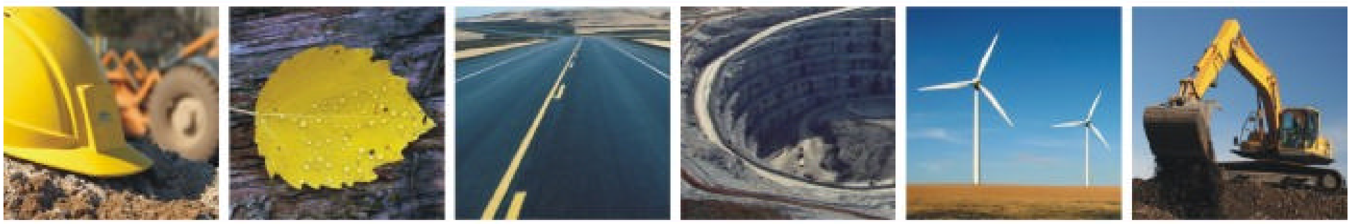
SHEAR DIAMONDS LTD.

WASTE ROCK MANAGEMENT PLAN
JERICHO DIAMOND MINE, NUNAVUT



REPORT

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ACRONYMS & ABBREVIATIONS

AA	Atomic Absorption Spectrophotometry
ABA	Acid Base Accounting
ACM	Asbestos-containing Material
AEM	Aquatic Effects Monitoring
AIA	Aquatic Impact Assessment
AIRS	Adaptation and Impacts Research Section
ANCOVA	Analysis of Covariance
ANFO	Ammonium Nitrate Fuel Oil Explosives
ANOVA	Analysis of Variance
APEC	Areas of Potential Environmental Concern
ARD	Acid Rock Drainage
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BACI	Before-after-control-impact
CALA	Canadian Association for Laboratory Accreditation
CCME	Canadian Council of Ministers of the Environment
CDA	Canadian Dam Association
CPK	Coarse Processed Kimberlite
DIAND	Department of Indian Affairs and Northern Development
DFO	Department of Fisheries and Oceans
DO	Dissolved Oxygen
EBA	EBA, A Tetra Tech Company
EC	Electric Conductivity
EIS	Environmental Impact Statement
EOC	Emergency Operations Centre
EPP	Emergency Preparedness Plan
ERP	Emergency Response Plan
ESA	Environmental Site Assessment
FSCF	Fuel Storage Containment Facility
FPK	Fine Processed Kimberlite
GC/FID	Gas Chromatograph - Flame Ionization Detector
GTC	Ground Temperature Cable
Hazmat	Hazardous Materials
HDPE	High Density Polyethylene
HVAS	High Volume Air Sampling
HWTA	Hazardous Waste Transfer Area
ICP-MS	Inductively Coupled Plasma – Mass Spectrometry
IDLH	Immediately Dangerous to Life and Health
INAC	Indian and Northern Affairs Canada
KIA	Kitikmeot Inuit Association
LBP	Lead-based Paint
LPRM	Long-term Post-reclamation Monitoring
MANOVA	Multivariate Analysis of Variance

MSDS	Material Safety Data Sheets
NIRB	Nunavut Impact Review Board
NP	Neutralization Potential
NWB	Nunavut Water Board
PHC	Petroleum Hydrocarbons
PKCA	Processed Kimberlite Containment Area
PPE	Personal Protection Equipment
QA	Quality Assurance
QC	Quality Control
RBC	Rotating Biological Contactor
RCM	Reclamation Construction Monitoring
ROM	Run of Mine
RPD	Relative Percent Difference
RRPK	Recovery Rejects Processed Kimberlite
SCBA	Self-contained Breathing Aparatus
Shear	Shear Diamonds (Nunavut) Corp.
SOP	Standard Operating Procedure
SPRM	Short-term Post-reclamation Monitoring
TDC	Tahera Diamonds Corporation
TDGR	Transportation of Dangerous Goods Act (RSNWT 1988) and Regulations
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
WSCC	Workers' Safety and Compensation Commission of the Northwest Territories and Nunavut
WHMIS	Workplace Hazardous Materials Information System
WWTP	Wastewater Treatment Plant

2011 Water Licence Renewal Documents

AEMP	Aquatic Effects Monitoring Plan
AQMP	Air Quality Management Plan
CAMP	Care and Maintenance Plan
CMP	Contingency Management Plan
EP-RP	Emergency Preparedness and Response Plan for Dam Emergencies
GMP	General Monitoring Plan
ICRP	Interim Closure and Reclamation Plan
LDP	Preliminary Landfill Design Plan
LMP	Landfill Management Plan
LFDP	Preliminary Landfarm Design Plan
LFMP	Landfarm Management Plan
OMS	Operations, Maintenance, and Surveillance Manual
PKMP	PKCA Management Plan
SWMP	Site Water Management Plan
WEMP	Wildlife Effects Management Plan

WMP	Waste Management Plan
WRMP	Waste Rock Management Plan
WTMP	Wastewater Treatment Management Plan

PART A: WASTE ROCK AND OVERBURDEN

1.0 INTRODUCTION

1.1 General

The Jericho Waste Rock Management Plan (WRMP) has been developed to provide a methodology for managing the placement and storage of the various types of waste rock generated during mining and processing of kimberlite ore at the Jericho Diamond Mine (Jericho). Part 1 of the WRMP discusses the management of the site's waste rock dumps. Part 2 of this document discusses the management of kimberlite ore and processed kimberlite stockpiles.

The plan fulfills the requirements specified in Part H and Schedule H, Item 3 (Part D, Item 10 and Part H, Item 3) of the Jericho Mine Water Licence NWB1JER0410 (issued December 21, 2004). This plan is being submitted to the Nunavut Water Board (NWB) in the absence of complete historical information as Shear Diamonds (Nunavut) Corp. (Shear) only assumed control of the project in August 2010. Since that time, Shear has discovered that detailed information on the present site conditions is limited. Comprehensive historical monitoring and maintenance records were not well maintained under previous ownership and management, so the available information is incomplete or lacking detail.

The WRMP is based on these existing records including previous management plans developed by SRK Consulting (Canada) Inc. (SRK 2005a,b), regulator comments, and external anecdotal information where available. The plan has been redeveloped for the current regulatory regime and to reflect Shear's commitment to the best practices in environmental stewardship.

The plan presents general descriptions of existing and planned infrastructure at Jericho. Once Shear has an opportunity to thoroughly investigate the site and gather information in 2011, the WRMP will be revised. Subsequent revisions of the WRMP will also be prepared and submitted to the NWB for review and approval at least 60 days prior to resuming mining operations or commencing closure and reclamation activities.

1.2 Objective of Waste Rock Management Plan

The primary objective of the WRMP is to provide Shear and its designated contractors with a working document for the management of granite and kimberlite waste at Jericho.

At the time of the water licence renewal application, mining operations have been suspended and the site is under care and maintenance. This document will therefore address the specific requirements at the present time. The PKCA serves a dual purpose at Jericho:

- Storing fine processed kimberlite (FPK) from mining and processing operations; and
- Treating and storing site and supernatant process water.

While Jericho is under care and maintenance, waste rock will not be generated with the possible exception of a relatively small volume produced during the evaluation of the processing plant. In 2011, Shear will undertake a resource evaluation and a processing evaluation in order to make critical decisions regarding the future of the Jericho Mine. The activities associated with these evaluations will be conducted while the project remains on care and maintenance and will help to determine when and if the project will go back into operations. In addition to being a management tool, the WRMP was developed to assist Shear and the regulatory agencies with mine closure planning and the development of the Jericho Interim Closure and Reclamation Plan (EBA 2011e).

1.3 Background Information

The Jericho Diamond Mine is located approximately 260 km southeast of Kugluktuk, NU, and 20 km north of Lupin Mine. The Jericho Mine was constructed and operated by Tahera Diamond Corporation (TDC) from 2004 to 2008. In January 2008, mining operations were suspended by TDC and the site was placed under care and maintenance. Shortly thereafter, Indian and Northern Affairs Canada (INAC) assumed control of the care and maintenance activities for the site. In August 2010, Shear purchased the Jericho Mine and its assets and assumed responsibility for the site.

Presently, the mine remains under care and maintenance as Shear evaluates the mineral resource in Jericho Pit. Once the evaluation is complete, a mine plan and operations schedule for the project will be established.

1.4 Linkage to Other Management Plans

The WRMP should be considered as part of the site wide management system. Other management plans that are related to or refer to the PKCA include:

- Site Water Management Plan (SWMP);
- Processed Kimberlite Management Plan (PKMP);
- General Monitoring Plan (GMP); and
- Interim Closure and Reclamation Plan (ICRP).

2.0 SITE BACKGROUND INFORMATION

2.1 Geology

The Jericho Diamond Mine is situated in the northern portion of the Slave Geological Province, within the Canadian Shield. The deposit consists of an elongate kimberlite pipe with a length of approximately 300 m, a width of up to 100 m, and a depth of at least 350 m. The kimberlite is hosted by regionally extensive Archean granitic rocks, which vary locally and over very short distances from granodiorite to syenogranite, with associated pegmatite phases. The granitic rocks have been intruded by Proterozoic diabase dykes. Pleistocene glacial sediments occur sporadically throughout the region, and provide a 10 to 20 m cover over the kimberlite pipe.

The Jericho kimberlite was formed from multiple emplacement events, comprising a precursor dyke (JDF2) and three diatreme intrusive stages consisting of northern (JDF4N), central (JDF6), and southern (JDF4S) lobes. The precursor dyke is described as a hypabyssal kimberlite or kimberlite breccia with a finely crystalline, calcite and oxide-rich groundmass hosting macrocrysts of olivine as well as garnet, chrome diopside, ilmenite and mantle xenoliths. The northern and southern lobes are serpentinized, fragmental kimberlites containing olivine macrocrysts, mantle xenoliths as well as xenocrysts and macrocrysts of chrome diopside, phlogopite and ilmenite, and 5 to 10% crustal xenoliths of granodiorite, diabase and limestone. The central lobe is a clast-supported tuffisitic kimberlite, with a serpentinized groundmass hosting olivine macrocrysts, 5% to 10% crustal xenoliths of limestone and granodiorite, and mantle derived material.

The granitic country rock consists of biotite ± muscovite granite with associated pegmatite, which varies from weakly foliated to massive. A large diabase dyke crosses through the east side of the kimberlite, and will be encountered during mining. Minor quantities of andesite, aplitic dykes, and quartz veins are found along with the granite. The relative percentage (by length of drill core) of the rock types from the five 1999/2000 geotechnical drill holes are presented in Table 1.

Sulphide mineralization is extremely rare in both the granitic rocks and kimberlite, and no occurrences of Yellowknife Supergroup Metasediments have been observed in the drill core or surface outcrops near the Jericho deposit.

Table 1: Rock Types by Percentage in 1999/2000 Geotechnical Drill Holes

Rock Type	Percentage	Length of Core (m)
Granite (both massive and foliated)	47	878
Kimberlite	20	384
Pegmatite	16	292
Diabase	13	240
Other	4	84
TOTAL	100	1,878

2.2 Topography and Surficial Soils

The local relief is subdued as a result of previous glaciations, and is characterized by numerous lakes and many small ephemeral streams interspersed among boulder fields, eskers, and bedrock outcrops. The water surface elevation in Carat Lake is approximately 470 m, and the topographic highs in the vicinity of the site facilities typically range from approximately 500 m to a maximum of 550 m. More resistant rocks in the nearby Willingham Hills (east of the site) lead to small cliffs and elevations of up to 580 m. Near the proposed open pit, slopes are gentle, and drainage is towards Carat Lake.

Drilling results and the surficial geological mapping indicate that the foundation conditions at the waste dump sites consist of bedrock with isolated soil deposits. The soil deposits typically range in thickness from 0 m to 3.2 m and consist of granular colluvial soils with a thin mantle of organic soil in some locations. Both sites are underlain by permafrost.

2.3 Permafrost

Regional permafrost maps, complemented by site-specific thermal data and data from the Lupin Mine, indicate that Jericho lies in a region of continuous permafrost. Permafrost is present everywhere except beneath large lakes. Available data suggests that the permafrost depth is about 450 m, which is consistent with published data from the Jericho area. Mining activities are not expected to extend below 300 m from the surface.

In the surficial soils, the active layer typically ranges in thickness from less than 1 m in organic soil to slightly more than 3 m where well-drained granular soils are present. The active layer thickness in exposed rock locally exceeds 3 m.

2.4 Mine Plan

The mine plan, as originally submitted as part of the Environmental Impact Statement (EIS) document in February 2005, consisted of an initial open pit mining plan to mine 3.6 million tonnes of kimberlite reserves and resources, of which 2.0 million tonnes are classified as reserves and 1.6 million tonnes are classified as resources (low grade). Inferred resources will require processing to determine the economics of the resource and possible reclassification into reserves. Shear is undertaking a resource evaluation during 2011 to confirm the original reserve estimation and to determine what was mined during the previous ownership. If this inferred resource kimberlite material is uneconomic, the low-grade kimberlite material would be stockpiled as a waste rock, and the mine plan would likely convert to an underground operation for the final two years of operation to mine an additional 0.6 million tonnes of the high grade reserve zone of the deposit. On the other hand, if the inferred material proves to be economic, then the mine plan is most likely to remain as an open pit operation, providing additional 25% kimberlite reserve and resource material. The WRMP is based on the combined open pit/underground mining scenario.

The initial years of mining will be by conventional open pit methods with a combination of mining shovels and haul trucks. Hydraulic shovels (or front-end loaders) with 5 to 10 m^3 buckets will be used. The open pit is expected be approximately 400 m wide and 500 m long, covering an area of approximately 16 ha. Mining is expected to proceed to a depth of about 270 m. The depth of permafrost is estimated to be 450 m and groundwater seepage into the pit will be limited, therefore, to flow from the active layer.

If further analysis dictates that underground mining is the preferable method for later years of the mine life, the open pit/underground transition would start at the level determined by the economic trade-off studies and actual mining costs experienced during the first years of operation. Under this scenario, once open pit mining is complete, an underground decline will be driven at a -15% gradient to access the high grade centre lobe kimberlite ore from elevations below the bottom of the open pit.

Open benching or sub-level caving is expected to be used to extract the ore. Operating efficiencies and economics experienced during initial open pit operations will dictate the final level for transfer to underground mining.

Two distinct waste materials will be produced during mining, including:

- Overburden Waste which comprises a mixture of glacial soils (till) overlying the kimberlite and surrounding waste rock; and

- Waste rock, which comprises granitic country rock, associated pegmatite phases, and diabase dykes.

The overburden and waste rock will be stockpiled in two designated waste dumps.

2.5 Production Schedule

Shear will not be generating waste rock during care and maintenance activities, other than the possible removal of a small amount during clean up of the pit. Once the resource evaluation is complete, Shear will develop a pit production schedule that will detail the volumes of waste rock and remaining overburden to be removed while mining the rest of the Jericho pit. The schedule will be included in a revised WRMP which, as discussed previously, will be submitted to the NWB for approval prior to resuming mining operations.

3.0 WASTE ROCK AND OVERBURDEN CHARACTERIZATION

3.1 General

The estimated life-of-mine quantities of waste rock and overburden waste rock for the open-pit/underground mining scenario are provided in Table 2. These values are based on the original mine plan submitted in the Jericho EIS document. The density, taken as the estimated dry density following placement in a waste dump or stockpile, is the basis of the volumetric estimates for each material. Once again Shear will verify and update these volumes during 2011 care and maintenance activities.

Table 2: Original Estimated Quantities of Waste Rock Materials

Material	Approximate Quantity (tonnes)			Estimated Density (t/m^3)	Approximate Volume (m^3)
	Mined	Used in Construction	Stored		
Waste rock	12,900,000	1,000,000	11,900,000	1.8	6,750,000
Overburden	1,600,000		1,600,000	1.7	940,000

Notes:
1. The information contained in this table is based on the open-pit/underground mine plan, which consists of a combined open pit/underground mining scenario.
2. Depending on the findings from the first year of mining, the quantities may change as a result of actual pit slopes; the waste rock/overburden split; reserve reclassification and potential mine plan changes.

The physical and geochemical properties of these materials are discussed in the following sections.

3.2 Physical Characterization

3.2.1 General

The physical characterization of waste dump materials for the design and management of the waste dumps under the previous ownership was based on data gathered during various drilling and laboratory programs and the construction and assessment of the decline that was completed to obtain bulk samples of the kimberlite. During care and maintenance activities, Shear will review the historical data, including laboratory sampling of waste rock generated during subsequent years of production, and determine whether revisions to these previous assumptions are required.

3.2.2 Waste Rock

Most of the waste rock has comprised granitic rocks, including granite, granodiorite and pegmatite, and, to a minor extent, diabase from dykes. Available data suggests that these "country rocks" are quite massive and extremely competent and strong.

3.2.3 Overburden

For the most part, the overburden soils (typically glacial till) were stripped and deposited into the existing waste dumps during the previous development of the mine. Shear understands that the overburden soils were comprised of mainly sand and gravel, with some zones of silt and till. Cobbles and, occasionally, boulders were also present in the overburden, and mixed material was assumed to be classified as overburden.

The active layer within the overburden was estimated to be less than 1 m with permafrost present below the active layer. The total tonnage of overburden soils was estimated to be 1.6 million tones, but a waste rock inventory may be required to confirm this value. The density of these soils after dumping is expected range from about 1.6 to 1.9 t/m^3. Shear understands that a small portion of the overburden soils was used for the construction of earthen structures related to water management. During care and maintenance activities, Shear will attempt to quantify the amount of overburden soils that can be recovered for use during closure and reclamation activities.

3.3 Geochemical Characterization

3.3.1 Sampling and Testing Programs

Detailed geochemical characterization of the waste rock was completed as part of the EIS. The programs included detailed core logging, examination of the development rock, mineralogical characterization, acid base accounting (ABA), solids ICP, leach extraction tests, interaction tests, and seepage sampling. Shear expects that additional information including the geochemical characterization of the waste rock during pervious production may be available. This assumption is based on testing requirements specified in the water licence during the previous owner's mining operations. Shear has not, however, been able to review the data for completeness and quality. As such, Shear is relying on the geochemical characterization developed during the EIS process until a thorough review of geochemical data is completed. Shear will complete the review and update the WRMP before resuming mining operations. A copy of the updated plan will be sent to the NWB for review and approval a minimum of 60 days prior to resuming mining operations.

3.3.2 Waste Rock

The majority of the waste rock will comprise granitic rocks. Mineralogical observations on hand samples from drill core and the development rock pile indicated that sulphides are extremely rare in the granites, occurring in limited quantities (<0.2%) in only a few sections of core and isolated locations in the development rock. A thin section of granite which contained atypically elevated (but still very low) quantities of sulphide (0.07%) indicated that the sulphides were in the form of pyrite, chalcopyrite and digenite. Rare veins of chalcopyrite observed in the development pile occurred in association with slickensides. Carbonates were generally not present.

ABA testing on eighteen granite and granodiorite samples including one sample that was altered and iron stained. Total sulphur tests on thirty samples indicated that these samples were non-acid generating with low neutralization potential (NPs from 2 to 21 mg $CaCO_3$/tonne) and negligible levels of sulphides (average <0.01% S).

Results of leach extraction testing on sixteen waste rock samples indicated that leachate in contact with the granitic waste rock is likely to have a neutral pH, moderate alkalinity levels, low total dissolved salts, and generally low metal concentrations.

Seepage from a small waste rock pile ("the development waste pile") associated with the exploration activities were also sampled periodically. The seepage results indicated that dissolved metal concentrations were generally low, except for copper, which slightly exceeded CCME guidelines, and uranium, which exceeded the CCME/Health Canada guidelines for drinking water.

Further testing completed to characterize the uranium content of the solids indicated that granite and pegmatite samples near the Jericho kimberlite had uranium concentrations consistent with the regional data, and that there were no indications of high concentrations in a particular rock type or area of the pit. Extraction tests indicated that enhanced leaching of uranium from the granitic rocks was due to mixing of the granitic rocks with kimberlite. Therefore, any waste rock that is inadvertently mixed with kimberlite should be segregated and placed into a designated area in the centre of the waste dump to promote freezing.

In summary, the testing results indicate there are relatively few concerns with respect to ARD and metal leaching from the waste rock. However, based on the observations of isolated sulphides on boulders in the development waste pile and elevated uranium in the development pile seepage, the waste rock solids will be monitored during mining to appropriately identify and manage any isolated materials that could require special handling.

3.3.3 Overburden

Three overburden samples were collected from the development waste pile and nearby area for settling tests to determine the metal content of the suspended sediments for use in estimating total metal concentrations in the discharges. The results indicated generally low dissolved metal concentrations. Total aluminum and iron concentrations were slightly elevated reflecting the aluminum and iron content of fine suspended sediments.

3.3.4 Other Waste Management Issues

In addition to the minor issues related to the geochemical properties of the rock, ammonia and nitrate from blasting and fine sediments in the waste rock and overburden may cause water quality issues in seepage and runoff from these areas. Measures to control blasting residues and reduce suspended sediments are provided in the Jericho Explosives Management Plan (TDC 2005).

4.0 DESIGN OF THE WASTE ROCK DUMPS

4.1 General Layout

The layout of the waste dumps was developed by SRK Consulting (SRK 2005a) and partially developed under previous mine ownership. The general layout of the dumps is illustrated in Figures 1 to 3. The dump design was selected to:

- Minimize the number of catchments potentially affected by drainage from the waste dumps;
- Facilitate the design and operation of seepage control structures related to the waste dumps;
- Maintain an adequate buffer zone between the toe of Waste Dump 1 and Carat Lake;
- Optimize the offsetting impacts associated with the minimized project footprint and conformity with the natural relief in the immediate area; and
- Minimize haul distances.

Waste Dump 1 will store primarily waste rock. Continued construction of the waste dump will start at contour elevations that allow any runoff to flow to the open pit and be handled by pit sumps. Through the Seepage Survey, described in the Jericho GMP (EBA 2011d), Shear is going to evaluate the quality of seepage water from the waste dumps. If seepage water quality is low and quantity is large enough that it cannot be controlled and collected within the natural topography, Pond A will be constructed.

Waste Dump 2 was previously used to store overburden and waste rock. Drainage from Waste Dump 2 was to flow to a sump in the open pit and subsequently to Pond B if significant quantities were encountered. Shear has not yet been able to confirm if adequate grading and drainage was constructed for this to happen. Shear will evaluate the suitability of site water and seepage management infrastructure during the current care and maintenance activities. If revisions to the WRMP or other documents are required, the changes will be made and submitted to the NWB for approval at least 60 days prior to resuming mining operations.

Recent photos and survey data indicate that the two Waste Dump areas have been merged with a layer of waste rock connecting the two structures. Shear will confirm the situation during 2011 care and maintenance activities and evaluate if the merging of the piles will affect future waste rock and site water management.

4.2 Foundation Conditions

4.2.1 Waste Dump 1

The drilling results and the surficial geological mapping indicate that the foundation conditions beneath Waste Dump 1 prior to construction, consisted of bedrock with isolated soil deposits. The soil deposits typically ranged in thickness from 0 m to 3.2 m and consisted of granular colluvial soils or till with a thin veneer of organic soil in some locations. The site was underlain by permafrost.

Previously, a series of ephemeral streams used to flow across the dump site to Carat Lake. In general, these occupy broad zones over which the water flows very slowly in the spring and early summer. Grassy vegetation is commonly associated with these streams.

4.2.2 Waste Dump 2

Based on site reconnaissance and surficial geological mapping records, the foundation conditions at Waste Dump 2 prior to construction consisted primarily of bedrock, with some till in the south edge of the site. This site was also underlain by permafrost.

4.3 Dump Designs

4.3.1 General

The design of the waste dumps was developed by SRK and partially developed under previous mine ownership. Shear expects to continue construction of the waste dumps as designed but is going to evaluate the suitability of the present design before resuming mining activities.

Dump designs were developed based on the properties of dump materials, the foundations conditions at the dump sites, and the approximate volume of mine waste that will be produced as a result of the current mine plan. The details of these designs are provided below. Typical sections through the two waste dumps are provided in Figure 4. The corresponding dimensions and storage capacities of the proposed waste dumps based on the planned open-pit/underground quantities are provided in Table 3. The dump capacity can be increased through design modifications if required.

Table 3: General Dimensions and Storage Capacities of the Waste Rock Dumps

Site	Area (ha)	Approx. Crest Elev. (m)	Height (m)	Capacity (Mt)	Capacity (Mm^3)
Waste Dump 1	37.7	520	44	13.930	7.739
Waste Dump 2	12.5	520	21	2.382	1.377

Notes:

1. The storage capacities quoted here are based on the design dump layouts and do not include the merging of Waste Dumps 1 and 2.
2. Depending on the findings of the resource evaluation and waste dump design review these values may change.

Shear understands that the waste dumps were constructed using a lift thickness of approximately 10 m. Depending on the projected height of the structure and the number of benches, the lift thickness may be modified to develop relatively uniform bench heights. Overall slopes of between 2.6H:1V and 1.4H:1V may be used depending on location and dump performance, as described below. During the life of mine, the slopes between benches will correspond to the angle of repose of the dump material, which is expected to be about 1.4H:1V (35 degrees).

4.3.2 Waste Dump 1

The overall downstream design slopes at this waste dump will be about 2.6H:1V (21 degrees), except for internal slopes during the course of dump development. Those slopes along the east side of the dump will be equal to the angle of repose or approximately 1.4H:1V (35.5 degrees). This variance is based on how the dumps will be constructed and the fact that the ground along the east side of the dump toe is rising, which is favourable to dump stability.

4.3.3 Waste Dump 2

Waste Dump 2 has been used to store a mixture of overburden and waste rock, much of which may have been frozen when it reported to the dump. Based on historical plans, Shear understands that a portion of the overburden stockpile may thaw during the summer months and, as such, required confinement at the dump perimeter. A waste rock buttress for the downstream slope was constructed and was used to provide confinement to the soils if they thaw and show a propensity to slump or "run." The slopes at this section of the waste dump are apparently 2.6H:1V (21 degrees), except for the internal slopes constructed during the course of dump development. Shear will verify the existence of the waste rock buttress during care and maintenance and will assess the structures performance to determine if it is achieving the design intent. During this time, Shear will also evaluate the whether some of the overburden in the dump can be used for mine closure and reclamation activities. A discussion of closure and reclamation activities can be found in the Jericho Interim Closure and Reclamation Plan (EBA 2011e).

4.4 Stability Analysis

4.4.1 General

The stability of the waste dumps has been considered in an overall context based on the generally favourable foundation conditions, moderate slope angles, and low seismic risk. Stability analyses were undertaken on Waste Dump 1 (the highest dump) during the original design process. Shear intends to have the dumps evaluated by a qualified geotechnical engineer during care and maintenance. The engineer will review the design of the dumps and their present condition and will recommend whether further stability analysis will be required.

4.4.2 Stability Criteria

A typical example of minimum factors of safety for waste rock dumps is provided in Table 4, the source of which is the guidelines published by the BC Mine Waste Rock Pile Research Committee in 1991.

Historically, the earthquake with a 475-year return period was usually selected for use in stability analyses associated with operations. However, changes proposed to the National Building Code of Canada in 2005 recommended the 475-year earthquake be replaced by the earthquake with a 2,475-year return period. As such, both earthquake events were considered in the design stability analyses.

It is common to select a larger but less frequent earthquake for purposes of closure. The selection is usually based on the consequences of failure. Given the size, design, failure mechanisms, and setting of the proposed waste dumps at Jericho, the consequence category is likely to be low. Assuming this to be the case, the maximum design earthquake for closure is assumed to be the same as the maximum design earthquake for operations.

Table 4 Guidelines for Minimum Design Factor of Safety – Waste Rock Dumps

Stability Condition	Case A – more severe	Case B – less severe
Stability of Dump Surface		
Short term (active)	1.0	1.0
Long term (closure)	1.2	1.1
Overall stability (deep-seated)		
Short term (active)	1.3 - 1.5	1.1 - 1.3
Long term (closure)	1.5	1.3
Pseudo-static	1.1 - 1.3	1.0
Case A: Low level of confidence in critical analysis parameters Possibly non-conservative interpretation of conditions, assumptions Severe consequences of failure Simplified stability analysis method (charts, method of slices) Stability analysis method poorly simulates physical conditions Poor understanding of potential failure mechanism(s)		
Case B: High level of confidence in critical analysis parameters Conservative interpretation of conditions, assumptions Minimal consequences of failure Rigorous stability analysis method Stability analysis method simulates physical conditions well High level of confidence in critical failure mechanism(s)		

4.4.3 Failure Modes

Given the granular nature of the dump materials and the dominance of the bedrock in the foundations of the two dumps, the most probable failure surfaces are likely to be relatively shallow and sub-parallel to the slope face. Nevertheless, the analyses also considered a failure through the till soils (this case is analogous to the deep-seated condition noted in Table 4).

4.4.4 Method of Analysis

The slope stability analyses were generally performed using two-dimensional limit equilibrium analyses and the computer program SLOPE/W, which was developed by GEO-SLOPE International. Factors of safety for these stability cases were determined using the Bishop method of analysis. The stability of the dump face was assessed on the basis of a simple infinite slope analysis (this analysis compares the friction angle of the dump material against the slope angle).

4.4.5 Geometry and Input Parameters

The dump height was taken as 40 m, which corresponds to the approximate height along the north face of Waste Dump 1. During operations, the dump was assumed to have an overall downstream slope of 2.6H:1V (21 degrees), with an inter-bench slope of 1.4H:1V (35 degrees). Post-closure, the analyses assumed the downstream dump slope would be 3H:1V (18.4 degrees). Other input parameters have been selected based on judgement and are believed to be at or below typical mean values for the respective material (Table 5).

Table 5 Input Parameters used in the Stability Analyses

Parameter Kimberlite	Moist Unit Weight (kN/m^3)	Effective Strength Parameters		Water Table	Earthquake for Pseudo-Static Assessment
		c (kPa)	phi (degrees)		
Waste rock	20	0	39	Low in dump	0.013 and 0.06
Till	22	5	32	In dump	
Bedrock	Failure surface prevented from intersecting the bedrock				

The water table was varied in the analyses. A low water table was used as the base case ("low") due to the expected porosity and durability of the granitic waste rock. Although it is considered unlikely, the analyses considered the possibility of short-term spikes in the water table resulting from a frozen face and the coincident spring freshet ("high").

The earthquakes with 475 and 2,475-year return periods coincide with peak ground accelerations of 0.013 g and 0.06 g, respectively.

4.4.6 Results of Analysis

The results of the stability analyses for Waste Dump 1 are summarized in Table 6. The till foundation results had slightly lower factors of safety than the results based on the bedrock foundation, so the till foundation results are what are reported in Table 6.

The minimum allowable factors of safety have been based on Case B in Table 4 because:

- Conservative assumptions have been used in the analyses; and
- The consequences of failure are minimal as they do not involve loss of life or large scale environmental impacts.

The potential failure modes are well suited to the analytical methods that have been used.

Table 6: Summary of Critical Factors of Safety for Waste Dump 1

Stability Condition	Suggested Minimum Factor of Safety	Calculated Factor of Safety	Comments
Dump Surface			
Short Term	1.0	1.0	Bench face, at angle of repose
Long Term	1.1	2.4	Slope graded to ≈18° for closure
Deep Seated			During operations, overall slope 21°
Short Term	1.3	1.9/1.3	Till foundation (low/high water table)
Long Term	1.3	1.9/1.3	Till foundation (water table as above)
Pseudo-static	1.0	1.8/1.3	Till foundation, acceleration = 0.013 g (low/high water table)
Pseudo-static	1.0	1.6/1.1	Till foundation, acceleration = 0.06 g (low/high water table)
Deep Seated			Post-closure, overall slope ≈18°
Short Term	1.3	2.1/1.5	Till foundation (low/high water table)
Long Term	1.3	2.1/1.5	Till foundation, (water table as above)
Pseudo-static	1.0	2.0/1.5	Till foundation, acceleration = 0.013 g (low/high water table)
Pseudo-static	1.0	1.7/1.3	Till foundation, acceleration = 0.06 g (low/high water table)

4.4.7 Conclusions

Stability analyses were completed for Waste Dump 1 using conservative input parameters. The calculated factors of safety met or exceeded the minimum allowable values.

The cases where the calculated factor of safety is close to the allowable value correspond to two general conditions:

- The case when the water table is very high. In reality, this would correspond to a transient condition that may or may not occur in the field. Observations during operations should provide a better indication of what the high water table might actually be during the freshet.
- The case of the dump surface, where the slope coincides with the angle of repose. This is typical for end-dumped materials.

These dump slopes can be optimized as additional information is obtained early in the operational life of the dumps.

5.0 CONTROL MEASURES – CONSTRUCTION AND OPERATIONS

5.1 General

This section describes the measures that will be implemented to minimize environmental impacts associated with mining and the construction and operation of the dumps.

5.2 Mine Operations related to Ammonia Management

Use of explosives in all aspects of the mining operation will be closely managed to reduce nitrogen loss to the waste rock as per the Jericho Explosives Management Plan (TCD 2005).

5.3 Use of Overburden and Waste Rock for Construction

Item 3, Schedule D of the Water Licence specifies the waste rock used for construction shall be non-acid generating and shall meet the physical specifications outlined in specific design reports for each of the major facilities on site.

Shear understands that previous geochemical testing indicates that that the waste rock is non-acid generating, with a limited potential for metal leaching. To reduce the potential for metal leaching, site staff will examine the blasted rock designated for use in construction for sulphide minerals and for material that contains a mixture of kimberlite and granitic rock. If visible sulphides or mixed kimberlite and granitic rock are observed, the rock will be placed in a designated area in the centre of the waste rock pile, and will not be used for construction. Samples to confirm rock geochemistry expectations will be collected on a weekly basis during the construction period.

Visual inspection of materials will be used to segregate the overburden from waste rock in regards to potential uses of materials for construction purposes.

5.4 Construction and Operation of Waste Dumps

5.4.1 Waste Dump 1

The proposed procedures for the construction of Waste Dump 1 are illustrated schematically on Figure 5. Waste rock will be hauled to the dump using off-road mine trucks on all-weather mine access roads. At the dump, the waste rock will be end-dumped and spread with a dozer to make a flat surface for the mine trucks to drive on. It has been previously noted that end dumping of trucks loads down the slope of the dump may segregate the rock and form a (desirable) drain at the bottom of the slope. In addition, end-dumping may prevent nesting of coarse particles at the crest, ensuring the slope remains at the angle of repose and is not "oversteepened." Shear will investigate options that involve end-dumping down the slope; however, the safety of the truck driver must remain the primary consideration and, in general, pushing with the dozer is the safer option.

Dump development is to occur in several stages, with the initial stage starting at the upstream limits of the dump and the final stage ending at the downstream limit of the dump. Further information regarding the general procedures that were proposed for the construction of Waste Dump 1 is provided below. Shear has not been able to confirm whether these procedures were followed during the initial development of the dumps:

- To the extent possible, a frozen foundation layer will be developed at the base of each waste dump area by placing a blanket of granitic waste rock over the tundra during the winter months. Also frozen berms may be developed at the toes to promote in-freezing of water within the dump of each dump stage.
- As noted above, the initial stage of dump construction will commence at the southeast limit of the dump site. The dump will be advanced towards the north and west stage limits. Dump slopes during this and the intermediate stage(s) of construction will be angle of repose over the lift height.
- The surface of the dump will be inclined to direct runoff water off the dump toward the open pit, or collection ponds, if the latter are required.
- To minimize the potential for metal leaching, site staff will examine the blasted rock for sulphide minerals. If visible sulphides or mixed granitic rock and kimberlite are observed, the rock will be encapsulated in the centre of the dump and below the active layer of the dumps where, they will remain frozen or freeze over time.
- The final dump face will be constructed during the last construction stage.

5.4.2 Waste Dump 2

Waste rock and overburden was and will be hauled to Waste Dump 2 using mine rock trucks on all-weather access roads. Shear will confirm in 2011 that the waste rock buttress was constructed adjacent to the downstream toe (north side) of Waste Dump 2.

6.0 CLOSURE AND RECLAMATION

Shear intends to reclaim the waste dumps such that they will serve as wildlife habitat. The aim of the reclamation plan is, therefore, to promote, to the extent practical, rehabilitation of the land to this use. Key elements of the plan include vegetation prescriptions based on reclamation trials, re-grading dump slopes and construction of ramps to allow safe caribou transit across the dump slopes.

A more detailed discussion of the reclamation objectives for the waste dumps can be found in the Jericho ICRP (EBA 2011e)

7.0 VERIFICATION AND MONITORING

7.1 Solids Quantities

As specified in Part K, Item 13 of Water Licence NWB1JER0410, Shear will record the monthly quantities of ore processed, and the monthly quantities and disposal location of any overburden, waste rock, low-grade ore, and CPK.

7.2 Solids Geochemistry

Geochemical monitoring will be carried out to confirm the geochemical properties of the waste rock during mining operations. Shear will review the requirements for the monitoring during care and maintenance activities and will develop a monitoring program that will be included in a revised version of the Jericho GMP for mining operations. The revised document will be submitted to the NWB for review and approval a minimum of 60 days prior to resuming mining operations.

7.3 Ground Ice

During collection of the waste rock samples, blasted rock and freshly blasted rock faces will be examined by qualified personnel for the presence of significant quantities of ground ice. If present, the quantity of ice will be estimated, and samples of the ice lenses will be collected and submitted for water quality analyses to characterize the quality of ice melt water that would report to the pit or waste rock dumps. The frequency of sampling would depend on the amount of ice encountered, and the water quality data from the first few samples. However, significant amounts of ice are unlikely to be encountered.

7.4 Seepage Monitoring

Seepage from the waste dumps will be analyzed and evaluated as part of the site wide general monitoring as discussed in Section 6.0 Seepage Survey Program in the Jericho GMP (EBA 2011d).

7.5 Visual Inspections

During the active development of each of the waste dumps, site staff will carry out daily visual inspections related to the performance and condition of each structure. In addition, documented weekly Operational Geotechnical Inspections are to be performed by qualified site personnel. If dump activity ceases on an interim or seasonal basis, the inspection frequency will shift to monthly. Following the completion of a dump or stockpile, inspections will continue on a semi-annual basis until closure. The purpose of the operational inspection is to identify and document any hazards and damage to or deterioration of the structure. If a condition is deemed to be serious, a qualified geotechnical engineer will be brought to site to inspect the structure. Depending on the performance of each of the dumps, the geotechnical engineer may recommend an increased inspection frequency and/or supplemental monitoring methods. A discussion of Operational Geotechnical Inspections can be found in Section 4.0 of the Jericho GMP (EBA 2011d).

Site personnel tasked with the operational inspections will be trained in identifying hazards and will be provided with an inspection form prepared by a qualified geotechnical engineer to assist with the identification of maintenance issues and hazardous conditions. Observations made during the inspection should be photographed and recorded. Photographs of the general condition of each structure are to be taken to track year by year changes in each structure. A discussion of Operational Geotechnical Inspections can be found in Section 4.0 of the Jericho GMP (EBA 2011d).

A copy of each operational inspection form and the associated photographs will be preserved in Shear's document management system. Additionally, a hard copy will be maintained in a binder on site for review by a visiting geotechnical engineer. Any identified deficiencies or features should be highlighted in the inspection forms such that the inspector can assess whether conditions are worsening. Shear expects that the inspection process and form will evolve as more information about the structures and their condition become available during care and maintenance activities.

Site wide inspections by a qualified geotechnical engineer are completed annually. These Formal Geotechnical Inspections will include a review of all waste rock dumps and ore stockpiles. A discussion of Operational Geotechnical Inspections can be found in Section 4.0 of the Jericho GMP (EBA 2011d). A copy of the Formal Geotechnical Inspection will be sent to the NWB for review.

7.6 Thermal Monitoring

Thermal monitoring, though not critical to the structural performance of the waste dumps, is an important aspect of the dump's geochemical monitoring. A portion of the water infiltrating the pile from precipitation and runoff is expected to form an ice-saturated core within the pile and remain permanently frozen as the permafrost aggrades into the pile. The saturation and freezing of the pile is expected to reduce the risk of impacted seepage from the piles as the ice will effectively limit oxygen circulation, and thus the reactivity of the waste rock, within the pile.

Thermal monitoring of the piles is a key component when attempting to determine the development of permafrost into the pile. This information is particularly important when considering the long-term post-closure performance of the piles. In order to provide information that will be useful for closure planning and post-closure monitoring, thermistors will be installed in the dumps. At Waste Dump 1, Shear expects to install a multi-thermistor ground temperature cable (GTC) at least two locations within the final stage of the dump. Similarly, at Waste Dump 2, two GTCs will also be installed. The temperature readings will be collected monthly for two years or until a clear pattern has been established. Thereafter, the reading frequency can be reduced to quarterly while mining operations continue. A post-closure schedule of readings will be established once the thermal trends have been analyzed and will be included in the Jericho ICRP.

PART B: KIMBERLITE ORE, COARSE PROCESSED KIMBERLITE, AND RECOVERY CIRCUIT REJECTS

8.0 COARSE PROCESSED KIMBERLITE PRODUCTION SCHEDULE

While Jericho remains under care and maintenance, processed kimberlite will not be produced with the exception of a small amount during the commissioning of the plant. In 2011, Shear is undertaking a resource evaluation of the Jericho pit; a production schedule for the mine will not be developed until the results of the evaluation are reviewed. However, as discussed previously, a revised WRMP will be submitted to the NWB for approval prior to resuming mining operations.

9.0 COARSE PROCESSED KIMBERLITE STOCKPILE MATERIALS

9.1 General

The kimberlite ore will only be stockpiled to separate mining and processing operations and provide a surge against weather and mine delays. It is expected that no more than one month's supply will be stockpiled at any given time (<30,000 m^3 of kimberlite).

The life-of-mine quantities of coarse processed kimberlite (CPK) and recovery rejects processed kimberlite (RRPK) (0.09 Mm^3) from the original EIS submission are provided in Table 7 for the total kimberlite processing scenario. The density, taken as the estimated dry density following placement in a PK waste dumps or stockpile, is the basis of the volumetric estimates for each material. Some of the CPK and RRPK have been used in the construction of the PKCA structures and may be used for future construction. In addition, the CPK may get used as a reclamation material as discussed in the Jericho Interim Closure and Reclamation Plan (EBA 2011e). Shear will revise the estimated CPK quantities once the resource evaluation is complete.

Table 7 CPK Materials - Total Estimated Quantities and Destinations

Source or Use	Approximate Quantity of Each Material			
	CPK		Recovery Circuit Rejects	
	Tonnes	Volume (m^3)	Tonnes	Volume (m^3)
Produced	3,430,350	2,144,000	169,400	105,875
Used in PKCA Construction	100,000	62,500	20,000	12500
Used for PKCA Closure	500,000	312,500	0	0
Stockpiled	2,830,350	1,769,000	149,400	93,375

Notes:
1. CPK and recovery circuit rejects are assumed at an in-situ density of 1.6mt/m3
2. Depending on actual processing rates, value economics of resource material, construction requirements and closure requirements, the quantities may change.

The physical and geochemical properties of the CPK materials are discussed in the following sections.

9.2 Physical Characterization

The physical characterization of kimberlite ore and CPK materials has been based on data gathered during various drilling and laboratory programs and the assessment of the product streams from the bulk samples of the kimberlite. During care and maintenance activities, Shear will determine if the previous owners gathered further information that can be used to characterize the materials.

9.2.1 Kimberlite Ore

The kimberlite ore will be a run-of-mine (ROM) product. Its gradation will depend on a variety of factors, but is expected to vary from silt and sand-sized particles to boulders. Observations reported in the EIS and testing done during site operations indicate the kimberlite is competent and shows no indication of rapid weathering.

9.2.2 Coarse Processed Kimberlite

The CPK will comprise a gravely sand made up of about 50% to 93% sand and 7% to 50% fine gravel from mechanical breakdown of the kimberlite ore. Processing plans call for the minimum and maximum particle sizes to be 0.1 mm and 19 mm, respectively. The CPK is the light fraction from the dense media separation circuit in the processing plant and therefore is made up of the lighter minerals which comprise most of the kimberlite. The total tonnage of coarse kimberlite is estimated to be 3.43 million tonnes (mt). The density of the CPK is expected to be about 1.6 to 1.65 t/m^3, which corresponds to an estimated volume of 2.14 million m^3. As discussed, a portion of the CPK was used for construction and CPK may be used during closure. The final stored volume of the CPK will, therefore, be significantly less than 2.35 million m^3.

9.2.3 Recovery Circuit Rejects

RRPK is produced as a result of kimberlite ore processing. They will comprise medium to coarse sand with some fine gravel. Particle sizes are expected to range from 1 to 8 mm. This material is the heavy fraction from the dense media separation, minus any diamonds, and is therefore made up of the heavier minerals in the kimberlite, such as ilmenite, chrome diopsite, garnet and phlogopite.

The total tonnage of the RRPK is estimated to be approximately 0.17 mt. The density of the recovery circuit rejects in a stockpile dump is expected to be similar to that of CPK, about 1.6 to 1.65 mt/m^3. The total volume of the recovery circuit rejects is therefore estimated to be about 0.11 million m^3. Some of the material may have been used for general construction purposes under the previous ownership.

9.3 Geochemical Characterization

9.3.1 Sampling and Testing Programs

Detailed geochemical characterization of the kimberlite ore and CPK was completed as part of the EIS and may have performed during operations by the previous ownership. Shear is in the process of reviewing operational records and will update the WRMP as more information becomes available. The programs under the EIS included detailed core logging, examination of the development rock, mineralogical characterization, acid base accounting (ABA), solids ICP, leach extraction tests, seepage sampling, and supernatant characterization. (TDC 2003, Appendix D.1.4).

9.3.2 Kimberlite Ore

Petrographic examination of five samples from the crushed ore stockpile taken during the bulk sampling phase, indicate varying amounts of carbonate (from 0.5% to 25%) and only trace amounts of sulphides, which occur as pyrite when present (EIS, Appendix D.1.4). Fizz testing indicated a strong reaction to weak hydrochloric acid, confirming the presence of reactive carbonate minerals (TDC 2003, Appendix D.1.4).

Results of ABA analysis of 30 kimberlite samples indicated relatively low sulphide concentrations, high neutralization potentials (NP), and neutral to alkaline paste pH.

Shake flask extraction tests performed on nine samples indicated that runoff in contact with stockpiled kimberlite ore will be alkaline, with pH in the range of 8, and alkalinity in the range of 40 mg $CaCO_3$ eq/L. Seepage from this material is expected to have relatively high total dissolved salts concentrations and generally low metal concentrations.

In summary, previous geochemical testing indicated that kimberlite has a low potential to generate acidic or strongly alkaline drainage. The testing also indicates that runoff in contact with stockpiled kimberlite ore and/or kimberlite waste rock could contain elevated concentrations of total dissolved salts. The drainage is expected to be slightly alkaline, with pH in the range of 8.0. During care and maintenance activities, Shear plans to review available geochemical data and determining whether further testing is required.

9.3.3 Coarse Processed Kimberlite

The diamond recovery process is based on physical methods rather than chemical or pyrometallurgical. CPK is therefore expected to be geochemically very similar to the ore. Results of specific tests on this material are summarized below. Mineralogical examination of CPK samples indicated that carbonate content ranged from 0.5% to 5% (TDC 2003, Appendix D.1.5). One sample had trace levels of disseminated sulphides as pyrite, and the other sample was devoid of sulphides. Results of ABA testing on CPK samples indicated that the CPK is net acid consuming with an insignificant sulphide content (less than 0.03% as S), very low sulphates (0.01% to 0.05% as S), and high neutralization potentials (TDC 2003, Appendix D.1.5). The neutralization potential ranged from 59 to 275 kg $CaCo_3$ eq/mt. Paste pH was strongly alkaline, ranging from 9.0 to 9.4.

Although supernatant samples were collected from the FPK, results are mentioned here as an indication the chemistry of water in contact with PK. The chemistry of six fresh and aged PK supernatant samples was characterized by alkaline pH and moderate to elevated alkalinity, chloride, calcium, magnesium, potassium and sodium concentrations (TDC, Appendix D.1.5). Heavy metal concentrations were generally very low; however, based on the specified criteria, barium, copper, manganese, molybdenum, and zinc levels were slightly elevated in some of the samples, and aluminum and nickel exceeded the criteria for freshwater aquatic life in more than one of the samples.

Sequential extraction tests on six samples indicated that alkalinity concentrations remained elevated in a second rinse, indicating that alkalinity levels could remain elevated over time. None of the metals exceeded the criteria for freshwater aquatic life.

9.3.4 Recovery Circuit Rejects

Recovery circuit rejects were not characterized separately in the original geochemical studies for the project, and samples of this CPK reject stream are no longer available for testing. Sulphides were not observed in the recovery circuit reject materials by SRK in 1999. Nonetheless, small amounts of sulphides from the original kimberlite ore could accumulate in this material, and light minerals such as carbonates could become depleted. Therefore, there is a slight potential that this material could be a source of acid generation and/or metal leaching.

As indicated in Table 7, the recovery circuit rejects comprise a relatively small amount of material. The leachate from this material will flow directly to the PKCA. Ongoing monitoring and testing of the leachate will determine if there any long-term ARD and water quality issue associated with this material.

10.0 DESIGN OF THE STOCKPILES

10.1 General Layout of the Stockpiles

The layout of the stockpiles for the kimberlite ore, CPK, and RRPK was developed by SRK Consulting (Canada) Inc. (SRK 2005b) and partially developed under previous mine ownership. The general layout of the dumps is illustrated in Figures 1, 2 and 6. According to SRK, the dump design was selected to:

- Maintain the location of the CPK stockpiles in a minimum number of catchments potentially affected by drainage from the CPK dumps and stockpiles;
- Facilitate the operation of existing seepage control structures related to the CPK stockpiles by using the east sump and the PKCA drainages;
- Optimize the offsetting impacts associated with the minimized project footprint and conformity with the natural relief in the immediate area; and
- Minimize haul distances and provide access to material for its potential use in reclamation.

The kimberlite ore stockpile will be situated immediately east of the plant facility and will be limited to blending piles representing, on average, less than 30,000 m^3 of material. The kimberlite ore stockpile will be graded so that any runoff is directed to the east sump for recycling or pumping to the PKCA.

Several disposal areas have been identified for the CPK. These areas include a zone within the southeast part of the PKCA (CPK Stockpile 1), the upstream toe area of the east and southeast dams (CPK Stockpile 2), the area immediately west of the Jericho camp facilities within the PKCA watershed (CPK Stockpile 3), and the area immediately south of the east sump (CPK Stockpile 4). Stockpiles for CPK will be unlined. All runoff from these stockpile areas will be captured in the east sump, pit sumps, or within the PKCA itself.

Due to the uncertainties in the geochemistry of the recovery circuit rejects, this material will be stockpiled in CPK Stockpile 1, so that leachate runoff is naturally directed to the PKCA. If geochemical testing and ongoing monitoring of the recovery circuit rejects demonstrates that there is no long-term ARD and water quality issue associated with this material, deposition of the recovery circuit rejects may shift to one of the other CPK stockpiles

10.2 Foundation Conditions at the Stockpiles

10.2.1 Kimberlite Ore Stockpile

Based on site reconnaissance and surficial geological mapping, the foundation conditions at the kimberlite ore stockpile area consist primarily of bedrock, with till under portions of the stockpile. Local permafrost data indicates that all areas are underlain by permafrost conditions.

10.2.2 Coarse Processed Kimberlite Stockpile

CPK Stockpiles 1 and 2 will be integrated with the FPK in the PKCA, and will be discussed in any updates to the Jericho PKCA Management Plan (PKMP, EBA 2011h). Site reconnaissance and surficial geological mapping indicates that the foundation conditions at CPK Stockpile 3 are primarily bedrock. At CPK Stockpile 4, the foundation conditions are primarily bedrock with isolated small pockets of granular colluvial soils or till with, in some locations, a thin veneer of organic soil. The small natural pond (East Sump) will be left in place as a water management control structure for the CPK drainage and plant area drainage. Local permafrost data indicates that all areas are underlain by permafrost conditions.

10.2.3 Recovery Circuit Rejects

As noted above, Shear expects to stockpile the RRPK, at least initially, in CPK Stockpile 1. The development of the stockpile will be discussed in a future revision of the PKMP written specifically for mine operations.

10.3 Stockpile Designs

10.3.1 General

The dimensions and overall storage capacities of the proposed or partially constructed stockpiles are provided in Table 8. Excluding the kimberlite ore stockpile, the total available capacity of the four stockpile areas is 1.94 Mcm. As noted in Table 7, the required stockpile capacity is 1.86 Mcm, which is based on 1.77 Mcm of CPK and 0.09 Mcm of recovery circuit rejects.

Table 8 General Dimensions and Storage Capacities of the Stockpiles

Site	Area (ha)	Approx. Crest Elev. (m)	Max Height (m)	Capacity (Mt)	Capacity (Mm^3)
Kimberlite Ore Stockpile	2	530	5	0.05	0.03
CPK Stockpile & Recovery Circuit Rejects – Area 1 (south side of PKCA)	4.0	539	23	0.77	0.48
CPK Stockpile – Area 2 (upstream of E and SE dams)	0.9	523	8	0.03	0.02
CPK Stockpile – Area 3 (west of camp facilities)	4.0	539	19	0.50	0.31

Table 8 General Dimensions and Storage Capacities of the Stockpiles

Site	Area (ha)	Approx. Crest Elev. (m)	Max Height (m)	Capacity (Mt)	Capacity (Mm^3)
CPK Stockpile – Area 4 (south of East Sump)	8.4	539	24	1.81	1.13
Total Available Capacity (excluding live storage at the ore stockpile)				3.10	1.94

Notes:

1. The capacity stated for the kimberlite ore stockpile is based on several blending piles and incorporates less than one month of plant feed at full capacity
2. The recovery circuit rejects stockpile will be developed in stages within Area 1, according to the actual rate of production.

10.3.2 Kimberlite Ore Stockpile

The kimberlite ore stockpile will be a relatively small, "live" stockpile. The stockpile area will be sloped so that any drainage from the area will flow to the East Sump or be collected for transfer to the PKCA or recycle to the process plant. Details of water management can be found in the Jericho Site Water Management Plan (EBA 2011i).

10.3.3 Coarse Processed Kimberlite Stockpiles

Typical sections through the CPK stockpiles are provided in Figure 7. The overall slopes at these stockpiles will be about 2.6H:1V (21 degrees), though they will be made up of benches. The slope angles between benches are expected to about 1.4H:1V (35 degrees).

The thickness of each lift in the stockpile is expected to be approximately 5 m, but depending on the projected height of the structure and the number of benches, the lift thickness may be modified in order to develop relatively uniform bench heights.

The overall CPK stockpiles will have nominal excess capacity at the final elevations indicated in Table 8.

10.3.4 Recovery Circuit Rejects Stockpile

Recovery circuit rejects will be stockpiled at CPK Stockpile 1, within the PKCA drainage area. The development of the stockpile will be discussed in a future revision of the PKMP written specifically for mine operations. Following evaluation of diamond recovery and geochemical characterization of the solids, deposition of the recovery circuit rejects may shift from Area 1 to a CPK stockpile closer to the processing plant (if testing indicates there are no ARD/ML concerns).

10.4 Stability Analysis

10.4.1 General

The overall stability of the CPK stockpiles was considered by SRK based on the generally favourable foundation conditions, moderate slope angles, and low seismic risk. Stability analyses were undertaken for the CPK stockpile structure immediately east of the plant facilities (CPK Stockpile 4). This stockpile will have a final height of about 24 m.

10.4.2 Stability Criteria

A typical example of minimum factors of safety for waste rock dumps is provided in Table 9, the source of which is the guidelines published by the BC Mine Waste Rock Pile Research Committee in 1991.

Historically, the earthquake with a 475-year return period was usually selected for use in stability analyses associated with operations. However, changes proposed to the National Building Code of Canada in 2005 recommended the 475-year earthquake be replaced by the earthquake with a 2,475-year return period. As such, both earthquake events were considered in the design stability analyses.

It is common to select a larger but less frequent earthquake for purposes of closure. The selection is usually based on the consequences of failure. Given the size, design, failure mechanisms and setting of the proposed waste dumps at Jericho, the consequence category is likely to be low. Assuming this to be the case, the maximum design earthquake for closure is assumed to be the same as the maximum design earthquake for operations.

Table 9 Guidelines for Minimum Design Factor of Safety – Waste Rock Dumps

Stability Condition	Case A – more severe	Case B – less severe
Stability of Dump Surface		
Short term (active)	1.0	1.0
Long term (closure)	1.2	1.1
Overall stability (deep-seated)		
Short term (active)	1.3 - 1.5	1.1 - 1.3
Long term (closure)	1.5	1.3
Pseudo-static	1.1 - 1.3	1.0
Case A: Low level of confidence in critical analysis parameters Possibly liberal interpretation of conditions, assumptions Severe consequences of failure Simplified stability analysis method (charts, method of slices) Stability analysis method poorly simulates physical conditions Poor understanding of potential failure mechanism(s)		
Case B: High level of confidence in critical analysis parameters Conservative interpretation of conditions, assumptions Minimal consequences of failure Rigorous stability analysis method Stability analysis method simulates physical conditions well High level of confidence in critical failure mechanism(s)		

10.4.3 Failure Modes

Given the granular nature of the CPK, the potential failure surfaces are likely to be relatively shallow and sub-parallel to the slope face.

10.4.4 Method of Analysis

The slope stability analyses were performed by SRK using two-dimensional limit equilibrium analyses and the computer program SLOPE/W, which was developed by GEO-SLOPE International. Factors of safety for the various stability cases were determined using the Bishop and infinite slope methods of analysis.

10.4.5 Geometry and Input Parameters

A maximum height of 24 m was used for the CPK stockpile. During operations, the stockpile was assumed to have an overall downstream slope of 2.6H:1V (21 degrees), with an inter-bench slope of 1.4H:1V (35 degrees). Other input parameters have been selected based on judgement and are believed to be at or below typical mean values for the respective material (Table 10).

Table 10 Input Parameters used in the Stability Analyses

Parameter	Moist Unit Weight (kN/m^3)	Effective Strength Parameters		Water Table	Earthquake for Pseudo-Static Assessment
		c (kPa)	phi (degrees)		
Kimberlite	20	0 to 10	30	Elevated in pile	0.013 and 0.06
Till	22	5	32	In stockpile	
Bedrock	Failure surface prevented from intersecting the bedrock				

Two water tables were used for the analysis. The first was a “low” water table that was about 15% of the slope height. This is believed to be a conservative estimate of the water table during operations, assuming no weathering of the CPK occurs. The second was a “high” water table, reflecting the potential for weathering and the development of fines, which leads to an elevated water table. This scenario could also apply under transient conditions due to an extended period of exceptional precipitation. The “high” water table was assumed to be about 40% of the slope height. Information gathered during operations will provide insights as to how much weathering, if any, of the CPK is likely to occur.

The earthquakes with 475 and 2,475-year return periods coincide with peak ground accelerations of 0.013 g and 0.06 g, respectively.

10.4.6 Results of Analysis

The results of the stability analyses for kimberlite are summarized in Table 11.

The minimum allowable factors of safety have been based on Case B in Table 9 because:

- Conservative assumptions have been used in the analyses

- The consequences of failure are minimal as they do not involve loss of life or large scale environmental impacts
- The potential failure modes are relatively simple and are well suited to the analytical methods that have been used.

The factor of safety at the face of the stockpile is based on a simple infinite slope analysis. Since the material is end-dumped, the stockpile slope will conform to the angle of repose which in the absence of a water table, means that the dump face has a factor of safety of about 1.

Table 11 Summary of Critical Factors of Safety for Kimberlite Stockpile

Stability Condition	Suggested Minimum Factor of Safety	Calculated Factor of Safety	Comments
Stockpile Surface Short Term	1.0	1.0	Bench face, at angle of repose
			During operations, c = 0 kPa
Deep Seated			Till foundation (low/high water table)
Short Term	1.3	1.5/1.4	Till foundation, acceleration = 0.013g
Pseudo-static	1.0	1.5/1.3	(low/high water table) Till foundation, acceleration = 0.06g
Pseudo-static	1.0	1.5/1.3	(low/high water table) During operations, c = 10 kPa
Deep Seated			Till foundation (low/high water table)
Short Term	1.3	1.8/1.5	Till foundation, acceleration = 0.013g
Pseudo-static	1.0	1.8/1.5	(low/high water table) Till foundation, acceleration = 0.06g
Pseudo-static	1.0	1.5/1.5	(low/high water table)

10.4.7 Conclusions

Stability analyses were completed for the maximum slope at the CPK stockpile using what are believed to be conservative input parameters. In all cases, the calculated factors of safety meet or exceed the minimum allowable values.

The analyses should be reviewed as additional information is obtained throughout mine operations.

11.0 CONTROL MEASURES - CONSTRUCTION AND OPERATIONS

This section describes the measures that will be implemented to minimize environmental impacts associated with mining and the construction and operation of the dumps and stockpiles.

11.1 Mine Operations related to Ammonia Management

Controls will be put in place to reduce the loss of nitrogen to the kimberlite during future mining operations. The use of explosives in all aspects of the mining operation will be closely managed. Wet blast holes have been identified as one of the primary causes of explosives loss to waste rock due to the soluble nature of the bulk ANFO. Although the potential for wet holes at Jericho is considered to be low due to the land-based nature of this pit and the presence of permafrost throughout the pit, contingency measures will be available so that any wet holes are charged using appropriate methods for minimizing nitrogen losses.

11.2 Use of Coarse Processed Kimberlite for Construction

Item 3, Schedule D of the Water Licence specifies the waste rock used for construction shall be non-acid generating and shall meet the physical specifications outlined in specific design reports for each of the major facilities on site.

Geochemical testing indicates that the CPK is non-acid generating, with a limited potential for metal leaching. Physical specifications for construction materials are specific to the designated use.

11.3 Construction and Operation of Waste Dumps

11.3.1 Coarse Processed Kimberlite Stockpiles

The CPK will be hauled to the stockpile locations using a front-end loader for short hauls and trucks for longer hauls. The dumps are expected to be developed over the life of the processing operation based on the following procedures:

- Over areas of till outside the PKCA, a layer of granite waste rock will be placed on the tundra to provide physical separation between organic soils and the stockpile material.
- To the extent practical, the granitic pad will be placed in the winter when the tundra is frozen, in order to develop a frozen foundation layer. Shear will then endeavor to place a sufficient thickness of CPK over the foundation.
- In addition, where this occurs, CPK placement will be managed to lock in the frozen conditions in the foundation layer.

CPK Stockpiles 2 and 4 were partially developed under the previous ownership.

11.3.2 Recovery Circuit Rejects Stockpile

Shear expects that RRPK will be stockpiled in Area 1, which drains naturally into the PKCA. Ongoing monitoring and testing of the leachate will determine if there any long-term ARD and water quality issue associated with this material. Assuming this information confirms that no such issue exists with the RRPK, they may be blended with CPK and stockpiled in areas close to the processing plant.

12.0 CLOSURE AND RECLAMATION

Reclamation details for the CPK stockpiles are presented in the Jericho ICRP (EBA 2011e).

13.0 VERIFICATION AND MONITORING PLANS

13.1 Solids Quantities

As specified in Part K, Item 13 of Water Licence NWB1JER0410, Shear will record the monthly quantities of ore processed and the monthly quantities and storage locations of kimberlite ore, CPK, and recovery circuit rejects once mining operations resume.

13.2 Solids Geochemistry

Geochemical monitoring will be carried out to confirm the geochemical properties of the CPK and kimberlite during mining and processing operations. Frequencies of testing will be established prior to resuming operations and will be included in the revised Jericho WRMP.

13.3 Monitoring of Seepage

An annual seepage survey is performed on all waste rock dumps and ore stockpiles. A discussion of the survey can be found in Section 6.0 of the Jericho GMP (EBA 2011d). The results of the seepage survey will be included in the Jericho Annual Report.

13.4 Visual Inspections

During the active development of each CPK stockpile, site staff will carry out documented Operational Geotechnical Inspections in relation to the performance and condition of each structure, including slope stability, seepage and conformity to the development footprint. A discussion of Operational Geotechnical Inspections can be found in Section 4.0 of the Jericho GMP (EBA 2011d).

Site wide inspections by a qualified Geotechnical Engineer are completed annually. These Formal Geotechnical Inspections will include a review of all waste rock dumps and ore stockpiles. A discussion of Operational Geotechnical Inspections can be found in Section 4.0 of the Jericho GMP (EBA 2011d). A copy of the Formal Geotechnical Inspection will be sent to the NWB for review.

13.5 Thermal Monitoring

Thermal monitoring is not critical to the performance of the stockpiles. However, to provide information that will be useful for closure planning and post-closure monitoring, GTCs will be installed in at least one of the CPK stockpiles. As Shear does not presently have detailed information on the performance of the existing CPK stockpiles on site, further information on the thermal monitoring of the CPK stockpiles will be including in a revised WRMP document. A copy of the revised Jericho WRMP will be submitted to the NWB for review and approval at least 60 prior to commencing mining operations.

14.0 CLOSURE

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2011 WATER LICENCE RENEWAL DOCUMENTS

Management Plans

EBA, A Tetra Tech Company (EBA), 2011a. Aquatic Effects Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011b. Care and Maintenance Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011c. Contingency Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011d. General Monitoring Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011e. Interim Closure and Reclamation Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011f. Landfarm Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011g. Landfill Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011h. Processed Kimberlite Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011i. Site Water Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011j. Waste Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011k. Waste Rock Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011l. Wastewater Treatment Management Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

Design Reports

EBA, A Tetra Tech Company (EBA), 2011m. C1 Diversion Construction Summary, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011n. Fuel Storage Containment Facility Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011o. Preliminary Landfarm Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011p. Preliminary Landfill Design Plan, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

Additional Plans

EBA, A Tetra Tech Company (EBA), 2011q. Operations, Surveillance, and Maintenance Manual, PCKA Dams, Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

EBA, A Tetra Tech Company (EBA), 2011r. Emergency Preparedness and Emergency Response Plan for Dam Emergencies at the Jericho Diamond Mine, Nunavut. Prepared for Shear Diamonds Ltd., February 2011.

REFERENCES

SRK Consulting (Canada) Inc. (SRK), 2005a. Waste Rock Management Plan (Part 1, Waste Rock and Overburden) Prepared for Tahera Diamond Corporation, May 2005.

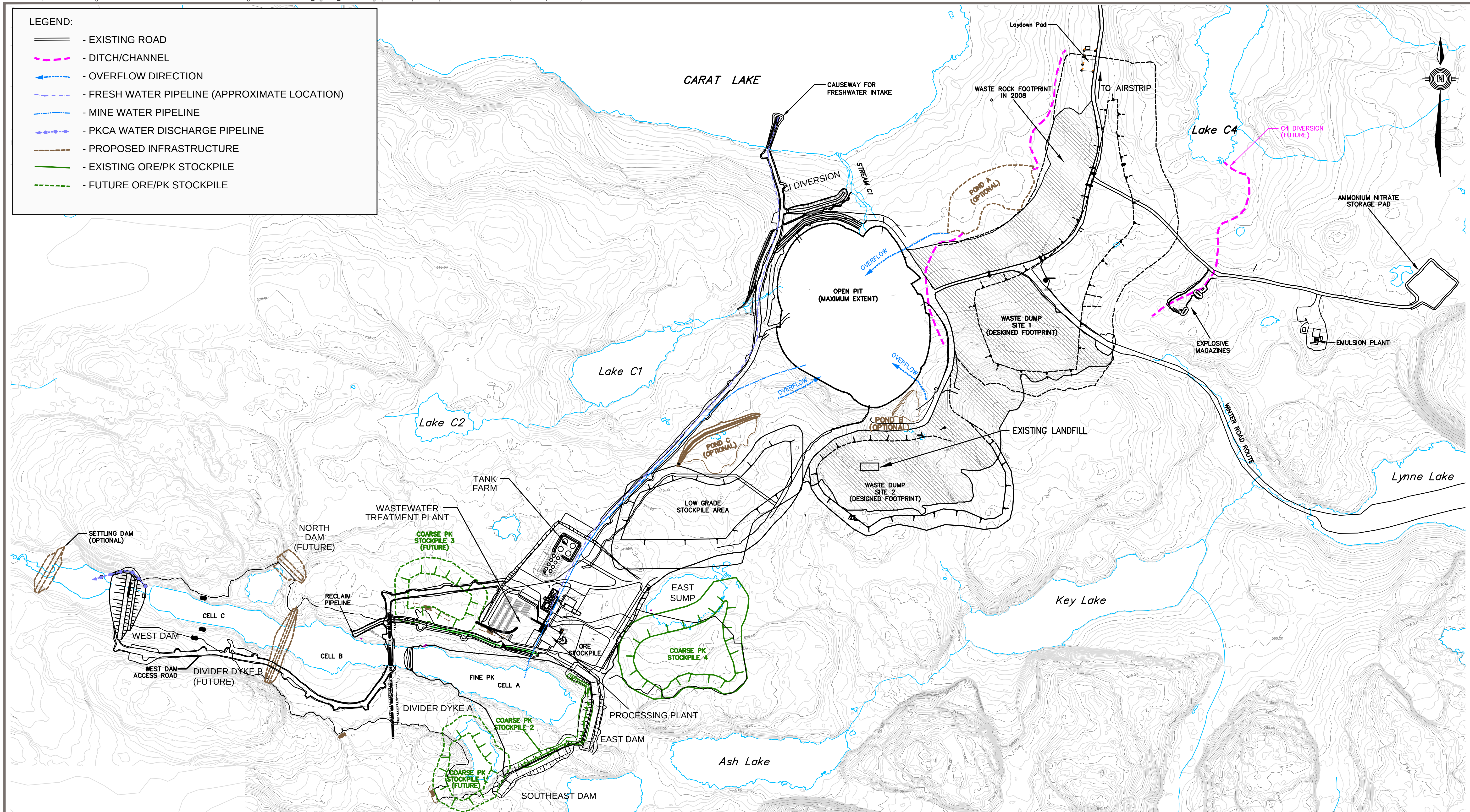
SRK Consulting (Canada) Inc. (SRK), 2005b. Waste Rock Management Plan (Part 2, Kimberlite Ore, Coarse Processed Kimberlite and Recovery Circuit Rejects) Prepared for Tahera Diamond Corporation, January 2006.

Tahera Diamond Corporation (TDC), 2003. Jericho Diamond Project Final Environmental Impact Statement. Report submitted to Nunavut Impact Review Board, January 21, 2003.

Tahera Diamond Corporation, 2005, Explosives Management Plan, Jericho Diamond Mine Version 2.

FIGURES

\\eba.local\corp\Edmonton\Drafting\CIVIL3D\E141\E14101118\Civil 3D\C1 Diversion Design Plan\acad\FORMER_Figure 1_C1 DDP.dwg [FIGURE 1] February 28, 2011 - 11:21:28 am (BY: MARSH, MAUREEN)



NOTES:

1. LAYOUTS ARE APPROXIMATE, AND MAY NOT REFLECT ACTUAL SIZE AND LOCATIONS
2. FOOTPRINTS OF WASTE ROCK PILES, COARSE PK STOCKPILES, AND ORE STOCKPILES ARE SHOWN IN MAXIMUM LIMITS, ACTUAL FOOTPRINTS MAY VARY

0 500

Scale: 1: 10 000 (metres)

STATUS
ISSUED FOR USE

CLIENT
SHEAR DIAMONDS LTD.

eba
A TETRA TECH COMPANY

C1 DIVERSION DESIGN PLAN
JERICHO DIAMOND MINE, NUNAVUT

SITE INFRASTRUCTURE PLAN

PROJECT NO.	DWN	CKD	REV
E14101118	DBD/TK	WL	0

OFFICE	DATE
EBA-EDM	February 28, 2011

Figure 1