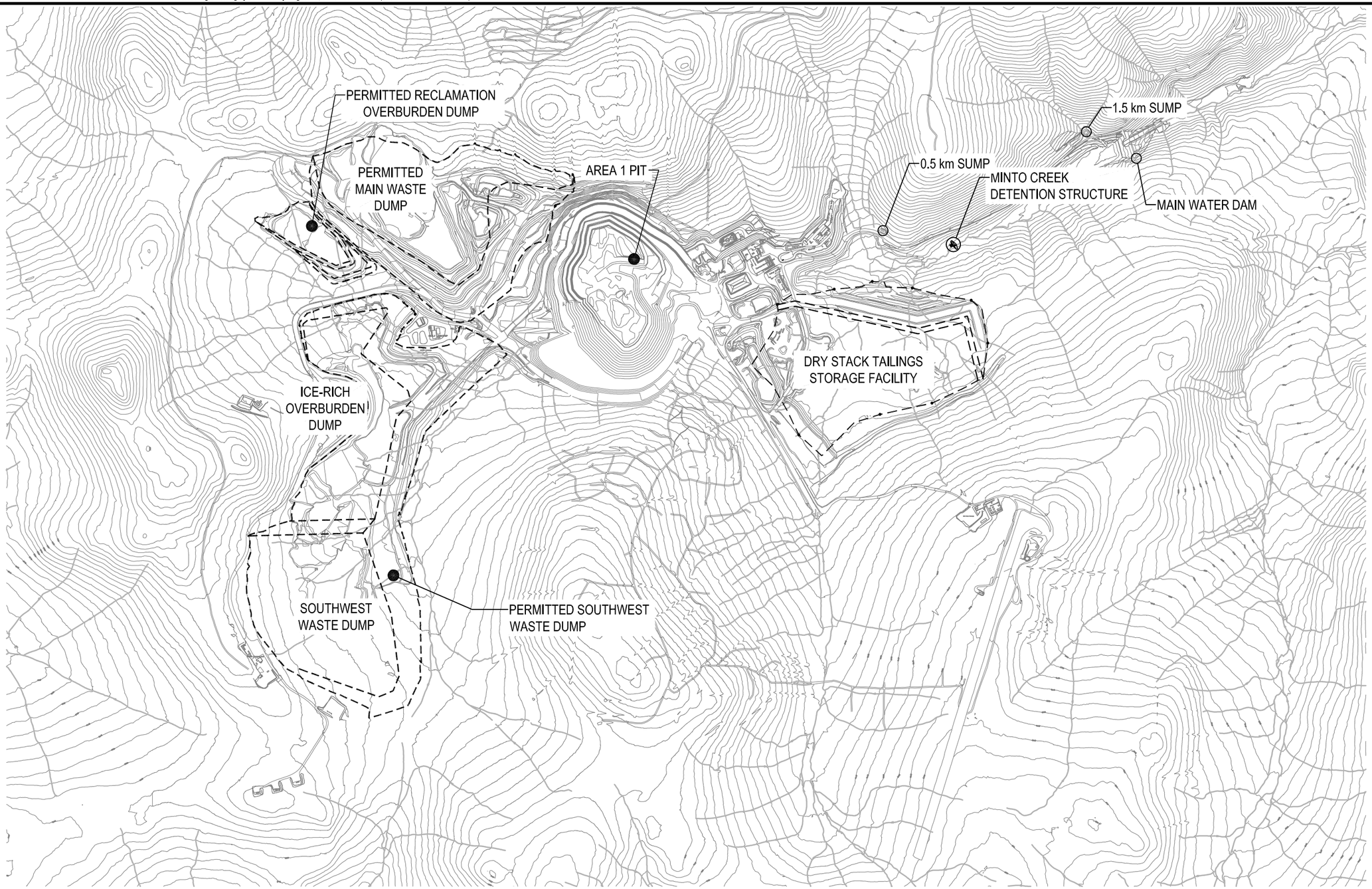
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 2-2**




NOTES :

3 m INTERMEDIATE AND 15 m INDEX CONTOUR DATA SHOWN BASED ON FEBRUARY 2010 SURVEY DATA PROVIDED BY MINTO.

0 500

Scale: 1: 10 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
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REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
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DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

PHASE IV EXPANSION
MINTO MINE, YT

CURRENT SITE CONDITIONS

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

Figure 2-3


LEGEND :

Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

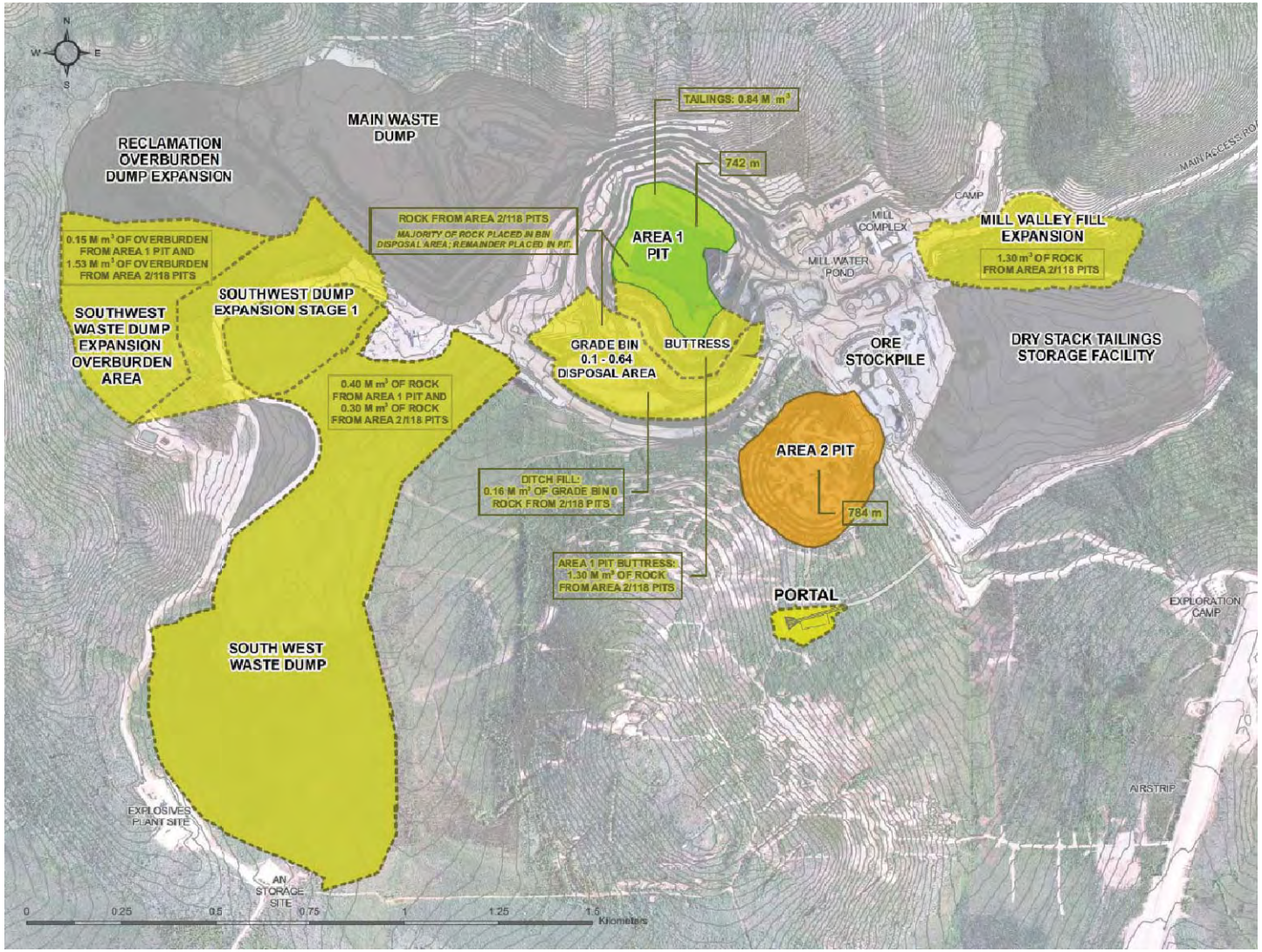
**ANNUAL SITE DEVELOPMENT PLAN 2011**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 2-4**




LEGEND :

- Proposed Waste Dump Development
- Pit Development
- Waste Rock and Tailings Placement
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**ANNUAL SITE DEVELOPMENT PLAN 2012**

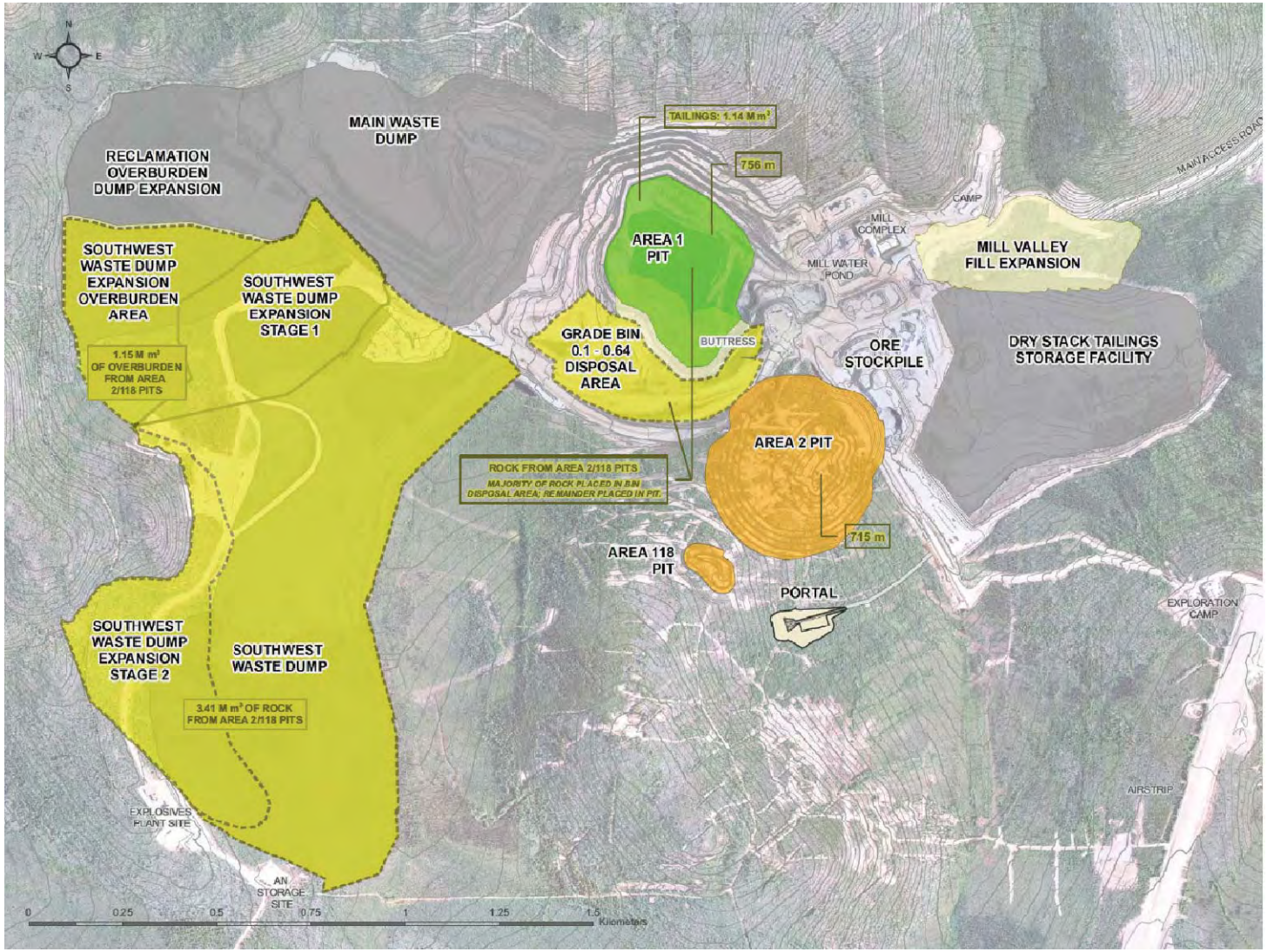
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 2-5**




LEGEND :

- Completed Development
- Proposed Waste Dump Development
- Pit Development
- Waste Rock and Tailings Placement
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**ANNUAL SITE DEVELOPMENT PLAN 2013**

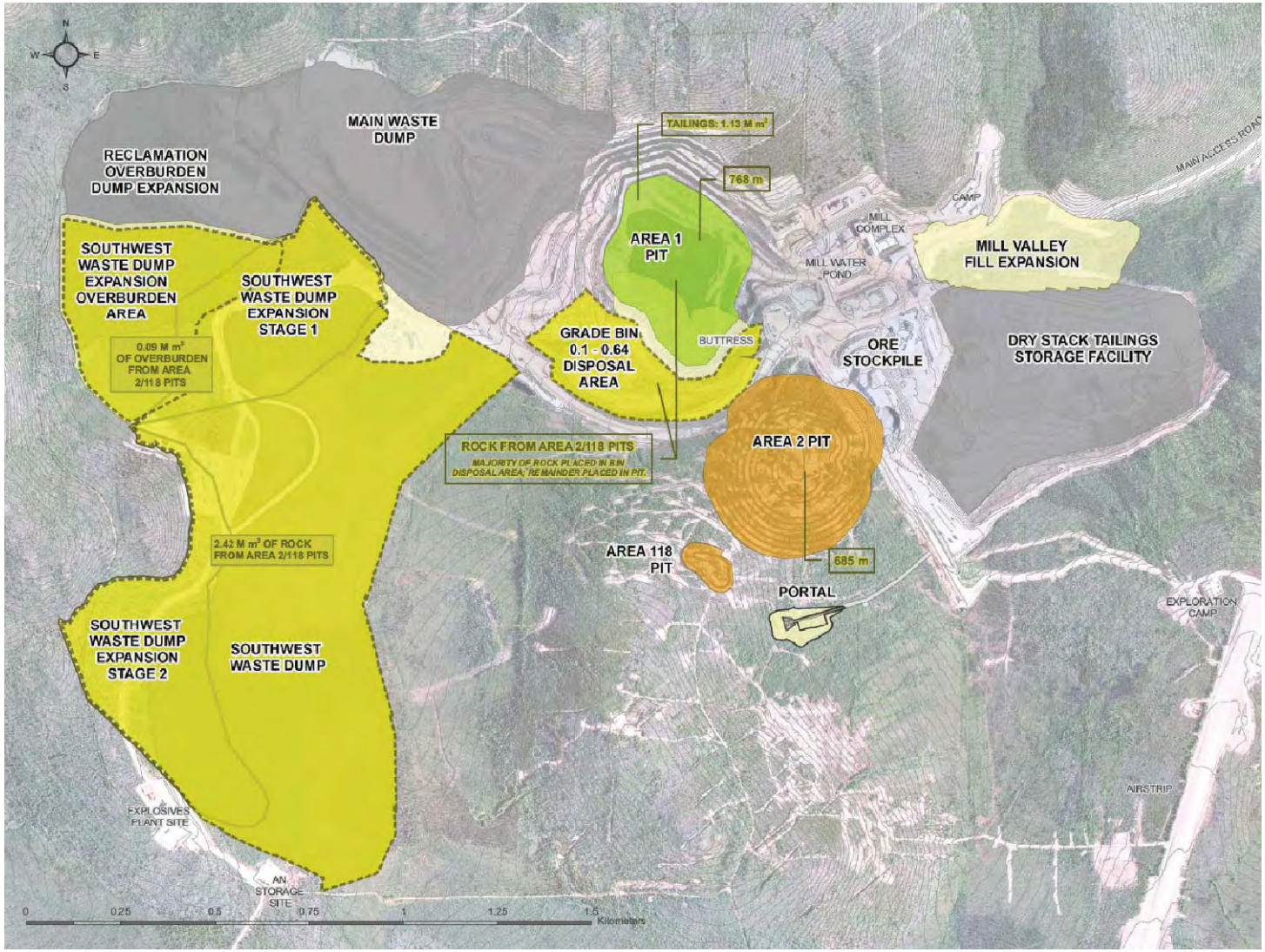
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 2-6**




LEGEND :

- Completed Development
- Proposed Waste Dump Development
- Pit Development
- Waste Rock and Tailings Placement
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**ANNUAL SITE DEVELOPMENT PLAN 2014**

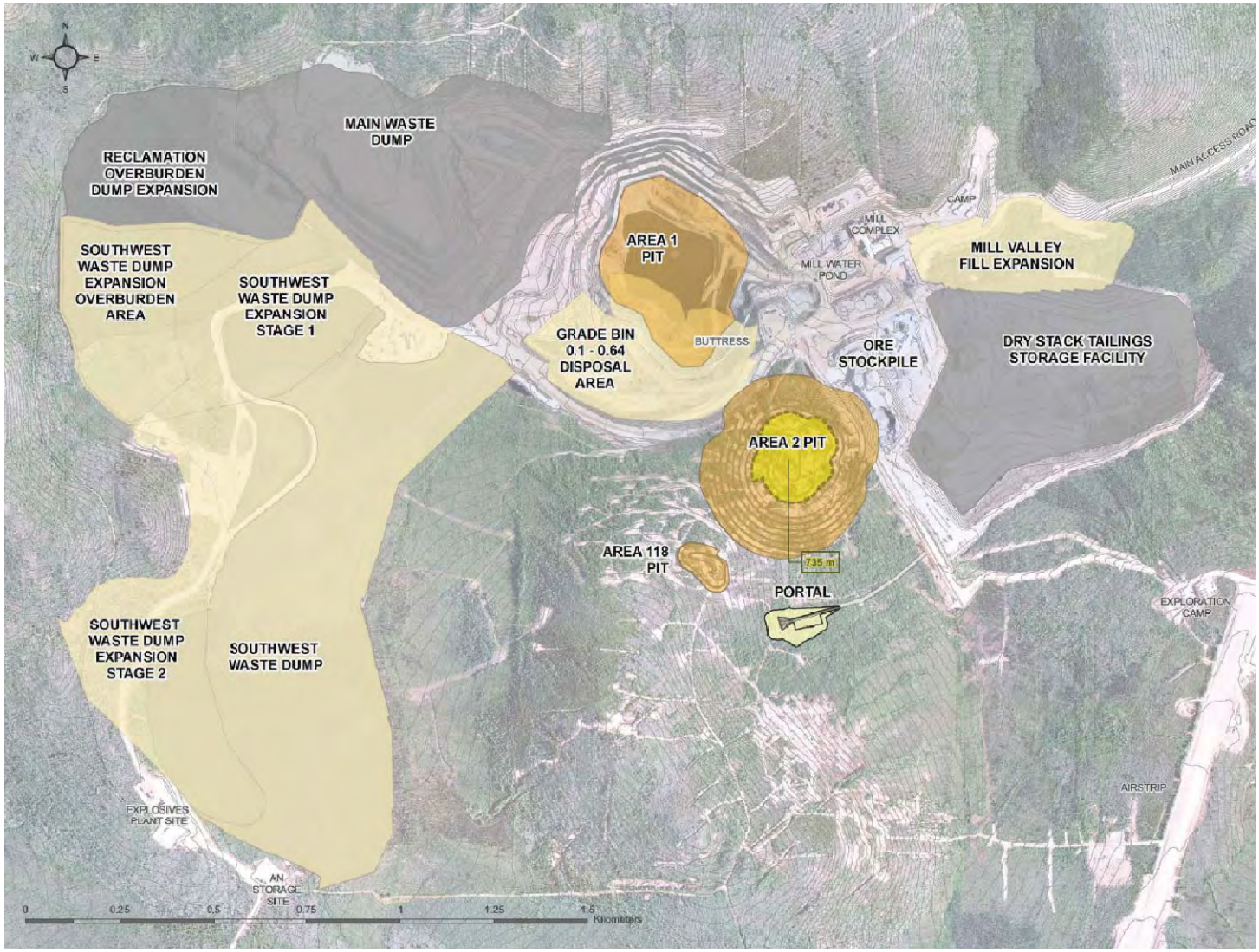
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 2-7**




LEGEND :

- Completed Development
- Proposed Waste Dump Development
- Pit Development
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

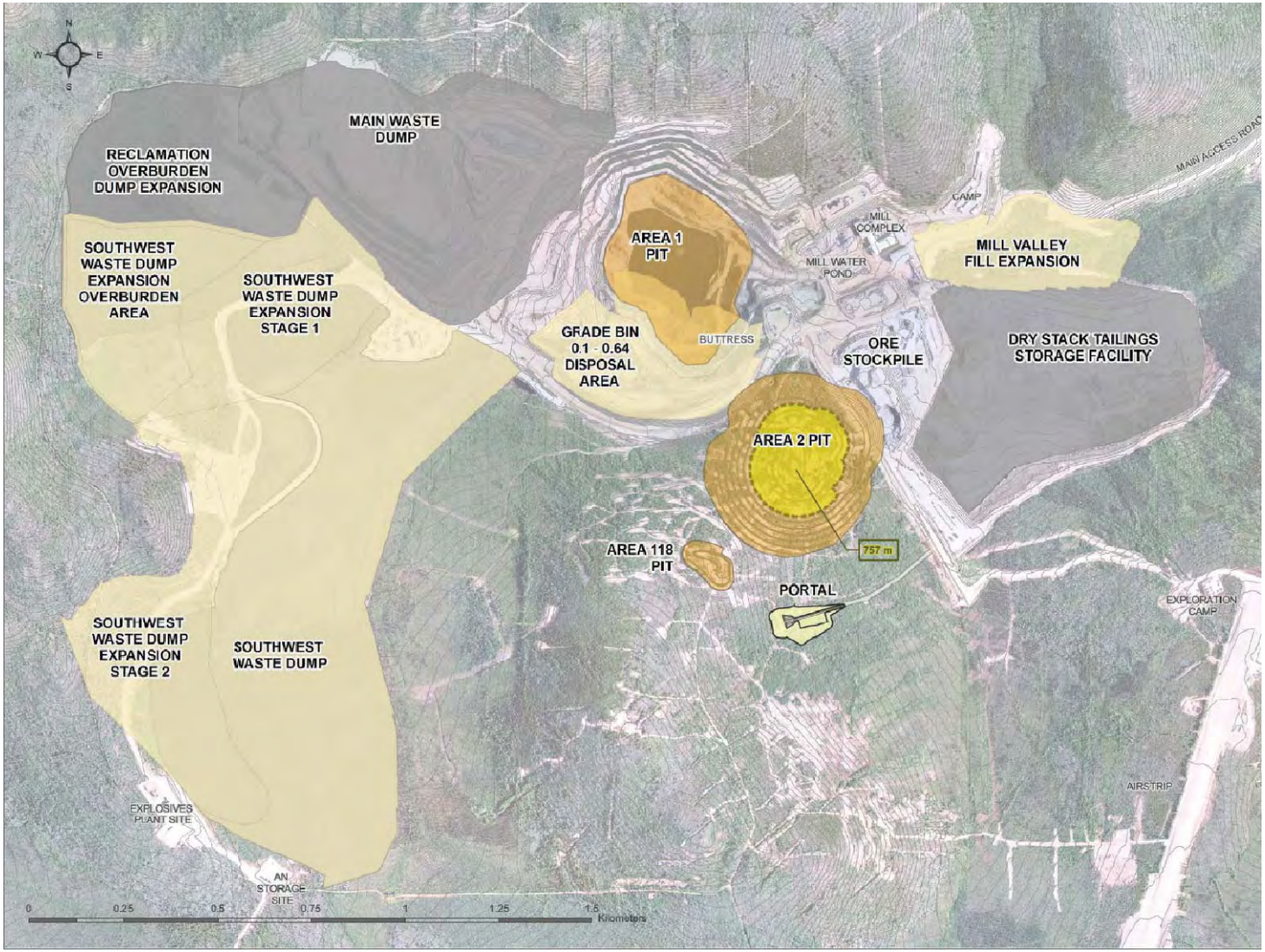
**ANNUAL SITE DEVELOPMENT PLAN 2015**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 2-8**




LEGEND :

- Completed Development
- Proposed Waste Dump Development
- Pit Development
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

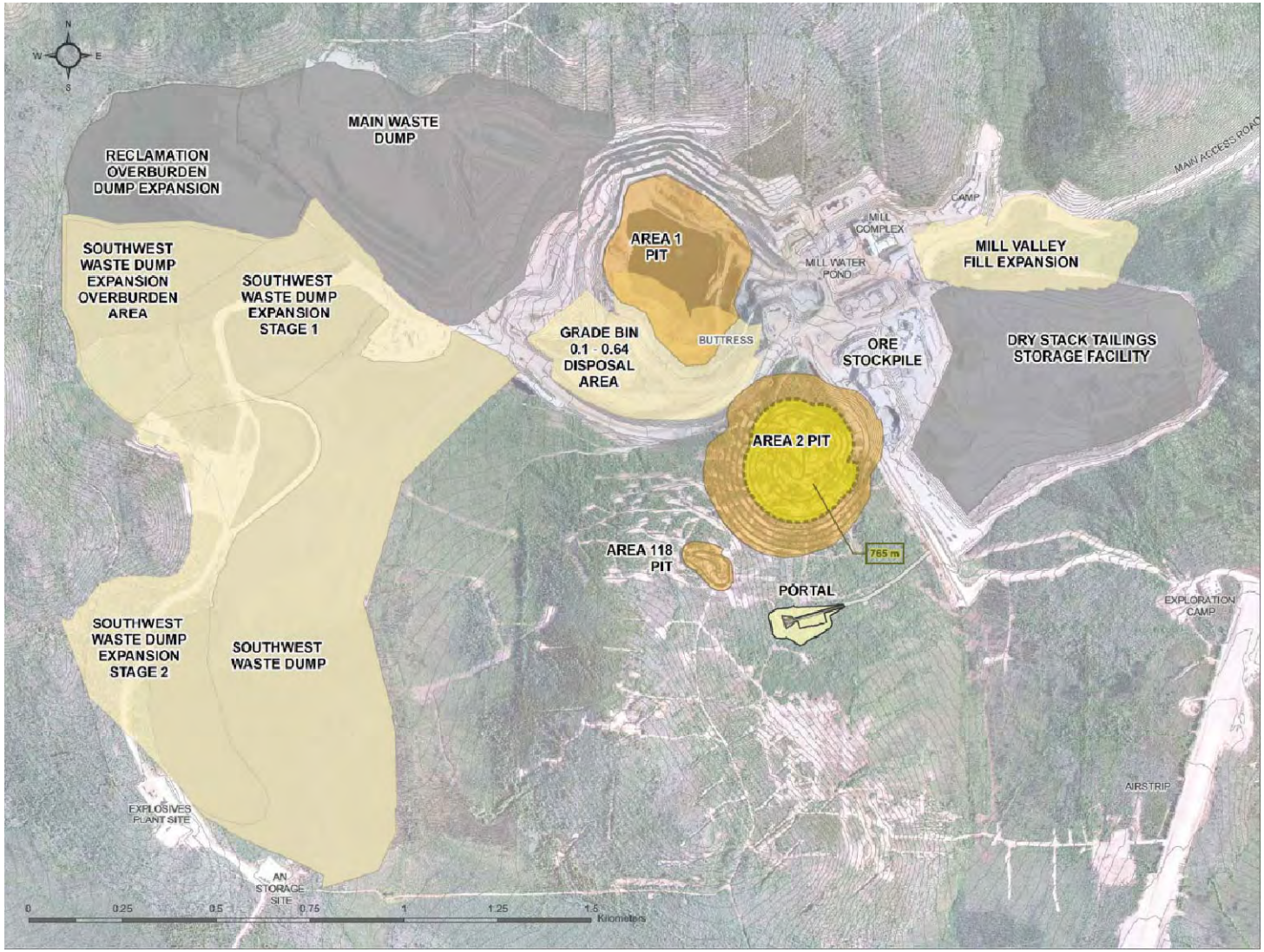
**ANNUAL SITE DEVELOPMENT PLAN 2016**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 2-9**




LEGEND :

- Completed Development
- Proposed Waste Dump Development
- Pit Development
- Previous Waste Dump Footprint

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 750

Scale: 1: 17 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**ANNUAL SITE DEVELOPMENT PLAN 2017**

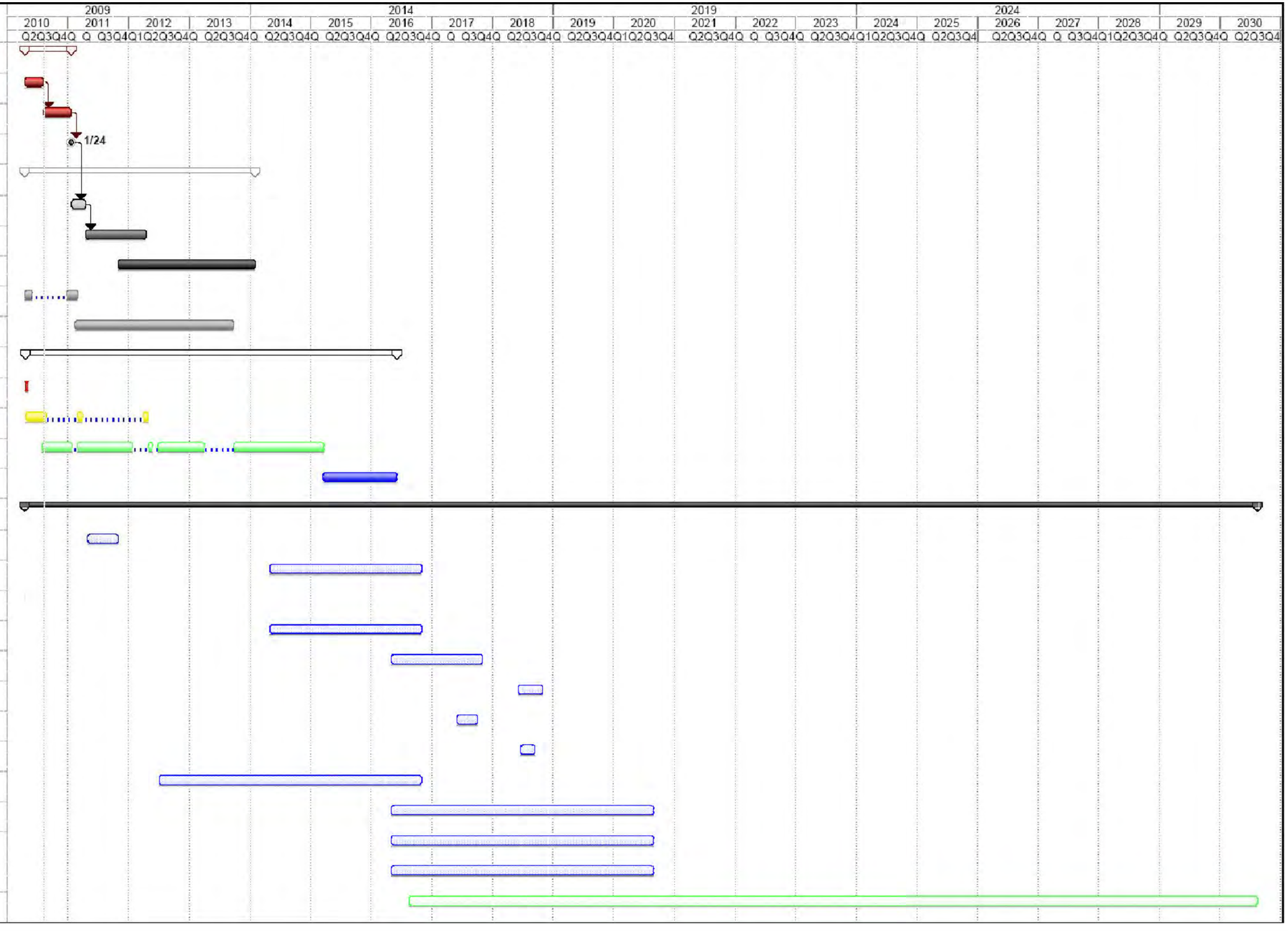
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 2-10**

| ID | Task Name |
|---|---|
| 1 | **Phase IV permit application** |
| 2 | Interim permit application prep |
| 3 | Interim permit review |
| 4 | Interim permit approval |
| 5 | **Phase IV Mining** |
| 6 | UG Exploration Ramp Prep |
| 7 | UG Ramp Development |
| 8 | UG Stoping |
| 9 | Main Pit Ore Production |
| 10 | Area 2 / 118 Ore Production |
| 11 | **Mill operations** |
| 12 | Draw from red stockpile |
| 13 | Draw from yellow stockpile |
| 14 | Draw from green stockpile |
| 15 | Draw from blue stockpile |
| 16 | **Minto Closure Reclamation** |
| 17 | Dry Stack Tailings Storage Facility |
| 18 | Southwest Waste Dump |
| 19 | Ice Rich Ocerburden Dump |
| 20 | Main Waste Dump |
| 21 | Bin 0.1 to 0.64 Stockpiled Material |
| 22 | Mill Valley Fill |
| 23 | Decommissioning Mill and Infrastructure |
| 24 | Site Discharge Channel Construction |
| 25 | Area 118 Pit |
| 26 | Area 2 Pit |
| 27 | Area 1 Pit |
| 28 | Closure Related Active Water Treatment |
| 29 | Post Closure Monitoring Programs |




CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**TIMELINE OF PROPOSED CLOSURE SCHEDULE**

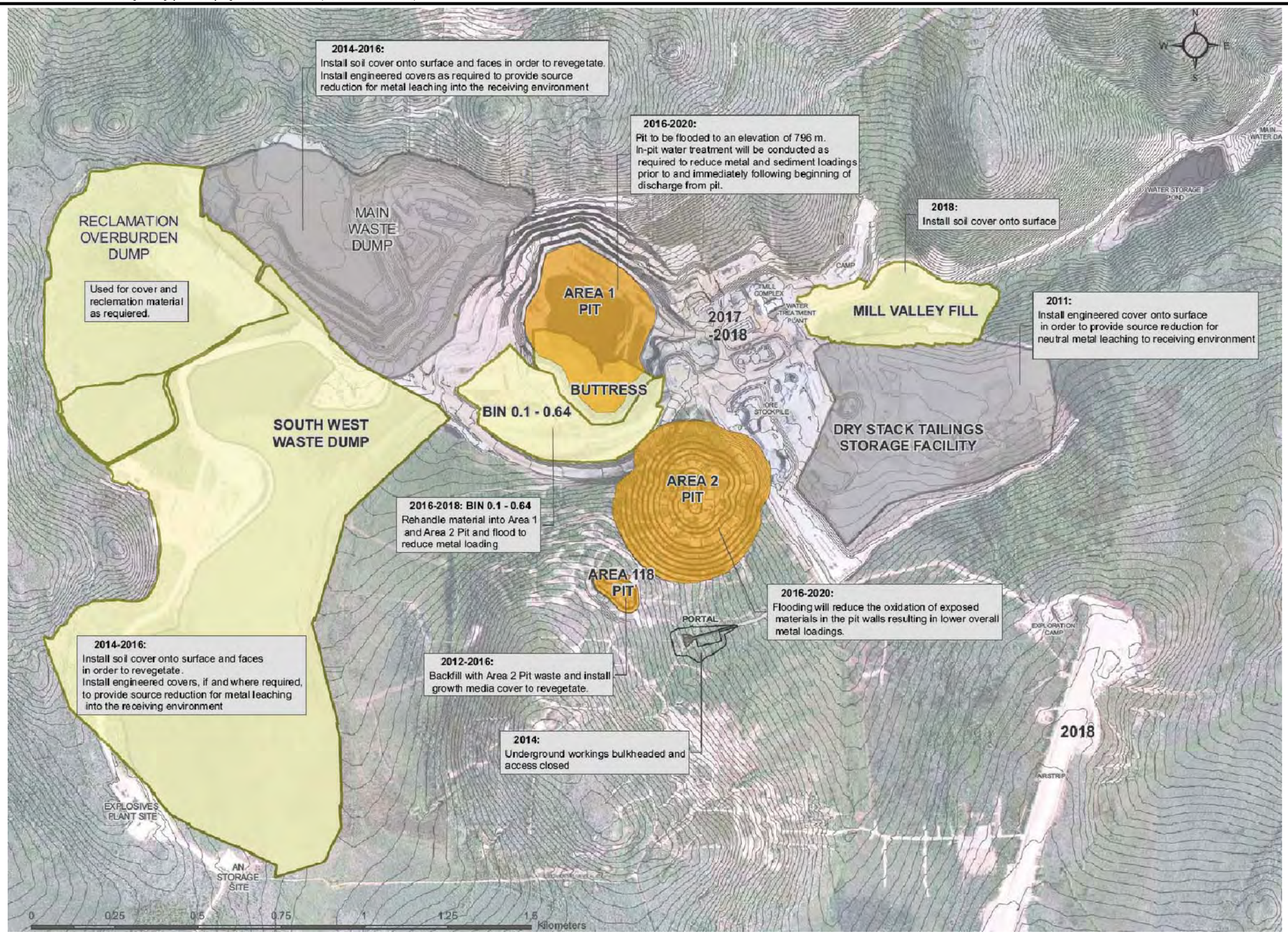
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 5-1**




LEGEND:

- WASTE DUMP FOOTPRINT
- PIT DEVELOPMENT
- PREVIOUS WASTE DUMP DISTURBANCE

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. CONTOUR INTERVALS ARE 3 m
3. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY SRK CONSULTING, PLAN 2CM022.013, DATED JULY 2010

0 500
Scale: 1: 12 500 (metres)

CLIENT
MINTO EXPLORATIONS LTD.

PHASE IV EXPANSION
MINTO MINE, YUKON

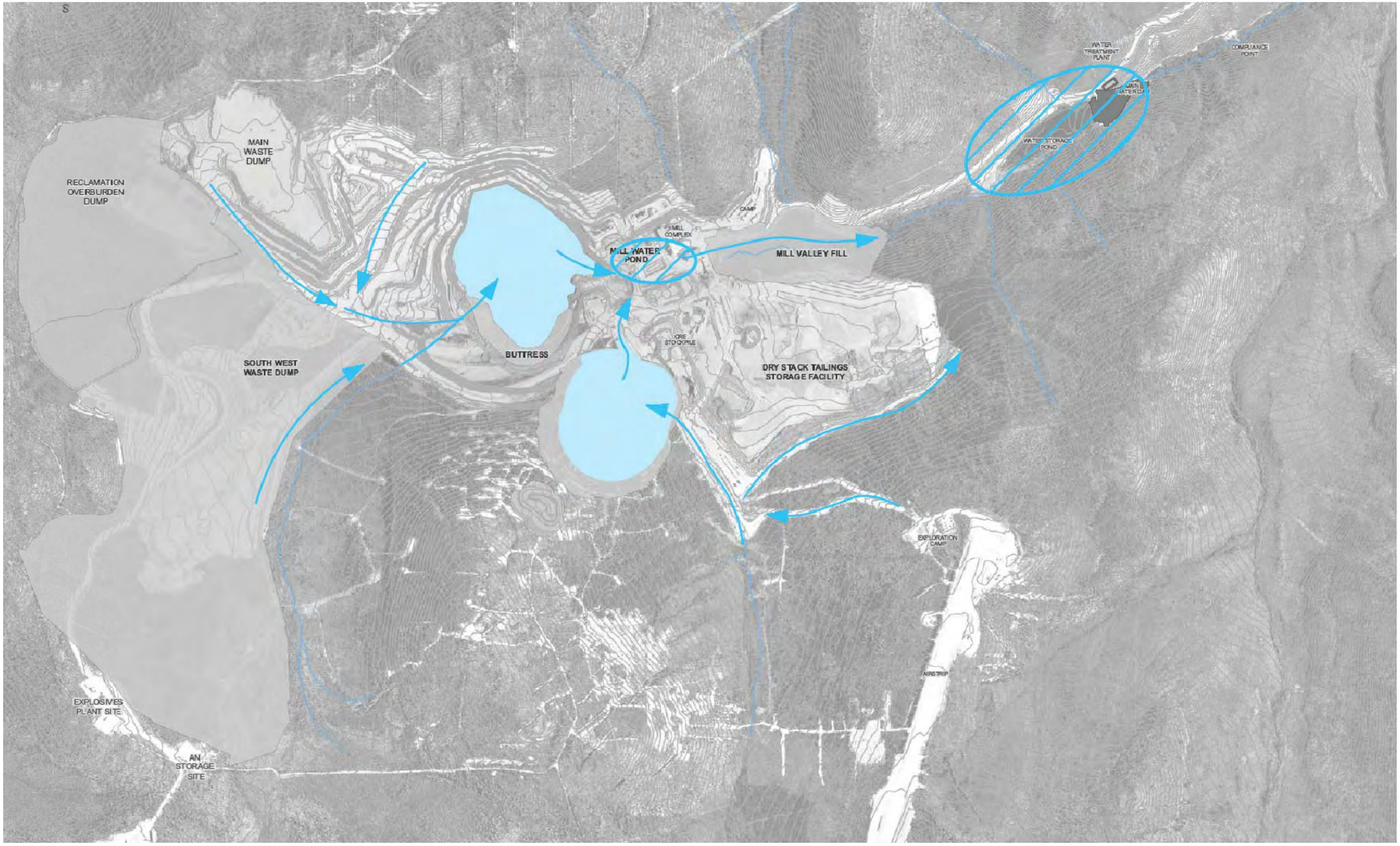
UNDERGROUND DEVELOPMENT DESIGN AND IMPLEMENTATION TIMELINES

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

Figure 6-1




LEGEND:

- CONCEPTUAL FLOW PATH
- POTENTIAL PASSIVE TREATMENT AREA (IF REQUIRED)

0 500

Scale: 1: 12 500 (metres)

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

CLIENT

MINTO EXPLORATIONS LTD.

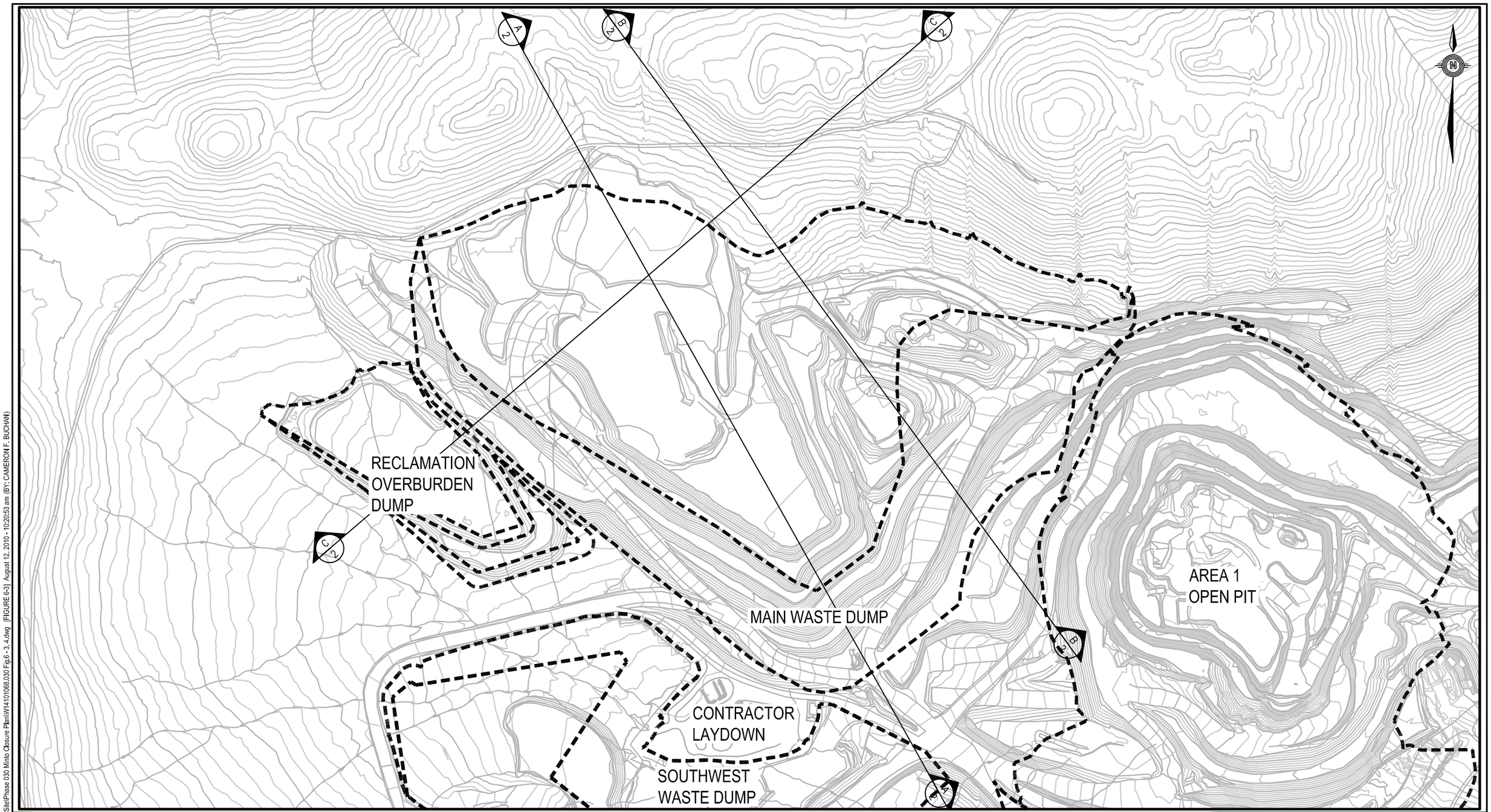
**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**CONCEPTUAL CLOSURE WATER MANAGEMENT PLAN**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |
| OFFICE: EBA-WHSE | DATE: August 12, 2010 | | |

**Figure 6-2**




0 250

Scale: 1: 5 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**MINTO MAIN WASTE DUMP**
**PLAN**

EBA Engineering Consultants Ltd.

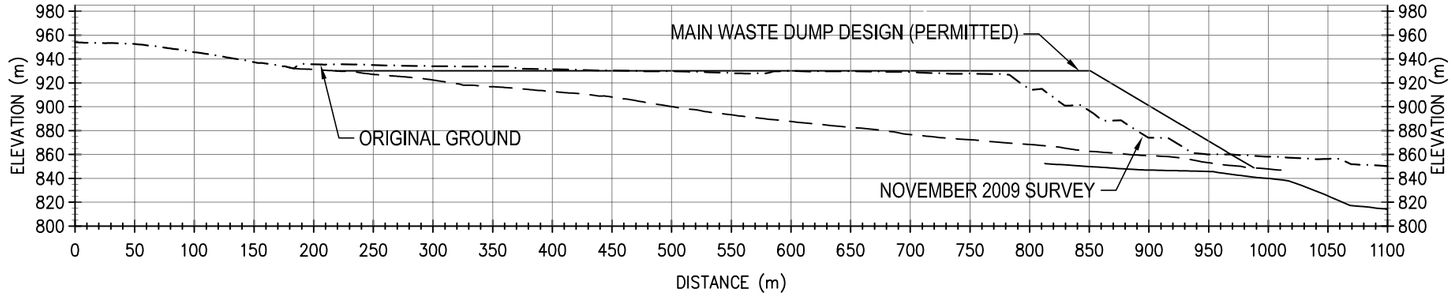
| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

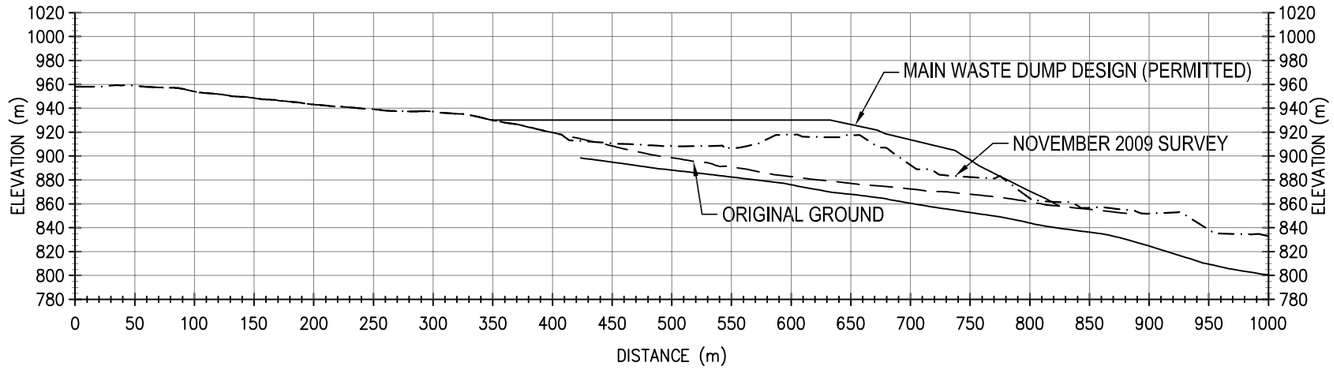
DATE: August 12, 2010

**Figure 6-3**

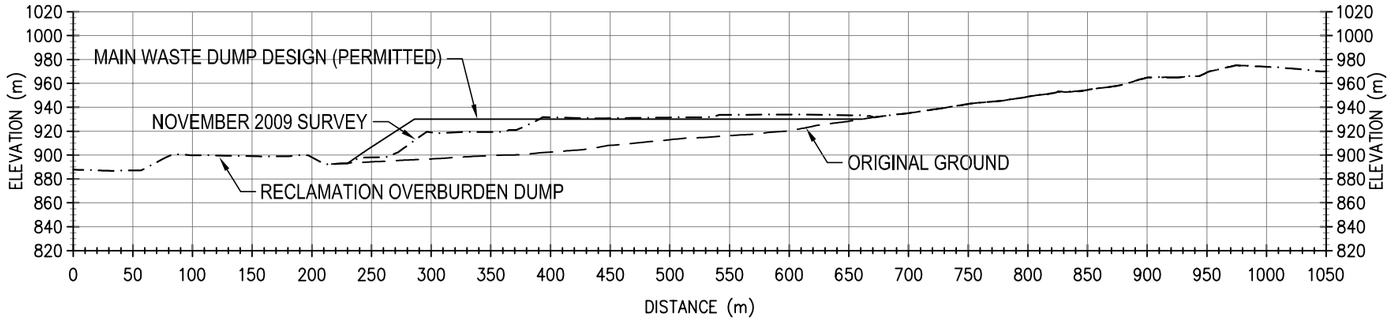
Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 030 Minto Closure Plan\W14101068.030 Fig.6 - 3, 4.dwg [FIGURE 6-3] August 12, 2010 - 10:20:53 am (BY: CAMERON F. BUCHAN)




A/1 SECTION A
SCALE 1:5,000




B/1 SECTION B
SCALE 1:5,000




C/1 SECTION C
SCALE 1:5,000

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

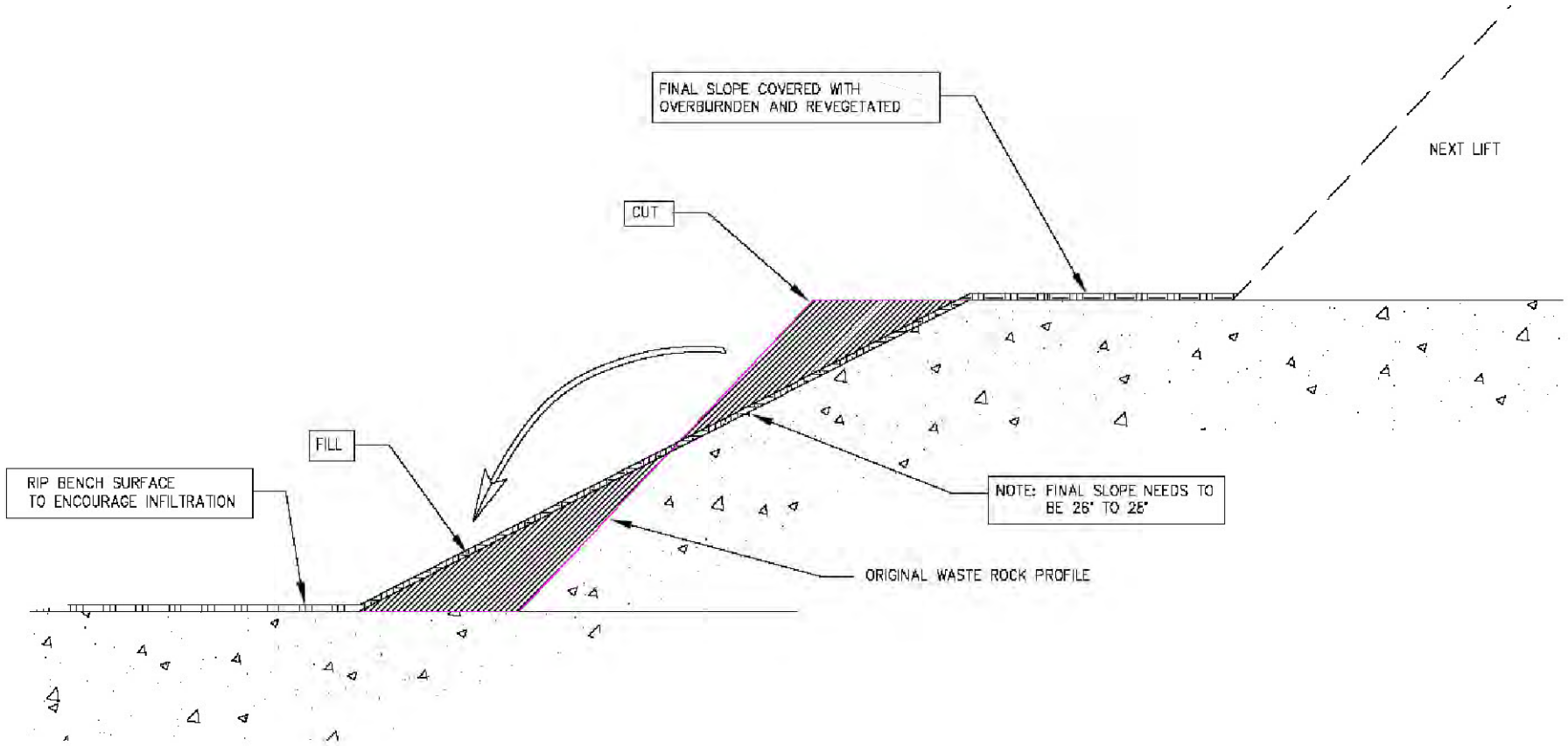
**MINTO MAIN WASTE DUMP SECTIONS**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

**Figure 6-4**




CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**TYPICAL RECLAMATION MEASURES FOR WASTE DUMPS**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 6-5**

PERMITTED MAIN
WASTE DUMP CREST

PERMITTED RECLAMATION
OVERBURDEN DUMP

PERMITTED
MAIN WASTE DUMP

SOUTHWEST WASTE DUMP
EXPANSION STAGE 1
AREA 2/118 VOLUME: 4.91 M m³
SCHEDULE: JUL 1, 2011 - OCT 1,2013

RECLAMATION
OVERBURDEN
DUMP EXPANSION

PERMITTED MAIN
WASTE DUMP TOE

AREA 1
OPEN PIT

E
11

PERMITTED
ICE-RICH
OVERBURDEN
DUMP

PERMITTED
SOUTHWEST WASTE
DUMP DESIGN TOE

GRADE BIN 0.10 - 0.64
DISPOSAL AREA

SOUTHWEST WASTE DUMP EXPANSION
OVERBURDEN AREA
AREA 2/118 VOLUME: 2.78 M m³
SCHEDULE: AUG 1, 2010 - APR 1,2013

PERMITTED
SOUTHWEST WASTE
DUMP DESIGN CREST

E
11

AREA 118

F
11

F
11

SOUTHWEST WASTE DUMP

PERMITTED SOUTHWEST WASTE DUMP

SOUTHWEST WASTE DUMP
EXPANSION STAGE 2
AREA 2/118 VOLUME: 1.51 M m³
SCHEDULE: JUL 1, 2011 - OCT 1,2013

NOTES :

3 m INTERMEDIATE AND 15 m INDEX CONTOUR DATA SHOWN BASED ON FEBRUARY 2010
SURVEY DATA PROVIDED BY MINTO.

0 250
Scale: 1: 7 500 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

PHASE IV EXPANSION
MINTO MINE, YUKON

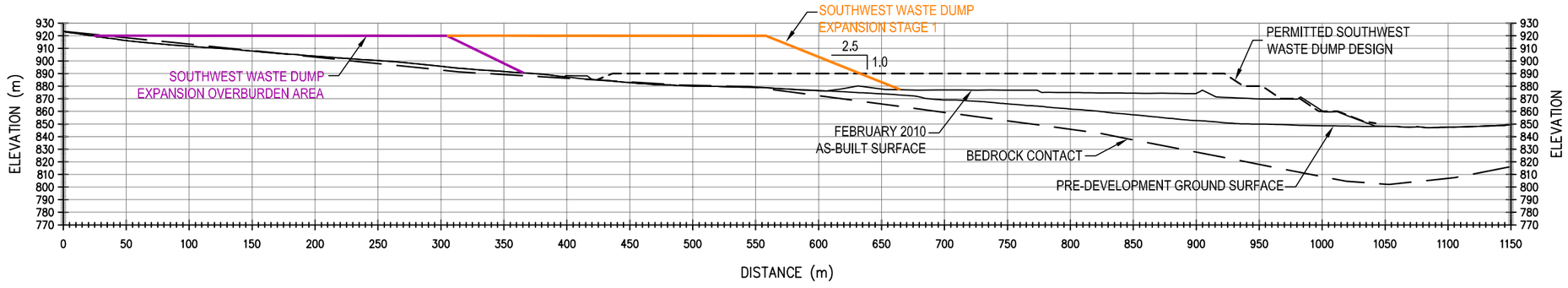
SOUTHWEST WASTE DUMP EXPANSION PLAN

EBA Engineering Consultants Ltd.

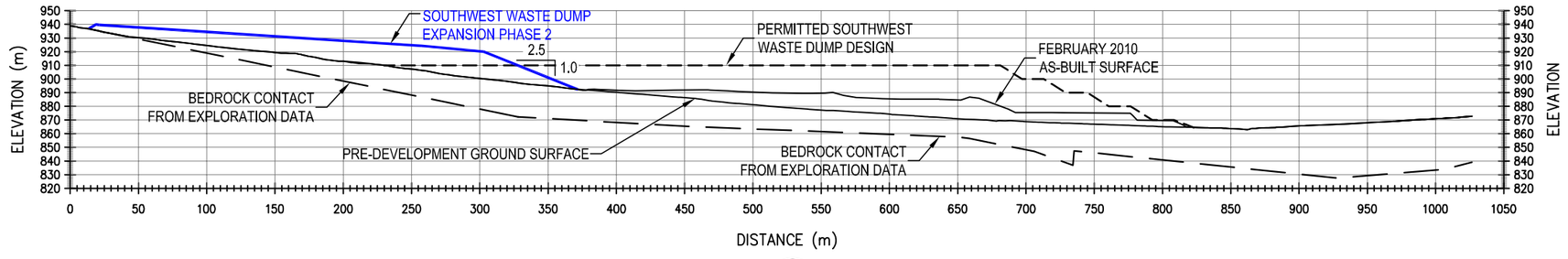
| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |
| OFFICE: EBA-WHSE | DATE: August 12, 2010 | | |

Figure 6-6

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 030 Minto Closure Plan\W14101068.030 Fig.6 - 6, 7.dwg [FIGURE 6-6] August 12, 2010 - 10:47:26 am (BY: CAMERON F. BUCHAN)




E
10




F
10

0 200
Scale: 1: 4 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**SOUTHWEST WASTE DUMP SECTIONS E AND F**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 6-7**

AREA 1
OPEN PIT

AREA 1 OPEN PIT
SOUTH WALL BUTTRESS
AREA 2/118 VOLUME: 1.30 M m$^3$
SCHEDULE: FEB 1, 2011 - JUL 1, 2011

D 06

GRADE BIN 0.10 - 0.64
DISPOSAL AREA STAGE 1
VOLUME = 1.38 M m$^3$

D 06

NEW DIVERSION DITCH NORTH OF
HAUL ROAD TO CONFLUENCE AREA

AREA 2 OPEN PIT
PHASE 1 & 2 - OPEN PIT

RELLY OFFICE
RELLY WORKSHOP
Transformers
Tanks
Tanks
Power & Electrical
Mill
Mill
Lunch Room
Concentrator Road
Tailings Building
Water Pump
Water Treatment
Stockpile

LEGEND:

- GRADE BIN 0.10 - 0.64 DISPOSAL AREA STAGE 1

0 200
Scale: 1: 4 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT
MINTO EXPLORATIONS LTD.

PHASE IV EXPANSION
MINTO MINE, YUKON

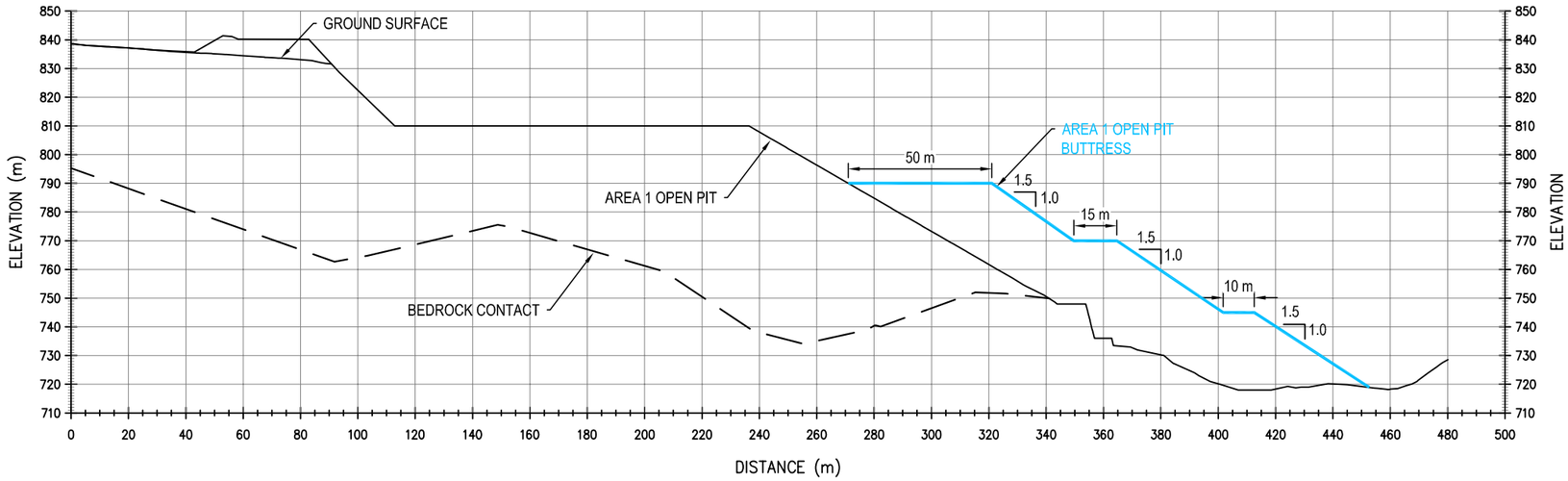
GRADE BIN 0.10 - 0.64 DISPOSAL AREA PLAN

EBA Engineering Consultants Ltd.

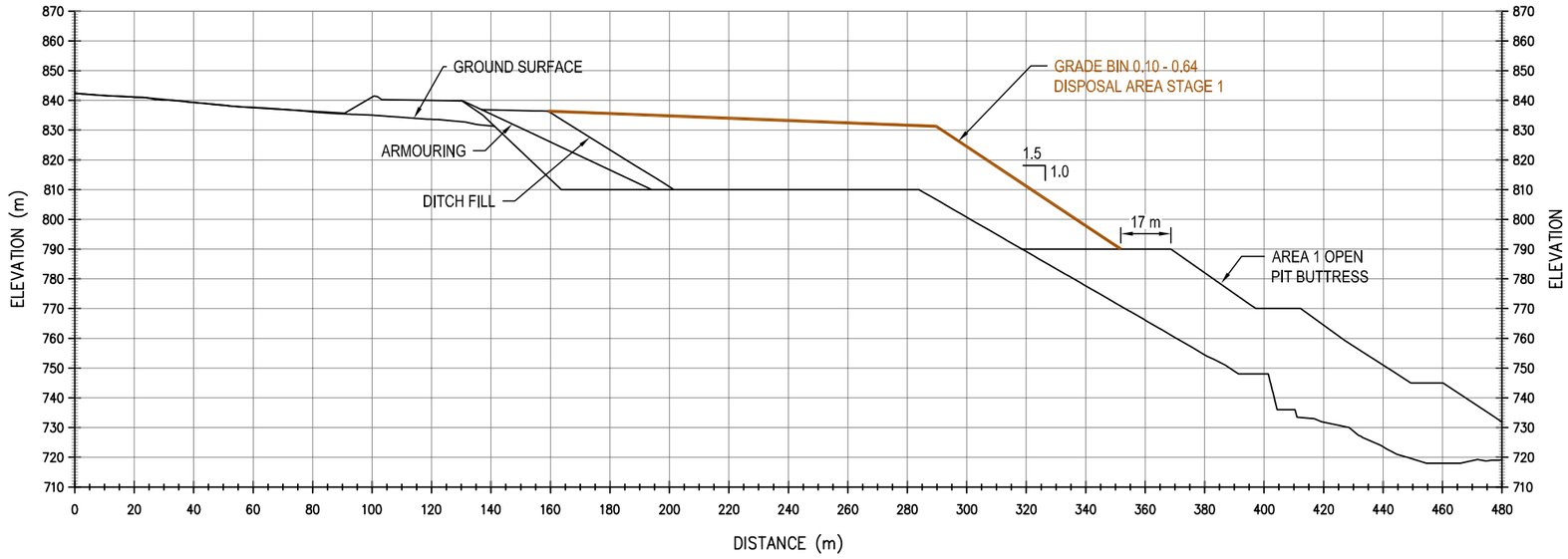
| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

Figure 6-8




A
05




D
09

0 100
Scale: 1: 2 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

EBA Engineering Consultants Ltd.

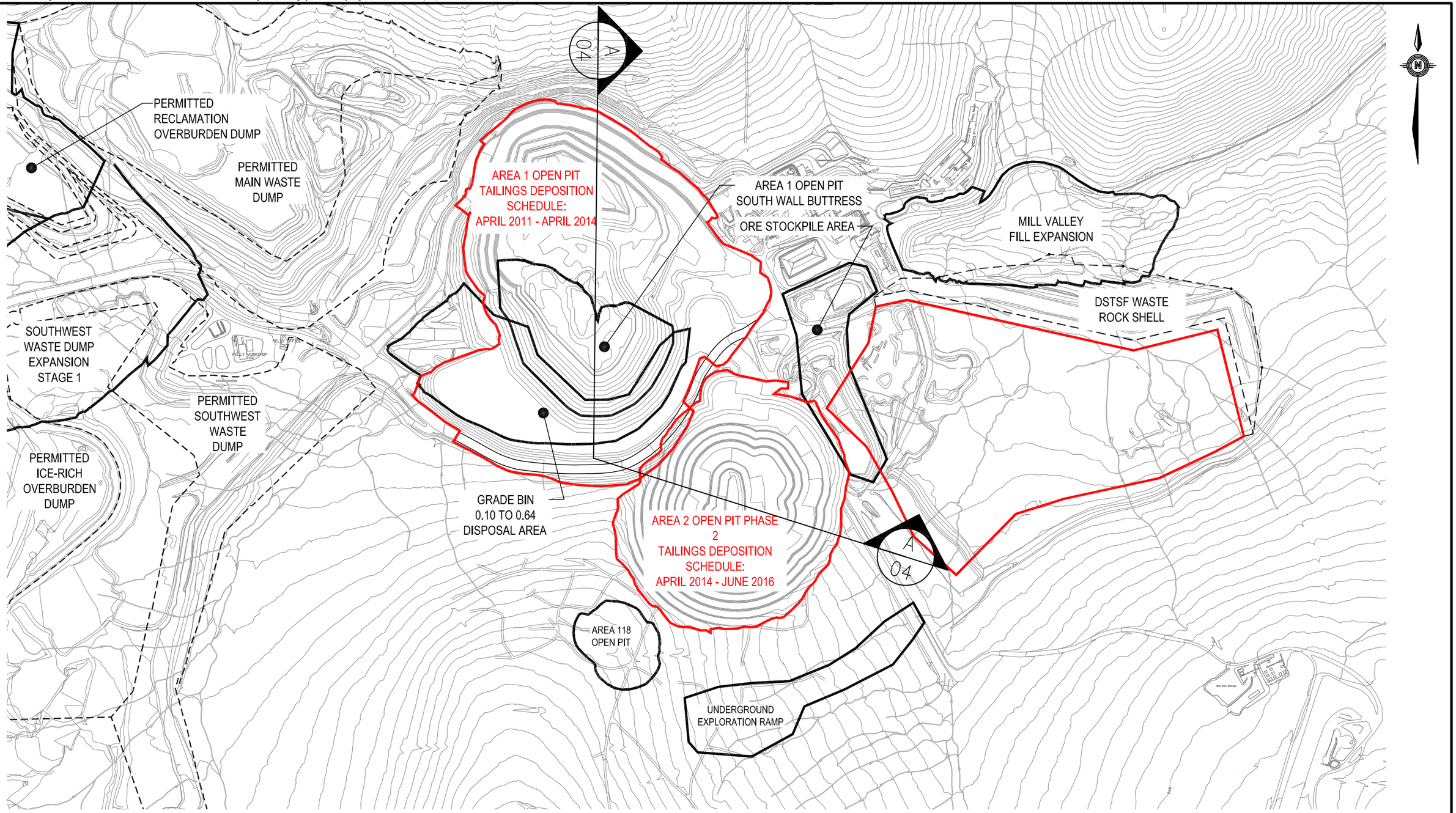
**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**GRADE BIN 0.10 - 0.64 DISPOSAL AREA SECTIONS A AND D**

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

**Figure 6-9**




NOTES :

1. 3 m INTERMEDIATE AND 15 m INDEX CONTOUR DATA SHOWN BASED ON APRIL 2010 SURVEY DATA PROVIDED BY MINTO.
2. TAILINGS MANAGEMENT COMPONENTS SHOWN IN RED, OTHER PHASE IV DEVELOPMENT COMPONENTS SHOWN IN BLACK

0 250

Scale: 1: 7 500 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

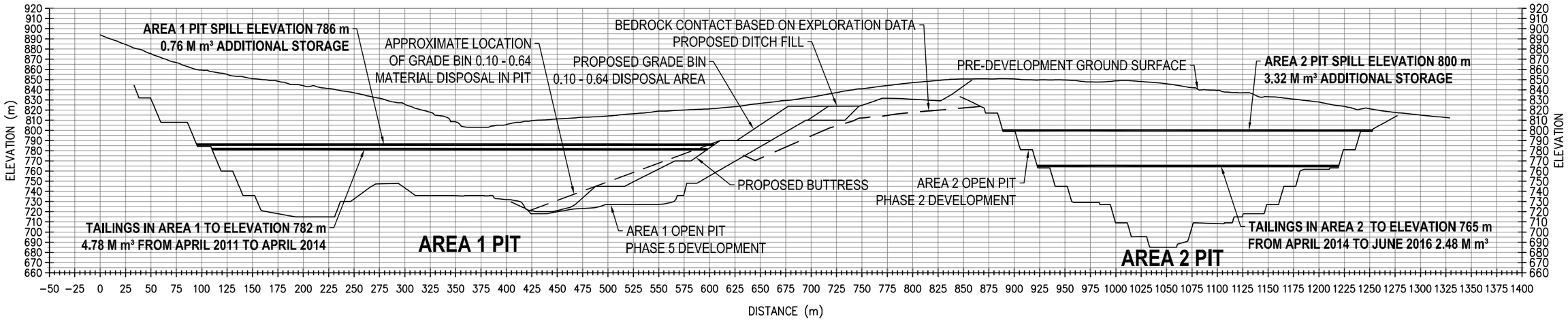
**OPEN PIT PLAN VIEW**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 6-10**




A
03

0 200
Scale: 1: 4 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

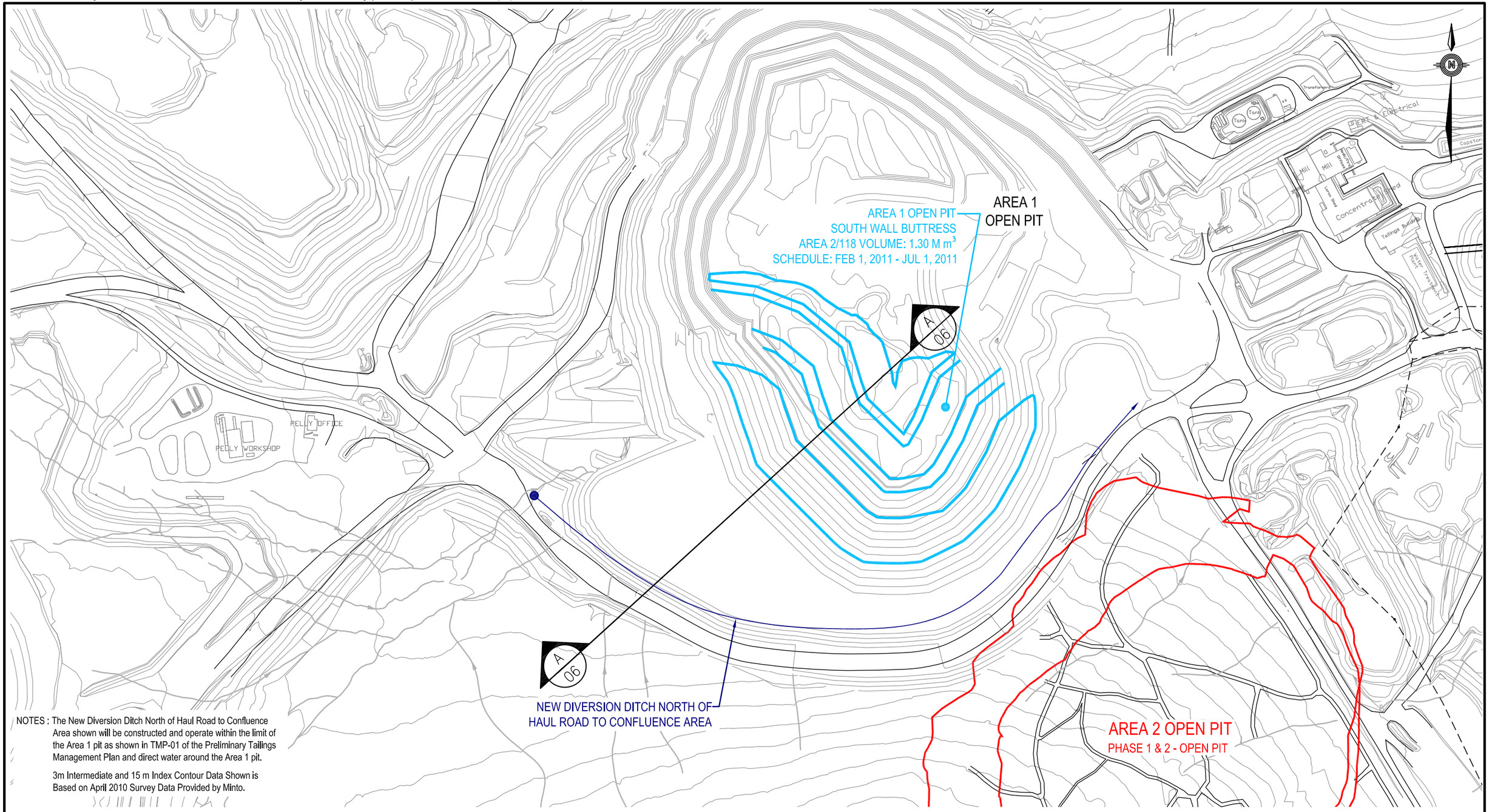
**AREA 1 AND 2 OPEN PIT**
**TYPICAL SECTION AT END OF PHASE IV**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 6-11**




NOTES : The New Diversion Ditch North of Haul Road to Confluence Area shown will be constructed and operate within the limit of the Area 1 pit as shown in TMP-01 of the Preliminary Tailings Management Plan and direct water around the Area 1 pit.

3m Intermediate and 15 m Index Contour Data Shown is Based on April 2010 Survey Data Provided by Minto.

LEGEND:

- SOUTH WALL BUTRESS BOUNDARY

0 200

Scale: 1: 4 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | 10/11/29 | CB | BJC | BJC | Updated notes |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

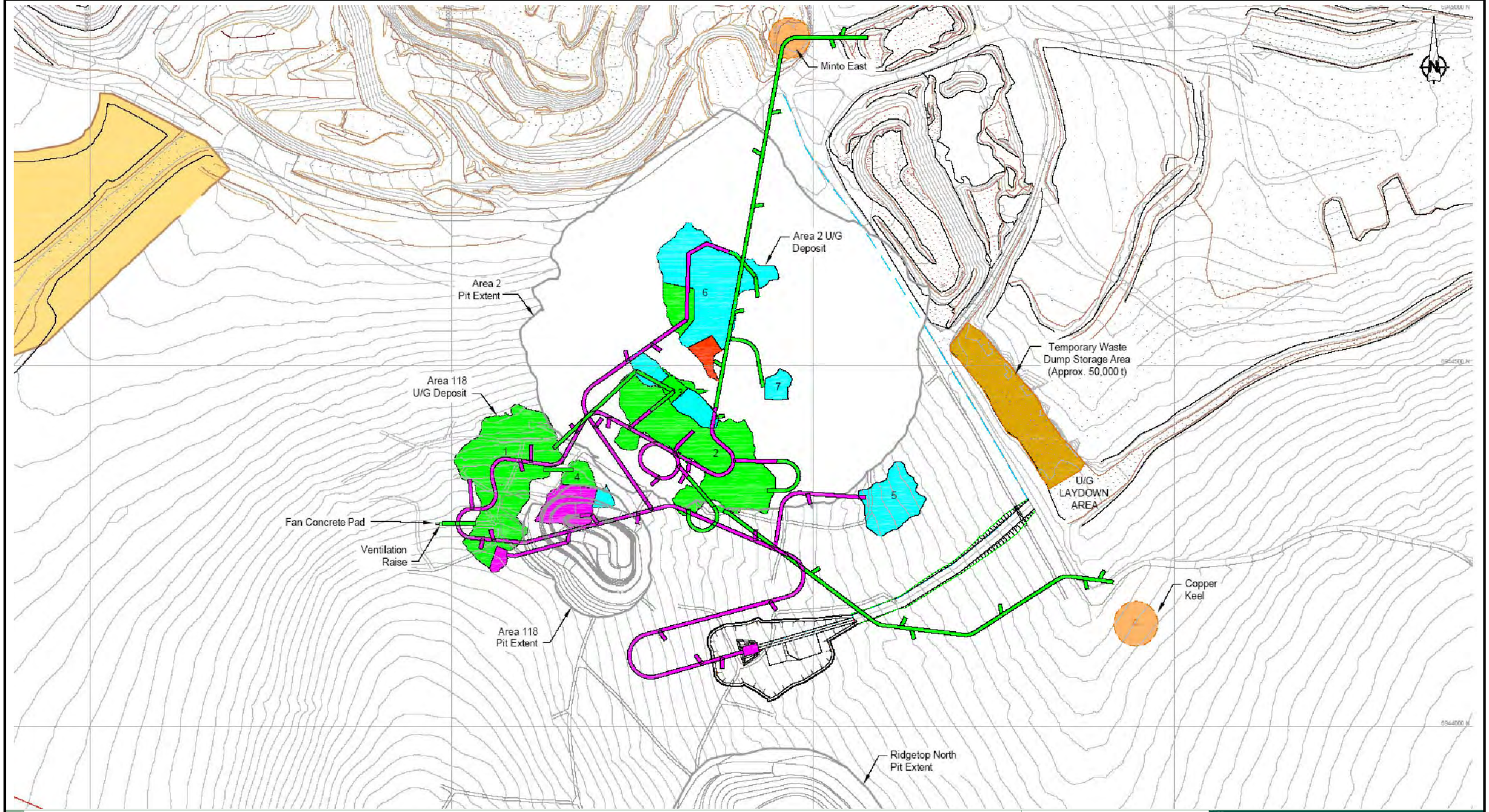
**AREA 1 OPEN PIT SOUTH WALL BUTTRESS PLAN**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 1 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | November 29, 2010 |

**Figure 6-12**




LEGEND:

- YEAR 2011
- YEAR 2012
- YEAR 2013
- YEAR 2014

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. CONTOUR INTERVALS ARE 3 m
3. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY SRK CONSULTING, PLAN 2CM022.013, DATED JULY 2010

0 250

Scale: 1: 5 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**UNDERGROUND DEVELOPMENT DESIGN**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 6-13**

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 030 Minto Closure Plan\W14101068.030 Fig.6 - 14.dwg [FIGURE 6-14] August 12, 2010 - 2:09:17 pm (BY: CAMERON F. BUCHAN)

385000 E

6944000 N

Culvert

U/G LAYDOWN AREA

Road & Excavation Area of Disturbance: 20,200 m²

Excess U/G Water Discharge Line

Approximately +12% Slope

Road Fill Volume: 8,630 m³

Perimeter Ditch

+2% Slope

-15% Slope

Excavation in Rock: 2,800 m³

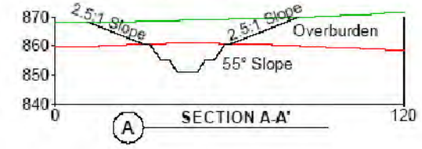
Underground Mine Facilities

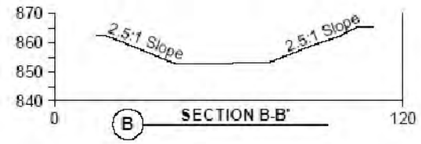
Excavation in Overburden: 81,000 m³

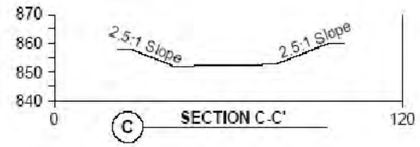
Portal

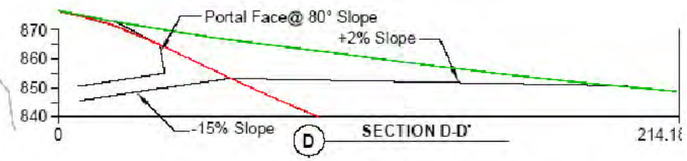
U/G Sump

Ventilation Fan and Mine Air Heater




NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. CONTOUR INTERVALS ARE 3 m
3. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY SRK CONSULTING, PLAN 2CM022.013, DATED MAY 2010

0 100

Scale: 1: 2 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

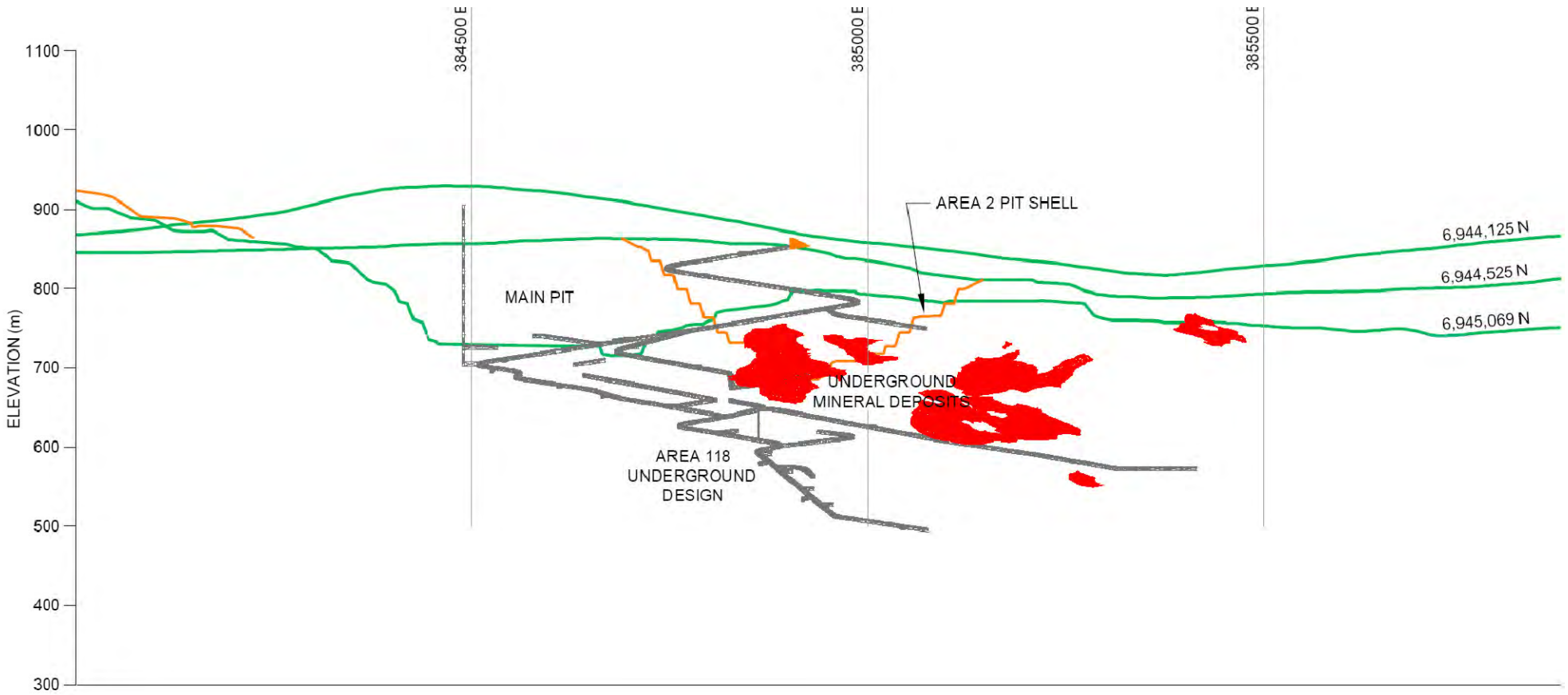
**PORTAL LAYOUT**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 6-14**




NOTES :

THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY

SRK CONSULTING, PLAN 2CM022.015, DATED AUGUST 2010

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

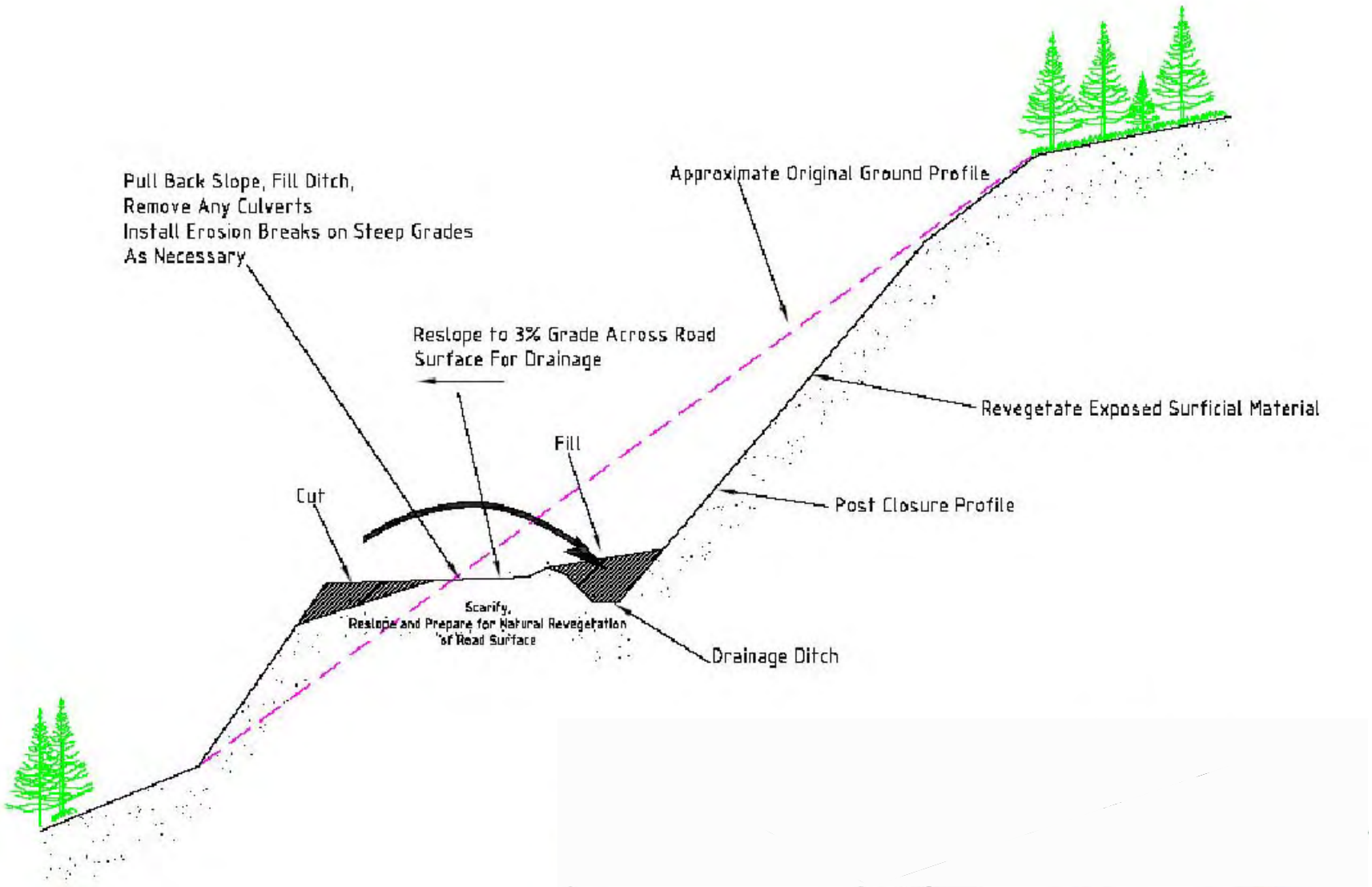
**SCHEMATIC SECTION OF PORTAL**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

| OFFICE | DATE |
|---|---|
| EBA-WHSE | August 12, 2010 |

**Figure 6-15**




LEGEND :

Sand & Gravel

Existing Vegetation

0 10

Scale: 1: 200 (metres)

NOTES :

THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED AUGUST 2010

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**TYPICAL ROAD RECLAMATION MEASURES**

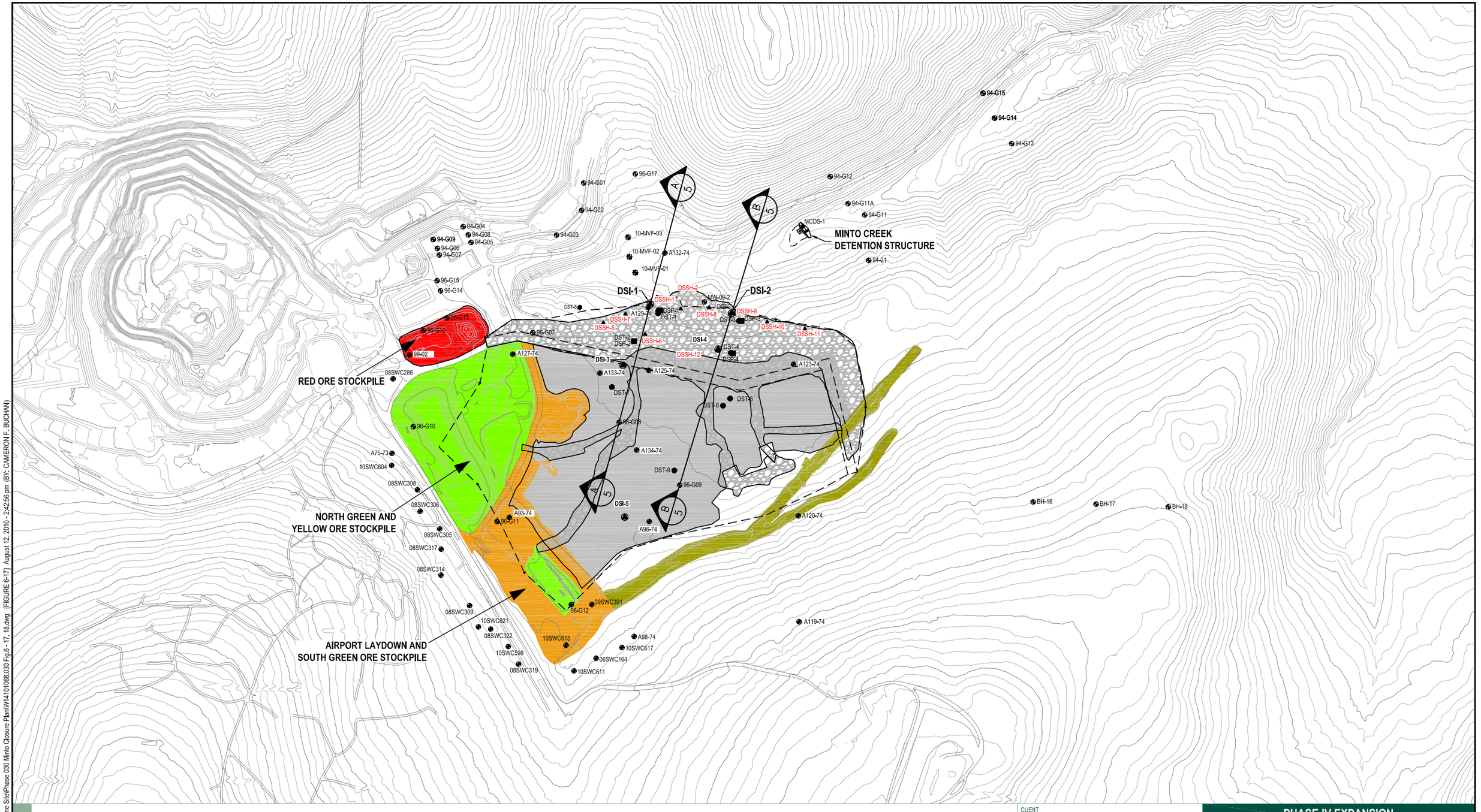
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE

DATE: August 12, 2010

**Figure 6-16**




LEGEND

- BOREHOLES LIMITED TO DSTSF AREA
- INCLINOMETERS LIMITED TO DSTSF AREA
- SURVEY HUBS LIMITED TO DSTSF AREA
- GROUND TEMPERATURE CABLES LIMITED TO DSTSF AREA
- PIEZOMETERS LIMITED TO DSTSF AREA
- TESTPITS LIMITED TO DSTSF AREA
- EXPLORATION BOREHOLES LIMITED TO DSTSF AREA

- STOCKPILE
- STOCKPILE
- LAYDOWN
- PLACED TAILINGS
- SURFACE DIVERSION BERMS

NOTE :
3m INTERMEDIATE AND 15m INDEX CONTOURS BASED ON APRIL SURVEY DATA PROVIDED BY MINTO AND PRE-DEVELOPMENT 2 m CONTOUR DATA.

**PLAN**

SCALE 1:7500

50 0 50 150 300m

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**DRY STACK TAILINGS STORAGE FACILITY**
**PLAN VIEW**

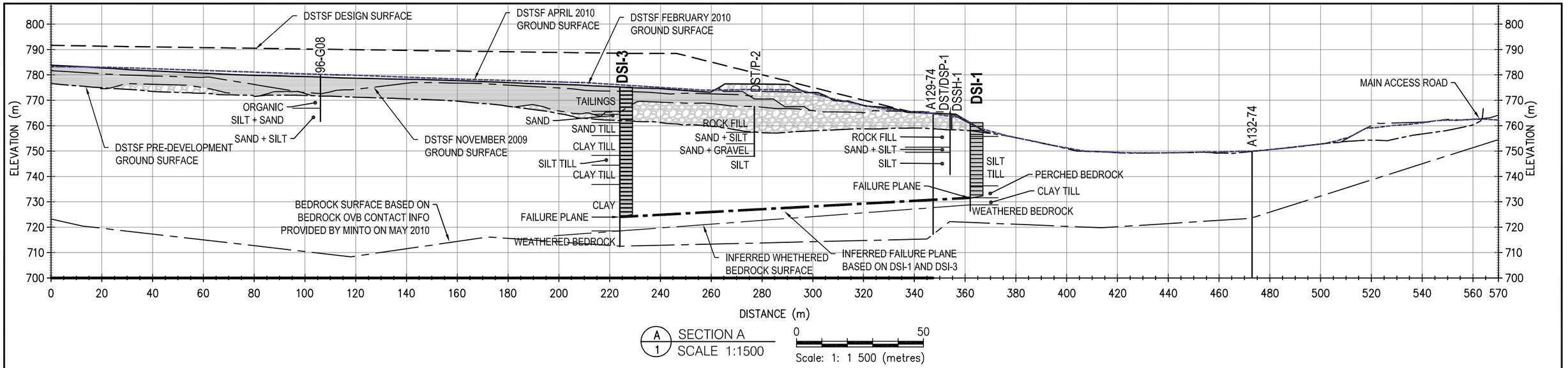
EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

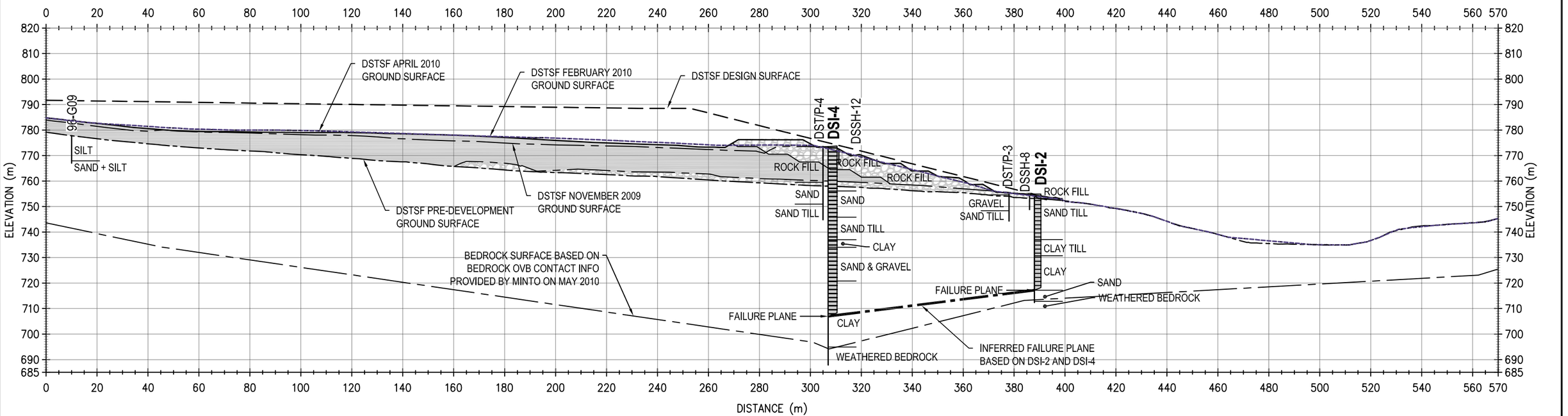
**Figure 6-17**

Q:\Whitehorse\Data\0201drawings\Minto\Minto Mine Site\Phase 030 Minto Cksure Plan\W14101068.030 Fig.6 - 17_18.dwg [FIGURE 6-17] August 12, 2010 - 2:42:56 pm (BY: CAMERON F. BUCHAN)




A/1 SECTION A
SCALE 1:1500

0 50
Scale: 1: 1 500 (metres)




B/1 SECTION B
SCALE 1:1500

0 50
Scale: 1: 1 500 (metres)

CLIENT
MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

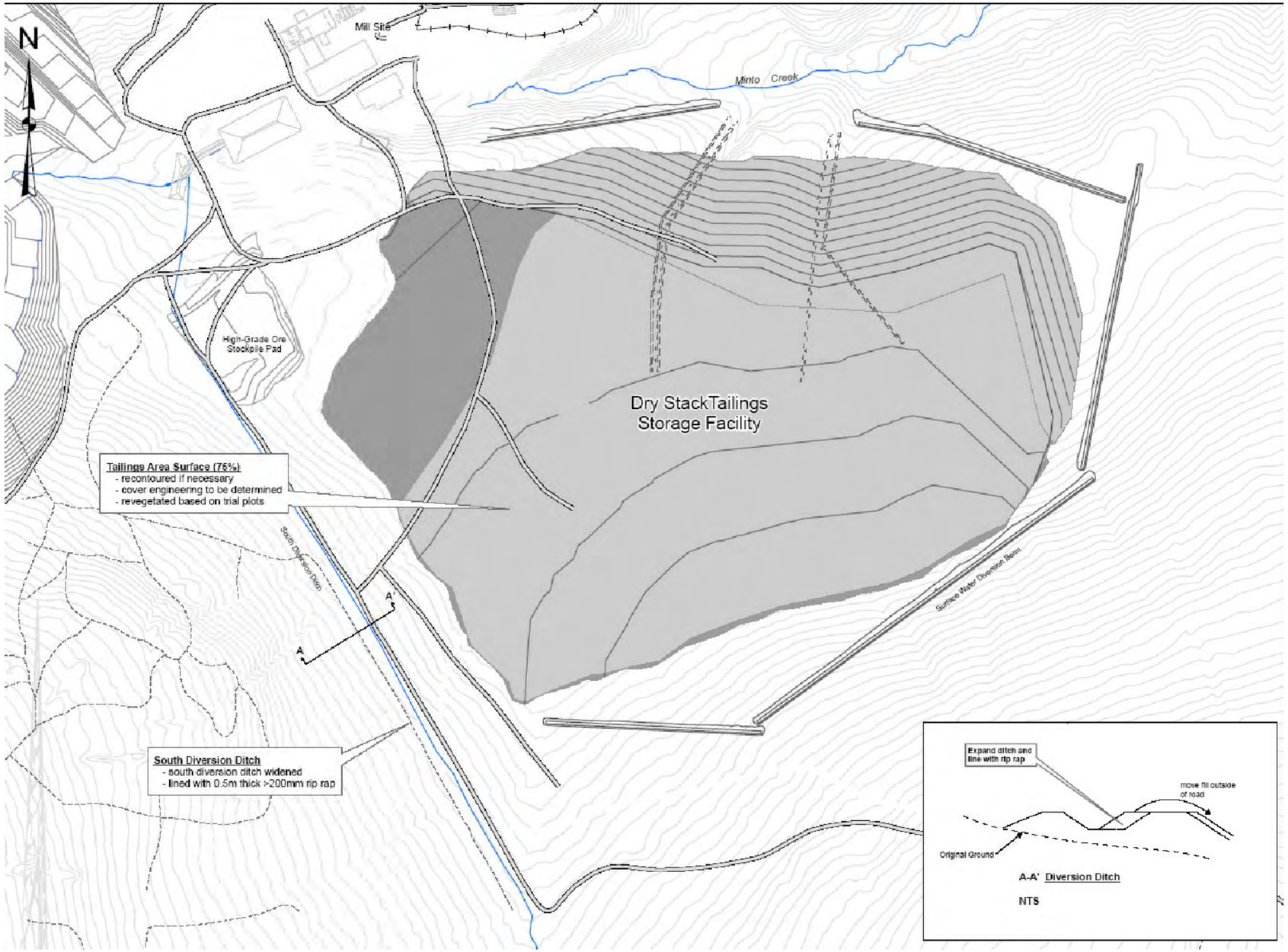
**DRY STACK TAILINGS STORAGE FACILITY**
**SECTION A AND SECTION B**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

**Figure 6-18**




LEGEND:

- Road
- Exploration Road/Trail
- Tailings Surface
- ProgessiveReclaimedTailings (25% of Tailings Surface)

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 250
Scale: 1: 5 000 (metres)

CLIENT
MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**PROPOSED RECLAMATION MEASURES FOR DRY STACK TAILINGS STORAGE FACILITY**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

**Figure 6-19**

EXISTING CAMP PAD

CAMP PAD EXPANSION

W-13a SAMPLING PONT
SAMPLING POINT TO BE MOVED
OR ACCESS MAINTAINED THROUGH
MANHOLE OR STANDPIPE

W-13a

DRAINAGE DITCH
IF REQUIRED

W-37

MILL VALLEY FILL EXPANSION
SURFACE AREA: 102,000 m²
AREA 2/118 VOLUME: 1.30 M m³
SCHEDULE: FEB 01, 2011 - OCT 1, 2011

TOE KEY

MILL VALLEY FILL EXTENSION DESIGN CREST

MILL VALLEY FILL EXTENSION DESIGN TOE

DSTSF DESIGN TOE

AREA 1
OPEN PIT

FRENCH DRAIN FROM END OF
EXISTING CULVERT TO TIE
INTO DRAINAGE BLANKET

EXISTING
CULVERT

W-8

W-8A

FRENCH DRAIN FROM
EXISTING SEEP TO TIE
INTO DRAINAGE BLANKET

DSTSF DESIGN CREST

AREA 2 OPEN PIT
PHASE 2

DRY STACK TAILINGS
STORAGE FACILITY

AREA 2 OPEN PIT
PHASE 1

NOTES:
3 m INTERMEDIATE AND 15 m INDEX CONTOUR
DATA SHOWN BASED ON FEBRUARY 2010
SURVEY DATA PROVIDED BY MINTO

LEGEND:
- MILL VALLEY FILL CRESTS AND TOES

0 200
Scale: 1: 4 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT
MINTO EXPLORATIONS LTD.

PHASE IV EXPANSION
MINTO MINE, YUKON

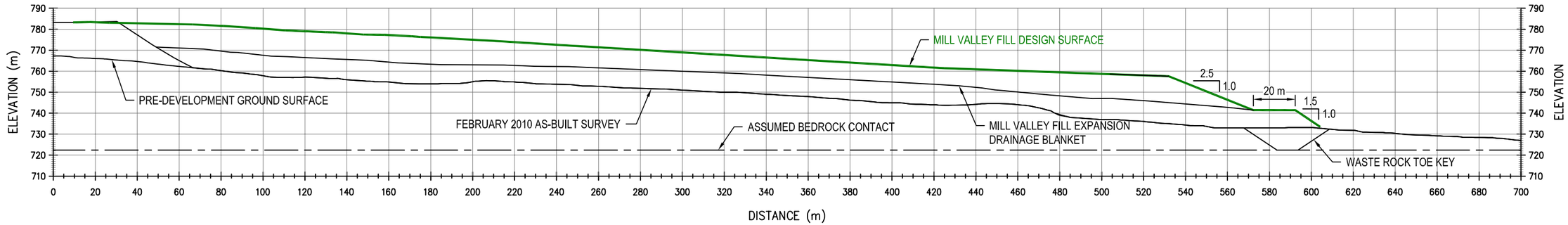
MILL VALLEY FILL EXPANSION PLAN

EBA Engineering Consultants Ltd.

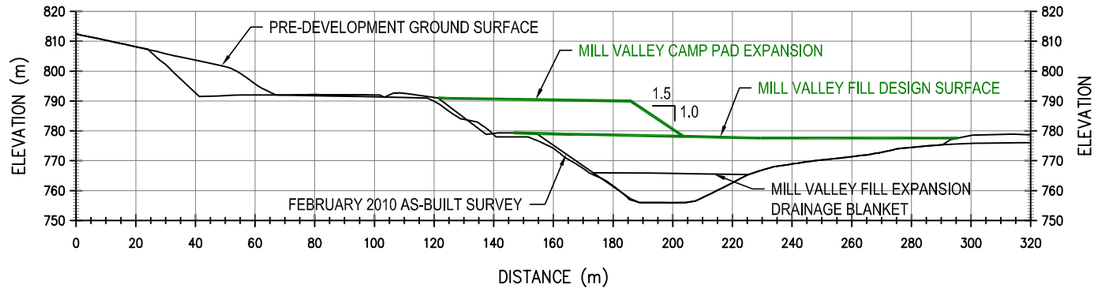
| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

Figure 6-20




B
07




C
07

0 100
Scale: 1: 2 000 (metres)

| NUM | DATE | DWN | CKD | APR | DESCRIPTION |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

| NUM | DATE | APR | DESCRIPTION |
|---|---|---|---|
| | | | |

DRAWING STATUS

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

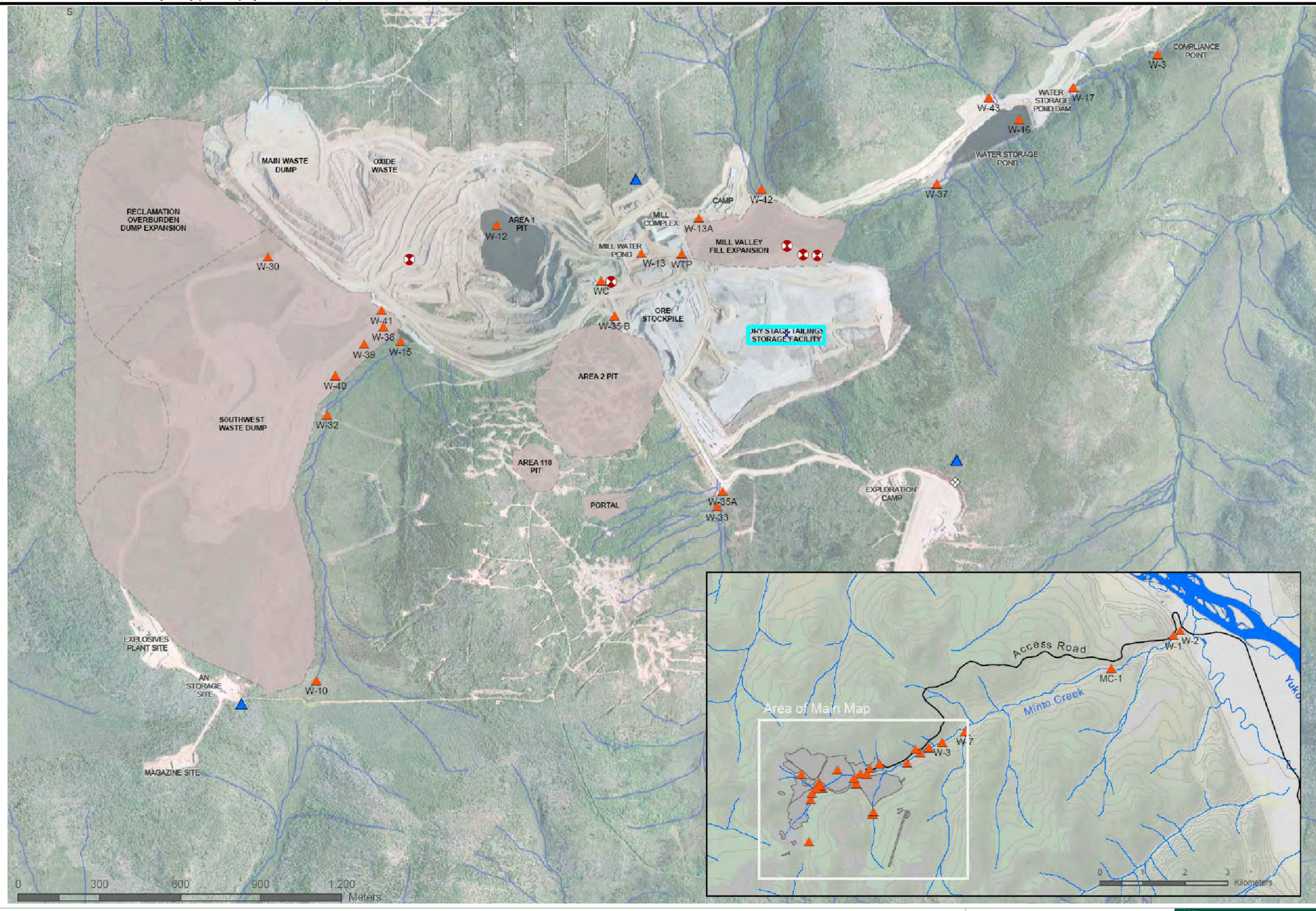
**MILL VALLEY FILL EXPANSION SECTIONS B AND C**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |

OFFICE: EBA-WHSE
DATE: August 12, 2010

**Figure 6-21**




NOTES :

THE INFORMATION CONTAINED ON THIS PLAN WAS PROVIDED BY ACCESS CONSULTING GROUP, DATED JULY 2010

0 500

Scale: 1: 15 000 (metres)

CLIENT

MINTO EXPLORATIONS LTD.

**PHASE IV EXPANSION**
**MINTO MINE, YUKON**

**WATER QUALITY SURVEILLANCE PROGRAM**
**MONITORING STATION LOCATIONS**

EBA Engineering Consultants Ltd.

| PROJECT NO. | DWN | CKD | REV |
|---|---|---|---|
| W14101068.030 | CB | SCD | 0 |
| OFFICE: EBA-WHSE | DATE: August 12, 2010 | | |

**Figure 7-1**

# APPENDIX A

## APPENDIX A EBA'S GENERAL CONDITIONS

## GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

### 1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

### 2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

### 3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

### 4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

### 5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

### 6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

## 7.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgemental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

## 8.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

## 9.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

## 10.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

## 11.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

## 12.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

## 13.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

## 14.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

## 15.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.