WOLVERINE MINE

CARE AND MAINTENANCE TEMPORARY CLOSURE PLAN

VERSION 2015-01

Prepared for:

Yukon Zinc Corporation

Prepared by:

Yukon Zinc Corporation

Vancouver, British Columbia

February 16th, 2015

Table of Contents

List of Figures

List of Tables

List of Pictures

Appendices

1 Introduction

This document serves as a guide for ensuring all structures, works and installations of Wolverine Mine (the Mine) remain stable during the temporary closure period that was initiated on January 21st, 2015. Closure activities for a temporary shutdown have been planned to ensure that all safety and environmental standards are achieved. This Plan incorporates requirements of *Quartz Mining License QML-0006*, *Type-A Water Use Licence QZ04-065*, *Waste Management Permit 81-014*, *Land Treatment Facility Permit 24-022*, and other relevant environmental regulations specified under Federal and Yukon Territorial Law.

During a temporary closure, YZC intends to be a responsible steward of the site and demonstrate its commitment to re-opening the site by continuing to:

- Ensure physical and chemical stability of the site;
- Monitor and maintain buildings and facilities;
- Maintain the site and main access roads;
- Maintain security and access protocols;
- Dewater the mine to prevent flooding of the underground workings;
- Collect site runoff from the industrial complex and waste rock pad; and
- Operate and maintain water management structures and treatment facilities to ensure no uncontrolled discharges occur.

Therefore, surface facilities will only be accessible to YZC personnel, or designated representatives, and equipment and facilities will remain essentially intact on site.

1.1 Glossary of Terms

The requirements of the *QML-0006, Type A Water Use Licence (QZ04-065)* and the *Yukon Mine Site Reclamation and Closure Policy* (January 2006) have been reviewed and incorporated into this Plan. For consistency in interpretation of the contents contained herein, the following terms are defined:

- **Decommissioning** - the period following the cessation of operations involving the removal of equipment from active service.
- **Temporary Closure** - unless otherwise agreed to in writing by the Chief, Dept. of Energy, Mines and Resources:
    1. The cessation of development or production that extends for more than a continuous two week period; or
    2. Any closure after the start-up date where no ore is mined or ore or tailings milled for a period exceeding two consecutive months.
- **Closure or Permanent Closure**
    1. The period in which decommissioning and reclamation activities are completed for the purpose of returning the mine site to pre-mining conditions (estimated to be a three year period for the Wolverine Mine to meet water discharge standards in the tailings facility); Monitoring frequency is quarterly for groundwater sampling and monthly for surface water sampling during closure.
    2. Where temporary closure exceeds three continuous years in duration.

2 Project Description

The Wolverine Mine, owned and operated by Yukon Zinc Corporation (YZC), is a zinc-silver-copper-lead-gold underground mine, with on-site milling capabilities of 1,700 t/d to produce copper, lead and zinc concentrates. The life-of-mine (LOM) was projected to be nine years, based on a 5.2 M tonne mineable reserve. YZC completed major site construction throughout 2009 and 2010. Mill commissioning commenced in 2011 and commercial production of 1,020 t/d or 60% of rate mill capacity over a 30 day period was achieved on March 1, 2012. Production first achieve 1,700 t/d capacity in January 2013, but since that date has been reduced to a 3 and 1 schedule, lowering the rate to ~1,200 t/d due to poor metal prices. On January 21st, 2015 YZC ceased production.

The Wolverine Mine is located in the south-eastern Yukon near the headwaters of the Wolverine Lake watershed within the Kaska Nation traditional territory (Figure 2-1). Site access is via air or a 24 km long all season access road that connects with the Robert Campbell Highway at km 190.

Figure 2-1: Location of the Wolverine Mine within the Yukon and Kaska Nation Traditional Territory

Exploration of the area commenced in the early 1970s, and in early 2005, a *Type B Water Use Licence (QZ01-051)* and a *Mining Land Use Permit (LQ00140)* were issued to allow for advanced exploration activities. Under these approvals, Yukon Zinc completed test mining and detailed infill diamond drilling programs. *Quartz Mining License QML-0006* and *Type A Water Use Licence QZ04-065*, to allow for the development and operation of the mine, were issued in December 2006 and October 2007, respectively.

The Wolverine Mine area climate is cold with a mean daily summer temperature of 15°C and a mean daily winter temperature of -25°C. Precipitation falls fairly evenly throughout the year, predominantly as rain from May to September and snow for the balance of the year. The mean annual precipitation is 570 mm, with total snowfall of less than 2 m. Maximum wind speeds are less than 40 km/hr and the annual average is 15 km/h. The project site elevation is approximately 1,350 masl.

The Wolverine Lake area is sparsely populated, and is used primarily for harvesting, gathering, and trapping by the Kaska First Nation bands from the Yukon, the Ross River Dena Council (RRDC) and the Liard First Nation (LFN). In July 2005, YZC signed a Socio-Economic Participation Agreement with the RRDC, on behalf of the Kaska Nation, that provides a basis for participation by all Kaska Nation members in project exploration and mine development and operations activities. This has and will include the review of environmental, social, and economic matters related to activities which support mine development, operation, and closure.

The Wolverine Mine has been planned and will be operated and reclaimed in accordance with the *Kaska Socioeconomic Participation Agreement* and the *RRDC Traditional Knowledge Protocol Agreement* as well as the Terrestrial Performance Standards outlined in *QML-0006* Schedule D (including terrain hazards, erosion control, re-vegetation, watercourses, contaminated soils, roads and trails, buildings and infrastructure, rock dumps, underground openings and workings, acid mine drainage concerns, tailings impoundment, and water control structures).

The overall projected timeline from construction through to post closure that was identified in the original design is provided in

design is provided in

Table 2-1 Wolverine Mine Project Timeline.

Table 2-1 Wolverine Mine Project Timeline

Period	Year(s)
Construction Phase	***2009 to 2010***
Production Ramp-Up	***2011***
Operations Phase	***2012 - 2020***
Year 1	***2012***
Year 2	***2013***
Year 3	***2014***
Year 4	***2015***
Year 5	***2016***
Year 6	***2017***
Year 7	***2018***
Year 8	***2019***
Year 9	***2020***
Permanent Closure Phase	***2021 to 2023***
Year 1 (Decommissioning)	**2021**
Year 2	**2022**

Year 3	**2023**
Post Closure Phase	**2023-2029**

2.1 Wolverine Mine Operations

The Wolverine Mine is an underground mine with surface ramp access, designed for 1700 t/day of mill feed ore. Figure 2-2 illustrates the overall mine site layout, and Figure 2-3 and Figure 2-4 provide the layouts for the industrial complex and tailings facility areas, respectively. The surface facilities and infrastructure for mine operations include the following:

- site access road;
- airstrip;
- fuel storage and dispensing;
- power generation and distribution;
- process buildings;
- assay laboratory;
- wet shotcrete plant;
- waste rock storage pads;
- tailings facility;
- truck shop;
- mining office complex;
- administration, first aid and mine rescue buildings, dry; and
- camp

The road is a private, single-lane road with passing bays, has restricted access and is operated under radio control. The road is used year-round with minimal load restrictions.

The on-site gravel airstrip is 1,340 m long with 280 m of runway at the south end of the airstrip required to provide for an emergency stop way to allow an aircraft to land on the airstrip with a full passenger load. The airstrip is intended for restricted use only by day during good visual meteorological flight conditions.

Diesel fuel is supplied from six diesel fuel storage tanks (75,000 L capacity each) and an 8,500 L gasoline tank. Storage is based on two weeks of reserve in the event of road problems and/or use restrictions. A fuel truck transports diesel fuel and lubricants to mobile equipment as required.

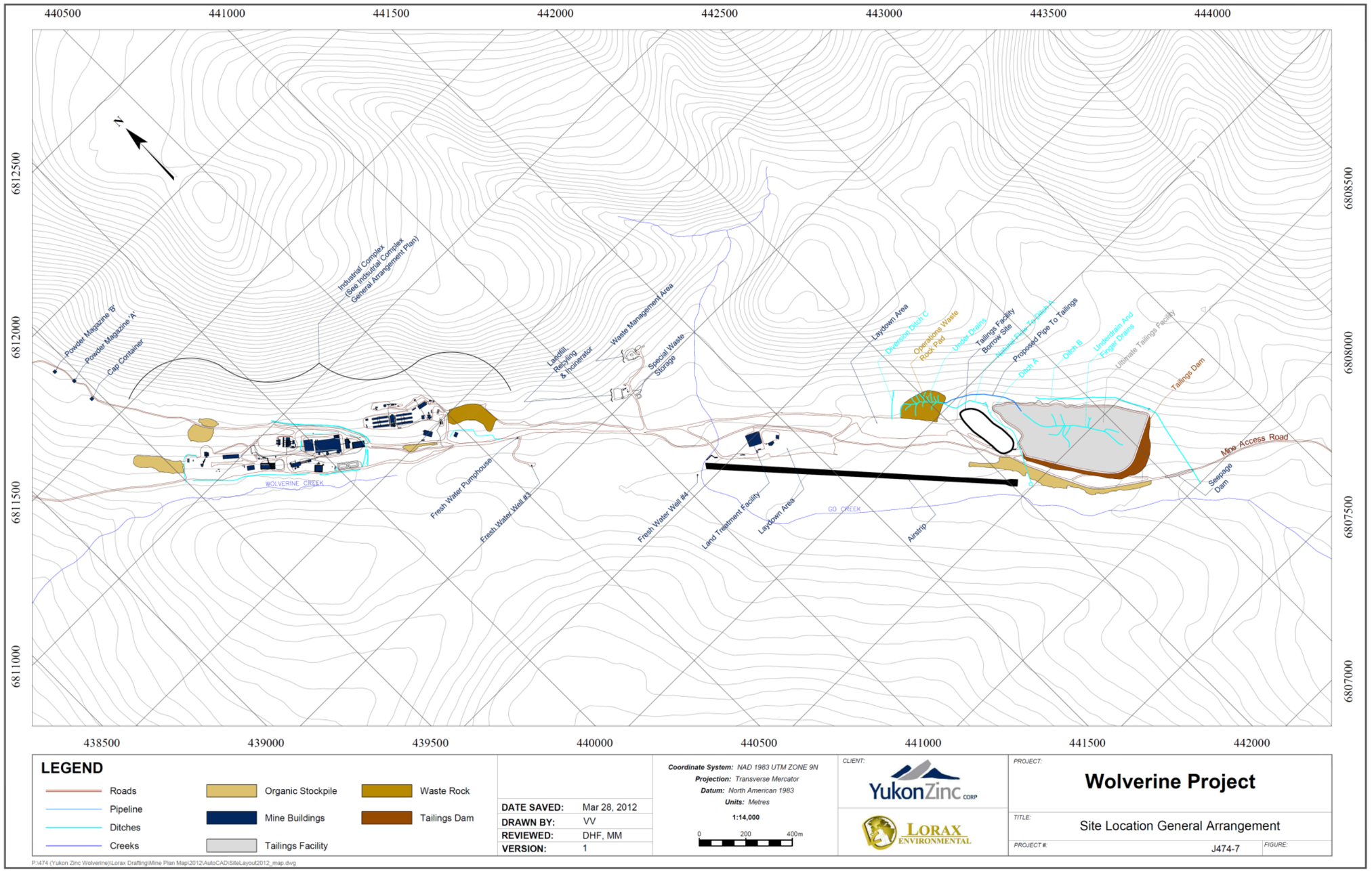

Figure 2-2: General Site Layout – Wolverine Mine Area

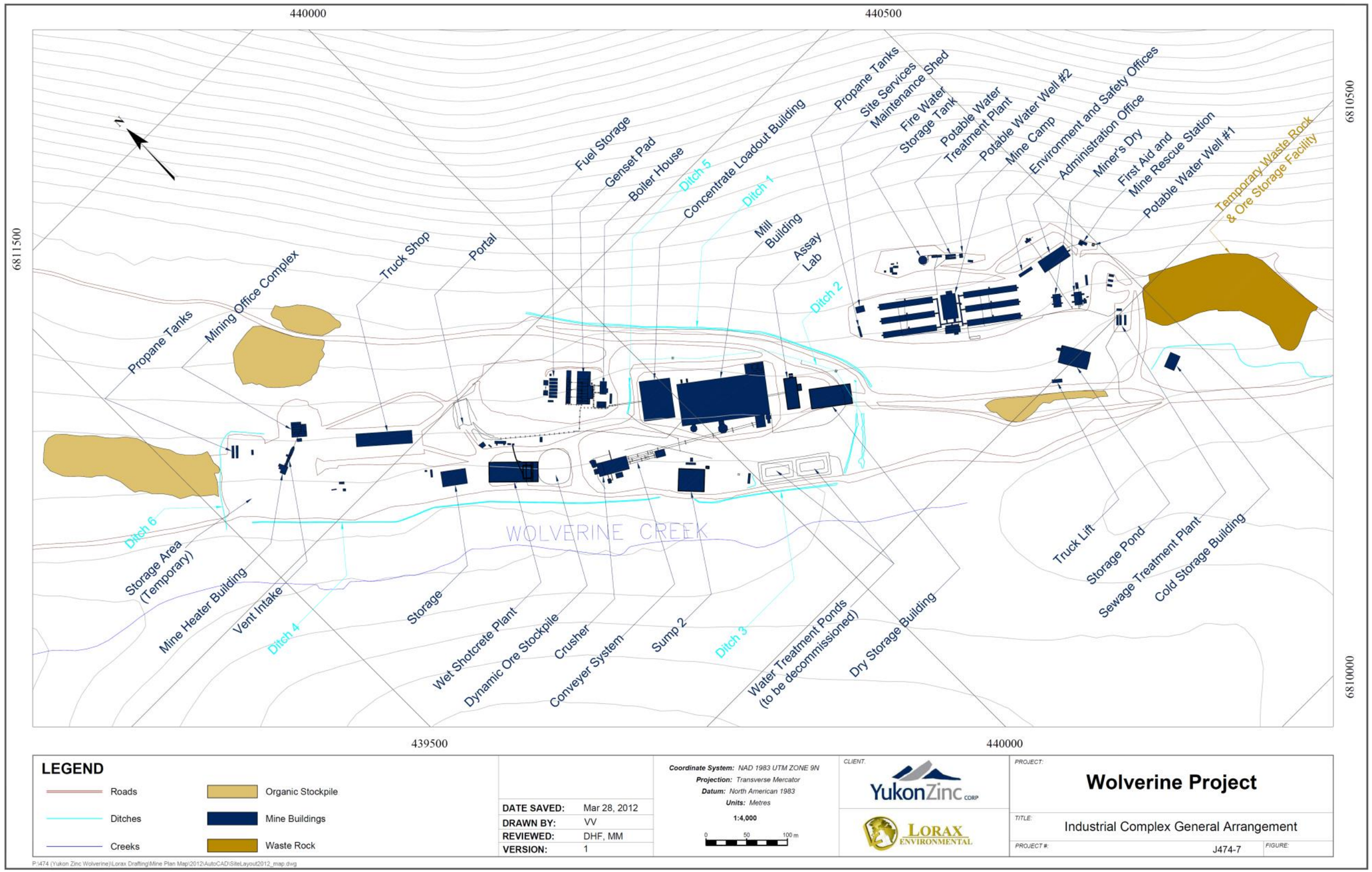

Figure 2-3: General Site Layout – Industrial Complex Area

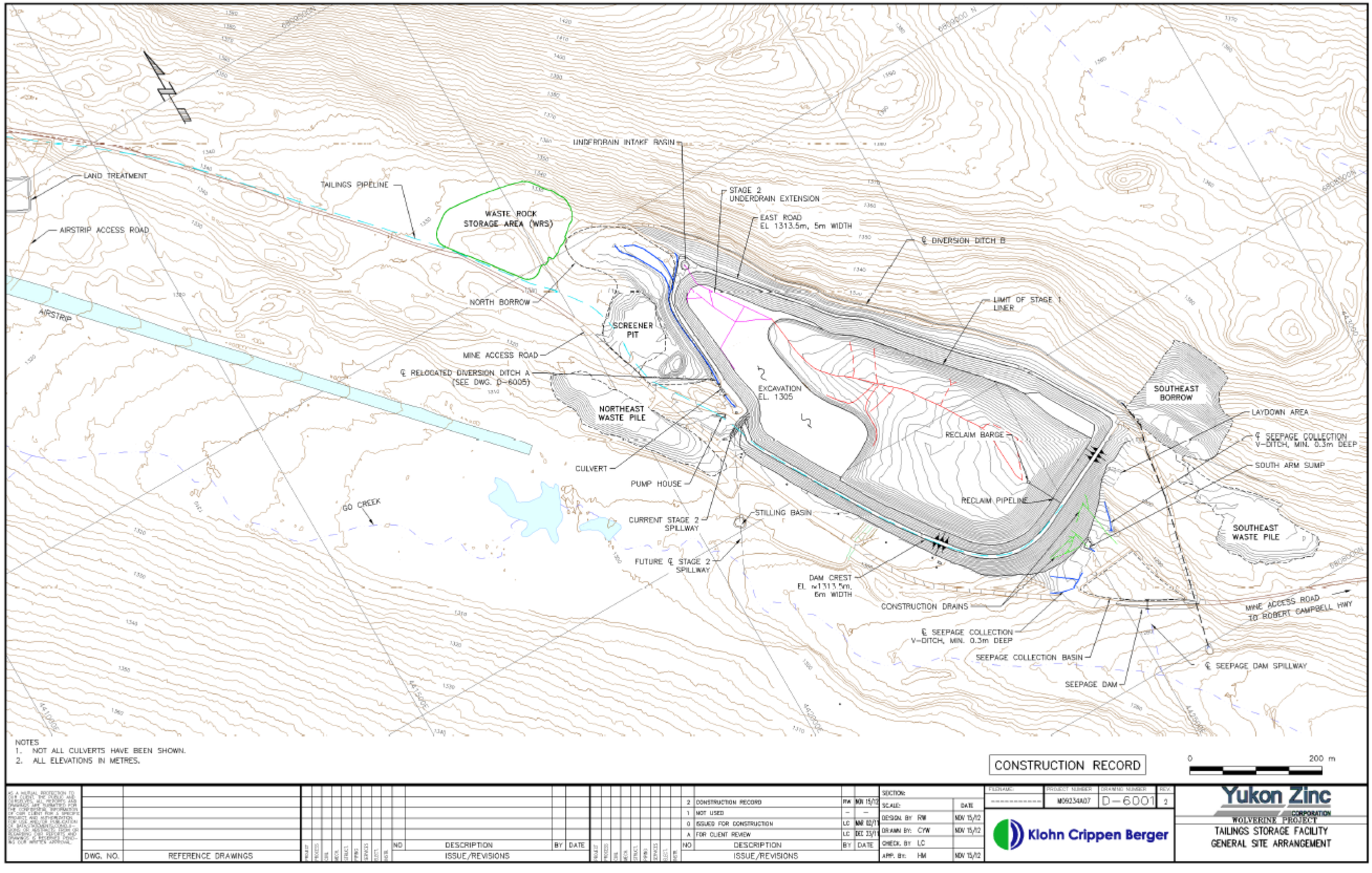

Figure 2-4: General Site Layout –Tailings Facility Area

On-site power generation is provided by eight diesel generator sets, each rated 1,200 rpm, 1.26 MW continuous, 1.45 MW prime power generating at 4,160 V for a total installed generating capacity of 10.08 MW continuous, 11.60 MW prime power.

The process facilities consist of a crusher building, mill building and concentrate load-out building. Feed conveyors connect the crusher building to the mill and transport crushed ore to the rod and ball mills. Ancillary facilities include a wet shotcrete plant, assay laboratory, mining office complex, truck shop and camp.

Camp infrastructure at the Wolverine Mine consists of six, 41-man dormitories, a kitchen, recreation hall, administration office, first aid office, mine rescue station and dry facilities. Additional support infrastructure includes a maintenance shed, training room, firewater tank, potable water treatment plant, communication station, and sewage treatment plant.

Water from the underground workings and the tailings slurry from the milling process are pumped to the tailings facility, then back to the mill for process water use. Approximately half of the tailings solids are designated for paste backfill operations.

Waste rock from the mine is stored temporarily on two waste rock pads. The first pad, located southeast of the camp, was constructed in 2005 and the second pad located north of the tailings facility was constructed in 2011.

Metal concentrates are predominantly trucked south along the Robert Campbell Highway through Watson Lake to the Stewart Bulk Terminal in Stewart, BC for transportation via ocean freighter to various smelters in Asia.

3 Onsite Access, Transportation and Communication

This section describes activities required to ensure transportation infrastructure and lines of communication are maintained during the temporary closure period.

3.1 Site Access, Transportation and Security

The following measures will be undertaken during the temporary closure period to ensure adequate access to all required infrastructure and to and from site, via road vehicle, plane or helicopter:

- Access Road, airstrip/heli pad, camp and general Mine Site will be maintained year round by receiving regular maintenance (e.g., snow removal, grading, and ditch clearing) using the appropriate equipment;
- All waterways and creek crossings will be monitored on a daily basis to prevent erosion, pooling and potential overflows from occurring, and the road kept clear of debris;
- Site wide support for mechanical assisted lifts and transporting of heavy freight;
- Daily pre-operation checks on all vehicles and equipment will be completed;
- Road signage will be kept clear of ice/snow buildup;
- Snow/ice buildup will around entrance ways to buildings and significant infrastructure (e.g., emergency/fire prevention equipment, communication equipment and water management facilities).

The duties specified above will be performed by certified Equipment Operators, trained in their use. Maintenance of mobile and stationary equipment necessary to perform the above duties will be completed as per their routine maintenance schedules and manufacturer specifications by a certified Mechanic, and will be recorded. Equipment not in use will be secured from use until it has been inspected by the Mechanic. The policies specified in the Standard Road Operation Procedure (Surface Operations #11) will be adhered to throughout the temporary closure.

The necessary equipment required supporting a Care and Maintenance plan, maintaining seasonal access to mandatory environmental sampling locations, completing the necessary underground rehabilitation, and identification of YZC owned active and available equipment are listed in Table 3-1.

The Mine Site will be kept secure from trespass and damage via a locked gate at KM 0, which will be monitored daily. If a visitor wishes to enter the site, they will confirm a date and time to meet at the gate before being admitted.

Table 3-1 Required Equipment for Care and Maintenance

Surface Care & Maintenance Required	Underground Rehabilitation Required	Environment Sampling Required	Active & Available on Site
YZ001 – 2004 CAT 966G Loader	Sandvik - LH410 - L310D792	YZQA3 - Suzuki 4X4 Quad	YZ009 - 2010 CAT 966H Loader
YZ002 – 2002 CAT 730 Rock Truck	Sandvik - DS311 - DE L13B5933	YZQA4 - Polaris 4X4 Quad	YZ029 - Sellick S-60 Forklift
YZ003 – 2002 CAT 420D Backhoe	Sandvik - TH430 - T230S038	YZSM-3 - Ski-Doo Tundra	YZ030 - CAT 226B Skid-Steer Loader
YZ004 – CAT 14H Grader	Sandvik - 2 TH430 - T230D008	YZSM-4 - Ski-Doo Tundra	YZ034 - Bobcat S70 Skid-Steer Loader
YZ005 – CAT 320C Excavator	Sandvik - 2 TH430 - T230D009		YZ037 - Lowboy (for Tridem Tractor)
YZ006 – 1994 CAT 14G Grader	Sandvik - 2 DD321 - 40 112D18919		YZW001 - Miller Welding Machine
YZ007 – CAT IT62 Loader	Sandvik - 2 DD321 - 40 112D18921		
YZ012 – 1988 CAT D8N Dozer	Sandvik - LH410 - L210D812		
YZ013 – 2010 CAT 966H Loader	Sandvik - DD321 - 40 112D19913		
YZ018 – 2005 International Sand Truck	Sandvik - 3 LH410 - L210D709		
YZ019 – 2011 Peterbuilt Vacuum Truck	Sandvik - 3 LH410 - L210D742		
YZ020 – CAT 930 Loader	Sandvik - 3 LH410 - L210D755		
YZ024 – Steam Truck			
YZ025 – 2011 Peterbuilt Gravel Truck			
YZ026 – 2011 Peterbuilt Water Truck			
YZ027 – Kenworth T800B Tridem Tractor			
YZ028 – Kubota Mini Hoe			
YZ035 – CAT 14M Grader			
YZ114 – 2005 Ambulance			
Light Vehicles – 5 (leased and owned)			
Westland Incinerator			

*Red Text identifies equipment still under lease obligations as of February 17th, 2015.

3.2 Communication Systems

The Communications Trailer located on the camp pad supports two means of communication, a Cisco Phone Network and Satellite Intra-net. There is a redundancy in the satellite dishes that can be used. There is also a satellite phone that can be used for backup emergency communications in the case of a system failure. In addition, an internet phone system will be established as a backup to the Cisco Phone Network.

4 Safety and Health Management

Primarily two personnel will work together at all times in and around the mine site; the exceptions are personnel with a permanent work area such as the Powerhouse attendant or an equipment operator. A routine means of monitoring will be maintained during working hours.

Underground personnel will be required to establish regular communications to surface, contact made on arrival and departure from check stops and on a pre-arranged scheduled basis. The locations that the underground workers are communicating from would be tracked. On loss of radio communications, personnel underground will contact surface with the use of the Femco Phone. Environmental personnel will operate under similar conditions when working in the field or remote locations as detailed in the Remote and Isolated Work Procedure (Environment #2).

Abiding by the Safety and Health Management Plan should ensure safe practices, training, and leadership on site. However, in the case of an emergency all personnel must be familiar with and follow the applicable plans (as listed below) for responding to any onsite emergency:

- Emergency Response Plan: Surface
- Emergency Response Plan: Underground
- Camp Evacuation Procedure

5 Environmental Monitoring and Management

Through the implementation of environmental policies as well as Environmental Protection and Mine Operating Plans developed in accordance with QML-0006, personnel will strive to preserve and protect the environment while providing a safe and responsible operating environment. Examples of commitment to the environment are the use of innovative energy and water saving initiatives that were incorporated into infrastructure design and operations including:

- Recycling of water contained within the tailings facility for use in mineral processing.
- Recycling of water from underground for use in the shotcrete plant.
- Recycling of process water in assay lab acid hood showers.
- Recycling of wash water in the truck shop through use of an oil/water separator.
- Generator waste heat usage through a closed loop glycol recirculation system.

- Burning of waste oil generated onsite to heat the truck shop and wet shotcrete plant (also minimizes transportation requirements for disposal offsite).

This section describes how personnel will continue to sustain the mine site environmental protection integrity moving into the temporary closure period.

5.1 Monitoring Activities

During temporary closure, regular inspections will be conducted to ensure compliance with applicable regulations and permits/licenses. Structures such as the waste rock pads, water collection sumps, land treatment farm, diversion and collection ditches, tailings facility, fuel and storage tanks, pipelines and roadside ditches and culverts will be inspected to ensure physical stability and integrity.

Surface water quality and flow monitoring will be conducted on selected surface water sampling stations as summarized in Table 5-1. Monitoring frequency will be in accordance *with Water Use Licence QZ04-065*.

Table 5-1: Selected Surface Water Quality Monitoring Stations – Temporary Closure

Station	Watershed	Frequency (# samples/yr)
W82	*Wolverine Creek*	Monthly (12)
W9		Monthly (9)
L1	*Little Wolverine Lake*	Monthly (12)
W31	*Go Creek*	Monthly (8)
W80		Monthly (6) & daily during discharge (184)
Retention Pond		daily during discharge (184)
W22	*Money Creek*	Monthly (12)
W71	*Access Road Route*	Monthly (12)
W72		Monthly (12)
W73		Monthly (12)

Based on the past two years of sampling, stations W9 and W31 cannot be sampled during the coldest winter months due to frozen conditions. Groundwater quality monitoring will be conducted quarterly on all monitoring well installations (in total 24 sampling wells - numbers of samples for some well have been reduced based on frozen conditions observed in past two years of sampling). For additional information with respect to station locations and analytical parameters, refer to *Wolverine Mine Monitoring and Surveillance Plan 2011-03*.

Sampling locations accessibility is often weather dependent and water samples collected are time sensitive for analytical tests; therefore, consideration will need to be made on occasion for additional flights to the Wolverine Mine site to ensure samples are shipped within their hold times for testing and to comply with the temporary closure plan. Additionally, to ensure there is no disruption to the sampling schedule, Maxxam Analytics accounts will need to be remunerated and kept in good standing for the duration of monitoring.

Annual engineering inspections and subsequent reports must be submitted to EMR. The inspections and respective reports are as follows:

- inspection of geotechnical aspects of the underground mine;
- inspection of the structures at and around the industrial; and
- a physical inspection of the Tailings Storage Facility.

Drinking water samples must be taken monthly to ensure the health of personnel on site which rely on the drilled wells for drinking water.

All spills that occur during temporary closure will be addressed following the existing *Spill Contingency Plan (version 2010-03)*, and the Land Treatment Facility will be managed as per permit requirements.

Wildlife presence will be monitored within the general mine site and tailings facility areas, and be recorded as per the *Wildlife Protection Plan (version 2009-02)*. Metal levels in vegetation and small mammals will also continue to be monitored every three years through the temporary closure period or as long as deemed necessary by the Wildlife Technical Committee.

5.2 Water Management

Water management activities during temporary closure will consist of dewatering of the underground workings, and collection of surface runoff from the temporary waste rock pads, land treatment farm and the industrial complex area. During the period of temporary closure there is sufficient storage capacity in the tailings impoundment; therefore, treatment is not necessary during the initial closure period. Dewatering and water treatment requirements during an extended closure period are currently being determined by an external third party, which is conducting an environmental audit. Critical samples from the tailings impoundment (sample location T1) will be required to monitor water chemistry changes.

5.2.1 Surface Water Runoff

For structures designed to collect contact water runoff or effluent, monitoring will be conducted to ensure that all runoff is captured and diverted to the Tailings Storage Facility. For the period of care and maintenance, mine discharge water, surface water from site and any residual water from the mill will be directed into or through Sump 2. Using primarily 3" HDPE pipe, a heat traced discharge water line is being run off of the existing Sump 2 discharge line to the Tailings Facility. Until the 3" line is complete Sump 2 will continue to discharge into a non-heat traced 8" Mill Tailings line. The new 3" discharge line is almost complete, waiting on additional material and manpower availability.

5.2.2 Diversion Ditches

All diversion and collection ditches are currently in good condition. As per the *Wolverine Mine 2014 Annual Observations of the On-site Earth Structures* report by Tetra-Tech EBA, all diversion and collection ditches that border the Industrial Complex are in Ditch 4 which runs along the toe of the Underground Laydown area where a pile of waste rock and ore still remain (see Figure 2-3). Water that may come into contact with the pile will be captured by Ditch 4 and diverted to Sump 2. In 2014, Ditch 4 was repaired by installing a strip of 110 m x 10 m liner along a significantly damaged section. To encourage flow toward Sump 2 in the spring, a glycol line heat loop was placed along the trough of the ditch to prevent ice from accumulating and refreezing, which led to an unauthorized discharge during the previous

spring. Further, a berm was also installed along the creek side portion of the ditch to ensure potential overflows are diverted toward the Mine site, rather than the creek. YZC is therefore fully confident that all runoff from the Underground Laydown area will be captured and diverted to Sump 2.

In July 2014, some noticeable slumping at the edge of the northern most point of the tailings facility (i.e., side opposite of the dam) was noticed. After an investigation by YZC ground support Engineers and consulting with the Tailings Facility Design Engineer (Klohn Crippen Berger), the cause was identified as water percolating through the bottom of Ditch A and undermining the tailings liner in that section. The solution was therefore to line Ditch A with a HDPE 6 mil liner and re-configure the length and contour of the ditch to capture and divert as much water away from the pond as possible. Rehabilitation included a settling sump that was established upstream of Ditch A to collect all surface/ground water sourced from the immediate surrounding area and decant it into the ditch, where a liner had been installed. Before entering the culvert at the end of the ditch, the water will pass through a staging of 3 rock sediment traps where it will be filtered and energy dissipated. The resulting slump at the northern edge of the tailings pond (i.e., not dam side) will be filled in and liner re-lock trenched during the summer of 2015. However, the cause of the slump has been rectified.

5.2.3 Tailings Facility

The current status of the tailings impoundment is shown and the general arrangement of the tailings impoundment at life of mine is provided in Figure 2-4. Further information pertaining to the Ultimate Tailings Storage Facility can be found in the as-constructed report for the Tailings Dam Lift Project submitted in December 2012, entitled: *Wolverine Stage 2 Expansion – Construction Record Report*.

Process effluent from the grinding and flotation circuits is stored in the tailings impoundment prior to being recycled back to the process plant. The tailings comprise a sand-silt mixture with a relatively low permeability. To prevent oxidation of the tailings solids and subsequent acid generation, the tailings impoundment has been constructed as a water retaining structure underlain with an impermeable liner. This will permit the tailings to remain completely saturated, both during operations and at closure, and will eliminate the potential for acid drainage from the facility. Moreover, the liner also greatly reduces the potential for seepage of tailings water and the concomitant potential for groundwater contamination occurring both during operations, closure and at post-closure.

Based on recent alterations to the Tailings Facility bathymetry (changes in discharge location) and surrounding diversions ditches, an environmental technician will monitor installed piezometers, survey monuments, weather stations and water quality on a monthly basis. Additionally, the environmental technician will coordinate the installation of a shape accel array technology to monitor structural stability of the dam, which will be used to replace the two damaged inclinometers. Weekly and monthly inspections of the entire Tailings Facility are to be conducted in order to monitor wildlife activity in the area, underdrain flow rates, and potential slump failures in the North end (slump identified in fall 2013, preventative work conducted on Ditch A in August 2014). A surveyed staff gauge will be installed near the pump barge to monitor the level of the water/tailings volume moving forward.

A new water management plan will need to be developed to address the contaminant levels in the water stored in the tailings storage facility. The environmental technician(s) will work with

Yukon Government, First Nations, and a third party consultant to identify and address risks associated with the contaminants. The existing Emergency Response Plan for a potential tailings breach will be kept updated annually, and followed as necessary.

5.3 Waste Management Plan

Waste management areas include the landfill, special waste storage pad, solid waste storage area, and land treatment facility Figure 5-1. All wastes will be handled, stored, managed and disposed of in a proper manner as outlined in the *Wolverine Mine Waste Management Plan Version 2011-03*. Domestic waste will be the primary source of waste during temporary closure.

Decommissioning activities will generate some non-hazardous waste material that will be disposed of in the landfill area. Waste that cannot be buried in the landfill will be temporarily stored at the solid waste or special waste storage areas prior to transportation for disposal offsite. Removal of hazardous waste to a proper handling/processing facility must be conducted in 2015.

During decommissioning and the early closure period, soils will be tested for contaminants in all areas where ore, concentrate, waste rock, solid wastes, special wastes, fuel and chemicals were stored or handled at the site. If contamination is found, the contaminated soil will be removed from the area and either temporarily disposed of in the land treatment farm near the airstrip or hauled directly offsite to an approved facility. The selected disposal method will be in accordance with the Yukon Environment Act and Contaminated Sites Regulation, and Special Waste Regulation.

5.3.1 Land Treatment Facility

Soils present in the land treatment facility during the final year of operation will be tested to determine if material is acceptable for use in reclamation programs around the industrial complex. Depending on the level of contamination, contaminated soils excavated during decommissioning may be placed in the land treatment facility for remediation for subsequent use in reclamation activities in the closure phase. If the various soils are found to contain residual contamination that does not permit use in reclamation, they will be hauled off site to an approved facility.

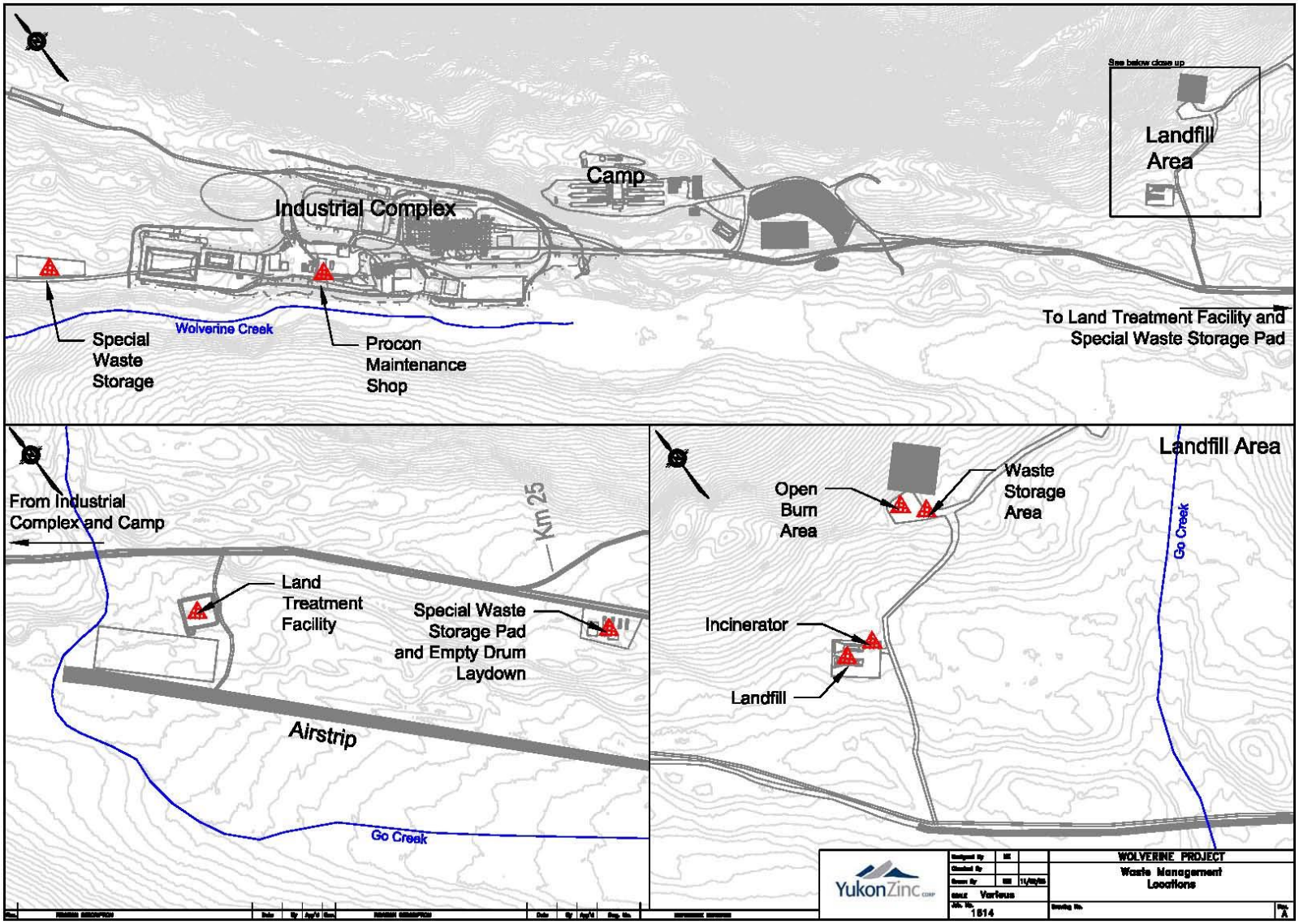

Figure 5-1 Location of Special Waste Storage, Landfill, Incinerator, Land Treatment Facility, Waste Storage and Open Burn Areas

6 Decommissioning and Inspection of Processing Buildings

Closure issues related to infrastructure include public health and safety, site stabilization, aesthetics, and restoration of disturbed lands. The industrial complex buildings (mill, crusher, concentrate load out, truck shop, assay lab, offices, and camp) and support facilities were to be decommissioned in stages.

During February of 2015, the processing buildings: Mill, Crusher, Assay Lab, and Concentrate Load-Out Building ceased operation and transitioned from shutdown and maintenance to a temporary closure status. The rapid loss of personnel familiar with these facilities drastically reduced the ability to complete necessary decommissioning procedures. A detailed list of shutdown and decommissioning tasks were compiled. Status of these tasks and those remaining will be undertaken by the designated Care and Maintenance team.

Chemicals, reagents and hydrocarbon products remaining onsite in inventory will be removed from the mine site and returned to the original supplier for credit and reuse, or sold to a third party user subject to the appropriate regulatory requirements. For specialized products, disposal options may include disposal through a licensed waste disposal firm.

7 Decommissioning and Monitoring of Underground Workings and Supporting Facilities

During a temporary closure period, the priorities are to ensure public safety and protection of wildlife, prevent flooding of the mine to maintain the integrity of the workings, and prevent uncontrolled discharge of groundwater at the portal. YOH&S Regulations, “Surface and Underground Mines or Projects”, 15.26 (2) f, stipulates that escape ways be inspected at least once a month by a competent person. Rehabilitation of underground workings will only be performed by trained professional workers and carried out according to the Ground Control Plan, under the direction of a Mine Engineer. Engineering plans for re-habitation will be submitted to WCB prior to implementation and will only commence with their approval. When Rehabilitation is in progress Mine Rescue Teams will be available on Site, contact will be made with North American Tungsten so they are aware and one of their Mine Rescue Teams may be available if needed.

7.1 Underground Access and Rehabilitation

The portal will be gated to restrict access to the mine when access is not routinely required. Water collected in levels in underground sumps will be pumped to the tailings facility. The following infrastructure and equipment will remain operational or onsite to support water management activities:

- main access road and onsite roads;
- light duty vehicles;
- tailings and reclaim pipelines and pumps;
- fuel storage facility;
- tailings facility water treatment plant (once operational);

- power generating facility with adequate capacity to power the water pumping systems and camp;
- small maintenance workshop; and communication system.

7.1.1 Ground Condition Assessment Report (Rehab Project NOT COMPLETED)

A ground condition assessment was conducted on January 30, 2015 by Woo Shin, Technical Service Superintendent, and Imran Haque, Geotechnical Engineer. The following rehab locations were identified as requiring additional ground support before transitioning to the care and maintenance stage of temporary closure. If these locations are not rehabilitated, then no personnel are authorized to enter the underground workings until a Geotechnical Engineer reassesses the ground conditions, and issues a revised Ground Condition Assessment Report. The rehabilitation work identified in this assessment is detailed as follows:

1160 – 1145 MAR

- 5 m from the first Safety Bay: two vertical hairline cracks → install 8' regular bolts with strap
- 10 m from the second Safety Bay: around 10 mm wide cracks from sill propagating to hairline cracks to shoulder area → install 12' super bolts with screen
- Beside the third Safety Bay: Shotcrete scraped off and FW material progressively sloughing → Shotcrete from exposed FW to the sill and around safety bay
- 5 m from the third Safety Bay: Exposed FW material in wall and possible sloughing failure → Shotcrete to wall
- 15 m from the third Safety Bay: Cracks along the left side wall and mesh exposed from shotcrete around 10 m across wall → install 12' super bolts with screen from wall up to shoulder

1125 Stope Access

- Beside Sump: Screens were scraped and FW material exposed. Possible sloughing failure → install 8' regular bolt with screen to exposed FW in wall
- 5 m from Main Ramp: Progressive sloughing failure → shotcrete from wall to sill

1125 – 1105 MAR

- Exposed FW material with torn screen. Possible sloughing failure → shotcrete to wall

If these required rehabilitation action items are completed by the end of February, the main ramp condition below 1150 level will not be in critical condition to prevent working underground. Additional ground movement and sloughing failure indicating systems were adopted for all the locations requiring rehab. These indicating systems will be monitored by a geotechnical engineer every day and a signed off assessment report will be completed by the geotechnical engineer. Once signed off the daily reports will be reviewed and approved by the technical service superintendent and / or mine superintendent. Copies of the 'base ground monitoring reports' will be forwarded daily, to WCB until the completion of rehab. If any additional ground movement or indications of potential failure are observed, all UG activities will be stopped and reported to YKWCB. No worker will perform work under or near identified fault areas. 'Mine Cats', with trained operators will be used exclusively for care and maintenance activities. Training records will be provided to YKWCB. In order to ensure safety

of workers, work will be performed under the direction of the Mine Geotechnical daily inspections.

Production headings requiring regular base ground monitoring:

1300: Possible sloughing failure

1240: Over-broken face. Couple spots of small scale sloughing failure

1220: Couple spots of possible sloughing failure. Water inflowing from the back in front of the face

1200: Heading underneath unconsolidated fill

1170: Couple spots of small scale failure

Once rehabilitation has been completed and approved by a Mine Engineer and WCB, the underground will be re-opened for regular maintenance and monitoring. Recommendations of ground monitoring and underground activities in care and maintenance to ensure the protection of workers were identified during this assessment:

- Access to all the level production headings will be barricaded, preventing Unauthorized entry, and will be permitted only under the authorization of the Geotechnical Engineer
- Monthly base ground condition assessments for both main ramp and level stopes by a certified Geotechnical Engineer are strongly recommended.
- Quarterly base rehabilitations based on monthly ground assessment reports for both main ramp and level stopes are recommended.
- All underground activities in care and maintenance will be limited to pump checks and dewatering maintenance using Mine Cat. Any other equipment will not be allowed to operate underground without prior approval from WCB
- To further protect the workers no work will be performed until such time as the Geotechnical Engineer has completed the “daily checks”, and returned to Surface.
- The Geotechnical Engineer will then meet with the workers to review his findings and sign off documentation of his review, accompanied by the workers – and provide a copy to YKWCB daily.
- Finally, a JHA will be performed, to assist in identifying potential hazards and discuss any risk mitigation, and will be signed by all, providing a copy to YKWCB daily.

7.2 Ancillary Support Facilities

Equipment used underground will be maintained by licensed mechanics according to the manufacturer’s recommendations and a maintenance schedule. Fire suppression system certifications will be carried out by a 3rd party. Emission checks will be performed as required by Procedure Underground #9 – Underground Diesel Equipment Testing for the operation of the equipment being used underground. A supply of ground support materials, swellex bolts, plates and mesh will be available on site. Reagents will be kept in warm storage, cement will be ordered in as required to prevent it from solidifying in the silos.

Re-habitation of underground workings will be a routine activity for the life of the Mine. The Truck Shop will remain heated for the duration of underground activities to house and repair underground equipment; it will also be used as the base of operations for underground activities.

The Shotcrete Batch Plant will be winterized as a precaution and kept cool. The waste heat loop will continue to circulate to the Batch Plant, but a majority of the heating units will be turned off. The ability to use Mine discharge water for the mixing of Shotcrete and a surge capacity for water will be implemented.

Unused explosives and detonation devices will be checked for current conditions and either returned to the supplier for credit, shipped to another third party user, or destroyed through appropriate procedures. In all cases the explosives will be handled, transported and disposed of in compliance with the Explosive Act. The explosives magazines will be returned to the supplier or to a third party.

8 Decommissioning of Temporary Waste Rock and Ore Storage Pads

Waste rock from the mine is stored temporarily on two waste rock pads. The first pad, located southeast of the camp, and the second pad located north of the tailings facility. The initial Temporary Waste Rock and Ore Storage Facility was constructed in 2005 (Phase 1) and extended in fall 2007 (Phase 2) to accommodate test mine and pre-production development rock generated in 2005 and 2009, respectively. Ore stored on the pad was used to commission the mill in 2010, and the current volume of waste on the pad from a survey completed on July 24, 2012 is 91,000 m^3 (Picture 5-6).

Picture 8-1: Test mine and pre-production waste rock on temporary waste rock storage pad located east of camp (July 14, 2013)

Due to updates in 2010-11 to the underground mine plan, a second waste rock pad was constructed in late 2011 to accommodate waste rock generated from mine ramp development during the production phase. The lined area is approximately 20,000 m^2 and current volume of waste on the pad from a survey completed on July 2, 2013 is 22,000 m^3 (Picture 5-7).

For both sites, activities to be undertaken when all rock has been placed within the mine will include:

- Granular till and clay components of the pad liners will be hauled to underground, and encapsulated with paste backfill;
- Geo-synthetic components of the Enviro Liners will be cut into manageable segments, then hauled underground, and encapsulated with paste backfill;
- Sumps will be backfilled with fine-grained materials, and any pipelines removed; and
- Footprints will be re-contoured, covered with stockpiled topsoil and organic stripping, and re-vegetated.

These deposits will ultimately need to be transported back underground as wastefill. Until this time, the stockpiled ore and waste rock located at KM28.5 will be relocated into the second pad (which has not reached full capacity) as it is not lined or contained in its current location. Should the mine enter into permanent closure prior to the end of the projected operations phase, all waste rock and granular till will be placed within the tailings facility and the liner will be removed and disposed of within the underground workings.

Picture 8-2: Operations phase waste rock pad looking west (July 14, 2013)

9 Power Generation Infrastructure

During the initial closure stage, power requirements will be reduced and only those generators required for ongoing activities will remain operational to support the water treatment plant, pipeline pumps and auxiliary facilities. Excess gensets will be deactivated and removed from the site.

As of February 2015, two generators are offline due to maintenance issues. Generator 5 has control and wiring issues, which will require technical assistance to repair. The original estimate was $5,462.80, if no parts were required. Generator 7 is due for a major overhaul; a cost estimate based on a previous overhaul is $315,391.20.

The Mill, Crusher, Assay Lab, Batch Plant and parts of the Powerhouse are heated off a waste heat recovery system on the Powerhouse Generators. The waste heat loop supported by the Cleaver Brooks Boilers in the Boiler House when there is not enough waste heat being produced by the generators. Manufacturer recommendations are that the heating solution does not freeze in the lines or remain stagnant for a long period of time.

Propane delivery, not designated for the underground, fills the Fuel Pad Propane Dispenser, First Aid Tank, Electrical Shop Tank, Warehouse Tank as well as the Camp Propane Tank. Elimination of the satellite propane, propane fuelled equipment, and a reduction in the camp footprint (using one Bunkhouse, the Kitchen, Main Office and Site Services Shop) will reduce propane demand.

The Mine Vent Fan Heater Propane Tanks supply the Truck Shop Hotsy Pressure Washer, Mine Office Complex and the Batch Plant Aggregate Dryer with propane. The Mine Office Complex will remain shut down, there will be minimal use of the Truck Shop Hotsy Pressure Washer and the Batch Plant Aggregate Dryer is redundant until the Mine goes back into production.

A gas monitor will be used the Care and Maintenance Team when inspecting the underground de-watering. The Mine Vent Fan will be operated to meet the requirements for Brake HP of the equipment being operated underground, for reduction of particulates in the atmosphere, to maintain a significantly low Carbon Monoxide level and meet requirements for Oxygen levels.

The Mine Vent Fan is set at 400RPM as the minimum speed to operate the Mine Air Heater. During normal mining operations with all production equipment in use, the Mine Vent Fan operates at 700RPM and the Mine Air Heater 6 Deg C.

- By operating the Mine Vent Fan as necessary to vent and heat the Mine when necessary.
- Turning the Mine Air Heater off when the ambient temperature is above 0 Deg C.
- Having the set point of the Mine Air Heater at the minimum temperature to prevent icing in the Mine and Vent Raise.

10 Closure Manpower

A number of personnel will be required onsite to implement the various decommissioning, closure and reclamation tasks. The majority of these activities will be undertaken on a seasonal basis (May–October) and directed by an onsite manager. While it is preferred that the work force be local to minimize travel expense, a realistic approach would budget travel from the nearest major city and include one night's stay in a hotel.

During the initial closure period a Care and Maintenance Team would be required to operate and maintain the equipment, support dewatering, and environmental requirements. Access to the underground would be by the approval of a Mine Engineer. Reporting to a Mine Engineer any changes to ground conditions, a Geological Technician would inspect the haulage ways underground on a daily basis. Surface personnel would support underground activities and underground personnel would support surface activities. A compliment of six Mine Rescue Team Members (5 team members and 1 co-ordinator) must be on surface when personnel are underground.

The work force requirements for an effective Care and Maintenance team are provided in Table 10-1. These numbers take into account a rotational schedule between two crews during the initial period of care and maintenance.

Table 10-1 Site Decommissioning, Closure and Reclamation Work Force Requirements

Personnel	Total Positions
Project Manager (Corporate)	1
Environmental Monitor	2
Gas Fitter/Utility Person	2
Powerhouse Attendant	2
Equipment Operators	4
Electrician	2
Mechanic	2
Geological Technician	2
Mine Rescue Members (and Coordinator)	12
Medic	2
Camp Cook	2

10.1 Accommodations

Based on the number of personnel on site and the resources to maintain buildings, there will be a gradual reduction in facilities that remain occupied.

The Potable Water Treatment Plant will stay in operation while the camp is habituated. The Sewage Treatment Plant is over capacity for the usage and has been shut down; it will be used as holding tanks for manual disposal. In excess of 7 personnel on site a Bunkhouse is the only viable housing. The Main Office building houses the communications equipment and Computer Server for site; therefore, it will be maintained.

11 Decommissioning and Temporary Closure Cost Estimates

Decommissioning and temporary closure costs have been prepared based on the existing condition of the Wolverine Mine site, as of February 17th, 2015. The cost summaries provided in Appendix A include costs associated with project shutdown, the decommissioning of facilities and support infrastructure, and environmental compliance and monitoring.

Appendix A: Site Management and Monitoring Costs – Care and Maintenance

Organization, Security and Overhead		Description	Units	Quantity	Unit Cost	Total Annual Costs
Gas Fitter / Utility Person	2	2 week rotational schedule	monthly	12	$ 15,402	$ 184,828
Electrician	2	2 week rotational schedule	monthly	12	$ 15,402	$ 184,828
Powerhouse Attendant	2	2 week rotational schedule	monthly	12	$ 16,136	$ 193,632
Mechanic	2	2 week rotational schedule	monthly	12	$ 15,402	$ 184,828
Environmental Technician	2	2 week rotational schedule	monthly	12	$ 17,161	$ 205,928
Equipment Operator	4	2 week rotational schedule	monthly	12	$ 29,219	$ 350,633
Camp Cook	2	2 week rotational schedule	monthly	12	$ 9,317	$ 111,800
Geo Technical	2	2 week rotational schedule	monthly	12	$ 14,167	$ 170,000
Mine Rescue Team	12	2 week rotational schedule	monthly	12	$ 75,000	$ 900,000
Medic	2	2 week rotational schedule	monthly	12	$ 16,667	$ 200,000
Mine Engineer	1	monthly underground inspection - directions to geo technician	contract - monthly		$ 15,000	$ -
Mine Rehab Crew	3	2 week rotational schedule (dependent on mine condition)	contract - daily	30	$ 1,800	$ 54,000
Flights - Commercial Connections		from employees home to Whitehorse	monthly	12	$ 34,500	$ 414,000
Flights - Whitehorse Charter		personnel travel + flights for necessary supplies and shipping	monthly	12	$ 15,000	$ 180,000
Food		$30 per person per day	monthly	12	$ 28,800	$ 345,600
Miscellaneous office/supply/costs		miscellaneous	monthly	12	$ 500	$ 6,000
	Sub Total					**$ 3,686,076**

Required Mobile Equipment		Description	Units	Quantity	Unit Cost	Total Annual Costs
YZ002 – 2002 CAT 730 Rock Truck		fuel and maintenance repair costs	monthly	12	$ 949	$ 11,391
YZ003 – 2002 CAT 420D Backhoe		fuel and maintenance repair costs	monthly	12	$ 1,548	$ 18,575
YZ004 – CAT 14H Grader		fuel and maintenance repair costs	monthly	12	$ 2,054	$ 24,651
YZ005 – CAT 320C Excavator		fuel and maintenance repair costs	monthly	12	$ 1,178	$ 14,140
YZ007 – CAT IT62 Loader		fuel and maintenance repair costs	monthly	12	$ 1,922	$ 23,066
YZ013 – 2010 CAT 966H Loader		fuel and maintenance repair costs	monthly	12	$ 4,894	$ 58,731
YZ018 – 2005 International Sand Truck		fuel and maintenance repair costs	monthly	12	$ 1,321	$ 15,855
YZ019 – 2011 Peterbuilt Vacuum Truck		fuel and maintenance repair costs	monthly	12	$ 1,419	$ 17,027
YZ020 – CAT 930G Loader		fuel and maintenance repair costs	monthly	12	$ 3,412	$ 40,944
YZ024 – Steam Truck		fuel and maintenance repair costs	monthly	12	$ 558	$ 6,697
YZ025 – 2011 Peterbuilt Gravel Truck		fuel and maintenance repair costs	monthly	12	$ 1,953	$ 23,431
YZ026 – 2011 Peterbuilt Water Truck		fuel and maintenance repair costs	monthly	12	$ 441	$ 5,289
YZ028 – Kubota Mini Hoe		fuel and maintenance repair costs	monthly	12	$ 472	$ 5,663
YZ035 – CAT 14M Grader		fuel and maintenance repair costs	monthly	12	$ 2,375	$ 28,495
YZ114 – 2005 Ambulance		fuel and maintenance repair costs	monthly	12	$ 544	$ 6,527
Light Vehicles – 5		fuel and maintenance repair costs	monthly	12	$ 2,579	$ 30,948
Westland Incinerator		fuel and maintenance repair costs	monthly	12	$ 11,859	$ 142,308
YZQA3 - Suzuki 4X4 Quad		fuel and maintenance repair costs	monthly	12	$ 3	$ 38
YZQA4 - Polaris 4X4 Quad		fuel and maintenance repair costs	monthly	12	$ 18	$ 217
YZSM-3 - Ski-Doo Tundra		fuel and maintenance repair costs	monthly	12	$ 55	$ 660
YZSM-4 - Ski-Doo Tundra		fuel and maintenance repair costs	monthly	12	$ 64	$ 767
	Sub Total					**$ 475,422**

Maintenance and fuel costs are based on normal usage of this equipment during 2014. Maintenance costs will remain high as anticipated repairs on aging and damaged equipment is high. High cost replacements made in 2014 (ie.engines and transmissions) were not included in determining maintenance costs. Fuel consumption is expected to be lower during care and maintenance therefore -15% was factored into monthly fuel costs.

Lease Obligations to Retain Critical Equipment		Description	Units	Quantity	Unit Cost	Total Annual Costs
YZ002 – 2002 CAT 730 Rock Truck		lease payment	monthly	12	$ 3,387	$ 40,641
YZ035 – CAT 14M Grader		lease payment	monthly	12	$ 10,795	$ 129,538
2012 Ford F550		lease payment	monthly	12	$ 1,815	$ 21,775
2013 Ford 350		lease payment	monthly	12	$ 1,251	$ 15,009
2013 Ford 250		lease payment	monthly	12	$ 1,201	$ 14,416
2013 Ford 250		lease payment	monthly	12	$ 1,201	$ 14,416
Sandvik - LH410 - L310D792		lease payment	monthly	12	$ 24,274	$ 291,293
Sandvik - DS311- DE L13B5933		lease payment	monthly	12	$ 24,924	$ 299,091
Sandvik - TH430 - T230S038		lease payment	monthly	12	$ 23,502	$ 282,026
Sandvik - 2 TH430 - T230D008		lease payment	monthly	12	$ 23,502	$ 282,026
Sandvik - 2 TH430 - T230D009		lease payment	monthly	12	$ 23,502	$ 282,026
Sandvik - 2 DD321- 40 112D18919		lease payment	monthly	12	$ 25,537	$ 306,442
Sandvik - 2 DD321- 40 112D18921		lease payment	monthly	12	$ 25,537	$ 306,442
Sandvik - LH410 - L210D812		lease payment	monthly	12	$ 24,274	$ 291,293
Sandvik - DD321- 40 112D19913		lease payment	monthly	12	$ 26,068	$ 312,817
Sandvik - 3 LH410 - L210D709		lease payment	monthly	12	$ 21,048	$ 252,577
Sandvik - 3 LH410 - L210D742		lease payment	monthly	12	$ 21,048	$ 252,577
Sandvik - 3 LH410 - L210D755		lease payment	monthly	12	$ 21,048	$ 252,577
	Sub Total					**$ 3,646,983**

Industrial Processing Facilities and Power Generation		Description	Units	Quantity	Unit Cost	Total Annual Costs
Truck Shop Building and Boilers		must remain functional/heated to support underground and site	monthly	12	$ 4,589	$ 55,068
Powerhouse - Generator			monthly	12	$ 218,400	$ 2,620,800
Powerhouse - Boiler		one boiler in operation	monthly	12	$ 63,718	$ 764,613
Propane - Underground		estimated litres for care and maintenance	monthly	12	$ 188,200	$ 2,258,398
Propane - Surface		estimated litres for care and maintenance	monthly	12	$ 24,898	$ 298,771
	Sub Total					**$ 5,997,650**

Truck Shop diesel fuel costs were increased by 25% due to less available waste oil used in boilers reflected in 2014 costs. Powerhouse boiler based on 2014 costs, fuel based on use to augment waste heat from generators. Propane costs are based on the 4site received invoices against standing purchase orders to superior propane.

Environmental Compliance Monitoring and Reporting		Description	Units	Quantity	Unit Cost	Total Annual Costs
Water Quality Analytical		surface water quality analytical	samples	95	$ 420	$ 39,900
		groundwater quality analytical (24 sites)	samples	72	$ 290	$ 20,880
Hydrological Monitoring						$ 15,000
Sample Transportation		Maxxam Analytics - Vancouver, BC	monthly	12	$ 100	$ 1,200
Site Operations		supplies, spill response, sediment and erosion control	monthly	12	$ 2,000	$ 24,000
Waste Management		2 waste hauls to offsite facility summer 2015	annual	2	$ 12,500	$ 25,000
Geotechnical Inspections		mandatory engineering inspections and subsequent reports	annual	1	$ 60,000	$ 60,000
	Sub Total					**$ 185,980**