EXPATRIATE RESOURCES LTD.

WOLVERINE PROJECT

DESCRIPTION OF THE PROPOSED UNDERGROUND EXPLORATION PROGRAM

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1.0 TERMS OF REFERENCE

This document provides a summary description of the proposed Wolverine Underground Exploration Program. This document makes reference to a prefeasibility-level design, including estimated excavation quantities, for underground development. That information was used to estimate manpower, equipment and consumable requirements based on that design. This document also describes a number of surface facilities, including; temporary rock storage, settling ponds, and laydown areas, and access roads that are required to carry out the underground development. These facilities have not been described previously and this document provides concept-level designs and estimates for some of those proposed facilities.

All quantities reported herein may change as a result of variances from the pre-feasibility and conceptual designs, unknown geotechnical conditions and other variances in the assumed approach to the underground exploration.

2.0 INTRODUCTION

The Wolverine deposit has been the focus of a pre-feasibility study in 2001 that contemplated mining operations with the concurrent mining and milling of the Kudz ze Kayah deposit, approximately 30km away. Current plans for the Wolverine deposit are to mine the deposit as a stand-alone operation. As a component of the Wolverine work for the former study, BGC Engineering Inc. (“BGC”) carried out a study of rock mechanics and ground support issues for the proposed underground Wolverine mine. It has been recognised that the Wolverine deposit has challenging ground control issues associated with it, and this has led to a review of at least two different styles of underground mining to accommodate those conditions.

In BGC’s Geomechanics Assessment Report for the Wolverine Project (November, 2000), it was highlighted that the footwall and hangingwall volcanic rocks were classified as having “Poor” rock mass quality based on the CSIR rock mass rating system, while the ore was classified as “Good” rock mass quality. These assessments were made on a review of drill core information only, and no previous excavations have been made in the host rocks or ore zone rocks to confirm this assessment. Empirical designs and recommendations for the excavation and support requirements were based on geotechnical information recorded by Expatriate geological staff and on observations of selected drill core conditions noted by Mr. Brennan Lang, P.Eng. (BGC). The design recommendations were incorporated into a prefeasibility-level mine plan prepared by Nilsson Mine Services (“Nilsson”) dated November, 2000, which scheduled the development, ore production and estimated costs of mining using a cut and fill technique. That report recommended a underground exploration program in the ore zone itself, which would be used to better gauge actual ground conditions, dilution, allowable mining spans, and support requirements (primarily in the hangingwall volcanics).

Underground exploration provides the best method of confirming and/or refining mining and ground support requirements and costs that have been assumed in the pre-feasibility study.

Previously, the ground support requirements, and the mine design itself were estimated on the basis of geotechnical information gathered from exploration drill core. The reliability of the geotechnical data collected in drill holes will be compared to actual conditions, however it is the opportunity to observe the performance of the underground openings that provides best estimates for feasibility level costing. Underground development will also generate ore that can be used for further metallurgical testing and for an assessment of metal zonation over the width of the ore body.

Ground conditions will play a very important role in determining the actual mining costs, not only in terms of the support that must be installed but also in terms of the productivity, for example, development will be slower and mining spans smaller in very poor ground conditions.

The report summarizes the following key topics;

- Underground development requirements, excavation quantities, and methodology;
- Estimated support requirements for development and ore zones;
- Instrumentation in the development and ore zones;
- Rock containment and other surface facilities;
- Water Management;
- Manpower, equipment, consumables and schedules.

3.0 GENERAL OBJECTIVES

3.1 DESCRIPTION OF UNDERGROUND EXPLORATION PROGRAM

The Wolverine deposit is located approximately 2km southeast of the south end of Wolverine Lake, as shown on Figure 1. The area proposed for the underground exploration program is in the upper portion of the eastern part of the deposit at an elevation of 1225m as shown on Figure 2. This area of the ore zone can be accessed with approximately 960m of decline development and is considered to be representative of much of the other areas of the deposit. Also, the ore within the underground development area varies in thickness, providing an opportunity to use the different mining methods planned and described in the geomechanics report (BGC, 2000).

It is proposed that the underground access decline will be collared southeast of the deposit as shown on Figure 2. It will be driven 665m at a –15% grade and will have dimensions of 4.5m wide by 5.0m high in cross section. The access decline is expected to encounter rhyolite and argillite with poor rock quality. To accommodate these conditions the ramp design calls for an arched back, which will be supported with rockbolts and shotcrete. From the Main Ramp, a 3.5m x 3.5m stope access decline will be driven approximately 235m to access the 1225m elevation area in the upper portion of the Wolverine Zone (as shown on Figure 3).

3.2 EXPECTED GROUNDWATER INFLOWS

Water inflows to the development heading are expected over much of the length of the ramp. In places where structural controls affect the total amount of water, it is expected that additional time and effort will be required during development. This may result in slower than anticipated advance rates and necessitate additional ground support in those local areas. Because the host rock is stratified and dipping north, whenever contacts or laminations are intersected by the development inflows may be higher than the average until the zone is drained. This may be especially acute when crosscutting the ore zone on the 1225m Level. It is anticipated that the advance rates may be reduced as a result of localized temporary groundwater inflows at the hangingwall and footwall contacts.

It was recommended in the Geomechanics Report (BGC, 2000), that the project schedule allow for a nominal period of drainage or “de-watering” prior to commencement of the underground development in the ore zone. After a monitoring period that is currently expected to be approximately one month, mining in the ore zone may commence under more favourable drained conditions. The actual period required to adequately drain the ore zone may be longer than one month. The site geotechnical engineer will monitor total inflows and piezometric conditions above the zone to establish the appropriate time to begin mining in the ore zone itself. In the event that adequate drainage does not occur within a reasonable period of time the project may need to be re-scheduled to allow for additional de-watering.

The mine dewatering phase is assumed to make use of long (50 to 100m) drill holes to promote and enhance drainage across the stratigraphy of the host rock in and around the ore zone.

3.3 UNDERGROUND DEVELOPMENT OPENINGS IN ORE

It is recommended that three stope drift headings be established in the orebody as shown in Figure 4. Development Area 1 will be a drift driven along the footwall of the ore. Initially the drift span will be 5m, but this will be gradually increased to 9m as ground conditions allow (and at the direction of the site geotechnical engineer). Care will be taken to avoid intersecting the hangingwall in the stope back. Instrumentation will be installed and monitored in the ore drifts as described later in this report. The objective of this part of the exploration program is to:

- Establish the maximum span that can be opened up in the ore;
- Assess the degree of waviness on the footwall contact;
- Assess ground support requirements in the ore; and,
- Monitor the ground support performance by monitoring rockbolt loading and deflection of the stope back.

Two other drifts, Development Areas 2 and 3 will be driven in ore to expose the poor quality rock in the hangingwall and to assess its performance, as shown in Figure 4. These drifts can be driven one above the other or they can be driven in opposite directions along strike from the crosscut. The objective of this part of the exploration program is to:

- Establish the maximum span that can be opened up in the hangingwall volcanics (Ideally, we will locate the drifts where both rhyolite and argillite can be exposed);
- Assess the degree of waviness on the hangingwall contact;
- To assess ground support requirement in the hangingwall rock units;
- To monitor the ground support performance by monitoring rockbolt/screen loading and deflection of the stope back.

3.3 BACKFILL REQUIREMENTS

As described by Nilsson 2000, Mine backfill is a key component of the proposed mining system at the Wolverine Project, however, it is not considered necessary to include this in the exploration program for the following reasons:

- The proposed hydraulic sand backfilling system or cemented rockfill system are not technically challenging and is similar to backfill used at other mining operations; and,
- The proposed backfill would consist of mine tailings that are not available during the exploration phase.

Laboratory scale tests need to be carried out on tailings obtained from future metallurgical test work to confirm the suitability of the tailings for use as hydraulic sand backfill. In addition to gradation analyses to assess how much of the tailings product is useable for hydraulic fill, tests will be carried out to optimize cement addition. The comparison of cement ratio to uniaxial strength tests will be used as the basis for required cement addition estimates.

3.4 VENTILATION AND EGRESS REQUIREMENTS

For the purposes of the exploration program it is proposed that the underground workings be ventilated using auxiliary mine fans and ventilation ducting only. Sufficient fresh air will be provided to the working areas in accordance with Yukon mining regulations and common practise.

It is also proposed that an application be filed with the Chief Inspector of Mines in the Yukon for a variance to perform the underground exploration without a secondary means of egress. This will reduce the amount of development required for the ore zone. A design for the various Development Areas (1, 2 and 3) will need to be prepared to demonstrate the temporary nature of the access requirements and the limited time required for access into any one area. Given that the objective of the exploration program is to confirm the ground conditions and support requirements, a site geotechnical engineer should be present for the duration of the underground development. Support requirements in all permanent and temporary openings will be directed by the site geotechnical engineer and may vary from the designs described previously and in this report depending on actual conditions.

3.5 MINED QUANTITIES

Development and ore quantities for the exploration phase are presented in Table 1, and are based on development estimates provided by Nilsson (November 2000).

Table 1 – Estimated Underground Exploration Quantities of Waste and Ore Quantities

	Length (m)	Area (m^2)	SG(t/m^3)	Tonnes	Loose (m^3)
Main Ramp (Waste)	625	20.3	2.90	36,800	17,800
Decline From Main Ramp to Wolverine Zone (Ore)	335	12.2	4.09	16,700	5,745
9x5 Stope Drift in Ore	125	45	4.09	13,800	4,747
4x4 Stope Drift in Ore	75	16	4.09	8,180	2,813
Re-Muck Stations	50	20.3	2.90	2,900	1,421
Total	1,220			78,380	32,526

4.0 DILUTION ASSESSMENT

One of the primary objectives of the underground exploration is to assess the degree of dilution that can be expected so that a mineable grade and tonnage can be derived from the current drilled resource/reserve. Factors that will control the dilution include:

- The thickness of the deposit;
- Natural undulations in the hangingwall and footwall contacts;
- The quality of the hangingwall and footwall;
- The size of mining equipment;
- Drilling and blasting techniques;
- The mining sequence and exposure time; and,
- Backfill stiffness and degree to which tight filling can be carried out.

It is intended that as ore is mined, samples will be taken from each muckpile and each drift round. Each face will be geologically mapped, requiring a geologist or geological technician on both dayshift and nightshift. The site geotechnical engineer will mark up each phase for drilling in such a way as to limit blast damage to the weak hangingwall in the ore zone for all underground development areas. Careful record keeping and sketches of each face must be kept that shows the mapped contacts, drilling mark-up, and limits of the excavation. From these records, the technical staff will obtain a fuller understanding of the “waviness” of the contact, which can then be extrapolated to the rest of the deposit. Probe holes drilled through the contact with a jackleg (or Jumbo) will provide a regular measure of the distance to the hangingwall contact, as shown on Figure 4.

Muckpile and face chip samples will be compiled and compared to the overall grade of the mining block as defined by the block model. Separate samples of the hangingwall and footwall should be taken so a grade can be assessed to the dilution.

The mining and geotechnical engineer on-site will observe and record how each round breaks after blasting and provide recommendations on how to drill and load the next round to avoid overbreak, especially in critical areas such as proximity to the hangingwall. Time will be required in the mining cycle to permit the geologist and geotechnical engineer to wash, map and sample the face and muckpile and to discuss the layout of the next round with the mining crew. The jumbo operator and loading crews will need to cooperate in the process of optimizing the drilling and blasting to reduce dilution.

A variety of explosives types are required to be on hand for the project, including small diameter watergel explosives for smooth wall blasting, low density ANFO, normal ANFO, and B-Line for tracing of back holes.

5.0 GROUND SUPPORT

5.1 GENERAL

The proposed underground exploration program is primarily intended to provide an assessment of the performance of the host rocks under mining conditions, ensure the feasibility of the mine plan and to assist in the refinement of the mining costs associated with the mine plan.

5.2 SUPPORT IN STOPES

Ground support design for production stopes is detailed in the geomechanics assessment report (BGC, 2000) and will be similar for the underground exploration. Where ore is exposed in the back, the support will consist of 2.4m long mechanical rockbolts on a1.8m staggered spacing. Walls will be spot bolted as required with split sets. Probe holes will be drilled regularly into the hangingwall to avoid cutting into the hangingwall contact. Depending on the proximity of the hangingwall contact, additional bolts may be required on the hangingwall side of the stope drift to support the wedge defined by the contact and the back of the drift.

In the stope drifts that expose the hangingwall volcanics and argillite, support will consist of a combination of resin grouted rebar and screen as described in the geomechanics report. The underground exploration will permit the geotechnical engineer to assess how the rock quality of the hangingwall changes upon drying, exposure to air, and over time. It is expected that the argillite will become weaker and more friable after it is initially exposed. The time dependency of the hangingwall behaviour is a key component of the mine design.

The site geotechnical engineer should maintain geotechnical records of each round noting the CSIR rock mass quality, NGI Tunnelling Quality Index Q, span, and installed support. After several weeks, a site-specific empirical span design chart will be developed for the Wolverine Project. This chart will be used as a tool to predict stability and required support, knowing the rock mass quality.

5.3 SUPPORT IN DEVELOPMENT HEADINGS

The purpose of the ground support in the development headings will be to provide permanent-access-type support that will resist deformation due to stress changes as mining progresses. Ground support requirements have been estimated using the NGI Tunnelling Index and exploration drill hole geotechnical data. For the pre-feasibility design, BGC (2000) recommended that rockbolts be installed on a 1m staggered pattern in the back and top corners of the tunnel and on a 2m pattern on the walls. Bolts in the walls should be 1.5m long split sets. Bolts in the back should be 20M rebar, fully grouted with resin. The rebar should be tensioned and plated. Fibre reinforced shotcrete should be applied 75mm thick over the back and 25mm thick on the walls.

Shotcrete is the most expensive component of the proposed ground support system. A preliminary assessment of shotcrete options has resulted in the selection of wet mix application for the program. Wet mix shotcrete involves batching all the components of the shotcrete (except accelerator) on surface and transporting it to the face where it is shot on the face. Aggregate for the shotcrete will be prepared by processing sand and gravel from a borrow source at the airport strip, as described in Section 8.2. A screening and washing plant will be used that will process the required amount of aggregate material.

It is estimated that 850 tonnes of aggregate are required for shotcrete during underground development. It is recommended that an additional 250 tonnes of aggregate be produced for contingencies and aggregate losses during development.

6.0 GEOTECHNICAL ISSUES AND MONITORING PROGRAM

6.1 GEOTECHNICAL INSTRUMENTATION

Geotechnical instrumentation will be installed during the exploration phase to measure the rock mass response to mining. These measurements will be used to demonstrate performance and to calibrate numerical models that will be used to predict pillar stresses later in the mine life.

IRAD bolts will be installed every 10m along each drift axis at approximately the centre of the span to measure the load on tunnel supports and possibly justify a wider bolt pattern. The IRAD bolt is a specially developed instrumented rockbolt containing a miniature IRAD strain gauge mounted in a hole along the central axis of the bolt. The load on the bolt can be measured by touching a probe onto the head of the bolt. The load on the bolts should be read at least once daily to observe the change in load with time. A gradual increase in load would be expected as the face is advance and then the load should stabilize at a load below the yield strength of the bolt. If the load begins to approach the yield strength of the bolt, additional support will have to be installed.

Ground Movement Monitors should be installed to monitor convergence of the stope back and to monitor potential wedge failures within the test stope. These instruments will be particularly useful for monitoring the wedge of ore between the hangingwall contact and the stope back (Figure 4). Once the instruments are installed, protocols will be established by the site geotechnical engineer that would guide the operation of the stope. If daily movements are ‘acceptable’ then the stope may be entered. If the movements are ‘not acceptable’ or are accelerating in a certain area then additional support may be required or the stope may be closed temporarily.

6.2 DEWATERING AND FLOW MEASUREMENT

It is recommended that a dewatering phase be undertaken in the area of underground development prior to excavating the stope drifts in the ore zone. As discussed in the geomechanics assessment (BGC, 2000), it is expected that initial inflows will reduce over time, as the surrounding rock mass is drained by the development. By allowing the rock mass to drain, the test stoping will be carried out in close to planned conditions. During full-scale production, the ore zone and surrounding rock mass will largely be drained by mine development in advance of stoping.

It is not recommended to attempt mining in the ore zone/hangingwall areas until the rock mass is drained. Attempting to do so would subject the underground exploration operations to “worst-case” conditions, potentially requiring additional support to prevent excess ravelling and erosion of the hangingwall rocks.

It is proposed that 50m to 100m drain holes be drilled to penetrate and enhance the rate of dewatering of the hangingwall, footwall, and ore above the underground development areas. The water will be collected in a sump and pumped to a settling pond near the portal. The water flow will be monitored on a daily basis by constructing a flow weir where the water is discharged into a settling pond. Water quality in the settling pond will be tested on a regular basis and treated if required before release. It is anticipated that the dewatering phase will take up to one month, and during this time, the contractor would be on standby with perhaps two employees on site to maintain pumps and generators. The actual time required for dewatering will depend on the results of the flow monitoring program.

7.0 ACID ROCK DRAINAGE (ARD) CHARACTERIZATION

A limited number of acid-base accounting (ABA) and kinetic tests have been completed on selected drill core samples for the Wolverine project. The samples were previously selected (by others) to be representative of the various rock types encountered at the site. Rock type sample groups were selected to represent the hangingwall rocks taken from the following drill holes; WV96-39, WV96-58, WV96-63 and WV96-72. The hanging wall group results are provided in the attached Environment Effects Assessment Report.

A review of the ABA results for the hangingwall rock samples indicates that a proportion of the waste rock (in addition to the ore) has the potential to generate acidic drainage. The results of the test work are summarized in Table 2.

Table 2 - Summary of Hangingwall Group ABA Testing

	Acid Potential (AP)	Neutralization Potential (NP)	Net Neutralizing Potential
Maximum	372	249	209
Minimum	17.5	14.1	-309
Mean	83	106	22.6
Median	53.8	65.2	-1.1

Two kinetic test samples were prepared by compositing the hangingwall samples above and are referred to as HC-1 and HC-4, respectively. The results of the kinetic testing program are provided in the attached Environment Effects Assessment Report. These tests were conducted over a 26 week period and indicate that carbonate minerals are likely responsible for the neutralization potential of the waste rock. In addition, both humidity cells had rinse water pH values of 6.4 after 26 weeks. Thus, it is likely that there will be a significant lag time before drainage from the waste rock becomes acidic. Metal analyses conducted on the humidity cell rinse water suggest that drainage from the waste rock may contain elevated levels of aluminium, manganese, strontium, and zinc.

The static and kinetic waste characterization studies focussed on the rhyolite and argillite units in the hangingwall. The iron formation in the hangingwall is not represented in the waste characterization data shown. Geochemical data from the iron formation shows greater amounts of carbonate minerals present than the rhyolites and argilites. This formation is likely to have some neutralizing capacity and will constitute a portion of the waste rock developed.

Based upon the information provided, it is likely that drainage collected from the waste rock during the underground exploration program will have a neutral pH and may contain elevated levels of various metals. Water quality monitoring will be required to determine if the collected water will require treatment to remove metals prior to discharge to the receiving environment.

The existing data also suggests that the majority of the waste rock has the potential to generate acid drainage containing elevated levels of metals in the long-term. Based on this information, permanent storage for some of the waste rock may be required.

Sampling and analysis of the waste rock and ore removed during the exploration program will be conducted on an on-going basis to determine the actual ARD and metal leaching potential of the rock. This information will be used to finalize the permanent ARD prevention strategy for the materials.

Approximately ten samples will be collected and analyzed for each major geologic unit encountered during the exploration program. Each sample will be subjected to the following analysis:

- Description of the sample type (i.e. waste or ore) and location;
- Description of the visual geological properties of the sample;
- Acid-Base Accounting (EPA-600);
- 32 element trace analysis by ICP; and
- Whole-rock major element analysis by XRF.

A sufficient sample size will be collected to facilitate additional test work such as mineralogical examination or kinetic cell testing if required in the future. Although the ore will also be characterized, the primary purpose of the ARD characterization program will be to identify any waste rock that has a potential to generate ARD.

8.0 SURFACE FACILITIES

8.1 TEMPORARY WASTE ROCK & ORE CONTAINMENT FACILITY

Based on limited acid rock drainage (ARD) test work conducted at the Wolverine, much of the development waste rock and the ore to be developed in the underground have the potential to generate some ARD and produce drainage with minor elevated metal levels. As a result, it will be necessary to temporarily manage these potentially acid generating materials in a manner that mitigates and minimizes production of ARD and limits the release of ARD from the site during the period of the underground exploration and up to the time of a “go/no go” decision to develop the mine.

An ARD characterization program will be implemented as described in Section 7.0 to document the actual acid generating potential of the waste rock and ore removed during the exploration program. At this time, no operational plan is proposed to segregate potentially acid generating (PAG) rock from non-potentially acid generating (NPAG) rock. All of the rock will be stored in a single temporary surface containment facility.

The temporary containment facility will be constructed to store all of the material generated from the underground exploration program as shown on Figure 5, and rendered in Photograph 1. The purpose of the facility will be to contain ARD in the short-term. Since the rock is proposed to be tested as it is placed in the facility it will be possible to separate the waste rock from the ore as shown in Figures 6 & 7. Further, it will be possible to locate specific volumes of PAG waste rock within the structure and remove them at a later date if required. The facility is designed to drain to a seepage collection sump at its northwest corner. In the event that testing indicates poor water quality, the drainage will be treated before release.

Upon initiation of full-scale mining at the Wolverine site, all of the ore will be processed at the mill at Wolverine for processing. In the event that the development of the project is significantly delayed, the ore and some of the most reactive PAG waste rock will be returned underground at Wolverine for permanent disposal. Borderline PAG material will be placed in a permanent storage facility on surface. The permanent storage facility may require a liner and an engineered cover to permanently isolate and encapsulate the material. The maximum volume of this permanent storage is equivalent to the total volume of the waste rock developed, approximately 32,500m^3. Waste rock identified as NPAG could be left permanently in the temporary containment facility and the site will be graded and reclaimed. The bonding requirement for the stored rock should be linked to the cost of returning the ore and any identified NPAG waste rock to the underground workings and/or its permanent storage on surface.

The conceptual design for the temporary containment facility is to effectively isolate the rock from excess runoff by placing a compacted natural soil cover over it, and to minimize seepage inflows by selecting favourable foundation conditions. In concept, by limiting the availability of water to the flush and drain the PAG rocks, the total quantity of ARD may be reduced. The proposed containment facility will be located approximately 100m north of the portal location as shown in Figure 5. This area of high ground, referred to as the “Portal Knob”, was selected as it will limit the potential for surface runoff and groundwater seepage to contact the stored material. This site was selected because its foundation conditions are closest to those required in the conceptual design. Those conditions are assumed to include weathered rhyolite, having favourable physical and geotechnical characteristics to limit seepage inflows. A field investigation program is required prior to completing a final design for this structure. If the foundation conditions are not adequate to meet the needs of the containment concept, a liner system may be used to prevent seepage.

The temporary facility will be constructed by excavating 1m of weathered rhyolite rock from the top of the Portal Knob area to create a shallow basin for the storage of the waste rock and ore as shown in Figure 7. The excavated rhyolite material will be stockpiled and then used to progressively cover the waste rock and ore as they are placed into the facility. The cover will be placed with a slope and crowned as shown in Figures 6 & 7 to promote runoff and minimize the amount of precipitation that infiltrates into the cover. In addition, the cover will be re-vegetated as soon as practical in order to:

- Provide erosion protection for the cover;
- Increase the evaporation of water stored in the cover; and
- Reclaim the containment facility to a level consistent with the surrounding area.

The organic layer (if any) in the Portal Knob area will be stripped and stockpiled prior to excavation of the rhyolite rock. This material will be placed over the rhyolite cover material to provide a growth medium for vegetation. In the event that no organic layer exists, it is expected that a loose, uncompacted layer of weathered rhyolite will provide an adequate growth medium. This is based on observations of existing drill pad sites where weathered rhyolite has been exposed and has been naturally re-vegetated. Progressive capping of the facility is expected to reduce the amount of precipitation and runoff that infiltrates into the waste rock and ore, and thus, minimize the potential for water inflows and thereby reduce the volume of potential ARD leaving the site.

A perimeter ditch has been included in the design to collect runoff and direct it to a runoff collection sump. The water will be tested and treated if required prior to discharge. The ditch will also act as an interceptor to prevent runoff flows from entering the facility.

The conceptual design of containment facility promotes the drainage of transported mine water (water that was placed with the mined rock during active placement of the waste rock and ore) into a collection sump located to the northeast corner of the facility, as shown in Figures 6 & 7. Water collected in the sump will be tested prior to discharge to the receiving environment. If its quality is acceptable, the water will be discharged into the gully located on the north side of the portal knob area and will flow east, away from Wolverine Lake.

The gully on the north side of the Portal Knob carries no permanent surface flow. Shallow depressions along its length capture surface runoff, resulting in the occasional isolated pond or marsh-like area. The gully drains toward Go Creek, approximately 500m from the proposed discharge point.

If water quality does not meet discharge criteria, it will be treated to meet the required criteria prior to discharge. Once the cover has been completed it is anticipated that seepage from the facility will be very low due to the location of the facility and the placement of the vegetated cover that will serve to minimize infiltration. This assumption will be confirmed by monitoring the volume of seepage that enters the collection sump following completion of the cover.

The combined factors of slow reaction time, containment, cover isolation, and the small volume of waste rock planned indicate a low risk of ARD contamination to the surrounding water bodies.

8.2 AGGREGATE SCREENING AND WASH PLANT

A mobile aggregate screening and wash plant will be used to process a small amount of local material for use as shotcrete aggregate. The operation will be located at the airstrip borrow/laydown area as shown on Figure 1. This site has been identified as a potential source of borrow.

A limited number of samples of the borrow material have been tested previously and a particle size analysis of the material provided indicates it can be classified as a ‘silty sand and gravel’. The specifications for shotcrete aggregate require that a screening process be used to remove the coarse fraction and the resulting screened product be washed to remove the very fine fraction.

The results of particle size analysis for the borrow material are presented in Figure 8. A comparison of the upper and lower bounds of acceptable shotcrete aggregate are also shown on the figure. The borrow will require processing and it is estimated that approximately one third (by weight) of the borrow will be retained after selecting the required screen fractions. Therefore, a total of approximately 3,300 tonnes (1,850 BCM) of borrow will need to be processed to produce the required quality and quantity of shotcrete aggregate.

Based on the estimated aggregate quantity and useable fraction, a borrow area of approximately 30m x 30m x 2m will be excavated (depending on actual site topography) and the excavated material will be stockpiled. Approximately two thirds of this volume will be replaced into the excavation after screening, and the area will be re-contoured on completion of the work.

The two-phase process of screening and washing will involve a multi-deck screening plant which will process and stockpile screened aggregate. Run-of-pit material from the borrow area will be placed over a grizzly that will remove +6” cobbles and boulders. The smallest screen on the deck will be 5mm resulting in a stockpile of –5mm material that is estimated to be close to meeting the required shotcrete gradation with the exception of the fines that will need to be washed from it.

Based on the particle size analysis, it is estimated that 5% (by weight) of the total borrow quantity will be washed from the screened product. The resulting 165 tonnes (estimated) of fines will be collected in a settling pond and fine solids allowed to settle prior to water being released from the pond. Wash water can be recircultated from the settling pond and used as make-up water as required. Depending on the pond foundation conditions a plastic liner may be required to achieve this.

The production rate of the operation should be left to the contractor and their equipment sizing. However, it is assumed that the plant will be capable of processing at least 10 tonnes per hour for 10 hours a day. On this basis the operation is required to process borrow material for a total of approximately 30 days. Wash water is required for one third of the total process material (34 tonnes) at an estimated rate of 1 tonne water per 1 tonne screened aggregate. Using these assumptions of the process and equipment, an estimated 34 tonnes ($34m^3$) of water is required for the wash plant on a daily basis. Some of this quantity can be recircultated from the settling pond.

No settling tests have been carried out on the silt size fraction of the borrow material. An estimated retention time of 12 hours should be designed in the pond to ensure the removal of solids to an acceptable level. Therefore, the settling pond should be sized to retain at least the daily wash water requirement of $34m^3$ in addition to the solids (estimated to be $110m^3$). A basic settling pond 30mL x 5mW x 1mD will provide $150m^3$ of storage and could be established within the borrow excavation area itself and be reclaimed on closure (Figure 9). These dimensions do not include a requirement for storage of runoff water or precipitation, and a final design using the site topography is required prior to construction.

8.3 WATER MANAGEMENT

Water will be used in two areas during the underground exploration operation; at the underground workings and at the aggregate screening and wash plant.

Water will be used for the underground development in drilling operations to establish the portal and for the initial 200m to 400m (estimated) of decline development. Water is needed in the drilling equipment and is also needed to wash down blasted faces and muck piles (as required by the Mines Act). Once the decline has progressed beyond the first 200m to 400m it is assumed that water will be available as a result of drainage into the workings and that the surplus water will be discharged from the workings. A sufficient quantity of water will be designed to be stored in underground sumps and in a surface settling pond to service the underground needs. The final design of the settling pond and underground sumps needs to be completed prior to construction and excavation.

For the initial development (prior to stored water being available from the underground workings), it is estimated that a total of $50m^3$ to $100m^3$ of water will be required from a surface source to meet the needs of the underground operation. This requirement is expected to reduce as the decline advances until no make-up water is needed to carry out these operations. This estimate assumes that the workings will make water, if they do not, then $50m^3$ to $100m^3$ of water from a surface source will be required for the duration of the project.

Water collected in the underground workings will be pumped to a settling pond prior to discharge to the receiving environment. It is anticipated that the pond will be located in close proximity to the portal area. Prior to release to the receiving environment the water will be tested to confirm it meets required discharge criteria. If water quality is acceptable, the water will be pumped to a natural dry channel that drains Money Creek at the northwest end of the airstrip. If unacceptable, the water will be treated to meet required water quality criteria prior to discharge to the wetland area.

A settling pond will also be constructed at the airstrip to manage solids originating from the wash plant described in Section 8.2. Water from this pond will be recircultated to the extent possible to minimize the requirement for additional fresh water and discharge. The discharge from the settling pond will be tested to ensure that the total solids are reduced to acceptable levels. The material is a natural sand and gravel and is assumed not to cause metal loading as a result of washing. Depending on the characteristics of the fine material, additional storage/retention time will be added or the addition of flocculants to enhance settling may be required. Upon completion of the work, the settling pond will be drained and reclaimed with local granular material from the borrow area. The aggregate wash plant settling pond requires final design prior to construction.

8.4 MATERIAL STORAGE

The materials required to conduct the underground exploration program will be stored in two different laydown areas.

The airstrip laydown area will be located at the airstrip as shown on Figure 1 and will provide bulk storage for the required materials. It is anticipated that the size of this laydown area will be approximately 100m by 100m. Materials to be stored at the airport laydown area include:

- Drilling supplies;
- Ground support materials; and
- Miscellaneous mining and development supplies.

It should be noted that the majority of the blasting supplies would also be stored at the airstrip. These materials will be stored in a separate area in an approved powder storage that will be kept locked at all times. The storage will be located at an acceptable distance from the airstrip itself. Borrow materials will also be screened and stockpiled at the airport site.

A second laydown area will be constructed adjacent to the portal area (as shown in Figure 5). The purpose of the second laydown will be to provide a staging area for the day-to-day mine development operations. It is anticipated that the size of this laydown area will also be approximately 100m by 100m. Materials to be stored in Laydown Area 2 include:

- A week of drilling supplies;
- A week of ground support materials;

- A week of miscellaneous mining and development supplies;
- All fuel and lubricants required for the exploration program (to be contained in approved storage and within spill containment structures or double walled 'enviro-tanks');
- Project management trailer;
- Underground mining equipment; and
- Spare parts and supplies for the mining equipment.

A small amount of blasting supplies, approximately a one-week supply, will also be stored in the vicinity of the portal area. These materials will also be stored in an approved powder magazine that will be kept locked at all times.

8.5 ACCESS USING EXISTING WINTER TRAIL

The proposed winter access trail connects the existing Wolverine Camp to the Robert Campbell Highway (Figure 3a) that will only be active during the winter months. This ice road will be used to haul equipment and supplies to the site and decommissioned after mobilization is completed. During the summer months, large aircraft will be used and land on the existing airstrip. The ice road/barge crossing will access the exploration road that currently exists on the east shore of the lake.

The temporary winter trail access would be developed to a similar standard as outlined in the permit from Highways and Public Works (submitted November 2, 2004). The winter trail would be a single lane with turn-outs at appropriate locations. The maximum design parameters considered are:

- Design speed — <20 km/h
- Design Vehicles: — 5t trucks and 20t sleighs, Nodwells, D7 Bulldozer
- Lane Width — 5 to 6 m

The temporary winter trail access will be developed to the extent necessary to carry out the exploration program. Minimum development and disturbance techniques will be utilized to meet the specific requirements of hauling the equipment and materials to the Wolverine site. The Company will utilize winter trail access to the extent possible in carrying out the program.

The Company reviewed the possibility of supporting the exploration program using the existing Wolverine airstrip. The volume of materials and size of equipment required for the program makes this option economically prohibitive; however, every attempt to use larger fixed-wing aircraft will be made when economically feasible, hence the reason for the current expansion of the size of the existing airstrip. The health and safety risk to the underground development crew is increased without the possibility of ground mobilization to the site. The most significant potential environmental effect associated with this option is disruption of wildlife from intense air traffic in the region and ground disturbance from airstrip rehabilitation.

A staging area of approximately 100-200 m^2 will be established at loading and unloading sites for temporary stockpiling of materials; noting a much larger existing area is located at the Robert Campbell Highway. Staging areas will be built at least 35 m from any watercourses.

Refuelling will be from a truck with a tidy tank with fuel sourced from the from the Wolverine fuelling facilities. No fuel will be stored in the staging areas or near the lake shore.

9.0 PROJECT LOGISTICS

9.1 PERSONNEL REQUIREMENTS

Table 3 presents a list of the Expatriate technical staff, support staff, and contractor personnel required for the project. It is assumed that transport to and from the site will be by air from Whitehorse.

Table 3 – Underground Exploration Personnel Requirements

EXR Staff	
Project Manager (Mine Engineer)	1
Geotechnical Engineer	1
Mine Technician/Surveyor	1
Geologist/Sampler	2
Cook	1
Cook's Helper	2
Camp Maintenance Man/Dry	1
Contractor	
Shiftboss	2
Drillers	2
LHD/Truck Operators/Loading Crew	7
Maintenance	3
Electrician	1
TOTAL	**24**

9.2 EQUIPMENT REQUIREMENTS

Based on the proposed underground exploration program, major equipment that will need to be mobilized to site is summarized in Table 4. It is assumed this equipment is mobilized by road to the site.

Table 4 - Major Mining Equipment for Underground Exploration

Major Equipment	Qty	Estimated Weight (Tonnes)	Total Weight (Tonnes)	Shipping Dimensions			Estimated Number of Trailers
				H(m)	W(m)	L(m)	
Mobile Equipment							
2-boom Jumbo	1	17	17	3	2	13	1
Bolting Jumbo (or scissor lift)	1	22	22	2	2	9	1
6 yd LHD	2	34	68	3	3	10	3
30 tonne Trucks	2	38	76	3	3	10	4
2.5 yd LHD	1	16	16	2.5	2	8	0.5
Front End Loader (5yd)	1	28	28	4	3.5	9	1
Mixer Truck	1	16	16	4	3	6	0.5
Wet Mix Pump and Boom Machine	1	16	16	4	3	6	0.5
Backhoe	1	9	9	3	2.5	4	0.5
Stationary Equipment							
Maintenance Shop (containers)	4	5	20	3	3	10	4
U/G Transformer Stations	1	5	5	2	2	3	0.25
Gen Sets	2	5	10	2	2	3	1
Explosives Magazine (container for Anfo storage)	1	5	5	3	3	10	1
Detonator Magazine	1	3	3	3	3	5	0.25
48 inch Ventilation Fans	3	1	3	1	1	1.5	0.5
Screen and Wash Plant – Shotcrete Aggregate	1	25	25	3	3	13	1
Screen Conveyor	1	4	4	1	1	13	0.5
Weigh Hopper	1	10	10	3	3	4	0.5
Weigh Hopper Conveyor to Feed Mixer truck	1	4	4	1	1	10	0.5

Total Weight (tonnes) = 357 **Total trailers (rounded) = 22**

9.3 MATERIALS AND SUPPLIES

The calculation of the materials and supplies required are estimates based on similar project and on assumed productivity of equipment and excavation methods used. The estimates include no contingency or surplus and were originally calculated to assess the requirement for transport and storage of materials in advance of the project.

The estimated materials and supplies required to carry out the underground exploration program are summarized in Table 5 and a detailed list of the materials is provided on the attached spreadsheet.

Table 5 – Summary of Estimated Materials

	Total Shipping Weight (kg)	Total Trailer Loads[1]
Total Estimated Consumables	627	31

[1] Trailer load = 20 tonnes (estimated)

9.4 SCHEDULE

A schedule for the underground exploration program is provided in Table 6.

Table 6 – Underground Exploration Schedule

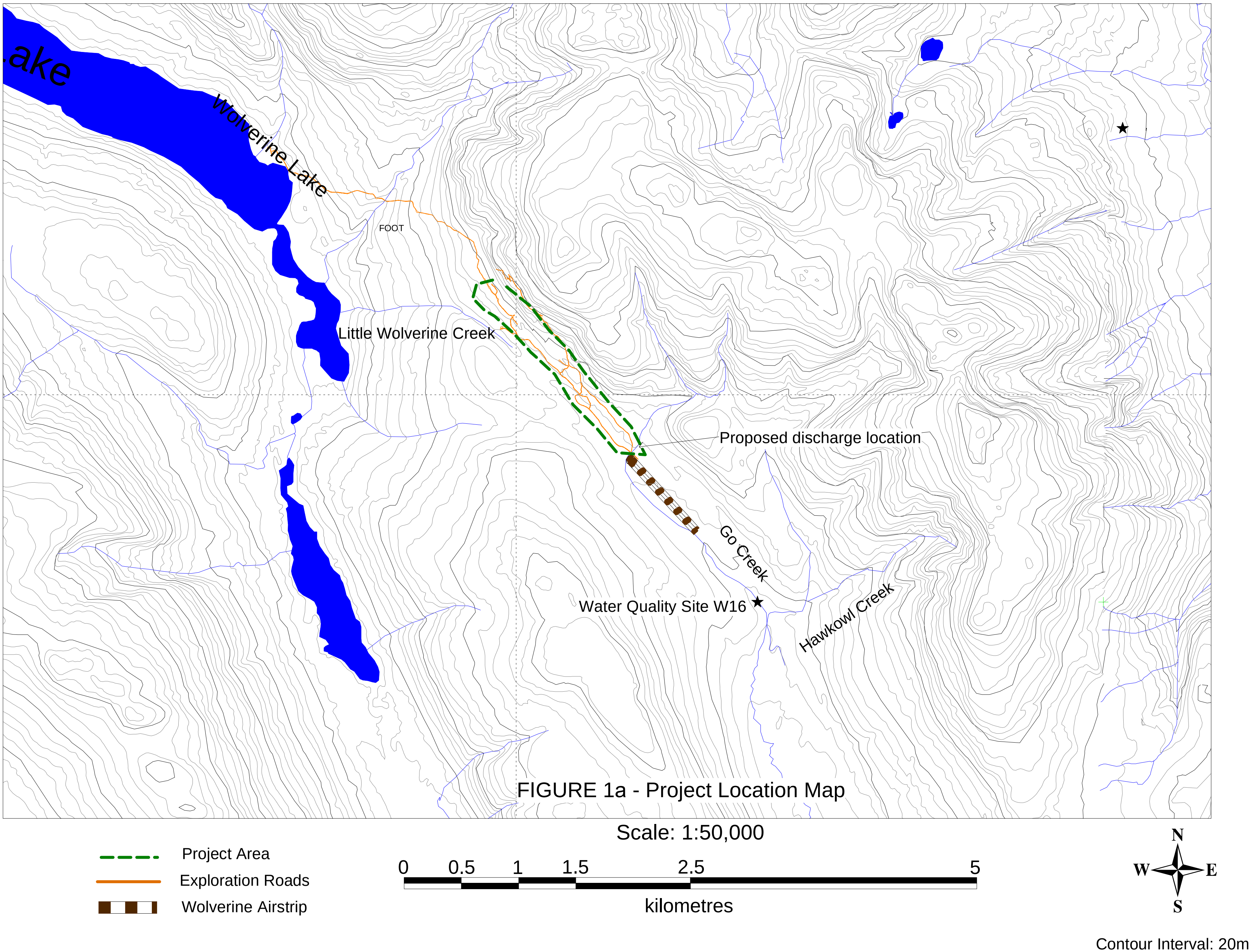
Task	Month 1	2	3	4	5	6	7	8
Collar Portal								
Stripping								
Bolting / Shotcrete								
Excavation								
Decline Development								
675m Decline (10.5m/d)								
330m Decline (Main Ramp to Ore Zone)								
Dewatering Period (1)								
Test Stoping								
125m along HW Contact								
75m within Ore zone								
Instrumentation								
Monitor Geomech (2)								

Note: (1) Dewatering period may by reduced if flows can be demonstrated to be reduced – may also be longer if monitoring shows that significant reduction can be achieved over additional time.
(2) Monitoring of Geomech instruments and water inflows to continue as long as possible during trial period.

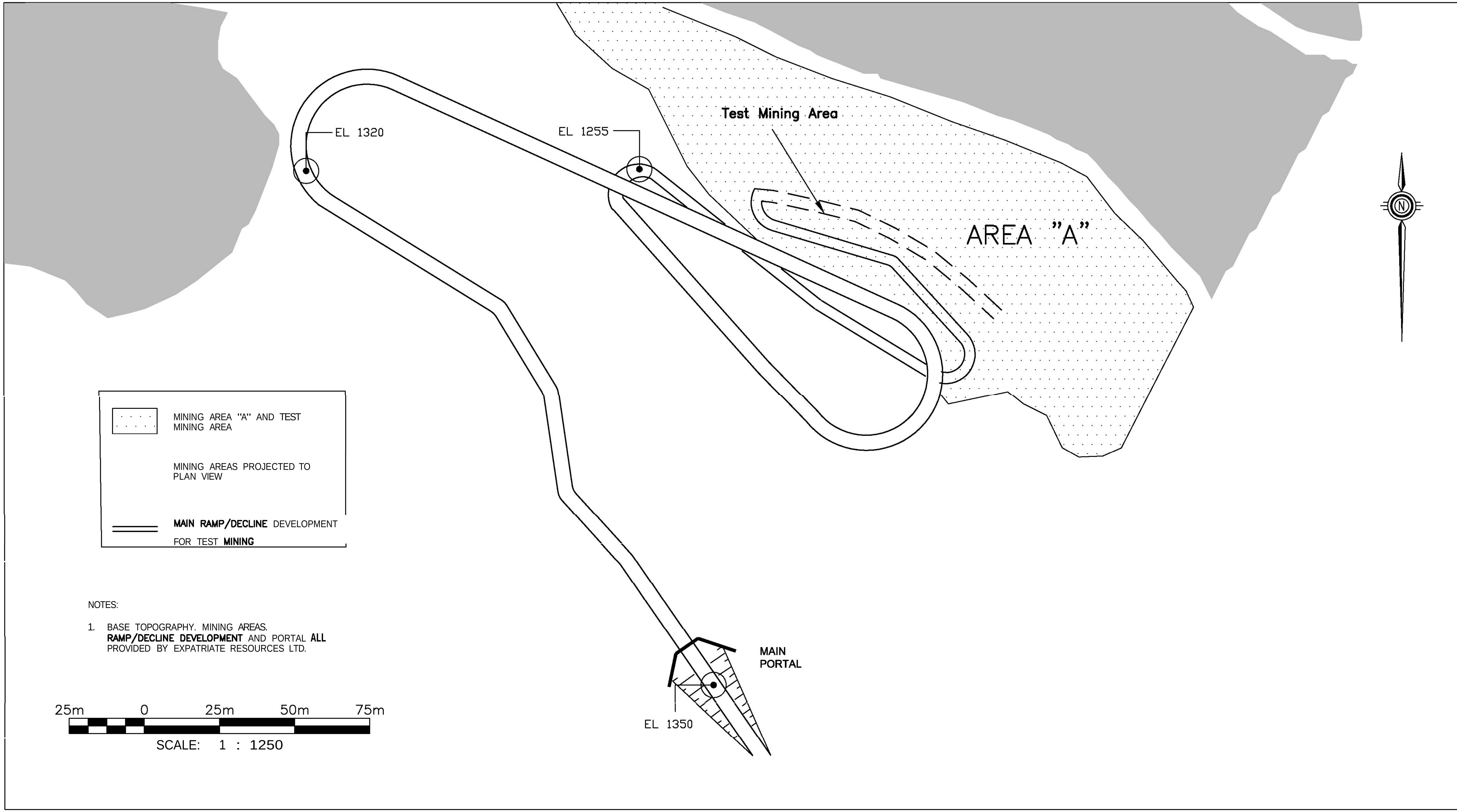
The schedule assumes typical advance rates for the decline mining and portal development. It also assumes that all equipment and materials described in section 8.2 and 8.3 have been mobilized to site. A road will be constructed for the project prior to mobilizing the mining contractor to site. A four-week dewatering phase is included in the schedule and this may vary depending on the observed hydrogeologic conditions and the results of an underground water flow monitoring program after completing the decline to the ore zone.

Delays resulting from unexpected ground conditions, weather delays and availability of consumables may affect the schedule.

FIGURES



Lake
Wolverine Lake
FOOT
Little Wolverine Creek
Proposed discharge location
Go Creek
Water Quality Site W16
Hawkowl Creek
FIGURE 1a - Project Location Map
Scale: 1:50,000
Project Area
Exploration Roads
Wolverine Airstrip
0
0.5
1
1.5
2.5
5
kilometres
N
W
E
S
Contour Interval: 20m



REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
DATE:	APR 2001
DRAWN:	GEJ
DESIGNED:	SB
CHECKED:	
APPROVED:	

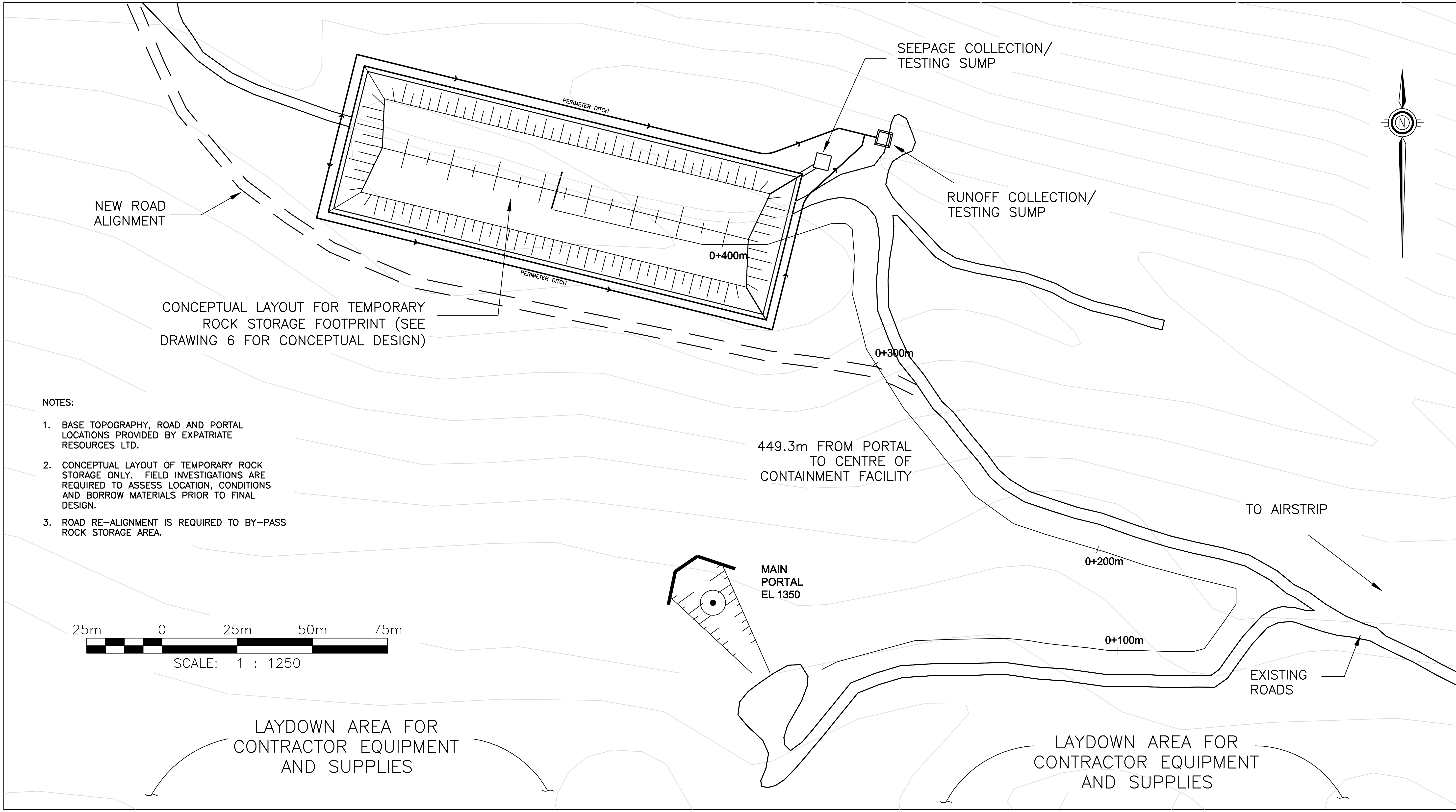
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY
Vancouver, B.C. Phone: (604) 684 5900

CLIENT: EXPATRIATE RESOURCES LTD.

PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: TEST MINE DEVELOPMENT

PROJECT No.	DWG. No.	REV.
0263-002-01	FIGURE1	0



NOTES:

1. BASE TOPOGRAPHY, ROAD AND PORTAL LOCATIONS PROVIDED BY EXPATRIATE RESOURCES LTD.
2. CONCEPTUAL LAYOUT OF TEMPORARY ROCK STORAGE ONLY. FIELD INVESTIGATIONS ARE REQUIRED TO ASSESS LOCATION, CONDITIONS AND BORROW MATERIALS PRIOR TO FINAL DESIGN.
3. ROAD RE-ALIGNMENT IS REQUIRED TO BY-PASS ROCK STORAGE AREA.

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SCALE: AS SHOWN
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CLIENT: EXPATRIATE RESOURCES LTD.

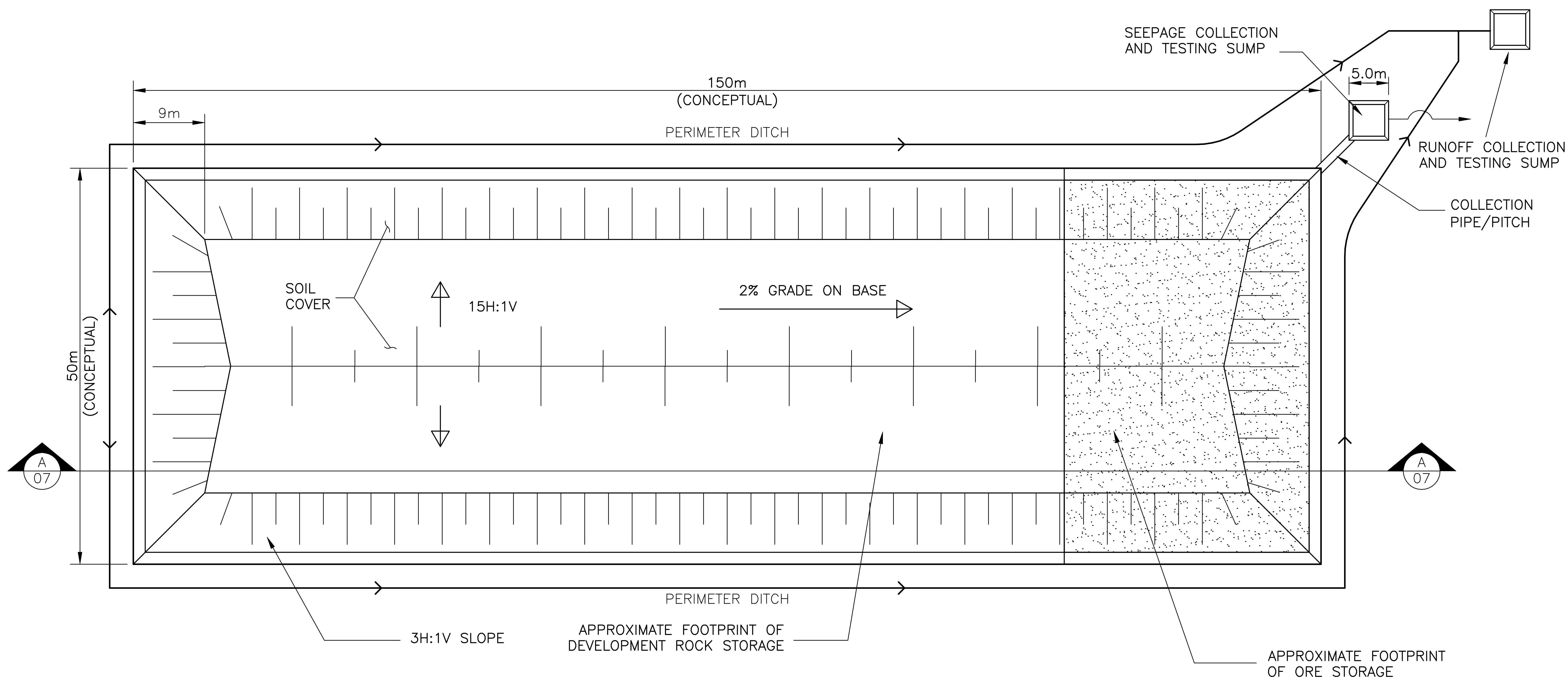
PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: SURFACE FACILITIES

PROJECT No. 0263-002-01

DWG. No. FIGURE 2

REV. 0



NOTES:

1. THIS IS A CONCEPTUAL ROCK STORAGE FACILITY ONLY. FINAL DESIGN AND SITE ISSUES NEED TO BE ASSESSED BEFORE CONSTRUCTION.
2. INVESTIGATIONS ARE REQUIRED TO CONFIRM AND ASSESS FOUNDATION CONDITIONS, CONTRUCTABILITY AND SEEPAGE POTENTIAL. A LINER MAY BE REQUIRED TO PREVENT SEEPAGE.
3. SEEPAGE COLLECTION SUMP, RUNOFF COLLECTION SUMP AND ASSOCIATED DITCHES ARE CONCEPTUAL ONLY. DETAILED DESIGN IS REQUIRED TO ENSURE PERFOMANCE DURING STORM/RUNOFF EVENTS.
4. PROPOSED SOIL COVER IS COMPOSED OF WEATHERED RHYOLITE FOUNDATION ROCK. TESTS TO ASSESS IT'S SUITABILITY IN THIS APPLICATION ARE REQUIRED.

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DATE:	MARCH 2001
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CLIENT: EXPATRIATE RESOURCES LTD.

PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: CONCEPTUAL DESIGN OF TEMPORARY ROCK STORAGE

PROJECT No. 0263-002-01

DWG. No. FIGURE 3

REV. 0

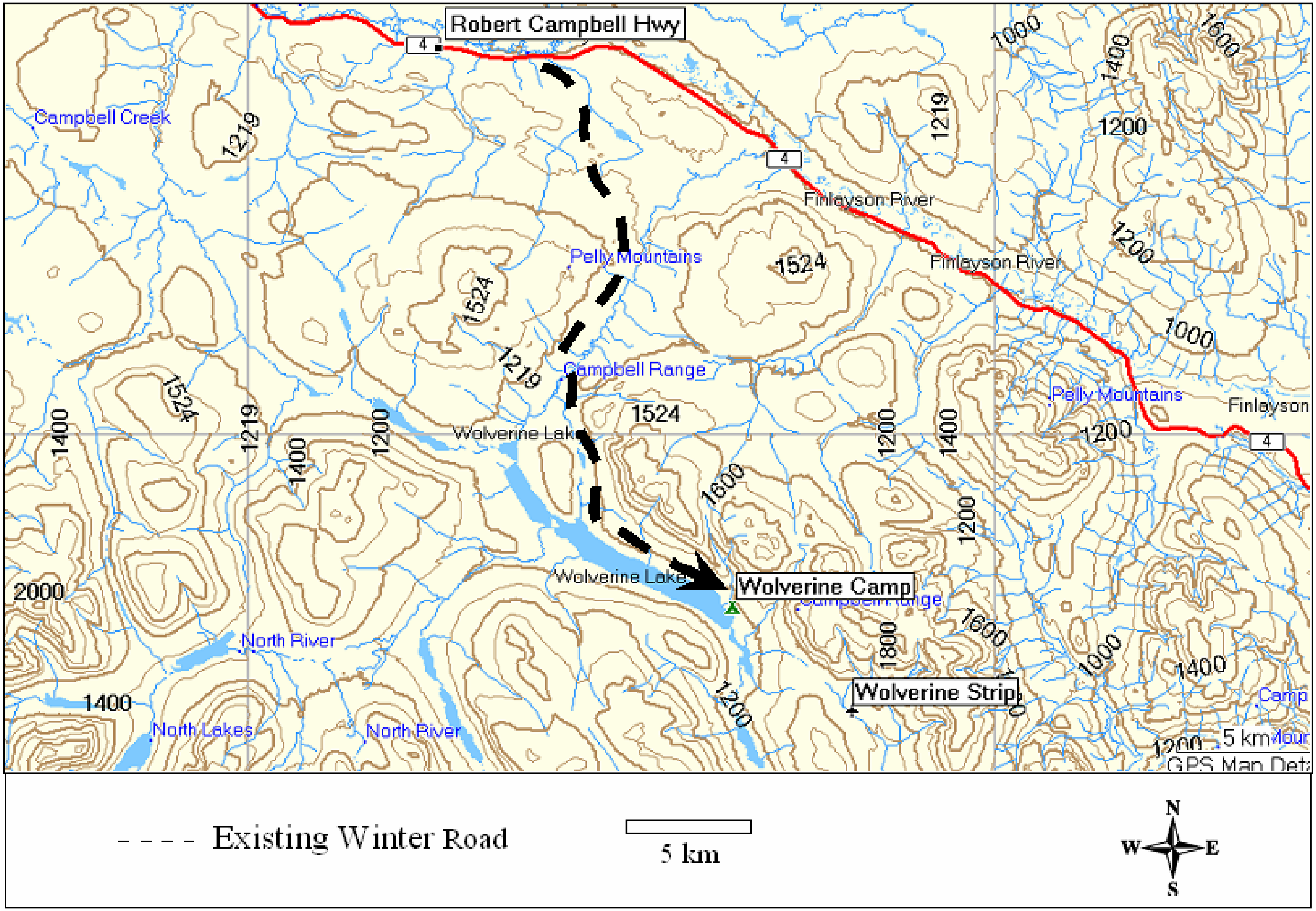
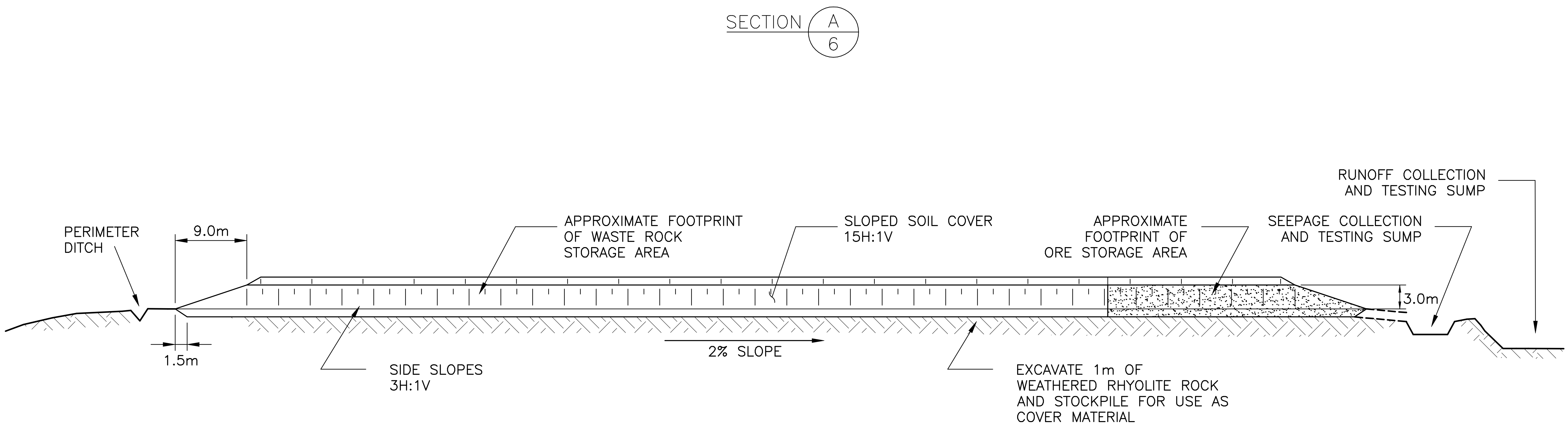

Robert Campbell Hwy
Campbell Creek
Finlayson River
Finlayson River
Pelly Mountains
Pelly Mountains
Campbell Range
Wolverine Lake
Wolverine Lake
Wolverine Camp
Wolverine Strip
North River
North River
North Lakes
Finlayson
Camp
1524
1219
1200
1400
1600
1800
1000
2000
Existing Winter Road
5 km
N
W
E
S

Figure 3a



NOTES:

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2. INVESTIGATIONS ARE REQUIRED TO CONFIRM AND ASSESS FOUNDATION CONDITIONS, CONTRUCTABILITY AND SEEPAGE POTENTIAL. A LINER MAY BE REQUIRED TO PREVENT SEEPAGE.
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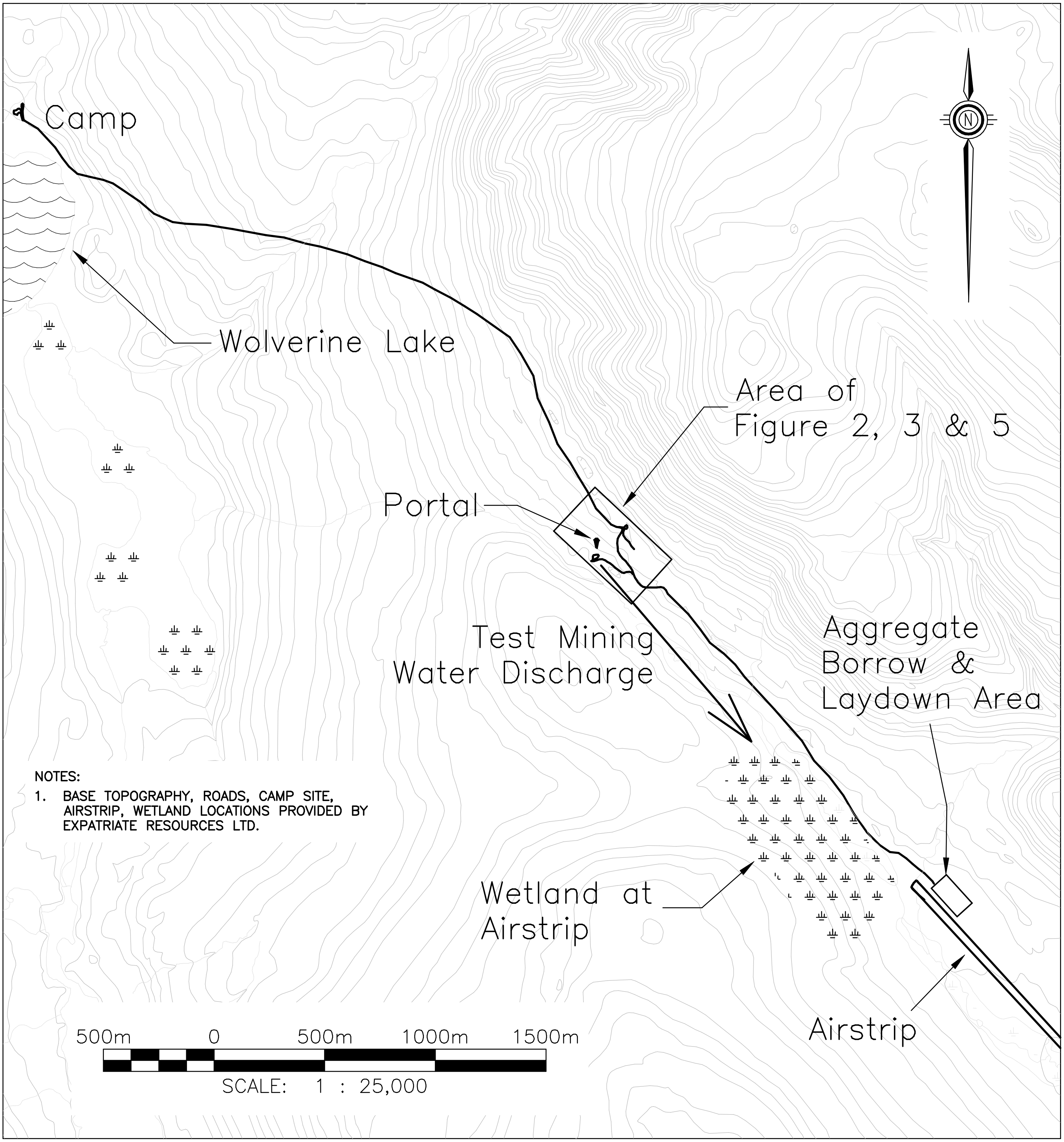
PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: CONCEPTUAL DESIGN OF TEMPORARY ROCK STORAGE 2

PROJECT No. 0263-002-01

DWG. No. FIGURE 4

REV. 0



NOTES:

1. BASE TOPOGRAPHY, ROADS, CAMP SITE, AIRSTRIP, WETLAND LOCATIONS PROVIDED BY EXPATRIATE RESOURCES LTD.

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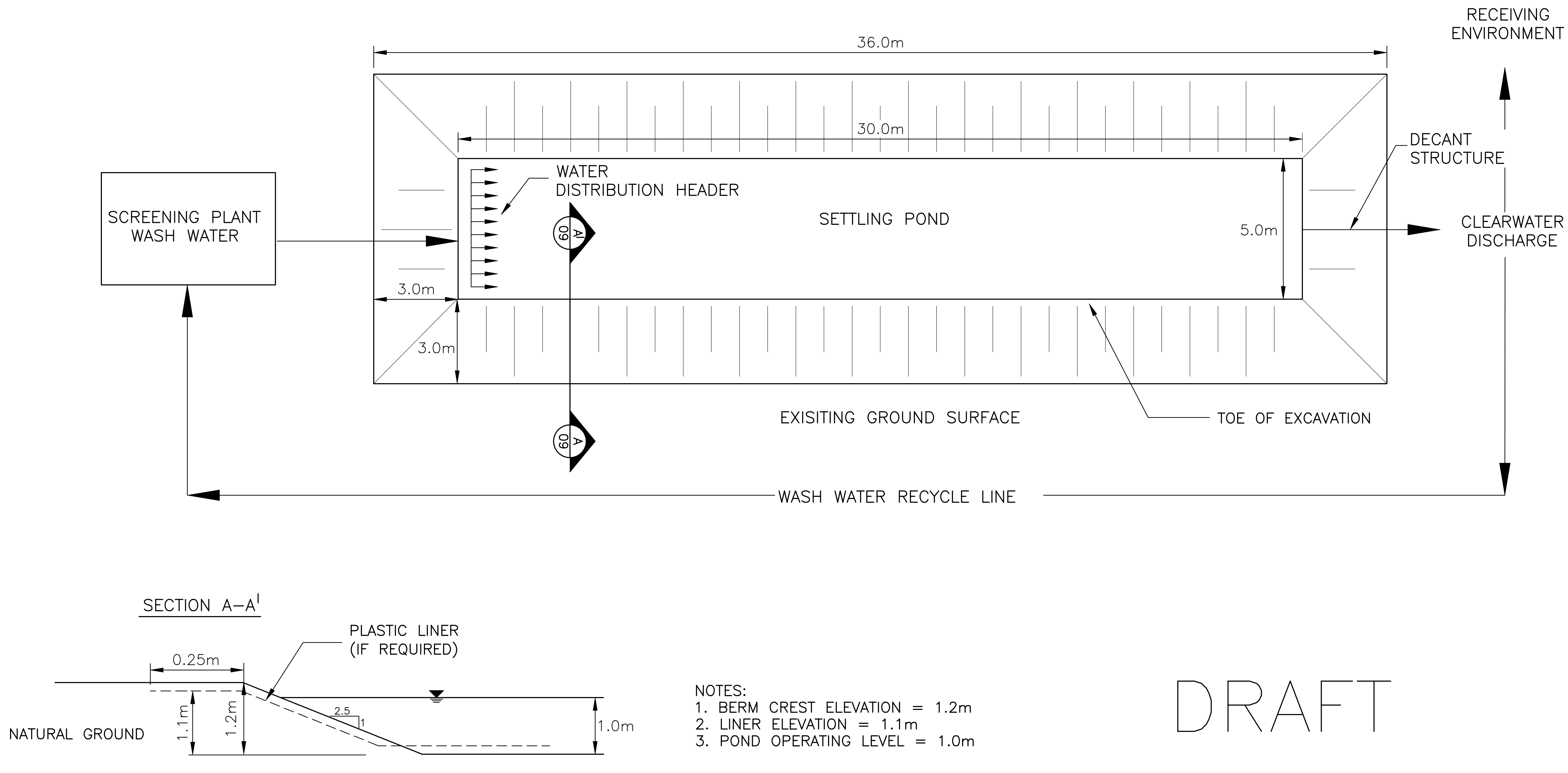
PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: SURFACE FACILITIES AND EXISTING ROADS

CLIENT:	PROJECT No.	DWG. No.	REV.
EXPATRIATE RESOURCES LTD.	0263-002-01	FIGURE 5	



NOTES:
1. BERM CREST ELEVATION = 1.2m
2. LINER ELEVATION = 1.1m
3. POND OPERATING LEVEL = 1.0m

DRAFT

REFERENCED DRAWING No.	REFERENCED DRAWING DESCRIPTION

REV.	DATE	REVISION	DRAWN	CHECKED	APPROVED

SCALE:	AS SHOWN
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AN APPLIED EARTH SCIENCES COMPANY
Vancouver, B.C. Phone: (604) 684 5900

CLIENT: EXPATRIATE RESOURCES LTD.

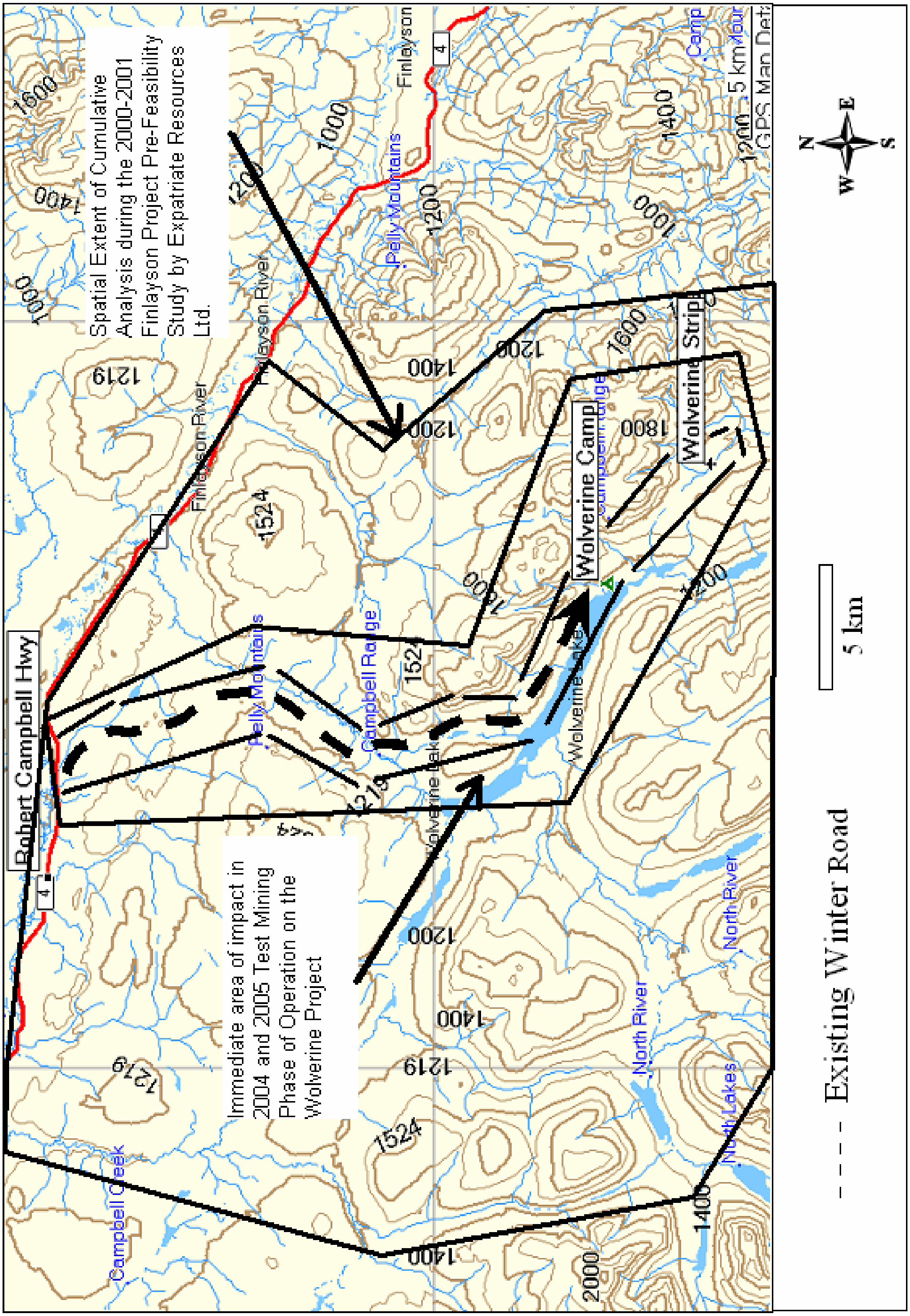
PROJECT: WOLVERINE TEST MINING PROGRAM

TITLE: SURFACE FACILITIES
AGGREGATE WASH PLANT SETTLING POND

PROJECT No.: 0263–002–01

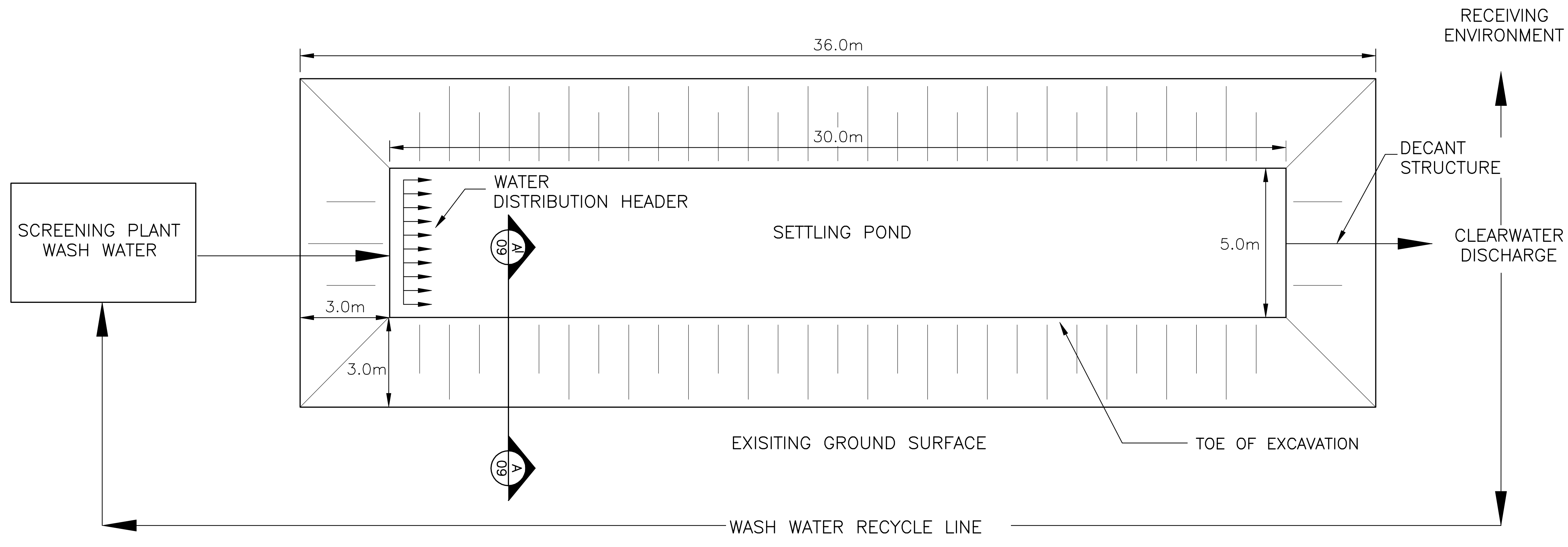
DWG. No.: FIGURE 6

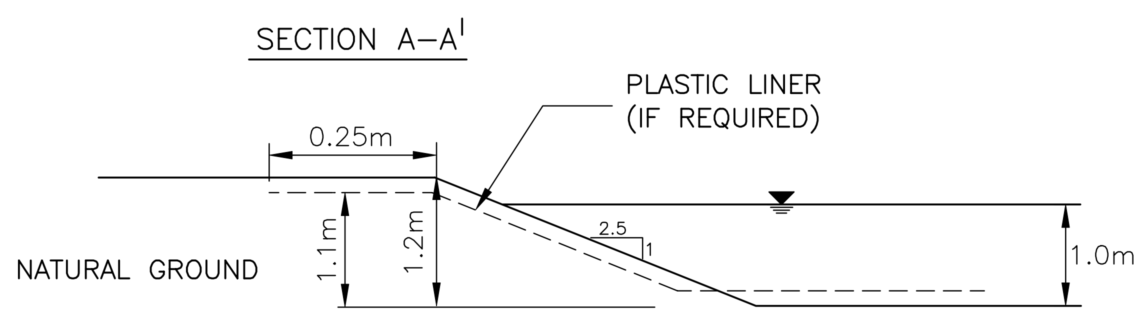
REV.:



Spatial Extent of Cumulative Analysis during the 2000-2001 Finlayson Project Pre-Feasibility Study by Expatriate Resources Ltd.
Immediate area of impact in 2004 and 2005 Test Mining Phase of Operation on the Wolverine Project
Robert Campbell Hwy
Wolverine Camp
Wolverine Strip
Wolverine Lake
Finlayson River
Pelly Mountains
Campbell Range
North River
North Lakes
Campbell Creek
Finlayson
5 km
---- Existing Winter Road
N
E
S
W

Figure 7





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2. LINER ELEVATION = 1.1m
3. POND OPERATING LEVEL = 1.0m

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CLIENT: EXPATRIATE RESOURCES LTD.

PROJECT: WOLVERINE TEST MINING PROGRAM

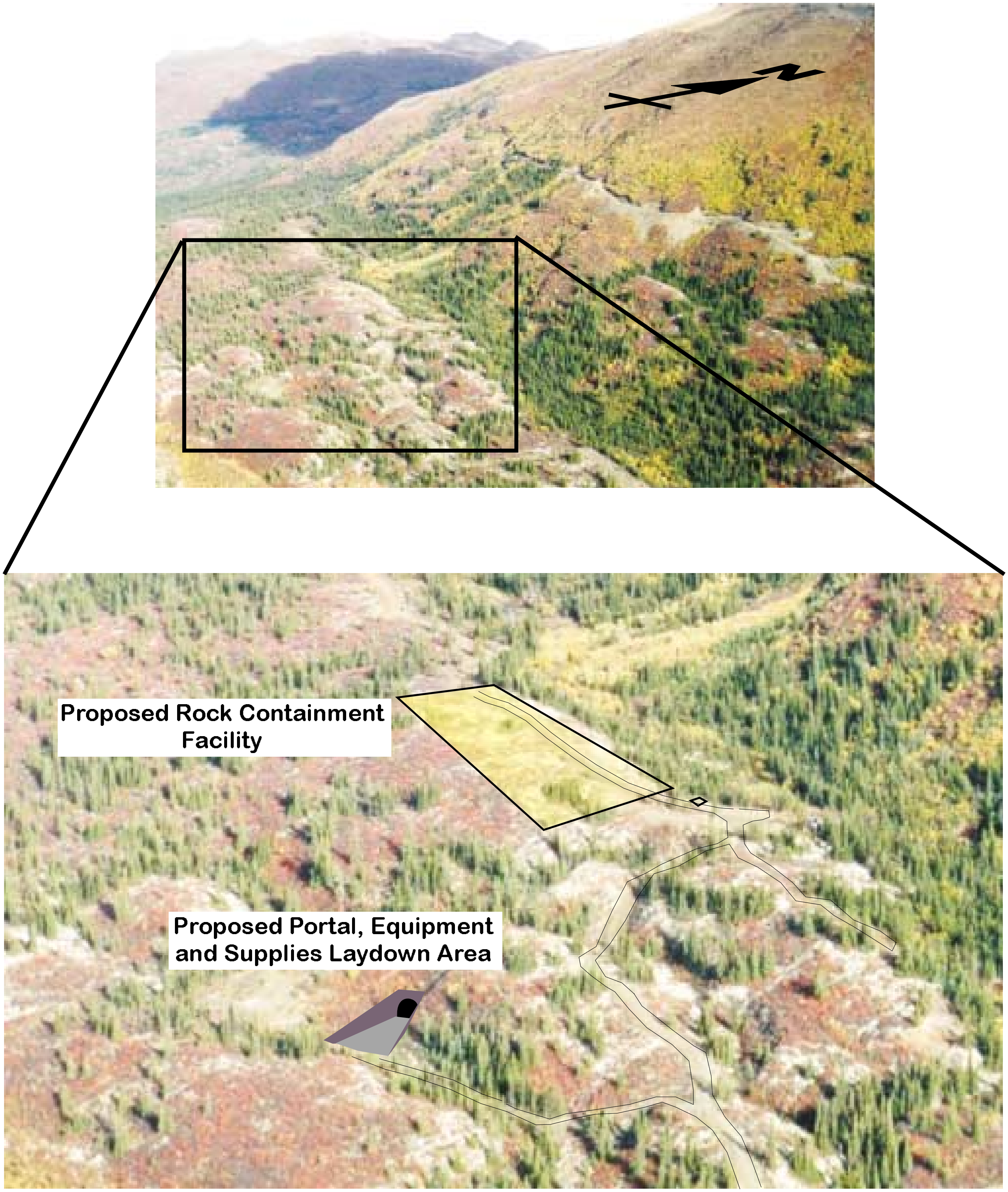
TITLE: SURFACE FACILITIES
AGGREGATE WASH PLANT SETTLING POND

PROJECT No. 0263–002–01

DWG. No. FIGURE 9

REV.

PHOTOGRAPHS



BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	Expatriate Resources Ltd. Wolverine Test Mining Program Surface Facilities Rendering Drawn: SEB March, 2001	Expatriate Resources Ltd.

Photo 1

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