Demerara Quarry Inc.

Project Summary

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EXECUTIVE SUMMARY

The Demerara Quarry Inc. project is located approximately 3 miles from Bartica and 56 miles from Georgetown. The intention is to develop this quarry using modernized techniques while adhering to all mining, environmental and other laws and regulations developed by the government of the Cooperative Republic of Guyana.

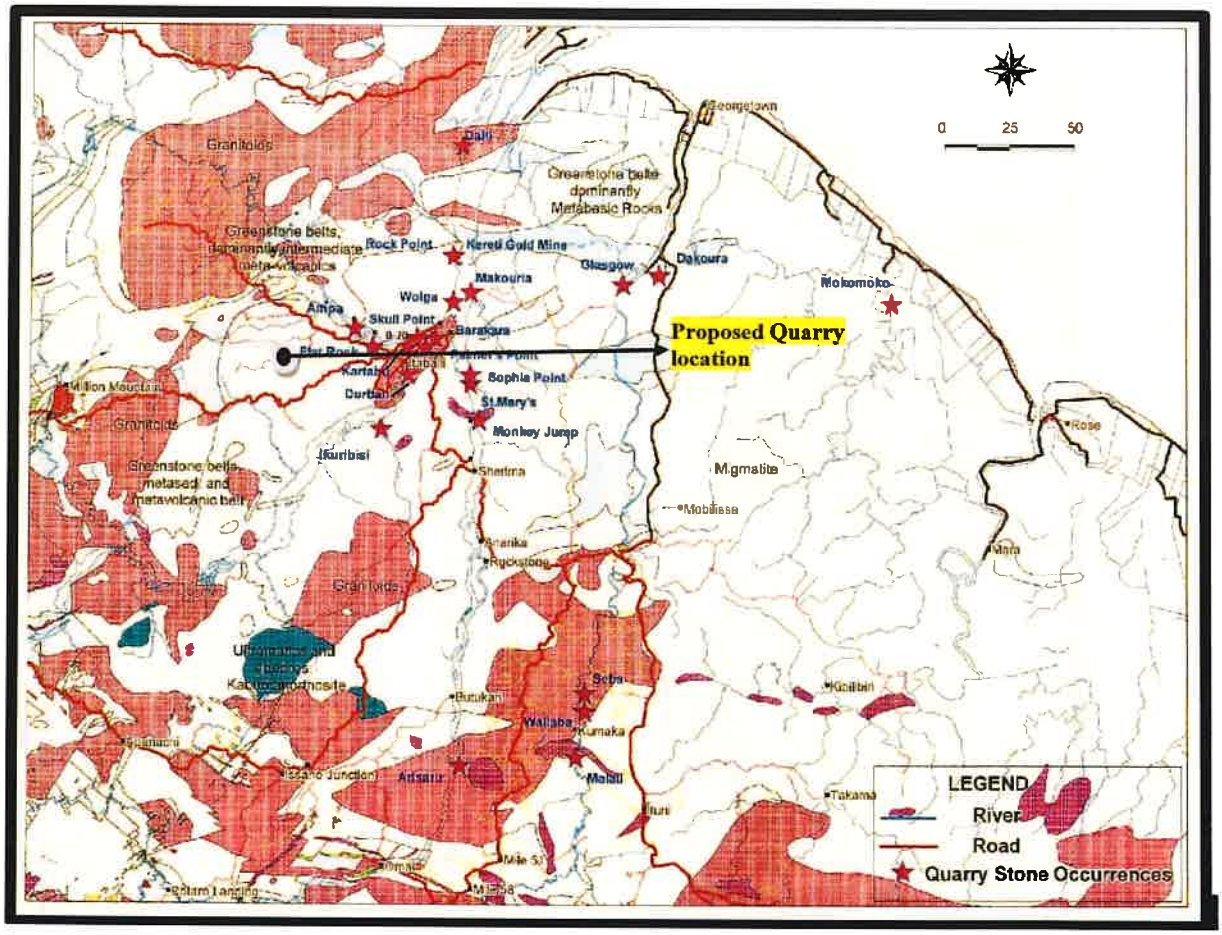
A rough estimate proves over 4,742,000 tons (above water) visible from the river, but much more is indicated in the adjoining ridge extending north-west direction of the quarry license block. It has the potential to supply our present market demand and after initial stripping and debushing a reserve calculation will be executed on the adjoining ridges.

The presence of joints trending from West to East is of significance; the "throw" of the rock from blasting must therefore be from North to South to preclude the excessive formation of boulders.

For the five (5) years operation plan, 2022-2026 it is estimated that 610,000 tons of rock will be extracted assuming that initial works and production starts by July 1, 2022. The annual production will be 122,000 tons of which 40,000 tons will be "Rip-Rap", 80,000 tons will be aggregate, and 2,000 tons crusher run.

The quarry will have a work force of 48 local employees, and two (2) expatriates. Development of the Amariwabe facilities for this quarrying complex will be completed by June of 2022. It is anticipated that all the necessary/additional authorization are received by April 2022

Light equipment and fuel are taken by road from Georgetown through Linden and Rockstone to the Suribanna crossing on the right bank of the Essequibo River, by pontoon to Sherima on the left bank of the Essequibo river, then by the Bartica-Potaro road to the property. Then by boat to Batavia\



Map Showing Accessibility to Proposed Quarry

2.0 DESCRIPTION OF BLOCK

Track of state land located in the Cuyuni Mining District No. 4 as shown on Terra Surveys Topographic Map 27 NE, at a scale 1:50,000 with reference point 'X' located at the confluence of the Cuyuni River and the Amariwabe River with geological coordinates of Longitude **58^0 45'23.587" W** and **Latitude 6^{0}23'3.97" N.**

Thence to a true bearing of 90.36^0 for 1 Mile 364.821 yards to the of commencement. **Point 'A'** located at geographically coordinates of longitude **58^{0}44'20.292"W** and latitude **6^{0}23'3.27"N,** thence along the Cuyuni River for approximately 1210 yards to **Point 'B'** with geographical coordinates of longitude **58^{0}43'48.122 W** and latitude **6^{0}23'18.38" N**, thence to a true bearing of 179.89^0, for a distance of approximately 1 mile 1246.17 yards to **Point 'C',** located at geographical coordinates of longitude **58^{0}43'47.946"W** and latitude 6^{0}21'49.385", thence to a true bearing of 236.34^0 for a distance of approximately 1 mile 174.035 yards to **Point 'D"**, located at geographical coordinates of longitude **58^{0}44'35.898"W** and latitude **6^{0}21'17.651"N**, thence at a true bearing of 0.44^0, for a distance of approximately 1 mile 503.6 yards to **Point 'E'** with geographically coordinates of longitude **58^{0}44'35.38"W** and latitude **6^{0}22'24.661"N**, thence to a true bearing of 91.11^0, for a distance of approximately 493.387 yards to a Point "F" located with geographical coordinates of longitude **58^{0}44'20.67"W** and latitude **6^{0}22'24.377"N**, then to a true bearing of 0.55^0, for a distance of approximately 1323.97 yards to the point of commencement Point 'A'.

Thus, enclosing an area of **920 acres** save and except lands lawfully occupied.

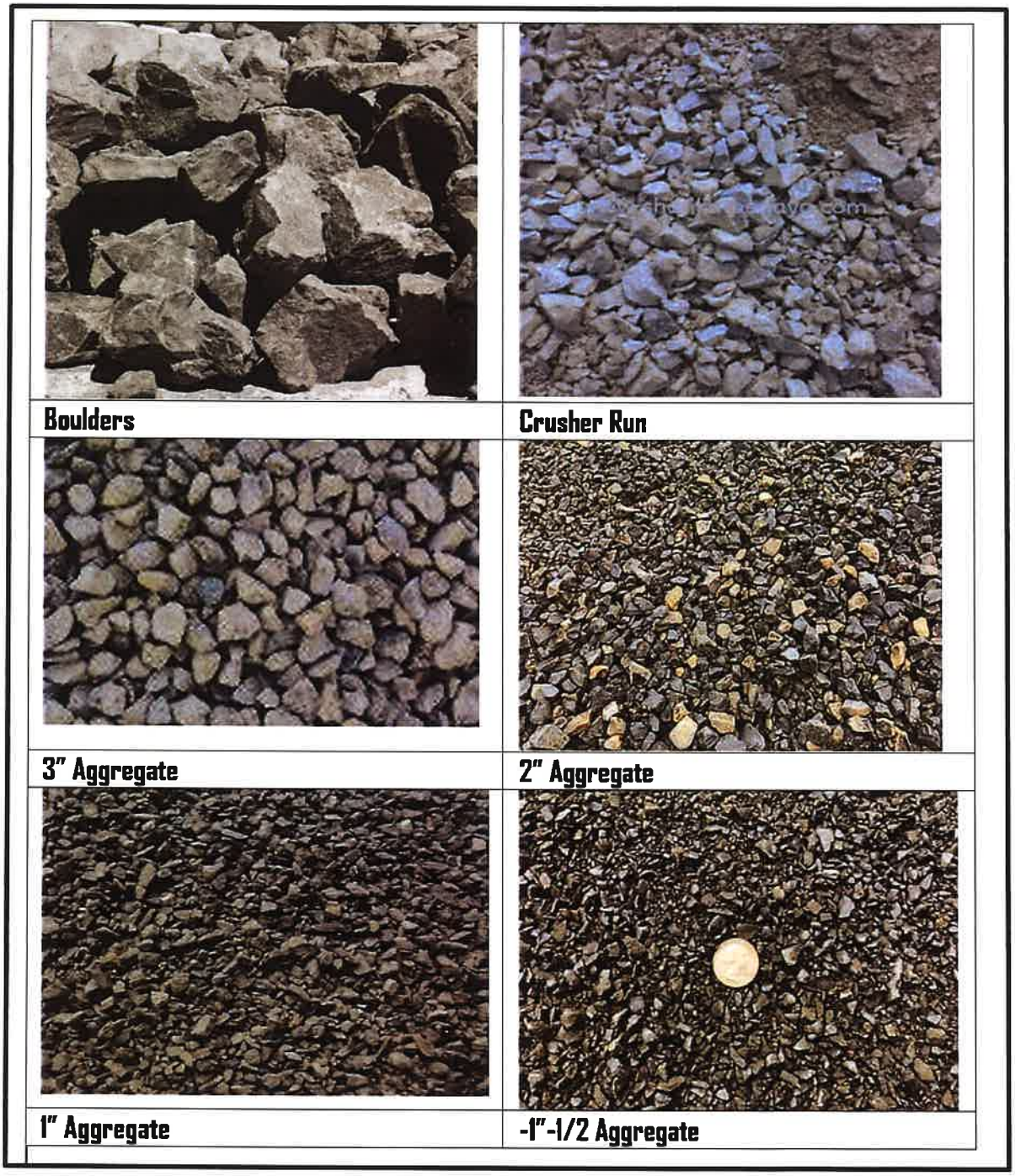
3.0 ORE GEOLOGY

The geology at has been described by H.Schielly as uniformly massive leucocratic muscovite granite which contains a few angular, black xenoliths of Biotite hornblende hornfels (less than 1%). R.T. Cannon (1964) in his very detailed study of "the Geology of the "BARTICA ASSEMBLAGE" has covered the deposit also in some detail. Cannon described the granite as a Muscovite-Biotite Granite. The map shows that the Geology of the Teperu/Itabu granite extends Westward across the Mazaruni river to Kartabu point. The Amariwabe and Kartabu Granite therefore can be classified into two distinct facies (Cannon1961a):

This classification is true from visual inspection of the granite and also that the grey granite is more fine grained and uniform in texture than the leucocratic granite which has larger crystals of quartz visible – this supports the theory that the granite is Igneous in origin with Leucocratic granite later than the grey granite which obviously crystallized closer to the surface.

Important, however, from a Mining Geology point of view is the presence of joints within the rock matrix. The drilling and blasting plan will give a direction of throw to preclude a sliding along the joint planes.

4.3 Quarry Products



6.0 GENERAL

The projected annual production from the quarry will be about 122,000 tonnes of material per year. Of this, around 80,000 will be high grade stone used in infrastructural projects such as roading and building, 40,000 tonnes boulders for sea defence and 2,000 tonnes crusher-run as a sub-base for concrete slabs, driveways, sidewalks and walkways.

6.1 Hours of Operations

- Operational hours are not restricted but must comply with noise emitted and the Noise Management Regulation 2002.
- Quarry products will be loaded and transported on Mondays, Wednesdays, and Fridays (but is subject to change to meet sales demands); and
- Quarry extraction and processing hours are set to meet operational demands and can be over 24/7 days per week subject to noise and dust restrictions

6.2 Resource Estimation

The competent evaluation and reporting of mineral resources is essential as background to investment decisions relating to the exploitation of those resources. To facilitate the application process, the Quarry Operator had requested a basic preliminary evaluation of the project to quantify the possible resources available.

6.3 Estimation of Recoverable Tonnage of Mineral

In simple terms, the tonnage of Mineral that can be recovered from a particular deposit may be estimate by applyig the following simple formula.

T = (V – W) * D

Where:

T = recoverable tonnage of mineral
V = recoverable volume of mineral
D = in situ density (the number of tonnes per cubic metre of mineral in the ground)
W = the volume of waste that will be excavated or result from primary processing

6.3.1 Volume

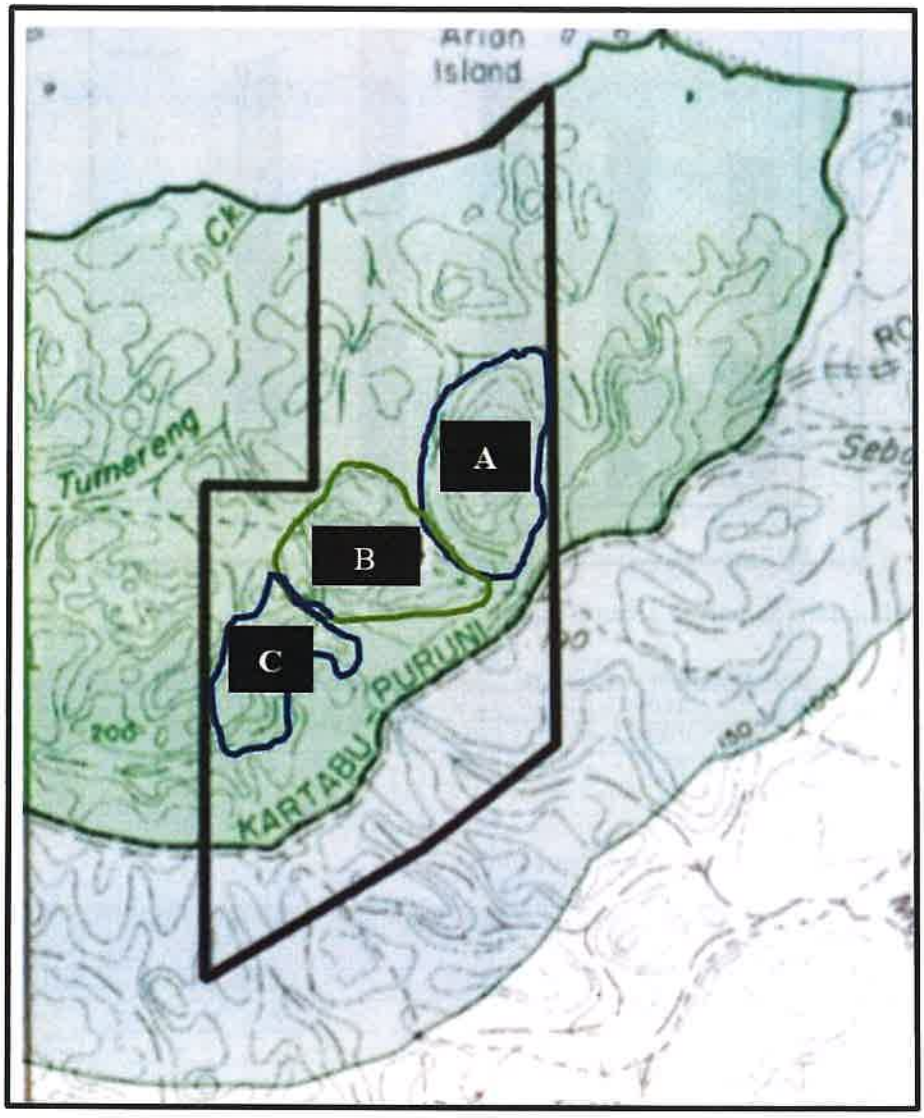
The simplest (and least accurate) which was used to determine the preliminary assessment involves the multiplication of the surface area by assumed depth (based on the adjoining quarry*)*.

- The most reliable method based on the definition, in three-dimensions of the three important surfaces.
- The ground surfaces
- The top of the rock/base of the soil or unconsolidated deposits at the surface
- The intended working geometry
- The top and base of mineral where these are not coincident with the top of rock/base of soil intended working geometry surfaces

The volume between these surfaces can then be calculated using methods of sections or by triangulation and a method of prism.

Terra Surveys Topographic Map 27NE, at scale 1: 50,000 was used in conjunction with information from the nearby exposed face of the previously worked Flat Rock Quarry to estimate the thickness.

6.4 ORE RESERVE ESTIMATION



Map 4 Proposed development

7.0 QUARRY OPERATION – EXTRACTION and PROCESSING

7.1 Equipment

Manufacturer	Type	Quantity	Capacity/specifications	Activities	
Caterpillar	Haul Trucks	2	40 T	Hauling	
Caterpillar	Front-end loader	2	980G	Loading	
Caterpillar	Bulldozer	1	D9	Debushing, stripping	
Caterpillar	Excavators	2	325 LN	Stripping/removing oversized rocks, loading	
Caterpillar	Jumbo drill	1	MD 5075	Drilling blast holes	

Caterpillar 740 Articulate Truck

Overburden Stripping

The quarry operator or his/her delegated representative will ensure that soil stripping within the quarry is a controlled activity and carried out in line with the quarry Development Plans and that best practices technically available.

7.2.1 Rock Excavation and Tip Areas

The quarry operator or his/her delegated representative will ensure that excavations and tip areas are designed, constructed, operated and maintained so as to ensure that –

(1) instability; or
(2) movement,

which is likely to give rise to a risk to the health and safety of any person, is avoided.

7.2.2 Extraction

Extraction of rock from the quarry is carried out by firstly drilling and blasting (where required) and then removal by excavators. Extracted rock is then delivered to the crushing plant(s) by loaders or dumpers depending on requirements of the crushing plant(s). It is the duty of the quarry operator or his/her

The degree of fragmentation produced during blasting is determined by two principal factors:

- Explosive energy creating new fracture surface in the rock mass; and
- Exploitation of existing planes of weakness such as joints, fractures etc.

Other factors relating to the choice and the quantity of explosives used, the arrangement of blast holes and the sequencing of detonation will also have an effect. Variations in these aspects can also be used to limit adverse environmental effects or to improve the profile of the blast pile

Ripping

Mechanical breakage is possible where the rock mass is already fractured extensively (usually by inherent planes of weakness in the rock). Ripping using a doozer fitted with a tooth at the rear, is the most common method.

In most quarries and deposits, ripping techniques may be used only on a limited basis if at all (e.g. in areas in poor ground) they can be effective in short duration excavations (e.g. for construction projects) of in preparation of the upper benches in a quarry (where the ground may already be fairly broken by weathering.
Where applicable, ripping has costs advantages over drilling and blasting and avoids many of environmental impacts associating with blasting.

Secondary Fragmentation

If the primary fragmentation is inefficient and mya not produce a well graded rock pile suitable for immediate loading and crushing. Geological conditions or a need to limit the amount of explosive used (in mitigating environmental impacts) may locally produce block sizes that are too great to be handled and, in such circumstances, it is often necessary to undertake secondary fragmentation.

Tis can be achieved using explosives, but such methods are normally unacceptable on safety grounds as blast can be uncontrolled and result in fly-rock being generated. It also produces environmental impacts (mainly noise). Mechanically methods are generally preferred.

- The use of drop ball
- The use of pneumatic/hydraulic impact breakers (rock pecker)

Drop balls are popular, effective and relatively cheap, but suffers from being slow and therefore inefficient where high production rates are required. Safety is often an hazard arising from flying rock pieces are often associated with this method.

Rock peckers have a number of advantages in secondary breaking applications. They are efficient machines and can be used to accurately reduce block sizes in the rock pile. In addition, they can also be used in other duties in the quarry, principally in scaling faces (to remove large hanging blocks that may pose safety hazards.

Explosives

When analysing the best explosive for use at a quarry operation, the decision comes down to the environment in which the explosive will be used and what is most cost-effective.

The main environmental consideration is whether the blastholes will be wet or dry. If the boreholes contain water, then the only available explosives are emulsion or a blend that is greater than 60 percent emulsion. In this case, the major decision will be based on the loading capabilities at the site and the cost of blends versus emulsions.

7.2.3 Appraisal of Excavations

The quarry operator or his/her delegated representative will ensure that a suitable and sufficient appraisal of all proposed or existing excavations at the quarry is undertaken by a competent person to determine whether any such excavation is a significant hazard.

(1) The quarry operator or his/her delegated representative will ensure that –

(a) any significant findings made during an appraisal, any conclusions reached and the reasons for those conclusions are recorded by the competent person undertaking the appraisal;

(b) the competent person signs and dates any such record; and

(c) the record made in accordance with sub-paragraph (a) is made available to each employer of persons at work at the quarry and to all persons at work at the quarry.

(2) Where the conclusion reached by the competent person following an appraisal is that the excavation presents no significant hazard then further such appraisals shall be carried out by a competent person –

(a) at appropriate intervals;

(b) whenever there is any reason to suspect that there has been or will be a significant change to-

(i) the matters to which the appraisal relates, or

(ii) any neighbouring land which may be affected by movement by or instability of the excavation to which the appraisal relates; and

(c) whenever there is any reason to doubt the validity of the conclusion of the current appraisal.

3) Where the conclusion reached by the competent person following an appraisal is that the excavation represents a significant hazard, the quarry operator or his/her delegated representative will close the excavations down as soon as is reasonably practicable pending an assessment of the site and or a geotechnical assessment. The quarry operator or his/her delegated representative will ensure that –

(a) any significant findings made during an assessment or geotechnical assessment are recorded; and

(b) any remedial works identified during the assessment are undertaken by the date specified.

7.2.4 Duties in Relation to a Significant Hazard – Excavations

Where the conclusion recorded following an assessment of a proposed or existing excavation is that the excavation represents a significant hazard by way of instability or movement, the quarry operator or his/her delegated representative will ensure, that a geotechnical assessment of the excavation is carried out as soon as is reasonably practicable.

7.3 Rock Processing (Crushing, Screening and Washing)

The Table below shows the equipment required to process quarry material.

No.	Name	Type	Qty	Unit	Capacity (kw)
1	Feeder	GZT1148	1	No.	2x5.5
2	Jaw crusher	PE750x1060	1	No.	110
3	Cone crusher	SMH250	1	No.	200
5	Small feeder	GZG125-4	1	No.	2x1.1
6	Heavy vibrate sieve	2YKRH1860	1	No.	18.5
7	Vibrate sieve	3YK2160	1	No.	30
8	Belt conveyor		12	No.	
9	Integrated circuit control system		1	set	
10	Non-standard part and leg of belt conveyor		1	set	

7.4 Cleanfilling

7.4.1 Cleaning Sites

Cleanfilling is part of the process of rehabilitating a quarry site through progressive backfilling, using only safe material which can be engineered to fit best practice standards. This ensures the land will be available for other uses in the future and align with any agreed environmental commitment. The quarry operator or his/her delegated representative will ensure that a suitable and sufficient appraisal of all proposed cleanfilling sites at the quarry is undertaken by a competent person to determine whether any such cleanfilling site is a significant hazard.

(1) The quarry operator or his/her delegated representative will ensure that –

(a) any significant findings made during an appraisal, any conclusions and the reasons for those conclusions are recorded by the competent person undertaking the appraisal.

(b) the competent person signs and dates any such record; and

(c) the record made in accordance with sub-paragraph (a) is made available to each employer of persons at work at the Quarry and to all persons at work at the Quarry.

(2) Where the conclusion reached by the competent person following an appraisal is that the cleanfill site presents no significant hazard, then further such appraisals shall be carried out by a competent person;

(a) at appropriate intervals

7.4.2 Potential Effects of Cleanfilling Activities

The main effect of any cleanfill which is not immediately used or restored is to:

- occupy space within or outside the working area,
- be visible,
- be a source of dust,
- be a source of sediment and other contamination in run-off,
- affect the surface water regime, e.g. by changing surface water flow in a flood plain.

The implications of carrying out cleanfilling activities can be minimised by Good Practice.

7.5 Quarry Operations – Safety

7.5.1 Inspections

The quarry operator or his/her delegated representative will prepare and keep an up-to-date written log of complaints, inspection, maintenance and, where appropriate, testing of –

(1) all complaints (environmental, operational, and other),

(2) all buildings (whether temporary or permanent) at the quarry,

(3) any plant at the quarry; and

(4) the carrying out of quarry operations.

7.5.2 Benches and Haul Roads

The quarry operator or his/her delegated representative will ensure that –

(1) Benches and haul roads are investigated, designed, constructed and monitored by a competent person so as to allow vehicles and plant to be used and moved upon them safely –

(a) a written report by a competent person that includes the statement that the intended height is safe and water discharge and collection is managed.

(b) each working bench would have separate loading arrangements and of sufficient length and breadth to provide safe working conditions for the vehicles and equipment used on it as determined by a competent person.

(1) to train the persons who work at the quarry in the appropriate actions to be taken in an emergency including, where appropriate, the correct use, handling, or operation of emergency equipment; and
(2) to train and check the skills of such persons to whom specific duties involving the use, handling or operation of such equipment have been assigned in the event of an emergency.

7.5.8 Fire and Explosive Hazards

The quarry operator or his/her delegated representative will ensure that –

(1) No person at work at the quarry uses a naked flame or carries out any work which could give rise to a risk of an unintended explosion or fire unless sufficient measures to prevent such an explosion or fire are taken.

(2) No person shall smoke in any part of the quarry where there is a risk of fire or explosion.

7.5.9 Control of Harmful and Explosive Atmosphere

(1) It is the duty of the quarry operator, or his/her delegated representative will ensure that –

(a) steps are taken to determine whether potentially explosive substances are present in the atmosphere and, where such substances are present,

(b) at any place in the quarry where there is a risk of the occurrence or accumulation of an explosive atmosphere, all necessary measures are taken with a view to –

(i) preventing such occurrence and accumulation, or, where this is not practicable,

(ii) preventing the ignition of such an atmosphere; and

(c) at any place in the quarry where there is a risk of the occurrence or accumulation of a substance harmful to health in the atmosphere, appropriate measures are taken in order to –

(i) prevent such occurrence and accumulation, or, where this is not practicable,

(ii) extract or disperse that harmful substance, in such a way that persons are not placed at risk.

(2) Whenever persons at work are present at any place in the quarry where they may be exposed to a substance harmful to health in the atmosphere –

(a) appropriate and sufficient breathing and resuscitation equipment shall be made available; and

(b) enough persons trained in the use of such equipment shall be present.

(3) The quarry operator or his/her delegated representative will ensure that equipment referred to a paragraph (2) (a) is suitably stored and maintained.

7.5.10 Danger Areas

The quarry operator or his/her delegated representative will ensure that –

(1) any danger areas in the quarry are clearly marked;

(2) equipment or barriers designed to prevent inadvertent entry by any unauthorised person are installed at any danger area in the quarry in which, because of the nature of the work being carried out there or for any other reason there is –

(a) risk of a person falling a distance likely to cause personal injury,

(b) risk of a person being struck by a falling object likely to cause personal injury, or

(c) a significant risk to the health and safety of persons; and

(d) where any person at work is authorised to enter a danger area, appropriate measures are taken to protect his/her Health and Safety

7.6 Quarry Operations – Explosives, Drilling and Blasting

This section will apply to the storage, transport, and use of explosives at the quarry.

7.6.1 Quarry Operator or His/her Delegated Representative - Duties

(1) The quarry operator or his/her delegated representative will ensure that –

(3) a suitable record is kept of the misfires.

7.6.4 Transport of Explosives

(1) No person (other than a person engaged in the transport of explosives to or from the quarry, a shot-firer, trainee shot-firer, a person authorised to handle explosives at a quarry, or a person appointed to oversee the explosives store) will handle explosives at the quarry.
(2) No person will bring any substance or article (other than explosives) likely to cause an unintended explosion or fire within 10 metres of any explosives or (except for the purpose of lighting igniter cord or safety fuse) take any naked flame within 10 metres of any explosives.
(3) No person will forcibly remove any detonator lead, safety fuse or other system for initiating shots from a shot-hole after the shot-hole has been charged and primed.
(4) No person shall charge or fire a shot –

(a) unless there is sufficient visibility to ensure that work preparatory to shot-firing, the shot-firing operation and any site inspection after the shot is fired can be carried out safely;
(b) in a shot-hole which has previously been fired, unless he is dealing with a misfire in accordance with action take; or
(c) in any tunnel or other excavation (not being merely a shot-hole) in the face or side of the quarry for the purpose of extracting minerals or products of minerals.

(5) No person shall fire a shot –

(a) unless he/she is a shot-firer or trainee shot-firer; and
(b) other than by means of a suitable exploder or suitable safety fuse.

(6) No person will cap a safety fuse with a detonator unless he is using equipment designed for the purpose and he is in a suitably sheltered place designated by the operator for the purpose,

7.6.5 Blast Timing

Blasting of quarry workings/faces for extraction of rock for production will be carried out in accordance with the established rules between 10.00am and 2.00pm, Monday to Friday only using approved industry practices.

1. In all cases applicable property owners shall be notified by mail one week in advance or through an agreed system between the Quarry Operator and the property owners.
2. Immediately preceding all blasts and following the all clear being given by the "shot-firer" the shot fire shall activate an all-clear siren. The siren sound shall distinguish it from normal Police, Ambulance or Fire Service sirens.
3. Immediately preceding all blasts and following the all clear being given by the " shot-firer " the shotfirer shall activate an all-clear siren.

7.6.6 Blast Design

In general, the blast design is determined by the geology of the material at the quarry to be broken and the fragmentation required. The degree of fragmentation required is related to the type and size of both the loading equipment and primary crusher(s). A written design will be prepared for each blasting operation to ensure, so far as is reasonably practicable, that when blasting occurs it will not give rise to danger to persons or property.

7.6.7 Blast Impact on Environment

- To reduce the effects of blasting (noise, flyrock, vibration) on the environment blast impacts will be controlled by good design and operations.
- To reduce the effects of blasting operations the following planning conditions relating to blasting in most cases will reduce the effects.
- These conditions include:
  - ✓ no blasting outside the permitted blasting hours (see 8.6.5 above)

the visible extent of the working area and screen truck movement from viewpoints below – namely SH1 and industry in the gorge. The bunds will be formed by leaving the outer edge of the road and working platform in place as a 'rim' and will be gradually lowered as the level of quarrying descends. Forming them in this way not only reduces the risk of rock fall from road and platform construction but also minimises the amount of ground disturbance on the slope below the working area.

8.2.4 Screen Planting – Northern Quarry Area

Screen planting will be commencing during Stage 1 of development of the northern face. By the time the quarrying operations reaches end of stage 4, the plants would have grown tall enough to block views of the quarrying operations. The planting will consist of fast-growing eco-sourced trees, common to the area. The screen planting proposal will be included in the revised northern quarry area staging plan design.

8.2.5 Buildings and Plant – Northern & Southern Quarry Area

The southern site of the quarry will include the processing plant, office, and temporary stockpiling, residence and recreational facilities area will be constructed. No permanent buildings or fixed machinery will be located at the northern part of the quarry.

8.2.6 Access Road Northern Quarry Area

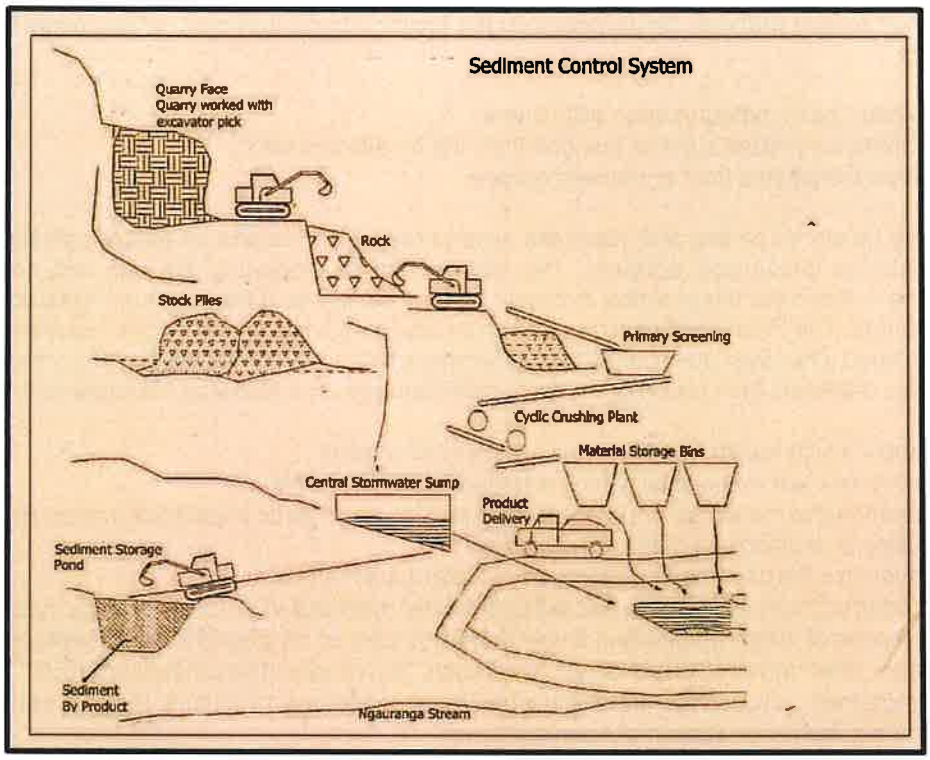
An access road will be constructed around the lower part of the southern spur to enable machinery to reach the northern face (which will be quarried first) and transport the rock material back to the quarry facilities for classification and stockpiling. This road will eventually be removed as the quarrying excavates below its level.

8.2.7 Stockpiles

Stock piling of quarry material will be provided for in the southern part of the quarry as part of daily operations. Quarry material will be stockpiled only for short periods.

8.2.8 Location of Crushing Plant and Stockpiles

The processing plant will be developed in the southern part of the quarry. However, the plant shall be relocatable. Temporary stockpiles (pre-processing) may be used within the southern part of the quarry.



9.2 Waste Management Activities

9.2.1 Solid Waste

Materials that may not be hazardous waste but are not appropriate for disposal on site will be shipped off site for recycling and/or disposal. Materials such as used oil and scrap metal will be shipped to recyclers that can be audited by regulatory agencies. Other materials, such as grease that may not have available markets for recycling, may need to be disposed onsite rather than recycled.

An area will be identified to establish a facility to dispose solid waste. The facility is planned to cover approximately 500 m^2 and will be managed using pitting and cover techniques. The facility will be managed for on-site, non-hazardous wastes, and will not accept any off-site wastes from other operators in the area. The primary disposal activities on site will include but may not be limited to the following:

- Demolition and construction debris
- Non-putrescible materials
- Waste from maintenance and operations meeting the definition of inert or non-hazardous such as respirator filters, gloves, boxes, non-recyclable packaging material, air filters, hoses, and piping

9.2.2 Hazardous Waste

Materials classified as hazardous waste will be treated onsite by some destruction mechanism before disposal. Materials such as contaminated grease, unused chemicals, paint related materials, and reagent that may be classified as hazardous waste will be treated. The Quarry Project plans to dispose of these materials using the most permanent and practicable disposal method available.

prices become so high there are not enough recyclers), scrap metal will be stockpiled near the solid waste facility for bulk recycling.

9.3.2 Grease

Grease associated with the hoisting, milling, and other operational equipment will be placed into drums or other bulk containers suitable for recycling. If the grease is not suitable for recycling, the contained waste will be sealed in drums and disposed at a suitable site for to be prepared. While on site, the containers will be managed in an area that will provide secondary containment.

9.3.3 Used Oil

Used oil from maintenance activities will be managed in bulk containers with secondary containment to ensure there is no release to the environment. Only oil acceptable for recycling will be placed in the bulk containers. Used oil not acceptable for recycling will be placed in drums for proper disposal.

9.3.4 Batteries

Lead acid batteries will be shipped off site to a recycler. While they are stored on site, they will be managed in an area protected from storm water and will have secondary containment. Nickel-Cadmium (NiCd) batteries will be stored for recycling by a local vendor. While on site, they will be managed in drums or boxes suitable for storage. Lithium batteries will also be stored for recycling in appropriate containers.

9.3.5 Tires

The Project plans to bury mining waste tires in an onsite cell. Once placed in the cell, the tires will be covered with a minimum of 0.5 m of material within 50 days of placement. Once the cell is full, at least 1 m of final cover will be placed over the cell within 180 days. The quarry management will also be investigating the potential for reuse of these tires and will seek contracts for beneficial uses of mining tires. As appropriate, tires may also be used for erosion control or structural fill. If alternatives to burial exist, the Project will review them and manage the tires accordingly

10.4 Water and Chemical Supply Systems

Fresh water for the quarry will be supplied from a well-established on the property.

Water from the wells will report to the freshwater tank. Water will be pumped from the freshwater tank by vertical turbine pumps. It will travel through a common pipeline and a system of water booster tanks and horizontal centrifugal pump systems, installed in series, to the plant area fresh/fire water tank.

Fresh water and fire water will be supplied from the fresh/fire water tank to the facility by gravity. The fire water distribution system is located in the plant site area and the foam fire system in the solvent extraction area.

10.5 Emergency Lighting and Exit Signs

Adequate and reliable illumination will be installed and maintained for all exits. Battery powered back up must provide a minimum of 60 minutes of illumination and will be standard for all emergency lighting and exit signs. Maintenance inspections will be conducted on a monthly basis. Emergency and exit lighting systems will be tested annually.

10.6 Fire and Smoke Alarms

Fire and smoke alarms will be installed in all employee work areas including the camps and kitchen. Systems and components will receive inspection monthly. Annual testing and maintenance will be conducted for systems and components. Records of inspections will be kept on site for the duration of the project.

10.6.1 Fire Extinguishers

The Project will conduct an analysis of the type, size, placement, and minimum number of extinguishers required for each building. Fire extinguishers will be installed in accordance with the local fire standard.

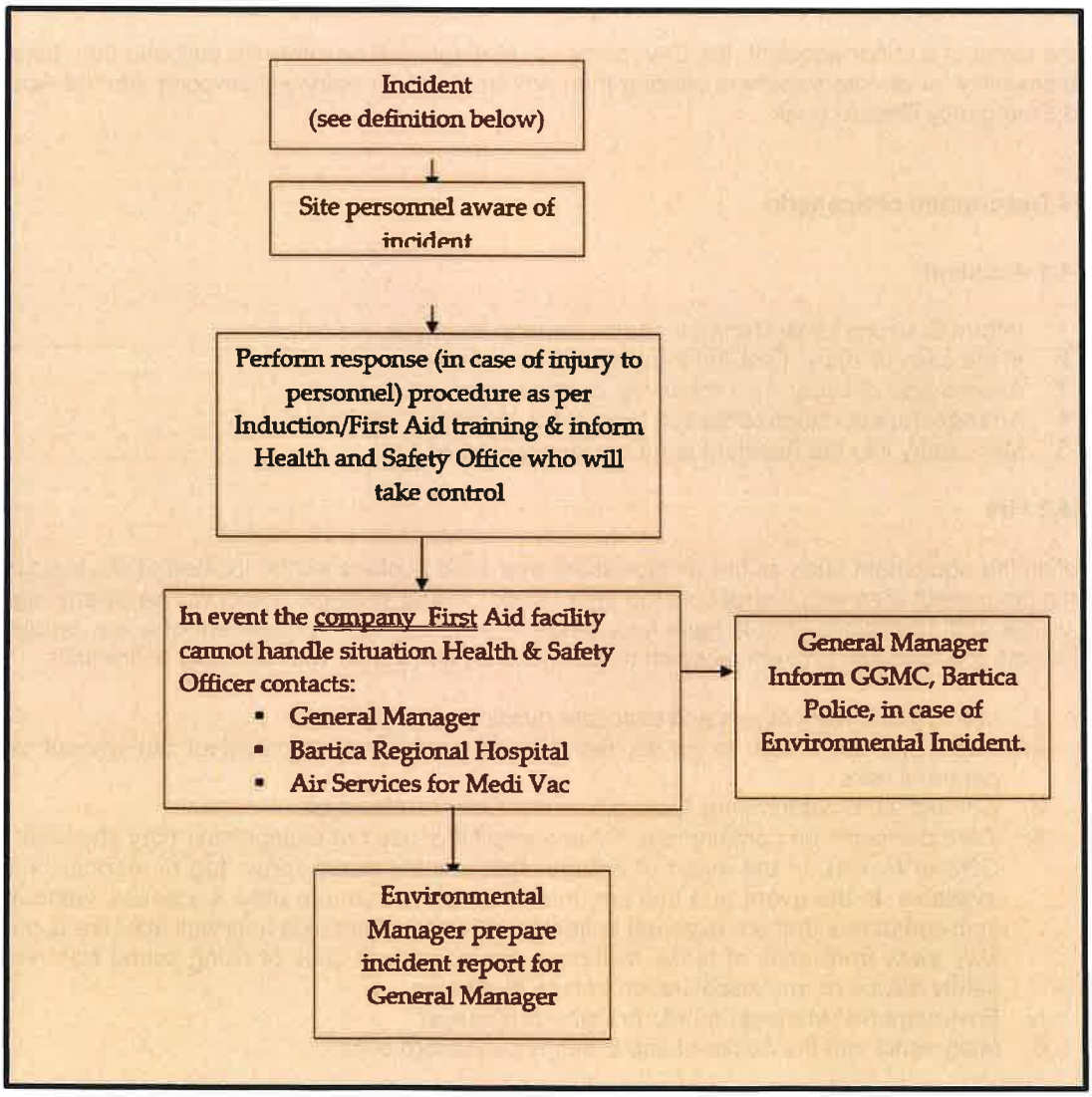
10.6.2 Standpipe Fire Hose Stations

In addition to portable fire extinguishers, standpipe fire hose stations will be provided for defend-in-place fire protection. This equipment is designed to protect individuals from initial developing fires and will be installed at mine plant site areas where fire response time exceeds five minutes.

11.2.1 Emergency Contact Details

(Georgetown Office)	592
Bartica Police Station	4552222
Bartica Hospital	4552339
GPF, Commander Bartica	4552241
GGMC	225 2862

11.2.2 Emergency Procedures



1. Inform Environmental Manager and/or General Manager.
2. In the case of injury, First Aid treatment to be applied.
3. Assess type of injury, i.e. broken leg, conscious or unconscious.
4. Arrange transportation to Bartica Hospital.
5. Arrange Medivac if injury is severe.
6. Make entry into the Accident and Emergency Record book.

11.4.4 Fuel Spills

Fuel will be stored on-site for the generator and refuelling of trucks, generators and other vehicles and machinery. In the event of a spill covering more than 2m x 2m the following action will be taken.

1. Inform Environmental Manager and/or General Manager.
2. With the use of on-site Spill Kits stop the flow if possible.
3. Prevent the movement of people or vehicles into restricted area.
4. Treat spill with absorbent materials such as sand or sawdust and a bund formed if possible, to prevent the spill spreading and contaminating the river and soil.
5. Collect absorbent materials and placed in a secured area with an impervious base at a restricted zone.
6. Make entry into the Accident and Emergency Record book.
7. Environmental Manager to prepare a detailed report.

11.4.4.1 Measures for Pollution Prevention - On-Site Fuelling Operations

The following measures will be adhered to avoid incident of fuel spillage:

1. Appropriate secondary containment devices and techniques (such as the use of drip pans) will be implemented for the fuel transfer area (pumping station).
2. Guyana Alpha Construction Inc will purchase oil-only spill response kits. Once in hand these kits will be place in strategic locations that are accessible to key personnel including drivers, security officers, and health and safety officer.
3. Workers, mechanics and other staff will be trained on the proper use of these kits through the executions of drills.
4. Drip pans will be placed under the fuel/vehicle coupling when vehicle tanks are being filled. This should prevent the possible leakage of fuel
5. Attendants and drivers will be trained regarding the proper use of the pumps to avoid overfilling and spillage. Training will also include the need and use of drip pans.
6. Fire extinguishers will be placed in strategic locations in the event of a fire. These extinguishers will be regularly tested and refilled as necessary. All Transportation staff, including drivers and mechanics will be trained in fire emergency response procedures and the use of firefighting equipment.
7. The on-site fuelling area will be deemed a 'no smoking' zone and all staff required to turn off cell phones when in that general vicinity. The area will have appropriate signage in conspicuous locations. All fuel storage containers will be labelled.
8. Storm water pollution prevention devices, particularly oil/ water separators, will be placed in the drains which are likely to be contaminated with fuel in the event of a spill.
9. Procedures have been developed for the filling and dispensing of fuel. These must be implemented and continuously monitored. Fuel dispensing areas will be checked weekly for leaks. Leaks will be immediately reported and corrected. All inspections and corrective action will be documented in an inspection log.
10. Prior to refuelling of fuel storage tanks, cross checks of fuel records (of tank capacity based in fuel used) will be completed. Additionally, the level of fuel will be manually checked, using a dip stick, so that there is clear indication of the capacity of the tank. This would prevent over filling and possible spillage.

11.4.6 incident Reporting

After every incident/accident a report will be required. The Environmental Officer will have direct responsibility for the preparation of such a report. The following is a format which would be used.

Record of Accident/Incident **SAFETY & HEALTH MANAGEMENT INFORMATION**	Type/Source: _____ / _____ Org. Code: _____

TO BE COMPLETED BY HEALTH, SAFETY & ENVIRONMENT MANAGER

1. Reason for Record: ☐ Accident ☐ Incident

2. Name: _____ 3. SSN:

_____
(Last, First, M.I)

4. Position: _____ 5. Phone:

_____

6. Date of Birth: _____ 7. Sex: ☐ Male ☐ Female

8. Date/Time of Accident/Incident: _____ Time: _____ ☐ AM ☐ PM

9. Duty Station Address:	10. Location of Incident:

11. Description of Accident/Incident

12. Extent of injury or illness and Body Parts Affected:

13. Medical Treatment? ☐ Yes ☐ No 13. Lost Time? ☐ Yes ☐ No

Signature: _____ Date:

_____

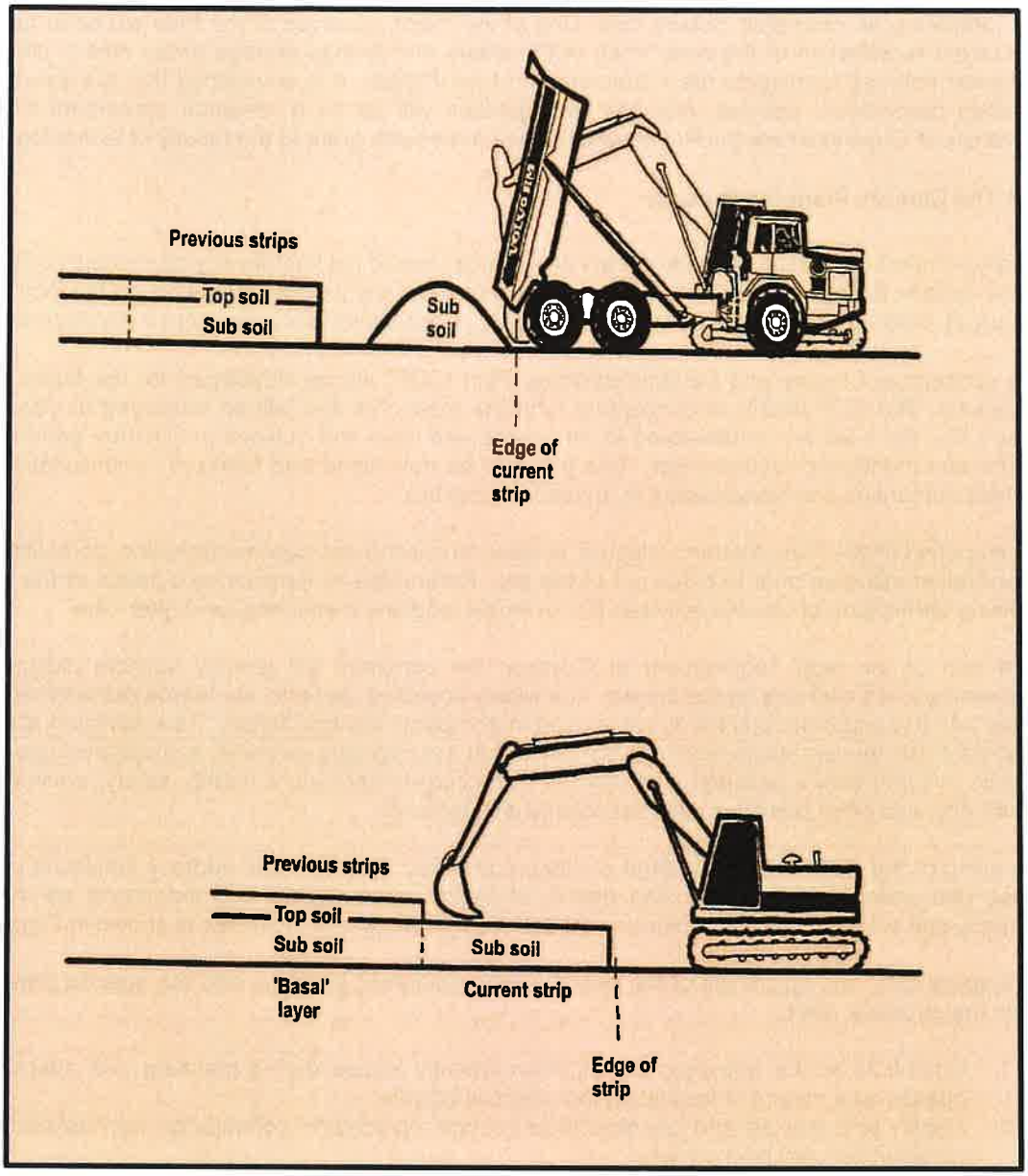
14. Description of Treatment:

15. Follow-up Acton:

Signature: _____ Date:

_____

Title: _____



Replacement of soil with excavator and trucks

12.2 *Closure Concepts*

The reclamation plan proposed for the quarry site has several key components, referred to as initiatives. These initiatives provide the physical and philosophical foundation for the reclamation plan and will remain constant throughout the operational life of the facility. These initiatives include: design of the facilities with closure goals in mind; concurrent reclamation practices; constraining disturbances to a single drainage; minimizing downstream hydrologic disturbances; preparing a comprehensive drainage plan; using modern technology to minimize the generation of impacted water; managing operations to minimize environmental impacts; reclaiming the facilities to blend with surrounding topography; constructing an outer facility shell to reduce visual impacts of the mining operations;

12.4 Closure approaches and Actions

12.4.1 Introduction

This section identifies environmental and socio-economic issues that have a bearing on closure and the post-closure phase and identifies conceptual options for effectively managing the closure process for each. Where relevant, preliminary performance targets and monitoring requirements will be identified. Technical investigations will be used to assist in decision making and in the choice of suitable option in specific cases. The items presented are preliminary and will require updating to conform to the final financial commitment.

The principal closure-related issues can be summarised as:

- Final voids (pits) arising from the quarry extraction;
- Waste dumps;
- Surface water management;
- Infrastructure (general, haul roads, bridges and plant)
- Post closure aftercare and monitoring.

Each of these will be described in each sub-section.

12.4.2 Specific Issues and Related Closure Options

12.4.2.1 Final Voids

Evaluation of the shape of the final void will depend on the size and extent, physical constraints and backfilling done during the quarry life. Determining the most appropriate closure for final void is one of the most difficult aspects due to the related technical challenges and economic cost. Options for beneficial uses are a priority where they can be identified and confirmed as being economically viable and sustainable.

Due to the close proximity of some of the proposed quarry to creeks, inundation of the pits will occur rapidly once dewatering activities are halted, leading to the creation of pit lakes.

12.4.2.2 Waste dumps and disposal areas

The variety of closure options available for waste dumps and disposal areas are generally linked to the need to create a final landform that is safe, stable, non-erosive, and designed so that it will support the final agreed land use. The most suitable land use for this aspect is to allow natural re-vegetation to create healthy and sustainable ecosystems. Specific options adopted will be determined by the physical and chemical characteristics of the waste and topography of the dump disposal area. However, in general terms, initial preparation is likely to include levelling and re-grading of steep slopes, installation of drainage, limited backfilling of depressions and preparation of ground in a stable state that blends in with the surrounding area.

The best and most site cost-effective erosion prevention method are good site design and the establishment of vegetation. It is generally wise to retain any existing drainage controls during the initial re-vegetation phase. Deep ripping may improve water infiltration, again reducing flow of surface water flow that causes soil erosion.

From observations in the area, natural re-vegetation will provide good cover within one year once there is some amount of top-soil present. No special measures are likely to be needed to promote the establishment of vegetation although some local amelioration may be required to promote rapid growth where low permeable material are on the surface.

12.4.2.5 Stakeholder Engagement

Key stakeholders will be consulted since input from them (local authorities and informed parties) is critical to the identification and successful implementation of closure measures. Following the distribution of this concept report, consultations will be held with the Government Agencies and local communities' part of development of a detailed closure plan. During this program, possible post-closure land use objectives will be discussed.

Opening the above area will have implications for environmental integrity and conservation, and it is therefore critical to develop a strategy regarding control of access and development, while considering productive uses of the land, such as formal development and responsible land management.

It is envisioned that a multi-stakeholder forum will be convened, at which development priorities will be identified and management terms will be agreed. It is anticipated that the following parties and institutions may be invited to participate in this consultation:

- National Government Ministries
- Regional Officers/Committees
- Government Agencies- GFC, GGMC, EPA, GLSC
- International NGO-CI, WWF
- National NGO-APA, GOIP, local indigenous groups

Following consultations, the suggested post closure land use objectives will be developed and approved to reflect the views of these stakeholders.

12.5 Summary of Closure Issues

The following summarizes the proposed approach to closure

- Re-profiling of dump area as appropriate;
- Removal or maintenance of surface water management features as appropriate;
- Natural re-vegetation of mine waste facilities, with assistance as necessary;
- Backfilling of pits where practical and economically feasible, replacing topsoil and natural re-vegetation;
- Demolition and removal of all buildings and infrastructure;
- Removal of scrap and rubbish;
- Access roads to be left in place if agreed with the government, otherwise ripped and allowed to re-vegetate naturally, with assistance if necessary; and
- Bridges to be left in place if agreed with the government, otherwise removed and scrapper or sold.
- Retrenched workers adequately compensated and trained to perform other livelihood activities.

From observation of other worked out areas near the property that was mined, it was observed that the waste dumps can rapidly recover to integrate with the existing natural environment. There are no long term closure issues that cannot be successfully managed by Quarry Operator.

- ***Pits***: details for the rehabilitation of the mined-out areas including the manner in which the actual site of the pit will be restored for future use.
- ***Water quality management***: details for post-closure prevention and control of erosion, sedimentation, siltation and leaching to ensure appropriate water quality standards are achieved.
- ***Waste management***: description of the type, quantity and quality of overburden and other waste, their disposal, and detailed proposals for utilization and/or stabilization to prevent siltation, erosion, dust generation and maximize integration with surrounding land.
- ***Infrastructure***: facilities such as roads, power lines, buildings and structures and their future utilization will be evaluated and where relevant the measures for their maintenance will be described. If decommissioning is proposed, the dismantling and disposal of building structures, support facilities and other infrastructure (such as electric power lines, water pipelines, fuel tanks, transformers etc.) will be discussed in detail.
- ***Retrenchment***: description of the socio-economic opportunities in the area, inventory of employees and associated skills, formation of a plan to retrain and re-skill employees and facilitate re-employment to minimize impacts of retrenchment and to ensure facilities and services provided by the Quarry Operator are supported.

In the specific environmental and socio-economical context of the existing site, options for post-closure land use with respect to these issues will be limited due to the potential for long term quarrying activities in the surrounding areas. The first priority therefore will be to protect the environment and public health and safety by using safe and responsible closure practices. For each principal component of the project design, a base case for post-closure land use has been identified, considering technical designs, the views of the stakeholders and emphasizing productive end use of each project area following appropriate rehabilitation. The base case for post-closure land use objectives is illustrated in TABLE below:

Project Item	Base Case Post-Closure Land Use Objectives
Quarry pits	Backfill and revegetate
Tailings ponds	Backfill and revegetate
Borrow pits	No feasible use, promote revegetation
Overburden dumps	No feasible use, promote revegetation
General Infrastructure	Remove unless requested to leave in place and transfer to the regional government or government agency. To be discussed and agreed with stakeholders
Haul roads	Leave in situ and transfer to regional government or government agency unless requested to remove. Mechanism to be discussed and agreed with stakeholders

12.6.2 Summaries of Post Closure Objectives

Specific rehabilitation and closure criteria will be fully developed as part of the subsequent consultation process. Components of the rehabilitation criteria will include:

- Land use objectives;
- Physical aspects (e.g. landform stability, resistance to erosion, re-establishment or drainage);
- Biological aspects (e.g. plant choice, canopy cover, fauna return, weed and invasive species control) for areas of re-vegetation; and
- Water quality and soil standards.

12.6.5 *Performance Indicators and Monitoring*

For stakeholders to evaluate the success of closure, indicators will be developed to measure and report performance, bearing in mind that what constitutes acceptable performance may vary according to different stakeholder perspectives. Emphasis will be on both socio-economic and environmental issues due to the number of people that will likely be affected by the closure.

The primary function of any post-closure monitoring is to ensure that closure targets and an appropriate level of performance have been achieved. The schedule will be established so that any monitoring programme is simple to operate and will provide data that can be directly understood and utilised by the relevant stakeholders. Development of a detailed post-closure monitoring program will comprise the following activities:

- Identification of the scope of monitoring required and listing of sub-programmes corresponding to each environmental issue;
- Definition of the objectives for each sub-programme;
- Specification of how data or information collected will be used in measuring success against desired performance criteria and targets;
- Definition of the spatial and pathway boundaries for the work and selection, mapping, planning of scales and sites for direct measurement observations or sampling;
- Based on appropriate characterisation studies, selection of key indicator for direct measurement; observation or sampling;
- Definition of how the data will be analysed and interpreted, and how it will be presented in a monitoring report;
- Definition of the precision and accuracy required in the data; and
- Consideration of compatibility of the data to be collected with historical data and with contemporary related data (e.g. from existing studies).

A clear feedback loop will be established between information acquired and the success of closure measures. If reporting indicated that performance is not in line with targets, then the closure process will be modified as appropriate. A post closure and monitoring plan will be developed in conjunction with the final closure plan.

Project Component	Issue	Closure Action	Performance target	Monitoring Requirements
	Stability	Create conditions for re-vegetation to prevent erosion and maximise stability	Maximise slope stability	Stable slopes
	Dust generation	Create conditions for re-vegetation in keeping with surrounding areas, to prevent erosion and dust generation	Eliminate significant windblown dust	Airborne dust concentrations
Overburden Dumps	Surface run-off and related suspended solids	Install toe drainage where none exist, create conditions for re-vegetation in keeping with surrounding areas	Eliminate adverse impact on water quality or run-off volume	Water quality.
	Visual impacts	Promote re-vegetation of surfaces	Complete vegetative cover	Sustainability of vegetative cover
	Biological			
	Re-vegetation	Promote re-vegetation and sustainable ecosystem development	Effective and sustainable re-vegetation; minimal erosion	Sustainability of vegetative cover
	Destruction of habitats	Create conditions for natural reinstatement and development of suitable host habitats in surrounding areas to facilitate inward migration of relevant species	Presence of fauna and avian species in rehabilitated areas	Species diversity, population numbers.
	Physical/chemical			
	Safety	Transfer to Guyana agencies. Otherwise remove and safely dispose of above and below surface items	No safety risks	Risk assessment
	Visual impacts and visual intrusion	Remove and safely dispose of above surface items and create suitable	Maximised land restoration and integration with surrounding areas	Sustainability of vegetative cover

Project Component	Issue	Closure Action	Performance target	Monitoring Requirements
	Visual impacts and visual intrusion	Transfer to Guyana agencies; otherwise create conditions for natural re-vegetation	Transfer to Guyana agencies or effective regeneration of vegetative cover	In the case of transfer, the agencies will assume responsibility, other sustainability of vegetative cover
	Biological			
	Removal of forest cover	Transfer to Guyana agencies; otherwise create conditions for natural regeneration of alternative and appropriate ecosystems; forest removal should be minimise throughout the remaining mine life	Transfer to Guyana agencies or develop sustainable ecosystems in areas where primary forest has been removed	Eco-system health; species diversity
	Destruction of habitats important to fauna and avian species with high conservation value	Transfer to Guyana agencies; otherwise create conditions for natural regeneration of suitable host habitats to facilitate inward migration of relevant species	Transfer to Guyana agencies or return of affected species to regenerated areas	In the case of transfer, the agencies will assume responsibility, other sustainability of vegetative cover
Haul roads	Increases/decreases in swamp water levels and associated dieback of vegetation	Ensure culverts are maintained and cleared prior to transfer to Guyana agencies; in the absent of transfer to agencies, re-profile or remove material and create conditions suitable for natural regeneration of vegetation	Transfer to Guyana agencies or effective regeneration of vegetative cover	In the case of transfer, the agencies will assume responsibility, other sustainability of vegetative cover
	Socio-economic/Cultural			
	Post transfer impacts	Any transfer to Guyana agencies should be subjected to the provisions of a sound development plan for the area	Confirm relevant plans to address potential health, safety, environmental and social impacts and maximise socio-	Not required, Guyana agencies will assume responsibility in post transfer phase

13.0 ENVIRONMENTAL ISSUES

The Quarry Operator plans to develop a large-scale quarry from a property located at the Batavia, Cuyuni River. As part of the licensing process, the company requires to fulfil all the necessary environmental permitting obligations before mining could commence. As such, the company has applied for Environmental Authorization simultaneously with the Quarry License application. The potential impacts were summarized, mitigation measures identified, and impacts evaluated after mitigation. The tables below provide a summary of the proposed actions.

				Maintain exhaust and engine systems Vegetation restricts dispersion	
All exposed surfaces	Dust generation	N	Reduced air quality due to dust generation but no external human receptors	Promote rapid generation	Minimum impact expected, no external receptors

OPERATION PHASE					
Transport operations	Transport on haul road.	N	Reduced air quality due to dust generation and exhaust fumes possible affecting miners	Water surfaces regularly, with greater intensity Enforce lower speed limits near mining areas Maintain engine and exhaust systems Vegetation may restricts dispersion to some extent.	Some dust generation may still occur that may reach miners
	Transport elsewhere	N	Reduced air quality due to dust generation and exhaust fumes	Water surface regularly Maintain engines and exhaust system Vegetation will restrict dispersion	Minimum impact expected, no external receptors.
Overburden and ore excavator and ore hauling	Dust generation	N	Reduced air quality due to dust generation and exhaust fumes	Water surfaces regularly	Minimum impact expected, no external receptors

SUMMARIES OF IMPACTS TO SURFACE WATER

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Quarry perimeter dewatering	Discharge of elevated TDS water into river	N	Change water chemistry at discharge	Natural dilution in receiving water and close to river water interface	None
Construction of pit ring dykes	Interruption of local drainage	N	Back up of water, raising local levels	Install or improve drainage channels around pits to convey water away	Improvement to exiting drainage
Haul roads	Interruption of local drainage	N	Back up water, raising local levels especially in the small Creek and killing vegetation Prevention of movement of aquatic life	Culverts through all low points in road embankment Monitoring Ongoing maintenance to keep culverts clear	Improvement to existing drainage Requirement to keep culverts clear as ongoing activity
OPERATION PHASE					
Pit perimeter dewatering	Elevated TDS groundwater into creek	N	Change of water chemistry at discharge	Natural dilution in receiving water and close to river water interface	None
Pit sump dewatering	High SS in sump water	N	High SS if discharged to river	Settlement pond before discharge and dilution	Discharge quality acceptable
Pit dewatering	Discharge of elevated TDS groundwater into swamp drainage	N	Change of water chemistry at discharge. Magnitude of change unknown	Natural dilution in receiving water Discharge to more than one point depending on volumes	Change of water chemistry at discharge. Magnitude of change unknown
Pit backfilling	Erosion of surface	N	Elevated TDS in surrounding water	Re-vegetation	Progressive improvement to good quality

Mine	Dewatering pit		Reduction in head in overlying formations could cause settlement of ground surface due to consolidation	Monitoring	Lowering of ground surface and inundation

SUMMARIES OF IMPACTS ON ECOLOGY

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION PHASE					
Haul roads, mines, waste dumps and other infrastructure	Land clearance and construction	N	Loss of vegetation of moderate to low conservation value	Restrict width of road corridor as far as possible Minimize deviation from alignment to temporary access road Minimize area of dumps and locate in areas of low conservation value Selectively clear only large trees with chainsaw (safety permitting) in safety zone along road margins Facilitate commercial use of felled timber where possible Promote re-vegetation following closure by ripping any compacted areas and spreading cut vegetation over these	Permanent loss of existing ecosystems (natural re-vegetation will occur but ecosystem quality will be lower)

All development on right bank	Access during operations	N	Increased access to forest resources (fauna and flora) via haul-road	Control road access Unauthorized access and forest usage to be reported to GFC	Some localized effects on fauna and flora could be experienced, but unlikely to occur
Haul roads and other infrastructure	Mine transport	N	Dust generated by road transport could cause smothering of adjacent vegetation	Road watering to minimize dust Enforce speed limits	Only vegetation immediately adjacent to road likely to be affected
POST CLOSURE PHASE					
Haul road	Access and land usage after closure	N	Possible increase in commercial forestry usage on right bank and commercial logging concessions	Assignment of formal concessions and enforcement of responsible forestry by GFC	Formal concessions may help to control impacts of logging
		N	Possible formal development if land becomes available as a result of mine waste disposal would result in additional clearing and possible hunting and logging	Formal and consultative planning of post-closure usage and development, involving GACI and other stakeholders	Could result in additional land clearance and harvesting of forest products
		N	Possible informal strip development along access road and increased access to forest resources	Access control	Reduced impact of strip development and access to forest resources

SUMMARIES OF IMPACTS ON TRAFFIC AND TRANSPORT

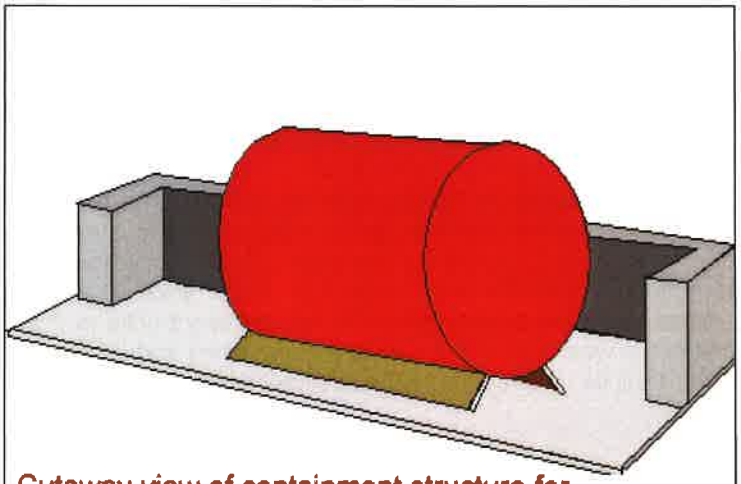
Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATIONS PHASE					
Haulroads	Construction of road and transport of materials		Effects on miners and businesses resulting from increased traffic	Illuminate road intersections with solar powered light fixtures Restrict access of construction and haul vehicles through the other mining areas, and ensure that all project vehicles operate only on private quarry roads	Access for other businesses slightly affected
Haul-roads	Transport of materials		Impacts resulting from spillage of materials, fuels and oils	Train contractors and staff in transport safety Enforce speed limits Ensure that bulk materials are covered if liable to generate dust Minimize unnecessary use and transport of hazardous substances	Some splits may still take place, but frequency will be considerably reduced by management of risk
				Ensure relevant hazardous data sheets on site for all hazardous substances being transported Ensure vehicles are roadworthy and well maintained and Inspect route regularly for signs of split materials Conduct periodic assessments of road quality and re-grade/re-profile as required	

SUMMARIES OF IMPACTS TO THE ECONOMY AND LOCAL BUSINESS

Activity or Project Component	Aspect	+VE (P) Or -VE (N)	Impact	Mitigation Measures	Impact after Mitigation
CONSTRUCTION AND OPERATION PHASE					
All construction and operational activities	Purchase of goods and services	P	Increase in economic activity	If possible ensure that the Regional Administration has a share in the tax income generated by the exploitation of the district's natural resources Where feasible source goods and services regionally to maximize local benefits, and Use tendering (procurement) processes which favour Small, Medium and Micro Enterprises	Greater emphasis on regional economic activity
All operational activities	Employment	P	Creation of approximately 100 direct jobs and several indirect jobs	Use labour-intensive methods where possible, and Use transparent employment procedures	Tendency towards regional rather than national job creation
CLOSURE AND POST CLOSURE PHASE					
Purchase of goods and services	Cessation of operations	N	Economic decline as a result of the termination of production	No mitigation	
Employment	Cessation of operations	N	Retrenchment of 100 workers	Develop a detailed closure plan in consultation with affected workforce Assist where possible with redundancy and retirement Retrain workers where possible	
Haul road	Access and land usage after closure	P	Increased production in commercial forestry operations because of increased access	Maintain the condition of the haul road into the post-closure phase	Formal concession may promote sustainable logging

Socio-economic environment			
Health and Safety	QO	Biannually Monthly	Use of protective gear by staff Condition of fire-fighting stations and equipment Adequate and appropriate signage for emergencies Location of Emergency Procedures In house training to keep employees up to date with various safety procedures. Health conditions of staff, in particular as it relates to respiratory ailments
Employment and Benefits	Q0	Biannually Biannually	Number of regional residents employed Conditions of employment Assistance to regional residents by company

Environmental Monitoring Strategies



Cutaway view of containment structure for above-ground tank.

Diagram showing propose set up for fuel tank

15.4 Mine Truck Shop and Fuel Storage

The mine truck shop will be located about 200 m south of the light vehicle and fuel storage facilities. The operators will maintain left-hand traffic in the mine, the primary crusher dump pocket, on ore and waste haul roads, and to the mine truck shop.

The mine truck shop will be approximately 250 m^2. It will contain three bays to accommodate up to four haul trucks and two bays for miscellaneous equipment such as front end loaders, dozers and excavators and water trucks.
The mine truck bays will have an eave height of 10 m, and the bays for miscellaneous mine equipment will have an eave height of 12 m. A 30-T service crane will be used to service the mine truck bays, and a 25-T service crane will be used to service the light equipment bays. The mine truck shop building

- ✓ Plant Operations 12
- ✓ Camp support staff 10
- ✓ Security 12

These employees are for the most part salary and will be working on a 40-hour per week work schedule, Monday through Friday.

On average, the quarry and plant operation will employ 45 hourly employees and 15 salaried employees. The shift supervisors will work 12-hour shifts on a four-days-on/four-days-off schedule.

The quarry hourly employees consist of operations employees such as excavator operators, haul truck drivers, drill operators, blasters and other quarry operating support, while the maintenance crews will consist of electricians, mechanics, and welders. The schedule for the operation crews will be two 12-hour shifts per day, seven days a week. A maintenance crew will work one 12-hour shift per day, seven days a week on day shift. In addition, there will be a small night shift maintenance crew that will work one 12-hour shift per day on a seven-day work week.

The security will consist of 16 persons working on 12-hour shifts, seven days per week and 52 weeks per year.

15.8 Mining Camps and Associated Facilities

The living accommodation will be constructed with logs form the project site. Ten bungalows will be constructed to accommodate eight persons each. Each one will have two toilets and bath facilities and will have cupboards for each occupant. Each will have a table for dining and reading. There will be special quarters for management and senior personnel.

A kitchen/restaurant will be built to prepare meals and for dining. Breakfast will be served between 4.00 am and 7.00 am, lunch between 11.00 am and 1.00 pm at the various locations and dinner between 5.00 pm and 8.00 pm. Light snack swill be available throughout the day up to 10.00 pm.

The Company will cater for all the laundry requirements of the staff and will employ six persons to execute these tasks along with cleaning the camps. A small truck will be used to transport garbage from the camp site to the dump.

A recreation building will also be established and will have a table tennis table, pool table, tables for dominoes, cards etc. There will also be a mini bar for refreshments and other toiletries. A large screen TV and DVD player will be available with cable television. There are plans to develop an area for cricket, football and other outdoor activities.

A guest house will be built for visitors and university students wishing to conduct research in any aspect of geology, mining and processing engineering or environmental sciences.

15.9 Haul and other Roads

In-site roads will generally measure 10-m wide with 0.5-m wide drainage channels, as required, along both sides of the road.

Haul roads will generally be 20 m wide inclusive of safety berms and ditches. Haul trucks will have the right-of-way and all other traffic crossing the haul roads must yield to the haul trucks

15.10 *Electrical Power Supply*

Operating expenses

Mining

Manufacturer	Type	Quantity	Costs	Per day
Caterpillar	Haul Trucks	2	$70/hr @ 20 per day	$2,800
Caterpillar	Front-end loader	1	$50/hr @ 20 per day	$1,000
Caterpillar	Bulldozer	1	$50/hr @ 15 per day	$750
Caterpillar	Excavators	2	$60/hr @ 10 per day	$1,200
Caterpillar	Jumbo drill	1	$50/he @ 2 per day	$100
Labour 10% Mining Cost				$585
Total Mining Cost				$6435

Crushing and screening

No.	Name	Qty	Unit cost	Per day
1	Feeder	1	$20/hr @ 20 per day	$400
2	Jaw crusher	1	$10/hr @ 20 per day	$200
3	Cone crusher	1	$10/hr @ 20 per day	$200
5	Small feeder	1	$10/hr @ 20 per day	$200
6	Heavy vibrate sieve	1	$20/hr @ 20 per day	$400
7	Vibrate sieve	1	$15/hr @ 20 per day	$300
8	Belt conveyor	4	$5/Hr @ 20 per day	$320
9	Integrated circuit control system	1	$4/hr @ 24 per day	$96
10	Non-standard part and leg of belt conveyor	1	$4/hr @ 24 per day	$96
11	Electric Generator	2	$30@ 12 per day	$720
Labour 10% Processing				$293
Total Processing Cost				$3,225

Other Expenses

Non Mining Labour Cost 2%) Mining and Processing cost	$193
Administration 2% Mining and Processing Cost	$193
Security	$300
Barging (1 trip per week) $3,000 per trip	$600
Power generation (Camp)	$600
Water Supply	$100
Environmental monitoring	$200
Miscellaneous 10%	$219
Total	$2,405