- Clearing of the TSF basin, including salvaging and stockpiling of merchantable timbers. Vegetation grubbing and stripping will be done to expose suitable fill material in the borrow areas;
- Topsoil stripping from within the work areas and stockpiling outside the basin in a nearby designated area for future recovery as reclamation material;
- Excavation of the initial key-in (for Stage 1 build up) and re-grading and proof rolling of the dam foundation surface. The nominal key-in depth will be about 2m deep;
- Setting up of temporary environmental control measures for site runoff water management during construction;
- All survey work required for laying out the work and control of lines and grades;
- A pre-construction trial pad will be carried out prior to the full-scale construction operation. It is important to conduct such test pad first to understand the geotechnical properties of the shale fill and its response in the actual field conditions. This will provide first-hand experience that will be useful during the full-blown construction. It will allow an assessment of the best gradation of fill material to use, the optimum moisture requirement to achieve optimum field compaction, and the strength/stability behaviour of the platform;
- Stockpiling of gravel for blanket drain material in a free area within the TSF basin and the supply of gravel will come from nearby limestone quarry operators, which will be delivered to site.

A construction quality assurance and control (QA/QC) programme will be developed specific to the construction of the upstream embankment of Stage 1. It will serve as a guide in the dam construction manual, including the operations and maintenance of the succeeding lifts. This programme will be performed by a qualified 3rd party engineering company.

The full-blown construction phase will be in three (3) stages. The ideal months of construction and build-up for each stage are March to first (1st) half of November, or during the relative dry season.

The Stage 1 will be constructed using borrow materials from the TSF basin. It will be raised from 20 mRL to 30 mRL to store 3.06 Mt of tailings over the next fourteen (14) months of tailings containment while Stage 2 is being completed. Construction of the dam is planned to start ahead by eight and half (8.5) months prior to the actual flotation schedule, where there is already enough initial ore stockpile. Materials to be used in raising Stage 1 will be sourced from the TSF basin, which is also a part of the cut-and-fill philosophy to increase capacity and for cost effectiveness at the same time. Normally, where the geology and the topographic features on the selected site support material availability for borrow sourcing, it is always cost effective to employ cut-and-fill over the sourcing of materials outside for embankment build-up. Plan of Stage 1 is shown in *Figure 18-3 - Plan View of Stage 1 of TSF at Jugan* below.

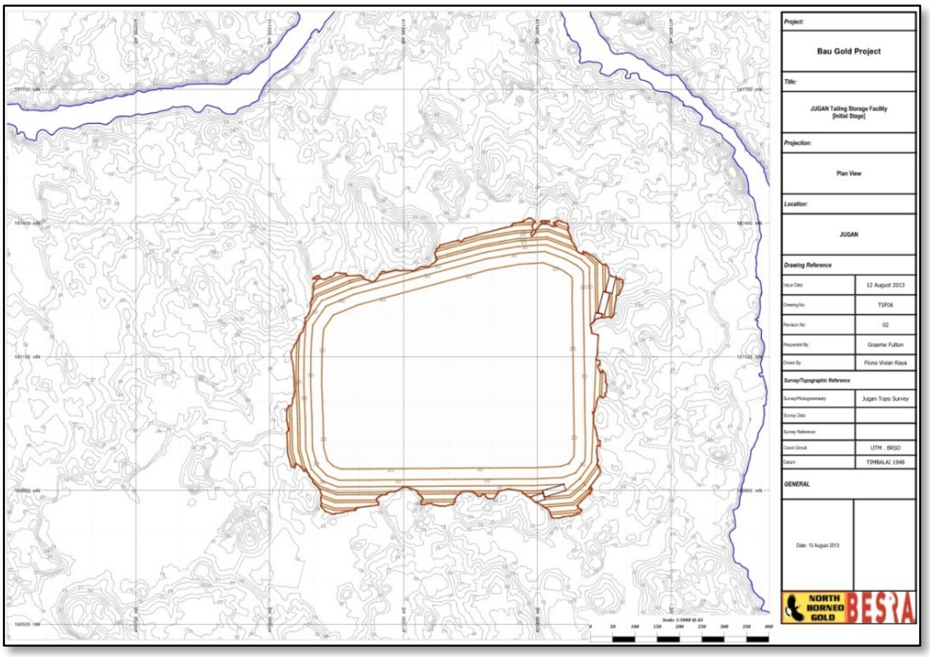


Figure 18-4 - Plan View of Stage 1 of TSF at Jugan

The lithology within the TSF basin is shale, which is similar to the host rock in Jugan Pit. From the aimed cut volume of about 1.23 Mm^3, around 0.86 Mm^3 will be used for the Stage 1 build-up. This may require twelve (12) units of 20-tonner trucks and two (2) units of 3.30 heap m^3 capacity excavators operating on a 6-day per week cycle, while assuming above 90 % efficiency truck-bin loading capacity. Moreover, around 0.64 Mm^3 of the cut materials from the basin, rendered unsuitable for construction since much of it is topsoil will be stored in the topsoil storage dump for future rehabilitation use.

Stage 2 will store around 1.64 Mt of tailings storage and will be built by expanding Stage 1 within the same elevation 20 mRL to 30 mRL. This will require about 1.34 Mm^3 mine waste rock augmented by around 0.39 Mm^3 of fill taken from the borrow area within the footprint of the TSF basin that has not been quarried yet in the build-up of Stage 1. The duration of the construction will be around 10 months. The hills inside the basin will be levelled down to 20 mRL, which is the base elevation of the TSF. Around 0.43 Mm^3 of the cut materials rendered unsuitable, will be stored in the topsoil storage dump for future rehabilitation use. The plan view of Stage 2 is shown in *Figure 18-4 - Plan View of Stage 2 of TSF at Jugan* below)

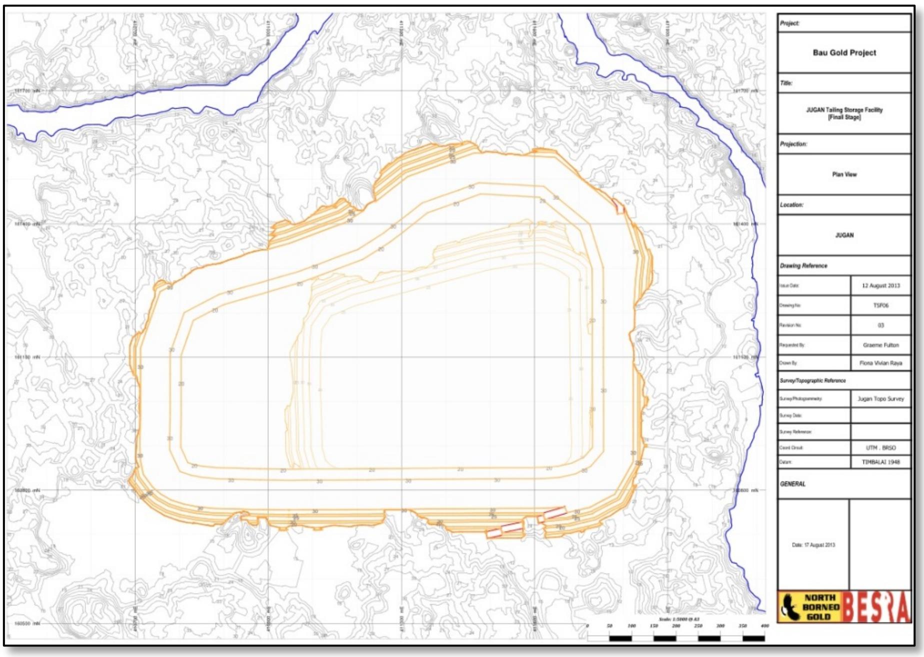


Figure 18-5 - Plan View of Stage 2 of TSF at Jugan

Stage 3, or the final stage, will store an extra 6.03 Mt of tailings and will be built from elevation by raising 30 mRL to 40 mRL over 8 month duration. This will be built solely with 1.53 Mm^3 mine waste rock. The 3rd and final stage of the TSF is shown in *Figure 18-5 - Plan View of Stage 3 of TSF at Jugan*.

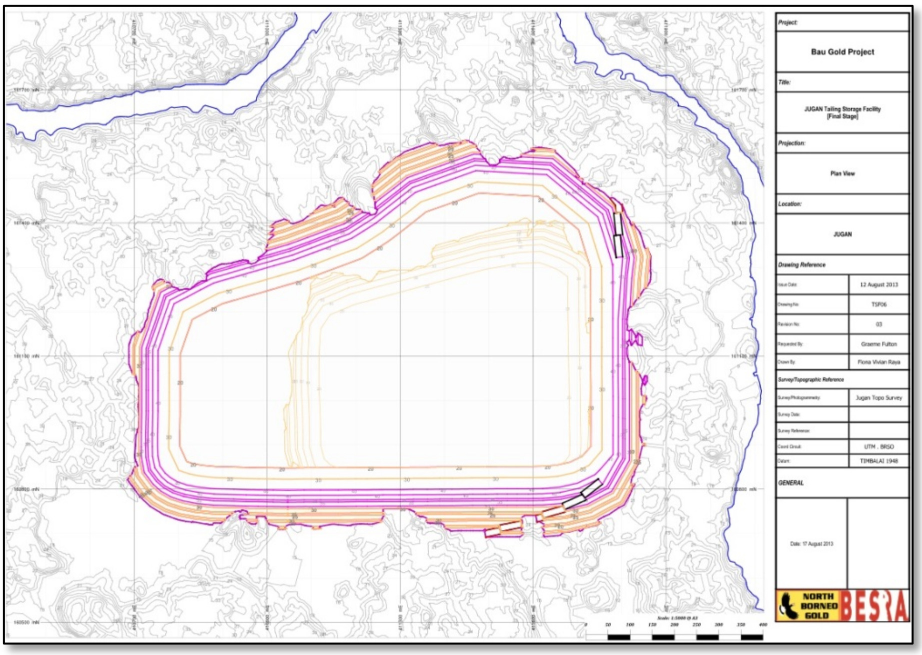


Figure 18-6 - Plan View of Stage 3 of TSF at Jugan

The three TSF stages are also shown in 3D perspective views in *Figure 18-6 - 3D View Stage 1 of TSF at Jugan* to *Figure 18-8 - 3D View Stage 1 of TSF at Jugan* below.

Figure 18-7 - 3D View Stage 1 of TSF at Jugan

Figure 18-8 - 3D View Stage 2 of TSF at Jugan

Figure 18-9 - 3D View Stage 1 of TSF at Jugan

The dam will be built much the same way that the Jugan waste dump is to be engineered but with the compaction slightly higher at a Proctor density of around 97 % compaction. This usually requires six (6) to eight (8) passes with the sheeps-foot roller combined with vibro-rolling through an initial 0.5 m high layer of placed material. Soil testing will also be more rigid, especially in the part where the TSF is to be keyed-in through a 4 m wide x 1.5 m nominal depth throughout the perimeter of the upstream side during the 1st stage construction. Additionally, along the footprints of the upstream and downstream sides of Stage 2, the foundation would have to be slotted in also inside a trench to form the base foundation of the Jugan TSF. The slopes are also gentler on both sides (upstream and downstream) of the TSF compared to the 37° slopes on the Jugan waste dump.

The placement of the PAF and NAF materials in the downstream embankment will have the same manner of handling described in *Section 19.2.3.3.1*.

For Stages 1 and 2, a 10 m wide transitory spillway for each will be provided. Each spillway will be founded into an original ground, in an area where a part of the embankment is abutted to a hill. As mentioned earlier in Section 20.4, the 10 m wide spillway will be more than enough to handle the runoff from a 103.56 mm/h 100 year event rainfall magnitude. The final 10 m wide spillway will be at 38 mRL. The catchment area at final spillway level will be 0.60 Mm^2 for an expected 100-year peak runoff volume of 17.37 m^3/s and 0.12 m^3/s from the tailings supernatant.

Estimated amount of materials needed for the construction are as follows:

- Ring Dam Embankment – 3.73 Mm^3
- Clay as foundation key-in – 35,900 m^3

- Clay as lining – 0.45 Mm^3
- Lime as clay additive – 1,800 m^3
- Blanket drain – 0.37 Mm^3
- Geofabric – 0.77 Mm^2
- Concrete drain
  - 620 m^3 cement
  - 1,760 m^3 sand
  - 4,250 pcs of 4 m long 50 mm dia. PVC pipes to be perforated
  - 2,430 pcs 2 m long x 1 m high x 1 m width rock gabion
  - 4,860 m^3 gabion boulders
- HDPE liner – 0.58 Mm^2
- Stage 1 spillway (14 m top by 10 m bottom width, concrete lined 0.10 m)
  - 60 m^3 cement
  - 90 m^3 sand
- Stage 2 spillway (14 m top by 10 m bottom width, concrete lined 0.10 m)
  - 85 m^3 cement
  - 125 m^3 sand
- Stage 3 spillway (14 m top by 10 m bottom width, concrete lined 0.10 m)
  - 165 m^3 cement
  - 250 m^3 sand

18.4.6. Planned Operations

18.4.6.1. Tailings Deposition Technique

For conventional storage, the tailings are generally discharged from spigots/outfalls located along the TSF embankment. The tailings will be discharged using sub-aerial techniques, i.e. the tailings will be impounded above the water line to form tailings beaches allowing faster drying or desiccation than when the tailings are deposited underwater. Generally during tailings deposition, natural segregation occurs. The degree of this segregation essentially depends on the particle size range of the tailings and the pulp density of the slurry. Normally, for low pulp density deposition, the rougher tails settle closest to the discharge point with the slimes being carried furthest away. The higher density coarse fraction will build up and rest next to the upstream slope while the slimes will stay afloat in the water. The deposition flow rate from the spigot greatly influences this segregation or if flows from adjacent spigots combine as a single stream further down the beach. For sub-aerial deposition this results in a beach sloping downwards from the spigot outfall towards the supernatant pond.

For the Jugan tailings, however, de-sliming will be carried out before tailings impoundment. The plant will have separate system for de-sliming the fines before combining with the coarse fraction in the TSF. The general concept is to de-slime by adding small amounts of ferric sulphate, then sequentially pipe them first for deposition into the TSF prior to the impoundment of the rougher tails above it. Such approach enhances the tailings characteristics by pinning the fines under the heavier rougher tailings.

The application of multiple outfalls for tailings deposition, or spigots, is the most common method used to fill a TSF and this technique will be adopted for Jugan. For conventional storage facilities, multiple spigots help to control the geometry and location of the supernatant pond within the facility. This helps to prevent the pond water encroaching into the embankment and reduces the risk of losing the freeboard. Moreover, pushing the pond water as far as possible from the upstream earth embankment brings down the head, thus the flow line and the pressure of the seepage pathways into the embankment. Multiple spigotting also has the advantage to control the layer thickness of tailings.

To promote faster drying and maximise desiccation as much as possible through the separation of the supernatant, the tailings discharge onto the beaches should form shallow low velocity braided streams that allow the tailings settlement and segregation. Sub-aerial impoundment is generally practiced at TSF sites the world over with the use of multiple discharge points. This allows the deposition of tailings to be rotated between different locations around the facility to allow newly deposited tailings to bleed, dry and consolidate while tailings can continue to be discharged to other zones of the facility. The frequency of discharge point rotation and the number of deposition zones is dependent on the climate, tailings production rate, tailings drying characteristics and the tailings facility shape. The company will employ a cyclic programme of discharge and drying of zones within the TSF to promote in-situ density gain in the tailings and thus maximise storage volume available. Desiccation and shrinkage of the tailings will occur as water is expelled and will become completely unsaturated if allowed to dry for a sufficient amount of time.

The cut-off gravel blanket drain system will intercept seepage and convey it out of the facility promoting faster drying. A new layer of tailings is then placed over the dried area in time corresponding to the TSF discharge zoning and cyclic plan.

On the other hand, sub-aerial deposition exposes the beached tailings to oxygen and water ingress and may allow oxidation of the remaining plus 0.2 % to 0.3 % sulphides. However, the production of any acidic drainage from this low sulphide value (non-acid forming) should never be detrimental to the receiving water environment. Moreover, the exposure of tailings in the sunlight will maximise evaporation and will dissipate or dispel the effects from such impact, if any at all.

18.4.6.2. Embankment Raising Method

Crest raise-up will be by zoned downstream method. This approach does not involve fill placement on top of tailings deposited (newly-deposited and desiccated tailings beaches) while building-up of the upstream embankment zone. This type of earth dam is the most stable engineered landform for tailings containment even in pseudo-static loading, since it is not seated on top of a liquefiable material – the tailings. Apart from its open spillway system, the gravel blanket drain system from the zoned embankment approach provides an effective desiccating and a cut-off medium by letting the supernatant flow through it easily and away from the structure; hence protection of the downstream embankment against saturation is achieved from a design and engineering standpoint. The blanket drain also relieves the upstream embankment of any pore water pressure build-up since as soon as the seepage gets through the drain filter, seepage flows through it easily and pressure is dropped substantially. Moreover, due to desiccation, the tailings will consolidate and strengthen in time compared to when in slurry state during deposition.

The tailings dam, as mentioned, will be raised in stages using a combination of borrow material from the basin and mine waste. By Stage 2 going through the final stage, the raise-up was established from the mine production schedule. The pit development schedule has incorporated these quantity requirements to ensure the supply of suitable fill material. The ultimate crest elevation of the dam provides enough storage for the projected 10.7 Mt plant tailings. The plant at this stage is already into production and Stage 1 is in commission for tailings containment.

The TSF is designed so that the supernatant, or the tailings effluent, and run-off from the catchment pond are draining out freely through the open spillway. At the same time, the water can also be recycled for use in the mill process at any one-time. The plant's minimum daily operating water requirement of 13,400 m^3 water can be augmented sufficiently from the tailings water fraction. The maximum normal operating volume in the TSF pond is based on the seasonal fluctuations in precipitation and the water treatment plant capacity. In average conditions, the maximum water level will occur in the tailings pond during the rainy months of November to February. The excess water will be handled by an open spillway provided for each stage. In a high precipitation region like Sarawak, it is always important that a TSF is provided with a proper spillway system to handle run-off volume in the event of unexpected climatic conditions or operational constraints.

18.4.6.3. Dam Safety & Satisfactory Performance

Aside from the suite of environmental monitoring procedures that is in the programme, to ensure the dam safety and satisfactory performance of the TSF, field instrumentation such as piezometers and prism monitors will be placed in the dam embankment. The piezometers will be slotted through the embankment down to a depth of a metre above the gravel blanket drain. The instrumentation will allow for monitoring of any movements in the embankment, monitoring of seepage water level, assess sudden changes in flow rates along the seepage concrete cut-off drain, and trace clogging along the blanket drain system, if any, or perched water during operation, deactivation, and post-closure. The concrete-lined open spillway system will also be inspected on a regular basis for any form of deterioration, whether by corrosion of concrete, clogging or damage along the entire length of the spillway for appropriate action. The same inspection arrangement will also extend to the concrete blanket drain. The frequency of such inspections on the spillways and concrete drain will be more often during the wet season, 2nd half of November through end of February.

Moreover, the operation of the TSF will undergo annual technical auditing by an internationally recognised tailings dam design and engineering consulting company.

18.4.7. Tailings Closure

As part of the closure plan, the tailings pond will be capped with clay materials at the end of mine life. The clay will be sourced from the stockpile topsoil material where the clayey part is segregated from the topsoil. If the stockpiled clay happens to be not enough, as a contingency, the additional clay required will be sourced nearby; the Jugan area has abundant clayey type soils derived from the weathering of the Pedawan Formation, which is basically shale.

Moreover, as part of the dam's rehabilitation programme, progressive re-vegetation will be carried out during its operating years. With the completion of each stage, planting of grasses along the slopes will be initiated while the next stage is being raised. This measure is also to prevent any erosion of the dam slopes during the rainy season, thus planting of grasses outright after completion of each stage is crucial in ensuring the structural integrity and aesthetic of the dam.

In terms of the final TSF closure, it is also determined that the clay cover of the tailings pond will encourage some water ponding and vegetation growth which thus offer a technically viable yet cost effective closure scheme. The final spillway of the tailings dam will be concreted and will serve a permanent structure in addressing any run-off volume coming from the pond. The water or effluent will be sampled and analysed for water quality and either release the water to the receiving environment, or treat it prior to release.

A continuing post-closure monitoring programme, instrumentation, inspection and audit will be provided for the TSF embankment. This will ensure that the embankment integrity is maintained.

Detailed closure and rehabilitation plan is covered in the Environmental Section of this report.

18.5. Power Supply & Distribution

Grid power is proposed as the permanent power supply for Jugan process plant and mine. Sarawak Energy will provide a 3 phase, 132KV transmission line to the plant site which will be available before the commissioning of the plant installation. Provision of the line would take in the order of 4-5 months upon signing of power agreements.

The incoming 132 KV line will be stepped down to 6,600 volts at the main receiving plant substation which is suitable for SAG Mill and Ball Mill and further stepped down to 415 volts, 3 phase, 50 hertz for the mill process plant downstream equipment's, open pit mine, support facilities, utilities ,tailing dam, warehouse and plant & mine lighting. It is estimated that under normal conditions, the mill process plant, mine and other support facilities will draw power of around 15,840 KW or 101,801,532 KWh per year broken down in *Table 18-1 - Power Requirement Breakdown for Plant & Mine Site* as follows:

Area	Item	Installed Power kW	Utilisation	Power Draw	Annual kWh
			%	%	
10	Crusher	450	70	80	2,207,520
20	Grinding	6232	95	80	41,490,163
30	Knelson-Cyclone	1315	95	85	9,301,916
40	Flotation	3875	90	85	25,967,925
50	Regrinding	1398	90	85	9,368,557
60	Compressor Air	375	80	85	2,233,800
70	Filter press thickener/Tank	206	90	85	1,380,488
80	Filter Press	499	90	85	3,343,999
90	Reagent	45	95	85	318,317
100	Utilities	720	80	80	4,036,608
110	Others	250	85	80	1,489,200
120	Mine	475	80	80	2,663,040
		15,840			**103,801,532**

Table 18-1 - Power Requirement Breakdown for Plant & Mine Site

The site will be reticulated by overhead and underground lines to mine , mill process plant, pant & mine mechanical/electrical maintenance repair shops, warehouse, camp housing, tailings dam pump house, industrial water pump house, domestic water pump house, water head tanks and to the recreational facilities. A transformer substation will be constructed as per power regulatory authority standard to address the line losses and prevent overloading and grounding problems. The full plant and support facilities will be well protected by lightning and earthing protection systems as per approved standards. All electrical equipment will have adequate locked-out mechanism to prevent inadvertent start-up during maintenance and repair activities. Lock-out procedures will be an important part of the safety training program.

It should be noted that the future requirement of 100% of the total connected load, which is 16 MW or more, is included in the determination of the size of the power line and the main transformer receiving station in preparation for any potential plant expansion for the downstream processing of flotation concentrate.

Based on the case studies, it shows that the main grid power is the most economical and the cheapest. However, to maintain flexibility and safe operation of SAG Mill & Ball Mill, a minimum standby source of power is hereby recommended for installation even after the grid power has been stringed to the plant/mine site. 4 units of 2 MW skid mounted portable synchronized diesel generators are hereby recommended for installation which will provide a 50% back-up source of power in anticipation to the grid abnormalities during operations.

Until the power grid is connected, the power requirement will be provided by the company from single unit skid mounted 2 MW, 415 volts, 3 phase, 50 hertz, diesel generator to be placed near the site temporary electrical control room. This generator will then become one of the backup diesel generators in the event of a grid power loss.

Operating cost of power as indicated by Sarawak Energy is 0.07 USD/KWh. This cost makes grid power the cheapest source of power, even after considering the temporary power and the provision of backup generators.

18.6. Site Water Supply

Water will be sourced from the main water pipeline running along the old Kuching-Bau road and piped a short distance (±1 km) to the mine site. Potable water will be supplied either in bottled form or from bulk coolers. Water sourced from the treated ponds and Sarawak River can be used to water rehabilitation plantings or dust suppression during dry weather.

Based on the milling rate of 8,000 tpd at 35 % solids, the clear water impoundment at the TSF is at the rate of 14,857 m^3/day or 14,857,000 l/day equivalent to 619m^3/hr. About 70 % TSF water will be recycled to the mill process plant; pumps which are capable of pumping 433 m^3/hr will be installed. The remaining water will be sourced from the main water pipeline, the mine pit and the bore wells.

A submersible pump is preferred for use. This will be mounted on a floating barge for mobility, which can be moved anywhere within the dam as necessary. To be more flexible, there will be two units of tails pumps to operate alternately mounted on the 2.5-ton capacity-floating barge.

The reclaimed process water and the raw water will be stored in separate closed top steel tanks which then supply water to the modules by identified pumps.

18.7. Offices, Workshops & Ancillary Buildings

The mine site will include a number of offices and structures in addition to the process plant setup and other mining landforms (TSF, Waste landform, pit and stockpiles), and these include:

- Mine operation offices
- Administration offices
- Mine technical offices
- Canteen and change rooms
- Dressing station and first aid facilties
- Computer and equipment control rooms
- Parking
- Process plant control office
- Metallurgical and assay laboratory
- Guard houses
- Storage areas/buildings
- Workshops, truck bays and associated buildings
- Refuelling station
- Special chemical and dangerous goods storage areas
- Other workshops

- Open storage areas (fenced)
- Etc.

18.8. Communications

External Communications

Internet and email services will be linked to a leased line from Telecom Malaysia as per the current situation. The compay server will be situated on site with a backup situated at the old mine site in Bau. All servers will be linked to the corporate server in Singapore. The leased line runs along the old Bau-Kuching road and is close to site with easy connection. Telephone and cell phone reception are available. A conferencing (Polycom) site will also be available on-site as is per current situation.

Internal Communications

A cable network (fibre-optic) will provide the infrastructure for the various operating systems around the mine site, and include:

- WAN/LAN
- VoIP
- Process monitoring and control
- Fire detection
- Security and surveillance (CCTV)
- Office computers
- Fire detection & emergency response
- Etc.

Also available will be radio system both hand-held and on-board mobile equipment.

18.9. Explosives Storage

Explosives will be stored in the designated explosives magazine, which will be constructed and maintained as per international standards and in line with Malaysian government requirements, as defined in the appropriate mining codes. It is envisaged that the magazine and exposives handling will be undertaken by a reputable company or operator or supplier of the explosives (e.g. Orica). The designed position of the magazine is as per distance regulations and it will be secured in accordance with mine security, safety and operational procedures and in accordance with all regulations.

18.10. Site Drainage

Pit water (either ground or runoff) will be collected in the pit sump at the base of the then current floor level. This water will be pumped to sets of water treatment and silt retention ponds. The treated and settled water will then be re-cycled or discharged appropriately based on requirements at that point in time.

Water from the TSF will be collected, transported and treated in the TSF ponds and wetland before discharge or usage.

Surface run off from the waste landform, roads and other areas within the mine site will be collected by a suitable network of drainage channels, culverts and other water flow structures to appropriate areas for collection, treatment and discharge (or re-use).

Runoff and water management will be minimised where possible by use of revegetation, silt retention geo-fabrics and other minimisation methods. This is particularly important during the construction phase where large amounts of ground will be exposed. All discharges will be subject to strict environmental standards and procedures.

18.11. Sewage & Solid Waste Disposal

Solid waste that cannot be re-cycled or is not of an organic nature will be collected in suitable waste skips and containers. This material will then be removed by the council waste collection contractor or a private contractor hired by the company. The refuse will then be transferred to the appropriate council refuse disposal facility.

Organic material will be collected, shredded and composted for use in the ongoing and final rehabilitation works or used for plant propagation in the plant nursery.

Sewage will be either collected from toilets and sewage collection points by mobile sewage contractors or the mine site sewage will be linked to the nearby sewage network.

18.12. Fire Protection & Emergency Response

Standard fire warning and response systems will be in place throughout the mine site with specialist equipment where dangerous gases and chemicals, or electrical equipment are present. Fire suppression systems will be present and will include fire extinguishers (suitable type for hazard), water hoses, sprinkler systems, etc.

A comprehensive fire and emergency response plan will be implemented in conjunction with the local Malaysian Fire and Rescue Department and local Malaysian Police Department. Mines rescue teams will be implemented and trained for on-site situations and will be available to support the above government departments for any fire or emergency response required at the mine site.

18.13. Security

The site will be surrounded by a continuous fence with gates at suitable points. Fencing will also be placed around facilities that required to be fenced off for safety reasons (e.g. pit) or for restricted access (e.g. plant). Security systems will include card access controllers and door mechanisms. Security personnel will be employed to prevent illegal access to the site or to restricted areas. The security systems and personnel will be supplemented by visual surveillance systems (e.g. CCTV) and preventative fencing (barbed or razor wire or electric fencing) where required.

All staff will have photo-ID access cards with the appropriate entry level authorisations which will be carried at all times. Other tagging systems may be used is required. Also standard locks and locking mechanisms will also be applied.

19. Market Studies & Contracts

Marketing of the gold concentrate has been investigated by NBG/Besra and preliminary offers by Chinese processing facilities have been used in the base case financial modelling. These are not disclosed here for commercial reasons.

Transport and shipping of concentrate is discussed in *Section 24.3*.

20. Environmental & Socio-Economic

20.1. Introduction

20.1.1. Project Overview and Concept

The Bau Gold project lies approximately 35 kilometres from Sarawak's administrative capital, Kuching and 7 kilometres from Bau Town, and is linked with a decently laid out network of sealed road. This plays an important role in terms of developing the project into a successful and sustainable mining venture.

The success of a mining operation does not lies with the amount of tonnage of ore a mine produces but rather the successful integration of responsible mining practices and restoring the landscape into a sustainable ecosystem post mining. By identifying any potential environmental and social impacts throughout various stages of project progression, strategies to manage and mitigate impacts related to mining can be implemented such as techniques of remediation and reclamation, including best practice of land management planning and monitoring.

The realistic nature of restoring a mine site to its pristine natural state may be an unlikely scenario. However, with diligent progressive rehabilitation and landscape stabilization of potential physical and chemical hazards, it is possible to establish a diverse and functional ecosystem in accordance to local and international standard of environmental awareness in creating a sustainable post-mining venture.

North Borneo Gold Sdn Bhd is actively pursuing the development of economical mineral resources in the Bau goldfield and at the same time, the company's is committed to undertake an environmental impact assessment to identify issues and data gaps to develop an environmental management and rehabilitation plan in compliance to international standard and local regulatory requirement, in order to create a sustainable environment during post-mining operation and closure. The aim is to create a post-mining environment that is at least equal in environmental value or better.

20.1.2. Key Environmental Aspects

The key environmental aspects that require consideration and attention for the future development of a mine and its associated infrastructure in the Bau area are:

- Identification of environmental impact and constraints associated with exploration and mining activities to ecology, socio-economic including historical / cultural sites in the area;
- The extent of land acquisition and loss of existing land use due to mining and exploration activities, and the likely cost of compensation to landowners;
- The potential for alteration of the existing environment such as elevated levels of suspended sediments or the presence of chemicals including metals (e.g. trace metals

such as Hg, As, and Fe) in streams emanating from the mine site, and the downstream ecological effects;
- The ecological impacts due to the alteration of pre-existing environment, such as land clearing and landscape modification affecting indigenous wildlife species in the area;
- The potential for ore, overburden, and tailings to generate Acid Mine Drainage due to the oxidation of the sulphide minerals and the mitigation measures associated with the rehabilitation and regulatory compliance;
- Socio-economic effects (both positive and negative) on local communities associated with or affected by the mining development, and the costs involved in maximising positive and minimising negative socio-economic effects;
- The scale and nature of rehabilitation scope for the eventual mine closure and post closure monitoring required for all deactivated mined-out areas and associated auxiliary structures and facilities; and
- Post mining environmental monitoring to ensure the success of rehabilitation and the preservation of a sustainable post-mining ecosystem.

20.2. Regulatory Framework

As stipulated in Malaysia's Environmental Quality Act (Prescribed Activities) 1987, Schedule No.11, under mining states that for:

- *Mining of minerals in new areas where the mining lease covers a total area in excess of 250 hectares; and;*
- *Ore processing, including concentrating for aluminium, copper, gold or tantalum;*

….an Environmental Impact Assessment is required to identify potential environmental risks and impact associated with the mining operation. The act stipulates that specific environmental risks and impact should be mitigated through the employment of an Environmental Management System.

North Borneo Gold is a strong proponent of creating a sustainable environment and pursuant of all aspects of environmental compliancy. The list of statutory regulations to be adhered to includes:

- *Sarawak Mining Ordinance 2004*
- *National Mineral Policy 2; and*
- *Environmental Quality (Environmental Impact Assessment) Order 1987 under the Environmental Quality Act (EQA) 1974*

Regulatory requirements for ***Sarawak Mining Ordinance 2004 under section 45*** stated that no development work or mining shall commence for which the lease has been granted until after the approval of:

a) Mine feasibility study under ***Section 55***, if such a study is required by the Authority;
b) Mine rehabilitation plan if so required, under ***Section 108***; and

c) An Environmental Impact Assessment (EIA) if so required under the Natural Resources and Environment (Prescribed Activities)

The National Mineral Policy 2 sets out the principles leading towards sustainable mining. It emphasizes sustainable development of mineral resources, environmental stewardship, and progressive and post- mining rehabilitation. The objectives are:

- To ensure sustainable development and optimum utilization of mineral resources;
- To promote environmental stewardship that will ensure the nation's mineral resources are developed in an environmentally sound, responsible and sustainable manner;
- To enhance the nation's mineral sector competitiveness and advancement in the global arena;
- To ensure the use of local minerals and promote the further development of mineral-based products; and
- To encourage the recovery, recycling and reuse of metals and minerals

Environmental Quality (Environmental Impact Assessment) Order 1987 under the Environmental Quality Act (EQA) 1974

The Environmental Quality Act addresses the prevention, abatement and control of pollution, and enhancement of the environment. The Act places restrictions on

- Atmospheric pollution
- Noise pollution
- Soil pollution
- Pollution of water-courses and water-bodies.

20.3. Existing Environment

20.3.1. Physical Environment

The Jugan prospect, amongst other deposits being explored at the moment, is generally low-lying with some very distinct topographic relief such as steep-sided hills formed by limestone pinnacles. The deposit in Jugan is of Carlin type model which generally consisted of interbedded sedimentary sequence of shale, siltstone, mudstone and sandstone of the Pedawan Formation of Lower Cretaceous age.

These areas are also a mixture of dispersed swampy areas and undulating hills. The typified drainage of the area is best characterized by dendritic system of creeks and riverine directed downstream towards Sungai Sarawak Kanan.

The surrounding steep terrain and high-rainfall eventually causes high rates of runoff into streams creating alternate low suspended sediment carrying loads during base flow conditions to considerably elevated loads following heavy rainfall. It can be surmised that indigenous aquatic fauna in these local fluvial environment are resilient and has adapted to frequent and wide variation in streams flows and fluctuation in turbidity.

The local economy is based on cash products such as rubber, cocoa, poultry and fish farming. Some residents also commute to the nearby city of Kuching for work. Other locally-produced cash crops include plantations of corn, cassava, oil palms and various fruit trees. Food sources are also supplemented by hunting for spotted birds, cats and other animals by the local people.

Apart from areas subjected to mining, agriculture and urban development, the project area, namely Jugan consisted of largely secondary or regrowth forest.

20.3.2. Land Usage

Other than nearby state land and road reserves, the surrounding land project area consisted of dispersed alienated land held by various lease holders.

Scattered and sporadic houses can be found in the immediate surrounds of Jugan prospect whilst 3 permanent settlements of sizeable communities are located within a 3 km radius from the prospect area namely Kg. Buso, Kg. Siniawan and Kg. Buso.

The current land status is comprised of cultivated and un-cultivated land, with the latter being in the majority. Many land parcels have absentee lease holders with no activity occurring on this land. Large portions of the land in and around Jugan comprised of secondary forest or re-growth scrubs and bushes.

Cultivation activities appear to be limited to small scale fish ponds and minor fruit growing, pepper & rubber trees supplemented by poultry farming and swine rearing including subsistence cash crops cultivation of corn and cassava.

The Bau District has had long association with mining and has been part of the district legacy since 1800's. Current and historical land use of the area is gold mining, which has occurred at least since the early 19th century. Evidences of both past and current mining activities can be found throughout the district, e.g. the deactivated Tai Parit pit and Lake Bekajang that served in the past as a tailings storage facility including several limestone quarries for aggregate production currently active.

20.3.3. Climate

Long-term rainfall data available from Kuching indicates an annual rainfall value of around 3100 mm minimum to 5100 mm maximum. Although significant rainfall may occur at any time of the year, the highest rainfall months are December and January, with the highest monthly rainfall occurring in January. The driest months are from April to September. Average monthly rainfall exceeds average monthly evaporation rates for all months of the year.

20.3.4. Biological Environment

Recently completed ecological survey of Jugan presented a diverse ecosystem through identification of approximately 20 known floras and at least 7 species of mammals including 5 species of reptiles and 7 species of birds whereas 7 species of aquatic fauna was identified comprising of mostly fresh water fishes and variety of crustaceans.

Amongst the flora and fauna identified at Jugan, 2 species of flora were categorized as endangered and 1 species of reptiles is listed as vulnerable. At least 1 type of amphibians is listed as a threaten species. None of bird species and aquatic faunas was listed as endangered.

20.3.5. Human Environment

The Bau District is approximately 884 km^2, with a municipal administrative centre located in Bau town. Bau is approximately 35 km southeast of Sarawak State capital Kuching. While the population is multi-racial, the main ethnic-group consist of Bidayuh (68.8 %), followed by Chinese (17.4 %) and Malays (7.8 %). The remaining 4 % constitute of other races and non-Malaysian.

Based on the Socio-economic study, statistics shows a significant proportion of the populations of Bau tend to migrate outside of Bau, particularly to Kuching for reasons of employment and improved standard of living. Such opportunities were possible due to:

- An improved road system which facilitates movement of people between rural and urban areas;
- Poor employment opportunities in Bau area relative to Kuching or other developing areas; and
- A tendency for government officials and white-collar employees to prefer living in urban rather than rural locations.

20.3.6. Socio-Economic Environment

The ethnic background of Bau Town and its surrounding areas comprised of the majority Bidayuh from the Dayak ethnic group followed by Chinese who are mainly descendants of early miners brought in the mid to late 19th Century to exploit the gold and antimony deposits at Bau and Sarawakian's Malays.

The known industries in the Bau district are limestone quarrying, small scale fish, poultry and swine rearing, rice farming, palm oil and rubber production.

The Jugan Project generally has good infrastructural aspects both within Bau Township towards Kuching. The main infrastructural features are:

- Regular and reliable international air services to Kuching from Kuala Lumpur, Singapore and Indonesia and the Airport is only 40 minute drive from the project area;
- Two ports with good dock and storage facilities;
- Two main sealed trunk roads from Kuching for delivery of supplies, heavy plant and equipment to the plant site;
- Excellent labour and engineering support services;

- Easy Accessibility – project extremities are less than 20 minutes' drive from the exploration base. All important mines and gold prospects are linked by road;
- Area is serviced with municipal power and water;
- The official language in Sarawak is Bahasa Malaysia, but most local communities have an understandable communication knowledge of English;
- Well educated workforce;
- An active quarrying industry focused mainly on limestone and marble for roading aggregates and agricultural purposes;
- Ready supply of earthmoving equipment that supports the quarrying industry; and
- A local labour source with mining experience gained from the quarrying industry and previous mining and exploration companies previously active in the area.

Based on the socio-economic study conducted, majority of respondent indicated farming does not constitute as a major source of income but rather as a supplementary means to acquire additional financial enrichment. Other income generating source comes from small scale business enterprise and self-employment such as carpentry and masonry including public and private sector executives. *Table 20-1 - Percentage Split of Economic Activities* shows the economic activities and employment percentage:

Economic Activities	Percentage of Employment
Private Sector	34%
Self-employed	34%
Farming	23%
Public Sector	11%

Table 20-1 - Percentage Split of Economic Activities

20.3.7. Community Development, Liaison & Public Relations

Stakeholders identified through socio-economic study and upcoming Environmental Impact Assessment (EIA), associated with the proposed Jugan prospect, will be encourage to participate in the planning and decision making in regards to issues relating to socio-economic development and environmental awareness in order to:

- Understand the likely environmental, social and economic impacts of mine closure on affected communities;
- Take into consideration the interests and expectations of the respective stakeholders;
- Ensure the process of closure occurs in an orderly, cost-effective and timely manner;
- Establish a set of indicators which will demonstrate the successful completion of the closure process;
- Establish completion criteria to the satisfaction of the responsible authority;
- Ensure support for closure decisions; and
- Enhance public image and reputation.

Stakeholder involvement and engagement process has been initiated and will continue through the feasibility study, EIA and throughout mining operations effectively to reduced misunderstanding and increased awareness via regular meetings, educational presentations, information releases, website updates as a mean to address any arising issues relating to socio-economic and environmental concern.

20.4. Environmental Assessment of Major Elements, Impacts & Mitigation

The nature of mining operations in transforming a landscape is a common occurrence. Although the restoration of a particular landscape to its natural state may not be a realistic solution, the next logical alternative would be to implement best mining practice and environmental rehabilitation framework to formulate an achievable outcome to restore the landscape and establish diverse functional and sustainable ecosystem post-mining.

The realisation of past mining practices and their lack of enthusiasm to identify and appropriately plan for a rehabilitative mine closure. This has since prompted an ever increasing awareness and the need to include environmental, social and economic issues into mine development planning.

As such, some of the main mining elements which require specific attention are:

- Open Pit
- Waste Disposal
- Tailing Storage Facility
- Mining Infrastructure (Processing Plant & Buildings)

The Environmental aspects relating to the above are:

- Acid Mine Drainage (AMD)
- Landform Stability (Slope stability and Erosional Control)
- Land Rehabilitation (Re-vegetation & Conservation)
- Dust and Noise
- Ecological

A successful mining venture legacy will be measure through the implementation and integration method whereby environmental degradation aspects has been properly addressed and avoid a costly mine closure.

The major mining elements and their related environmental aspects are covered in the following sections.

20.4.1. Major Elements

20.4.1.1. Open Pit

Overburden removal of topsoil and non-mineralised rock in conjunction with the extraction of economic ore is a significant part of the mining operation. The overall configuration and extent of the open pit depends on the geological setting, size of the deposit and related economic aspects.

The proposed Jugan mine pit is approximately 24 ha. This size of pit is at the lower end of the scale when compared with other open pit mining around the world. The open pit is estimated to produce approx. 9 Mt of ore and 22 Mt of non-mineralized rock (waste) material over the entire mine's operation. The final depth is provisionally estimated at approx. 200 metres depth below surface. This is based on the current feasibility study and subject to change depending on future mine planning and possible discovery of new extension of mineralized ore.

Rehabilitation & Post Mining Options

The open pit will be part of an altered landform throughout a mine's life until cessation of mining. There are a number of conceptual rehabilitation options such as transforming it into a recreational lake to support local tourism and recreation, or for agricultural and commercial activities such as re-stocking with common fresh aquatic species for use in supply to local fish farmers. An alternate option would be to utilise the open pit as a disposal site for residential and/or industrial waste with each layer being capped with clay liner to prevent seepage and act as containment for waste.

20.4.1.2. Waste Disposal Landform

The waste disposal landform is anticipated to be a visible landform feature at the end of mining. The desired goal would be to integrate and blend the landform into the surrounding topography and environment.

Progressive rehabilitative schemes can be conducted concurrently with regular mine operations. These include slope grading to minimize erosion and surface runoff and progressive re-vegetation.

A diversion drainage channel or spillway will be constructed surrounding the waste disposal landform to regulate and divert runoff to designated silt and settling ponds to contain possible runoff. This surface runoff water will be subsequently sampled and sent for laboratory analysis to ensure compliance to local and international environmental standards.

The waste disposal landform will be constructed in a series of lifts with 5m catch berms. Currently, the projected final height of the waste disposal landform will be approximately 70m in height. It will be built in a bottom-up construction method where thin layers will be compacted and loose spoils on the slope, will be trimmed at every designated height interval.

All potentially acid producing mine waste (PAF) will be overlain by a metre thick non-acid producing mine waste (NAF) and will be encapsulated with clay-lining and covered with topsoil for eventual re-vegetation.

Rehabilitation & Post Mining Options

There is various reclamation and rehabilitation options available for consideration for the waste disposal landform, some examples are:

- Return land to natural state as part of a park area (in itself or as part of the overall rehabilitation strategy), which could include planting and re-introduction of native species; or
- Create recreational facilities, by itself, or in conjunction with the rehabilitation of the other areas, e.g. hiking and mountain biking trails; or
- Possibility of transforming the land into some form of agriculture usage e.g. for grazing of livestock; or
- Usage of the land as part of a tourism venture, e.g. Bidayuh longhouse and village; or
- Combinations of the above options.

20.4.1.3. Tailings Storage Facility

The tailing storage facility (TSF) will be an integral part of mining operations and contains the processed material after the ore has been extracted. As such, the TSF needs to be a stable structure to properly hold processed material. This structure will be rehabilitated as part of the overall plan.

The current proposed TSF is projected to cover an area of approximately 75ha with an estimated height of approximately 20m. It will comprise an impoundment bund constructed from the same waste rock / un-mineralized overburden at Jugan Hill and contain the processed tailings. Waste rock of will be compacted and stacked-up in 1m lifts. Localized clay will be utilised as lining at the bottom of the TSF and acting as "Capping" to seal any PAF material in-place and to prevent seepage. Progressive re-vegetation of slopes at every suitable lift interval will be conducted, after the clay-lining.

The embankment will rise or expand overtime to accommodate tailings production. Aspects such as slope stability, erosional control and vegetative cover will be some of the elements to be addressed in the progressive rehabilitation framework, which can be initiated concurrently with the expansion of the TSF embankment.

Rehabilitation & Post Mining Options

One conceptual option for environmental sustainability would be to convert the TSF into wetlands and transform it into a wildlife sanctuary with proper rehabilitation programmes and reclamation design. Alternately, the rehabilitated land may have some agricultural or commercial usage, e.g. livestock farming, or some other land use may be devised to fit in with the overall rehabilitation.

20.4.1.4. Infrastructure, Building & Processing Plant

Buildings and other infrastructure elements will be decommissioned and demolished at the end of mining operations. A few structures will remain post closure to be utilized as monitoring and treatment facilities e.g. pump stations to regulate drainage. Vacant areas will be graded to ensure land form stability and reclaimed/rehabilitated through various stages of the re-vegetation scheme.

Rehabilitation & Post Mining Options

Operational and re-useable mechanical component including building material will be salvage and may be potentially re-used in other mining projects owned by the company or re-sale to potential buyers. Scraps metals and other recyclable leftover shall be delivered to gazetted recycling facility for proper handling.

Vacant areas are likely to be re-contoured, graded and re-vegetated. Some potential uses may be:

- Convertion back into agricultural land or for commercial enterprises;
- Recreational facilities either individually or in conjunction with the other elements;
- As a park and associated nursery for re-introduction of local flora and fauna, etc.

20.4.2. Environmental Impacts & Mitigation

20.4.2.1. Acid Mine Drainage

Acid mine drainage (or acid rock drainage) is a process whereby minerals containing sulphides are oxidized due to exposure to atmospheric conditions. Contributing factors to AMD can be classified into 3 categories, namely Primary, Secondary and Tertiary. The Primary factors involved sulphide oxidation, where sulphide bearing rocks are exposed to atmospheric oxygen, which subsequently initiates chemical reactions producing sulphate and acidic conditions. Secondary factors are those involving minerals with acidity neutralizing characteristics, which altered the chemical composition. Tertiary factors involved physical conditions such as topography and climate, which accelerates sulphides oxidation and subsequently the migration of oxidized products.

The extraction of mineral ores and associated sulphide bearing minerals potentially increase the rate of AMD. Earth moving operations such as stripping of waste rock may also contribute to AMD due to close geological association to sulphide wall rocks being exposed in the mine pit and within the waste dump. The most cost effective solution, is to minimize AMD through proper mine planning, suitbale containment or treatment and the integration of hydrological controls covering all stages of mining.

It is essential to understanding the source, pathway and receptors in order to properly address AMD effectively. By understanding the site specific mechanism for acid generation, suitable control strategies can be develop to address AMD. Specific and detailed analysis of this has been undertaken for NBG, by SGS Environmental in Perth, Australia.

The common laboratory tests, conducted by SGS, to determine the acid generation or neutralization capacity of a rock or minerals are (i) Static (ii) Kinetic Tests.

i. Static Test
- Total Sulphur (in Sulphides)
- Net Acid Generation (NAG)
- Net Acid Producing Potential (NAPP)
- Acid Neutralization Capacity (ANC)

ii. Kinetic Test
- Sulphides Oxidation Rates
- Rates of Metal and Mineral leachate Generation
- Biological Acid Production Potential

Mitigation Options

There are a number of commonly utilised strategies available to prevent or mitigate the impact of AMD. These include avoidance of disturbance, dry covers, clay lining, underwater storage, neutralization, collection and treatment. Avoidance of disturbance of a potential acid forming material is always the preferred option. PAF materials are inert as long as they are not exposed to oxygen and water. If disturbance is inevitable, minimisation of acid drainage requires control of oxygen diffusion, water infiltration and neutralisation of existing and potential acidity.

Preventive measures in dealing with AMD comprise of the following mechanisms:

- Exclusion of oxygen from sulphidic mine wastes;
- Control of water influx and hydrological management to minimized migration and transport of oxidized products;
- Neutralization of AMD with alkaline materials; or
- Encapsulation by utilising "Wet or Dry" covers.

As part of the Feasibility Study and the baseline work for the EIA, samples were collected and sent to an internationally accredited laboratory (SGS Environmental in Perth, Australia) for testing to assess potentially acid forming (PAF) or non-acid forming (NAF) properties on non-mineralized rocks (waste) to be utilize as buffer or barrier to reduce and minimize the effect of AMD.

Recent static geochemistry laboratory test results shows majority of the waste rock or un-mineralized rocks indicates these have strong NAF (non-acid forming) properties or at least acid consuming.

The incorporation and placement of NAF to encapsulate any potential PAF in alternate layers has the capacity to reduce or at least moderate acid drainage. The layered NAF will act as "cap" of dry cover material in AMD seepage mitigation. The design strategy is to prevent generation of acid leachate and prevent un-control seepage into the surrounding environment by constructing alternating layers of NAF and PAF with clay acting as barrier or seal. These will be followed up with re-vegetation of types of resilient and plants with acid consuming ability (like the local ferns on the natural exposures) to limit AMD as well as to enhance slope stability and erosion prevention.

Another solution would be to utilize water as a cover (wet cover). Sulphide material would be rendered unreactive due to reduced availability of oxygen. By combination of passive and active methods, including the incorporation of inert material such as quart sand, fly-ash and calcium carbonate; or application of alkaline material (e.g. limestone), will increase the AMD stabilisation or neutralisation impacts.

20.4.2.2. Landform Stability (Slope Stability & Erosional Control)

The factors affecting land form stability depend upon the landform slope gradient, drainage or surface run-off control and erosion prevention. Changes to elevation, slope angles and lengths brought about by excavation, dumping and reshaping may possibly render the new land surface susceptible to erosion if suitable measures are not undertaken. The desired goal should be a stable and non-erosive landform that conforms and blends into the surrounding topography and environment

When considering slope stability, geological characterization, design parameters and slope geometry play an important role. Another important attribute in slope stability is the drainage pattern. Since the natural drainage pattern has potentially achieved equilibrium with the natural surroundings over time, changes brought by excavation, alteration of landform in terms of elevation and geometry will render newly exposed land surface susceptible to erosion unless handled or mitigated properly.

Three major elements when dealing with slope stability aspects are, the:

- Jugan Mine Pit;
- Waste Disposal Area; and
- Tailing Storage Facility.

<u>Mitigation Options</u>

There are three (3) major criteria for determining slope stability and design. The first being the structural domain of lithological contact boundaries such as faults, shear zones and planes of weakness. The second is mining pit wall orientation as rock within the same structural domain exhibit different degrees of instability at different rock face angles. The final and third criterion is the operational factor whereby the slope of an area, within the open pit and waste dump, is interactive and revolves around mine planning.

Key mitigation steps are:

- Bench design in the open pit – final benches are left with suitable final widths to assist with pit slope stability and act as rock catchments for any material that is dislodged;

- Slope angles – all slope angles (pit, TSF, waste landform and others) are designed, based on their constituent materials, to prevent slope failure, in conjunction with appropriate drainage and suitable coverage;
- Slope management – particularly in the pit it is important to identify any potential failure areas such as faults, joints and other weak rock elements, and introduce or apply observation and rectification strategies to ensure these potential failure areas are managed adequately; these will include visual mapping, use of measurement devices (e.g. inclinometers), slope design and orientation and support strategies (e.g. cable bolts, shotcreting, etc.);
- Water management – an integrated water management and drainage design and implementation to control water flow in such a manner as to limit the erosional or failure impacts; these include drainage elements (surface and sub-surface), vegetation or other surface binding (e.g. geo-fabrics), ponds and silt retention barriers;
- Vegetative and topsoil cover – prevention of erosion is best mitigated using vegetation to ensure a cohesive and physically stable surface, particularly for runoff; the plan is to minimise exposed land surfaces as much as possible and to re-vegetate land at the earliest possible moment after exposure, both finally and in an ongoing manner.

It should be noted that the above are intrinsically linked and will not be implemented individually but holistically in a combied and planned manner.

20.4.2.3. Land Rehabilitation (Re-Vegetation & Conservation)

The ultimate objective of a successful mine closure plan is to “return” the altered landscape as close as practical to its natural condition into a sustainable ecosystem or as a substitute landscape that is natural in form and principle. The re-vegetation scheme will cover a wide range of areas such as mine pit, waste dump, tailing embankment and areas affected by infrastructures and engineer design such as building, plant facilities and access roads.

Mitigation Options

Disturbed areas such as waste dump and excavated overburden will be re-vegetated to further create slope stability and as a means of erosion control. As part of the re-vegetation scheme, native plant species shall be selected where applicable or those that enhance the landscape.

The scope will be to provide sufficient vegetative cover for natural and altered land to create soil retention and slope stabilization. Therefore, re-vegetation framework will encompass various levels in order to achieve a successful closure plan. Re-vegetation will comprise the bulk of the rehabilitation program which will eventually be extended post mining to ensure exposed surfaces are covered and vegetated to reduce soil erosion and create stable landforms.

20.4.2.4. Air and Noise

Dust particulates in the air may be generated from mining activities within and surrounding the open pit (drilling and loading of haul trucks), and from haul truck movement along haul roads, or from transport trucks into and out of the mine site. Activities such mechanical disturbance of rock and soil materials from bulldozing and blasting will also contribute to create dust. Wind blowing over exposed ground or stockpiles of fine aggregate, especially during dry season, may generate additional dust.

Noise levels will primarily be emanating from the operating plant. Additional noise from vehicular movement, other machinery and rock blasting will potentially increase noise levels.

Mitigation Options

Identified noise and dust issues will be mitigated by implementing the measures listed below. Also, by establishing strategically stationed air and noise monitoring points, data can be collected to formulate solutions for ongoing noise and dust issues.

Common methods that are likely to be implemented in some form, to minimize releases of airborne particulate matter (dust), include:

- Selective spraying water on possible dust generation surfaces (e.g. haul roads) to maintain sufficient surface moisture;
- Vehicles to go through a “Wheel Wash” or “Wash Bay” to reduce dust and dirt from the vehicle wheels and undercarriage;
- Using tarpaulin covers for trucks to minimise the release of dust or to prevent material falling out onto roads during the transportation of material to/from the mine site;
- Minimising the amount of exposed soil or un-vegetated surfaces;
- Establishing speed limits on unpaved surfaces that are sufficient to minimise dust from vehicles; and
- Regular and systematic air monitoring to ensure compliance.

Noise mitigation methods include:

- Impose speed limits to minimise vehicle’s noise;
- Equipment with lower sound power levels will be used in preference to more noisy equipment;
- The on-site road network to be maintained to limit body noise from empty trucks travelling on uneven internal roads;
- Implement vehicle muffling or noise reduction equipment to limit/reduce noise emanating from machinery and vehicle exhaust pipes;
- No blasting to be conducted at night time, and only at designated times;
- Regular vehicle and machinery maintenance to ensure proper equipment operation;
- Construct noise bunds, fencing and vegetation planting to act as noise barriers where applicable; and
- Processing plant and other structures with equipment that may potentially generate noise to be covered in, and if applicable to have noise reduction elements installed.

20.4.2.5. Visual Aspects

The mining operation, including the initial construction phase, may possibly have some visual impacts on the surrounding area. These visual impacts need to be addressed and mitigated.

Mitigation Options

Typical visual mitigation measures are:

- Planting of vegetation to screen the pit, plant and other elements from the surrounding areas affected;
- Construction of suitable fencing or walls to block the visual impact;
- Building or creating visual bunds (including vegetation) to further assist in the screening of visual impacts; and
- Vegetation and rehabilitation of mining elements in a progressive manner to reduce any obvious visual impacts.

20.5. Environmental Monitoring & Management

20.5.1. Environmental Management Plan

The main objective of an Environmental Management Plan is to develop control strategies and mitigation measures to deal with potential environmental impacts and restore the land to a satisfactory condition by:

- Eliminating unacceptable health hazards and ensuring public safety;
- Limiting the production and circulation of substances that could have negative impact on the environment
- Restoring the site to a condition in which it is visually acceptable to the community; and,
- Develop a rehabilitation plan which focuses on land reclamation, solid waste storage, tailings containment, and drainage control to prevent erosion

Rehabilitation is a continual process whereby work can commence at any stage throughout mining operations, provided it is appropriate and physically achievable. It is a dynamic and evolving framework which addresses the various facets of environmental issues.

Essentially, all disturbed earth and “borrowed land” will to be rehabilitated not just for the sake of regulatory compliance and adherence to internationally accepted mining best practice. It is to “return” or transform the land into a sustainable ecosystem post mining. At the onset of mining activities, as certain areas will not be disturbed and rehabilitation activities can occur during the mining phase where applicable, i.e. progressive rehabilitation. However, the bulk of the rehabilitation work will be conducted after mining and associated other activities are complete. In order to achieve a successful and sustainable objective, the following section will further discuss various environmental monitoring measures.

20.5.2. Environmental Baseline Data Management

Environmental baseline monitoring was undertaken to collect background data on the surrounding land, which will further enhance rehabilitation strategies by identifying any pre-existing concerns or situations.

A governmentally accredited and recognized environmental consulting firm (Chemsain Sdn Bhd) has been engaged to conduct laboratoratory testing and environmental monitoring at the Jugan mining project. This consulting firm is also planned to provide additional support and services in the studies and compilation of the EIA report. List of baseline studies include;

- Soil Monitoring
- Surface Water Monitoring
- Ambient Air and Noise Monitoring
- Weather and Rainfall Recording
- Ecological Study
- Social Economic Study

Additional studies and analysis work has been planned in the near term to meet EIA requirement and regulatory compliance. Monitoring program is by no means a short term undertaking but rather a continuous process until cessation of mining to ensure all environmental aspects are properly manage and the land is self sustaining.

As the Jugan mining project expands, and transform into a fully functional mine, other environmental monitoring scope will be incorporated to better evaluate the altered environment and implement site specific rehabilitation parameter in compliance with local and international regulatory standard. Other scope of environmental monitoring includes:

- Groundwater Monitoring
- Soil Monitoring
- Water Discharge and Sedimentation Monitoring
- Vibration Monitoring
- Ecological Monitoring of Flora and Fauna
- Air and Noise Monitoring

20.5.3. Environmental Monitoring

Collection of baseline environmental data will be based on parameters detailed and stated in the EIA as approved by local regulatory governing bodies. Data collection will be a combined effort of mining personnel and appointed environmental consultant recognized and approved by governmental regulatory department. Methods and parameters of environmental data collection are listed below.

The majority of baseline envonronmental work has been completed to date, with only a few minor studies to be undertaken. Ongoing monitoring will also need to e conducted and this is also summarised below.

20.5.3.1. Baseline Surface and Groundwater Monitoring

Parameters to be included are pH, dissolved oxygen, turbidity, conductivity suspended solids, Biological Oxygen Demand (BOD,) Chemical Oxygen Demand (COD), oil and grease, metals (As, Cd, Cr, Cu, Fe, Pb, Ni, Hg, Zn), coliforms and cyanide (specifically weak acid dissociable WAD cyanide).

Locations of sampling points have been and will be positioned to monitor the following:

- Operating plant discharge to TSF;
- Seepage from waste rock and waste disposal;
- Mine discharge water;
- Discharge and seepage from TSF;
- Selected locations upstream and downstream of discharge to surface water.

Surface water monitoring will be supplemented by groundwater monitoring and sampling as stipulated in the EIA and EMP. Accumulated data will be incorporated into the EIA as a baseline for future monitoring.

In order to characterize the groundwater characteristics and flow regime, a detail hydrogeological study will be incorporated as part of the EIA study to determine the water level drawdown and potential ground subsidence effect due to dewatering associated with the mine pit operation. Future proposed ground water well(s) may be installed in the periphery of the mine pit for aquifer test pumping calculations and on water recharge rates.

20.5.3.2. Baseline Soil Monitoring

Prior to the commencement of mining operations, a regional baseline soil sampling program was completed to characterise the geochemical and geotechnical properties of the soil in the project area. Data collected will be incorporated into the EIA to be utilised in subsequent environmental monitoring program and rehabilitation schemes.

Soil geochemical test parameters included:

- pH
- Metals (Fe, Ag, Mo, Mn, Mg, Cd, Pb, As, Al, Fe, Hg, Cu, Zn)
- Nutrients (N, P, Na, K, NO3, S).

Geotechnical properties parameters analysed included:

- Moisture Content
- Specific Gravity / Density
- Atterberg Limit (Liquid Limit & Plasticity Index)
- Constant Head Permeability Test

Data compiled may be utilized for future re-vegetation and rehabilitation undertakings and serve as baseline data for the EIA documentation.

20.5.3.3. Water Discharge & Sedimentation

Sediment samples will be taken at pre-determined location as indicated in the EIA to monitor the metals concentration in the river sediments. This will establish the baseline metal concentrations associated with mineralised rock being deposited into the river from naturally exposed outcrop.

Monitoring location will be set up at strategically determine location as identify in the EIA to monitor effluent discharge outlet such as:

- Processing Plant
- Tailing Storage Facility
- Spillway
- Laboratory

Sediment sampling is necessary to characterise sedimentation profiles on nearby streams and rivers to determine sedimentation overload especially during rainy season which will cause an increase in amount of suspended solids and turbidity, whereby affecting oxygen demand levels for aquatic life. Monitoring stations will be proposed at positions:

- Upstream
- Midstream
- Downstream

20.5.3.4. Air, Noise & Vibration

Parameters monitored and to have ongoing monitoring include, noise level, air such as SO2, NOx, CO, wind direction and including wind speed to predict dispersion effect. Daily rainfall, humidity, evaporation and barometric pressure measurement will be monitor and collected should be established at the mine site offices in order.

The noise at selected work sites and workshops around the mine should be periodically tested at least twice per year and when new major machinery is brought on-line. This should allow the correct level of noise protection equipment to be purchased and issued to staff working in these areas.

Potential adverse noise effects from plant operations especially at night time will need to be identified and dealt with accordingly. Adverse effects from mining operation vehicles should to be considered as well. Air and Noise aspect and mitigation measure had been discussed in previous section.

Blast vibration should be measured around the site and at nearby locations to ensure compliance with vibration levels. It is envisaged that modern blasting methods are expected to produce low vibration levels.

20.5.3.5. Ecological Monitoring of Flora and Fauna

During construction and operational phases, environmental monitoring will be conducted to measure and assess any potential adverse concern related to natural flora and fauna. This will include natural habitat monitoring of the Sarawak Kanan River (Sg. Sarawak Kanan) to identify possible ecological impact in the surrounding vicinity.

Baseline monitoring will be an effective tool to capture baseline data which can be incorporated into mine planning to develop a co-existence scenario with the natural habitat.

An ecological study has been completed for the Jugan project whereby species of flora and fauna were categorized to assist in future conservation effort.

20.6. Site Closure & Rehabilitation

A conceptual Mine Rehabilitation Plan (MRP) has been submitted to governmental departments and agencies for review, has been updated twice, and has been accepted. The current conceptual MRP is subject to amendment pending results of the detailed EIA and Feasibility Study work and actual operations. Any changes will be communicated to the authorities in the form of a revised or updated MRP.

The main focus after completion of a successful mining operation would be to return the "Borrowed Land" and disturbed area to an environmentally sustainable and properly rehabilitated landscape with suitable land usage. Goals set out include:

- Regulatory Compliance – Meet and exceed all regulatory requirements and standards
- Environment Rehabilitation – Develop a sustainable and rehabilitated land
- Stakeholder Agreement - Active stakeholder and community engagement
- Public Safety - Elimination of hazard and return the land safe for future use

Decommissioning and closure of the majority of the facilities and infrastructure will commence only after cessation of mining. However, some ongoing rehabilitation will also be conducted as required. Others facilities such as power station, water pump station, TSF and detox pond need to remain long after closure to facilitate rehabilitation and reclamation. Sequential closure will be based on governmental regulatory institution and stakeholder agreement. Post closure monitoring and maintenance will continue to ensure compliance and achievement of all regulatory criteria successfully.

Figure 20-1 - 3D View: Indicative Sequence Showing Current Topography, Mining Infrastructure & Rehabilitated Site below is an indicative closure option – the sequence of images shows the original topography, the mining infrastructure and landform amendments, and finally an example of the rehabilitated topography post-mining and after closure.

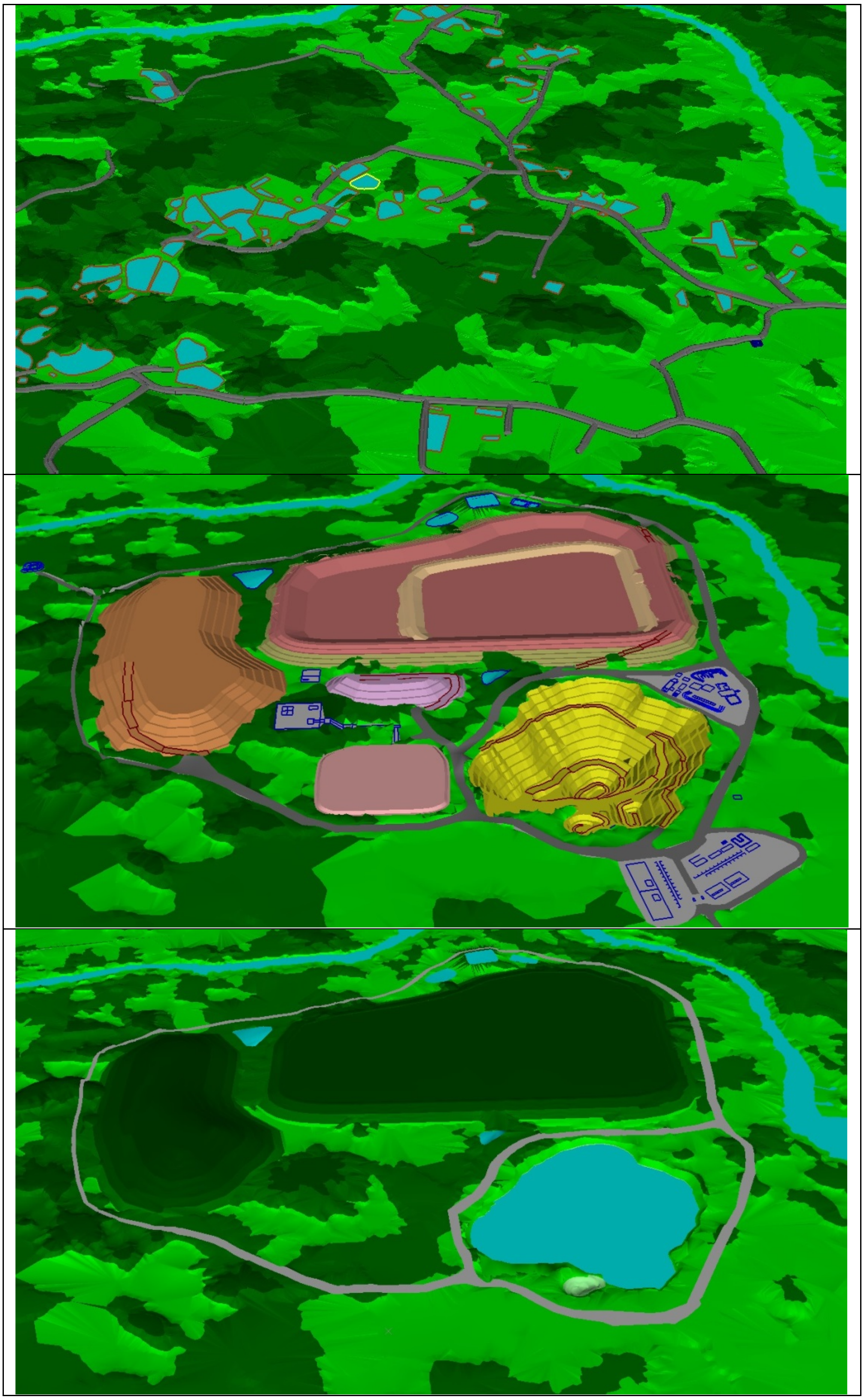


Figure 20-1 - 3D View: Indicative Sequence Showing Current Topography, Mining Infrastructure & Rehabilitated Site

The monitoring program involves data recording of variables associated with the impacts. These includes, air, water, soil, rehabilitation success and public safety.

Surface water monitoring will be a crucial component to ensure the health of the rehabilitated land and detection of any potentially harmful and hazardous substances is not being released to existing water supply (i.e. rivers, streams and lakes). Water sampling will be further supplemented by soil sampling at selected areas which has shown historical impact or potentially new areas which need constant monitoring.

General health and safety issues need to be address post mining as certain areas may be hazardous to the public, namely the open pit, TSF and waste disposal. These areas will require proper signage and fencing where applicable or other measures to properly mitigate any hazards.

20.6.1. Closure Timeframes

Typically post closure activities range from six (6) months to two (2) years in duration depending upon the size and scale of mining, and the amount of on-going rehabilitation work completed to date. A typical conceptualized closure timeframe, detailing work activities and the related timings are detailed in the following table. Completion of the Feasibility Study and EIA will provide information to further undertake detailed scheduling of mine closure activities and help develop the associated costs of rehabilitation.

20.7. Identification & Management of Closure Issues

Closure frameworks, associated with various mining activities, will be identified at the onset of mine planning and the operations stage. This framework will be constantly under review and assessment throughout until mine closure. By identifying important aspects relating to environmental impacts, control measures can be implemented and integrated into mine planning and operations, to prevent long lasting reputational and financial risk. As such, prior to the actual closure, issues such as AMD, erosion, drainage and slope stability control including re-vegetation will be given precedence.

20.7.1. Measures on Public Safety and Health

Mining and exploration sites must be left in a condition that ensures the safety of the Public are well looked after. All appropriate and recognized Health and Safety practices will be followed. The Rehabilitation Plan should cover the security of the site and public safety, following cessation of operations. This may require limiting public access by fencing and barring of vehicular access tracks.

Safety and security objectives include the following:

- Safe and secure environment for humans and wildlife for the long term;
- Stability assessment of remaining mining voids where relevant to the potential for further ground movement and the need for controls such as barriers or fencing;
- Stabilization of slopes (e.g. of pit walls, waste dumps, dams) so that no hazard to the public remains after final closure. Temporary restriction of access to specific areas to

protect remaining equipment or facilities or to ensure undisturbed development of vegetation which needs care and maintenance until the area is deemed safe. Over the long-term, there will be no restrictions of access by the public, as all hazards to safety, property and health will have been removed;

- Site maintenance and security will be on going activities during closure, and will be subject to periodic inspection.

Other Public Health and Safety measures include, but are not limited to:

- Elimination of areas susceptible to water logging and free of stagnant and standing water to reduce and / or eliminate breeding ground of disease borne insects, especially mosquito;
- Proper disposal of waste and erection of Health and Safety signboards with proper barricades at specifically designated waste disposal areas to reduce public contact with waste and prevent public contamination;
- Occupational Health and Safety training for employees to create awareness on methods of prevention of accidents and disease whereby, trained employees will be able to relate and share these knowledge to their respective family member;
- Community engagement and liaison including education for the public to foster cooperation and awareness in creating a clean, sustainable and healthy living environment;
- Environmental monitoring of air, noise and water to ensure public are not exposed to harmful effects and contamination especially water reservoir.

20.8. Summary & Conclusions

North Borneo Gold Sdn Bhd is actively pursuing the development of economical mineral resources in the Bau goldfield and at the same time, the company's is committed to undertake an environmental impact assessment to identify issues and data gaps to develop an environmental management and rehabilitation plan in compliance to international standard and local regulatory requirement, in order to create a sustainable environment during post-mining operation and closure. The aim is to create a post-mining environment that is at least equal in environmental value or better.

Regulatory framework and compliance plays an important role to guarantee the basis for environmental impact assessment is being addressed appropriately to ensure sustainable development of mineral resource and at the same time, promote environmental stewardship to ensure the mining project is being developed in an environmentally sound, responsible and sustainable manner.

Socio-economic undertaking such as stakeholder engagement, local community development, public relation and liaison present a unique opportunity for the company to encourage local community participation and interest for dialog to identify possible concerns and expectation relating to socio-economic development and environmental awareness. This will foster relations and create credibility which will further elevate the company's public image and reputation. As such, some of the key environmental aspects, which required attention as the project progresses into a viable mining operation, are:

- Identification of environmental impacts and constraints associated with exploration and mining activities to ecology, socio-economic including historical / cultural sites in the area;
- The ecological impacts due to alteration of pre-existing environment such as land clearing and landscape modification effecting indigenous wild life species in the area
- The concern of Acid Mine Drainage (AMD) generation due to the oxidation of sulphide minerals from ore and waste and mitigation measure associated with the rehabilitation and regulatory compliance;
- Socio-economic effects (both positive and negative) on local communities associated with or affected by the mining development, and the costs involved in maximising positive and minimising negative socio-economic effects; and
- The scale and nature of rehabilitation scope for the eventual mine closure and post closure monitoring required for all deactivated mined-out areas and associated auxiliary structures and facilities.
- Post mining environmental monitoring to ensure the success of rehabilitation and the preservation of a sustainable ecosystem.

In order to achieve the task of creating a sustainable environment post mining, control measures and mitigation methods need to be in place to counter potential environmental impact. Hence, mine planning isincorporating the following management framework for the integration of site specific mitigation design. These are:

- Environmental Impact Assessment
- Environmental Management Plan
- Mine Rehabilitation Plan
- Monitoring Program
- Alternatives Land Use Planning

Through proper incorporation of the above mentioned management framework, a progressive rehabilitation process can commence to deal with potential long-term environmental impacts due to mining. The objectives of rehabilitation schemes are to develop achievable goals at various stages as mine planning evolves by converting an area of concern to a safe and stable condition, restoring the site to a pre-mining condition as closely as possible in order to ensure sustainability development. Mine rehabilitation is essentially a process whereby the development of mineral resources is being conducted in accordance with the principles of leading sustainable practice. Rehabilitation should be part of an effective integrated program coexisting with mine operation and mine development in all phases.

In summary, mining is a temporary use of the land, the successes of a mining venture lies with the notion that the mining operator has successfully integrated mining best practice with the development of sustainable mining operation and integrated the best mine closure standards by ensuring the future of the land is not compromised but rather in a sustainable manner.

The progression from current land status through mining to a possible rehabilitated state is shown in the modelled 3D views to show the concept, and these are shown in *Figure 20-2 - Jugan - Current Land Situation and Status* to *Figure 20-4 - Indicative Rehabilitated Scenario Option for Jugan* below.

Figure 20-2 - Jugan - Current Land Situation and Status

Figure 20-3 - Jugan - Land Situation During Short Mining Phase

Figure 20-4 - Indicative Rehabilitated Scenario Option for Jugan

21. Capital & Operating Costs

21.1. Introduction & Basis of Estimate

Capital and operating cost estimates are based on a number of processes and techniques, and these are listed below in no particular order:

- Quotes were obtained for major process and mining capital items from Metso, CAT Tractors Malaysia, Sandvik Malaysia Sdn Bhd, Orica, etc;
- Costs where applicable were benchmarked against in-house costs at Beras's other operations, from costing database and from information from similar operations worldwide;
- Where applicable costs have been derived from first principles based on unit costs and derived calculations;
- Costs for locally sourced items obtained from local suppliers;
- Standard engineering rates and principles were applied to anciliary items and associated elements in line with normal engineering costing practice;
- Standard rates and values were applied based on published information, e.g. import tariffs, etc.

21.2. Capital Costs

21.2.1. Mining Capital

Mobile mining equipment capital costs are listed in *Table 21-1 - Mining Capital Costs - Mobile Equipment (Owner-Operator)* below and they are for the owner-operator mining type option at the 8,000tpd base case option. For the contract-mining option it is assumed that similar equipment is used but is supplied by a contractor and not be included in the capital estimate.

The equipment includes an estimate for critical or major spares and ranges fro 10-30 % of the total capital cost. The equipment costs do not include import tariffs or freight costs as they are quoted from within Malaysia with these already included. Mining capital costs for the different options are detailed in the project cost model and summarised in *Section 22* or in the *Appendices*.

No.	Mining Equipment for Jugan Open Pit	Unit Cost (US$)	Total Cost (US$)	Spares (US$)	Total (US$)
2	Production Drill, Sandvik DX800 or equivalent, 76mm to 127mm hole, crawler	$ 565,920	$ 1,131,840	$ 339,552	$ 1,471,392
2	Hydraulic Shovel, 7m3, CAT6015/FS	$1,476,765	$ 2,953,530	$ 590,706	$ 3,544,236
1	Wheel Loader CAT 988H, 6.4 m3 for pit operation	$ 820,425	$ 820,425	$ 164,085	$ 984,510
1	Wheel Loader or FEL, 6.4 m4 for stockpile operation	$ 820,425	$ 820,425	$ 164,085	$ 984,510
1	CAT_D10T Dozer with ripper	$1,670,385	$ 1,670,385	$ 334,077	$ 2,004,462

No.	Mining Equipment for Jugan Open Pit	Unit Cost (US$)	Total Cost (US$)	Spares (US$)	Total (US$)
1	D6W Tractor (CAT_D6R XL)	$ 274,022	$ 274,022	$ 54,804	$ 328,826
9	Hauling Truck, Rigid Rear Dump CAT_772G	$ 662,903	$ 5,966,131	$ 1,193,226	$ 7,159,357
2	Road Grader, CAT_12K	$ 308,480	$ 616,960	$ 61,696	$ 678,656
2	Water Truck (10,000 liters)	$ 88,606	$ 177,212	$ 17,721	$ 194,933
2	Compactor, CAT CS533E	$ 95,169	$ 190,339	$ 19,034	$ 209,372
1	Surface Drill Rig for Cable Bolting	$ 565,920	$ 565,920	$ 56,592	$ 622,512
2	Explosive Truck (1000 kg cap) or Mobile Mixing Unit	$ 50,000	$ 100,000	$ 10,000	$ 110,000
2	Service/Tire Truck (off highway road)	$ 90,000	$ 180,000	$ 18,000	$ 198,000
5	4WD LV Toyota Hi-lux	$ 26,254	$ 131,268	$ 13,127	$ 144,395
33	**Totals**		**$15,598,456**	**$3,036,705**	**$18,635,161**

Table 21-1 - Mining Capital Costs - Mobile Equipment (Owner-Operator)

For both the owner-operator and the contract-mining option there is fixed plant capital. This cost is applicable to both options as this would not be within a mobile equipment contract. The fixed plant capital costs are listed in *Table 21-2 - Mining Capital Costs - Fixed Equipment (All Mining Type)* below.

No.	Fixed Plant & Capital Services	Total (US$)
2	Surface Blaster (i-kon)/Exploder	$ 20,700
4	Mobile Light Plant (13kW)	$ 40,000
1	Pit Dewatering Pump, centrifugal 75 li/sec	$ 20,550
1	Pit Dewatering Pump, centrifugal 40 li/sec	$ 13,700
1	Dewatering Pump, diaphragm type 20 li/sec	$ 34,250
2	Vacuum Pump	$ 6,250
1	Butt Welder for HDPE pipes	$ 22,500
1	Workshop Tools & Equipment	$ 15,000
500	HDPE Pipes (for air & water), 6m length	$ 21,000
22	Fire Fighting Equipment for each machine	$ 2,200
535	**Totals**	**$ 196,150**

Table 21-2 - Mining Capital Costs - Fixed Equipment (All Mining Type)

Capital costs for mining construction work, and in particular the initial construction work, is listed in *Table 21-3 - Mining Capital Costs - Mining Construction (All Mining Types)* below.

No.	Mining Construction & Contents	Total (US$)
	Building & Infrastructure	
1440 m^2	Heavy Machine & Truck Maintenance Workshop	$ 793,981
180 m^2	Electrical Workshop	$ 82,706
250 m^2	Tyre (repair & maintenance) Shop	$ 114,870
312 m^2	Drilling / Drill Equipment Shop	$ 143,358

No.	Mining Construction & Contents	Total (US$)
180 m^2	Light Vehicle Shop	$ 82,706
600 m^2	Mine Operation Dispatch Cabin	$ 101,138
600 m^2	Equipment Operators & Drivers Cabin	$ 101,138
140 m^2	Coreyard & Core House	$ 23,599
42 m^2	Exploration & Resource Drillers Cabin	$ 5,095
42 m^2	Pit (production) Drilling Crew Cabin	$ 5,095
54 m^2	Survey Crew Cabin	$ 6,550
42 m^2	Explosive Mixers & Blasting Crew Cabin	$ 5,095
45 m^2	Dewatering & Diesel/Oil Crew Cabin	$ 5,459
672 m^2	Operation Washbay	$ 308,771
1,000 m^2	Diesel Tank Area/Depot	$ 82,050
500 m^2	Explosive Magazine	$ 303,585
10,800 m^3	Explosive Magazine Perimeter Bund	$ 42,535
1,188 m^2	Mine & Mill Operation Warehouse	$ 545,862
500 m^2	Reagents & Chemicals Store/Warehouse	$ 229,740
682 m^2	Mining Admin & Management Offices	$ 514,815
650 m^2	Mining Engineers & Geologists Offices	$ 490,659
720 m^2	Training & Conference Room	$ 543,499
363 m^2	Canteen & Food Store	$ 36,694
1,188 m^2	Nursery for Agro-Forest & Rehabilitation	$ 116,970
750 m^2	Mining Contractors Area	$ 73,845
5 m^2	Guard House	$ 1,477
	Total Building & Infrastructure	**$ 4,761,292**
	<u>Workshop Equipment & Tools:</u>	
1	Standby power generator 60 to 70 kW_workshop	$ 21,700
1	Standby power generator 20kW_Office	$ 4,595
1	Medium duty overhead crane - Demag 20t	$ 70,000
2	Mono-rail hoist_5t for workshop & warehouse	$ 17,001
2	Chain Hoist (comealong) - 1ton	$ 295
2	Chain Hoist (comealong) - 2ton	$ 446
1	Lever/Chain Hoist - Ratchet type 3t	$ 246
1	Lever/Chain Hoist - Ratchet type 5t	$ 361
1	Forklift, 10tonne cap	$ 63,000
1	Hydraulic Jack - 50 ton	$ 1,641
2	Battery Charger - 12V	$ 118
2	Welding Machine - professional welder	$ 1,615
1	Portable (inverter) welder	$ 527
1	Inverter Plasma	$ 1,077
2	Oxy Acetylene welding/cutting set	$ 255
1	Bandsaw variable speed	$ 223
1	Air Compressor	$ 256
2	Bench Grinder	$ 257

No.	*Mining Construction & Contents*	*Total (US$)*
3	Disk Grinders	$ 180
1	Lathe Machine complete with cutting tools	$ 2,745
1	Boring Machine	$ 1,053
1	Bench Drill	$ 383
1	Hydraulic Press - floor type 20-tonne	$ 1,148
1	Arbor press - 3 tonne	$ 560
1	Bench Press - 10 tonne	$ 599
1	Combination Spanner - 25pcs per set	$ 71
1	16 to 36mm Spanner set - 12pcs per set	$ 59
1	Socket Set - 40 pcs per set	$ 30
1	Hex Key Set - 30 pcs per set	$ 18
1	Box Wrench - 6 pcs per set	$ 15
2	Adjustable Wrench - heavy duty	$ 16
1	Extension (socket) bars - 3pcs per set	$ 12
1	Metric Socket set - 7 pcs per set	$ 17
4	Pipe Wrench - 4 sizes	$ 39
1	Bunded Diesel Fuel Tank, 12000 liter capacity with metering dispenser (for pit operation)	$ 16,800
1	Bunded Steel Fuel Tank, 5000 liter capacity	$ 5,600
3	Pressure Washers	$ 591
	Total Workshop Equipment & Tools:	**$213,549**
	Office Equipment & Furnitures:	
4	Split type air conditioning unit, 4hP	$ 1,444
10	Window type office aircon unit	$ 1,050
10	Window type aircon unit for cabin	$ 1,050
2	Q-series Office System_Director's Office	$ 1,168
4	V-series Office System_Management Office	$ 1,838
14	Office Tables for sr managers	$ 2,619
12	Office tables for Mine Office staff	$ 1,674
4	Office table for Mechanical/Electrical Office	$ 558
6	Office tables for Mill Office staff	$ 837
6	Office tables for Metallurgical Office	$ 837
10	Office tables for Admin Office staff	$ 1,395
4	Office table for Safety & Environment Office	$ 558
4	Office tables for Engineering Office staff	$ 558
12	Tables for Procurement, Accounting, HR & IT staff	$ 1,674
8	Office tables for Mining Engineers & Geologists	$ 1,116
14	Executive Chairs	$ 1,378
64	Office Chairs	$ 4,621
24	Steel File Cabinets - 4 drawer	$ 4,490
8	HR & Accounting cabinets	$ 1,838
10	Book shelves (2m x 2m)	$ 1,313

No.	*Mining Construction & Contents*	*Total (US$)*
15	Full Height Cupboard	$ 2,215
36	Desk Top Computers with Windows Pro	$ 70,891
18	Laptop for Sr Managers with Windows Pro	$ 38,399
14	Laptop for Engineers & Geos with Windows Pro	$ 36,758
16	Laptop for Support Staff with Windows Pro	$ 39,384
1	A0 Roll Printer	$ 2,626
1	Network Printer/Scanner/FAX (FUJI)	$ 7,220
2	A4 Printer for Management Office	$ 2,626
1	High resolution, Lumens=4000+, Projector	$ 2,462
2	Low resolution, Lumens=2000-3000, Projector	$ 1,772
2	Coffee Maker Dispenser	$ 1,641
	Total Office Equipment & Furnitures:	**$238,010**
	Office/Business System & ICT:	
1	Microsoft Office for 84 computer units	$ 100,800
1	CAE Mining System	$ 150,000
1	SCALA Office system (timekeeping & payroll)	$ 150,000
1	Telephone/Communication System	$ 75,000
1	Integrated Plant & Office Security Systems	$ 50,000
	Total Office/Business System & ICT:	**$525,800**
	Mine Roads & Clearing	
29,008 m^3	Sub_grade Fill (0.5m) for 25m Haul Road (4.392 km)	$ 116,032
82,880 m^3	Base Course (1.0m) for 25m Haul Road (4.392 km)	$ 828,800
41,440 m^3	Wearing Course (0.5m) for 25m_wide Haul Road	$ 414,400
18,053 m^3	Sub_grade Fill (0.5m) for 15m service road (4.350 km)	$ 72,212
51,580 m^3	Base Course (0.5m) for 15m service road (4.350 km)	$ 515,800
25,790 m^3	Wearing Layer (0.5m) for 15m_wide service road	$ 257,900
	Total Mine Roads & Clearing	**$2,205,144**
	ROM Pad	
33,641 m^3	Base Course (0.5m)	$ 336,410
	Total ROM Pad	**$336,410**
	Waste Dump	
27 Ha	Clearing/grubbing and drainage	$ 218,700
10 Ha	Downstream Wetland (drain location)	$ 100,000
91,142 m^3	Base Course (0.3m) - Drainage	$ 911,424
	Total Waste Dump	**$1,230,124**
	Mining Construction (incl road & waste dump):	**$9,510,329**

Table 21-3 - Mining Capital Costs - Mining Construction (All Mining Types)

All other or sundry mining capital costs are listed in *Table 21-4 - Mining Capital Costs - Mining Other (All Mining Types)* below.

No.	***Other Mining Capital***	***Total (US$)***
	Health & Safety and Environment	
1	First Aid Equipment & paraphernalias	$ 21,000
10	Fire Fighting Equipment - Fixed	$ 1,050
1	Fire Hydrant System	$ 15,000
1	Ambulance	$ 31,500
	Total Health & Safety:	***$ 68,550***
	Mine Services: (mine planning, survey & geology)	
1	Survey Equipment	$ 35,200
1	GeoMIMS System or GEMS Additional Licences	$ 80,000
5	Computer / Laptops	$ 12,500
	Total Mine Services:	***$ 127,700***
	Communication & Security:	
1	Telephone System	$ 20,000
1	Base Radio for pit operation	$ 10,000
5	Wireless Camera System	$ 25,000
5	Motorbikes for Security personnel	$ 7,500
	Total Communication & Security:	***$ 62,500***
	Sundries:	-
1	Office Furniture (one lot)	$ 1,641
4	Workshop Racks & Storage	$ 3,480
5	Oxy-acetylene Equipment	$ 1,969
100	Caplamps with charger	$ 17,500
65	Handheld Radios	$ 53,328
	Total Sundries:	***$ 77,917***
	Total Mining Other	**$ 336,667**

Table 21-4 - Mining Capital Costs - Mining Other (All Mining Types)

The total mining capital cost for the base case 8,000 tpd, for owner-operator is summarised in *Table 21-5 - Summary of Mining Capital Costs (Owner-Operator)* with the contract-mining costs summarised in *Table 21-6 - Summary of Mining Capital Costs (Contract-Mining)* below.

Mining Capital Group	***Total Cost (US$)***
Mobile Mining Equipment	18,635,200
Fixed Mining Equipment	196,150
Mining Construction	9,510,300
Mining - Other	336,700
Total – Owner-Operator	**28,678,350**

Table 21-5 - Summary of Mining Capital Costs (Owner-Operator)

Mining Capital Group	*Total Cost (US$)*
Mobile Mining Equipment	0
Fixed Mining Equipment	196,150
Mining Construction	9,510,300
Mining - Other	336,700
Total – Contract-Mining	**10,043,150**

Table 21-6 - Summary of Mining Capital Costs (Contract-Mining)

It should be noted that due the the outcropping nature of the orebody and the direct access to ore from day one (1), no pre-stripping capital is applicable.

21.2.2. Process Plant Capital

This section provides the comparative capital costs for the treatment of Jugan ore at 4,000 tpd, 8,000 tpd and 12,000 tpd milling rates. These tonnages are the middle and both ends of the 2,000tpd increment options being considered.

Four process options have been considered, namely production of a flotation concentrate to be sold to a third party in the first option and production of gold dore by further processing of the flotation concentrate on location by either the BIOX (biological oxidation route), the POX (pressure oxidation route) or Albion (ultrafine grinding and atmospheric oxidation route).

Details of these processes have been provided in *Section 17* above. The flotation concentrate is the base case option but the oxidation options and the plant tail end are also calculated should one of these options be selected now or in the future.

The capital costs below have been used in conjunction with operating costs for input in the Feasibility Model discussed in *Section 22* of this report. The costs for the alternate process options are included in the project cost model and included in *Section 22* and in the *Appendices*.

21.2.2.1. Capital – Flotation Concentrate

Table 21-7: Capital Cost for Flotation Concentrate Production from Jugan Ore below summarizes the capital costs for the production of a flotation concentrate from Jugan ore at three daily milling rates. The mass pull in flotation has been assumed to be 10% based on testwork to-date. These are for the base case and both ends of the concentrate production spectrum. Further below is the costing for the possible oxidation options and the tail end of a plant (CIL, electrowinning, etc.) should those options be followed now or at a later stage.

Tonnage Rate	**12,000 TPD**	**8,000 TPD**	**4,000 TPD**
Costing Elements	**(US$)**	**(US$)**	**(US$)**
A - Packaged Plant			
Crushing Plant	1,885,000	1,420,000	980,000
Primary SAG Mill	11,279,000	7,779,000	5,585,000
Knelson CVD	1,350,000	950,000	650,000

Tonnage Rate	12,000 TPD	8,000 TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
Primary Cyclone Cluster	375,000	310,000	275,000
Flotation Conditioner Tank	190,000	145,000	105,000
Flotation Cell Unit	10,810,000	8,110,000	4,950,000
Regrind Ball Mill	3,267,000	2,252,000	1,332,000
Regrind Mill Cyclone	402,000	346,000	301,000
Concentrate Filter Feed Thickener	455,000	355,000	295,000
Filter Press Unit	3,507,000	2,705,000	1,965,000
TOTAL - A	**33,520,000**	**24,372,000**	**16,438,000**
B - Out of Packaged Plant			
Reagents	750,000	650,000	500,000
Water Supply System	550,000	450,000	350,000
Low/High Pressure Air System	650,000	450,000	350,000
Buildings/Cranes	1,550,000	1,550,000	1,250,000
Electrical Power System, Generator/Grid	4,800,000	4,300,000	3,800,000
TOTAL - B	**8,300,000**	**7,400,000**	**6,250,000**
TOTAL (A+B)	**41,820,000**	**31,772,000**	**22,688,000**
C - Other Vendor Items			
Structural Steel/Platform etc,8%	3,698,190	2,859,480	2,041,920
Pumps, Piping, Valves, Launders, Chutes, 7%	3,345,600	2,541,760	1,815,040
Civil works, 5%	2,091,000	1,588,600	1,134,400
Concrete works, 10%	4,182,000	3,177,200	2,268,800
Electrical Distribution, 12%	5,018,400	3,812,640	2,722,560
Instrumentation & Control, 4%	1,045,500	1,270,880	907,520
Customs/Taxes & Shipping/Transport, 10%	4,182,000	3,177,200	2,268,800
Engineering Cost, 2.5%	1,045,500	794,300	567,200
Contingency, 10%	4,182,000	3,177,200	2,268,800
First fill cost/Spare, 5 %	2,091,000	1,588,600	1,134,400
TOTAL - C	**30,881,190**	**23,987,860**	**17,129,440**
TOTAL (A+B+C)	**72,701,190**	**55,759,860**	**39,817,440**

Table 21-7: Capital Cost for Flotation Concentrate Production from Jugan Ore

21.2.2.2. Capital – BIOX

Table 21-8: Capital Costs for a Gold Plant with BIOX Treatment of the Jugan Ore below summarises the capital cost for three milling rates applying the same up front flotation concentrate flowsheet as above and further processing of the flotation concentrate by bacterial oxidation in suitably aerated tanks, folowed by counter current washing in three thickeners, carbon-in-leach (CIL) gold extraction, carbon stripping and gold electro-winning, carbon regeneration and gold doré melting. The CIL tailings are detoxified with SO_2 and air in the presence of a copper catalyst.

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
A - Packaged Plant			
Water Cooling Unit	6,500,000	4,000,000	2,160,000
Isa Mill	0	0	0
Air Compressors	5,800,000	3,900,000	2,000,000
Nutrient Module	4,500,000	3,000,000	1,500,000
Oxidation Plant	28,000,000	17,000,000	9,000,000
Oxygen Plant-Installed	0	0	0
Limestone Plant-Installed	18,000,000	12,000,000	6,000,000
Installation, 12%	5,376,000	3,348,000	1,759,200
Freight, 5%	2,240,000	1,395,000	733,000
TOTAL - A	**70,416,000**	**44,643,000**	**23,152,200**
B - Out of Packaged Plant			
Crushing Plant	1,885,000	1,420,000	980,000
Primary SAG Mill	11,279,000	7,779,000	5,585,000
Knelson CVD	1,350,000	950,000	650,000
Primary Cyclone cluster	375,000	310,000	275,000
Flotation Conditioner Tank	190,000	145,000	105,000
Flotation Cell Unit	10,810,000	8,110,000	4,950,000
Regrind Ball Mill	3,250,000	2,240,000	1,325,000
Regrind mill cyclone	365,000	315,000	275,000
Thickeners	4,500,000	3,500,000	2,750,000
CIL	4,500,000	3,100,000	1,400,000
Elution & Gold Room	4,850,000	4,000,000	2,950,000
Detox	1,500,000	700,000	400,000
Nutralization Tanks	1,750,000	1,350,000	1,050,000
Reagents	5,200,000	4,000,000	2,200,000
Water Supply System	650,000	500,000	350,000
Low/High Pressure Air System	650,000	550,000	450,000
Buildings	2,200,000	1,800,000	1,200,000
TOTAL - B	**55,304,000**	**40,769,000**	**26,895,000**
TOTAL (A+B)	**125,720,000**	**85,412,000**	**50,047,200**
C - Other Vendor Items			
Electrical Power Systems, Generator/Grid	5,955,000	5,155,000	4,355,000
Structural Steel/Platform, etc., 8%	10,057,600	6,832,960	4,003,776
Piping, Valves, Launders, 7%	8,800,400	5,978,840	3,503,304
Civil Works, 5%	6,286,000	4,270,600	2,502,360
Concrete Works, 10%	12,572,000	8,541,200	5,004,720
Electrical Distribution, 12%	15,086,400	10,249,440	6,005,664
Instrumentation & Control, 4%	5,028,800	3,416,480	2,001,888
TOTAL - C	**63,786,200**	**44,444,520**	**27,376,712**
TOTAL (A+B+C)	**189,506,200**	**129,856,520**	**77,423,912**

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
D - Other Items			
First Fill & Spares - 5%	9,475,310	6,492,826	3,871,196
Transportation Cost - 2%	3,790,124	2,597,130	1,548,478
Customs & Duties - 8%	15,160,496	10,388,522	6,193,913
Engineering Charges - 2.5%	4,737,655	3,246,413	1,935,598
Contingency, 10%	12,572,000	8,541,200	5,004,720
TOTAL - D	**45,735,585**	**31,266,091**	**18,553,905**
TOTAL (A+B+C+D)	**235,241,785**	**161,122,611**	**95,977,817**

Table 21-8: Capital Costs for a Gold Plant with BIOX Treatment of the Jugan Ore

21.2.2.3. Capital – POX

Table 21-9: Capital Cost for a Gold Plant with POX Treatment of the Jugan Ore summarizes the capital cost for the processing of Jugan ore at three milling rates with treatment of the flotation concentrate by autoclave pressure oxidation followed by counter-current washing of the oxidized concentrate, CIL and gold recovery in the same way as for the BIOX concentrate processing above.

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
A - Packaged Plant			
Water Cooling Unit	0	0	0
Isa Mill	0	0	0
Air Compressors	0	0	0
Nutrient Module	0	0	0
Oxidation Plant	40,000,000	28,000,000	15,000,000
Oxygen Plant-Installed	28,000,000	21,000,000	10,000,000
Limestone Plant-Installed	18,000,000	12,000,000	6,000,000
Installation, 12%	4,800,000	3,360,000	1,800,000
Freight, 5%	2,000,000	1,400,000	750,000
TOTAL - A	**92,800,000**	**65,760,000**	**33,550,000**
B - Out of Packaged Plant			
Crushing Plant	1,885,000	1,420,000	980,000
Primary SAG Mill	11,279,000	7,779,000	5,585,000
Knelson CVD	1,350,000	950,000	650,000
Primary Cyclone Cluster	375,000	310,000	275,000
Flotation Conditioner Tank	190,000	145,000	105,000
Flotation Cell Unit	10,810,000	8,110,000	4,950,000
Regrind Ball Mill	3,250,000	2,240,000	1,325,000
Regrind Mill Cyclone	365,000	315,000	275,000
Thickeners	3,500,000	2,750,000	1,950,000
CIL	3,200,000	2,400,000	1,400,000

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
Elution & Gold Room	4,850,000	4,000,000	2,950,000
Detox	860,000	700,000	400,000
Nutralization Tanks	1,750,000	1,350,000	1,050,000
Reagents	5,200,000	4,000,000	2,200,000
Water Supply System	650,000	500,000	350,000
Low/High Pressure Air System	650,000	550,000	450,000
Buildings	2,200,000	1,800,000	1,200,000
TOTAL - B	**52,364,000**	**39,319,000**	**26,095,000**
TOTAL (A+B)	**145,164,000**	**105,079,000**	**59,645,000**
C - Other Vendor Items			
Electrical Power Systems, Generator/Grid	5,955,000	5,155,000	4,355,000
Structural Steel/Platform, etc., 8%	11,613,120	8,406,320	4,771,600
Piping, Valves, Launders, 7%	10,161,480	7,355,530	4,175,150
Civil Works, 5%	7,258,200	5,253,950	2,982,250
Concrete Works, 10%	14,516,400	10,507,900	5,964,500
Electrical Distribution, 12%	17,419,680	12,609,480	7,157,400
Instrumentation & Control, 4%	5,806,560	4,203,160	2,385,800
TOTAL - C	**72,730,440**	**53,491,340**	**31,791,700**
TOTAL (A+B+C)	**217,894,440**	**158,570,340**	**91,436,700**
D - Other Items			
First Fill & Spares - 5%	10,894,722	7,928,517	4,571,835
Transportation Cost - 2%	4,357,889	3,171,407	1,828,734
Customs & Duties - 8%	17,431,555	12,685,627	7,314,936
Engineering Charges - 2.5%	5,447,361	3,964,259	2,285,918
Contingency, 10%	14,516,400	10,507,900	5,964,500
TOTAL - D	**52,647,927**	**38,257,710**	**21,965,923**
TOTAL (A+B+C+D)	**270,542,367**	**196,828,050**	**113,402,623**

Table 21-9: Capital Cost for a Gold Plant with POX Treatment of the Jugan Ore

21.2.2.4. Capital – Albion

Table 21-10: Capital Cost for a Gold Plant with Albion Treatment of the Jugan Ore below summarizes the capital cost for a gold plant using the Albion process for the treatment of the flotation concentrate with CIL, carbon stripping and gold electro-winning, carbon regeneration, gold doré melting and CIL tails detoxification with SO_2 and air in the presence of a copper catalyst.

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
A - Packaged Plant			
Water Cooling Unit	0	0	0

Tonnage Rate Costing Elements	12,000 TPD (US$)	8,000TPD (US$)	4,000 TPD (US$)
Isa Mill	14,650,000	10,000,000	6,000,000
Air Compressors	0	0	0
Nutrient Module	0	0	0
Oxidation Plant	18,600,000	13,000,000	7,000,000
Oxygen Plant-Installed	23,000,000	15,000,000	8,000,000
Limestone Plant-Installed	18,000,000	12,000,000	6,000,000
Installation, 12%	4,000,000	2,640,000	1,560,000
Freight, 5%	1,700,000	1,150,000	650,000
TOTAL - A	**79,950,000**	**53,790,000**	**29,210,000**
B - Out of Packaged Plant			
Crushing Plant	1,885,000	1,420,000	980,000
Primary SAG Mill	11,279,000	7,779,000	5,585,000
Knelson CVD	1,350,000	950,000	650,000
Primary Cyclone Cluster	375,000	310,000	275,000
Flotation Conditioner Tank	190,000	145,000	105,000
Flotation Cell Unit	10,810,000	8,110,000	4,950,000
Regrind Ball Mill	3,250,000	2,240,000	1,325,000
Regrind Mill Cyclone	365,000	315,000	275,000
Thickeners	3,500,000	2,750,000	1,950,000
CIL	4,500,000	3,100,000	1,400,000
Elution & Gold Room	4,850,000	4,000,000	2,950,000
Detox	1,500,000	1,150,000	700,000
Nutralization Tanks	0	0	0
Reagents	5,200,000	4,000,000	2,200,000
Water Supply System	650,000	500,000	350,000
Low/High Pressure Air System	350,000	280,000	150,000
Buildings	2,200,000	1,800,000	1,200,000
TOTAL - B	**52,254,000**	**38,849,000**	**25,045,000**
TOTAL (A+B)	**132,204,000**	**92,639,000**	**54,255,000**
C - Other Vendor Items			
Electrical Power Systems, Generator/Grid	6,415,000	5,615,000	4,815,000
Structural Steel/Platform, etc., 8%	10,576,320	7,411,120	4,340,400
Piping, Valves, Launders, 7%	9,254,280	6,484,730	3,797,850
Civil Works, 5%	6,610,200	4,631,950	2,712,750
Concrete Works, 10%	13,220,400	9,263,900	5,425,500
Electrical Distribution, 11%	15,864,480	11,116,680	6,510,600
Instrumentation & Control, 4%	5,288,160	3,705,560	2,170,200
TOTAL - C	**67,228,840**	**48,228,940**	**29,772,300**
TOTAL (A+B+C)	**199,432,840**	**140,867,940**	**84,027,300**
D - Other Items			
First Fill & Spares - 5%	9,971,642	7,043,397	4,201,365

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Costing Elements	**(US$)**	**(US$)**	**(US$)**
Transportation Cost - 2%	3,988,657	2,817,359	1,680,546
Customs & Duties - 8%	15,954,627	11,269,435	6,722,184
Engineering Charges - 2.5%	4,985,821	3,521,699	2,100,683
Contingency, 10%	13,220,400	9,263,900	5,425,500
TOTAL – D	**48,121,147**	**33,915,790**	**20,130,278**
TOTAL (A+B+C+D)	**247,553,987**	**174,783,730**	**104,157,578**

Table 21-10: Capital Cost for a Gold Plant with Albion Treatment of the Jugan Ore

In summary the capital costs for the four process options for the upper, lower and middle tonnage rates are summarised and rounded up (nearest 100) in *Table 21-11 - Summary of Total Capital Costs by Tonnage Option & Process Method* below.

Tonnage Rate	12,000 TPD	8,000TPD	4,000 TPD
Process Methods	**(US$)**	**(US$)**	**(US$)**
Flotation Concentrate	**72,701,190**	**55,759,860**	**39,817,440**
Biological Oxidation	**235,241,800**	**161,122,700**	**95,977,900**
Pressure Oxidation	**270,542,400**	**196,828,100**	**113,402,700**
Albion Process	**247,554,000**	**174,783,800**	**104,157,600**

Table 21-11 - Summary of Total Capital Costs by Tonnage Option & Process Method

The detailed equipment list and costing for the base case process plant (8,000 tpd flotation concentrate option) can be found in *Appendix A21-6*, with the plant buildings list included in *Appendix A21-7*.

21.2.3. Infrastructure & Facilities

Mining infrastructure, including roading, has been included with the mining capital costs above.

One major infrastructure capital item is the TSF and this cost is outlined in *Table 21-12 - Tailings Storage Facility - Capital Cost Breakdown* below for the designed TSF as specified in Section 16 for the 8,000tpd base case scenario.

Amount	TSF Construction Item	Unit Cost	Total Cost
82.0 ha	Clearing/grubbing & removal of horizon 'A'	$ 8,100	$ 664,200
3,726,235 m3	Ring Dam - Placement of fill material from pit & TSF basin	$ 4.00	$ 14,904,940
35,850 m3	Clay as Foundation Key-in	$ 4.80	$ 172,080
370,000 m3	Blanket Drain_clean gravel (installed volume)	$ 10.80	$ 3,996,000
770,000 m2	Geo Fabric in sqm (4m x 225m per roll)	$ 1.38	$ 1,061,399
4,851 m	Concrete Drain - perimeter cut-off drain	$ 11.91	$ 57,775
4,260 m	PVC Pipe 50mm dia	$ 2.00	$ 8,520
2500 pcs	Rock Gabion Wire	$ 3.40	$ 8,500
5,000 m3	Rock Material for Gabion	$ 10.80	$ 54,000

Amount	TSF Construction Item	Unit Cost	Total Cost
45.0 ha	Scarify & Compaction of TSF floor	$ 9,720	$ 437,400
454,910 m3	Placement of additional clay lining-installed volume	$ 4.80	$ 2,183,568
580,000 m2	HDPE Liner - 500 m^2 per roll	$ 1.70	$ 986,000
580,000 m2	HDPE Liner Installation	$ 1.28	$ 739,500
550 m	Spillway (cut & concrete lined)	$ 11.91	$ 6,551
3,500 m	Protection Bund, including cut for key-in	$ 103.70	$ 362,950
1,793 m3	Lime to be mixed with the clay for posolanic effect	$ 164.10	$ 294,149
	Field Testing work & 3rd Party review/sign-off		$ 1,148,689
	Total:		***$27,086,221***

Table 21-12 - Tailings Storage Facility - Capital Cost Breakdown

This capital cost is split into three (3) parts associated with the three (3) stages of the TSF construction. The split of costs are:

- Stage 1 = $8,125,866
- Stage 2 = $13,543,111
- Stage 3 = $5,417,244

A capital cost has been calculated for general offices, car park and warehousing and is $492,300 for 800m^2 area. This excludes the mine offices and workshops which are included in the mining costs.

Fencing and gates to surround the mining site and other facilities represents a total of 7,138 m to 8,123 m depending upon the mine site configuration. The plant and other key sites within the mine site will also have fencing, which is approximately 1,921 m and 1,786 m in length, respectively. The total fencing cost, including installation and gates, has been costed at $2,402,700.

Water and drainage infrastructure will be provided to handle the TSF water requirements, roading drainage and general drainage around the facilities. The construction of the water and drainage infrastructure including ponds, drainage channels and wetland costing will be $1,154,575. The breakdown of the costing is shown in *Table 21-13 - Water Infrastructure Cost Breakdown* below.

Water Infrastructure Item	Cost
Wetlands	$ 400,000
TSF Ponds (x5)	$ 125,000
Drainage channels for ponds & wetlands (1,725 m)	$ 91,325
Other ponds (x3)	$ 75,000
General site drainage channels (8,750 m)	$ 463,250
Total	***$1,154,575***

Table 21-13 - Water Infrastructure Cost Breakdown

21.2.4. Other Capital

Land valuation costing for the purchase land (approx. 340 ha) affected by the mining operations is $21,847,200. The *Table 21-14 - Land Valuation Summary* below summarises the land valuation totals and land improvement amounts that make up the total land valuation cost. The table also includes a contingency factor and the MYR : USD ROE is 3.2 : 1.

Land Valuation & Improvement Description	Total Amount	Total Amount
Land Value	RM 51,600,200	$ 16,125,060
Land Improvement – Fishponds	RM 547,700	$ 171,160
Land Improvement – Concrete Structures	RM 9,009,800	$ 2,815,560
Land Improvement – Wooden & Other Structures	RM 2,397,800	$ 749,310
Total Land Value	**RM 63,555,500**	**$ 19,861,090**
Contingency (@ 10 %)	*RM 6,355,550*	*$ 1,986,110*
Total Land Value (incl. Contingency)	***RM 69,911,050***	***$21,847,200***

Table 21-14 - Land Valuation Summary

Basis for land costs is based on the provision of land costs and land improvement calculations supplied by a qualified chartered surveying company (Williams, Talhar, Wong & Yeo Sdn Bhd) for standard or base land types in the Jugan-Siniawan area. These base or standard land type parameters and costs were then applied to similar land parcels.

This is an estimate for the purposes of the feasibility study with a contingency of 10 % applied to cover minor variations. Prior to actual land purchases a full land valuation will need to be performed.

Where land is not fully required to be purchased, or is peripheral in nature or will only have minor impacts applicable (e.g. road through property) then these land parcels may be leased/rented from the leaseholder/landowner for some ongoing rental amount yet to be negotiated.

This approach may reduce the capital amount required for land purchase. This has not been applied to the costs above but is considered a possible upside to this cost.

Sale of land after completion of mining operations and full rehabilitation has been included with a percentage applied to the costing based on the potential saleable part.

21.2.5. Contingency & Other Factors

A contingency factor of 10 % has been applied to the major mining and processing capital items. Other minor contingencies and conservative costing has been applied throughout.

The following items are excluded from the capital cost calculations:

- Inflation and escalation;

- Costs associated with protection against currency fluctuations;
- Project financing costs.

21.2.6. Sustaining Capital

The sustaining capital is based on two parts; sustaining capital for the mining and sustaining capital for the process plant. For mining the sustaining capital is based on 5% of the fixed mining capital items per annum. For the processing the sustaining capital is based on 5% of the processing Opex cost per tonne (excluding consumable spares) multiplied by the annualised tonnage. Also included is calculation for major mobile plant replacement parts based on operating hours and usage. For the base case this is $1,963,102 ($53,300 mining, $943,500 mobile equipment & $966,300 processing) which is $490,800 per quarter.

This amount caters for such items as equipment upgrades and modifications, pump replacements, ancilliary mining equipment, major spares for plant and mobile equipment, etc. and other deferred capital e.g. future TSF expansion stages.

The sustaining capital also includes TSF extensions, but these have been costed individually and separately and are $18,156,320 for Stage 2 & 3 and are not part of the initial capital requirement.

21.2.7. Reclamation & Closure

The mine site rehabilitation costs have been calculated for mine closure, post mine closure (monitoring) and ongoing rehabilitation during operations (where applicable or possible). The total rehabilitation cost is $6,365,750 broken down into $2,403,780 for pre-closure/ongoing rehabilitation, $3,166,970 for mine closure activities and $795,000 for post closure monitoring.

The costs per major closure component and rehabilitation timing are listed in *Table 21-15 - Mine Rehabilitation Costs by Compnent & Closure Period* below.

Closure Component	Pre-closure Cost	Mine Closure Cost	Post-Closure Cost	Total Cost per Component
TSF	$1,286,310	$1,708,160	$421,840	**$3,416,310**
Waste Disposal	$570,380	$747,280	$176,940	**$1,494,600**
Nursery	$31,750	$31,750	$31,750	**$95,250**
Mine Pit	$ 0	$406,970	$96,880	**$503,850**
Infrastructure	$205,250	$272,810	$67,590	**$545,650**
During Construction	$310,090	$ 0	$ 0	**$310,090**
Total Cost per Timing	***$2,403,780***	***$3,166,970***	***$795,000***	***$6,365,750***

Table 21-15 - Mine Rehabilitation Costs by Component & Closure Period

21.3. Operating Costs

21.3.1. Mining Operating Costs

The open pit operating costs along with the associated mining costs are detailed in *Table 21-13 – OPEX Costs: Direct & Associated Mining Costs* below. The total mining cost (per tonne) is then derived for both ore and waste mining for the owner-operator mining type. The contract-mining cost markups based on current mining contractor rates within Besra are detailed at the bottom of the table.

Mining Cost Item Description	Qty		Unit Cost		Total Cost	Cost/Tonne
			(US$)		(US$)	(US$/t)
DRILLING: For Ore						
Blastholes	24	holes			Annualised	
Drill Bit	264	m	$ 2.08	/m	$ 200,156	$ 0.069
Drill Rod	264	m	$ 1.47	/m	$ 141,456	$ 0.048
Diesel	354	liters	$ 0.90	/litre	$ 104,577	$ 0.036
Spare parts, tires & lube	7.7	hrs	$38.00	/UT hr	$ 95,988	$ 0.033
Drilling Labour	23.1	hrs	$ 4.38	/hr	$ 36,880	$ 0.013
Total Drilling Cost_ore					**$ 579,056**	**$ 0.20**
Drilling: For Waste						
Blastholes	24	holes				
Drill Bit	264	m	$ 2.40	/m	$ 323,339	$ 0.067
Drill Rod	264	m	$ 1.47	/m	$ 203,558	$ 0.041
Diesel	354	liters	$ 0.90	/litre	$ 150,487	$ 0.030
Spare parts, tires & lube	7.7	hrs	$38.00	/UT hr	$ 138,129	$ 0.028
Drilling Labour	23.1	hrs	$ 4.38	/hr	$ 53,070	$ 0.011
Total Drilling Cost_Waste					**$ 877,584**	**$ 0.18**
BLASTING: For Ore	24	holes				
Emulsion (wet/dewatered holes) using Fortis bulk system	1,498	kgs	$ 2.35	/kg	$ 1,283,351	$ 0.440
Package Explosive	-	kgs	$ 3.08	/kg	$ -	$ -
Non electric detonators Exel MS 7.3m	24.0	pcs	$14.82	each	$ 129,668	$ 0.044
Pentex Booster H (120g) as primer/initiator	24.0	pcs	$13.04	/piece	$ 114,053	$ 0.039
Exel Lead Line	150.0	m	$ 1.02	/m	$ 55,496	$ 0.019
Mixing Emulsion, delivery & charging (3-men)	144.0	m	$ 3.50	/hr	$ 183,709	$ 0.063
Dewatering & stemming (3-men)	6.0	hrs	$ 3.50	/hr	$ 7,655	$ 0.003
Total Blasting Cost_Ore					**$ 1,773,932**	**$ 0.61**
Blasting: For Waste						
Emulsion (wet/dewatered holes) using Fortis bulk system	1,488	kgs	$ 2.35	/kg	$ 1,846,764	$ 0.370
Package Explosive	-	kgs	$ 3.08	/kg	$ -	$ -
Non electric detonators Exel MS 7.3m	24.0	pcs	$14.82	each	$ 186,595	$ 0.038

Mining Cost Item Description	Qty		Unit Cost (US$)		Total Cost (US$)	Cost/Tonne (US$/t)
Pentex Booster H (120g) as primer/initiator	24.0	pcs	$13.04	/piece	$ 164,124	$ 0.033
Exel Lead Line	150.0	m	$ 1.02	/m	$ 79,859	$ 0.016
Mixing Emulsion, delivery & charging (3-men)	144.0	m	$ 3.50	/hr	$ 264,361	$ 0.053
Dewatering & stemming (3-men)	6.0	hrs	$ 3.50	/hr	$ 11,015	$ 0.002
Total Blasting Cost_Waste					**$ 2,552,718**	**$ 0.51**
Loading: CAT 6015FS Hydraulic Shovel/Excavator	2	units			Annualised	
Diesel	651,200	litres	$ 0.90	/litre	$ 527,472	$ 0.049
Parts, materials/supplies & Lube	11,840	hrs	$60.00	/hr	$ 639,360	$ 0.060
Operating Labour (2man-crew)	23,680	hrs	$ 4.38	/hr	$ 103,600	$ 0.010
Maintenance Labour (3-man crew)	12,618	hrs	$ 4.31	/hr	$ 54,320	$ 0.005
Total Loading Cost - Ore					**$ 1,324,752**	**$ 0.12**
Total Loading Cost - Waste						**$ 0.12**
Hauling Ore: CAT 772G - Rigid Dump Truck	4	units			Annualised	
Diesel	992,208	litres	$ 0.90	/litre	$ 803,688	$ 0.192
Parts, materials/supplies & Lube based on machine hrs	23,624	hrs	$30.00	/hr	$ 637,848	$ 0.153
Operating Labour based on machine hours	23,624	hrs	$ 4.38	/hr	$ 103,355	$ 0.025
Maintenance Labour (2-man crew)	17,896	hrs	$ 4.31	/hr	$ 77,042	$ 0.018
Total ORE Hauling Cost					**$1,621,934**	**$ 0.39**
Hauling Waste: CAT 772G_Rigid Dump Truck	5	units			Annualised	
Diesel	1,240,260	litres	$ 0.90	/litre	$ 1,004,611	$ 0.144
Parts, materials/supplies & Lube	29,530	hrs	$30.00	/hr	$ 797,310	$ 0.115
Operating Labour based on machine hours	29,530	hrs	$ 4.38	/hr	$ 129,194	$ 0.019
Maintenance Labour (2-man crew)	22,370	hrs	$ 4.31	/hr	$ 96,303	$ 0.014
Total Waste Hauling Cost					**$ 2,027,417**	**$ 0.29**
Dozing/Ripping, CAT D10 & CAT D6R	2	units			Annualised	
Diesel	422,928	litres	$ 0.90	/litre	$ 342,572	$ 0.036
Parts, materials/supplies & Lube	10,638	hrs	$41.50	/hr	$ 397,329	$ 0.041
Operating Labour	10,638	hrs	$ 4.38	/hr	$ 46,541	$ 0.005
Maintenance Labour (2man-crew)	9,302	hrs	$ 4.31	/hr	$ 40,045	$ 0.004
Total Dozing /Ripping Cost					**$ 826,487**	**$ 0.09**
Mining Ancilliary:					Annualised	
Wheel Loader for Stockpile operation & back-up pit loader	5520	UT hrs	$56.00	/hr	$ 861,120.00	$ 0.09
Road Grader / Road Maintenance	4,800	UT hrs	$80.00	/hr	$ 384,000.00	$ 0.040
Water Truck / Road Maintenance	3,300	UT hrs	$90.00	/hr	$ 297,000.00	$ 0.031
Mobile Mixing Unit (MMU) or Explosive Truck	6,210	UT hrs	$80.00	/hr	$ 496,800.00	$ 0.052
Service/Tire Truck	8760	UT hrs	$90.00	/hr	$ 788,400.00	$ 0.082
Service Vehicle Leased (4 units)	5	units	$1,500	/month	$ 7,500.00	$ 0.001

Mining Cost Item Description	Qty		Unit Cost (US$)		Total Cost (US$)	Cost/Tonne (US$/t)
Diesel (180 liters per month per unit)	10,800	litre	$ 0.66	/litre	$ 7,088.47	$ 0.001
Power for dewatering pumps (90kW)	345,600	kWhr	$0.068	/kWhr	$ 23,500.80	$ 0.002
Total Mine Ancilliary Cost - ore					**$ 2,865,409**	**$ 0.30**
Total Mine Ancilliary Cost - waste						**$ 0.30**
Waste Dump Maintenance					Annualised	
Grader	4,800	UT hrs	$80.00	/hr	$ 384,000	$ 0.057
Compactor	4,800	UT hrs	$80.00	/hr	$ 384,000	$ 0.057
Tractor/Dozer	4,800	UT hrs	$80.00	/hr	$ 384,000	$ 0.057
Water Truck	3300	UT hrs	$90.00	/hr	$ 297,000	$ 0.044
Waste Dump Maintenance Cost					**$1,449,000**	**$ 0.22**
Grade Control					Annualised	
Blasthole samples by AAS	11664	samples	$ 7.50	/sample	$87,480.00	$ 0.030
Blasthole samples by Fire Assay	2916	samples	$12.00	/sample	$34,992.00	$ 0.012
Trench/Channel samples	1458	samples	$12.00	/sample	$17,496.00	$ 0.006
Total Grade Control Cost					**$139,968**	**$ 0.05**
Ground/Slope Support					Annualised	
Cable Bolting - 6m to 16m	20,800	m	$ 5.29	/m	$110,032.00	$ 0.04
Wire Mesh & straps	10,400	set	$ 7.50	/set	$ 78,000.00	$ 0.03
Grout (approx 5kg per hole)	104,000	kg	$ 2.20	/kg	$228,800.00	$ 0.08
Drilling (all in)	20,800	m	$ 6.80	/m	$141,440.00	$ 0.05
Bolting Labour	41,600	hrs	$ 2.80	/hr	$116,480.00	$ 0.04
Total Ground Support Cost					**$ 674,752.00**	**$ 0.23**
Ore Mining – Owner-Operator						**$ 2.02**
Waste Mining – Owner-Operator						**$ 1.72**
	Cost	*Profit*	*Total*			
		Mark-up				
Ore Mining – Mining-Contract	*5%*	*25%*	*30%*			**$ 2.62**
Waste Mining – Mining-Contract	*5%*	*25%*	*30%*			**$ 2.23**

Table 21-16 – OPEX Costs: Direct & Associated Mining Costs

For the contract mining an additional amount of $0.49/tonne is added to the cost for mining equipment costs applied by the contractor.

Mining labour costs are summarised in *Table 21-14 - OPEX Costs - Direct & Indirect Mining Labour* below, both for direct and in-direct mining labour. The detailed breakdown is included in *Appendix 21-3*.

Labour Cost Item Description	Qty	Total Cost (US$/mth)
Direct Labour (pit operations) - costing included in OPEX1_Mining		
Equipment Operators	74	$ 84,996.03
Shop Mechanics	10	$ 11,485.95

Labour Cost Item Description	Qty	Total Cost (US$/mth)
Service Mechanics	4	$ 4,594.38
Shop Electrician	4	$ 4,594.38
Service Electrician	3	$ 3,445.79
Helper/Utility	12	$ 7,876.08
Direct Labour	**107**	**$116,992.61**
Manager & Supervision Staff Labour:		
Mine Manager Expat	1	$20,000.00
Mine Shift Foreman	3	$19,690.20
Planning Engineer	1	$5,907.06
Shift Supervisor	6	$29,535.30
Pit Geologist	2	$9,845.10
Resource/Reserve Geologist	1	$5,907.06
Geotech Engineer	1	$5,907.06
Chief Surveyor	1	$3,281.70
Safety Manager	1	$3,281.70
Safety Supervisor	3	$4,922.55
Fleet Maintenance Manager	1	$4,922.55
Mechanical Engineer	1	$3,281.70
Maintenance Supervisor	3	$4,922.55
Maintenance Planner	1	$1,969.02
Electrical Engineer	1	$3,281.70
Electrical Supervisor (maint)	3	$4,922.55
Warehouse Manager	1	$3,281.70
Warehouse Supervisor	2	$3,281.70
Environment Engineer	1	$3,281.70
Tailings Dam Manager	1	$3,281.70
Supervisor (tailings dam)	3	$4,922.55
Mine Overhead Labour	**38**	**$149,627.15**
Mine Service Department		
Safety Officer/Trainer	2	$3,281.70
Mine Clerk/Statisticians	2	$3,281.70
Grade Control Technician	3	$2,658.18
Samplers	6	$5,316.35
Surveyor	1	$1,640.85
Survey crew	4	$3,544.24
Geotech crew	2	$1,772.12
Security manager	1	$3,281.70
Security guards	12	$10,632.71
Mine Services Labour	**33**	**$35,409.55**
Engineering Services		
Engineering Manager	1	$15,000.00
Civil Engineer	1	$3,281.70
Mechanical Engineer	1	$3,281.70

Labour Cost Item Description	Qty	Total Cost (US$/mth)
Electirlcal Engineer	1	$3,281.70
Engineering Labour	**4**	**$24,845.10**
Admin, PR & HR		
Mine Admin Manager	1	$15,000.00
HR Manager	1	$3,281.70
PR Manager	1	$3,281.70
Office Personnel	9	$7,383.83
Admin Labour	**12**	**$28,947.23**
Procurement, Accounting & Finance & ICT		
Procurement Manager	1	$15,000.00
Procurement Staff/ Buyer	3	$2,953.53
Finance Mgr/Comptroller	1	$3,938.04
Accountant	1	$1,969.02
Cashier	1	$984.51
Accounting Staff	2	$1,969.02
IT Manager	1	$3,938.04
IT Technician	2	$2,625.36
PAFI Labour	**12**	**$33,377.52**
Tailings Dam Labour:		
Tailings Dam Crew	6	$ 4,922.55
Total Labour Costs:		**$277,129.10**
Overhead Labour:		
Labour_Staff Onsite Costs	15	$41,569
Labour_Travel & Accommodation	15	$41,569
Contractual Expats/Consultants		$50,000
Total Overhead Costs		**$133,138.00**
Grand Total Labour/Overhead		**$410,267.10**
Total Annual Labour Costs:		**$4,923,205**
Personnel with PPEs	*188*	
Labour Cost per tonne (for MCAF)		**$ 0.62**

Table 21-17 - OPEX Costs - Direct & Indirect Mining Labour

Additional mining related operating costs are summarised in *Table 21-17 - OPEX Costs - Mine Engineering Services Costing* covering the engineering services related to mining; and Table 21-18 - OPEX Costs - Technical Services, Health & Safety and Sundry Costing covering the mining services, health & safety and sundry mining costs both at the 8,000 tpd rate. The detailed tables are shown in *Appendix A21-4* and *Appendix A21-5* respectively.

Engineering Cost Item Description	Total Cost (US$)	Cost/Tonne (US$/t)
Services:		
Water Pipe - Service Water	$ 29,160.00	$ 0.010

Engineering Cost Item Description	Total Cost (US$)	Cost/Tonne (US$/t)
HDPE Pipe - pit dewatering pipes	$ 29,160.00	$ 0.010
Water Pipe Clamps	$ 8,323.20	$ 0.003
Water Pipe - Bends	$ 106.70	$ 0.000
Water Pipe - Valves	$ 416.65	$ 0.000
LT Equipment	$ 7,700.00	$ 0.003
LT Equipment - Frames	$ 905.44	$ 0.000
Pipe Support	$ 25,044.00	$ 0.009
Electric Cable - 70mm XLPE	$ 39,660.00	$ 0.014
Elec Cable - 70mm XLPE 1000/600V	$	$ -
Electric Cable - 4C/16mm	$ 5,920.00	$ 0.002
Luminaires	$ 1,435.00	$ 0.000
Bulbs	$ 260.00	$ 0.000
Dewatering pump consumables	$ 8,000.00	$ 0.003
Total Services:	***$ 156,090.99***	***$ 0.05***
Electricity		
Workshop & equipment (70kW)	$ 29,245.44	$ 0.010
Mobile Light Plant for pit (6 x 13kW)	$ 16,292.80	$ 0.006
Offices & accommodation (20kW)	$ 8,355.84	$ 0.003
Electricity for pumps (in opex1)		
Total Electricity	***$ 53,894.08***	***$ 0.02***
Sundries		
Potable Water	$ 1,575.22	$ 0.001
Water for Workshop	$ 2,362.82	$ 0.001
Cleaners - Degreasing	$ 50,112.00	$ 0.017
Total Sundries:	***$ 54,050.04***	***$ 0.02***
TOTAL ENGINEERING COSTS	**$ 264,035.11**	**$ 0.09**

Table 21-18 - OPEX Costs - Mine Engineering Services Costing

Cost Item Description	Total Cost (US$)	Cost/Tonne (US$/t)
Health & Safety:		
Boots	$ 16,287.73	$ 0.004
Hard Hats	$ 3,701.76	$ 0.001
Overalls	$ 6,367.02	$ 0.002
Gloves	$ 96.25	$ 0.000
Belts	$ 26,652.65	$ 0.007
Ear Muffs	$ 6,663.16	$ 0.002
Glasses	$ 4,145.97	$ 0.001
First Aid Materials	$ 5,119.45	$ 0.001
Reflector Jackets	$ 5,922.81	$ 0.002
Danger Tape	$ 2,047.78	$ 0.001

Cost Item Description	Total Cost (US$)	Cost/Tonne (US$/t)
Hand Torches	$ 1,122.34	$ 0.000
Safety Signage	$ 6,563.40	$ 0.002
Total Health & Safety:	***$ 84,690.33***	***$ 0.02***
Mining Services:		
Sampling Materials		
Sample Bags	$ 15,789.57	$ 0.005
Hammers	$ 59.07	$ 0.000
Spray Paint	$ 1,575.22	$ 0.001
Measuring Tape	$ 23.63	$ 0.000
Survey Materials		$ -
Survey Pegs	$ 1,260.17	$ 0.000
Spray Paint	$ 1,575.22	$ 0.001
Measuring Tape	$ 23.63	$ 0.000
Geology Materials		$ -
Sample Bags	$ 1,181.41	$ 0.000
Geology Hammers	$ 39.38	$ 0.000
Spray Paint	$ 1,575.22	$ 0.001
Measuring Tape	$ 23.63	$ 0.000
Office Items/Supplies		$ -
Software Licenses/ Maintenance	$ 30,000.00	$ 0.010
Office Supplies	$ 1,969.02	$ 0.001
Total Mining Services:	***$ 55,095.16***	***$ 0.02***
Sundries:		
Paint	$ 393.80	$ 0.0001
Spray Paint	$ 2,100.29	$ 0.0007
Measuring Tapes	$ 118.14	$ 0.0000
Hand Tools	$ 1,969.02	$ 0.0007
Pad Locks	$ 393.80	$ 0.0001
Shovels & Picks	$ 708.85	$ 0.0002
Hammers	$ 590.71	$ 0.0002
Heavy Duty Plastic	$ 11,814.12	$ 0.0040
Cement	$ 10,553.95	$ 0.0036
Nails, Nuts & Bolts	$ 220.53	$ 0.0001
Battery Fluid	$ 656.34	$ 0.0002
Oxygen	$ 2,629.35	$ 0.0009
Acetylene	$ 2,192.70	$ 0.0008
Washers	$ 656.34	$ 0.0002
Gaskets	$ 1,640.85	$ 0.0006
Total Sundries:	***$ 36,638.79***	***$ 0.01***
TOTAL GENERAL:	**$ 176,424.28**	**$ 0.05**

Table 21-19 - OPEX Costs - Technical Services, Health & Safety and Sundry Costing

21.3.2. Process Plant Operating Costs

This section provides the comparative operating costs for the treatment of Jugan ore at 4,000 tpd, 8,000 tpd and 12,000 tpd milling rates. Four options have been considered, namely production of a flotation concentrate to be sold to a third party in the first option (base case scenario) and production of gold dore by further processing of the flotation concentrate on location by either the BIOX (biological oxidation route), the POX (pressure oxidation route) or Albion (ultrafine grinding and atmospheric oxidation route). Details of these processes have been provided in *Section 17* above.

The operating costs have been incorporated in conjunction with the capital costs in the feasibility model for each process and option. The feasibility model is discussed in *Section 22* of this report.

21.3.2.1. Operating – Flotation Concentrate

Listed below in *Table 21-13 - OPEX Costs - 8,000 tpd Flotation Concentrate Option* is a breakdown of the operating costs for the 8,000 tpd flotation concentrate option.

Item	Unit Cost	Flotation Concentrate	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
Power	0.07/kWh	35kW/t	2.45
Steel Balls	1.6	0.74	1.18
Grinding Media		0	0.00
CuSO4	2.45	0.2	0.49
CMC	2.00	0.2	0.40
PAX	2.13	0.15	0.32
Frother,MIBC	3.2	0.04	0.13
Promoter	3.2	0.035	0.11
Nutrients	0.7	0	0.00
Floculent	5	0.015	0.08
Coagulent	2.19	0	0.00
Oxygen	0.02	0	0.00
Limestone	0.035	0	0.00
Lime	0.2	0.5	0.10
NaOH	0.7	0	0.00
NaCN	3.8	0	0.00
Carbon	2.8	0	0.00
Na2S2O5	0.8	0	0.00
LPG	0.58	0	0.00
HCl	0.47	0	0.00
Manpower		80	0.67
Maintenance	(4% CAPEX/yr)	$50.4M	0.69
Total:			**6.62**
Spares		5.5%	0.95
Total Operating Cost:			**7.57**

Table 21-20 - OPEX Costs - 8,000 tpd Flotation Concentrate Option

21.3.2.2. Operating – BIOX

Listed below in *Table 21-14 - OPEX Costs - 8,000 tpd Biological Oxidation Option* is a breakdown of the operating costs for the 8,000 tpd biological oxidation (BIOX) option.

Item	Unit Cost	Biological Oxidation	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
Power	0.07/kWh	70kW/t	4.90
Steel Balls	1.6	0.74	1.18
Grinding Media		0	0.00
CuSO4	2.45	0.35	0.86
CMC	2.00	0.2	0.40
PAX	2.13	0.15	0.32
Frother,MIBC	3.2	0.04	0.13
Promoter	3.2	0.035	0.11
Nutrients	0.7	0.75	0.53
Floculent	5	0.112	0.56
Coagulent	2.19	0.135	0.30
Oxygen	0.02	0	0.00
Limestone	0.035	60	2.10
Lime	0.2	8.25	1.65
NaOH	0.7	0	0.00
NaCN	3.8	1.95	7.41
Carbon	2.8	0.05	0.14
Na2S2O5	0.8	2	1.60
LPG	0.58	1L/t	0.58
HCl	0.47	0.037	0.02
Manpower		119	1.00
Maintenance	(4% CAPEX/yr)	$156M	2.83
Total:			**26.62**
Spares		5.5%	3.89
Total Operating Cost:			**30.49**

Table 21-21 - OPEX Costs - 8,000 tpd Biological Oxidation Option

21.3.2.3. Operating – POX

Listed below in *Table 21-15 - OPEX Costs - 8,000 tpd Pressure Oxidation Option* is a breakdown of the operating costs for the 8,000 tpd pressure oxidation (POX) option.

Item	Unit Cost	Pressure Oxidation	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
Power	0.07/kWh	67kW/t	4.69
Steel Balls	1.6	0.74	1.18
Grinding Media		0	0.00
CuSO4	2.45	0.235	0.58
CMC	2.00	0.2	0.40
PAX	2.13	0.15	0.32
Frother,MIBC	3.2	0.04	0.13

Item	Unit Cost	Pressure Oxidation	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
Promoter	3.2	0.035	0.11
Nutrients	0.7	0	0.00
Floculent	5	0.112	0.56
Coagulent	2.19	0.135	0.30
Oxygen	0.02	69	1.38
Limestone	0.035	80	2.80
Lime	0.2	1.8	0.36
NaOH	0.7	0	0.00
NaCN	3.8	0.75	2.85
Carbon	2.8	0.05	0.14
Na2S2O5	0.8	0.8	0.64
LPG	0.58	1L/t	0.58
HCl	0.47	0.037	0.02
Manpower		119	1.00
Maintenance	(4% CAPEX/yr)	$191.7M	3.32
Total:			**21.36**
Spares		7.5%	6.22
Total Operating Cost:			**27.56**

Table 21-22 - OPEX Costs - 8,000 tpd Pressure Oxidation Option

21.3.2.4. Operating – Albion

Listed below in *Table 21-16 - OPEX Costs - 8,000 tpd Albion Process Option* is a breakdown of the operating costs for the 8,000 tpd Albion process option.

Item	Unit Cost	Albion Process	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
Power	0.07/kWh	83kW/t	5.81
Steel Balls	1.6	0.74	1.18
Grinding Media		0	0.50
CuSO4	2.45	0.375	0.92
CMC	2.00	0.2	0.40
PAX	2.13	0.15	0.32
Frother,MIBC	3.2	0.04	0.13
Promoter	3.2	0.035	0.11
Nutrients	0.7	0	0.00
Floculent	5	0.112	0.56
Coagulent	2.19	0.135	0.30
Oxygen	0.02	47	0.94
Limestone	0.035	60	2.10
Lime	0.2	9.75	1.95
NaOH	0.7	5.25	3.68
NaCN	3.8	2.1	7.98
Carbon	2.8	0.05	0.14
Na2S2O5	0.8	2	1.60
LPG	0.58	1L/t	0.58

Item	Unit Cost	Albion Process	
		Consumption	Cost
	US$/kg	(kg/t)	(US$/t)
HCl	0.47	0.037	0.02
Manpower		119	1.00
Maintenance	(4% CAPEX/yr)	$169.2M	3.01
Total:			**33.23**
Spares		6.0%	4.51
Total Operating Cost:			**37.28**

Table 21-23 - OPEX Costs - 8,000 tpd Albion Process Option

21.3.3. Transportation & Infrastructure Costs

In the base case option the concentrate transportation costs are applicable from site to the concentrate processing facility in China. The concentrate transport costs are $32.76/concentrate tonne, and are inclusive of transport from mine site to port/warehouse, port/warehouse rehandling and sea freight, etc.

If gold is produced on-site then the transport and refining costs are listed below under Non-OPEX items.

21.3.4. Overheads, G&A Costs

Accounts have provided a rate of $0.55 per tonne for overheads and this is in line with the current rate for Besra operations in Vietnam.

21.4. Non-OPEX Items

21.4.1. Transportation & Refining

The refining, including transport, is only applicable if the POX, BIOX or Albion process options are selected. The base case option would see the gold refined by the concentrate processing company. Therefore, costs are applied only for these options and the costs are based on our current costs as per our Vietnam operations. Currently Besra's gold is refined in Switzerland but options for refining in Singapore are being investigated with the option to reduce these costs.

For the concentrate option the costs for transport from mine-site to processing/smelting facility are calculated based on standard transport and shipping rates (see above). These costs are not applicable when the full processing options on-site are selected.

If the full processing option is selected then the cost to transport and ship gold for refining is $4.50/oz and $2.50/oz respectively.

21.4.2. Royalties, Taxes, Tariffs & Tax Incentives

21.4.2.1. Royalties, Taxes & Tariffs

In Malaysia the corporate income tax is 24 % of net taxable profits. Other taxes are GST (10 %) and where applicable a service tax (6 %) – where services only are provided.

Import duties are applicable at a rate of bewtween 10-30 % for most standard goods; however, drilling and mining equipment are subject to nil import tariffs based on the individual item and related part numbers.

Employees and company contribute to the Malaysian Employee Provident Fund (EPF) and to employee insurance (SOCSO). A training levy will be imposed starting 2014 and is a 1 % levy on the local employees salary amount. These amounts are included in the labour rates.

There is no royalty (0 %) on gold produced in Sarawak, and there is no export duty or tariff for gold concentrate.

21.4.2.2. Tax Incentives

Pioneer Status is a standard concession available under which companies can apply for this status which allows 70 % of the net income of the project to be tax free for the first five years. That can also be extended for a second five year term under certain circumstances. Pioneer status must be applied for prior to project commencement.

Pioneer status is not automatically available and must be applied for. It is generally granted for companies within industries that the government wishes to encourage. It is noted that the committee will favour the submission by a company that intends to use local labour predominantly, and will source inputs locally as well as having a unique product or processing facility.

Investment Tax Allowance (ITA) is a capital expenditure-based incentive which is given by way of an exemption of income. ITA is a 'once only' allowance which is given at the standard rate of 60% of qualifying capital expenditure for the basis period in which the capital expenditure is incurred. Eligibility lasts for five years from the date of approval. The allowance is used to exempt statutory income, with a limit of 70% on that income.

Any allowance not used may be carried forward indefinitely. Where the 70% restriction applies, the balance of 30%, as under pioneer status, becomes liable to tax. Capital expenditure refers to capital expenditure incurred on a factory or on any plant and machinery used in Malaysia in connection with, and for the purposes of, the promoted activity or product. It does not include buildings used as living accommodation.

Income is computed in the normal way down to statutory income level, at which point the eligibility for exemption can be determined. Normal capital allowances may also be claimed but there is no compulsion to do so. Loss relief is also given in the normal way. Unlike pioneer status, there is no requirement to offset losses against exempt income.

Exploration and prospecting costs are eligible for special tax allowances to which we will be entitled.

22. Economic, Sensitivity & Risk Analysis

22.1. Economic Analysis

A cost model was derived to be able to analyse each of the 650+ possible scenarios. These were based on the main factors making up all the possible options available. These have been subsequently refined down to ±40 options. The remaining options are still built into the cost model and can be re-visited if this option becomes available or more information/data comes to hand. The model is built around the selection of a scenario number which then calculates or updates the costing worksheets, this information is then extracted and summarised in the cost model worksheet. *Figure 22-1 – Extract from Cost Model Scenario Options List* below shows an extract from the options table showing some examples of the option parameters.

Option	Ore Source	Production Rate (tpd)			Production Options			Process Rate (tpd)			Crush/Grind	Flotation	Oxidation-CIL	Oxidation	Secondary	CIL	Au Recovery			Transport	Transport	Contractor
		1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	Location	Location	Location	Process	Process	Float Tails	Primary	Direct CIL	Heap Leach	Option 1	Option 2	Option
445	Jugan+BYG	10,000	10,000		10_ALBN_C2			10,000	10000		On-Site	Central	Central	ALBION	HL1	Y2	80%		50%	Conveyor		Y
446	Jugan+BYG	10,000	10,000		10_ALBN_C2			10,000	10000		On-Site	Central	Central	ALBION	HL1	Y2	80%		50%	Highway-Truck		Y
447	Jugan+BYG	10,000	10,000		10_BIOX_C2			10,000	10000		On-Site	Central	Central	BIOX	HL1	Y2	80%		50%	Conveyor		Y
448	Jugan+BYG	10,000	10,000		10_BIOX_C2			10,000	10000		On-Site	Central	Central	BIOX	HL1	Y2	80%		50%	Highway-Truck		Y
449	Jugan+BYG	8,000	8,000		8_POX_B2			8,000	8000		On-Site	On-Site	On-Site	POX		Y2	85%			Site-Truck		N
450	Jugan+BYG	8,000	8,000		8_ALBN_B2			8,000	8000		On-Site	On-Site	On-Site	ALBION		Y2	80%			Site-Truck		N
451	Jugan+BYG	8,000	8,000		8_BIOX_B2			8,000	8000		On-Site	On-Site	On-Site	BIOX		Y2	80%			Site-Truck		N
452	Jugan+BYG	8,000	8,000		8_FLOT_B2			8,000	8000		On-Site	On-Site	Overseas	FLOTATION		Y2	72%			Site-Truck	Truck-Shipping	N
453	Jugan+BYG	8,000	8,000		8_POX_B2			8,000	8000		On-Site	On-Site	On-Site	POX	HL1	Y2	80%		50%	Site-Truck		N
454	Jugan+BYG	8,000	8,000		8_ALBN_B2			8,000	8000		On-Site	On-Site	On-Site	ALBION	HL1	Y2	80%		50%	Site-Truck		N
455	Jugan+BYG	8,000	8,000		8_BIOX_B2			8,000	8000		On-Site	On-Site	On-Site	BIOX	HL1	Y2	80%		50%	Site-Truck		N
456	Jugan+BYG	8,000	8,000		8_FLOT_B2			8,000	8000		On-Site	On-Site	Overseas	FLOTATION	HL1	Y2	77%		50%	Site-Truck	Truck-Shipping	N
457	Jugan+BYG	8,000	8,000		8_POX_B2			8,000	8000		On-Site	On-Site	Central	POX		Y2	85%			Pipeline		N
458	Jugan+BYG	8,000	8,000		8_POX_B2			8,000	8000		On-Site	On-Site	Central	POX		Y2	85%			Slurry-Truck		N
459	Jugan+BYG	8,000	8,000		8_ALBN_B2			8,000	8000		On-Site	On-Site	Central	ALBION		Y2	80%			Pipeline		N
460	Jugan+BYG	8,000	8,000		8_ALBN_B2			8,000	8000		On-Site	On-Site	Central	ALBION		Y2	80%			Slurry-Truck		N
461	Jugan+BYG	8,000	8,000		8_BIOX_B2			8,000	8000		On-Site	On-Site	Central	BIOX		Y2	80%			Pipeline		N
462	Jugan+BYG	8,000	8,000		8_BIOX_B2			8,000	8000		On-Site	On-Site	Central	BIOX		Y2	80%			Slurry-Truck		N

Figure 22-1 – Extract from Cost Model Scenario Options List

22.1.1. Pre-Tax Basis

Some assumptions were used in the cost models and the main assumptions for the base case options, are listed below:

- Gold price fixed at $1,300, though sensitivities have been investigated (see below);
- Based on a discounted cash flow model on a pre-tax basis;
- Production levels are fixed for each production option, except in build up and end;
- High grading with higher production initially and lower production has been investigated, though processing was maintained at constant level – this was only applicable in limited cases but is an option to be investigated further if required;
- NPV was fixed at 8% and calculated based on the net cash flow generated from the Project;
- No escalation or inflation factors were taken into account (constant 2013);
- The IRR on total investment was calculated based on 100% equity financing;
- Production schedules for Jugan and BYG-Krian are linear/serial and were not done in parallel, though this option is possible and may need investigation if required;
- Pre-mining occurs in all options and a six-month build up applied;
- Processing is offset by one quarter to allow for commissioning, build up and throughput lag;
- Phased capital was applied at the appropriate time ahead of requirements.

Table 22-1 - Cashflow Model - Option 484 (8,000tpd Contractor-Mining) and *Table 22-2 - Cashflow Model - Option 452 (8,000tpd Owner-Operator)* below presents the project cost model (before tax) for both base case options (owner-operator & contract-mining). *Enclosure B22-1* lists the cost models for both base case scenario options for comparative purposes. These are at A3 size for ease of reading.

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Mined Ore Tonnes	10,927,500	240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-	-
Mined Au Grade	1.70	1.53	1.53	1.53	1.53	1.53	1.58	1.58	1.58	1.58	1.56	1.56	1.56	1.56	1.59	2.11	3.24	-	-	-	-	-
Mined Au Ounces	598,830	11,870	24,090	35,960	35,960	35,960	36,990	36,990	36,990	36,990	36,600	36,600	36,600	36,600	37,190	48,940	74,500	-	-	-	-	-
Cumulative Mined Ore Tonnes		240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000	5,840,000	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-	-
Cumulative Mined Au Grade		1.53	1.53	1.53	1.53	1.53	1.54	1.55	1.55	1.55	1.55	1.56	1.56	1.56	1.56	1.60	1.70	-	-	-	-	-
Cumulative Mined Au Ounces		11,870	35,960	71,920	107,880	143,840	180,830	217,820	254,810	291,800	328,400	365,000	401,600	438,200	475,390	524,330	598,830	-	-	-	-	-
Processed Ore Tonnes	10,927,500		240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-
Recovered Au Grade	1.32		1.19	1.19	1.19	1.19	1.19	1.22	1.22	1.22	1.22	1.21	1.21	1.21	1.21	1.23	1.63	2.51	-	-	-	-
Recovered Au Ounces	463,650		9,190	18,650	27,840	27,840	27,840	28,640	28,640	28,640	28,640	28,340	28,340	28,340	28,340	28,800	37,890	57,680	-	-	-	-
Cumulative Processed Ore Tonnes		-	240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000	5,840,000	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-
Cumulative Recovered Au Grade		-	1.19	1.19	1.19	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.21	1.24	1.32	-	-	-	-
Cumulative Recovered Au Ounces		-	9,190	27,840	55,680	83,520	111,360	140,000	168,640	197,280	225,920	254,260	282,600	310,940	339,280	368,080	405,970	463,650	-	-	-	-
Waste Volume			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Tonnes	18,569,000	118,100	239,900	358,000	358,000	358,000	922,600	922,600	922,600	922,600	1,650,100	1,650,100	1,650,100	1,650,100	1,813,000	2,320,900	2,712,300	-	-	-	-	-
Cumulative Waste Tonnes		118,100	358,000	716,000	1,074,000	1,432,000	2,354,600	3,277,200	4,199,800	5,122,400	6,772,500	8,422,600	10,072,700	11,722,800	13,535,800	15,856,700	18,569,000	-	-	-	-	-
Strip Ratio	1.70	0.49	0.49	0.49	0.49	0.49	1.26	1.26	1.26	1.26	2.26	2.26	2.26	2.26	2.49	3.22	3.79	-	-	-	-	-
Cumulative Strip Ratio		0.49	0.49	0.49	0.49	0.49	0.65	0.75	0.82	0.88	1.03	1.15	1.25	1.34	1.43	1.55	1.70	-	-	-	-	-
Capital Costs:																						
Capital Development/Pre-stripping																						
Capital Costs Relative to Option																						
Capital Cost - Mining	$ 4,304,495	$ 4,304,495																				
Capital Cost - Processing (Main)	$ 58,547,853	$ 58,547,853																				
Capital Cost - Processing (Addn CIL Circuit)	$ -																					
Capital Cost - Processing (Heap Leach)	$ -																					
Capital Cost - Transport	$ -	$ -																				
Capital Cost - Other	$ 60,205,555	$ 29,087,341	$ -	$ -	$ 11,356,641	$ 8,469,245	$ 5,646,164	$ -	$ -	$ -	$ -	$ -	$ 2,823,082	$ 2,823,082	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Rehabilitation (Stage 1&2)	$ 7,160,750		$ -	$ -	$ -	$ -	$ -	$ -	$ 2,403,780	$ -	$ -	$ -	$ -	$ -	$ 3,166,970	$ -	$ 795,000	$ 795,000	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Process	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Land Acqisition	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - TSF & Other	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Rehabilitation	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Condemnation/Resource Drilling	$ 180,000	$ 180,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Sustaining Capital	$ 4,479,262		$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ -	$ -	$ -	$ -	$ -
Total Capital Costs	$ 134,877,915	$ 92,119,690	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 3,121,699	$ 3,465,587	$ 298,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -	$ -
Cumulative Capital Costs		$ 92,119,690	$ 92,418,307	$ 92,716,925	$ 104,372,183	$ 113,140,046	$ 119,084,827	$ 119,383,444	$ 122,085,842	$ 122,384,459	$ 122,683,077	$ 122,981,694	$ 126,103,394	$ 129,225,093	$ 132,690,680	$ 132,989,298	$ 134,082,915	$ 134,877,915	$ -	$ -	$ -	$ -
Operating Costs:																						
Mining - Waste	$ 50,525,000	$ 321,342	$ 652,752	$ 974,094	$ 974,094	$ 974,094	$ 2,510,333	$ 2,510,333	$ 2,510,333	$ 2,510,333	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,933,051	$ 6,315,013	$ 7,379,986	$ -	$ -	$ -	$ -	$ -
Mining - Ore	$ 33,862,504	$ 746,509	$ 1,515,640	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,260,289	$ 2,236,428	$ 2,218,765	$ -	$ -	$ -	$ -	$ -
Labour (Mine Overhead)	$ 18,872,319	$ 410,268	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ -	$ -	$ -	$ -	$ -
General Costs	$ 584,299	$ 12,881	$ 26,152	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,039	$ 39,039	$ 39,039	$ 39,039	$ 39,001	$ 38,590	$ 38,285	$ -	$ -	$ -	$ -	$ -
Engineering Costs	$ 988,097	$ 21,783	$ 44,226	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,018	$ 66,018	$ 66,018	$ 66,018	$ 65,955	$ 65,258	$ 64,743	$ -	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Main)	$ 196,325,629	$ -	$ 4,307,431	$ 8,745,221	$ 13,052,652	$ 13,052,652	$ 13,052,652	$ 13,068,652	$ 13,068,652	$ 13,068,652	$ 13,068,652	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,061,581	$ 13,111,576	$ 13,409,805	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Addn CIL)	$ -																					
Metallurgical/Processing Costs (Heap Leach)	$ -																					
Transport Cost to Central Plant/Port	$ 35,796,851	$ -	$ 789,152	$ 1,602,218	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,389,405	$ 2,364,181	$ 2,345,509	$ -	$ -	$ -	$ -
General Overhead (BESRA)	$ 6,010,125	$ 132,495	$ 269,005	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,555	$ 401,555	$ 401,555	$ 401,555	$ 401,170	$ 396,935	$ 393,800	$ -	$ -	$ -	$ -	$ -
Total Operating Costs	$ 342,964,825	$ 1,645,278	$ 8,835,161	$ 15,321,027	$ 20,417,610	$ 20,417,610	$ 21,953,849	$ 21,969,849	$ 21,969,849	$ 21,969,849	$ 23,949,707	$ 23,945,746	$ 23,945,746	$ 23,945,746	$ 24,386,331	$ 25,734,013	$ 26,802,138	$ 15,755,314	$ -	$ -	$ -	$ -
Operating Cost per Tonne Ore	$ 31.39	$ 6.83	$ 18.06	$ 20.99	$ 27.97	$ 27.97	$ 30.07	$ 30.10	$ 30.10	$ 30.10	$ 32.80	$ 32.80	$ 32.80	$ 32.80	$ 33.43	$ 35.66	$ 37.43	$ -	$ -	$ -	$ -	$ -
Cumulative Operating Costs		$ 1,645,278	$ 10,480,439	$ 25,801,466	$ 46,219,077	$ 66,636,687	$ 88,590,536	$ 110,560,385	$ 132,530,234	$ 154,500,083	$ 178,449,789	$ 202,395,536	$ 226,341,282	$ 250,287,028	$ 274,673,359	$ 300,407,372	$ 327,209,511	$ 342,964,825	$ -	$ -	$ -	$ -
Total Costs:																						
Total Costs	$ 477,842,740	$ 93,764,968	$ 9,133,779	$ 15,619,644	$ 32,072,869	$ 29,185,473	$ 27,898,630	$ 22,268,466	$ 24,672,246	$ 22,268,466	$ 24,248,324	$ 24,244,364	$ 27,067,445	$ 27,067,445	$ 27,851,919	$ 26,032,631	$ 27,895,756	$ 16,550,314	$ -	$ -	$ -	$ -
Total Cumulative Costs		$ 93,764,968	$ 102,898,746	$ 118,518,391	$ 150,591,260	$ 179,776,733	$ 207,675,363	$ 229,943,829	$ 254,616,076	$ 276,884,542	$ 301,132,866	$ 325,377,230	$ 352,444,675	$ 379,512,121	$ 407,364,039	$ 433,396,670	$ 461,292,426	$ 477,842,740	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore	$ 43.73	$ 389.23	$ 18.67	$ 21.40	$ 43.94	$ 39.98	$ 38.22	$ 30.50	$ 33.80	$ 30.50	$ 33.21	$ 33.21	$ 37.07	$ 37.07	$ 38.18	$ 36.07	$ 38.96	$ -	$ -	$ -	$ -	$ -
Total Cost per Ounce	$ 1,030.61	$ -	$ 993.88	$ 837.51	$ 1,152.04	$ 1,048.33	$ 1,002.11	$ 777.53	$ 861.46	$ 777.53	$ 846.66	$ 855.48	$ 955.10	$ 955.10	$ 982.78	$ 903.91	$ 736.23	$ 286.93	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore (incl. Resale)	$ 41.29																					
Total Cost per Ounce (incl. Resale)	$ 973.14																					
Revenue:																						
Mine Call Factor	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-
Capital Equipment Resale/Salvage	$ 8,291,104		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,291,104	$ -	$ -	$ -	$ -
Asset Resale	$ 18,354,167	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,354,167	$ -	$ -	$ -
Gold Revenue	$ 602,745,000	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 74,984,000	$ -	$ -	$ -	$ -
Marketing & Royalties																						
Freight/Transport	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refining	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Marketing Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenue Before Tax	$ 629,390,272	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 83,275,104	$ 18,354,167	$ -	$ -	$ -
Cumulative Revenue		$ -	$ 11,947,000	$ 36,192,000	$ 72,384,000	$ 108,576,000	$ 144,768,000	$ 182,000,000	$ 219,232,000	$ 256,464,000	$ 293,696,000	$ 330,538,000	$ 367,380,000	$ 404,222,000	$ 441,064,000	$ 478,504,000	$ 527,761,000	$ 611,036,104	$ 629,390,272	$ -	$ -	$ -
Annual Revenue before Tax	$ 629,390,272	$ -	$			108,576,000	$			147,888,000	$			147,758,000	$			206,814,104	$			18,354,167
Annualised Cumulative Revenue		$ -	$			108,576,000	$			256,464,000	$			404,222,000	$			611,036,104	$			629,390,272
Quarterly Cash Flow	$ 151,547,532	($ 93,764,968)	$ 2,813,221	$ 8,625,356	$ 4,119,131	$ 7,006,527	$ 8,293,370	$ 14,963,534	$ 12,559,754	$ 14,963,534	$ 12,983,676	$ 12,597,636	$ 9,774,555	$ 9,774,555	$ 8,990,081	$ 11,407,369	$ 21,361,244	$ 66,724,791	$ 18,354,167	$ -	$ -	$ -
Cumulative Cash Flow		($ 93,764,968)	($ 90,951,746)	($ 82,326,391)	($ 78,207,260)	($ 71,200,733)	($ 62,907,363)	($ 47,943,829)	($ 35,384,076)	($ 20,420,542)	($ 7,436,866)	$ 5,160,770	$ 14,935,325	$ 24,709,879	$ 33,699,961	$ 45,107,330	$ 66,468,574	$ 133,193,364	$ 151,547,532	$ -	$ -	$ -
Annualised Cashflow	$ 151,547,532	($ 93,764,968)	$			22,564,235	$			50,780,191	$			45,130,421	$			108,483,485	$			18,354,167
Annualised Cumulative Cashflow		($ 93,764,968)	($			71,200,733)	($			20,420,542)	$			24,709,879	$			133,193,364	$			151,547,532
Yearly NPV @ 8%	$ 91,407,216																					
Yearly IRR	38.0%																					
Estimated Dates for Project (Assuming Start Date)		30/06/2014	30/09/2015	31/12/2015	31/03/2016	30/06/2016	30/09/2016	31/12/2016	31/03/2017	30/06/2017	30/09/2017	31/12/2017	31/03/2018	30/06/2018	30/09/2018	31/12/2018	31/03/2019	30/06/2019	30/09/2019	31/12/2019	31/03/2020	30/06/2020
Period NPV @ 8%	$ 88,666,062																					
Period IRR	29.5%																					

Table 22-1 - Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Mined Ore Tonnes	11,209,300	241,100	489,400	730,500	730,500	730,500	729,900	729,900	729,900	729,900	730,300	730,300	730,300	730,300	726,700	668,500	728,300	323,000	-	-	-	-
Mined Au Grade	1.69	1.53	1.53	1.53	1.53	1.53	1.56	1.56	1.56	1.56	1.55	1.55	1.55	1.55	1.55	1.55	2.74	3.83	-	-	-	-
Mined Au Ounces	609,900	11,870	24,110	35,980	35,980	35,980	36,680	36,680	36,680	36,680	36,390	36,390	36,390	36,390	36,310	33,400	64,180	39,810	-	-	-	-
Cumulative Mined Ore Tonnes		241,100	730,500	1,461,000	2,191,500	2,922,000	3,651,900	4,381,800	5,111,700	5,841,600	6,571,900	7,302,200	8,032,500	8,762,800	9,489,500	10,158,000	10,886,300	11,209,300	-	-	-	-
Cumulative Mined Au Grade		1.53	1.53	1.53	1.53	1.53	1.54	1.54	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.63	1.69	-	-	-	-
Cumulative Mined Au Ounces		11,870	35,980	71,960	107,940	143,920	180,600	217,280	253,960	290,640	327,030	363,420	399,810	436,200	472,510	505,910	570,090	609,900	-	-	-	-
Processed Ore Tonnes	11,209,300		241,100	489,400	730,500	730,500	730,500	729,900	729,900	729,900	729,900	730,300	730,300	730,300	730,300	726,700	668,500	728,300	323,000	-	-	-
Recovered Au Grade	1.31		1.19	1.19	1.19	1.19	1.19	1.21	1.21	1.21	1.21	1.20	1.20	1.20	1.20	1.20	1.20	2.12	2.97	-	-	-
Recovered Au Ounces	472,240		9,190	18,670	27,860	27,860	27,860	28,400	28,400	28,400	28,400	28,180	28,180	28,180	28,180	28,110	25,860	49,690	30,820	-	-	-
Cumulative Processed Ore Tonnes		-	241,100	730,500	1,461,000	2,191,500	2,922,000	3,651,900	4,381,800	5,111,700	5,841,600	6,571,900	7,302,200	8,032,500	8,762,800	9,489,500	10,158,000	10,886,300	11,209,300	-	-	-
Cumulative Recovered Au Grade		-	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.26	1.31	-	-	-
Cumulative Recovered Au Ounces		-	9,190	27,860	55,720	83,580	111,440	139,840	168,240	196,640	225,040	253,220	281,400	309,580	337,760	365,870	391,730	441,420	472,240	-	-	-
Waste Volume			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Tonnes	20,926,100	126,500	256,900	383,400	383,400	383,400	983,200	983,200	983,200	983,200	1,713,500	1,713,500	1,713,500	1,713,500	2,066,600	1,901,200	3,542,000	1,095,900	-	-	-	-
Cumulative Waste Tonnes		126,500	383,400	766,800	1,150,200	1,533,600	2,516,800	3,500,000	4,483,200	5,466,400	7,179,900	8,893,400	10,606,900	12,320,400	14,387,000	16,288,200	19,830,200	20,926,100	-	-	-	-
Strip Ratio	1.87	0.52	0.52	0.52	0.52	0.52	1.35	1.35	1.35	1.35	2.35	2.35	2.35	2.35	2.84	2.84	4.86	3.39	-	-	-	-
Cumulative Strip Ratio		0.52	0.52	0.52	0.52	0.52	0.69	0.80	0.88	0.94	1.09	1.22	1.32	1.41	1.52	1.60	1.82	1.87	-	-	-	-
Capital Costs:																						
Capital Development/Pre-stripping																						
Capital Costs Relative to Option																						
Capital Cost - Mining	$ 24,499,502	$ 24,499,502																				
Capital Cost - Processing (Main)	$ 58,547,853	$ 58,547,853																				
Capital Cost - Processing (Addn CIL Circuit)	$ -																					
Capital Cost - Processing (Heap Leach)	$ -																					
Capital Cost - Transport	$ -	$ -																				
Capital Cost - Other	$ 60,205,555	$ 29,087,341	$ -	$ -	$ 11,356,641	$ 8,469,245	$ 5,646,164	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,823,082	$ 2,823,082	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Rehabilitation (Stage 1&2)	$ 7,955,750		$ -	$ -	$ -	$ -	$ -	$ -	$ 2,403,780	$ -	$ -	$ -	$ -	$ -	$ 3,166,970	$ -	$ 795,000	$ 795,000	$ 795,000	$ -	$ -	$ -
Capital Cost - Stage 3 - Process	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Land Acqisition	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - TSF & Other	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Rehabilitation	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Condemnation/Resource Drilling	$ 180,000	$ 180,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Sustaining Capital	$ 4,777,880		$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ -	$ -	$ -	$ -
Total Capital Costs	$ 156,166,540	$ 112,314,696	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 6,288,669	$ 298,617	$ 1,093,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -
Cumulative Capital Costs		$ 112,314,696	$ 112,613,314	$ 112,911,931	$ 124,567,190	$ 133,335,053	$ 139,279,834	$ 139,578,451	$ 142,280,849	$ 142,579,466	$ 142,878,084	$ 143,176,701	$ 143,475,319	$ 146,597,018	$ 152,885,687	$ 153,184,305	$ 154,277,922	$ 155,371,540	$ 156,166,540	$ -	$ -	$ -
Operating Costs:																						
Mining - Waste	$ 33,880,177	$ 204,808	$ 415,931	$ 620,740	$ 620,740	$ 620,740	$ 1,591,839	$ 1,591,839	$ 1,591,839	$ 1,591,839	$ 2,774,224	$ 2,774,224	$ 2,774,224	$ 2,774,224	$ 3,345,907	$ 3,078,117	$ 5,734,637	$ 1,774,305	$ -	$ -	$ -	$ -
Mining - Ore	$ 21,229,027	$ 456,614	$ 926,863	$ 1,383,477	$ 1,383,477	$ 1,383,477	$ 1,382,340	$ 1,382,340	$ 1,382,340	$ 1,382,340	$ 1,383,098	$ 1,383,098	$ 1,383,098	$ 1,383,098	$ 1,376,280	$ 1,266,056	$ 1,379,310	$ 611,722	$ -	$ -	$ -	$ -
Labour (Mine Overhead)	$ 20,103,123	$ 410,268	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ -	$ -	$ -	$ -
General Costs	$ 599,367	$ 12,892	$ 26,168	$ 39,060	$ 39,060	$ 39,060	$ 39,028	$ 39,028	$ 39,028	$ 39,028	$ 39,050	$ 39,050	$ 39,050	$ 39,050	$ 38,857	$ 35,745	$ 38,943	$ 17,271	$ -	$ -	$ -	$ -
Engineering Costs	$ 1,013,578	$ 21,801	$ 44,253	$ 66,054	$ 66,054	$ 66,054	$ 66,000	$ 66,000	$ 66,000	$ 66,000	$ 66,036	$ 66,036	$ 66,036	$ 66,036	$ 65,710	$ 60,448	$ 65,855	$ 29,207	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Main)	$ 201,321,170	$ -	$ 4,310,855	$ 8,750,756	$ 13,061,610	$ 13,061,610	$ 13,061,610	$ 13,062,140	$ 13,062,140	$ 13,062,140	$ 13,062,140	$ 13,064,587	$ 13,064,587	$ 13,064,587	$ 13,064,587	$ 13,001,564	$ 11,960,319	$ 13,460,552	$ 6,145,386	$ -	$ -	$ -
Metallurgical/Processing Costs (Addn CIL)	$ -																					
Metallurgical/Processing Costs (Heap Leach)	$ -																					
Transport Cost to Central Plant/Port	$ 36,719,985	$ -	$ 789,807	$ 1,603,201	$ 2,393,008	$ 2,393,008	$ 2,393,008	$ 2,391,043	$ 2,391,043	$ 2,391,043	$ 2,391,043	$ 2,392,353	$ 2,392,353	$ 2,392,353	$ 2,392,353	$ 2,380,560	$ 2,189,906	$ 2,385,802	$ 1,058,100	$ -	$ -	$ -
General Overhead (BESRA)	$ 6,165,115	$ 132,605	$ 269,170	$ 401,775	$ 401,775	$ 401,775	$ 401,445	$ 401,445	$ 401,445	$ 401,445	$ 401,665	$ 401,665	$ 401,665	$ 401,665	$ 399,685	$ 367,675	$ 400,565	$ 177,650	$ -	$ -	$ -	$ -
Total Operating Costs	$ 321,031,543	$ 1,238,988	$ 8,013,851	$ 14,095,866	$ 19,196,528	$ 19,196,528	$ 20,166,075	$ 20,164,639	$ 20,164,639	$ 20,164,639	$ 21,348,058	$ 21,351,816	$ 21,351,816	$ 21,351,816	$ 21,914,182	$ 21,420,969	$ 23,000,338	$ 19,687,311	$ 7,203,486	$ -	$ -	$ -
Operating Cost per Tonne Ore	$ 28.64	$ 5.14	$ 16.37	$ 19.30	$ 26.28	$ 26.28	$ 27.63	$ 27.63	$ 27.63	$ 27.63	$ 29.23	$ 29.24	$ 29.24	$ 29.24	$ 30.16	$ 32.04	$ 31.58	$ 60.95	$ -	$ -	$ -	$ -
Cumulative Operating Costs		$ 1,238,988	$ 9,252,839	$ 23,348,705	$ 42,545,232	$ 61,741,760	$ 81,907,835	$ 102,072,474	$ 122,237,113	$ 142,401,751	$ 163,749,810	$ 185,101,625	$ 206,453,441	$ 227,805,257	$ 249,719,439	$ 271,140,408	$ 294,140,746	$ 313,828,057	$ 321,031,543	$ -	$ -	$ -
Total Costs:																						
Total Costs	$ 477,198,083	$ 113,553,684	$ 8,312,469	$ 14,394,483	$ 30,851,786	$ 27,964,391	$ 26,110,856	$ 20,463,256	$ 22,867,036	$ 20,463,256	$ 21,646,676	$ 21,650,433	$ 21,650,433	$ 24,473,515	$ 28,202,852	$ 21,719,586	$ 24,093,955	$ 20,780,929	$ 7,998,486	$ -	$ -	$ -
Total Cumulative Costs		$ 113,553,684	$ 121,866,153	$ 136,260,636	$ 167,112,422	$ 195,076,813	$ 221,187,669	$ 241,650,925	$ 264,517,961	$ 284,981,218	$ 306,627,893	$ 328,278,327	$ 349,928,760	$ 374,402,275	$ 402,605,126	$ 424,324,713	$ 448,418,668	$ 469,199,597	$ 477,198,083	$ -	$ -	$ -
Total Cost per Tonne Ore	$ 42.57	$ 470.98	$ 16.99	$ 19.70	$ 42.23	$ 38.28	$ 35.77	$ 28.04	$ 31.33	$ 28.04	$ 29.64	$ 29.65	$ 29.65	$ 33.51	$ 38.81	$ 32.49	$ 33.08	$ 64.34	$ -	$ -	$ -	$ -
Total Cost per Ounce	$ 1,010.50	$ -	$ 904.51	$ 771.00	$ 1,107.39	$ 1,003.75	$ 937.22	$ 720.54	$ 805.18	$ 720.54	$ 762.21	$ 768.29	$ 768.29	$ 868.47	$ 1,000.81	$ 772.66	$ 931.71	$ 418.21	$ 259.52	$ -	$ -	$ -
Total Cost per Tonne Ore (incl. Resale)	$ 39.83																					
Total Cost per Ounce (incl. Resale)	$ 945.52																					
Revenue:																						
Mine Call Factor	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-
Capital Equipment Resale/Salvage	$ 12,330,106		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,330,106	$ -	$ -	$ -
Asset Resale	$ 18,354,167	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,354,167	$ -	$ -
Gold Revenue	$ 613,912,000	$ -	$ 11,947,000	$ 24,271,000	$ 36,218,000	$ 36,218,000	$ 36,218,000	$ 36,920,000	$ 36,920,000	$ 36,920,000	$ 36,920,000	$ 36,634,000	$ 36,634,000	$ 36,634,000	$ 36,634,000	$ 36,543,000	$ 33,618,000	$ 64,597,000	$ 40,066,000	$ -	$ -	$ -
Marketing & Royalties																						
Freight/Transport	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refining	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Marketing Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenue Before Tax	$ 644,596,273	$ -	$ 11,947,000	$ 24,271,000	$ 36,218,000	$ 36,218,000	$ 36,218,000	$ 36,920,000	$ 36,920,000	$ 36,920,000	$ 36,920,000	$ 36,634,000	$ 36,634,000	$ 36,634,000	$ 36,634,000	$ 36,543,000	$ 33,618,000	$ 64,597,000	$ 52,396,106	$ 18,354,167	$ -	$ -
Cumulative Revenue		$ -	$ 11,947,000	$ 36,218,000	$ 72,436,000	$ 108,654,000	$ 144,872,000	$ 181,792,000	$ 218,712,000	$ 255,632,000	$ 292,552,000	$ 329,186,000	$ 365,820,000	$ 402,454,000	$ 439,088,000	$ 475,631,000	$ 509,249,000	$ 573,846,000	$ 626,242,106	$ 644,596,273	$ -	$ -
Annual Revenue before Tax	$ 644,596,273	$ -				108,654,000				146,978,000				146,822,000				171,392,000				70,750,273
Annualised Cumulative Revenue		$ -				108,654,000				255,632,000				402,454,000				573,846,000				644,596,273
Quarterly Cash Flow	$ 167,398,190	($ 113,553,684)	$ 3,634,531	$ 9,876,517	$ 5,366,214	$ 8,253,609	$ 10,107,144	$ 16,456,744	$ 14,052,964	$ 16,456,744	$ 15,273,324	$ 14,983,567	$ 14,983,567	$ 12,160,485	$ 8,431,148	$ 14,823,414	$ 9,524,045	$ 43,816,071	$ 44,397,620	$ 18,354,167	$ -	$ -
Cumulative Cash Flow		($ 113,553,684)	($ 109,919,153)	($ 100,042,636)	($ 94,676,422)	($ 86,422,813)	($ 76,315,669)	($ 59,858,925)	($ 45,805,961)	($ 29,349,218)	($ 14,075,893)	$ 907,673	$ 15,891,240	$ 28,051,725	$ 36,482,874	$ 51,306,287	$ 60,830,332	$ 104,646,403	$ 149,044,023	$ 167,398,190	$ -	$ -
Annualised Cashflow	$ 167,398,190	($ 113,553,684)				27,130,871				57,073,595				57,400,943				76,594,678				62,751,787
Annualised Cumulative Cashflow		($ 113,553,684)				($ 86,422,813)				($ 29,349,218)				28,051,725				104,646,403				167,398,190
Yearly NPV @ 8%	$ 97,289,637																					
Yearly IRR	34.3%																					
Estimated Dates for Project (Assuming Start Date)		30/06/2014	30/09/2015	31/12/2015	31/03/2016	30/06/2016	30/09/2016	31/12/2016	31/03/2017	30/06/2017	30/09/2017	31/12/2017	31/03/2018	30/06/2018	30/09/2018	31/12/2018	31/03/2019	30/06/2019	30/09/2019	31/12/2019	31/03/2020	30/06/2020
Period NPV @ 8%	$ 94,912,428																					
Period IRR	27.4%																					

Table 22-2 - Cashflow Model - Option 452 (8,000tpd Owner-Operator)

The base case options summary results are shown in the following tables – *Table 22-3 - Key Summary Results from Cashflow Model - Option 484 (8,000tpd Contractor-Mining)* to *Table 22-4 - Key Summary Results from Cashflow Model - Option 452 (8,000tpd Owner-Operator).*

Key Summary Results			
Mined Ore Tonnes			10,928,000
Waste Tonnes			18,569,000
Gold Price		$	1,300.00
Strip Ratio			1.70
Total Recovered Ounces			463,700
Average Ounces/Annum			116,000
Recovery Percentage			0.77
Total Capital		$	134,878,000
Initial Capital		$	92,119,690
Stage 3 Capital		$	-
Ongoing Capital		$	42,758,310
Operating Cost/ Ore Tonne		$	31.39
Cost per Ounce		$	1,030.61
Cost per Ounce (incl. Resale)		$	973.14
Mine Life (Years)			4.00
Mine Life (Quarters)			16.00
Pre-Mine Period (Years)			1.00
Yearly NPV @	8%	$	91,407,216
Yearly IRR			38.0%

Table 22-3 - Key Summary Results from Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Key Summary Results			
Mined Ore Tonnes			11,210,000
Waste Tonnes			20,927,000
Gold Price		$	1,300.00
Strip Ratio			1.87
Total Recovered Ounces			472,300
Average Ounces/Annum			111,200
Recovery Percentage			0.77
Total Capital		$	156,167,000
Initial Capital		$	112,314,696
Stage 3 Capital		$	-
Ongoing Capital		$	43,852,304
Operating Cost/ Ore Tonne		$	28.64
Cost per Ounce		$	1,010.50
Cost per Ounce (incl. Resale)		$	945.52
Mine Life (Years)			4.25
Mine Life (Quarters)			17.00
Pre-Mine Period (Years)			1.00
Yearly NPV @	8%	$	97,289,637
Yearly IRR			34.3%

Table 22-4 - Key Summary Results from Cashflow Model - Option 452 (8,000tpd Owner-Operator)

The payback period is 2.25 years (9 quarters) from the start of production (excluding any pre-mining).

22.1.2. After Tax Basis

The taxes and royalties are outlined in detail in Section 21.4.2, and the key items are summarised below:

- Zero percent (0%) royalty on gold produced;
- No export duty or tariffs applicable to gold concentrate exports;
- Corporate income tax is 24 % of net taxable profits.

Import duties are applicable at a rate of bewtween 10-30 % for most standard goods; however, drilling and mining equipment are subject to nil import tariffs based on the individual item and related part numbers. These duties are included in the capital costs where applicable.

Two tax incentive schemes are available in Malaysia; these are Pioneer Status and Investment Tax Allowance (ITA).

Pioneer Status is a standard concession available under which companies can apply for this status which allows 70 % of the net income of the project to be tax free for the first five years. That can also be extended for a second five year term under certain circumstances.

Investment Tax Allowance (ITA) is a capital expenditure-based incentive which is given by way of an exemption of income. ITA is a 'once only' allowance which is given at the standard rate of 60% of qualifying capital expenditure for the basis period in which the capital expenditure is incurred. Eligibility lasts for five years from the date of approval. The allowance is used to exempt statutory income, with a limit of 70% on that income.

These tax incentives are not included in the cashflow model, but are currently being investigated to assess their impact on the project.

Building in the taxes and royalty rates listed at the beginning of this section the after tax cash flow model is determined. The after-tax cash flow model is shown in *Table 22-5 - After-Tax Cashflow Model - Option 484 (8,000tpd Contractor-Mining)* and *Table 22-6 - After-Tax Cashflow Model - Option 452 (8,000tpd Owner-Operator)* below, this first part of the cash flow models are as above and the figures below only show the subsequent after tax calculations. *Enclosure B22-1* lists the cost models for both base case scenario options for comparative purposes. These are at A3 size for ease of reading.

The key summary results, for each base option, are shown in *Table 22-7 - After-Tax Summary Results from Cashflow Model - Option 484 (8,000tpd Contractor-Mining)* and *Table 22-8 - After-Tax Summary Results from Cashflow Model - Option 452 (8,000tpd Owner-Operator).*

Cashflow Item	Totals	Yr -1 Pre-Mining	Yr 1 Qtr1	Yr 1 Qtr2	Yr 1 Qtr3	Yr 1 Qtr4
Stage		*1*	*1*	*1*	*1*	*1*
Tax - No Incentives						
Opening Capital/Deferred Exploration		$ 7,500,000				
Capital Expenditure (Stage 1&2)	*$ 134,877,915*	$ 92,119,690	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863
Capital Expenditure (Stage 3)	*$ -*	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	*$ 22,942,709*	$ 22,942,709	$ -	$ -	$ -	$ -
Depreciable Capital		$ 99,619,690	$ 99,918,307	$ 93,972,030	$ 99,362,487	$ 101,033,029
Depreciation	142,377,915	$ -	$ 6,244,894	$ 6,264,802	$ 7,097,320	$ 7,771,771
Depreciation Quarters			16	15	14	13
Closing Depreciable Capital		**$ 99,619,690**	**$ 93,673,413**	**$ 87,707,228**	**$ 92,265,166**	**$ 93,261,258**
Disposal of Plant & Equipment	*$ 8,291,104*	$ -	$ -	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	*$ 8,291,104*	$ -	$ -	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	*$ 18,354,167*		$ -	$ -	$ -	$ -
Write-Off @ Project End			$ -	$ -	$ -	$ -
Balance of Non-Depreciable Capital (after disposal)			**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**
Debt Drawdowns	*$ 64,483,783*	$ 64,483,783				
Interest Counter		1	4	4	4	4
Quarters Production		-	1	2	3	4
Principal Repayment Sweep %			0.00%	0.00%	0.00%	10.00%
Principal Repayments	*($ 64,483,783)*		$ -	$ -	$ -	($ 6,448,378)
Debt Outstanding		$ 64,483,783	$ 64,483,783	$ 64,483,783	$ 64,483,783	$ 58,035,404
Interest	*($ 13,283,659)*	($ 3,611,092)	($ 1,289,676)	($ 1,289,676)	($ 1,289,676)	($ 1,160,708)
EBITDA	*$ 259,780,175*	($ 1,645,278)	$ 3,111,839	$ 8,923,973	$ 15,774,390	$ 15,774,390
Depreciation	*($ 142,377,915)*	$ -	($ 6,244,894)	($ 6,264,802)	($ 7,097,320)	($ 7,771,771)
Interest	*($ 13,283,659)*	($ 3,611,092)	($ 1,289,676)	($ 1,289,676)	($ 1,289,676)	($ 1,160,708)
Taxable Profits/(Losses) on Disposal of P&E	*$ 8,291,104*		$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	*$ -*		$ -	$ -	$ -	$ -
Taxable Earnings	*$ 112,409,705*	($ 5,256,370)	($ 4,422,731)	$ 1,369,495	$ 7,387,394	$ 6,841,910
Carry Forward Losses (if applicable)		($ 5,256,370)	($ 9,679,101)	($ 8,309,606)	($ 922,212)	$ -
Adjusted Taxable Earnings		**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,919,698**
Tax with No Incentives	*($ 26,978,329)*	$ -	$ -	$ -	$ -	($ 1,420,728)
After Tax Cashflow	*111,285,543*	*($ 32,892,277)*	*$ 1,523,546*	*$ 7,335,680*	*$ 2,829,455*	*($ 2,023,287)*
Cumulative After Tax Cashflow		*($ 32,892,277)*	*($ 31,368,731)*	*($ 24,033,051)*	*($ 21,203,596)*	*($ 23,226,883)*
Annualised Cashflow	*111,285,543*	*($ 32,892,277)*				*$ 9,665,394*
		-$ 93,764,968				*$ 21,143,507*
Yearly NPV: Tax No Incentive	**$ 71,983,893**					
8%						
Yearly IRR: Tax No Incentive	**32.6%**					

Cashflow Item	Yr 2 Qtr1	Yr 2 Qtr2	Yr 2 Qtr3	Yr 2 Qtr4	Yr 3 Qtr1	Yr 3 Qtr2	Yr 3 Qtr3	Yr 3 Qtr4
Stage	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Capital Expenditure (Stage 1&2)	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 3,121,699
Capital Expenditure (Stage 3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Depreciable Capital	$ 99,206,039	$ 91,237,486	$ 85,645,567	$ 77,379,628	$ 69,080,509	$ 60,744,063	$ 55,188,039	$ 49,111,731
Depreciation	$ 8,267,170	$ 8,294,317	$ 8,564,557	$ 8,597,736	$ 8,635,064	$ 8,677,723	$ 9,198,006	$ 9,822,346
Depreciation Quarters	12	11	10	9	8	7	6	5
Closing Depreciable Capital	**$ 90,938,869**	**$ 82,943,169**	**$ 77,081,010**	**$ 68,781,891**	**$ 60,445,445**	**$ 52,066,339**	**$ 45,990,032**	**$ 39,289,385**
Disposal of Plant & Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Write-Off @ Project End	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Balance of Non-Depreciable Capital (after disposal)	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**
Interest Counter	4	4	4	4	4	4	4	4
Quarters Production	5	6	7	8	9	10	11	12
Principal Repayment Sweep %	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Principal Repayments	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)
Debt Outstanding	$ 51,587,026	$ 45,138,648	$ 38,690,270	$ 32,241,891	$ 25,793,513	$ 19,345,135	$ 12,896,757	$ 6,448,378
Interest	($ 1,031,741)	($ 902,773)	($ 773,805)	($ 644,838)	($ 515,870)	($ 386,903)	($ 257,935)	($ 128,968)
EBITDA	$ 14,238,151	$ 15,262,151	$ 15,262,151	$ 15,262,151	$ 13,282,293	$ 12,896,254	$ 12,896,254	$ 12,896,254
Depreciation	($ 8,267,170)	($ 8,294,317)	($ 8,564,557)	($ 8,597,736)	($ 8,635,064)	($ 8,677,723)	($ 9,198,006)	($ 9,822,346)
Interest	($ 1,031,741)	($ 902,773)	($ 773,805)	($ 644,838)	($ 515,870)	($ 386,903)	($ 257,935)	($ 128,968)
Taxable Profits/(Losses) on Disposal of P&E	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Earnings	$ 4,939,241	$ 6,065,061	$ 5,923,789	$ 6,019,577	$ 4,131,359	$ 3,831,628	$ 3,440,312	$ 2,944,940
Carry Forward Losses (if applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Adjusted Taxable Earnings	**$ 4,939,241**	**$ 6,065,061**	**$ 5,923,789**	**$ 6,019,577**	**$ 4,131,359**	**$ 3,831,628**	**$ 3,440,312**	**$ 2,944,940**
Tax with No Incentives	($ 1,185,418)	($ 1,455,615)	($ 1,421,709)	($ 1,444,698)	($ 991,526)	($ 919,591)	($ 825,675)	($ 706,786)
After Tax Cashflow	*($ 372,167)*	*$ 6,156,768*	*$ 3,915,861*	*$ 6,425,619*	*$ 5,027,901*	*$ 4,842,765*	*$ 2,242,566*	*$ 2,490,423*
Cumulative After Tax Cashflow	*($ 23,599,049)*	*($ 17,442,282)*	*($ 13,526,421)*	*($ 7,100,802)*	*($ 2,072,901)*	*$ 2,769,864*	*$ 5,012,430*	*$ 7,502,853*
Annualised Cashflow				*16,126,081*				*14,603,655*
				$ 45,272,751				*$ 41,686,844*

Cashflow Item	Yr 4 Qtr1	Yr 4 Qtr2	Yr 4 Qtr3	Yr 4 Qtr4	Yr 5 Qtr1	Yr 5 Qtr2	Yr 5 Qtr3	Yr 5 Qtr4
Stage	*1*	*2*	*2*	*0*	*0*	*0*	*0*	*0*
Capital Expenditure (Stage 1&2)	$ 3,465,587	$ 298,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -	$ -
Capital Expenditure (Stage 3)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Depreciable Capital	$ 42,754,973	$ 32,364,847	$ 22,670,182	$ 12,130,091	$ -	$ -	$ -	$ -
Depreciation	$ 10,688,743	$ 10,788,282	$ 11,335,091	$ 12,130,091	$ -	$ -	$ -	$ -
Depreciation Quarters	4	3	2	1	-	-	-	-
Closing Depreciable Capital	**$ 32,066,229**	**$ 21,576,565**	**$ 11,335,091**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Disposal of Plant & Equipment	$ -	$ -	$ -	*$ 8,291,104*	$ -	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	$ -	$ -	$ -	*$ 8,291,104*	$ -	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	$ -	$ -	$ -	$ -	*$ 18,354,167*	$ -	$ -	$ -
Write-Off @ Project End	$ -	$ -	$ -	$ -	$ -	*$ 4,588,542*	$ -	$ -
Balance of Non-Depreciable Capital (after disposal)	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 4,588,542**	**$ -**	**$ -**	**$ -**
Interest Counter	4	4	4	4	4	4	4	4
Quarters Production	13	14	15	16	-	-	-	-
Principal Repayment Sweep %	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Principal Repayments	($ 6,448,378)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Outstanding	$ 0	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA	$ 12,455,669	$ 11,705,987	$ 22,454,862	$ 59,228,686	$ -	$ -	$ -	$ -
Depreciation	($ 10,688,743)	($ 10,788,282)	($ 11,335,091)	($ 12,130,091)	$ -	$ -	$ -	$ -
Interest	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of P&E	$ -	$ -	$ -	$ 8,291,104	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Earnings	$ 1,766,926	$ 917,704	$ 11,119,771	$ 55,389,699	$ -	$ -	$ -	$ -
Carry Forward Losses (if applicable)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Adjusted Taxable Earnings	**$ 1,766,926**	**$ 917,704**	**$ 11,119,771**	**$ 55,389,699**	**$ -**	**$ -**	**$ -**	**$ -**
Tax with No Incentives	($ 424,062)	($ 220,249)	($ 2,668,745)	($ 13,293,528)	$ -	$ -	$ -	$ -
After Tax Cashflow	*$ 2,117,641*	*$ 11,187,120*	*$ 18,692,499*	*$ 53,431,263*	*$ 18,354,167*	*$ -*	*$ -*	*$ -*
Cumulative After Tax Cashflow	*$ 9,620,494*	*$ 20,807,614*	*$ 39,500,113*	*$ 92,931,376*	*$ 111,285,543*	*$ -*	*$ -*	*$ -*
Annualised Cashflow				*85,428,523*				*18,354,167*
				$ 91,876,901				*$ 18,354,167*

Table 22-5 - After-Tax Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Stage		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*2*	*2*	*0*	*0*	*0*	*0*
Tax - No Incentives																						
Opening Capital/Deferred Exploration		$ 7,500,000																				
Capital Expenditure (Stage 1&2)	*$ 156,166,540*	$ 112,314,696	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 6,288,669	$ 298,617	$ 1,093,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -
Capital Expenditure (Stage 3)	*$ -*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	*$ 22,942,709*	$ 22,942,709	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Depreciable Capital		$ 119,814,696	$ 120,113,314	$ 113,346,442	$ 117,917,548	$ 118,824,241	$ 116,281,576	$ 107,635,457	$ 101,368,233	$ 92,451,557	$ 83,505,019	$ 74,525,301	$ 65,508,256	$ 59,271,633	$ 55,681,696	$ 44,843,975	$ 34,726,598	$ 24,244,683	$ 12,917,342	$ -	$ -	$ -
Depreciation	163,666,540	$ -	$ 7,065,489	$ 7,084,153	$ 7,861,170	$ 8,487,446	$ 8,944,737	$ 8,969,621	$ 9,215,294	$ 9,245,156	$ 9,278,335	$ 9,315,663	$ 9,358,322	$ 9,878,605	$ 11,136,339	$ 11,210,994	$ 11,575,533	$ 12,122,342	$ 12,917,342	$ -	$ -	$ -
Depreciation Quarters			17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	-	-	-
Closing Depreciable Capital		**$ 119,814,696**	**$ 113,047,825**	**$ 106,262,290**	**$ 110,056,378**	**$ 110,336,795**	**$ 107,336,840**	**$ 98,665,836**	**$ 92,152,939**	**$ 83,206,401**	**$ 74,226,683**	**$ 65,209,638**	**$ 56,149,933**	**$ 49,393,027**	**$ 44,545,357**	**$ 33,632,981**	**$ 23,151,066**	**$ 12,122,342**	**$ -**	**$ -**	**$ -**	**$ -**
Disposal of Plant & Equipment	*$ 12,330,106*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 12,330,106*	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	*$ 12,330,106*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 12,330,106*	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	*$ 18,354,167*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 18,354,167*	$ -	$ -
Write-Off @ Project End			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 4,588,542*	$ -
Balance of Non-Depreciable Capital (after disposal)			**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 4,588,542**	**$ -**	**$ -**
Debt Drawdowns	*$ 78,620,288*	$ 78,620,288																				
Interest Counter		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Quarters Production		-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	-	-	-
Principal Repayment Sweep %			0.00%	0.00%	0.00%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Principal Repayments	*($ 78,620,288)*		$ -	$ -	$ -	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	$ -	$ -	$ -	$ -	$ -	$ -
Debt Outstanding		$ 78,620,288	$ 78,620,288	$ 78,620,288	$ 78,620,288	$ 71,472,989	$ 64,325,690	$ 57,178,391	$ 50,031,092	$ 42,883,793	$ 35,736,494	$ 28,589,195	$ 21,441,897	$ 14,294,598	$ 7,147,299	$ 0	$ -	$ -	$ -	$ -	$ -	$ -
Interest	*($ 16,981,982)*	($ 4,402,736)	($ 1,572,406)	($ 1,572,406)	($ 1,572,406)	($ 1,429,460)	($ 1,286,514)	($ 1,143,568)	($ 1,000,622)	($ 857,676)	($ 714,730)	($ 571,784)	($ 428,838)	($ 285,892)	($ 142,946)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA	*$ 292,880,457*	($ 1,238,988)	$ 3,933,149	$ 10,175,134	$ 17,021,472	$ 17,021,472	$ 16,051,925	$ 16,755,361	$ 16,755,361	$ 16,755,361	$ 15,571,942	$ 15,282,184	$ 15,282,184	$ 15,282,184	$ 14,719,818	$ 15,122,031	$ 10,617,662	$ 44,909,689	$ 32,862,514	$ -	$ -	$ -
Depreciation	*($ 163,666,540)*	$ -	($ 7,065,489)	($ 7,084,153)	($ 7,861,170)	($ 8,487,446)	($ 8,944,737)	($ 8,969,621)	($ 9,215,294)	($ 9,245,156)	($ 9,278,335)	($ 9,315,663)	($ 9,358,322)	($ 9,878,605)	($ 11,136,339)	($ 11,210,994)	($ 11,575,533)	($ 12,122,342)	($ 12,917,342)	$ -	$ -	$ -
Interest	*($ 16,981,982)*	($ 4,402,736)	($ 1,572,406)	($ 1,572,406)	($ 1,572,406)	($ 1,429,460)	($ 1,286,514)	($ 1,143,568)	($ 1,000,622)	($ 857,676)	($ 714,730)	($ 571,784)	($ 428,838)	($ 285,892)	($ 142,946)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of P&E	*$ 12,330,106*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,330,106	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	*$ -*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Earnings	*$ 124,562,041*	($ 5,641,724)	($ 4,704,746)	$ 1,518,576	$ 7,587,897	$ 7,104,567	$ 5,820,675	$ 6,642,172	$ 6,539,445	$ 6,652,530	$ 5,578,876	$ 5,394,738	$ 5,495,024	$ 5,117,687	$ 3,440,532	$ 3,911,038	($ 957,871)	$ 32,787,347	$ 32,275,278	$ -	$ -	$ -
Carry Forward Losses (if applicable)		($ 5,641,724)	($ 10,346,470)	($ 8,827,894)	($ 1,239,997)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	($ 957,871)	$ -	$ -	$ -	$ -	$ -
Adjusted Taxable Earnings		**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,864,569**	**$ 5,820,675**	**$ 6,642,172**	**$ 6,539,445**	**$ 6,652,530**	**$ 5,578,876**	**$ 5,394,738**	**$ 5,495,024**	**$ 5,117,687**	**$ 3,440,532**	**$ 3,911,038**	**$ -**	**$ 31,829,476**	**$ 32,275,278**	**$ -**	**$ -**	**$ -**
Tax with No Incentives	*($ 29,894,890)*	$ -	$ -	$ -	$ -	($ 1,407,497)	($ 1,396,962)	($ 1,594,121)	($ 1,569,467)	($ 1,596,607)	($ 1,338,930)	($ 1,294,737)	($ 1,318,806)	($ 1,228,245)	($ 825,728)	($ 938,649)	$ -	($ 7,639,074)	($ 7,746,067)	$ -	$ -	$ -
After Tax Cashflow	*120,521,318*	*($ 39,336,133)*	*$ 2,062,126*	*$ 8,304,111*	*$ 3,793,808*	*($ 1,730,646)*	*$ 276,370*	*$ 6,571,756*	*$ 4,335,576*	*$ 6,855,162*	*$ 6,072,365*	*$ 5,969,747*	*$ 6,088,624*	*$ 3,499,049*	*$ 315,176*	*$ 6,737,466*	*$ 9,524,045*	*$ 36,176,997*	*$ 36,651,553*	*$ 18,354,167*	*$ -*	*$ -*
Cumulative After Tax Cashflow		*($ 39,336,133)*	*($ 37,274,007)*	*($ 28,969,896)*	*($ 25,176,088)*	*($ 26,906,734)*	*($ 26,630,365)*	*($ 20,058,609)*	*($ 15,723,033)*	*($ 8,867,871)*	*($ 2,795,506)*	*$ 3,174,241*	*$ 9,262,866*	*$ 12,761,915*	*$ 13,077,091*	*$ 19,814,557*	*$ 29,338,601*	*$ 65,515,598*	*$ 102,167,151*	*$ 120,521,318*	*$ -*	*$ -*
Annualised Cashflow	*120,521,318*	*($ 39,336,133)*				*$ 12,429,399*				*$ 18,038,863*				*$ 21,629,786*				*$ 52,753,683*				*$ 55,005,720*
		-$ 113,553,684				*$ 25,723,374*				*$ 50,916,438*				*$ 52,220,225*				*$ 67,191,227*				*$ 55,005,720*
Yearly NPV: Tax No Incentive	$ 76,106,036																					
8%																						
Yearly IRR: Tax No Incentive	29.4%																					

Table 22-6 - After-Tax Cashflow Model - Option 452 (8,000tpd Owner-Operator)

Comparison of Pre-Tax, After Tax & After Tax Allowances			
Pre-Tax:			
Yearly NPV @	8%	**$**	**91,407,216**
Yearly IRR			**38.0%**
After Tax:			
Yearly NPV: Tax No Incentive	8%	**$**	**71,983,893**
Yearly IRR: Tax No Incentive			**32.6%**
After ITA Allowance:			
Yearly NPV: ITA Allowance	8%	**$**	**-**
Yearly IRR: ITA Allowance			**N/A**
After Pioneer Status:			
Yearly NPV: Pioneer Status	8%	**$**	**-**
Yearly IRR: Pioneer Status			**N/A**

Table 22-7 - After-Tax Summary Results from Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Comparison of Pre-Tax, After Tax & After Tax Allowances			
Pre-Tax:			
Yearly NPV @	8%	**$**	**97,289,637**
Yearly IRR			**34.3%**
After Tax:			
Yearly NPV: Tax No Incentive	8%	**$**	**76,106,036**
Yearly IRR: Tax No Incentive			**29.4%**
After ITA Allowance:			
Yearly NPV: ITA Allowance	8%	**$**	**-**
Yearly IRR: ITA Allowance			**N/A**
After Pioneer Status:			
Yearly NPV: Pioneer Status	8%	**$**	**-**
Yearly IRR: Pioneer Status			**N/A**

Table 22-8 - After-Tax Summary Results from Cashflow Model - Option 452 (8,000tpd Owner-Operator)

22.2. Sensitivity Analysis

A sensitivity analysis has been performed on some of the key factors that will or may have a financial impact on the project performance. The following financial and non-financial elements were assessed along with their variability values and the results are presented in the tables and graphs shown below in the list.

- Gold price: $1,100 to $2,000 ($100 increments)

Gold Price	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
$1,100	$ 21,529,886	15.3%	$ 26,575,389	15.4%
$1,200	$ 56,468,551	26.9%	$ 61,932,513	25.0%
$1,300	$ 91,407,216	38.0%	$ 97,289,637	34.3%
$1,400	$ 126,345,880	48.8%	$ 132,646,761	43.3%
$1,500	$ 161,284,545	59.3%	$ 168,003,885	52.2%
$1,600	$ 196,223,210	69.6%	$ 203,361,009	60.9%
$1,700	$ 231,161,874	79.7%	$ 238,718,133	69.4%
$1,800	$ 266,100,539	89.7%	$ 274,075,257	77.8%
$1,900	$ 301,039,204	99.6%	$ 309,432,381	86.2%
$2,000	$ 335,977,869	109.3%	$ 344,789,505	94.4%

Table 22-9 – NPV & IRR – Gold Price Sensitivity

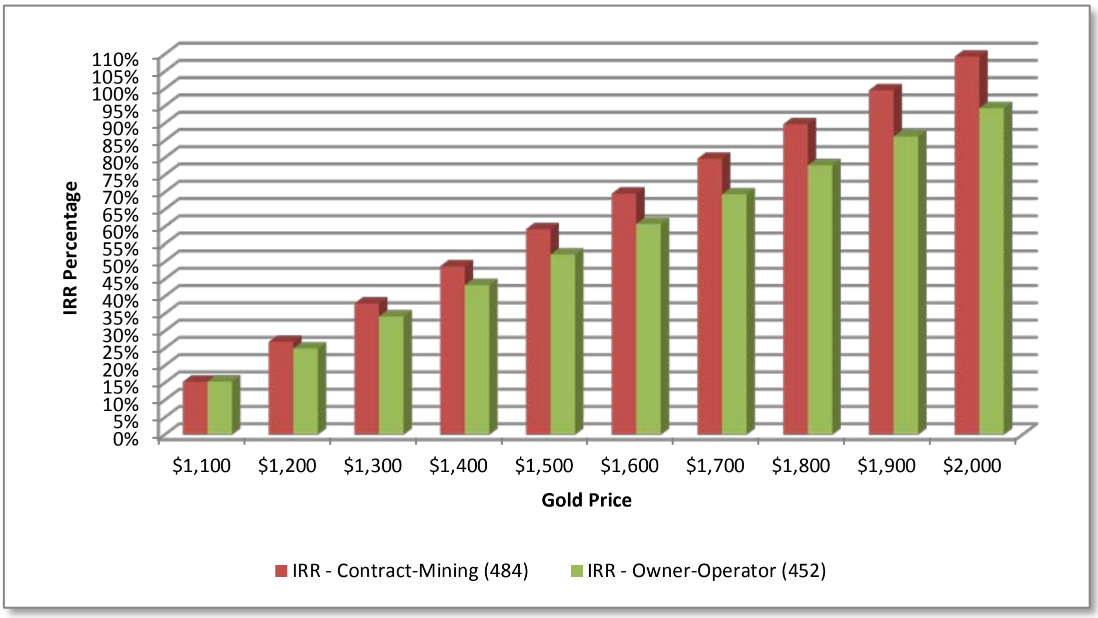


Figure 22-2 - Graph of IRR - Gold Price Sensitivity

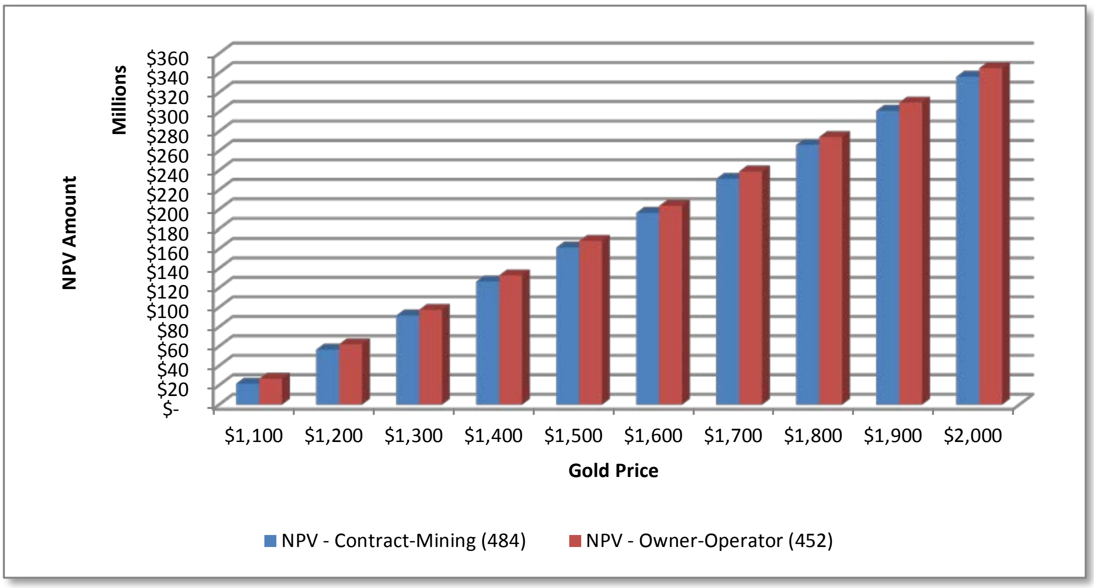


Figure 22-3 - Graph of MPV - Gold Price Sensitivity

- Mining costs: -20%, -10, 0%, 10%, 20% difference in mining costs

Mining Cost	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
-20%	$ 104,092,520	41.9%	$ 105,533,935	36.4%
-10%	$ 97,749,868	40.0%	$ 101,411,786	35.3%
0%	$ 91,407,216	38.0%	$ 97,289,637	34.3%
10%	$ 85,064,563	36.0%	$ 93,167,488	33.2%
20%	$ 78,721,911	34.0%	$ 89,045,338	32.1%

Table 22-10 - NPV & IRR – Mining Cost Sensitivity

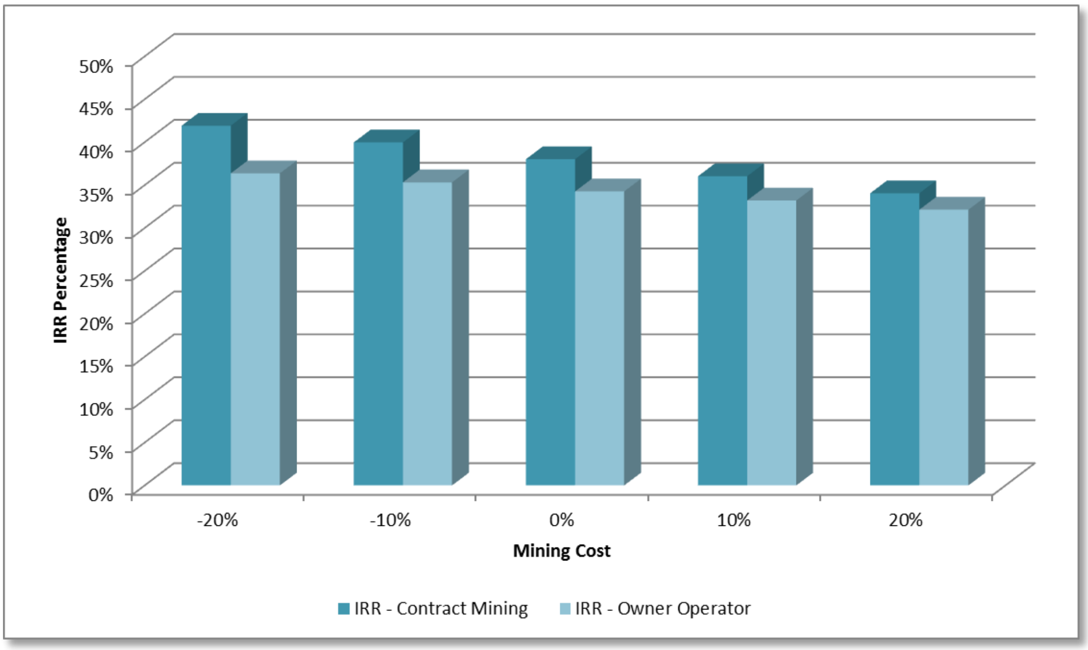


Figure 22-4 - Graph of IRR - Mining Cost Sensitivity

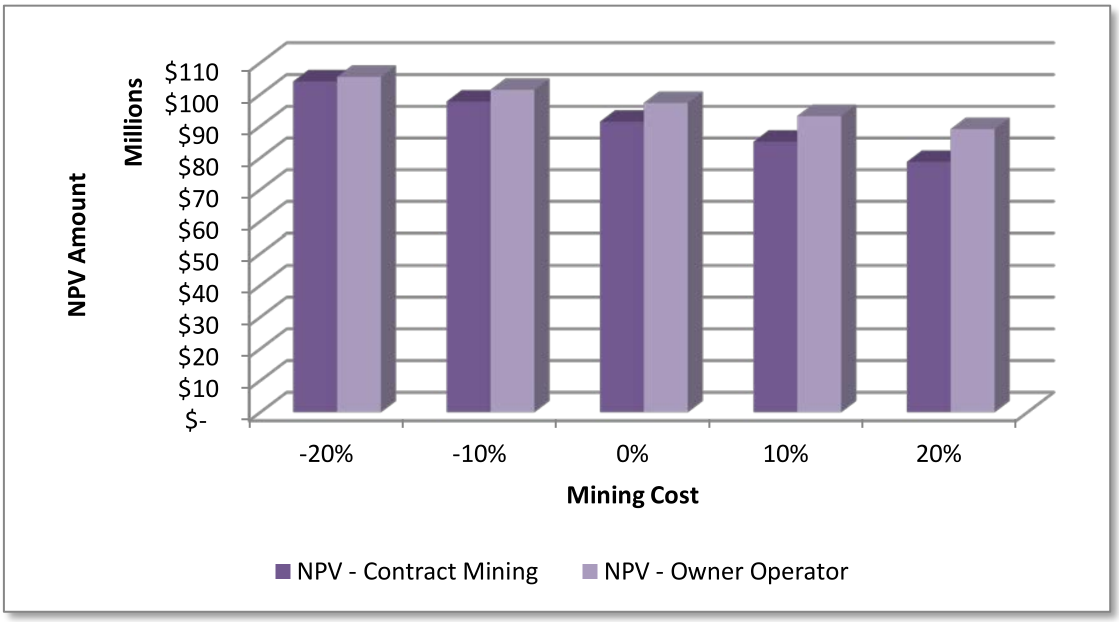


Figure 22-5 - Graph of NPV - Mining Cost Sensitivity

- Processing costs: -20%, -10, 0%, 10%, 20% difference in processing costs

Process Cost	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
-20%	$ 104,281,395	42.1%	$ 110,436,077	37.8%
-10%	$ 97,844,305	40.1%	$ 103,862,857	36.0%
0%	$ 91,407,216	38.0%	$ 97,289,637	34.3%
10%	$ 84,970,126	35.9%	$ 90,716,416	32.5%
20%	$ 78,533,036	33.8%	$ 84,143,196	30.7%

Table 22-11 - NPV & IRR – Process Cost Sensitivity

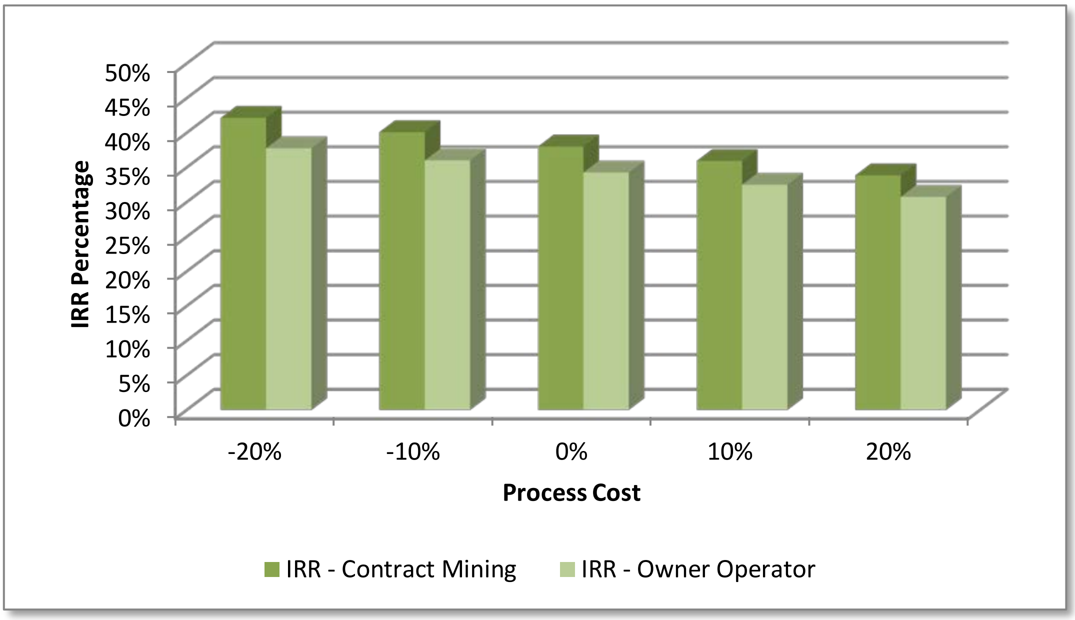


Figure 22-6 - Graph of IRR - Process Cost Sensitivity

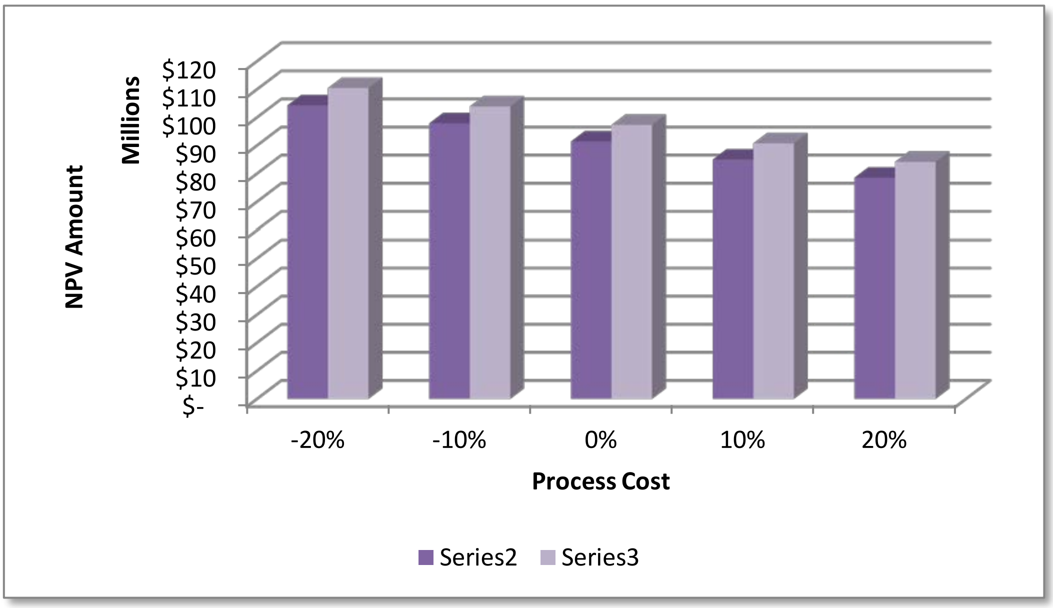


Figure 22-7 - Graph of NPV - Mining Cost Sensitivity

- Capital costs: -20%, -10, 0%, 10%, 20% difference in capital costs

Capital Cost	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
-20%	$ 111,611,728	51.1%	$ 121,203,223	46.6%
-10%	$ 101,509,472	44.0%	$ 109,246,430	39.9%
0%	$ 91,407,216	38.0%	$ 97,289,637	34.3%
10%	$ 81,304,959	32.9%	$ 85,332,843	29.5%
20%	$ 71,202,703	28.5%	$ 73,376,050	25.3%

Table 22-12 - NPV & IRR – Capital Cost Sensitivity

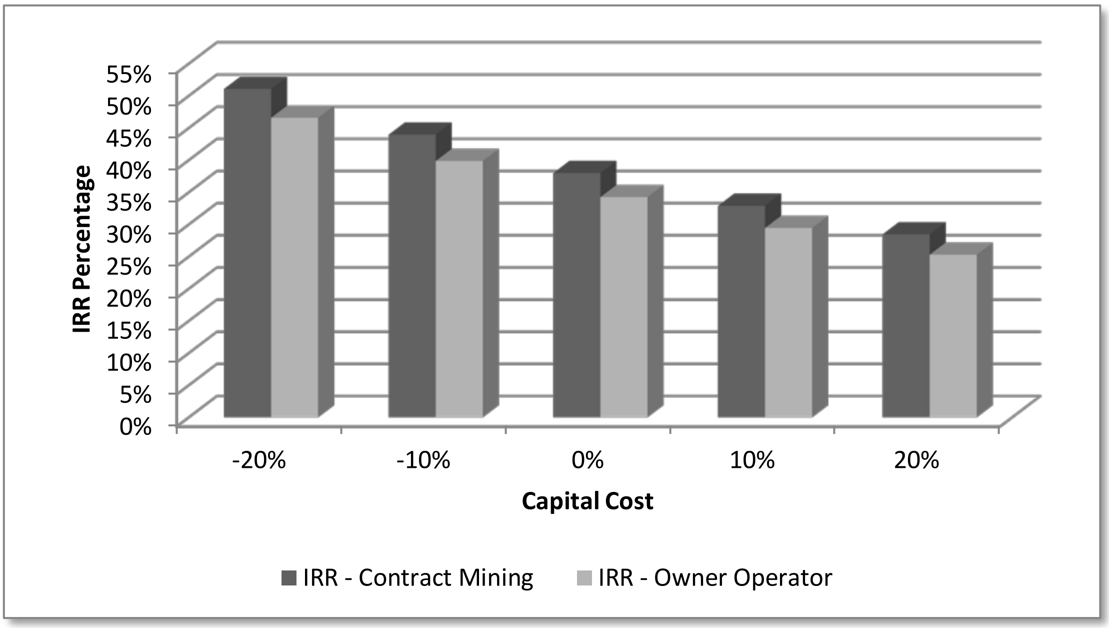


Figure 22-8 - Graph of IRR - Capital Cost Sensitivity

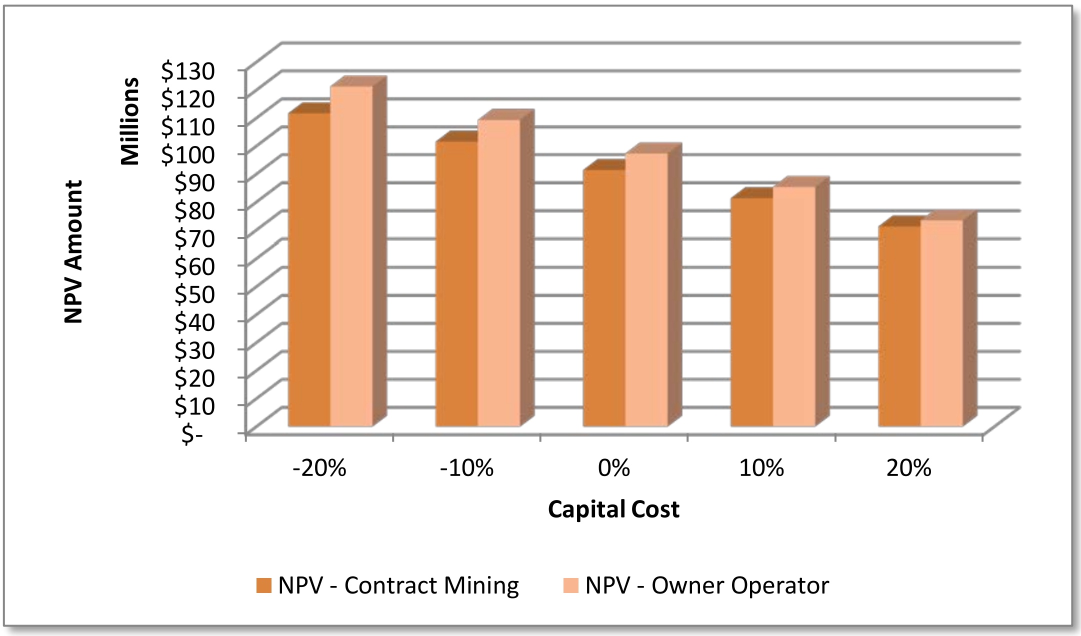


Figure 22-9 - Graph of NPV - Capital Cost Sensitivity

- Grade: -20%, -10, 0%, 10%, 20% difference in average grade

Grade	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
-20%	$ 1,964,234	8.7%	$ 6,775,399	9.9%
-10%	$ 46,685,725	23.7%	$ 52,032,518	22.3%
0%	$ 91,407,216	38.0%	$ 97,289,637	34.3%
10%	$ 136,128,706	51.8%	$ 142,546,755	45.8%
20%	$ 180,850,197	65.1%	$ 187,803,874	57.1%

Table 22-13 - NPV & IRR – Grade Sensitivity

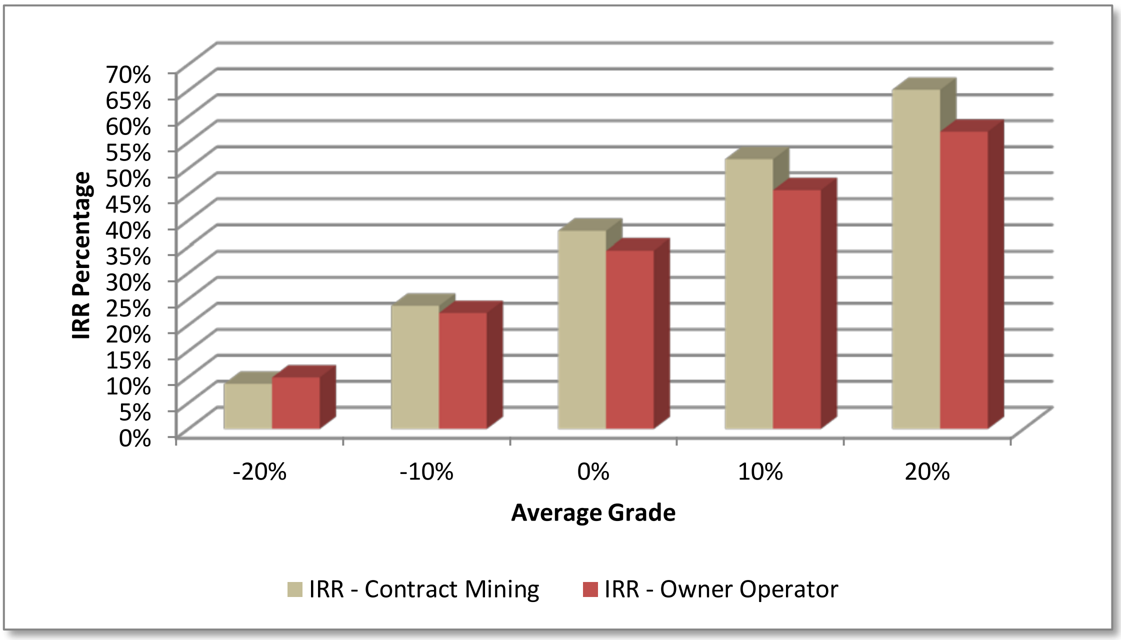


Figure 22-10 - Graph of IRR - Grade Sensitivity

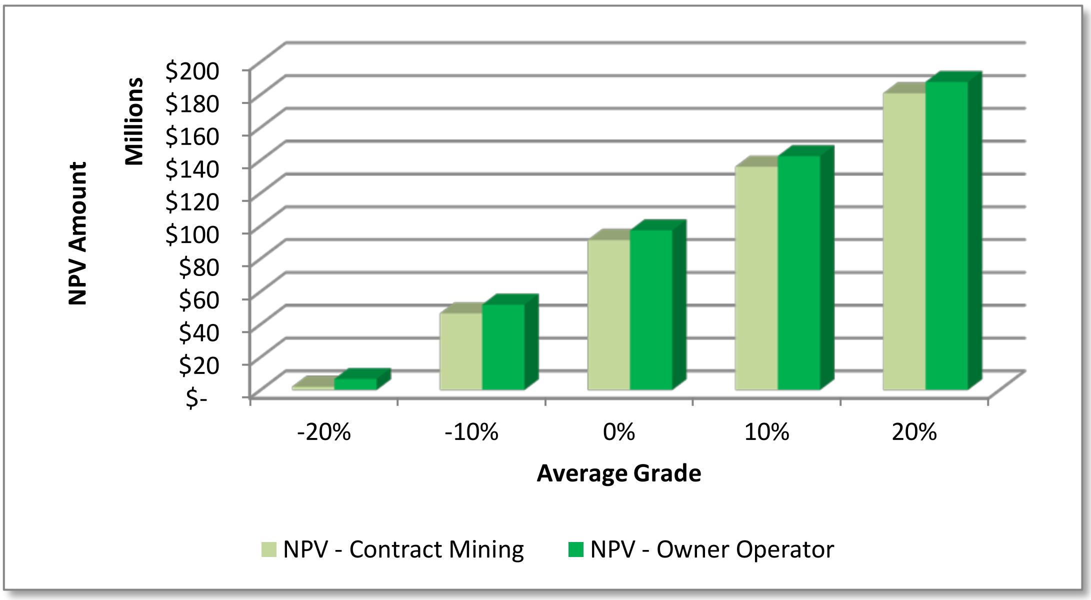


Figure 22-11 - Graph of NPV - Grade Sensitivity

- Process Recovery: -20%, -10, 0%, 10%, 20% difference in overall recovery around the current 72%:

Recovery	Contract-Mining		Owner-Operator	
	NPV	IRR	NPV	IRR
-20%	$ 1,952,448	8.7%	$ 6,763,236	9.9%
-10%	$ 46,694,139	23.7%	$ 52,014,738	22.3%
0%	$ 91,407,216	38.0%	$ 97,289,637	34.3%
10%	$ 136,166,330	51.8%	$ 142,538,230	45.8%
20%	$ 180,853,444	65.1%	$ 187,813,130	57.1%

Table 22-14 - NPV & IRR – Recovery Sensitivity

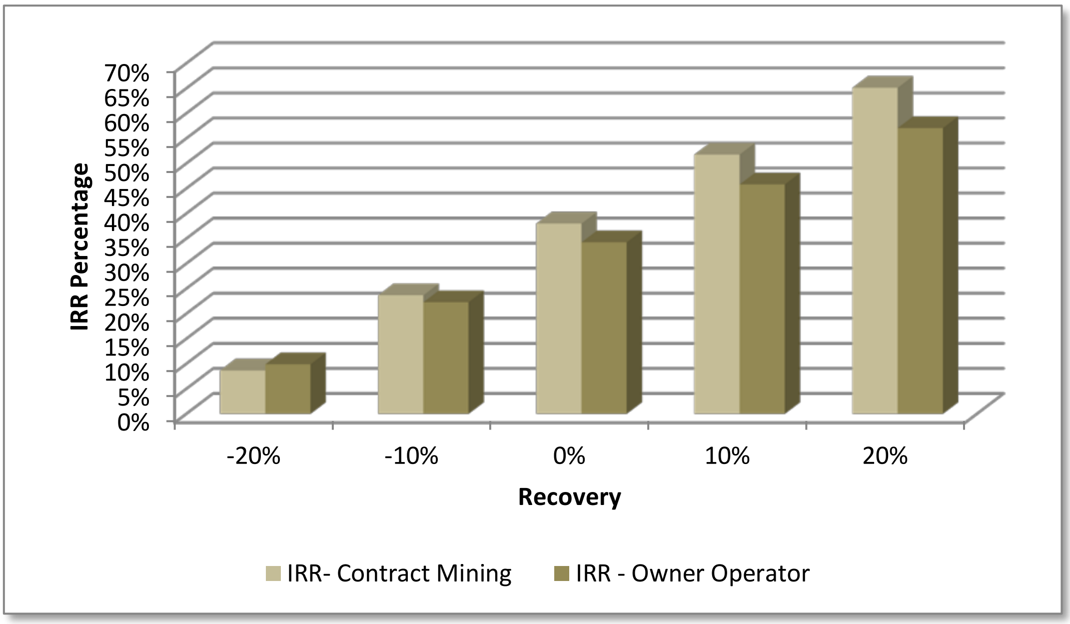


Figure 22-12 - Graph of IRR - Recovery Sensitivity

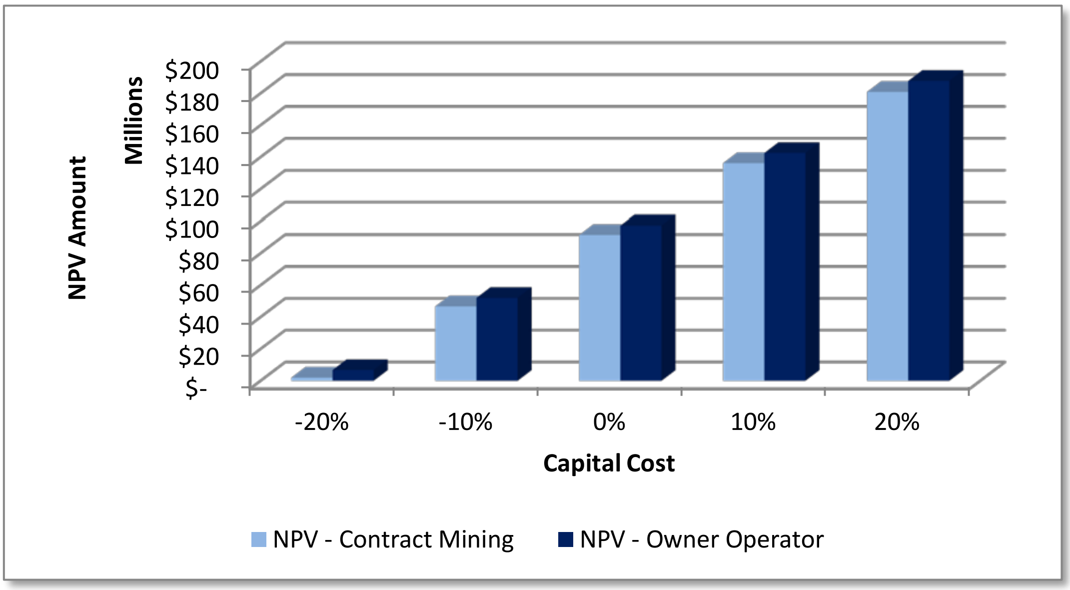


Figure 22-13 - Graph of NPV - Recovery Sensitivity

Some key effects can be seen in the above tables and graphs, and these are:

- Although mining and process cost variations, and in particular in the positive direction, show drops in IRR/NPV but these do not go negative within the variations tested, showing a little less sensitivity.
- Similarly the capital cost variation, shows similar trend although the +20% takes the project negative.
- Other than gold price the grade and recovery analysis shows much more sensitivity to the factors.
- Although the sensitivities show the negative impact on higher costs and lower grade, recovery and gold price they also show a large upside for small increments.
- These sensitivities have been reviewed individually. Combined they have a compounded impact.
- The negative impacts are of lower value than the equivalent positive impact.

22.3. Risk Analysis

22.3.1. Introduction & Methodology

Various key areas of the project have been examined and reviewed in terms of their risk profile. The risk identification and documentation of these critical elements is identified below, along with their potential impact, probability, manageability and any mitigation measures.

Each risk within each Risk Group is identified, along with which area it impacts (e.g. schedule) and it's possible consequence or possible impact(s). Thereafter the probability of occurrence is assigned as High, Medium or Low. Then the mitigation level is assessed in terms of the impact or effect of the mitigation and this is also qualitatively assessed as High, Medium or Low.

Associated with the mitigation level is the potential mitigation measure(s) that can or may be applied to the identified risk. Also, any related comments are also added if any.

The "probability of occurrence" levels are associated with a probability description and these are listed in *Table 22-15 - Risk Anaysis: Probability of Occurrence Levels* below.

Assigned Level	Probability Description
HIGH	Likely to happen or high probability of occurrence
MEDIUM	May happen or moderate probability of occurrence
LOW	Unlikely to happen or low probability of occurrence

Table 22-15 - Risk Anaysis: Probability of Occurrence Levels

The "consequence levels" are associated with the potential impact or consequence that the risk might have, and these are listed below in *Table 22-16 - Risk Anaysis: Consequence Levels.*

Assigned Level	Consequence Description
HIGH	High impact or major consequence
MEDIUM	Medium level impact or moderate consequence,
LOW	Low level of impact or little/minor consequence

Table 22-16 - Risk Anaysis: Consequence Levels

Therefore, any risk with a HIGH "probability of occurrence" and a HIGH "consequence level" has the greatest risk impact on the project. Conversely, the opposite combination has the lowest impact.

22.3.2. Project Risk Analysis

Table 22-17 - Project Risk Register (Part 1) and *Table 22-18 - Project Risk Register (Part 2)* below, presents a summary of the project risks identified to date, and the risk categories and mitigation measures associated with that risk. This is a live document and should be visited regularly during the project and updated as progress is made. Table is also shown in *Enclosure B22-2* at A3 size.

A risk matrix has also been developed to display the relationship between the "probability" and "consequences". The key risks are displayed in the top right of the matrix (above the brown line and shaded area). This matrix is shown in *Table 22-19 - Consequence vs. Probability Risk Matrix* following the risk register lists.

No.	Risk Group	Risk Description	Description of Consequence or Impact	Probability	Consequence	Score	Estimated Cost Impact	Mitigation Measures	Comments
1	Processing/Plant	Low Concentrate Grade	Concentrate grade too low	HIGH	HIGH	6	>$5million	Test existing and new metallurgical processes with a focus on slimes removal and flotation technologies (flash flotation, arsenopyrite/pyrite separation, ultrasonics). Develop testwork programme to gain understanding of deposit geometallurgy. Utilise information in design of plant to optimise concentrate grade.	
2	Processing/Plant	Concentrate Specs Not Met	Concentrate produced does not meet the required specs of processor/smelter	HIGH	HIGH	6	>$5million	As above.	
3	Processing/Plant	Clay in Ore	Clay affecting mining, crushing and processing of ore; do we require roll crusher before jaw crusher	HIGH	HIGH	6	>$5million	Investigate existing and new metallurgical processes for slimes removal and clay mitigation. Plant design to account for high clay content. Develop testwork programme to gain understanding of deposit geometallurgy.	
4	Processing/Plant	More Metallurgical Testwork Required for Economics	More detailed testwork required help define requirements for plant and associated costs or economics	HIGH	MEDIUM	5	>$1million	Develop project testwork programme to gain understanding of deposit geometallurgy using both in-house and external expertise. Assign budget to geometallurgical programme. Utilise test results in plant design and project economics.	
5	Processing/Plant	Metallurgical Characteristics Incomplete for Design	Incomplete understanding of metallurgical charactersitics	HIGH	MEDIUM	5	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design and project economics.	
6	Construction & Implementation	Construction/Commission Delays	Delays in construction and/or commissioning schedule	MEDIUM	HIGH	5	>$5million	Incorporate both penalties and bonuses into construction contracts to discourage delays.	
7	Geotechnical	Pit Slope Instability/Failure(s)	Pit instability or failures affecting pit production	MEDIUM	HIGH	5	>$5million	Measure geotechnical properties of orebody. Incorporate these measurements into mine design.	
8	Geotechnical	Landform/Slope Stability or Failure	Landform instability or failures affecting the TSF, waste dump and plant/infrastructure	MEDIUM	HIGH	5	>$1million	As above.	
9	Processing/Plant	Low Concentrate Recovery	Concentrate recovery too low	MEDIUM	HIGH	5	>$1million	Test existing and new metallurgical processes with a focus on slimes removal and flotation technologies (flash flotation, arsenopyrite/pyrite separation, ultrasonics). Develop testwork programme to gain understanding of deposit geometallurgy. Utilise information in design of plant to maximise concentrate recovery.	
10	Processing/Plant	Plant Design Specifications Not Met	Plant operation not meet design specifications	MEDIUM	HIGH	5	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design.	
11	Procurement & Capital Items	Delivery Schedule Delay	Delay in capital item delivery or delays due to other impacts (customs, shipping, etc.)	LOW	HIGH	4	>$5million	Order critical items asap. Incorporate penalties and bonuses into delivery contract. Track delivery status on a regular basis.	
12	Permits/Approvals	Mining Certificate/Lease Delays	Inability or delays of Gladioli to obtain MC/ML renewal covering part of the mine operational area (mainly TSF and waste landform)	LOW	HIGH	4		Ensure regular and ongoing liaison with Gladioli. Track progress of permits and ensure deadlines are met.'	
13	External Factors	Political Change/Government Interference	Changes in the current political situation or interference from government officials	LOW	HIGH	4		Communicate regularly with all parties and promote the project to ensure positive views. Monitor political communications for any negative communications	
14	Geology/Resource	Missing or Incomplete Resource Data	Possible missing elements affecting process; Zonation of mineralogical characteristics unknown; Incomplete key element data (particularly S & Fe)	MEDIUM	MEDIUM	4		Ensure data is captured in future drilling and if applicable in any grade control work.	
15	Geology/Resource	Oxidised Layer	Impact of partial oxidative layer - amount and volume of oxidated material	MEDIUM	MEDIUM	4		Geological mapping and grade control to monitor the oxidised layer. Track plant performance and recovery.	
16	Environmental & Rehab	EIA Delayed/Rejected	Process of obtaining EIA delayed/rejected	LOW	HIGH	4		Ensure EIA basline work is comprehensive enough. That the EIA report and EIA consultant have clearly identified the effects and applied suitable mitigation measures. Track the EIA schedule and timeline closely. Ensure open and clear communications with all parties.	

Table 22-17 - Project Risk Register (Part 1)

No.	Risk Group	Risk Description	Description of Consequence or Impact	Probability	Consequence	Score	Estimated Cost Impact	Mitigation Measures	Comments
17	Environmental & Rehab	MRP Delayed/Rejected	Process of obtaining or acceptance of MRP is delayed or rejected	LOW	HIGH	4		As above.	
18	General	Inflationary Impacts	Inflationary effects on pricing due to delays	HIGH	LOW	4	>$1million	Use of hedge instruments. Incorporate inflationary estimates into economic model.	
19	Permits/Approvals	Building/Construction Permit Delays	Delays in building/construction permits issued by local government	LOW	HIGH	4		As per EIA, MRP and other government processes	
20	Geology/Resource	Lower Average Grade	Resource grade lower on average than in model	MEDIUM	MEDIUM	4		Monitor through geological investigations and grade control	
21	Processing/Plant	Plant Operational/Throughput Problems	Problems affecting the plant throughput - bottlenecks, breakdowns, under-performance	MEDIUM	MEDIUM	4	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design.	
22	External Factors	Gold Export Rule Change	Increase in current export rates for gold concentrate > 0%	LOW	MEDIUM	3			Current 0%
23	Environmental & Rehab	Acid Mine Drainage	Leakage or levels above permitted	LOW	MEDIUM	3	>$1million	Containment of PAF material and control of site drainage. Incorporation of lime dosage.	
24	Environmental & Rehab	Mine Closure Rehab Delayed/Rejected	Non-acceptance of mine closure rehab or delays due to rectification	LOW	MEDIUM	3		As per EIA, MRP and other government processes	
25	Hydrology & Water Management	Severe Weather Events	Impact of severe weather events on the mining operations or other operations (power disruption, flooding preventing staff getting to work, etc.)	MEDIUM	LOW	3	>$100,000	Incorporate weather forecasts in routine operational planning.	
26	Finance/Costs	Operating Cost Increases	Increase in some or all of operating costs	LOW	MEDIUM	3	>$1million	Maintain tight control on contract negotiations/costs; minimise unit costs and usage.	
27	Mining/Operations	Production Delays	Delays in reaching full/ongoing production	LOW	MEDIUM	3		Regular and detailed project schedule to ensure no delays. Develop alternate options list should delaying events occur ahead of tme to ensure quick remedy	
28	General	Major Negative Event	Major event e..g fire, loss of power supply, etc.	LOW	MEDIUM	3		Regular monitoring of all hazards, regular checks and detailed H&S training. Develop a H&S strategy to deal with any incident	
29	External Factors	Royalty Rate Increase	Increase in current royalty rate >0%	LOW	MEDIUM	3		Communicate benefits of no increase and constantly monitor government opinion. Develop strategies to mitigate	Current 0%
30	Tailings Facility	Insufficient Waste Material	Insufficient construction material at point in time	LOW	LOW	2		Develop alternate plans and sources of material. Ensure detailed and regular short term planning to ensure no problem with waste aterial balance and supply	
31	External Factors	Illegal Miners	Illegal miners stealing gold/ore or impacting operations	LOW	LOW	2	>$10,000	Employ security team to keep deposit secure; regular contact with local police; physical barriers to exclude miners (fence).	
32	External Factors	Anti-Mining & Environmental Disruption	Protests or other interference from anti-mining groups or environmental groups	LOW	LOW	2	>$10,000	Regular monitoring of these groups. Good communications strategy to government and local residents. Good security and regular communications with the police.	
33	Environmental & Rehab	Excessive Rehabilitation Bond	Excessive rehabilitation bond and restrictive rehab conditions	LOW	LOW	2	>$1million	Design closure plan in accordance with best practice; use of reasonable examples in bond application.	
34	Contracts	Contract Conditions Not Met	Contract conditions with service provider not met on consistent basis	LOW	LOW	2	>$100,000	Close contract management - penalties and bonuses to encourage contract obeyance.	
35	Contracts	Poor Contractual Terms	Poor, inconsistent or vague contract terms	LOW	LOW	2	>$100,000	Legal review of contract conditions.	
36	Transport	Transport Security Issues	Security issues with concentrate transport - theft	LOW	LOW	2	>$100,000	Monitoring of vehicles, personnel and concentrate bags. Good security measures and plans	
37	Transport	Transport Disruption	Disruption due to ship unavailability, road issues, truck unavailability, etc.	LOW	LOW	2	>$100,000	Develop a strategy and plan to deal with any disruptions. Ensure suitable equipment, transport, personnel and other options to meet any problems	
38	Mining/Operations	Low Mine Production	Various factors impacting the mine production	LOW	LOW	2		Regular planning and operational monitoring to ensure no impacts on mine production	
39	General	Labour Issues	Insufficient labour, skills level and training	LOW	LOW	2		Develop a detailed labour, training and HR policy plan. Ensure good instructors and training material available	

Table 22-18 - Project Risk Register (Part 2)

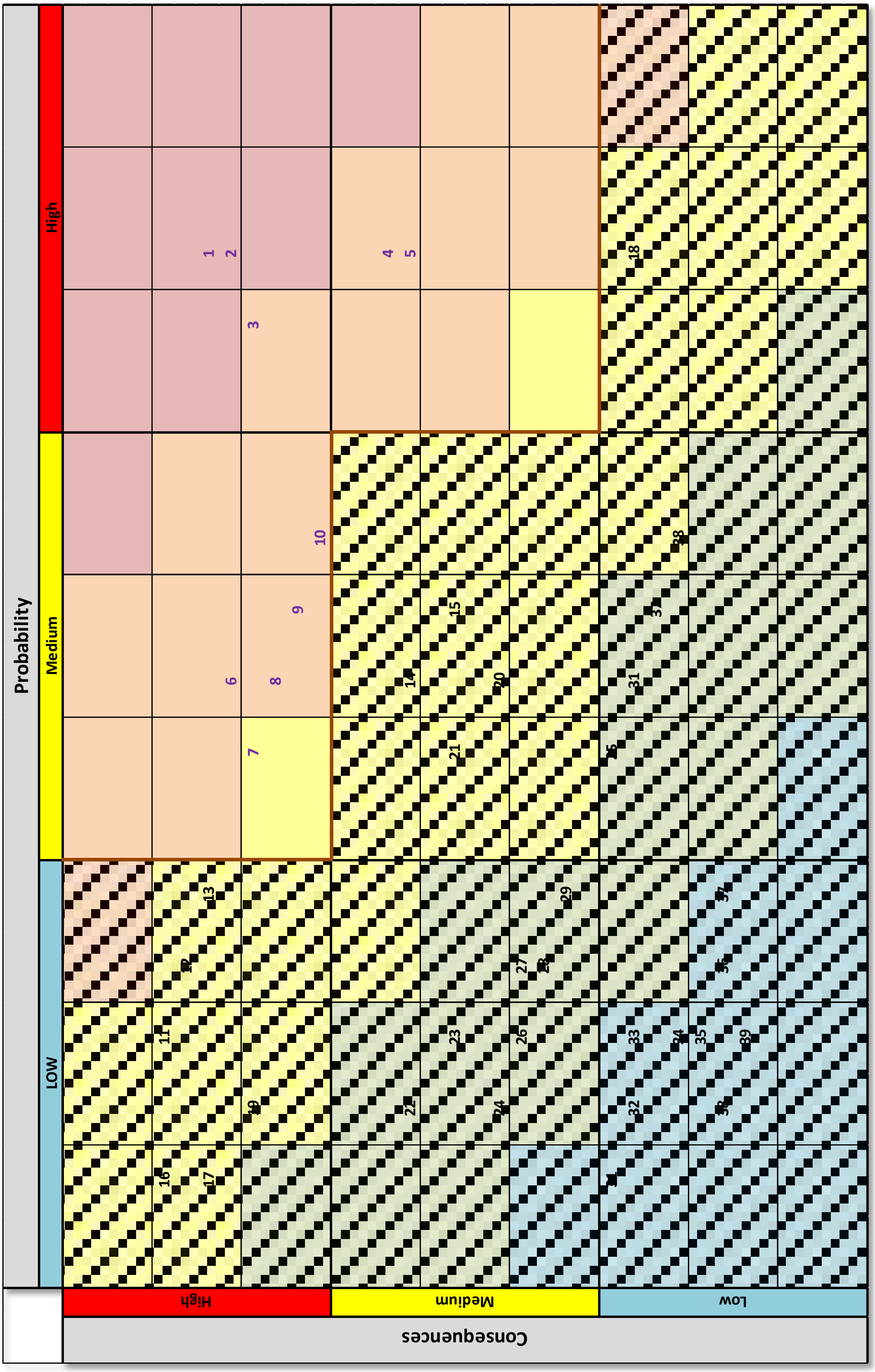


Table 22-19 - Consequence vs. Probability Risk Matrix

23. Adjacent Properties

There are no known significant producing properties adjacent to or near the Bau Gold property. North Borneo Gold Sdn Bhd (NBG) is the only significant explorer in the Bau Goldfield.

The most significant adjoining mine not under the control of NBG, is the now abandoned Lucky Hill Mine which was mined primarily for antimony but with reported high gold. There are no known production records available for this deposit which is part of the vein systems in the Krian area, near Bau.

The nearest properties with significant gold production history are in Kalimantan. These include the now closed Kelian Gold Mine, mined by CRA which produced approximately 176 tonnes of gold from and inventory of 245 tonnes, and the Mt. Muro Mine in central Kalimantan which is operated by Straits Resources and has a gold resource inventory of approximately 2 Moz (2009 Annual report, Straits Resources Limited).

Further to the north in Sabah, Malaysia's largest copper mine, the Mamut Porphyry Copper Deposit operated from 1975 to 1999 and had a reported production of 600,000 tonnes of copper, 45 tonnes of gold and 294 tonnes of silver. (Crimsonant.com, 2013).

24. Other Relevant Data & Information

24.1. Geotechnical Studies

24.1.1. Introduction

The geotechnical investigations conducted in Jugan and Bekajang areas were aimed at obtaining data for the two open pit mine sites and in the existing deactivated tailings storage facility (TSF) of the decommissioned mining pits of Bukit-Young and Tai Parit. The geotechnical study forms part of the feasibility study for the project being carried out by the company.

The study began in the Jugan area during the drilling period from September 2011 to September 2012 followed by a surface structural mapping from June 2012 to September 2012. Seventy-five (75) holes were drilled by the company in the area from JUDDH-6 to JUDDH-81 and these serve the basis for geologic logging and geomechanical rating of the rocks. The geomechanical logging with RMR rating and structural interpretation from the drill cores went together with the geological logging.

In the Bekajang area, forty-two (42) holes were drilled during the period April to December 2011. Geomechanical logging and RMR rating was also carried out on all the drill cores.

The geotechnical investigation on the deactivated Bekajang TSF is still on going up to date. Since April 2011, a total of thirteen (13) standard penetration test (SPT) have be carried out to form part of the in-situ measurement, including installation of nine (9) piezometers and five (5) inclinometers all around the TSF site. Some field vane shear tests were also done in identified soft grounds. The cone penetration test (CPT) is still on schedule to commence and around thirteen (13) CPT will also be done in the site.

24.1.2. Field Investigations & Findings

24.1.2.1. Jugan Sector

24.1.2.1.1. Jugan – Drillhole Geomechanical Logging

The drillhole geomechanical logging was done together with the geological logging of drillholes from JUDDH-6 to JUDDH-81. While the geological logging was largely based on the lithology, alteration and mineralisation, and veining and structures, the geomechanical logging was done based on the drill run at a maximum length of 3.0 metres per run. The geomechanical logging takes into account the several features of the rock, namely, the mechanical, structural and the mineralogical properties of the rocks and rates them according to the Rock Mass Rating (RMR) criteria.

The parameters in measuring the RMR are the following:

1. Rock Quality Designation (RQD) based on:

   a. Recovered length
   b. Length of run
2. Discontinuity per metre based on:
   a. Total number of discontinuities
   b. Recovered length of run
3. Discontinuity roughness
4. Discontinuity alteration and fill based on:
   a. Infill and mineralisation in the infill
   b. Alteration of the discontinuity walls
   c. Minerals present in the discontinuity walls
5. Weathering state of discontinuities
6. Aperture of the discontinuities
7. R-values taken from the intact samples of each lithology units
8. Intact Rock Strengths (IRS) derived from the weighted R-values of intercepted lithologies in the run

For the purpose of this study, the measured RMR values are used to develop the block model RMR for Jugan. Together with the structural model that was created, a slope design was developed for a planned 15m high with 5m bench face slope. The slopes from the optimised pit design generated using an initial overall 45-degree pit slope were adjusted based on the recommended slopes from the RMR block model.

As an example a geomechanical logsheet looks is shown below in *Figure 24-1: Geomechanical Logging Example - JUDDH-77* below.

HOLE ID	FROM	TO	RQD	DEFECT TYPE	NO. OF SET	COUNT	JN/M	JC ROUGHNESS	R FACTOR	JC FILL/ ALT.	ALT. FACTOR	JC WEATHERING	WEATHERING FACTOR	JC OPENING	APERTURE RATING	WATER	LITHO	R VALUE	IRS	RATING RQD	RATING IRS	RATING JN/M	RATING JC	RMR	RMR CLASS
JUDDH-77	0.00	1.50	0.00		3	9999	>30	ps	0.65	cp-ox	0.50	D	0.00	Vo	0.00		Overburden	0.00	2.85	5	0.13	2	0.00	7.13	Very poor
JUDDH-77	1.50	1.80	0.00		3	9999	>30	ps	0.65	cp-ox	0.50	D	0.00	Vo	0.00		Overburden	0.00	2.85	5	0.13	2	0.00	7.13	Very poor
JUDDH-77	1.80	3.30	60.00		3	9999	>30	ps	0.65	cp-ox	0.50	Hw	0.17	Mo-T	0.75		Overburden-Shale	43.33	29.31	12	2.27	2	1.66	17.92	Very poor
JUDDH-77	3.30	4.80	0.00		3	9999	>30	ps	0.65	cyc	0.67	Mw	0.50	Vo	0.00		Shale	50.00	41.96	5	3.20	2	0.00	10.20	Very poor
JUDDH-77	4.80	6.30	13.33		3	9999	>30	ps	0.65	cyc	0.67	Sw	0.83	Vo-O	0.09		Shale	50.00	41.96	5	3.20	2	1.23	11.43	Very poor
JUDDH-77	6.30	6.80	92.00	j	1	1	2	ps	0.65	cyc	0.67	Uw	1.00	T-Vt	0.92		Shale	50.00	41.96	19	3.20	24	15.94	62.14	Good
JUDDH-77	6.80	7.80	0.00	j	3	15	19	ps	0.65	cyc	0.67	Uw	1.00	Vo	0.00		Shale	50.00	41.96	5	3.20	8	0.00	16.20	Very poor
JUDDH-77	7.80	8.80	13.00	j	3	16	16	ps	0.65	cyc	0.67	Uw	1.00	Vo-O	0.09		Shale	50.00	41.96	5	3.20	10	1.48	19.68	Very poor
JUDDH-77	8.80	9.60	0.00	j	3	12	15	ps	0.65	cyc	0.67	Uw	1.00	Vo	0.00		Shale	50.00	41.96	5	3.20	11	0.00	19.20	Very poor
JUDDH-77	9.60	10.80	10.83	j	3	10	8	ps	0.65	cyc	0.67	Uw	1.00	Vo-O	0.09		Shale	50.00	41.96	5	3.20	16	1.48	25.68	Poor
JUDDH-77	10.80	12.30	25.33	j	2	9	6	ps	0.65	cyc	0.67	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	5	3.20	19	7.32	34.52	Poor
JUDDH-77	12.30	13.80	50.67	j	2	8	5	ps	0.65	cyc	0.67	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	10	3.20	20	13.07	46.27	Fair
JUDDH-77	13.80	15.30	26.67	j	3	14	9	ps	0.65	cyc	0.67	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	6	3.20	15	7.32	31.52	Poor
JUDDH-77	15.30	16.20	0.00	j	3	14	16	ps	0.65	cyc	0.67	Uw	1.00	Vo	0.00		Shale	50.00	41.96	5	3.20	10	0.00	18.20	Very poor
JUDDH-77	16.20	16.80	50.00	j	1	4	7	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	10	3.20	21	15.45	49.65	Fair
JUDDH-77	16.80	18.30	8.67	j	3	12	12	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Vo	0.00		Shale	50.00	41.96	5	3.20	13	0.00	21.20	Poor
JUDDH-77	18.30	19.80	60.00	j	2	8	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	20	15.45	50.65	Fair
JUDDH-77	19.80	21.30	52.67	j	2	8	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	11	3.20	20	15.45	49.65	Fair
JUDDH-77	21.30	22.70	59.29	j	2	7	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	20	15.45	50.65	Fair
JUDDH-77	22.70	24.30	63.75	j	2	5	3	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	13	3.20	21	15.45	52.65	Fair
JUDDH-77	24.30	25.80	23.33	j	3	12	8	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	5	3.20	16	8.65	32.85	Poor
JUDDH-77	25.80	27.30	0.00	f	3	9999	>30	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Vo	0.00		Shale-Fault	16.67	6.98	5	0.40	2	0.00	7.40	Very poor
JUDDH-77	27.30	28.90	0.00	f	3	9999	>30	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Vo	0.00		Fault-Shale	6.25	3.99	5	0.27	2	0.00	7.27	Very poor
JUDDH-77	28.90	30.30	75.00	j	2	6	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	15	3.20	21	17.21	56.41	Fair
JUDDH-77	30.30	31.80	16.00	j	2	9	6	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Vo-O	0.09		Shale	50.00	41.96	5	3.20	19	1.75	28.95	Poor
JUDDH-77	31.80	33.30	82.00	j	2	8	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	17	3.20	20	17.21	57.41	Fair
JUDDH-77	33.30	34.80	84.00	j	2	6	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	17	3.20	21	17.21	58.41	Fair
JUDDH-77	34.80	35.80	95.00	j	1	2	2	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	T-Vt	0.92		Shale	50.00	41.96	19	3.20	24	18.85	65.05	Good
JUDDH-77	35.80	36.30	42.00	j	1	2	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo	0.67		Shale	50.00	41.96	9	3.20	23	13.81	49.01	Fair
JUDDH-77	36.30	39.30	73.33	j	3	12	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	15	3.20	19	17.21	54.41	Fair
JUDDH-77	39.30	42.30	56.67	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	18	15.45	48.65	Fair
JUDDH-77	42.30	45.30	44.67	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo	0.67		Shale	50.00	41.96	9	3.20	18	13.81	44.01	Fair
JUDDH-77	45.30	48.40	69.68	j	3	13	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	14	3.20	19	15.45	51.65	Fair
JUDDH-77	48.40	51.30	57.59	j	3	18	6	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	17	15.45	47.65	Fair
JUDDH-77	51.30	54.30	56.67	j	3	12	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	19	15.45	49.65	Fair
JUDDH-77	54.30	57.30	57.33	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	18	15.45	48.65	Fair
JUDDH-77	57.30	60.10	62.14	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	13	3.20	18	15.45	49.65	Fair
JUDDH-77	60.10	63.20	67.74	j	3	13	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	14	3.20	19	15.45	51.65	Fair
JUDDH-77	63.20	66.30	35.48	j	3	19	6	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	7	3.20	17	8.65	35.85	Poor
JUDDH-77	66.30	69.30	30.67	j	3	9999	>30	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	6	3.20	2	8.65	19.85	Very poor
JUDDH-77	69.30	72.30	60.00	j	3	12	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	19	15.45	49.65	Fair
JUDDH-77	72.30	75.30	71.00	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	15	3.20	18	17.21	53.41	Fair
JUDDH-77	75.30	78.00	53.33	j	3	14	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	11	3.20	18	15.45	47.65	Fair
JUDDH-77	78.00	81.10	55.48	j	3	13	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	11	3.20	19	15.45	48.65	Fair
JUDDH-77	81.10	83.90	27.14	j	3	17	6	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	O-Mo	0.42		Shale	50.00	41.96	6	3.20	17	8.65	34.85	Poor
JUDDH-77	83.90	87.00	78.39	j	3	13	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-Vt	0.84		Shale	50.00	41.96	16	3.20	19	17.21	55.41	Fair
JUDDH-77	87.00	87.50	60.00	j	1	2	4	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	23	15.45	53.65	Fair
JUDDH-77	87.50	90.50	61.33	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	13	3.20	18	15.45	49.65	Fair
JUDDH-77	90.50	93.40	58.97	j	3	15	5	ps	0.65	no-cyc-ca-cb	0.79	Uw	1.00	Mo-T	0.75		Shale	50.00	41.96	12	3.20	18	15.45	48.65	Fair
JUDDH-77	93.40	96.50	45.16	j	3	16	5	ps	0.65	no-ca-cb	0.83	Uw	1.00	Mo	0.67		Shale-Sandstone	50.81	43.82	9	3.47	18	14.52	44.98	Fair
JUDDH-77	96.50	99.50	94.33	j	2	9	3	ps	0.65	no-ca-cb	0.83	Uw	1.00	T-Vt	0.92		Sandstone-Shale	54.83	54.42	19	4.00	21	19.83	63.83	Good

Figure 24-1: Geomechanical Logging Example - JUDDH-77

24.1.2.1.2. Jugan – Surface & Subsurface Structural Mapping & Interpretation

Details of the structural mapping were taken from the "Report on the Detailed Geological Mapping of Jugan" dated 9 November 2013. The detailed geological mapping was conducted by the company between June to September 2012. The objective of the geological mapping programme was to create an updated detailed map of Jugan to better understand the controls of mineralisation. It obtained an enhanced interpretation of the apparent trend of the deposit that is based largely on the structural expressions. This also provided the reasons that influenced heavily the mechanical properties of the rock mass aside from the different lithology units in the area.

The Jugan deposit is hosted by the Pedawan formation that consists of shale with interbedded siltstone and sandstone units. This sedimentary sequence is intruded by several post-mineral NW and WNW trending dacite porphyry dikes.

The majority of the bedding planes NE-SW direction while conjugate fractures and strike-slip faults generally trend NW. The presence of folds, thrust/reverse faults and strike-slip faults in the area indicates a compressional regime. Development of NE-trending folds, thrust faults and NW-trending strike-slip faults indicates that the principal stress ($\sigma 1$) is coming from the northwest heading towards the southeast. These NE and NW structures were interpreted to have formed during WNW event in the mid-Eocene. The event is comprised of EW to NW-SE compression. The NE-trending thrust faults recorded on the east side of the hill which was interpreted as part of footwall thrust and selected NW-trending faults matched to the structures interpreted in the drillholes.

The several exploration activities such as trenching and drilling that time made it difficult to recognise and map the structures. All minor and major thrust/reverse faults recorded on the central to the east part of Jugan hill are all NE trending and moderately to steeply dipping to the NW. Only few fold axes were recorded and all are NE trending and slightly plunging (<10°) to the NE.

On the west part of the hill, the fracturing, shearing and deformation is more intense compared to the east part. There are three (3) sets of bedding planes recorded on the west part, first is trending E-W, second is NE and the third is trending NW forming highly deformed structures. An ENE trending isolated fold and a localised NNW trending listric fault is also noted in this part with strike-slip and dip-slip movement along certain fault planes. Structures recorded in Jugan surface mapping and trenching are displayed in *Figure 24-2: Surface and Trench Structural Mapping at the Jugan Hill Deposit* below.

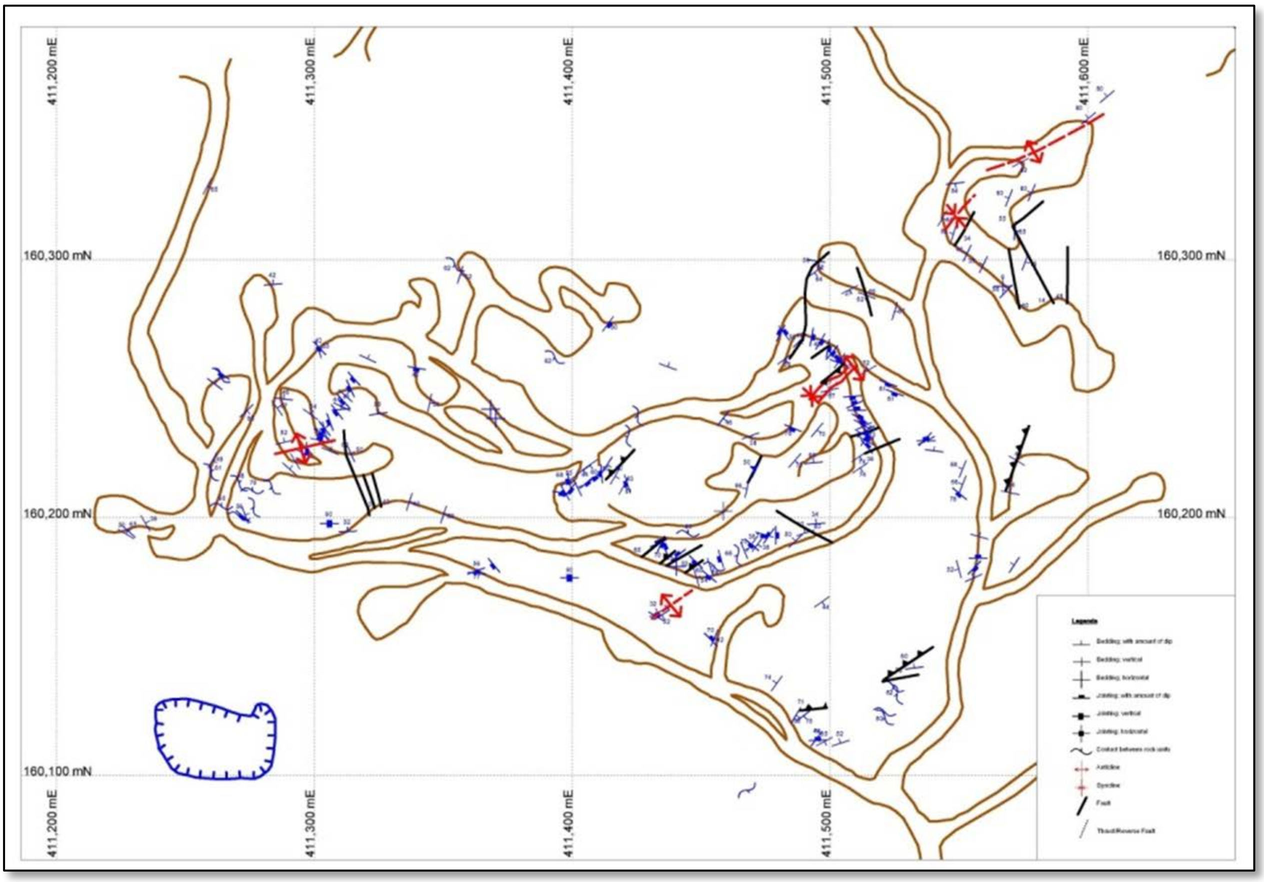


Figure 24-2: Surface and Trench Structural Mapping at the Jugan Hill Deposit

On the subsurface structural mapping, the findings at depth are as follows. Based on recorded structural data from two hundred and fifty three (253) drillholes in Jugan, which the included the seventy-nine (79) drilled by the company, several series of faults were identified and interpreted to provide control on the geometry and possible extension of the known Jugan orebody.

There are two (2) general set of fault trends: first is the pre to syn-mineral, ENE-trending and NW-dipping thrust/reverse-faults. Generally, these structures bound the mineralisation along the footwall and hanging wall. However they do not strictly confine and limit it as mineralisation was observed to extend or come-short from the thrust-fault contact.

The second set is the syn to post-mineral, steeply-dipping, NW-trending, conjugate strike-slip, oblique and scissor faults. These NW-faults cut across the earlier ENE faults and are the result of differential movement from compression and thrusting. These structures are thought to be responsible for the offset of the mineralisation to the ENE and tapering of the geometry of the orebody in the SW.

The complexity of structures in Jugan can be correlated to the NNE and WNW deformation events. The WNW event has more impact being the most recent event.

Based on the surface mapping and structural evidence collected from the drillholes, it is concluded that there are two major fault trends controlling the geometry and limits of the Jugan orebody. Firstly is the NE-trending thrust/reverse fault that confines the ore body and secondly the NW-trending strike-slip faults that cut and displaced the earlier NE-trending structures as well as the orebody. The NW faults are younger and are observed to cut and displaced the older NE thrust.

In terms of geotechnical consideration other than the strength of the rockmass based on its RMR rating and the observed surficial degradation of shale upon exposure of the expansive clays in the atmosphere, the presence of these major structures, including the dike intrusive trending NNW were also considered into the final pit design after the pit optimisation process.

The attached plan view in *Figure 24-3: Sub-Surface Structural Modelling at -100 mRL* shows the intertwining major structures at depth of -100 mRL. Those ones in yellow colour are the series of conjugate strike-slip-and-oblique NW-trending faults. Those blue ENE-trending thrust faults that flank the orebody in the north represent the upthrown hanging wall while the other flanking at the south is the footwall side. The one highlighted in magenta is the NNE-trending orebody dipping NW.

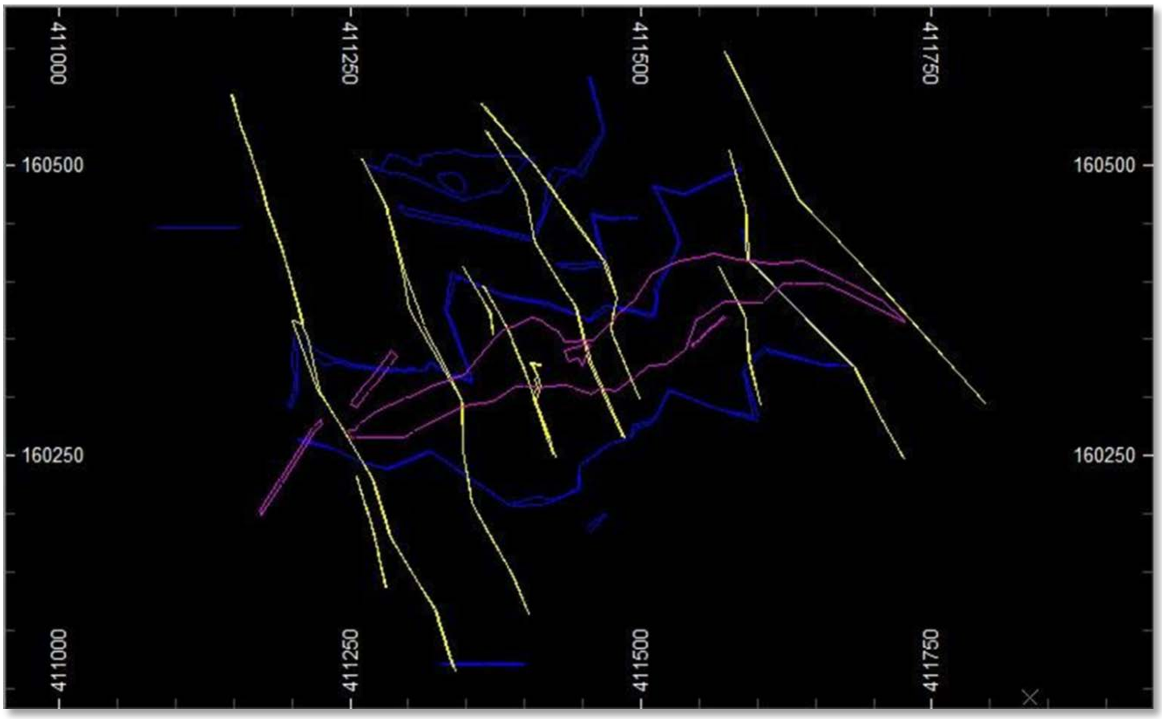


Figure 24-3: Sub-Surface Structural Modelling at -100 mRL

24.1.2.1.3. Jugan – Geotechnical Modelling

The geotechnical modelling is based on the block model derived from the RMR ratings of the drillholes and the surface and subsurface structural interpretations at Jugan.

In terms of the structural complexity in the area, it needs to be accepted that some berm losses will occur along with some instabilities from the local slopes. The rapid variations in structural conditions should also limit the scale of the failures provided that the major faults, the folds, shear zones, and the NW-trending clay-altered dike are not undercut. These features would however be evident while the pit develops and appropriate measures must be taken when observed. The orientation and continuity of the structural features control the pit wall stability.

Upon exposure, the shale rocks are prone to disintegration. This is evidenced by the breaking down of the cores, surface exposures of the clays (smectite and illite) and fracturing. It is however expected that this will only be a surface feature within the proposed open pit, with slopes exposed in the long term having small talus slopes forming at the toe.

The walls of the open pit are designed consistent with the economic factors, the stability during the life of mine and the consequence of any failure, for example pit access will require a higher safety factor than for some other areas of the pit. The final wall design is a result of the interaction between the orebody geometry, the pit access and the stability factor. It is observed and recorded that due to the silicified nature of the orebody; it is relatively competent compared to the surrounding host rock.

The proposed mining envisages an open pit mining method over an approximate area of 240,000 m^2. The mine design is currently proceeding as part of the feasibility which was based on the optimised pit using a 56° cut slope with bench height of 15 m and 5 m berm arriving at 45° overall pit slope. The face slopes were later on adjusted using the RMR block model.

From 30 mRL to -85 mRL, the rock mass approximate friction angle varies from 15° to slightly above 30° while cohesion varies from less than 100 kPa to slightly above 250 kPa. Down to -85 mRL, the rocks are rated between poor to fair, and from RL -85 mRL to pit bottom they are generally fair to good with friction angle ranging from above 30° to 40° and cohesion ranging above 250 kPa to 400 kPa.

Rosettes were applied in the slope design beginning from approximately 25 mRL down to -85 mRL to provide a varying pit slope designs. The pit slope at this sector is between 40-48°. From -85 mRL to the pit bottom at -145 mRL, the pit slope throughout is 48°.

A plan view *(Figure 238: Plan View of Jugan Orebody Wireframe & Pit Design*) of the open pit design relative to the orebody wireframe and a section view with the colour-coded RMR blocks together with the orebody (in magenta) and the modelled major structures (in orange) are provided for in the succeeding pages as examples on how the interpretation and modelling was done using CAE Mining Studio 3. In the section view (*Figure 24-5: Section View of Jugan Orebody, RMR Model and Pit Design*) looking N45E along section line 135_02, the graphics display on the RMR block model, the orebody and structure wireframes are shown as intersections.

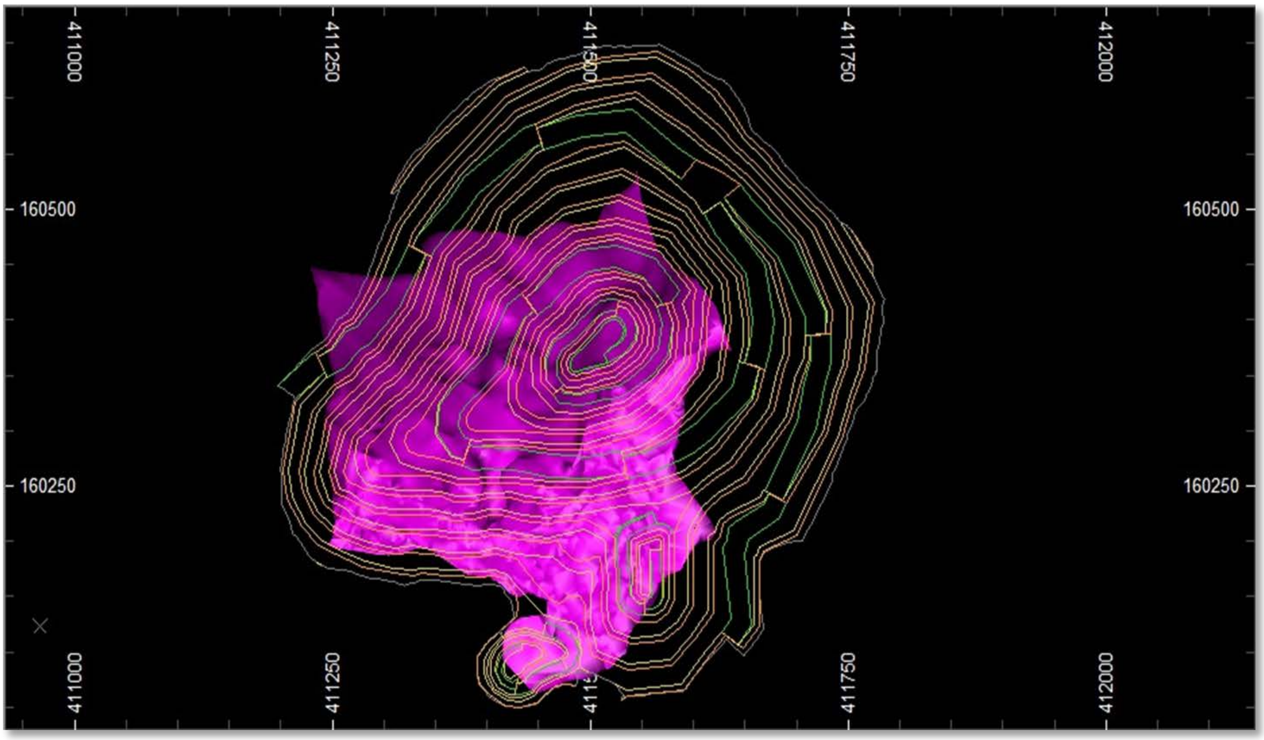


Figure 24-4: Plan View of Jugan Orebody Wireframe & Pit Design

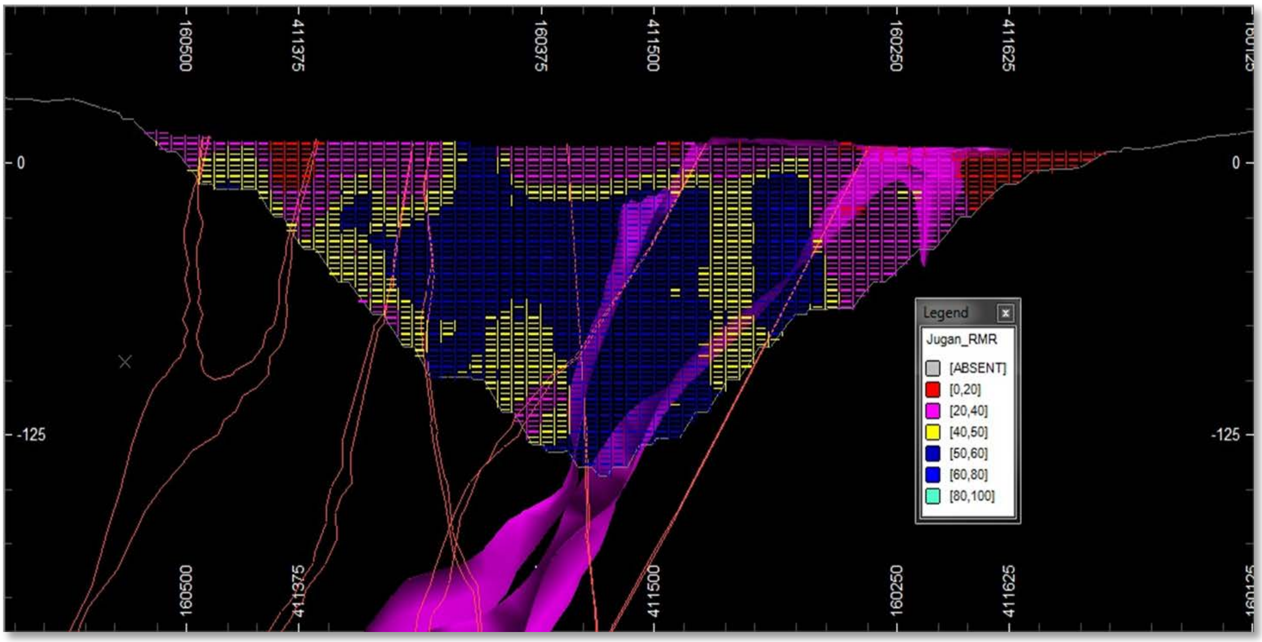


Figure 24-5: Section View of Jugan Orebody, RMR Model and Pit Design

As stated earlier, it is observed and recorded that due to the silicified nature of the orebody; it is relatively competent compared to the surrounding host rock. Hence, it has a relatively higher RMR than the host rock/waste rock. *Table 24-1: Jugan Orebody RMR Values in Group Ranges* and *Table 24-2: Jugan Host Rock/Waste RMR Values in Group Ranges* below show a summary of the RMR values of the ore and the waste rock.

RMR Group		Population (%)	Est. Friction Angle (φ)	Est. Cohesion (kPa)
Very poor	0-20	3.10	<15	<100
Poor	20-30	10.55	15-20	100-150
Poor	30-40	19.34	20-25	150-200
Fair	40-50	23.93	25-30	200-250
Fair	50-60	39.67	30-35	250-300
Good	60-80	3.41	35-45	300-400
Very good	80-100	-	>45	>400

Table 24-1: Jugan Orebody RMR Values in Group Ranges

RMR Group		Population (%)	Est. Friction Angle (φ)	Est. Cohesion (kPa)
Very poor	0-20	8.43	<15	<100
Poor	20-30	18.56	15-20	100-150
Poor	30-40	25.51	20-25	150-200
Fair	40-50	22.19	25-30	200-250
Fair	50-60	24.61	30-35	250-300
Good	60-80	0.69	35-45	300-400
Very good	80-100	-	>45	>400

Table 24-2: Jugan Host Rock/Waste RMR Values in Group Ranges

Other than the established RMR values and the corresponding designed pit angles from 25 mRL to -85 mRL (40-48°) and -85 mRL down to -145 mRL (48°), the additional procedures should be observed:

- The disintegration of the shale domain from 25 mRL down to -85 mRL upon exposure. As stated earlier, due to the presence of smectite and illite along the laminations, the shale rocks are prone to disintegration. This may impact on the stability of the pit slopes. Field mapping and additional investigation as the pit develops will be carried out.
- Drying of the clays during summer season may result into development of tension cracks, hence further degradation of excavated surfaces. Tension cracks may be present behind steep excavations faces. Intermittent rain water may percolate and create high pore water pressure that will destabilise the slope. Adequate run-off diversion is required and routine, on-going inspections and monitoring are recommended.
- Drainage measures, such as horizontal drains, may be required at localised areas where preferential seepage is observed to maintain slope stability.
- A detailed kinematic slope stability assessment by wedge analysis should be carried out as soon as the pit is developed to the point wherein structural mapping can be conducted either by digital photogrammetry or field mapping. Through this, the

existing structural geology model based on the previous field mapping of the Jugan hill and exploration boreholes can be updated.

- Where the pit is advanced to the presumed fault locations at depth, or where the faults daylight/ meet with the surface, or where the faults change in dip directions (as most of them are conjugate faults especially those at the northwest side of the pit), additional investigations should be done every now and then, or at need basis as part of the update on the structural model.
- Pit development should include assessment of slope performance that allows adjustment to the slope geometry.
- Piezometers will be needed in deep wells that are scheduled to be drilled within the peripheries of the pit as part of the hydrogeological study for Jugan Pit. Details of the study are explained in *Section 21.1*. The water level variations relative to the pit development and seasonality would have to be monitored on a monthly basis. This will enable modelling and prediction of water inflow to the pit.
- Inclinometers may have to be established in strategic locations to monitor pit slope movements, e.g. east wall, SE wall, NW wall and safeguard mine operations.
- Slope alarms or radar monitors, the latter if budget permits, may also be established along the pit walls in conjunction with the inclinometers.
- An operational manual is needed for the safe development and operation of the open pit.

24.1.2.2. Bekajang/Krian Sector

24.1.2.2.1. BYG – Drillhole Geotechnical Logging

The drilling in the area was focused mainly in the deactivated Bukit-Young Pit, which is a part of the Bekajang/Krian Sector. The objective was to find the mineralised extension of the orebody that was once mined by the previous company Bukit-Young Gold Sdn Bhd.

The drillhole geomechanical logging on the drillholes BYDDH-01 to BYDDH-42 was done together with the geological logging. Like the same methodologies adopted on the Jugan drillholes, the same set of procedures was employed on the BYDDH holes. While the geologic logging was largely based on the lithology, alteration and mineralisation, and veining and structures, the geomechanical logging was done based on the drill run at a maximum length of 3.0 metres per run. The geomechanical logging takes into account the several features of the rock, namely, the mechanical, structural and the mineralogical properties of the rocks and rates them according to the Rock Mass Rating (RMR) criteria. The parameters in measuring the RMR are the same as those explained in *Section 19.2.1.1*.

The measured RMR values are used to develop the RMR block model for Bukit-Young. Together with the projections from the initial structural model that was created, a slope design was developed for a planned 15m high with 5m bench face slope. The slopes from the optimised pit design generated using an initial overall 45° pit slope were adjusted based on the recommended slopes from the RMR block model.

An example of the geomechanical logsheet for BYG drillholes is shown in *Figure 24-6: Geomechanical Logging Example - BYDDH-34* below.

HOLE ID	FROM	TO	RQD	DEFECT TYPE	NO. OF SET	COUNT	JN-M	JC ROUGHNESS	R FACTOR	JC FILL/ ALT	ALT. FACTOR	JC WEATHERING	WEATHERING FACTOR	JC OPENING	APERTURE RATING	WATER	LITHO	R VALUE	IRS	RATING RQD	RATING IRS	RATING JN-M	RATING JC	RMR	RMR CLASS
BYDDH-34	0	1.5	10.67	j	2	8	10	Ps	0.65	cgt	0.67	Sw	0.83	Vo-O	0.09		Soil, Clay, Mullock, Rock Fill or Tailings	0.00	2.85	5.0	0.12	16.0	1.23	22.36	Poor
BYDDH-34	1.5	1.9	0.00	j	2	8	20	Ps	0.65	cgt	0.67	Sw	0.83	Vo	0.00		Soil, Clay, Mullock, Rock Fill or Tailings-Intrusive	0.00	2.85	5.0	0.13	10.0	0.00	15.13	Very poor
BYDDH-34	1.9	3.4	0.00	-	3	9999	>30	Pr	0.70	cp-cx	0.50	D	0.00	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	3.4	4.9	0.00	-	3	9999	>30	Pr	0.70	cp-cx	0.50	D	0.00	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	4.9	6.4	0.00	-	3	9999	>30	Pr	0.70	cp-cx	0.50	Mw	0.50	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	6.4	7.9	0.00	-	3	9999	>30	Pr	0.70	cp-cx	0.50	Mw	0.50	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	7.9	9.4	0.00	-	3	9999	>30	Pr	0.70	cp-cx	0.50	Mw	0.50	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	9.4	10.9	0.00	-	3	9999	>30	Pr	0.70	qt-scgc-c	0.65	Sw	0.83	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	10.9	12.2	0.00	-	3	9999	>30	Pr	0.70	qt-scgc-c	0.65	Sw	0.83	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	12.2	13	0.00	-	3	9999	>30	Pr	0.70	qt-scgc-c	0.65	Sw	0.83	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	13	13.8	0.00	-	3	9999	>30	Pr	0.70	qt-scgc-c	0.65	Uw	1.00	Vo	0.00		Intrusive	65.00	94.03	5.0	6.40	2.0	0.00	13.40	Very poor
BYDDH-34	13.8	14.6	55.00	j	1	2	3	Pr	0.70	qt-scgc-c	0.65	Uw	1.00	Mo-T	0.75		Intrusive-Andesite	66.50	101.94	11.0	7.00	23.0	13.65	54.65	Fair
BYDDH-34	14.6	15.7	95.45	j	1	2	2	Pr	0.70	qt-ca-c-sl	0.77	Uw	1.00	T-Vt	0.92		Andesite	67.00	104.72	19.0	7.00	24.0	19.73	69.73	Good
BYDDH-34	15.7	16.8	100.00	j	1	1	1	Pr	0.70	qt-ca-c-sl	0.77	Uw	1.00	Vt	1.00		Andesite	67.00	104.72	20.0	7.00	25.0	21.56	73.56	Good
BYDDH-34	16.8	18.4	100.00	j	1	1	1	Pr	0.70	qt-ca-c-sl	0.77	Uw	1.00	Vt	1.00		Andesite	67.00	104.72	20.0	7.00	25.0	21.56	73.56	Good
BYDDH-34	18.4	19.1	97.14	j	1	1	1	Pr	0.70	qt-ca-c-sl	0.77	Uw	1.00	T-Vt	0.92		Andesite	67.00	104.72	20.0	7.00	25.0	19.73	71.73	Good
BYDDH-34	19.1	19.9	100.00	v	1	2	5	Pr-Us	0.75	qt-ca-c	0.79	Uw	1.00	Vt	1.00		Andesite	67.00	104.72	20.0	7.00	22.0	23.70	72.70	Good
BYDDH-34	19.9	21.4	100.00	j	1	1	1	Us	0.80	qt-ca-c	0.79	Uw	1.00	Vt	1.00		Andesite	67.00	104.72	20.0	7.00	25.0	25.28	77.28	Good
BYDDH-34	21.4	22.9	98.67	j	1	2	1	Us	0.80	qt-ca	0.85	Uw	1.00	T-Vt	0.92		Andesite-Intrusive	67.00	104.72	20.0	7.00	25.0	24.89	76.89	Good
BYDDH-34	22.9	24.4	94.67	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	19.0	6.40	25.0	20.22	70.62	Good
BYDDH-34	24.4	25.9	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	25.9	26.8	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	26.8	27.5	95.71	j	1	1	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	19.0	6.40	25.0	20.22	70.62	Good
BYDDH-34	27.5	30.5	97.00	j	1	3	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	30.5	33.5	96.33	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	33.5	36.5	98.33	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	36.5	37.9	78.57	j	1	3	2	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Mo-Vt	0.84		Intrusive	65.00	94.03	16.0	6.40	24.0	18.45	64.85	Good
BYDDH-34	37.9	39.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	39.5	42.5	95.00	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	19.0	6.40	25.0	20.22	70.62	Good
BYDDH-34	42.5	43.5	89.00	j	1	1	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Mo-Vt	0.84		Intrusive	65.00	94.03	10.0	6.40	25.0	18.45	67.05	Good
BYDDH-34	43.5	45.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	45.5	48.5	98.67	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	48.5	51.5	95.33	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	19.0	6.40	25.0	20.22	70.62	Good
BYDDH-34	51.5	54.5	98.33	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	54.5	57.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	57.5	60.5	99.33	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	60.5	63.5	98.33	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	63.5	66.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	66.5	69.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	69.5	72.5	100.00	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	72.5	75.5	95.67	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	19.0	6.40	25.0	20.22	70.62	Good
BYDDH-34	75.5	78.5	97.67	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	78.5	81.5	100.00	-	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	81.5	84.5	100.00	0	1	0	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	84.5	87.5	96.67	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	87.5	90.5	100.00	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	90.5	93.5	96.67	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	93.5	96.5	100.00	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	96.5	99.5	96.33	j	1	2	1	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good
BYDDH-34	99.5	103	99.67	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	Vt	1.00		Intrusive	65.00	94.03	20.0	6.40	25.0	22.10	73.50	Good
BYDDH-34	102.5	106	97.33	j	1	1	0	Ur	0.85	qt-scgc-c	0.65	Uw	1.00	T-Vt	0.92		Intrusive	65.00	94.03	20.0	6.40	25.0	20.22	71.62	Good

Figure 24-6: Geomechanical Logging Example - BYDDH-34

24.1.2.2.2. BYG – Surface & Subsurface Structural Mapping & Interpretation

The Bekajang/Krian project is three (3) plus years down the line. A surface structural mapping in the area is planned into the near future.

The initial subsurface structural interpretation, however, were initially established based on the result from the airborne geophysical data done in the late 1990s. There were some sharp contrasts between the low and high resistivities in some areas within the Bekajang/Krian sector giving the impression that these are major structures. The aim of studying these structures recently is to understand the mineralisation based on its ore controls. It served also as a guide why recent initial drilling activities were conducted at the old deactivated Bukit-Young Pit.

In terms of geotechnical consideration other than the strength of the rockmass based on its RMR rating, the presence of these major structures trending NNE dipping steeply to the NW were also considered into the interim pit design after the pit optimisation process.

The semi- to detailed surface structural mapping and subsurface structural modelling will be part of the Bekajang/Krian project schedule into the near future.

24.1.2.2.3. BYG – Geotechnical Modelling

The geotechnical modelling on the Bukit Young Pit is based on the block model derived from the RMR ratings of the drillholes and the preliminary subsurface structural interpretations in the area.

In terms of the structural complexity in the area based entirely on aeromagnetics, there seems to be less structural variations in the major structures that trends NNE. These features, however, will be more evident when future exploration drilling commences together with the structural mapping. Also, when the pit develops, the better it will be to fully understand the visual imprints of the structures and how they influence pit wall stability. The overall geotechnical soundness of the walls other than the established mechanical properties of the rock fabric by RMR rating will then be thoroughly established.

The proposed mining envisages an open pit mining method over an approximate area of 85,530 m^2. The mine design is currently proceeding as part of the feasibility which was based on the optimised pit using a >65°cut slope with bench height of 10 m and 5 m berm width arriving at approx. 47° overall pit slope. The slopes were designed fixed at those angles from 39 mRL down to -50mRL.

It is observed that the orebody is relatively competent compared to the surrounding host rock. It has a relatively higher RMR than the host rock/waste rock. However, the orebody occurs in vughy sheared breccias rich in quartz, jasperiod and sulphides. *Table 24-3: BYG Ore & Waste RMR Values in Group Ranges* below shows a summary of the RMR values within the ore and waste. It should be noted that it is difficult to separate the two (2) materials in terms of their RMR values because of the patchy nature of the shear breccia type orebody.

RMR Group		**Population (%)**	**Est. Friction Angle *(φ)***	**Est. Cohesion (kPa)**
Very poor	0-20	13.02	<15	<100
Poor	20-30	10.42	15-20	100-150
Poor	30-40	14.71	20-25	150-200
Fair	40-50	20.74	25-30	200-250
Fair	50-60	21.71	30-35	250-300
Good	60-80	19.37	35-45	300-400
Very good	80-100	0.04	>45	>400

Table 24-3: BYG Ore & Waste RMR Values in Group Ranges

A plan view (*Figure 24-7: Plan View of BYG Orebody Wireframe & Pit Design*) of the open pit design relative to the orebody wireframe and a section view of the pit with the colour-coded RMR blocks together with the orebody (in magenta) and the modelled major structures (in orange), are provided for in the succeeding pages. In the section view (*Figure 24-8: Section View of BYG Orebody, RMR Model and Pit Design*) looking north along section line BYC 2.5N, the RMR block model, the orebody and the structure wireframes are shown as intersections.

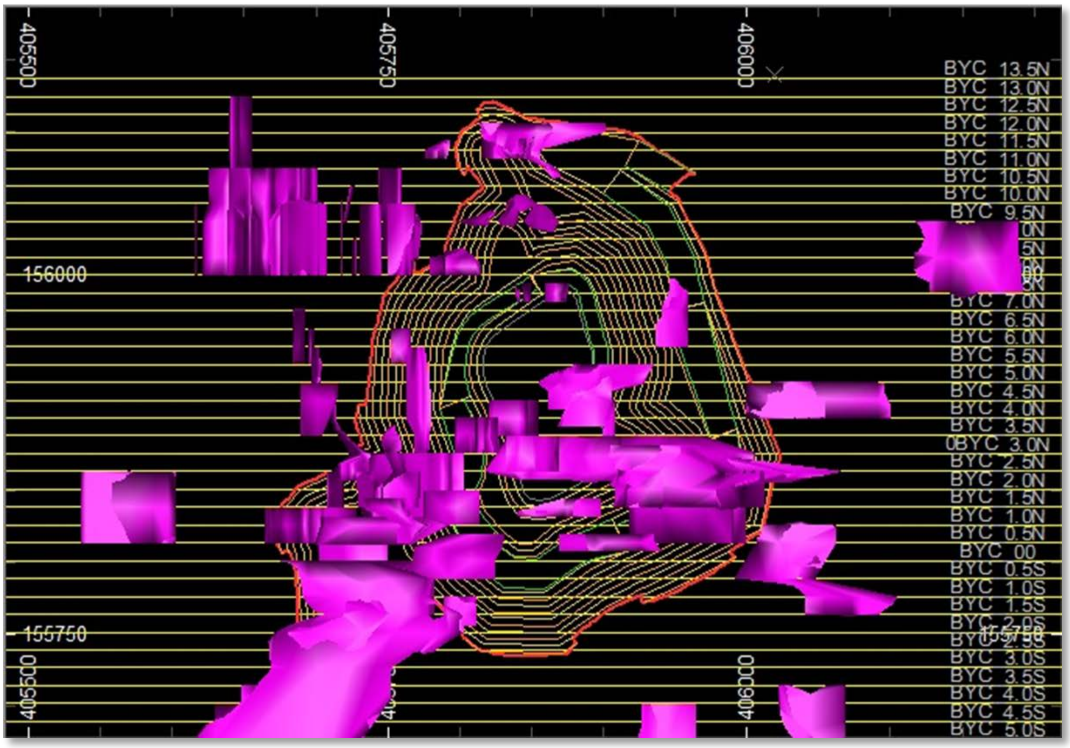


Figure 24-7: Plan View of BYG Orebody Wireframe & Pit Design

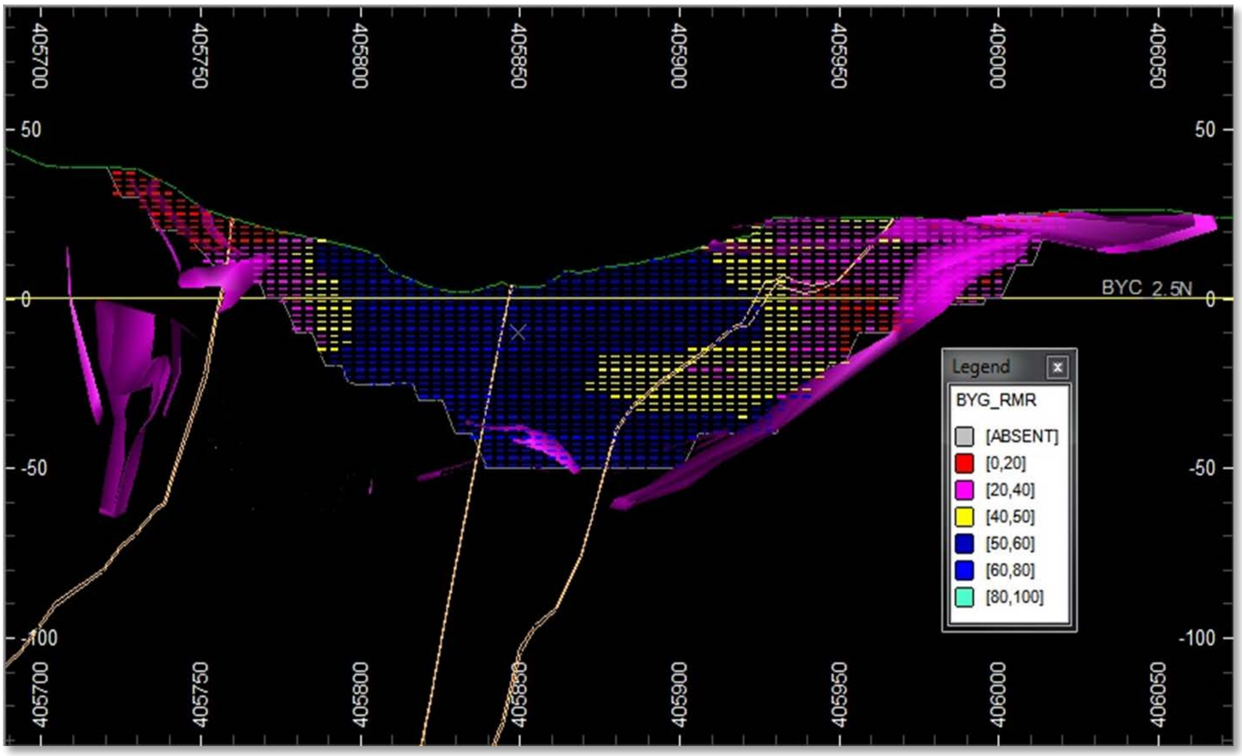


Figure 24-8: Section View of BYG Orebody, RMR Model and Pit Design

Other than the established RMR values and the corresponding designed 47° pit angle, the additional procedures should be observed:

- Drainage measures, such as horizontal drains, may be required at localised areas where preferential seepage is observed to maintain slope stability.
- A detailed kinematic slope stability assessment by wedge analysis should be carried out as soon as the pit is developed to the point wherein structural mapping can be conducted either by digital photogrammetry or field mapping. Through this, the existing structural geology model based on the previous aerial geophysical results, may be verified and updated.
- Where the pit is advanced to the presumed fault locations at depth, or where the faults daylight/ meet with the surface, or where the faults change in dip directions, additional investigations should be done every now and then, or at need basis as part of the update on the structural model .
- Pit development should include assessment of slope performance that allows adjustment to the slope geometry.
- Piezometers will be needed in deep wells that are scheduled to be drilled within the peripheries of the pit as part of the hydrogeological study for Bukit-Young Pit. Details of the study are explained below in *Section 21.2*. The water level variations relative to the pit development and seasonality would have to be monitored on a monthly basis. This will enable modelling and prediction of water inflow to the pit.
- Inclinometers may have to be established in strategic locations to monitor pit slope movements, e.g. NW wall and safeguard mine operations.
- Slope alarms or radar monitors, the latter if budget permits, may also be established along the pit walls in conjunction with the inclinometers.
- An operational manual is needed for the safe development and operation of the open pit.

24.1.2.3. Other

Other work that has been conducted, in progress or planned for other elements that have a geotechnical or geomechanical input are listed in the following sub-sections.

24.1.2.3.1. TSF – Proposed

The proposed TSF in Jugan is sized taking into account the flotation concentrate mass pull-out of 10%. Out of the total 9.71 Mt ore grading 1.56 g/t Au average that will be milled around 8.74 Mt at 0.40 g/t Au average will end up as tailings. The rest will be treated elsewhere (possibly in China) as gold concentrate.

For the build-up of the TSF, around 6.4 Mm^3 of mine waste and 1.9 Mm^3 derived from the cut materials in the containment pond will be required. This will be done in three (3) stages throughout the current mine life.

The proposed TSF is planned as a beach-type TSF during its operating years. The tailings dam will be built from RL 25m to RL 45m and will be provided with a final spillway at RL 43m to naturally drain out the supernatant or the tailings water fraction up to the spillway invert elevation and to handle any excess run-off water since the region is known for frequent rains. The final spillway is initially sized at 15m wide but this figure will be confirmed later on based on the updated historical rain figures and catchment size within the pond as the feasibility is still progressing. The design will be based on 72-hour PMF (Probable Maximum Flood) period.

The 20m high zoned TSF with combined clay and borrowed sulphide-free material as upstream material and mine rock waste as downstream material will be provided with a 1m thick blanket drain (D_{50} = 5cm) in between the upstream and downstream. A concrete cut-off drain at the downstream toe to handle seepage from the pond passing through the clay zone and into the blanket drain will also be part of the structure. The function of the blanket drain is to bring down the phreatic head passing through the upstream embankment zone such that disallowing excessive pore pressure from occurring at this side, to deny any form of seepage from the pond water to pass through the downstream embankment, and to prevent the downstream from getting saturated.

Figure 24-9: Proposed Jugan Tailings Impoundment Design in Relation to Pit below displays the layout of the proposed TSF relative to the Jugan Pit, and an estimate on tailings production after flotation process in *Table 24-4: Tailings Production Estimate - Jugan Pit*, thereafter. A 100 m buffer is given between the final toe of the dam to the final crest level of the pit.

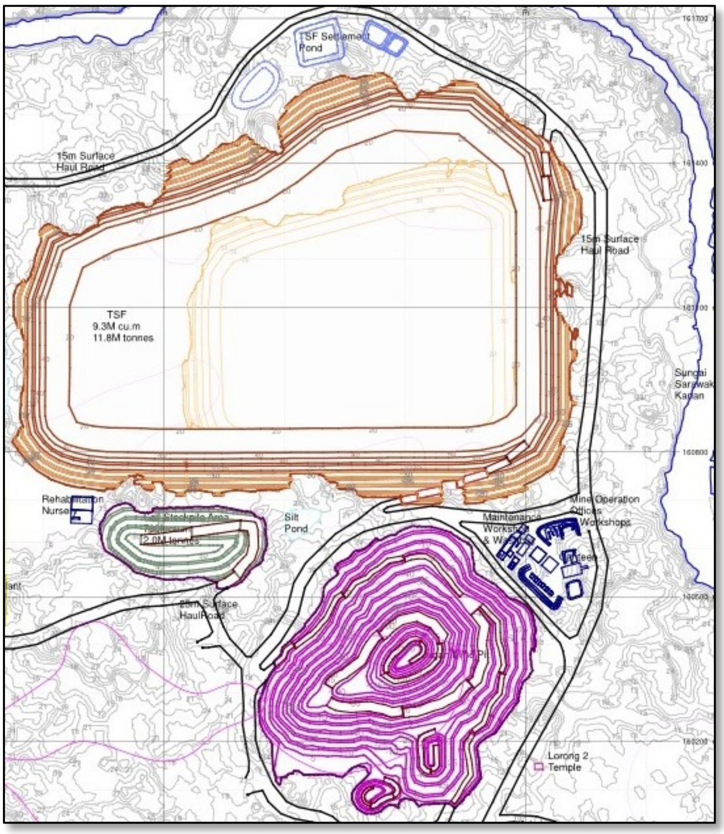


Figure 24-9: Proposed Jugan Tailings Impoundment Design in Relation to Pit

Year	Units	Year 1	Year 2	Year 3	Year 4	Total Average
Working days	days	365	365	365	119	1,213.91
Milling rate	t/d	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00
	t/y	2,920,000.00	2,920,000.00	2,920,000.00	951,243.72	9,711,243.72
Mill grade	gAu/t	1.56	1.56	1.56	1.56	1.56
Recovery %	Au	77.00%	77.00%	77.00%	77.00%	77.00%
Flotation concentrate	t/d	800.00	800.00	800.00	800.00	800.00
	t/y	292,000.00	292,000.00	292,000.00	95,124.37	971,124.37
Production	oz Au/y	112,768.90	112,768.90	112,768.90	36,736.54	375,043.23
To tailings pond	flotation tailings, t/d	7,200.00	7,200.00	7,200.00	7,200.00	7,200.00
	flotation tailings, t/y	2,628,000.00	2,628,000.00	2,628,000.00	856,119.35	8,740,119.35
	gAu/t	0.40	0.40	0.40	0.40	0.40
	tails slurry, m^3	5,853,978.98	5,853,978.98	5,853,978.98	1,907,041.35	19,468,978.30
	tails solids, m^3	973,344.98	973,344.98	973,344.98	317,085.04	3,237,119.99
	tails slurry, m^3 (final settled volume)	2,364,306.34	2,364,306.34	2,364,306.34	770,216.29	7,863,135.31
	ore density, t/m^3	2.70	2.70	2.70	2.70	2.70
	flotation tails density, t/m^3	1.28	1.28	1.28	1.28	1.28
	% solids by weight	35.00%	35.00%	35.00%	35.00%	35.00%

Table 24-4: Tailings Production Estimate - Jugan Pit

The 8.74 Mt flotation tails from the Jugan Pit will be slurried at 35 % solids before pumping the tailings to the TSF pond. At 35 % solids it will have an initial estimated density of 1.3 t/m^3. The 20 m high ring dam to contain it has a total capacity of 8.6 Mm^3. The natural removal of the tailings water fraction at some point will be through the 15 m wide spillway, while desiccation will be achieved by beaching the tailings at the time of deposition. Beaching is accomplished by perimeter spigotting of the tailings. The estimated final settling density of the tailings is 1.70 t/m^3 at 65.4% solids, which will amount to about 7.9 Mm^3.

The upstream clay zone will maintain a slope of 2.5H : 1.0V or 21.8° while the downstream side made entirely of mine waste will maintain a local slope 2.0H : 1.0V but will be mated with 5m wide berms for every 5 m lifts. The resulting flatter downstream slope will be around 18.4° or about 3.0H : 1.0V average.

Estimated amount of materials needed for the construction are as follows:

- Upstream clay zone – 0.36 M lcm
- Downstream mine waste plus clay as cover – 11.10 M lcm
- Blanket drain – 0.37 Mm^3
- Geofabric – 0.77 Mm^2
- Concrete drain
  - 620 m^3 cement
  - 1760 m^3 sand
  - 4,250 pcs of 4m long 50mm dia. PVC pipes to be perforated
  - 2,430 pcs 2 m long x 1 m high x 1 m width rock gabion
- HDPE liner – 0.58 Mm^2
- Final spillway (20 m wide on top, 15 m wide bottom lined with 0.10 m thick concrete)
  - 60 m^3 cement
  - 90 m^3 sand

24.1.2.3.1.1. Soil Geotechnical Investigation Tests Required

The following tests are central to any TSF detailed design and construction and are precursor to any foundation engineering design. These are deemed to be the most applicable for our objective of constructing a tailings dam in Jugan that is idealised to be also a water-retention structure throughout its operational stage.

Soil Field Tests:

- Standard Penetrometer Test (SPT) up to zone of refusal
- Collection of undisturbed samples by SPT
- Cone Penetration Test or CPT (in selected areas following the SPT)
- Field vane shear test on soft soils encountered by SPT
- Field permeability test on soil
- Test pitting in selected areas
- Trenching – to observe preferential seepage pathway since the groundwater is believed to be shallow at this floodplain area
- Rock coring up to 4m deep, if intercepted
- Rock Quality Designation (RQD)
- Field permeability test on rockmass intercepted (Packer Test)

Laboratory Test for Soil, Drainage Blanket, and Mine Waste:

- Atterburg limits (liquid limit, plastic limit, Plasticity Index)
- Permeability of clay
- Grain size distribution
- Permeability of drainage blanket material where D50 = 5mm
- Density of clay
- Density of sand
- Density of mine waste
- Sulphate soundness test for blanket drain material
- Pinhole test for clay
- X-ray diffraction for clay
- Void ratio for clay
- Tri-Axial with pore pressure for clay
- Direct shear test for clay
- Unconfined Compressive Strength (UCS) for clay
- Absorption test for mine waste
- X-ray diffraction for mine waste
- Petrographic analysis for mine waste

Laboratory Test for Rock Cores:

- Specific gravity
- Unconfined Compressive Strength

As explained above, the idea of a water retention tailings dam instead of a typical beach-type is to prevent the oxidation of tailings by oxygen ingress. When the tailings are stored under water, the reduction in oxidation is about 25,000 times less and the production of sulphate (SO_4) in the water (supernatant coming out of the spillway and as seepage caught by the blanket drain) is maintained at a minimum. Also since our available filter drain material on site may most likely be sourced from the limestone or limestone-marblelised quarries, the production of precipitates that may blind the carbonate-type underdrain is minimised significantly.

24.1.2.3.2. TSF - Existing

24.1.2.3.2.1. Re-Activiation of Existing TSF at BYG

The possible resumption of the old TSF to accommodate any future tailings from the operation of BYG Pit, the Bekajang and Krian deposits is subject to the result of the on-going validation of its structural integrity at current state (deactivated state).

A preliminary report summary will be prepared in-house after all the tests needed have been concluded. The in-house report will then undergo 3rd party review for any gaps, errors, corrections up to validation and certification. A discussion with the 3rd party may also lead to further stability analysis extending to an increased embankment height scenario to accommodate future tailings, both for operational and deactivation stages.

At the current there is only around 283,000 m^3 of remaining volume for the containment of tailings inside the pond while maintaining the present freeboard of about 1.7 m based on the existing pond water level compared to the crest level of SE dike.

Figure 24-10 - Remaining Impoundment areas at Existing TSF and *Table 24-5 - Tailings Production Estimate - BYG Pit* below are the approximate lay-out of the pockets of remaining impoundment areas inside the Bekajang TSF pond, and the estimate of tailings expected to be generated from the resumption of mining at the old BYG Pit. Volume of tailings estimated is based on the latest mining schedule and concentrate mass pull-out percentage from the flotation process.

Figure 24-10 - Remaining Impoundment areas at Existing TSF

Year	Units	Year 1	Total Average
Working days	days	203	202.75
Milling rate	t/d	4,000.00	4,000.00
	t/y	811,000.00	811,000.00
Mill grade	gAu/t	3.34	3.34
Recovery %	Au	77.00%	77.00%
Flotation concentrate	t/d	200.00	200.00
	t/y	40,550.00	40,550.00
Production	oz Au/y	67,057.78	67,057.78
To tailings pond	flotation tailings, t/d	3,800.00	3,800.00
	flotation tailings, t/y	770,450.00	770,450.00
	gAu/t	0.81	0.81
	tails slurry, m³	1,971,601.54	1,971,601.54
	tails solids, m³	540,673.14	540,673.14
	tails slurry, m³ (final settled volume)	870,928.56	870,928.56
	ore density, t/m³	2.40	2.40
	flotation tails density, t/m³	1.12	1.12
	% solids by weight	35.00%	35.00%

Table 24-5 - Tailings Production Estimate - BYG Pit

At its current state, the remaining 283,000 m^3 capacity of the TSF pond to accommodate total tailings slurry of 870,930 m^3 at settled density is not enough. Certainly, we have to complete all the in-situ soil geotechnical tests first and validate the dam's structural integrity in terms of slope stability analysis, stress and strain analysis as upstream-type construction dam, seepage analysis if any, and safety factor against sliding prior to any decision to utilise it once more as tails impoundment site.

Once the analysis is complete and the findings are positive the option to increase the TSF capacity will be undertaken. If the analysis is not positive then the tailings will need to be accommodated in another TSF, likely at Jugan.

24.1.2.3.2.2. Current Investigation & Analysis of Existing TSF

The on-going soil geotechnical study on the old and deactivated upstream-type Bekajang tailings storage facility (BYG TSF) is focused on its structural integrity. The sites of concern within the impoundment area are the main embankment located in the north and at the far end to the SE is the dyke located within the once Bekajang lake, which eventually became a part of the whole BYG TSF. The dyke is serving as a cut-off structure that blocked the Bekajang Lake adjoining the Jebong Lake to the east.

The objectives of this undertaking is to establish the long term stability of the dam at its deactivated state, where the tailings are assumed to have consolidated (up to a point) since Bukit-Young Mine ceased operating, and if it can function once again as a tailings impoundment site for the Bukit-Young, Bekajang and Krian pits. Additionally, after the analysis it will be determined if the tailings infrastructure can accommodate the additional tailings requirement.

The work involves mainly the in-situ measurement of the soil used as embankment fill for the embankment and the dike. The in-situ measuring instruments are standard penetration test (SPT) up to rockhead depth, rock coring up to 4 metres depth starting from the rockhead depth, installation of standpipe piezometers and inclinometers as monitoring stations, field vane shear test of intercepted soft clays within the soil horizon, and cone penetrometer test. The various laboratory tests of disturbed and undisturbed soils samples and uni-axial testing of selected rock cores is part of the activity.

As from the last week of April 2013 to present, what has been completed to date is the wash-boring of twelve (12) SPTs at the main embankment and one (1) at the southeast dyke, rock coring at up to 4m depth, some field vane shear tests beside SPT locations that returned very low N values at some sections along their holes, installation of piezometers and inclinometers for the monitoring of the phreatic level and lateral movements in the embankment, if any. Currently on-going are the laboratory tests and the CPT tests.

Below in *Figure 24-11 - Existing TSF - In-Situ Measuring Points for TSF Assessment* is a layout of the proposed in-situ measuring points at the main embankment and SE dyke.

Figure 24-11 - Existing TSF - In-Situ Measuring Points for TSF Assessment

Four (4)of the five (5) inclinometers were slotted and keyed-in below 1.0 – 1.5 m the rockhead inside each of the SPTs located along the 2nd berm of the main embankment , and one (1) at the SE dyke. The objective of the inclinometers is to monitor any lateral movement of the embankment with respect to the rock unit beneath. Eight (8) of the total nine (9) piezometers, on the other hand, were fitted inside the SPTs done at the 1st and bottom berms of the main embankment while the other one (1) is located 2 m away from the inclinometer installed at the SE dyke. The piezometers will serve as monitoring points for phreatic surface passing through the embankment materials, if any.

Once all in-situ tests and laboratory testing have been completely done, there will be a semi-detailed if not a thorough in-house assessment on the structural integrity of the deactivated Bekajang TSF, followed by a 3rd party review.

24.1.2.3.3. Waste Landforms

24.1.2.3.3.1. Jugan – Waste Landform

As indicated above around 6.4 Mm^3 of mine waste will be required in the build-up of Jugan TSF. The remaining mine waste, around 3.4 Mm^3, will be stored in an engineered waste dump. The maximum slope on mine waste landforms required by the Malaysian Government is 37° as the angle of repose and the company will treat this as a local face slope, not as the overall. The waste landform will be constructed in three (3) lifts at 10 m height with 5 m berm for each lift.

It will be built in a bottom-up construction method where thin layers of about 0.5 m thick will be vibro-roll compacted up to 0.3 m in height. The loose spoils on the side slopes, on the other hand, will be trimmed at every 4 m height interval, placed on top of the dump, spread out thinly in layers and re-compacted. Vibro-rolling will be with the use of a smooth drum roller or a sheeps-foot where a maximum 95 % Proctor density is to be achieved. Compaction tests will be conducted at every 1 m lift either with the use of a nuclear density meter (NDM) or sand-cone replacement.

All the potentially acid producing mine waste (PAF) arriving on site will be vibro-roll compacted as well that for every stacked-up 1m height, they will be underlain by a meter thick non-acid producing mine waste (NAF). Clay-lining at the bottom of the waste landform (before the build-up) and during deactivation period (after its operating years) will be provided. There will also be clay-lining on the side slopes of the waste dump after the loose spoils have been trimmed and compacted. Progressive re-vegetation of slopes at every required 10m lift and after the clay-lining, as explained, will be carried out.

24.1.2.3.3.2. Bukit-Young – Waste Landform

Around 1.8 Mm^3 of mine waste will be stored in an engineered waste landform proximate to the SE part of the Bukit-Young Pit. Similar to Jugan waste landform, the Bukit-Young waste landform will follow the government stipulated 37° angle of repose for every 10 m lift.

Construction of the waste landform will be via bottom-up method where vibro-roll compaction and re-trimming of the batter slopes as explained above will also be employed. Compaction will be maintained at 95 % Proctor density.

The host rock in Bukit-Young Pit, or in Bekajang area as a whole, is carbonaceous in nature where it is classed by colour predominantly as medium-to-dark grey, argillaceous, crystalline limestone and pale-to-medium grey, fossiliferous, crystalline limestone.

The host rock is treated as non-PAF waste material in general although there was no static geochemistry test done so far in the samples. The sulphides are existent only within silicified ores found along the lithological contacts of shale and limestone and in limestone with intrusive-shale-limestone combination. Along the vein-type ores, on the other hand, in calcite with microcrystalline quartz and vughy quartz, the sulphides are non-observable in most occasions mainly due to the very fine-grain texture of this ore type. The carbonate, stockworks and quartz veins can measure from less than a centimetre thick to around 5 metres. All the sulphidic veins, except on one occasion, measure between 0.1 to 1.0 centimetres thick with sulphide contents ranging from 1 % to 5 %. The single sulphidic vein intercepted in a drillhole measured around 2.75 metres thick and contains 7 % sulphide. All the different ore types, however, will undergo gold beneficiation at the plant where the tailings will end up under water inside the Bekajang tailings pond.

Although the host rock is treated as non-PAF waste material, the 1.4 % sulphides cut-off on NAF applied in Jugan will also be adopted for the Bukit-Young waste characterisation. The same arrangement of waste placement and management practice to be applied in Jugan waste landform will also be adopted in the Bukit-Young waste landform.

24.1.3. Design Recommendations

Under each of the following sub-sections are the design recommendations as supplied by the geotechnical/geomechanical team. These are either designed and as modelled and analysed or are generic principles until such time as they are modelled, analysed and recommended.

24.1.3.1. Open Pit

24.1.3.1.1. Jugan Open Pit

The Jugan Pit will employ varying pit slopes based on the RMR values and structural orientations per sector, i.e. for the E-SE slope and W-NW slope, and RMR values per elevation as the pit progresses to its final economic mining depth. Moreover, the Jugan Pit will be mined in flitches of every 2.5 m height only thus if the actual situation in the field requires any adjustments in the cut slope early on, which eventually affects the pit slope up to a point, can be carried out immediately before a single bench reaches its full height of 15 m. General details of the pit design based on the results of the geotechnical modelling were previously discussed in *Section 19.2.1.3*.

Anywhere between 30 mRL down to 0 mRL, a 40° pit slope will be maintained all throughout the pit. Starting at 0 mRL down to -25 mRL on the W-NW side of the pit, the pit slope will be around 44° starting midway up to final pit boundary. Between -25 mRL down to -55 mRL, the pit slope will adjust anywhere between 44° and 48°. By -55 mRL down to the bottom of the pit at RL -145m, the 48° pit slope will be maintained up to the W-NW pit limit boundary. The geological structures at this side of the pit are generally steeply dipping towards the slopes, which is favourable for stability, though some of the structures may change in dip-direction at depth since they are labelled as conjugate faults. We expect some slight adjustments in terms of cut slope and direction of the cuts (i.e. slightly acute/obtuse to the strike direction of the structure or ground support by cable-bolting) when the structures dip away from the slopes.

On the E-SE sector, on the other hand, starting from the surface at approximately 30 mRL down to -35 mRL, a pit slope of 40° will be maintained at the final pit limit. The reason for adopting this is mainly due to the very poor RMR values at this sector. Around 0 mRL to -35 mRL though, midway towards the final pit limit, the pit slope varies from 40° to 44° depending on the RMR values of the rockmass encountered. From -35 mRL down to -65 mRL at the pit limit boundary, the pit slope will be highly variable between 40° to 44°. By -65 mRL to -85 mRL, the pit slope will vary from 44° to 48°. From -85 mRL down to the pit bottom, a 48° pit slope will be maintained. The geological structures at this side of the pit are generally steeply dipping away from the slopes, which is “conditionally” unfavourable for stability. When the cut slope is steeper than the structure’s dip and when the slopes are excavated parallel to the strike of the structures then slope stability is compromised. Actual mining at this sector as carried out per 2.5 m high flitch will be slightly acute or obtuse to the strike direction of the structures. Any required slope improvements as we go along, e.g. slope adjustment, ground support by cable-bolting, and provision of weep holes will be carried out accordingly.

24.1.3.1.2. Bukit-Young Open Pit

The current Bukit-Young Pit design is based on a 10 m high slope x 5 m wide berm and maintains a consistent 47° pit slope all throughout from RL 30m down to RL -50m. This design was based on the previous pit optimisation run that uses the overall 66.5° cut slope and 47° pit slope. However, before the economic model was made for the Bukit-Young pit optimisation we already have a general idea on the strength of the rock masses and their RMR ratings thus a steeper 66.5° cut slope was initially adopted.

A design revision using a 15 m high slope x 5 m wide berm is underway. The difference though from the current model will be as follows:

From RL 30m down to RL 0m the pit slope will be at 44° and from RL 0m down to the bottom at RL -50m the pit slope will be 48°.

The major geological structures in the Bekajang/Krian area where the Bukit-Young Pit is situated are striking NNE and steeply dipping towards NW. We expect that the trends of these structures are consistent at depth and appear to be non-conjugate faults. As mentioned above, the Bekajang/Krian project is still three (3) plus years down the line. The semi- to detailed surface structural mapping and subsurface structural modelling in this area will be part of the project schedule into the near future. By then, we would have a better interpretation and more vivid presentation of these geological structures in question and have more confidence in incorporating them in detail into the whole geotechnical modelling.

Similar to the mining in Jugan, actual mining will be carried out per 2.5m high flitch and as such, any required slope improvements as we go along, e.g. slope adjustment, adjustment in direction of the slope cut, ground support by cable-bolting, and provision of weep holes will be carried out accordingly.

24.1.3.2. Tailings Storage Facilities

24.1.3.2.1. TSF – Proposed

The Jugan TSF has been designed in-house to internationally acceptable standards (Australian New Zealand Committee on Large Dams (ANCOLD) Guidelines) to provide a facility for the safe and environmentally acceptable containment of process tailings. To further ensure its structural integrity, the company will engage a 3rd party review. An internationally and nationally recognised dam designer and construction consulting company will be selected to do the review and validation of the proposed TSF. Furthermore, the consultant will be involved during the construction process, providing construction advice along the way, and ensuring adherence of the local dam contractor to QA/QC standards. Thereafter, prior to the operation of the facility, a certification would have to be issued by the consulting company.

The TSF design has also taken into account the requirements for progressive rehabilitation by grassing during its operational years and towards the end of mine life, and its reclamation and further re-greening during its deactivation and closure stage.

The criteria considered in the design of the TSF are the following aspects:

- Structural integrity or physical stability both on static condition and pseudo-static loading coming from the nominal 475-year earthquake event in Sarawak;
- Groundwater protection;
- Maximised drying or desiccation of tailings through an effective use and placement of appropriate blanket drain materials combined with an open spillway system;
- Maximised tailings consolidation;
- Maximised use of borrow materials from the TSF basin;
- Maximised use of mine wastes as added source of borrow materials on a cost-effective manner ; and
- Safety against overtopping based on a peak 100-year rainfall event.

24.1.3.2.2. TSF – Dam Seepage Analysis

Seepage analyses were carried out for each of the three (3) stages of the TSF to estimate the seepage through the dam for the purpose of sizing and positioning of the blanket drain layer, as well as examining the foundation seepage and the effectiveness of the HDPE liner that is intended to be placed from the basin's floor to 3.0 metres above it, i.e. 20 mRL to 23 mRL.

The seepage analyses were based on the hydraulic conductivities of the foundation strata, embankment fill and tailings derived from external references as well as dam engineering experience with relatively quite similar materials used in numerous tailings dam constructions experience in the recent past. Moreover, some auger drilling was done in the area for the purpose of exploration where samples from soil profile B horizon (clay derived from weathered shale) were submitted for soil mechanics laboratory analyses. The depth/thickness of the intercepted weathered B horizon, where A horizon is the topsoil, was about 3.0 metres thick extending towards the transition zone (C horizon) prior to the Shale bedrock.

The seepage analysis and estimates on various stages were done using a finite element application, SEEP/W. The analysis provided a picture of the movement of the seepage starting from the tailings that contain around 65 % water by weight upon deposition through the embankment and finally through the gravel blanket drain conduit. The pore-water or pressure head distribution throughout the discretised area was also provided for each analysis. The seepage analysis indicated that very minimal to nil amounts of seepage may get through the foundation, mainly because of the presence of the non-permeable HDPE liner coupled by the non-permeable nature of the foundation and the placement of the gravel blanket drain relatively near to seepage sources.

For Stage 1, a one (1) metre thick blanket drain extends from the bottom at an idealised elevation of 20 mRL and will branch-out up to 25 mRL where it is just distanced 10 m to the tailings interface with the upstream embankment outline. The same arrangement will be used for Stage 2 since it will have the same height as Stage 1, with volume of impoundment increasing laterally due to the TSF aerial extension. Stage 3, on the other hand, will be provided with an additional 1m thick branch up to 35 mRL, also just 10 m close to the tailings interface. All of the finger drains' branching up are connected to the 1.5 m thick blanket drain main line at 20 mRL. *Figure 24-12 - TSF: Stage 1 - Finite Element Model for Seepage Analysis* to *Figure 24-20 - TSF: Stage 3 - Seepage Flow Vectors* shows the section of the seepage analyses for Stages 1 and 3. In the figures, the flow vectors are magnified several thousand times to show how seepage flows from high-pressure low permeability zones to low-pressure zones and high permeability conduits (gravel blanket drain), and how the seepage or groundwater height goes down thus effectively lowering the pore-water pressure in the embankment to increase the dam's structural stability.

Furthermore, the flow vectors themselves also provide an indication as to how the tailings are desiccated. It should be noted, however, that the presence of an open spillway system at 26 mRL (for Stages 1 and 2) and at 38 mRL (for Stage 3), to handle excess supernatant discharge, and mainly, to prevent dam overtopping from rainfall run-off was not incorporated into the analysis. It is believed that the target settled density of 1.70 t/m3 is achievable based on the results of the seepage analysis. Drying of the tailings from 65 % by weight water content, or about 83 % by volume, down to about 34.6 % by weight water content can be achieved not only because of the presence of a gravel blanket drain but also due to the presence of an open spillway system at each stage in the dam construction and during operation.

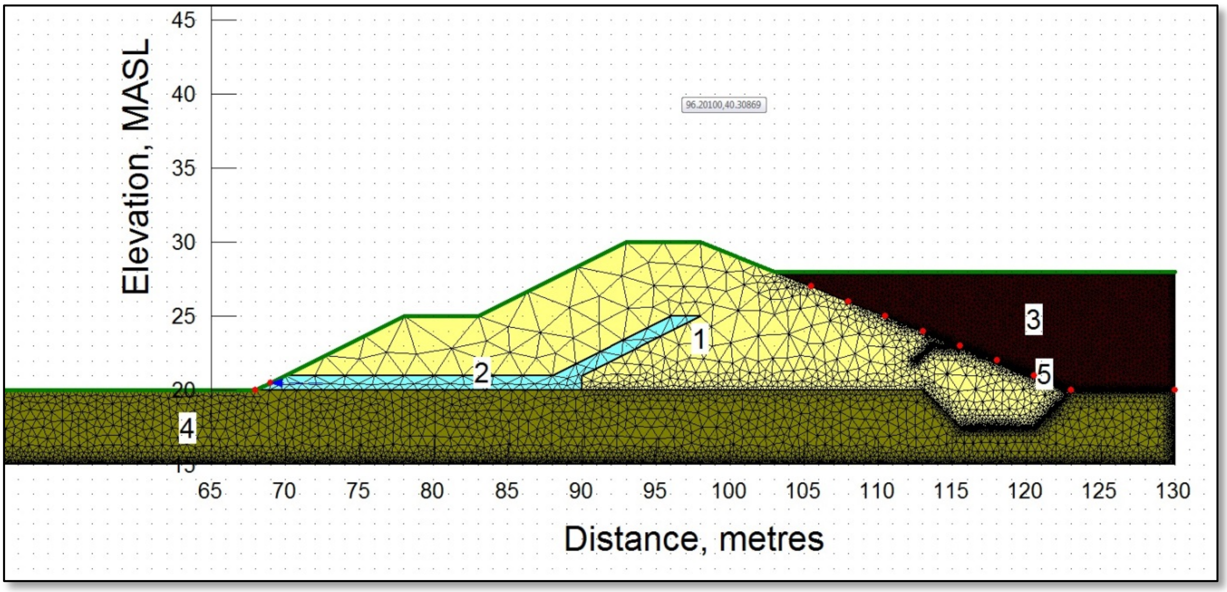


Figure 24-12 - TSF: Stage 1 - Finite Element Model for Seepage Analysis

Figure 24-12 - TSF: Stage 1 - Finite Element Model for Seepage Analysis above shows the different zones; Zone 1 – TSF embankment (light yellow), Zone 2 – Gravel blanket drain (aqua blue), Zone 3 – Stage 1 tailings (dark brown), Zone 4 – Foundation (greenish brown) , Zone 5 – HDPE liner (black). Red dots represent the boundary conditions outlining where varying hydrostatic pressure at depth is applied. The red dots at the left-hand side of the model, located at the toe of the downstream side where the blanket drain discharge section is located indicate the seepage face.

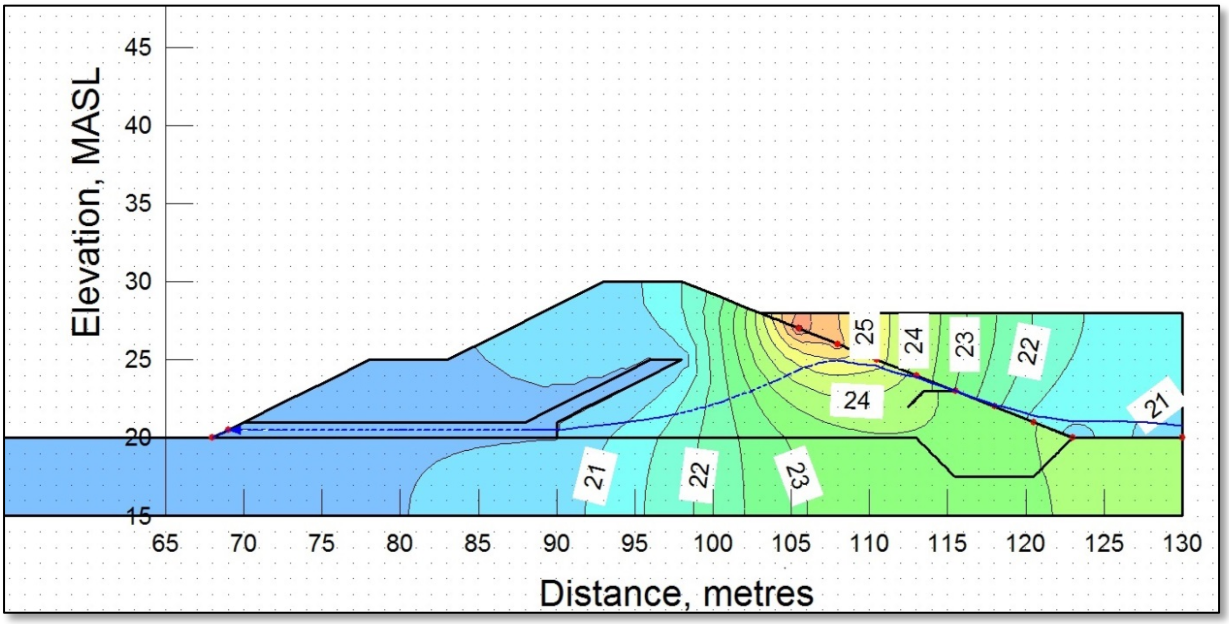


Figure 24-13 - TSF: Stage 1 - Seepage Analysis Results Based on Head

In *Figure 24-13 - TSF: Stage 1 - Seepage Analysis Results Based on Head* above, the phreatic line or groundwater seeping into the embankment towards the gravel filter drain is indicated in dashed outline (blue colour).

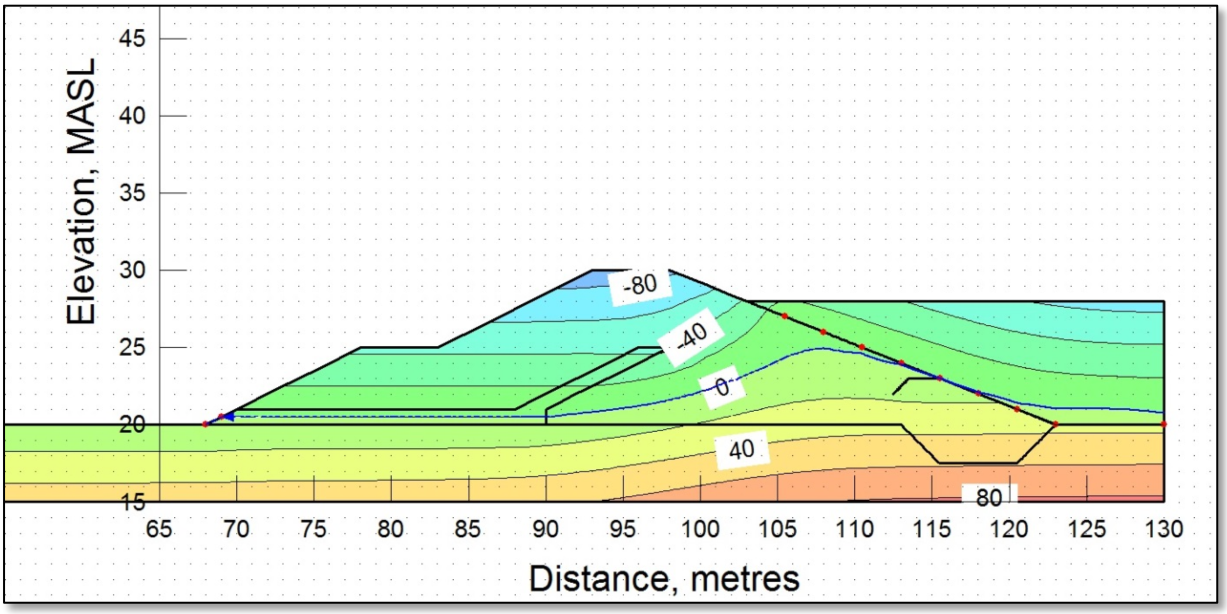


Figure 24-14 - TSF: Stage 1 - Seepage Analysis Results Based on Pressure (kPa)

In *Figure 24-14 - TSF: Stage 1 - Seepage Analysis Results Based on Pressure (kPa)* above, the zero (0) pressure indicates where the phreatic/groundwater level is located.

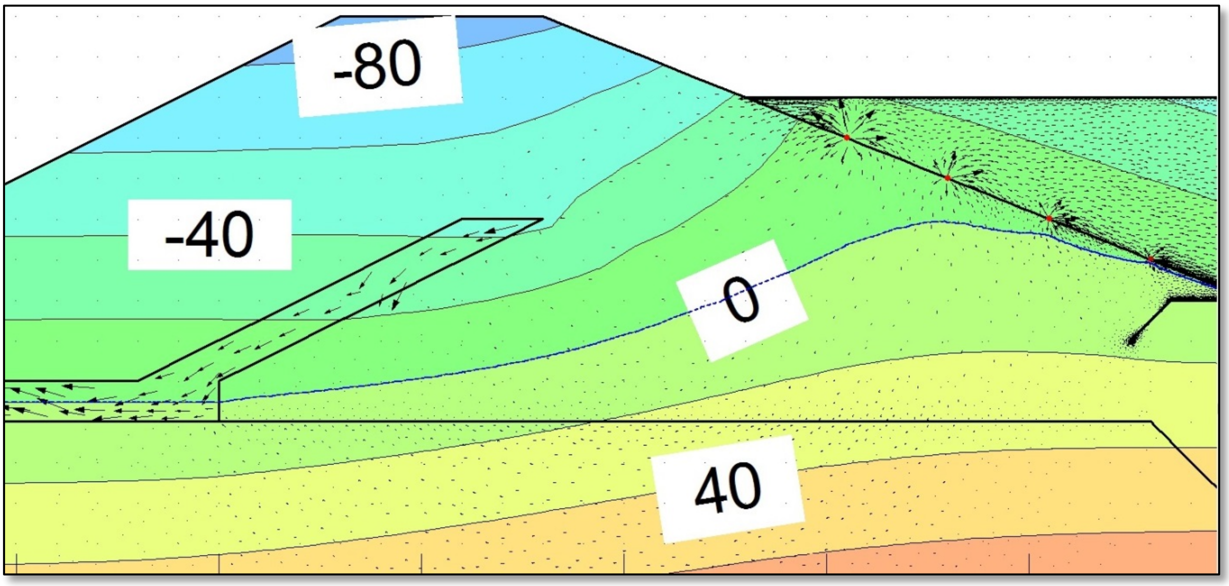


Figure 24-15 - TSF: Stage 1 - Seepage Flow Vectors

In Figure 24-15 - TSF: Stage 1 - Seepage Flow Vectors above, the seepage flow vectors that are directed from high pressure towards the zero (0) pressure where the gravel filter drain is located effectively lowering the groundwater table in the process. The vectors are magnified 300,000x where 1mm = 1.67 x 10^{-6} m/sec.

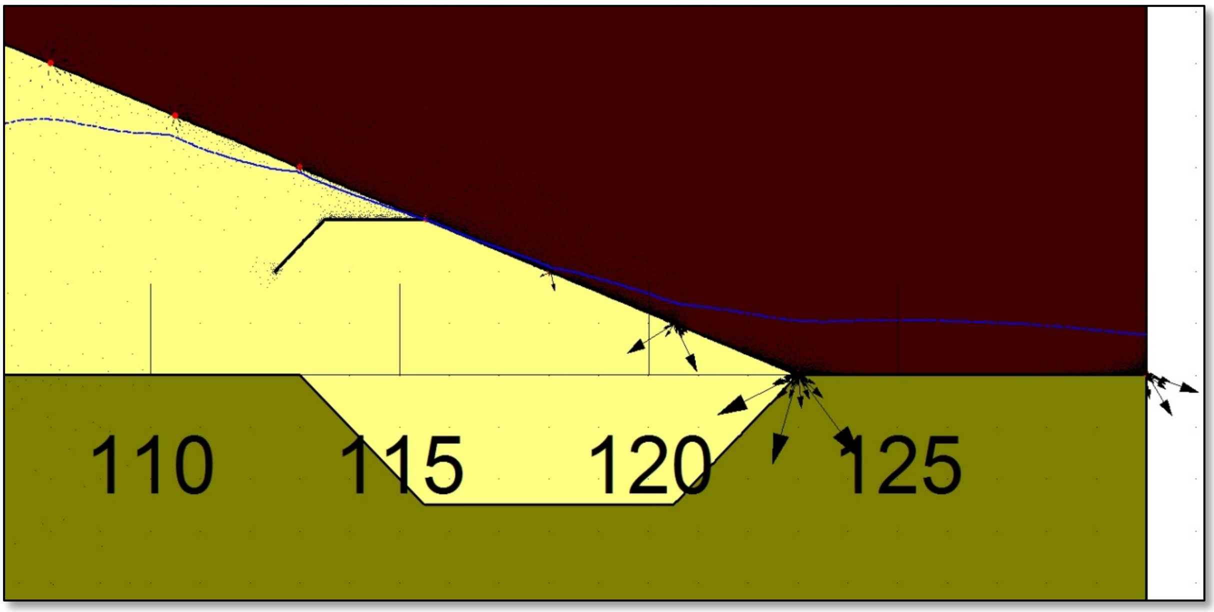


Figure 24-16 - TSF: Stage 1 - Seepage Flow Vectors at HDPE Liner

In *Figure 24-16 - TSF: Stage 1 - Seepage Flow Vectors at HDPE Liner* above, shows the seepage flow vectors supposed to permeate through the HDPE liner. The absence of vectors beneath the liner into the foundation basin and convection thereafter into the gravel blanket drain indicates zero seepage into the basin exactly beneath the liner. The vectors are magnified 100,000x where 1mm represents a seepage rate of 5.00 x 10^{-6} m/sec.

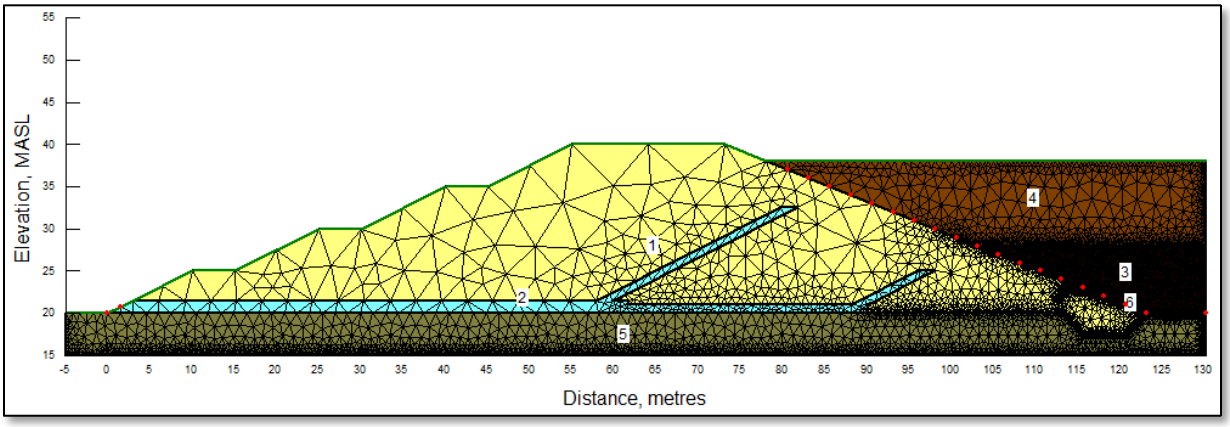


Figure 24-17 - TSF: Stage 3 - Finite Element Model for Seepage Analysis

In *Figure 24-17 - TSF: Stage 3 - Finite Element Model for Seepage Analysis* above, shows the different zones; Zone 1 – TSF embankment (light yellow), Zone 2 – Gravel blanket drain (aqua blue), Zone 3 – Stage 1 tailings (dark brown), Zone 4 – Stage 3 tailings (light brown), Zone (5) – Foundation (greenish brown) , Zone 6 – HDPE liner (black). Red dots represent the boundary conditions outline where varying hydrostatic pressure at depth is applied. The red dots at the left-hand side of the model, located at the toe of the downstream side where the blanket drain discharge section is located indicate the seepage face.

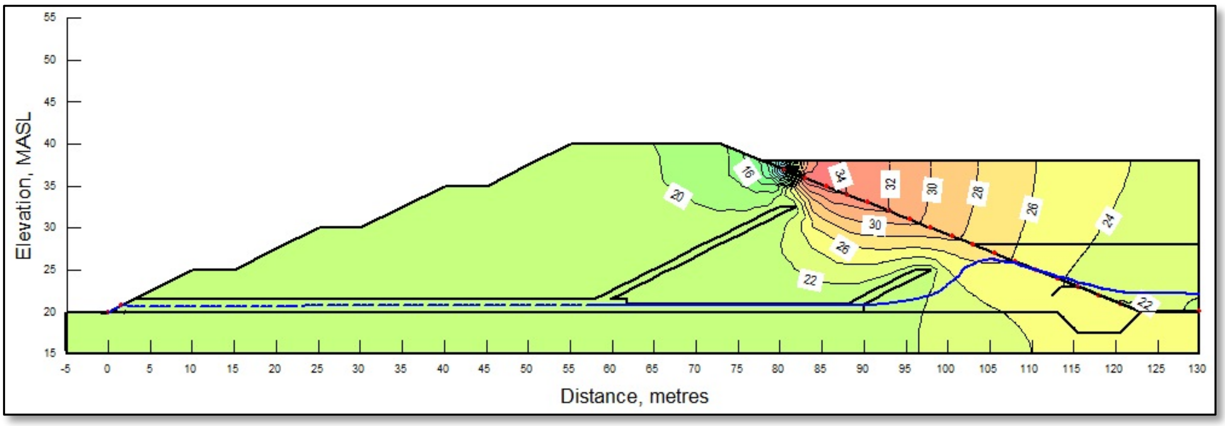


Figure 24-18 - TSF: Stage 3 - Seepage Analysis Results Based on Head

In *Figure 24-18 - TSF: Stage 3 - Seepage Analysis Results Based on Head* above, the phreatic line or groundwater seeping into the embankment towards the gravel filter drain is indicated in dashed outline (blue colour).

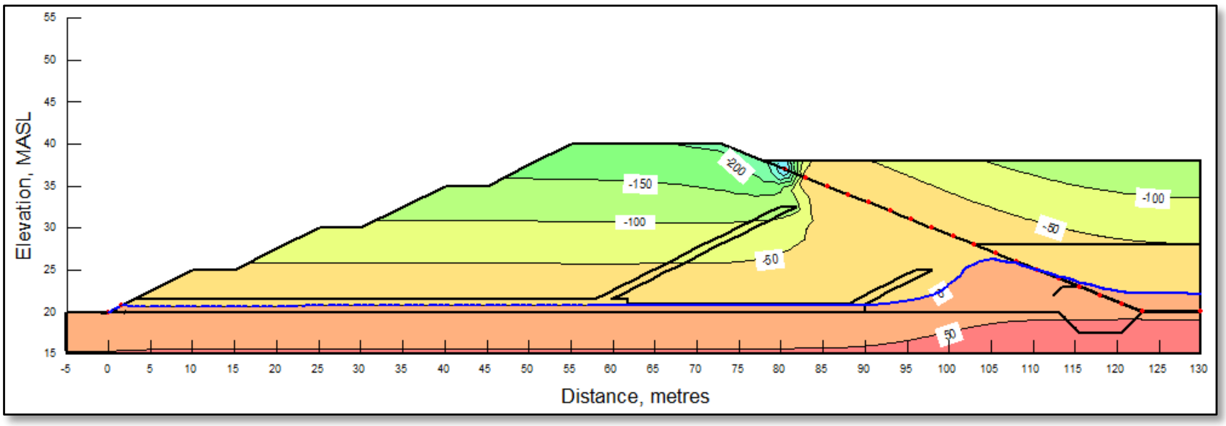


Figure 24-19 - TSF: Stage 3 - Seepage Analysis Results Based on Pressure (kPa)

In Figure 24-19 - TSF: Stage 3 - Seepage Analysis Results Based on Pressure (kPa) above, the zero (0) pressure indicates where the phreatic/groundwater level is located.

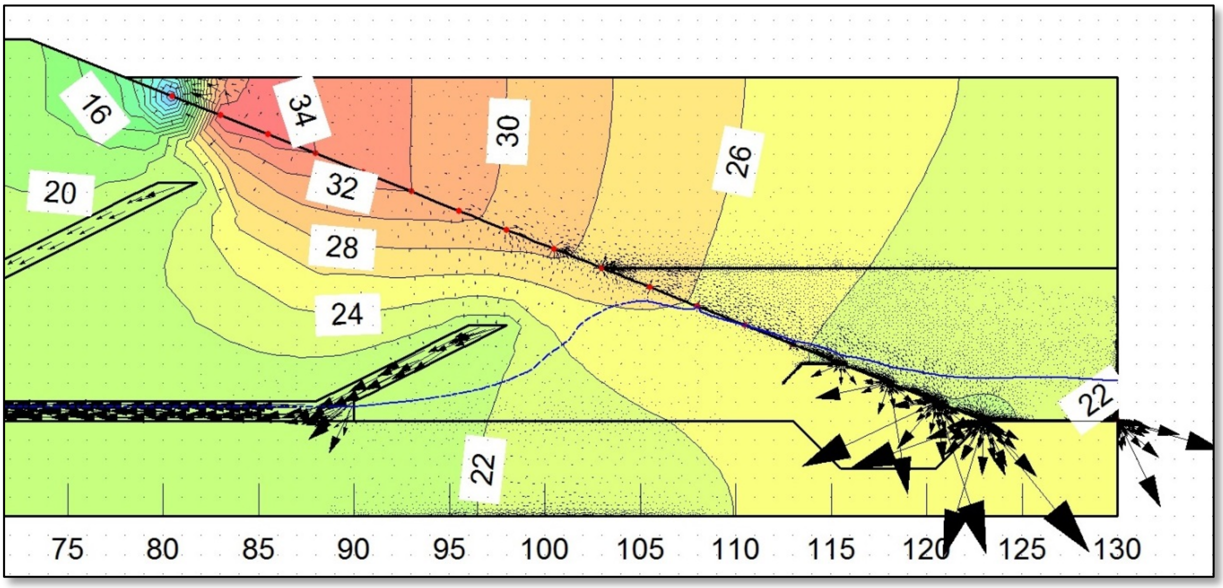


Figure 24-20 - TSF: Stage 3 - Seepage Flow Vectors

In *Figure 24-20 - TSF: Stage 3 - Seepage Flow Vectors* above, the seepage flow vectors directed from high head to the lowest head (20 mRL), where the gravel filter drain is located effectively lowering the groundwater table in the process. The vectors are magnified 250,000x where 1 mm means a seepage rate of 2.0 x 10^{-6} m/sec. The absence of flow vectors beneath the HDPE liner into the foundation basin and absence of convection within that discrete section indicate zero seepage into the basin exactly beneath the liner.

On the other hand, those very slow moving vectors that we see some distance away from the liner and permeating downwards from the tailings and seemingly seeping into the foundation are actually convecting upwards again towards the blanket drain, where the low head (20 m) or zero pressure zone is located. Thus almost all of the seepage from the tailings, if not all, are caught up by the filter drain.

24.1.3.2.3. TSF – Dam Stability Analysis

The total pressure head values and the resulting groundwater level from the SEEP/W were incorporated into the limit-equilibrium slope stability analysis software SLOPE/W.

By examining the results of the slope stability analyses given in the succeeding pages, it may be concluded that the TSF design complies with all the Acceptable Factors of Safety stipulated under the Australian New Zealand Committee on Large Dams (ANCOLD) Guidelines on Tailings Dam Design, Construction and Operation. The recommended minimum factors of safety (F of S) for tailings dams at every perceivable loading condition during dam operation and post-operation are as follows:

- Steady seepage at high pool level – 1.5
- Rapid drawdown from pool level – 1.2 (see Note 3)
- Earthquake (high pool for downstream slope, or at intermediate pool for upstream slope – 1.1 for pseudo-static analysis (see Note 4 and Section 6.12)
- Construction conditions, either slope 1.3 or 1.1 (see Note 5)

Note 1 – Values are quoted by the National Research Council (1983) from the US Corp of Engineer's requirements.

Note 2 – The Bishop Simplified method (or equivalent, i.e. Spencer, Fredlund and Krahn, Janbu Generalised, Morgenstern and Price, and Sarma methods) must be used.

Note 3 – F of S for undrained analysis only. If analysed using pore pressure from transient seepage analysis, use an F of S of at least 1.4.

Note 4 – The pseudo-static analysis is only for a preliminary screening evaluation of the stability condition. US Corp of Engineers suggest F of S of 1.1 post-earthquake using post-liquefaction strength.

Note 5 – If saturated soil parameters are assumed.

Note 6 – Whichever gives the more critical situation.

Under Note 6, particularly in section 6.12, the Operating Basis Earthquake (OBE) for tailings dams should generally be governed by the following criteria in terms of dam size and hazards it pose to the environment, subject to ANCOLD 1998:

- A one (1) in 50 Annual Exceedance Probability (AEP) event for Low Hazard Dams – 2.00 % probability exceedance in any given year
- A one (1) in 100 AEP event for Significant Hazard Dams – 1.00 % probability of exceedance in any given year
- A one (1) in 1,000 AEP event for High Hazard Dams – 0.10 % probability of exceedance in any given year.

The US Global Seismic Hazard Assessment Program (GSHAP) provides expected earthquake acceleration for countries around the world over a return period of 475 years. The expected resulting peak ground acceleration (PGA) in Sarawak originating from any nearby earthquake generators is in the range or 0.40 m/s^2 to 0.80 m/s^2, or between 0.04 g to 0.08 g. The 475-year return period PGA range supplied by GSHAP means that there is a probability of exceedance of 0.21 % in any given year, or i.e. there is a chance that a PGA in any of these values will occur in the area at any given year.

The Maximum Credible Earthquake (MCE) in consonant to the OBE requirement under ANCOLD, or the Design Basis Earthquake (DBE) used for the Jugan TSF is based on the PGA values provided in the GSHAP. For the Jugan TSF, a 0.10 g was adopted for the slope stability analysis which is slightly greater than the maximum 0.08 g in the GSHAP. By statistical and hazard category in the ANCOLD 1998 criteria for OBE, the Jugan TSF's slope stability design assessment is based between the requirements for Significant Hazard Dams and High Hazard Dams.

Moreover, well compacted embankment dams constructed in clayey fill and rockfill are generally resistant to earthquake shaking, especially when constructed as downstream-types like the Jugan TSF will be built upon. It is the upstream-type of dams built or standing on hydraulically-placed sand fills that require careful design and detailing to withstand earthquake loading as they are susceptible to ground shaking because of their inherent less cohesive foundation properties where liquefaction occurs easily during earthquakes.

The soil parameters used in the stability analysis of the Jugan TSF and the F of S results in the upstream and downstream embankment sectors at static and pseudo-static conditions are provided in the next pages, in *Table 24-6 - TSF: Material Properties for Stability Analyses* and *Table 24-7 - TSF: Sectors and Factors of Safety* plus *Figure 24-21 - TSF: Stage 1 Downstream Sector F of S under Steady-State Seepage in Static Conditions* to *Figure 24-30 - TSF: Stage 3 F of S in Rapid Drawdown Condition*. For the analysis on Stage 3, however, the tailings impounded in Stage 1 is assumed to have a settled density of 16.67 kN/m^3 due to its relatively drier state as a result of its self-weight, effects of surface drying and the effects of the draining out of seepage through series of underdrain gravel blanket drains.

Material properties							
Type	Model	Unit weight, kN/m^3	φ vertical	φ horizontal	c vertical, kPa	c horizontal, kPa	τ/σ ratio
Embankment	Mohr-Coloumb	23.30	25.00	25.00	30.00	30.00	
Tailings	Shansep (overburden)	12.55					0.75
Pond water	No strength	9.81					
Foundation	Anisotropic	22.00	25.00	20.75	30.00	24.00	
Blanket drain	Mohr-Coloumb	22.00	34.00	34.00	34.00	34.00	
HDPE liner	Impenetrable	-	-	-	-	-	-

Table 24-6 - TSF: Material Properties for Stability Analyses

Dam stages	Sector	Safety factor
Stage 1 and 2	Downstream	2.093
	Upstream	5.452
	Downstream at 0.1g PGA	1.583
	Upstream with 0.1g PGA	3.133
	Rapid drawdown	2.016
Stage 3	Downstream	1.815
	Upstream	6.133
	Downstream with 0.1g PGA	1.393
	Upstream with 0.1g PGA	3.638
	Rapid drawdown	1.719

Table 24-7 - TSF: Sectors and Factors of Safety

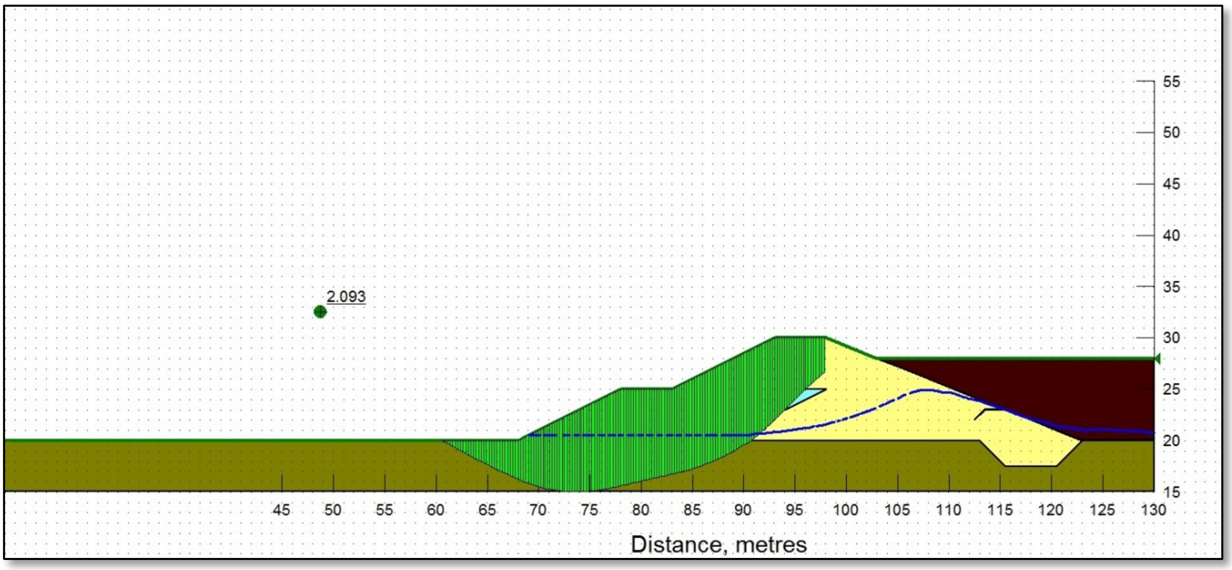


Figure 24-21 - TSF: Stage 1 Downstream Sector F of S under Steady-State Seepage in Static Conditions

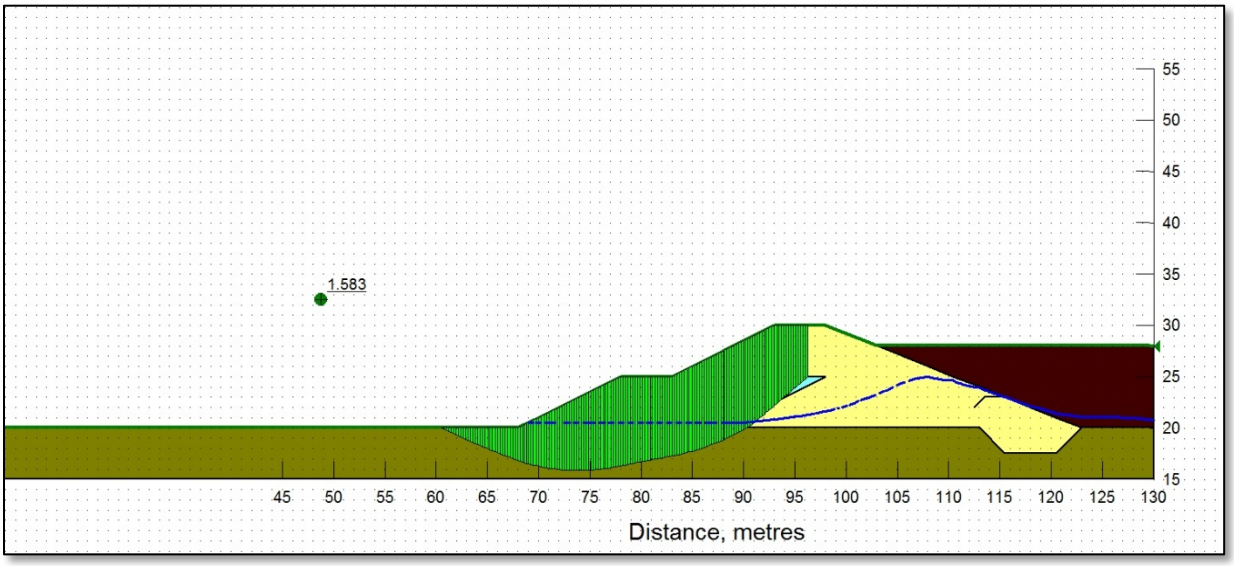


Figure 24-22 - TSF: Stage 1 Downstream Sector F of S under Steady-State Seepage in Pseudo-Static Conditions of 0.1g

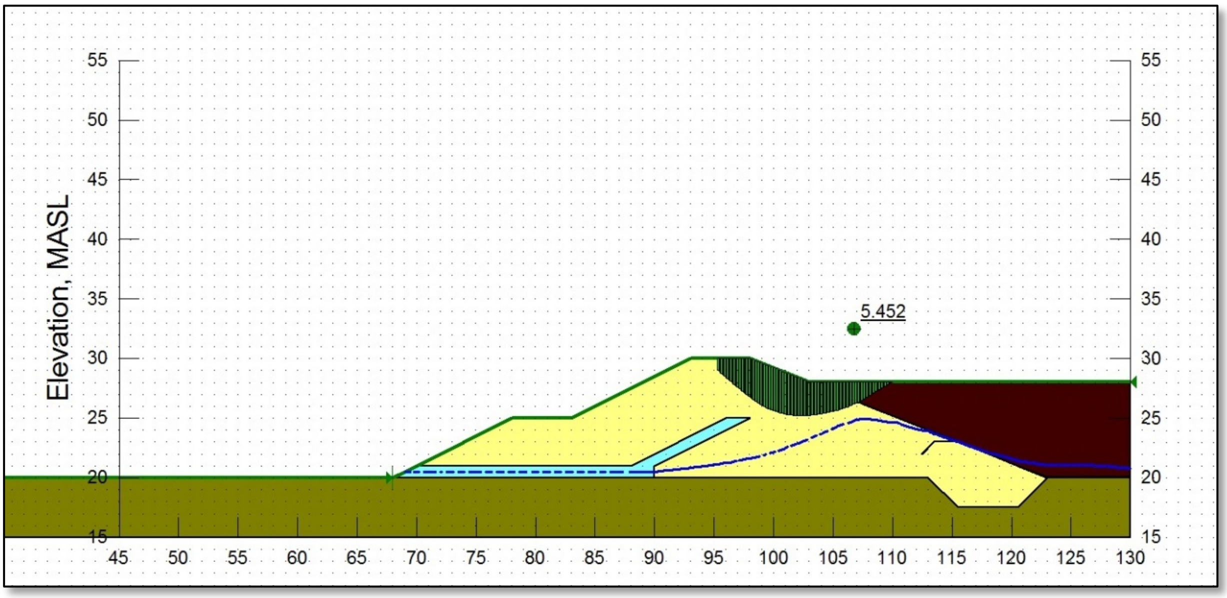


Figure 24-23 - TSF: Stage 1 Upstream Sector F of S under Steady-State Seepage in Static Conditions

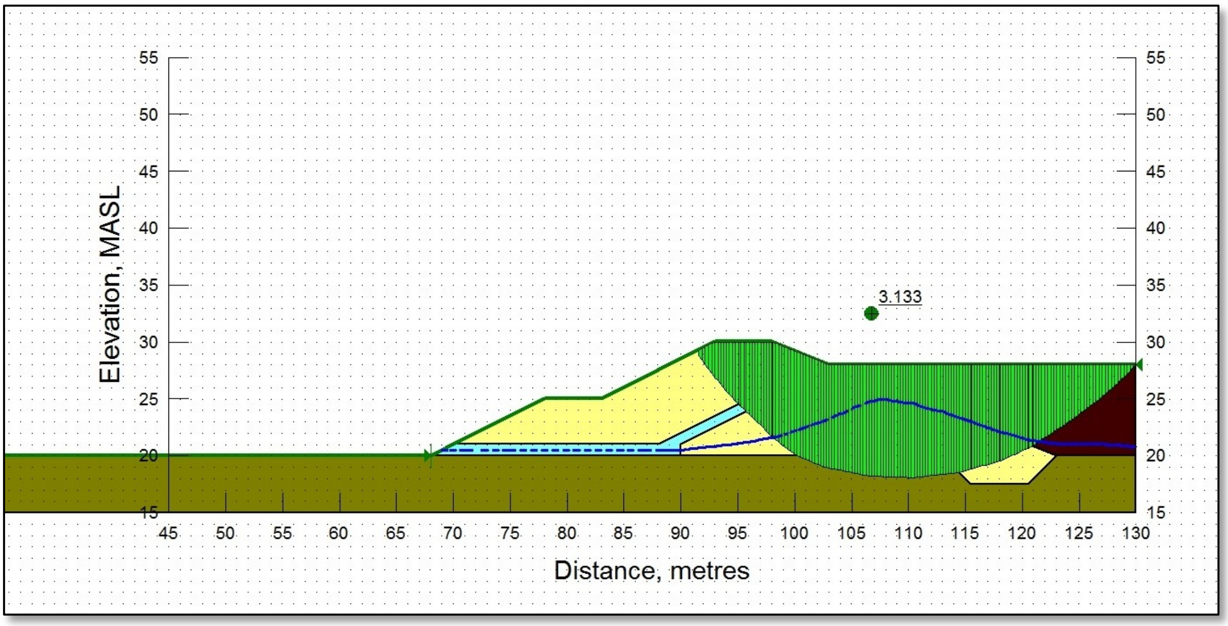


Figure 24-24 - TSF: Stage 1 Upstream Sector F of S under Steady-State Seepage in Pseudo-Static Conditions of 0.1g

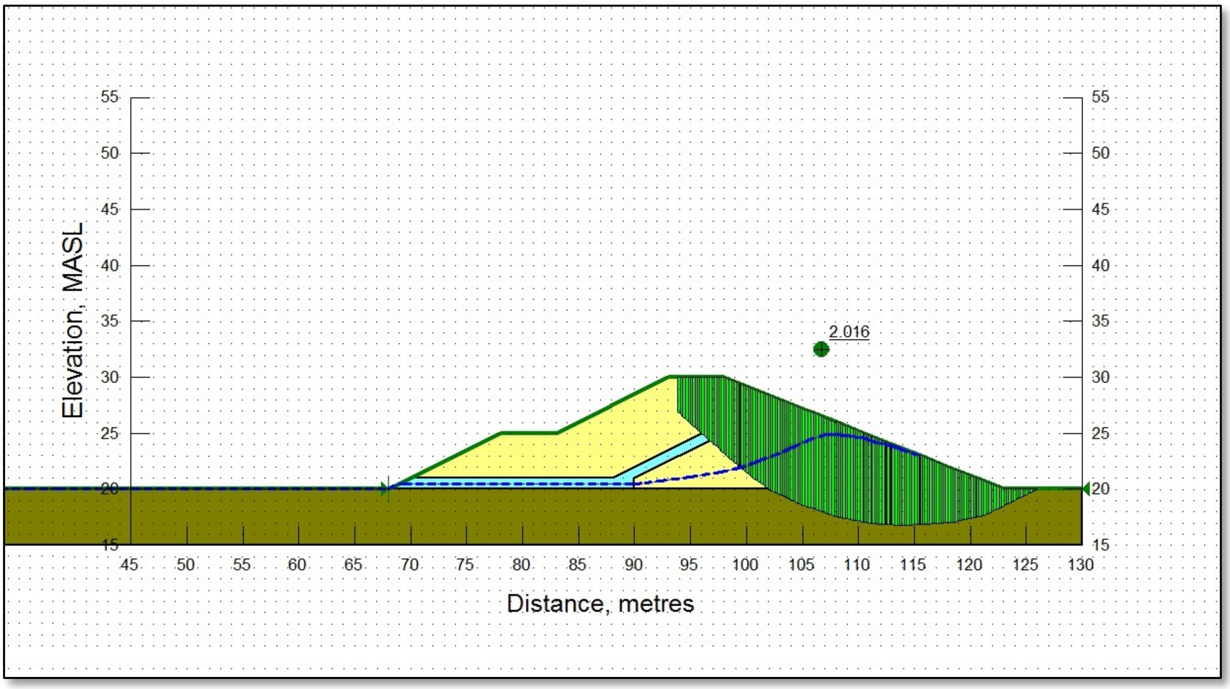


Figure 24-25 - TSF: Stage 1 F of S in Rapid Drawdown Condition

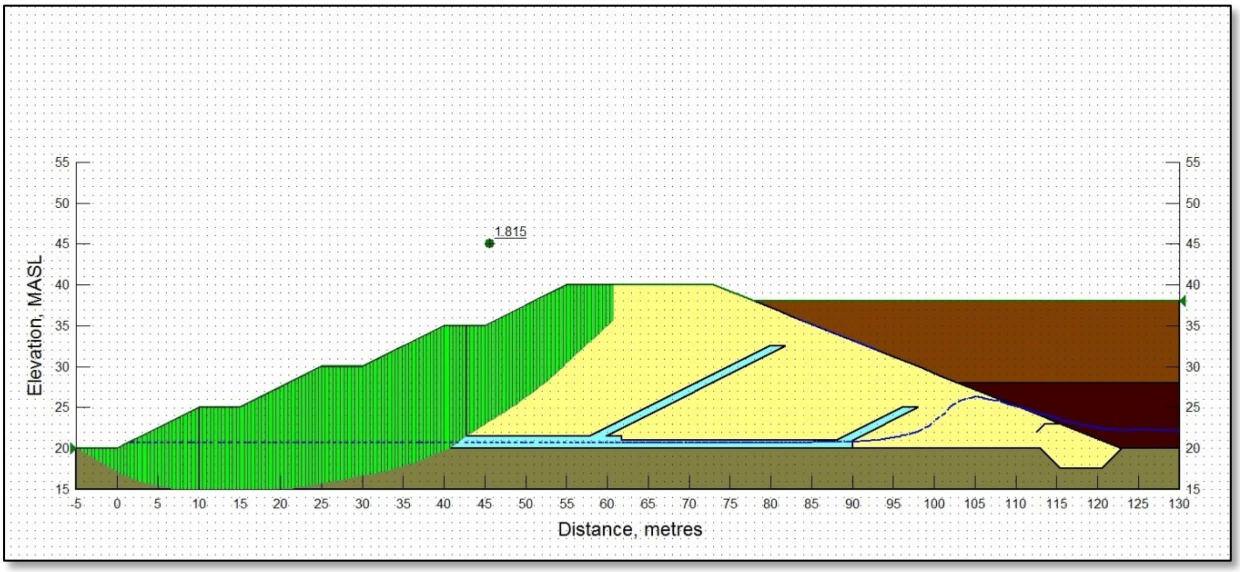


Figure 24-26 - TSF: Stage 3 Downstream Sector F of S under Steady-State Seepage in Static Conditions

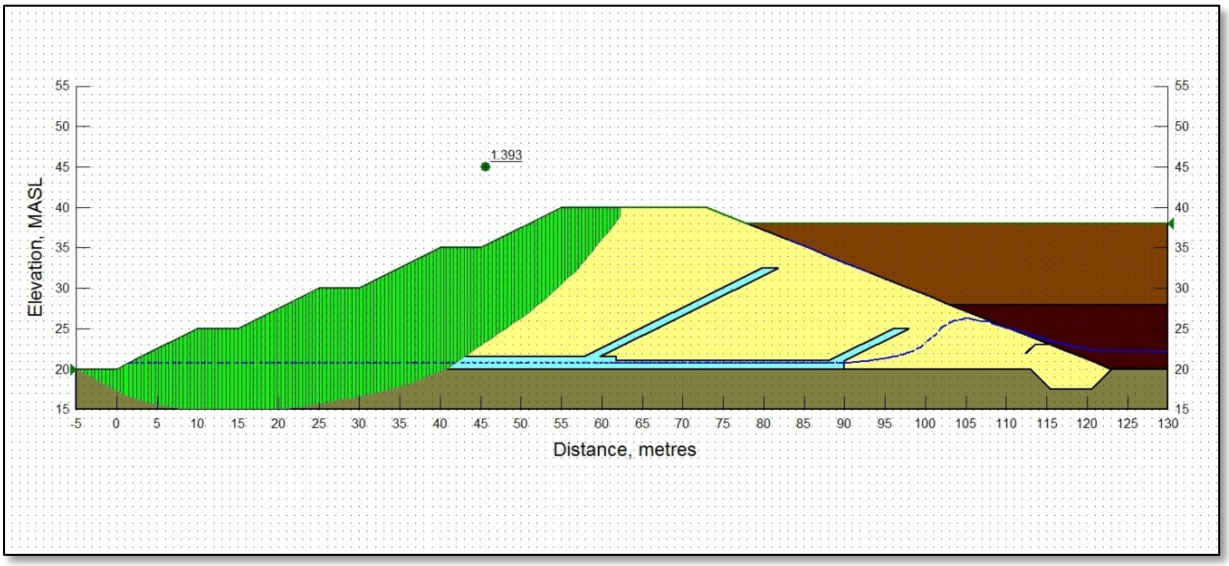


Figure 24-27 - TSF: Stage 3 Downstream Sector F of S under Steady-State Seepage in Pseudo-Static Conditions of 0.1g

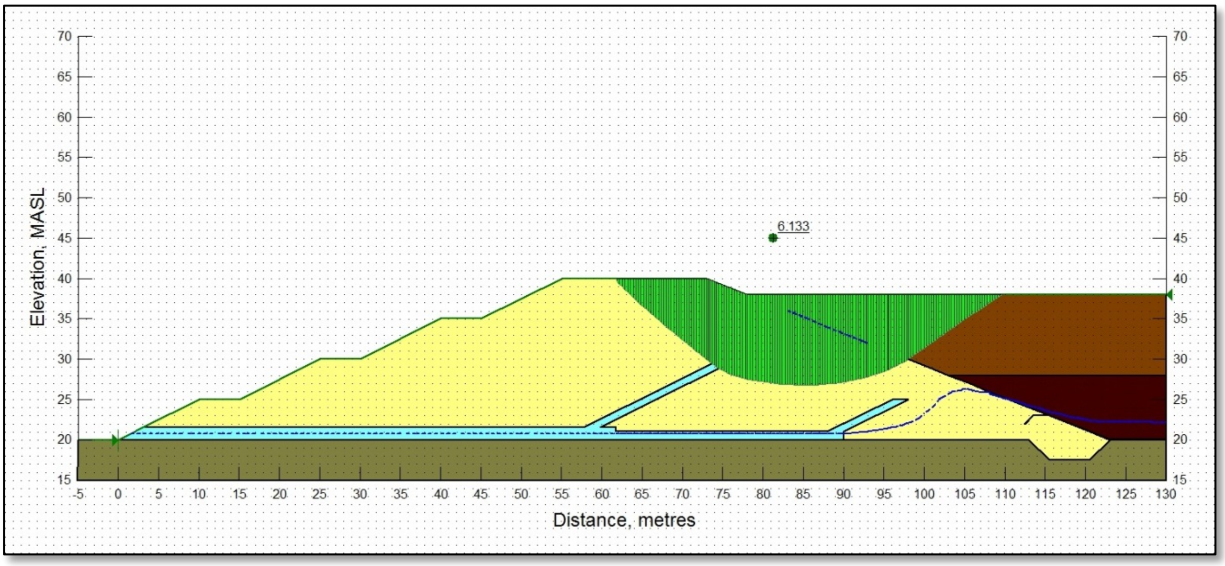


Figure 24-28 - TSF: Stage 3 Upstream Sector F of S under Steady-State Seepage in Static Conditions

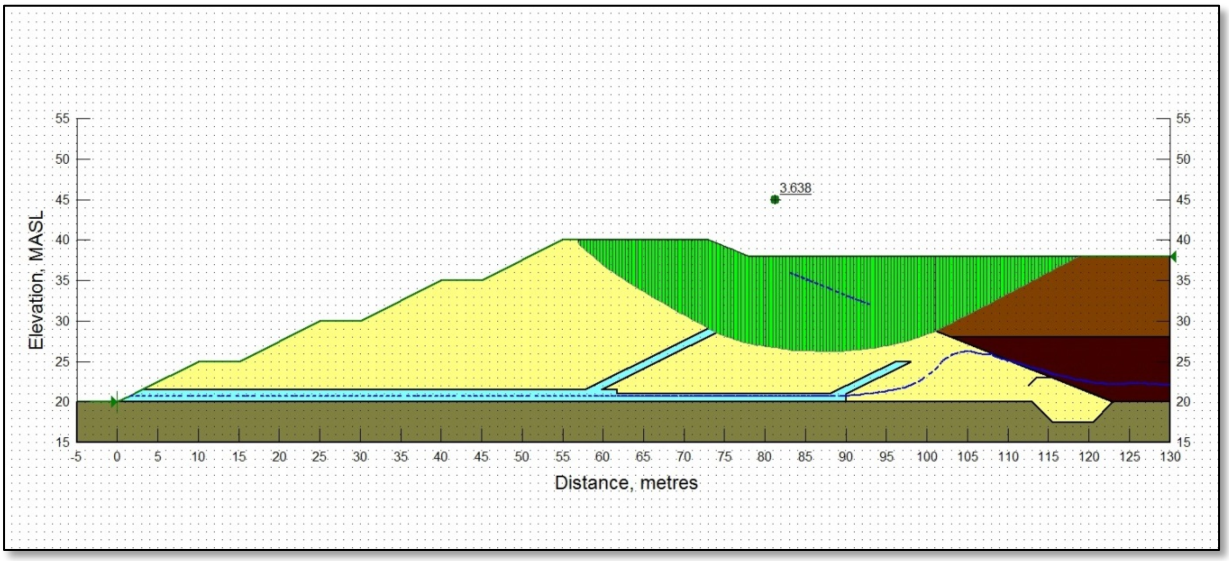


Figure 24-29 - TSF: Stage 3 Upstream Sector F of S under Steady-State Seepage in Pseudo-Static Conditions of 0.1g

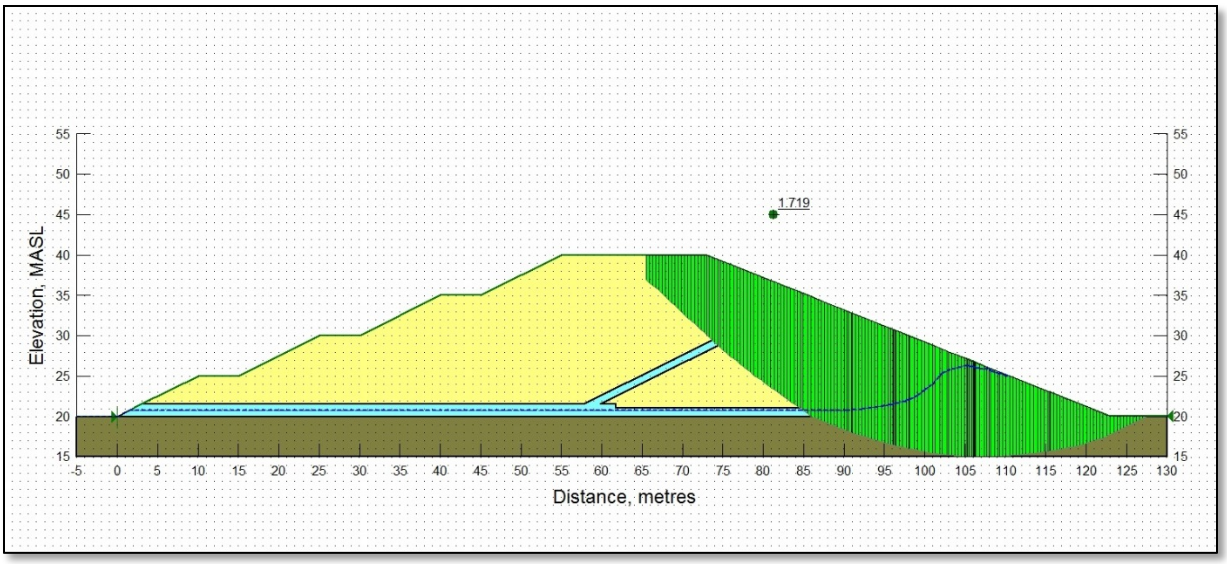


Figure 24-30 - TSF: Stage 3 F of S in Rapid Drawdown Condition

24.1.3.2.4. TSF – Soil & Rock Geotechnical Investigation Required

The following tests are central to any TSF detailed design and construction and are precursor to any foundation engineering design. These are deemed to be the most applicable for our objective of constructing a tailings dam in Jugan that is idealised to be also a water-retention structure throughout its operational stage.

<u>Soil Field Tests:</u>

1. Standard Penetrometer Test (SPT) up to zone of refusal
2. Collection of undisturbed samples by SPT
3. Cone Penetration Test or CPT (in selected areas following the SPT)
4. Field vane shear test on soft soils encountered by SPT
5. Field permeability test on soil
6. Test pitting in selected areas
7. Trenching – to observe preferential seepage pathway, if any, and identify unsuitable materials beneath the TSF, such as soft materials, swelling clays and potential abnormal constituents
8. Rock coring up to 4m deep, if intercepted
9. Rock Quality Designation (RQD)
10. Field permeability test on rockmass intercepted (Packer Test)

Laboratory Test for Soil, Drainage Blanket, and Mine Waste:

a) Atterburg limits (Liquid Limit, Plastic Limit, Plasticity Index)
b) Shrinkage Limit – to establish Shrinkage Index (Liquid Limit – Shrinkage Limit)
c) Void ratios at Liquid Limit and Shrinkage Limit
d) Grain size distribution
e) Permeability of clay and fill

f) Permeability of drainage blanket material where D50 = 50mm
g) Specific gravities of fill, clay and blanket drain materials
h) Sulphate soundness test for blanket drain material
i) Pinhole and Emerson dispersion tests
j) X-ray diffraction
k) Tri-axial with pore pressure
l) Unconfined Compressive Strength (UCS)
m) Absorption test
n) Petrographic analysis

Laboratory Test for Rock Cores:

I. Specific gravity
II. Unconfined Compressive Strength

Others tests:

- Detailed topographic survey
- Condemnation/sterilisation drilling on site
- Mapping of any exposed geological structures

24.1.3.2.5. TSF – Existing

As mentioned above, the possible resumption of the old Bekajang tailings dam to accommodate any future tailings from the operation of Bukit-Young Pit, the Bekajang and Krian deposits is subject to the result of the on-going validation on its structure at its current state (deactivated state). Other than this, there are also issues on the following:

- How stable the dam will be to accommodate more tailings into the future;
- How stable it will be should we raise it up granting that it has no longer enough capacity;
- It was built by the previous company (Bukit-Young Gold Sdn. Bhd.) as an upstream-type where each lifts are sitting on top of the tailings, and it may well remain as such if we raise it up into the future;
- There may be huge land issues should we extend the embankment towards the downstream side, or if we shift to a downstream-type embankment since a community below the facility (a private housing complex or subdivision) already exists;
- Issues on transport of new pollutants in the form of seepage – the old TSF was built without a filter drain to handle any seepage permeating through and underneath the embankment and the foundation is generally underlain by karst topography.

The in-situ soil geotechnical study on this old TSF is still on-going.

24.1.3.3. Other/Miscellaneous

24.1.3.3.1. Plant Site

The proposed plant in Jugan will be situated on top of a hill north of the Jugan Pit. The objective of this being located in a slightly higher elevation is to, among others:

- Lesser requirements in terms of foundation engineering specifications since the topsoil depth is lesser compared to when the plant is sited in flat low-lying area where the same is known to be a floodplain. Moreover, the rock horizon is not too deep at the top of the hill and it makes a better foundation than the usual thick topsoil horizon with some presence of high liquid limit clays found in the low-lying areas around Jugan;
- The groundwater in the hills is relatively deeper compared to the low-lying area within the Jugan mining complex that is just 450m away towards the east where the major river system, Sunggai Sarawak Kanan, channels through;
- Lesser excavation volume of unwanted materials since the topsoil is not as deep compared to the topsoil horizon found usually in low-lying lying areas;
- A relatively higher area provides better security measures in terms of overseeing, monitoring management, and the siting provides added deterrence against pilferage and theft;
- Lesser tails slurry pumping cost to the TSF although there will be some cost for pumping of return water.

Prior to the implementation of any detailed foundation design and structural engineering and construction related to the plant's erection, in conjunction with the plant site preparation by soil stripping, the area has to undergo detailed soil and rock geotechnical in-situ testing in selected sites where foundations are to be laid-out based on the conceptual plant design layout prepared by the plant construction engineers. Emphasis should be given in grounds where there will be vibrating plant equipment assemblies, such as the crushing plant and the ball bill.

Among the most important in-situ tests and observational tests to be done are SPTs with collection of undisturbed sample for laboratory, CPTs, test pitting, and rock coring. The undisturbed samples has to be tested for Atterburg limits, density of the fill, x-ray diffraction, void ratio of fill, tri-axial with pore pressure in soils, UCS on rock core samples, and sulphate soundness which if at a higher percentage will compromise the integrity of the concrete in the foundation in long-term.

The combined field observation by shallow subsurface test pitting, in-situ soil and rock measurements, and laboratory tests would be more than enough for the civil designers to arrive at the bearing capacity estimates,soil compressibility, in predicting total settlement, rates of settlement, differential settlements (the latter if any), and what foundation style will be most appropriate for each of the plant module and for the whole plant's base foundation (mat foundation, spread footing, combined spread footing with slab, or piling - though the latter is most unlikely to be used).

24.2. Hydrogeology

24.2.1. Jugan – Hydrogeological Study & Pit Dewatering Assessment

A series of three to four (3 to 4) deep boreholes, to a depth of ±200 m, for pit dewatering assessment are planned shortly in areas around the pit. This is to investigate the hydraulic condition (k) in the vicinity of Jugan pit with respect to the Sunggai Sarawak Kanan River (SSK) and to evaluate and establish the potential groundwater inflow into the pit for pit dewatering purposes.

The SSK is located anywhere between 450 to 1,600 metres away from the Jugan Pit and meandering relative to pit's northwest to northeast sides before it heads up straight to Kuching where it meets up with the South China Sea.

Piezometers will be installed in selected boreholes so that in-situ hydraulic conductivity tests could be performed to characterise the hydraulic conductivity of the Shale domain.

Although the Jugan orebody is generally a shale-hosted gold deposit, it is expected that the k value will be much higher in the shale-sandstone interbeds, along the contact between the WNW-trending clayey intrusive and shale domain, and in the highly-fractured rock matrix itself from the Jugan hill at 25 mRL down to about -85mRL (a massive rockmass is basically non-existent in these levels).

A hydrogeologist will be contracted to carry-out the job. Furthermore, pumping wells within the perimeter of the proposed pit will be drilled and tested. The pumping test will include both step-test and constant rate tests. The data from the pumping tests would be analysed using methods appropriate to the hydrogeological conditions. Values for transmissivity and aquifer storativity will be determined. All of these once established would be used to define the model input parameters for simulation purposes. This would provide more confidence in the results of the modelling that the hydrogeologist would be doing.

Further to the geotechnical considerations, the established cut slopes and pit slopes at the Jugan pit will be further optimised once the phreatic level, if any, has been established. To incorporate the phreatic level into the overall analysis, a finite element application, Phase 2, will be used to perform a shear strength reduction modelling. This will also enable us to achieve a particular safety factor for an individual sector in the pit while optimising the pit angles. Phase 2 is a numerical modelling stress-strain application package.

24.2.2. BYG – Hydrogeological Study & Pit Dewatering Assessment

Closer to the commencement of the BYG-Krian pit mining, a series of deep boreholes for pit dewatering assessment are planned in the area between the Bukit-Young Pit and Tasik Biru. This is to investigate the hydraulic condition (k) in the vicinity of the pit with respect to the Tasik Biru Lake and to evaluate and establish the potential groundwater inflow into the pit for pit dewatering purposes. The lake is located around 500 m away from the northwest side of the Bukit-Young Pit.

Piezometers will be installed in selected boreholes so that in-situ hydraulic conductivity tests could be performed to characterise the hydraulic conductivity of the limestone and sandstone domains.

Similar work to that at Jugan will be undertaken.

24.3. Ore Concentrate Bagging & Transport

24.3.1. Bulk Bag – 1m x 1m 1m made of Woven Polypropylene Plastic

24.3.1.1. Types of Construction

General types are Circular (Tubular), U Panel, or rectangular. There are various specification variants with top, base, in-let & out-let spouts wherever applicable. Duffle/skirt and/or side skirting is specified by client. Bulk bags are cost effective method of shipping and storing dry goods. Made from woven polypropylene plastic, bulk bags have been estimated to have a lifespan of 400 to 1000 years before completely disintegrating. In most industries they can be used multiple times and when not in use can collapse to 1/50 of their size when filled, minimizing the need for storage space.

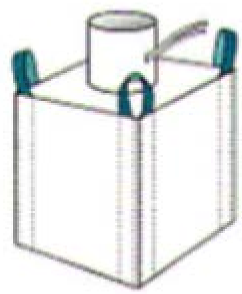
Product Name	Polypropylene (PP) jumbo bag/bulk container bag/PP woven bag/FIBC bag
Materials	Woven Polypropylene Plastic -new pp (made in China or Australia)
Type of bag	U-panel/ tubular/circular/rectangular shape
Fabric	Laminated/plain/vent
Size	100*100*100cm,or any other size is ok
Color	white, or under clients' request
Top	Full open/ with spout/with skirt cover
Bottom	Flat/spout
Liner	yes or as per customers' request, Liner(HDPE,LDPE)
Sewing	Plain/chain/chain lock with optional soft-proof
Lifting loop	2 or 4 belts, cross corner loop/fully loop/loop in loop
Ropes	1 or 2 around the bag body, or under customers' requirement
SWL	2500kg – 3000kg
Safety Factor (std)	5:1
Package	bales or sacks
Characteristics	Breathable and airy, anti-static, UV stabilization, reinforcement, dust-proof, moisture-proof
Delivery time	10-20 workdays

Feature	Breathable
Packing	20pcs/Bundle, 3500pcs/container in bales or pallets or as per customers' demand
Trade Term	CIF, FOB

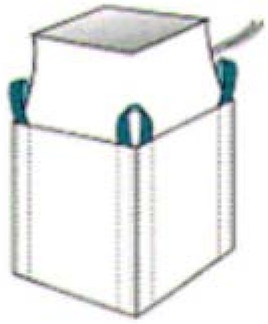
Table 24-8 - Concentrate Bag Specifications

24.3.1.2. Top Filling Options (2 of 5 options)

Listed below in the *Figure 24-31 - Concentrate Bag – Some Top Filling Options* are 2 examples of bag filling options.



A – Inlet Spout with Tie

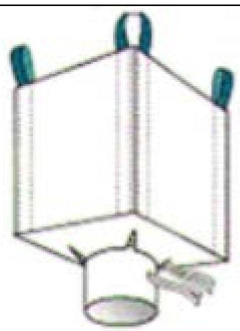


B – Skirt Top

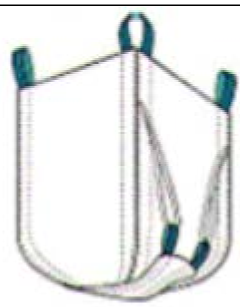
Figure 24-31 - Concentrate Bag – Some Top Filling Options

Discharge Options (2 of 5 options)

Listed below in the *Figure 24-32 - Concentrate Bag – Some Discharge Options* are 2 examples of bag filling options.



A – Outlet Spout with Tie



B – Skirt Top

Figure 24-32 - Concentrate Bag – Some Discharge Options

Figure 24-33 - Example of Bulk Bag

24.3.1.3. Filling and Weighing

There is a wide range of bulk bagging-filling systems in the market but has to be custom-designed based on the product or material to be handled.

Some examples of bulk bag filling are shown by the *Figure 24-34 - Bucket Loader Mounted as Bucket of Wheel Loader* to *Figure 24-37 - Base Weight System in Combo with Bagging/Filling Equipment* below.

Figure 24-34 - Bucket Loader Mounted as Bucket of Wheel Loader

Figure 24-35 - Mechanised Fill System

Figure 24-36 - Automated Filling System

Figure 24-37 - Base Weight System in Combo with Bagging/Filling Equipment

24.3.2. Loading at Jugan Plant Site

Probably the most practical loading system at the plant site aside from a Forklift is an overhead hoist and trolley similar to the *Figure 24-34 - Loading / Unloading using Overhead Trolley* below.

An overhead hoist & trolley is more appropriate for loading High-bed Trailer Trucks or Low-bed Trailer Trucks with 20 ft container vans. If possible direct loading into container vans at the plant site is preferable to minimize multiple lifting of the bulk bags.

Figure 24-38 - Loading / Unloading using Overhead Trolley

24.3.3. Hauling – From Jugan Mine Site to Pending Port

Material to be hauled:	Ore Concentrate (density 2.5 tonnes per cubic meter)
Packaging System:	Bulk Bags (1m x 1m x 1m) weighing about 2.5 tonnes
HAULING DISTANCE:	35 kilometers from Jugan (plant site) to Pending (shipping port)
Trucks to be used:	Hi-bed trailer trucks or Low-bed trucks with 20ft container vans
Capacity of truck:	At least 30 tons payload or 12-Bulk bags (2 container vans)
Quantity:	At least 400 tonnes per day (12,000 tonnes per month)
No. of trips:	400 trips/mth (80 trips/truck per mth using 5 units of 30t-truck)
Loading at Jugan:	By overhead hoist & trolley for the bulk bags
Unloading at Pending:	Assume Overhead Crane

24.3.4. Port Handling including Storage & Security – Pending Industrial Estate Kuching

Assumptions:

Bulk Bags containing the merchandise (ore concentrate) will be hauled to Pending Industrial Estate, accumulated and stored in a secured building awaiting shipment schedule.

Assuming that shipment to China is by small dedicated Cargo Vessel (4000 t to 6000 t DW capacity), this means an accumulation period of at least 10 days given a minimum production of 400 tonnes per day ore concentrate.

24.3.5. Shipping

Dedicated small Cargo Vessel (4k – 6k deadweight ton capacity), the type of cargo vessel could be a bulk carrier or small container ship. For bulk carrier, there is no need for container vans as the bulk bags can be loaded directly into the vessel. If shipment is by Container Cargo Ship, 20 ft container vans will be used but due to the payload limit of 28,000 kg, the container van will just be 50 % loaded in terms of volume. Shipping cost is expected to be higher compared to big container ship but has some degree of flexibility in terms of shipment schedule.

24.3.5.1. Bagging & Transport Cost (cost/tonne)

Assumptions:

- Ore Production: 8,000 tpd (basecase)
- Mass Pull: 7% ave. (from 6% to 8% range)
- Concentrate Production: 560 tpd
- Number of Bulk Bags: 224 bags (2.5 capacity)
- Hauling Distance: 35 km (via Jln Bau- Jln Stephen Yong-Jln Batu Kawa)
- Alternate Route: 29 km (Jalan Bau - for night hauling)
- Payload capacity of truck 30 tonnes (12 bulk bags)

24.3.5.2. Cost Items

1. ***Bulk Bag*** – made of woven Polypropylene Plastic with HDPE Liner. Alibaba.com listed a made in China bulk bags with an FOB price of $2.00 to $9.00 per bag. For heavy load of up to 2.5 t, the design needs to be customized, reinforced and tested to make sure it can take the required load and should be able to endure multiple usages.

   - Adjusted Price: US$ 15.00 per bag (2.5t cap with HDPE liner/skirting)
   - Average Usage: 4 times (assume use the bags 4x before proper disposal)
   - Tonnage per bag: 4 x 2.5 = 10.0 tonnes (life span of bag in terms of tonnes)

2. ***Bagging & Weighing*** – The filling and weighing of the bulk bags should be at least semi-automatic. Bagging rate is assumed to be 20-bags per hour using 2-man crew as compared to the advertised 20-bags per hour NBE (1-operator) semi-auto system or 20 bags per minute for FIBC_7000 fully automatic filling/weighing system.

Bagging & Weighing Description	Parameters
Bagging and weighing production line	1 x 2-man crew
Bagging & Weighing Rate	20 bags/hour
Bagging & Weighing Time for 224 bags	11.2 hours
Bagging/weighing man-hours for 224 bags	22.4 hours
Preparation, equipment checks & house keeping (excluding 2hrs allocated for maintenance)	0.5 hour
Lunch break (day shift break)	1 hour

Bagging & Weighing Description	Parameters
Total bagging man-hours for 224 bags	23.9 hours

Table 24-9 - Bagging & Weighing Parameters

3. ***Loading of Haul Trucks*** – assume loading at plant site is by overhead hoist & trolley with 2-man crew. Ideally, the bagging and loading rates should be almost the same in terms of the number of bags filled and loaded per hour.

Haul Truck Loading Description	Parameters
Loading system	Overhead hoist & trolley (5t_cap)
Loading crew (1 operator + 1 spotter)	2-man crew
Loading Cycle Time (open top loading)	2.5 min/bag (including spotting)
Loading Rate	24 bags per hour
Loading Time for 224 bags	9.33 hours
Loading man-hours for 224 bags	18.67 hours
Equipment checks & housekeeping (excluding 2hrs allocated for maintenance)	0.5 hour
Lunch/meal break	1 hour
Truck change & truck spotting	1 min per truck
Truck change & spotting for 19 trucks	0.32 hr (1min per truck)
Total Loading man-hours for 224 bags	20.49 hours

Table 24-10 - Haul Truck Loading Parameters

4. ***Transport Cost***

Contractor Transport quotes:

Price in RM (all-in cost): RM 315 per trip at 30 tonnes per trip via 35km route

Price in US$: $ 96.21 per trip or US$ 3.21 per tonne

5. ***Port Handling Cost*** – including storage & security. Same as previous estimate = $ 3.00/tonne

6. ***Shipping Cost***

- Previous estimate was $ 25.00/tonne
- From World Freight Rates.com = $ 693.61 per container van (20ft) (Reference: Kota Kinabalu to Shanghai)
- Cost per tonne using 28t payload capacity = $ 24.77

Table 24-11 - Concentrate - Bagging and Transport Costing below summarises the costing for the concentrate transport costs.

Production Data	TPD	1 bag	1 bag (used 4 times)	224 bags (used 4 times)
Ore, t	8,000			
Concentrate, t	560			
Bulk Bags	224 bags	2.5	10.0	2,240

Description (Cost Item)	**Qty-Unit**	**Unit Cost (US $)**	**Total Cost (US $)**	**Cost/Tonne (concentrate)**
Bulk Bag – 1m x 1m x 1m Made in China PP	224 bags	$ 15.00	$ 3,360.00	$ 1.50
Bagging Labour for 224 bags	23.90 hrs	$ 5.12	$ 122.37	$ 0.22
Loading Labour for 224 bags	20.49 hrs	$ 4.44	$ 90.98	$ 0.16
Bagging/Loading supervision	12 hrs	$ 6.25	$ 75.00	$ 0.13
Power	72 KwH	$ 0.07	$ 5.04	$ 0.01
Maintenance (labour & parts)	2 hours	$ 9.00	$ 18.00	$ 0.03
Trucking by Contractor	560 t	$ 3.21	$ 1,797.60	$ 3.21
SUMMARY				
BAGGING AND TRANSPORT COST				**$ 5.27**
Port Handling at Port of Exit & Entry (Same as previous estimate)				**$ 3.00**
SHIPPING COST a. **Previous Estimate** b. **based from World Freight Rates.com**				**$ 25.00**
TOTAL COST a. **using previous estimate of shipping cost** b. **based on WFR.com rates**				**$ 33.27**

Table 24-11 - Concentrate - Bagging and Transport Costing

25. Conclusions

In conclusion, BESRA finds the first stage of the plan to develop and put the Bau Goldfield into production is a lean business case and economically viable strategy with manageable risks.

The region has significant opportunity for growth and by moving into detailed engineering and construction now BESRA can best be setup for a return to higher gold prices and for developing long term partnerships with the smelter customers. Strategically, the concentrate option offers advantages as fuel source for the smelters while leaving BESRA the opportunity for secondary processing on site should a more robust gold market return.

By moving into production now BESRA is able to generate significant cash flow to further improve the gold field resources and reserves as well to take advantage of the opportunity for growth with the site infrastructure built up to then. BESRA has become a stronger operator every year of its existence and the management team are fully aware of the lessons learned from the past while being cautiously optimistic about the next step in our future in Malaysia.

26. Recommendations

The project has the capacity for further optimisation and refinement of the following:

- Process plant equipment and clay/fines handling
- Capital and operating cost optimisation
- Detailed in-house engineering and construction using the existing skills that have developed two mines already – reducing the EPCM costs
- Mining and infrastructure detailed design and optimisation to reduce
- Use of materials and equipment sourced locally (or within Malaysia) to reduce transport and any import costs

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A. Appendices

A2-1. Glossary, Technical Nomenclature & Abbreviations

Symbol/Abbreviation/Nomenclature	Description
>	Greater than
<	Less than
=	Equal
%	Percent
±	Plus/Minus or approximate
>=	Greater than or equal to
<=	Less than or equal to
‘ or ft	Feet (Imperial)
“ or in	Inches (Imperial)
#	Mesh
$	Dollars (US unless specified)
°	Degrees
°C	Degrees Celsius
3D	Three dimensional
AAS	Atomic absorption spectrometer
AI	Abrasion Index
Ag	Silver
Al	Aluminum
As	Arsenic
Au	Gold
AusIMM	Australasian Institute of Mining & Metallurgy
Ba	Barium
BBWI	Bond Ball Mill Work Index
Bi	Bismuth
BLEG	Bulk leach extractable gold
BIOX	Biological Oxidation
BQ	Diamond drill core – 36.4 mm diameter
BRSO	Borneo Rectified Skew Orthomorphic
BRWI	Bond Rod Mill Work Index
BYG	Bukit Young Goldmines

Symbol/Abbreviation/Nomenclature	Description
BYGS	Bukit Young Gold Services (Menzies)
Ca	Calcium
Cd	Cadmium
CIL	Carbon-in-leach
CIMM	Canadian Institute of Mining, Metallurgy & Petroleum
Co	Cobalt
Cr	Chromium
Cu	Copper
CV	Coefficient of variation
DD	Diamond drilling
DDH	Diamond drill hole
DIGHEM	
E	East
EIA	Environmental impact assessment
ELF	Engineered Land Form
EM	Electromagnetic
ENE	East north east
EPCM	Engineering procurement and construction management
EPL	Exclusive Prospecting Licence
ESE	East south east
FA	Fire assay
Fe	Iron
FOB	Free on board
G&A	General and administration
gcm^{-3}	Grams per cubic centimetre
Gladioli	Gladioli Enterprises Sdn Bhd
GPL	General Prospecting Licence
g/t	Grams per tonne
g/t Au	Grams per tonne gold
Ha	Hectare
Hg	Mercury
hr(s)	Hour(s)

Symbol/Abbreviation/Nomenclature	Description
HQ	Diamond drill core – 63.5 mm diameter
HQ-3	Diamond drill core – 61.1 mm diameter
ICP	Inductively coupled plasma
ICP-MS	Inductively coupled plasma mass spectrometer
ICP-OES	Inductively coupled plasma optical emission spectroscopy
IP	Induced potential
IRR	Internal rate of return
IsaMill	Proprietary Mt Isa mill technology
ISO	International Standards Organisation
JORC	Joint Ore Reserves Committee
JV	Joint venture
K	Potassium
kg	kilogramme
km(s)	Kilometre(s)
km^2	Square kilometres
Koz	Thousand ounces
kPa	Kilopascal
Kg/m^3	Kilogramme per cubic metre
Kt	Thousand tonnes
kW	Kilowatt
kWh	Kilowatt hour
kl	Kilolitre
l	Litre
LOM	Life of mine
L&S	Lands & Survey Department
l/s	Litre per second
LSC	Limestone-shale contact
m	Metre
m^2	Square metre
m^3	Cubic metre
M	Million
Ma	Million years

Symbol/Abbreviation/Nomenclature	Description
MC	Mining Certificate
MCAF	Mine cost adjustment factor
Mg	Magnesium
MIK	Multiple Indicator Kriging
MIM	Mount Isa Mines
ML	Mining Licence
mm	Millimetre
µm	Micron
MMI	Mobile metal Ion
Mo	Molybdenum
Moz	Million ounces
Mn	Manganese
mE	Metres East
mN	Metres North
mRL	Metres relative level
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Megawatt
MYR	Malaysian ringgit
my	Million years
N	North
Na	Sodium
NAF	Non-acid forming
NAPP	Net acid production potential
NBG	North Borneo Gold Sdn Bhd
NE	North east
Ni	Nickel
NNE	North north east
NNW	North north west
No.	Number
NPV	Net present value
NQ	Diamond drill core – 47.6 mm diameter

Symbol/Abbreviation/Nomenclature	Description
NQ-3	Diamond drill core – 45 mm diameter
NREB	Natural Resources Environment Board
nsg	Non-sulphide grains
NW	North west
OK	Ordinary Kriging
OYM	Olympus Pacific Minerals (Besra predecessor)
oz	Ounce (troy)
pa	Per annum
Pb	Lead
PAF	Potentially acid forming
POX	Pressure Oxidation
ppb	Parts per billion
ppm	Parts per million
PQ	Diamond drill core – 85 mm diameter
PQ-3	Diamond drill core – 83 mm diameter
P_{80}	80% passing
Q-Q	Quantile-Quantile plots
QAQC	Quality assurance, quality control
RC	Reverse circulation (drilling)
RL	Relative level
ROM	Run of mine
RQD	Rock quality designation
RM	Malaysian ringgit (alternate)
RMR	Rock mass rating
S	Sulphur
SAG	Semi-autogenous grinding (mill)
Sb	Stibnite (antimony ore)
SE	South east
SG	Specific gravity
SGS	Société Générale de Surveillance
SHRGD	Sediment-hosted rock gold deposits
SO_2	Sulphur dioxide

Symbol/Abbreviation/Nomenclature	Description
SO_3	Sulphide
SO_4	Sulphate
SO_x	Sulphide oxidation
SPI	SAG power index
SSE	South south east
SSW	South south west
SW	South west
t	Tonnes
Ti	Titanium
Tl	Thallium
TMCSA	Terra Mining Consultants & Stevens & Associates
t/m^3	Tonnes per cubic metre
tpa	Tonnes per annum
tpd	Tonnes per day
UCS	Unconfined compressive strength
UFG	Ultra-fine grinding
US$	United States of America dollar
UTM	Universal Transverse Mercator
V	Volt
V	Vanadium
W	Tungsten
WI	Work index
WNW	West north west
WSW	West south west
wt	weight
yr	Year
Zn	Zinc
4WD	Four-wheel drive

A11-1. Logging Codes & Descriptions

Lithology	Lithology Description
A	Andesite
A-J	Andesite-Tonalite
APV	Andesitic Pyroclastic Volcanics
B	Basalt
BC	Calcite - Black Fine Grained, Sulphide, Pyrite & Organics
BM	Base-Metal Vein
CL	Clay
DAC	Dacite
DE	Dacite-Mudstone Contact
DF	Dacite Porphyry - Fine Grained
DI	Diorite
DK	Endoskarn-calcsilicates
D-LD	Dacite in contact with limestone
D-M	Dacite-Marble Contact Zone
DP	Dacite Porphyry
DPV	Dacitic Pyroclastics
D-SH	Dacite-Shale Contact Zone
DXI	Intrusion Breccia in Dacite Porphyry
F	Hornfels
FM	Hornfelsed Marble
FT	Fault
FTG	Fault Gouge
G	Conglomerate
GD	Granodiorite
G-SL	Interbedded Conglomerate and Siltstone
GT	Grit
GT-L	Grit in contact with Limestome
GTOL	Interbedded Grit, Marl and Limestone
GT-SS	Interbedded Grit and Sandstone
H2O	Water-Drilling of Platform in Tasik Biru
IN	Intrusive

Lithology	Lithology Description
L	Limestone - Undifferentiated
LA	Limestone - Dark Grey, Gritty, Argillaceous
LC	Limestone - Clastic, Grey-Dark Grey
LD	Limestone - Dark Grey-Black, Argillaceous
LD-LG	Limestone-Interbedded Pale Grey and Dark Grey and Gritty
LD-LP	Interbedded Light and Dark Grey Limestone
LD-XT	Limestone-Dark Grey Argillaceous- Brecciated (Tectonic)
LF	Limestone - Fossiliferous
LF-SS	Limestone Fossiliferous wth Sandstone Layers
LG	Limestone - Massive, Pale Grey-Grey
LG-SH	Interbedded Limestone and Shale
LG-W	Limestone - Contact Cavity
LG-WC	Limestone - Contact Calcite Veining
LG-XH	Limestone - Hydrothermlally brecciated
LG-XT	Limestone-Brecciated (Tectonic)
LJ	Jasperoid
LK	Exoskarn-calcsilicates
LL	Calclutite
LOSL	Interbedded Limestone, Marl and Siltstone
LP	Limestone - Pale Grey, Soft-Porous
LP-LG	Limestone - Grey in contact with pale grey
LP-O	Pale Grey Limestone in Contact with Marl
LS	Limestone - Silty
LSHM	Interbedded Limestone, Shale and Mudstone
M	Marble
MD	Microdiorite
MDPV	Micro-Diorite and Pyroclastics
MGD	Micro-granodiorite
MQDP	Microgranodiorite porphyry
MS	Mudstone
MS-SH	Interbedded Mudstone and Shale
NC	No Core or Sample
NL	No Lithology Indicated

Lithology	Lithology Description
O	Marl
OB	Overburden
O-GT	Interbedded Marl and Grit
O-XT	Brecciated Marl (Tectonic)
PV	Pyroclastic Volcanics
QTZ	Quartz Vein
QC	Quartz-Calcite Vein
QX	Brecciated Quartz Vein
R	Radiolarian Siliceous Rock
SC	Calcareous Shale-Marl
SH	Shale
SH-G	Interbedded Shale and Conglomerate
SH-GTL	Shale-Grit and Limestone
SH-LD	Interbedded Shale & Dark Grey-Black Argillaceous Limestone
SH-LG	Shale in contact with pale grey limestone
SHOL	Interbedded Shale, Marl and Limestone
SH-SL	Interbedded Shale-Siltstone
SH-SS	Interbedded Shale-Sandstone
SL	Siltstone
SL-GT	Interbedded Siltstone and Grit
SL-LD	Interbedded Siltstone and Limestone
SL-O	Interbedded Siltstone and Marl
SLOGT	Interbedded Siltstone, Marl and Grit
SL-SHL	Interbedded Siltstone, Shale and Limestone
SL-SS	Interbedded Siltstone-Sandstone
SS	Sandstone
SS-SL	Interbedded Sandstone-Siltstone
ST	Coarse Sandstone
T	Tonalite
TF	Tuff
U	Alluvium
V	Void-Cavity
V-CL	Cavity with Clay Fill

Lithology	Lithology Description
WC	Calcite - White, Sparry with Sulphide
X	Breccia
XC	Breccia - Collapse
XH	Breccia - Hydrothermal
XI	Breccia - Intrusive
XQC	Brecciated Quartz Calcite Vein
XQDP	Xenolithic Quartz Diorite Porphyry
XT	Breccia - Tectonic
Z	Soil, Clay, Mullock, Rock Fill or Tailings

Formation	Formation Description
B	Bau Limestone Formation
I	Intrusive
KR	Krian Member
NF	No Formation
NR	Not Recorded
P	Pedawan Formation
Q	Quaternary and Recent Deposits
S	Serian Volcanics
W	Water-Tasik Biru

Colour	Colour Description
BK	Black
BL	Blue
BR	Brown
CM	Cream
GN	Green
GY	Gray
MV	Mauve
OR	Orange
RD	Red
WH	White

Colour	Colour Description
YW	Yellow

Colour Intensity	Colour Intensity Description
L	Light
M	Medium
D	Dark

Oxidation	Oxidation Description
1	Unoxidised
2	Weakly oxidised
3	Moderately oxidised
4	Strongly oxidised
5	Completely oxidised

Alteration Type	Alteration Description
C	Carbonate
CL	Clay altered
CLX	Clay altered-Oxidized
CS	Carbonate-Silica
CSX	Carbonate-Silica - Oxidised
CX	Carbonate - Oxidised
D	Decalcified
DX	Decalcified-Oxidised
E	Epidote
I	Illite
IS	Illite-Smectite
K	Calc-silicate (skarn)
KS	Calc-silicate (skarn)-Silicified
KX	Calc-silicate (skarn)-Oxidised
L	Recrystallised
M	Marble
ME	Marble-Epidote

Alteration Type	Alteration Description
MX	Marble-Oxidised
O	Chlorite
OI	Chlorite-Illite
ORT	K-Feldspar+Epidote+Calcite
OM	Chlorite-Marble
OS	Chlorite-Silica
OX	Chlorite - Oxidised
Q	Quartz-Sericite-Pyrite
QCO	Quartz-Sericite-Carbonate-Chlorite
QRO	Quartz-Sericite-Chlorite
R	Sericite
RC	Sericite-Carbonate
RCO	Sericite-Carbonate-Chlorite
RCS	Sericite-Carbonate-Silica
RO	Sericite-Chlorite
RX	Sericite-Oxidised
S	Silicified
SC	Sericite-Carbonate
SD	Siderite
SE	Silica-Epidote
SR	Silica-Sericite
SX	Silicified - Oxidized
UN	Unaltered
X	Oxidised
XD	Oxidised-Decalcified
XO	Oxidised-Chloritised
Y	Propyllitic
YX	Propyllitic-Oxidised
Z	Oxidised-Silicified

Alteration Style	Alteration Style Description
FC	Fracture controlled
FG	Fracture coating

Alteration Style	Alteration Style Description
IR	Irregular
PA	Patchy
PER	Pervasive
SP	Semi-pervasive
SR	Selective replacement
ST	Stringer
VN	Veins
VS	Vein Selvedges

Alteration Intensity	Alteration Intensity Description
1	Incipient
2	Weak
3	Moderate
4	Strong
5	Intense

Mineralisation	Mineralisation Description
A	Arsenopyrite
A-R	Arsenopyrite-Orpiment-Realgar
A-S	Arsenopyrite-Stibnite
B	Pyrite-Chalcopyrite-Galena-Sphalerite
BP	Pyrite-Chalcopyrite-Galena
C	Calcite-Pyrite-Native Arsenic
CZ	Quartz-Calcite-Stibnite
D	Dickite-Illite
E	Dickite-Calcite-Pyrite
F	Quartz-Calcite-Pyrite
FK	Quartz-Calcite-Pyrite-Stibnite-Native Arsenic
FS	Quartz-Calcite-Pyrite-Stibnite
FSA	Quartz-Calcite-Pyrite-Stibnite-Native Arsenic-Arsenopyrite
G	Dickite-Pyrite
H	Pyrite-Arsenopyrite

Mineralisation	Mineralisation Description
H-BP	Arsenopyrite-Basemetal
H-D	Pyrite-Arsenopyrite-Dickite-Calcite
H-L	Pyrite-Calcite-Arsenopyrite
H-Q	Pyrite-Arsenopyrite-Quartz-Dickite
H-R	Pyrite-Native Arsenic-Orpiment-Realgar
H-S	Pyrite-Arsenopyrite-Stibnite
H-Z	Pyrite-Arsenopyrite-Quartz Vein
I	Stibnite-Native Arsenic
J	Quartz-Pyrite
J-I	Quartz-Pyrite-Stibnite-Native Arsenic
JP	Jasperoid-Pyrite
J-S	Quartz-Pyrite-Stibnite
KC	Realgar-Native Arsenic-Stibnite
KN	Orpiment-Stibnite-Native Arsenic
L	Calcite Vein
LA	Calcite-Arsenopyrite
LAS	Calcite-Arsenopyrite-Stibnite
L-D	Calcite-Dickite
LN	Calcite-Realgar-Native Arsenic
LNA	Calcite-Realgar-Native Arsenic-Arsenopyrite
L-R	Calcite-Realgar-Orpiment
M	Calcite-Pyrite-Stibnite
N	Native Arsenic
P	Pyrite
PN	Pyrite-Realgar-Orpiment-Native Arsenic
PO	Pyrite-Pyrrhotite
P-Q	Pyrite-Quartz-Dickite
PR	Pyrite-Orpiment-Realgar
Q	Quartz-Dickite
R	Orpiment-Realgar
RN	Realgar-Orpiment-Native Arsenic
RS	Realgar-Orpiment-Stibnite
S	Stibnite

Mineralisation	Mineralisation Description
S-P	Stibnite-Pyrite
SZ	Quartz-Stibnite
T	Quartz-Dickite-Pyrite-Stibnite
U	Quartz-Calcite
UA	Quartz-Calcite-Arsenopyrite

Mineralisation Style	Mineralisation Style Description
AG	Aggregations
BND	Banded
BX	Breccia
DI	Disseminated
FG	Fracture coating
IN	Interstitial
IR	Irregular
MA	Massive
MS	Conc in vein margins-selvedges
PA	Patchy
PV	Pervasive
SC	Specks
SO	Spots
SP	Semi-pervasive
SR	Selective replacement
ST	Stringer
VG	Vughy
VN	Veins
VS	Vein Selvedges

Mineralisation Intensity	Mineralisation Intensity Description
1	Incipient
2	Weak
3	Moderate

Mineralisation Intensity	Mineralisation Intensity Description
4	Strong
5	Intense

Sulphide Type	Sulphide Type Description
A	Arsenopyrite
BO	Bornite
CH	Chalcocite
CP	Chalcopyrite
CS	Cu-sulphides (general)
CV	Covellite
GA	Galena
MO	Molybdenite
OP	Orpiment
PO	Pyrrhotite
PY	Pyrite
RG	Realgar
SB	Stibnite
SP	Sphalerite
SR	Sarabauite

Sulphide Style	Sulphide Style Description
BM	Concentrated within breccia matrix
BND	Banded sub parallel layers
CD	Coarse grained disseminated
FD	Fine grained disseminated
FG	Fracture coating
GN	Granular
IR	Irregular
MD	Medium grained disseminated
MS	Concentrated in vein margins and selvedges
PA	Patchy
RM	Rimming fragments

Sulphide Style	Sulphide Style Description
SC	Specks
SE	Segregations
SO	Spots
VL	Veinlets
VN	Vein

Sulphide Percentage
0.1
0.25
0.5
1.0
1.5
2.0
2.5
3.0
3.5
5.0
7.0
10.0
20.0
30.0
50.0
80.0
100.0

Vein Type	Vein Type Description
VC	Carbonate (undifferentiated)
VD	Dolomite
VF	Crustiform
VG	Vughy
VH	Sheeted
VI	Calcsilicate

Vein Type	Vein Type Description
VL	Crack seal
VO	Colloform
VQ	Quartz
VR	Carbonate Stringers
VS	Sulphidic
VT	Tensional
VW	Stockwork
VX	Brecciated
VY	Cryptocrystalline
VZ	Quartz-calcite

Breccia Type	Breccia Type Description
BC	Collapse Breccia
BE	Milled Breccia
BF	Fault Breccia
BH	Hydrothermal Breccia
BI	Intrusion Breccia
BK	Karst collapse Breccia
BL	Crackled Breccia
BN	Monomictic Breccia
BR	Zone of Brecciation and re-cementation
BS	Shear Breccia
BT	Imbricate Breccia
BU	Undifferentiated Breccia
BV	Vein Breccia
BY	Polymictic Breccia

Breccia Intensity	Breccia Intensity Description
1	Weak
2	Moderate
3	Strong

Structure	Structure Description
BD	Bedding
BR	Broken
BX	Breccia
CG	Cleavage
CN	Contact
CO	Compositional layering
CT	Cataclasites
FB	Fault brittle
FL	Fault brittle-ductile
FO	Foliation
FR	Fracture
FT	Fault
FWC	Vein contact - footwall
HWC	Vein contact - hanging wall
JN	Joint
LI	Lineation
MY	Mylonite
PC	Pug-clayzone
SH	Shear zone
SL	Slickensides
ST	Stringers
SW	Stockwork
UC	Unconformity
VL	Veinlets
VN	Vein

Fill	Fill Description
AS	Arsenopyrite
CA	Calcite
CH	Chlorite
CL	Clay
CS	Calc-Silicate
GO	Gouge

Fill	Fill Description
IC	Iron Carbonate
IO	Iron Oxide
PY	Pyrite
QZ	Quartz
SU	Sulphide

Roughness	Roughness Description
1	Rough or irregular, stepped
2	Smooth, stepped
3	Slickensided, stepped
4	Rough or irregular, undulating
5	Smooth, undulating
6	Slickensided, undulating
7	Rough or irregular, planar
8	Smooth, planar
9	Slickensided, planar

A15-1. Reserves – Pit Optimisation

JUGAN RESERVES – 4,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #	3,442,370	1.471
	Contract Mining-POX Processing	2,889,480	1.645
	Contract Mining-BIOX Processing	2,654,580	1.723
	Contract Mining-Albion Processing	2,137,160	1.909
	Owner Mining-Concentrate Production	3,445,955	1.470
	Owner Mining-POX Processing	2,902,270	1.642
	Owner Mining-BIOX Processing	2,667,260	1.720
	Owner Mining-Albion Processing	2,152,050	1.905
Probable	Contract Mining-Concentrate Production	6,471,250	1.607
	Contract Mining-POX Processing	5,300,100	1.753
	Contract Mining-BIOX Processing	5,072,920	1.784
	Contract Mining-Albion Processing	4,041,500	1.909
	Owner Mining-Concentrate Production	6,505,980	1.604
	Owner Mining-POX Processing	5,574,080	1.741
	Owner Mining-BIOX Processing	5,303,440	1.779
	Owner Mining-Albion Processing	4,354,420	1.905

JUGAN RESERVES – 6,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #	3,444,390	1.470
	Contract Mining-POX Processing	2,891,390	1.645
	Contract Mining-BIOX Processing	2,661,660	1.721
	Contract Mining-Albion Processing	2,140,970	1.908
	Owner Mining-Concentrate Production	3,446,390	1.470
	Owner Mining-POX Processing	2,905,070	1.642
	Owner Mining-BIOX Processing	2,669,070	1.720
	Owner Mining-Albion Processing	2,152,990	1.905
Probable	Contract Mining-Concentrate Production	6,473,220	1.607
	Contract Mining-POX Processing	5,505,550	1.745
	Contract Mining-BIOX Processing	5,078,980	1.783
	Contract Mining-Albion Processing	4,190,980	1.907

Category	Scenario Description	Tonnes (t)	Grade (g/t)
	Owner Mining-Concentrate Production	6,609,400	1.594
	Owner Mining-POX Processing	5,612,750	1.736
	Owner Mining-BIOX Processing	5,324,130	1.779
	Owner Mining-Albion Processing	4,397,180	1.903

JUGAN RESERVES – 8,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #	3,444,580	1.470
	Contract Mining-POX Processing	2,892,650	1.645
	Contract Mining-BIOX Processing	2,664,500	1.721
	Contract Mining-Albion Processing	2,145,010	1.907
	Owner Mining-Concentrate Production	3,452,670	1.469
	Owner Mining-POX Processing	2,912,748	1.640
	Owner Mining-BIOX Processing	2,674,220	1.718
	Owner Mining-Albion Processing	2,153,290	1.905
Probable	Contract Mining-Concentrate Production	6,475,920	1.607
	Contract Mining-POX Processing	5,539,620	1.743
	Contract Mining-BIOX Processing	5,248,330	1.785
	Contract Mining-Albion Processing	4,285,540	1.912
	Owner Mining-Concentrate Production	6,705,100	1.590
	Owner Mining-POX Processing	5,788,262	1.727
	Owner Mining-BIOX Processing	5,476,530	1.774
	Owner Mining-Albion Processing	4,532,840	1.902

JUGAN RESERVES – 10,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #	3,445,100	1.470
	Contract Mining-POX Processing	2,899,480	1.643
	Contract Mining-BIOX Processing	2,666,430	1.720
	Contract Mining-Albion Processing	2,150,840	1.906
	Owner Mining-Concentrate Production	3,453,350	1.469
	Owner Mining-POX Processing	2,912,750	1.640

Category	Scenario Description	Tonnes (t)	Grade (g/t)
	Owner Mining-BIOX Processing	2,675,520	1.718
	Owner Mining-Albion Processing	2,156,310	1.904
Probable	Contract Mining-Concentrate Production	6,647,860	1.597
	Contract Mining-POX Processing	5,573,050	1.741
	Contract Mining-BIOX Processing	5,276,740	1.782
	Contract Mining-Albion Processing	4,354,420	1.905
	Owner Mining-Concentrate Production	6,763,260	1.587
	Owner Mining-POX Processing	5,812,680	1.724
	Owner Mining-BIOX Processing	5,481,400	1.773
	Owner Mining-Albion Processing	4,539,940	1.901

JUGAN RESERVES – 12,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #	3,445,960	1.470
	Contract Mining-POX Processing	2,901,480	1.642
	Contract Mining-BIOX Processing	2,667,260	1.720
	Contract Mining-Albion Processing	2,150,840	1.906
	Owner Mining-Concentrate Production	3,459,240	1.467
	Owner Mining-POX Processing	2,913,090	1.640
	Owner Mining-BIOX Processing	2,675,520	1.718
	Owner Mining-Albion Processing	2,156,310	1.904
Probable	Contract Mining-Concentrate Production	6,648,050	1.597
	Contract Mining-POX Processing	5,574,080	1.741
	Contract Mining-BIOX Processing	5,276,900	1.782
	Contract Mining-Albion Processing	4,354,420	1.905
	Owner Mining-Concentrate Production	9,159,660	1.437
	Owner Mining-POX Processing	5,819,500	1.723
	Owner Mining-BIOX Processing	5,486,840	1.773
	Owner Mining-Albion Processing	4,541,170	1.901

BYG-KRIAN RESERVES – 4,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #		

Category	Scenario Description	Tonnes (t)	Grade (g/t)
	Contract Mining-POX Processing		
	Contract Mining-BIOX Processing		
	Contract Mining-Albion Processing		
	Owner Mining-Concentrate Production		
	Owner Mining-POX Processing		
	Owner Mining-BIOX Processing		
	Owner Mining-Albion Processing		
Probable	Contract Mining-Concentrate Production	972,760	3.177
	Contract Mining-POX Processing	869,190	3.482
	Contract Mining-BIOX Processing	814,270	3.628
	Contract Mining-Albion Processing	711,610	3.980
	Owner Mining-Concentrate Production	1,036,980	3.088
	Owner Mining-POX Processing	922,020	3.393
	Owner Mining-BIOX Processing	861,630	3.535
	Owner Mining-Albion Processing	742,300	3.902

BYG-KRIAN RESERVES – 6,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #		
	Contract Mining-POX Processing		
	Contract Mining-BIOX Processing		
	Contract Mining-Albion Processing		
	Owner Mining-Concentrate Production		
	Owner Mining-POX Processing		
	Owner Mining-BIOX Processing		
	Owner Mining-Albion Processing		
Probable	Contract Mining-Concentrate Production	1,005,430	3.137
	Contract Mining-POX Processing	874,160	3.469
	Contract Mining-BIOX Processing	816,920	3.620
	Contract Mining-Albion Processing	716,970	3.967
	Owner Mining-Concentrate Production	1,044,130	3.086
	Owner Mining-POX Processing	924,910	3.388
	Owner Mining-BIOX Processing	870,970	3.520
	Owner Mining-Albion Processing	743,190	3.898

BYG-KRIAN RESERVES – 8,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #		
	Contract Mining-POX Processing		
	Contract Mining-BIOX Processing		
	Contract Mining-Albion Processing		
	Owner Mining-Concentrate Production		
	Owner Mining-POX Processing		
	Owner Mining-BIOX Processing		
	Owner Mining-Albion Processing		
Probable	Contract Mining-Concentrate Production	1,007,380	3.133
	Contract Mining-POX Processing	901,240	3.419
	Contract Mining-BIOX Processing	818,860	3.616
	Contract Mining-Albion Processing	722,380	3.951
	Owner Mining-Concentrate Production	1,051,310	3.077
	Owner Mining-POX Processing	931,535	3.378
	Owner Mining-BIOX Processing	869,050	3.516
	Owner Mining-Albion Processing	770,760	3.854

BYG-KRIAN RESERVES – 10,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #		
	Contract Mining-POX Processing		
	Contract Mining-BIOX Processing		
	Contract Mining-Albion Processing		
	Owner Mining-Concentrate Production		
	Owner Mining-POX Processing		
	Owner Mining-BIOX Processing		
	Owner Mining-Albion Processing		
Probable	Contract Mining-Concentrate Production	1,008,090	3.132
	Contract Mining-POX Processing	906,610	3.405
	Contract Mining-BIOX Processing	828,120	3.592
	Contract Mining-Albion Processing	733,810	3.923
	Owner Mining-Concentrate Production	1,060,490	3.062
	Owner Mining-POX Processing	936,020	3.367
	Owner Mining-BIOX Processing	886,370	3.504
	Owner Mining-Albion Processing	771,910	3.851

BYG-KRIAN RESERVES – 12,000TPD

Category	Scenario Description	Tonnes (t)	Grade (g/t)
Proven	Contract Mining-Concentrate Production #		
	Contract Mining-POX Processing		
	Contract Mining-BIOX Processing		
	Contract Mining-Albion Processing		
	Owner Mining-Concentrate Production		
	Owner Mining-POX Processing		
	Owner Mining-BIOX Processing		
	Owner Mining-Albion Processing		
Probable	Contract Mining-Concentrate Production	1,021,030	3.116
	Contract Mining-POX Processing	907,240	3.404
	Contract Mining-BIOX Processing	861,000	3.537
	Contract Mining-Albion Processing	734,130	3.922
	Owner Mining-Concentrate Production	1,060,720	3.062
	Owner Mining-POX Processing	936,490	3.366
	Owner Mining-BIOX Processing	886,640	3.503
	Owner Mining-Albion Processing	772,020	3.851

A15-2. Ore Reserves – JORC Code Table 1 Checklist

Section 1: Sampling Techniques & Data

Criteria	Section 1 – Commentary
Sampling techniques	• Besra drillholes were sampled and assayed on nominal 1m intervals, except at geological or lithological boundaries. Early historic drillholes were sample at 1.5 and 2m intervals with later historic holes were nominally 1m. These longer lengths only make up approximately 5-10% of the total drilling metres. • Besra drillhole assays were sample prepped and assayed by SGS at their onsite laboratory in Bau (ISO17025 certified); assaying onsite was for Au by fire assay with other elements (23) assayed by ICP at the SGS laboratory in Perth. Umpire assays were done by Mineral Assay & Services Company (MAS) in Bangkok, Thailand. Some selected samples were also checked at SGS Waihi, New Zealand. • Historic assays: Renison Goldfields (RGC) and Gencor/Minsarco used commercial labs and their own QAQC systems; BYGS/Menzies Gold used Assaycorp initially in Australia and then in Kuching, Sarawak with McPhar, Analabs and Inchape for umpire sampling and QAQC. • For Besra assays, the Au grades were determined by 50g Fire Assay with AAS finish at the onsite SGS laboratory. • Channel and trench sampling was extensively carried out across the Jugan orebody/deposit outcropping on the hill. Channels/trenches were excavated across the mapped orebody surface extents to a depth between 1-3 metres. The base of the trench was “cored/slotted” in 1m sample lengths to mimic the same or similar volume as HQ drill core. These channels and trenches were used to delimit the orezone on surface. Samples collected followed the same/similar logging and sample processing procedures as for drillholes. Trench samples were used in the geological and resource modelling. Analyses of channel/trench data in the resource modelling showed little or no difference in results with or without these channels/trenches, and were deemed applicable to use.
Drilling techniques	• For Besra drilling: all drillholes were diamond with triple tube; all drillholes were angled and orientated; standard drill diameter used is HQ3 with PQ3 collars; NQ3 only used when requirement to reduce (e.g. ground conditions); metallurgical drillholes were drilled in PQ3/PQ. • For historic drilling: diamond and RC drilling; diamond drillholes were predominantly NQ diameter with additional holes in HQ/PQ. • At Jugan only 17 of the 82 RC drillholes (±5% of the 252 total drillholes) were used in the geological modelling; some drillholes were drilled at BQ with only 24 of the 252 (9.5%) drillholes used in the geological modelling; a mix of standard and triple tube drilling was used in the historical diamond drillholes. • At BYG-Krian • Where historic drilling was in BQ or RC, these holes were checked by infill drilling or twinned drillholes at PQ/HQ; analysis of drillhole data in the resource modelling showed little or no difference in results with or without these drillholes; this and the low percentage of these holes was deemed not have a material impact.
Drill sample recovery	• For Besra drillholes at Jugan deposit core recovery was good with an average of 98.25% recovered throughout the deposit/orebody.

Criteria	Section 1 – Commentary
	• Some historic drilling recoveries were also recorded at Jugan, and these average 96.42% • Besra BYG-Krian core recoveries averaged 94.73% and slightly lower mainly due to low recoveries near the collar outwith the ore zones. • Where difficult ground was encountered or where the sample recovery could be compromised, controlled drilling and short drilling runs (1.5m triple tube) were used. • There is no observed correlation between core recovery and Au grades, suggesting no apparent bias in the assay grades due to core recovery.
Logging	• Besra logging was done in specifically designed Excel spreadsheets in the core shed, checked and validated and uploaded to master spreadsheet; subsequently the logging sheets have been uploaded to a fully integrated GDMS system with further validation and checking • Spreadsheet uses pick lists and extensive code tables to standardise data capture; codes entered populate description fields used to verify code entry; during upload to master spreadsheet data range checking and further validation was conducted; GDMS system also provides data and code validation. • Historic data is contained in logging sheets and these have been captured in the Excel spreadsheet format, validated and checked. • Besra logging of lithology, alteration, mineralisation, structure and orientation, recovery, geotechnical and density was undertaken as routine data collection; additionally geomechanical logging was also conducted by a geotechnical engineer as routine • Historic core was systematically reviewed and re-logged/re-interpreted where appropriate by the geologists and assigned to the appropriate logging workbook. • All Besra core was photographed (wet and dry) prior to being logged by geologists with each tray clearly marked with drillhole identification and the interval from beginning of the tray to the end of the tray. All photos are collated electronically and indexed. • All drillcore and RC chips are stored at the core shed in Bau, along with sample pulps and coarse rejects. • Observations of historic drill core shows that all previous companies involved systematically geologically logged data onto paper logs with adequate geological descriptions, sample intervals marked, and correlated to assay data, to lead to the conclusion that systematic procedures were followed in most cases to the accepted standard at the time.
Sub-sampling techniques and sample preparation	• Half core samples are taken using a diamond core saw; majority of historic drillholes were done in the same manner, with only a small amount of very early holes done by core splitter. • The core is then delivered to the cutting room where the field technicians under the supervision of the geologist responsible for each drill hole cuts the core in half using one of the four Clipper core saws installed in 2010. • Density determinations have been carried out routinely on drill core with 10 centimetre cylinders of whole core taken between 10 metres and 20 metres downhole or wherever there is a change in lithology. The method used is a displacement method with samples air dried, weighed, and then sprayed with polyurethane to seal them. They are then weighed again in air and then in water and the density determined using the standard formula.
Quality of assay data	• The sample is dried at a temperature of approximately 100°C. The total sample is then put through a jaw crusher (less than 10mm) followed a Rocklabs Boyd crusher (less than 4mm);

Criteria	Section 1 – Commentary
and laboratory tests	the sample is then riffle split twice with ½ sample being pulverized in an LM3 with 90% passing 75µm; 2 x 150g samples are then packaged with one sample going for Fire Assay and the other for ICP analysis; all sample pulps and coarse rejects are bagged and stored for usage as required (period of 3 months), and thereafter returned to Besra for storage at the core shed in Bau. • Assay data quality was determined by Besra through the submission of standards (Rocklabs SE58, SG56, SK52, SN60, SG40 & SG50), field and laboratory duplicates and blanks were inserted at a nominal interval of 1 sample per 10 samples, except for blanks and standards which are inserted at 1 in 30. • SGS also insert their own duplicates and standards and report these in their monthly reporting. Also reported were percentages passing and not passing 75µm with associated duplicate assays in the Au assay return. • Au grades are determined by 50g Fire Assay (FAA505) with an AAS finish with a detection limit of 0.01ppm. • All other elements (23) are determined by ICP (SGS methods ICP12S, IMS12S, AAS12S & CSA06V); where values exceed detection limit these are then analysed by alternate methods with higher upper limits (e.g. AAS42S) • Standards: the majority of the standards have performed reasonably well with a slight tendency to report on the lower side of the expected value based on the 95 percentile values. Most fall within plus or minus 5% of the expected value. • Field & preparation duplicates: Comparison of the field duplicate plots for Jugan and BYG-Krian shows that correlation coefficients for field duplicates are close to one (1), ranging from 0.9923 to 0.9918; for preparation duplicates the correlation coefficient from 0.9867 to 0.9923 • Laboratory duplicates: the log-log plot of SGS duplicates compiled by Besra shows a correlation coefficient of 0.9848 • Historic drillholes: Gencor and RGC used their own protocols of duplicates, standards, blanks and umpires that were to industry standards of the 1990's. BYGS / Menzies Gold had a rigorous QAQC protocols. All historic QAQC values where available have been captured and analysed. • A full summary of the QAQC and associated sample handling is contained in the appropriate section of the Feasibility Study report.
Verification of sampling and assaying	• NBG routinely sends pulps from approximately 10% of all its samples to a separate independent laboratory for umpire analysis and the results compared, with no significant bias that would affect any resource classification • During the audit process during 2010 on historic drillholes a randomly selected group were sent to SGS Waihi, New Zealand for checking. No significant discrepancies were found. • Possible discrepancies in historic data have been re-sampled (quarter core or coarse rejects) and validated/checked with the discrepancies if occurring resolved. These were re-assayed at SGS.
Location of data points	• Drillhole surveying and orientation readings. All drill holes are routinely surveyed using either single shot or multi-shot downhole cameras. For the most part Camteq Proshot multi-shot electronic cameras were the norm. Drillhole surveys were taken every 25 metres downhole for all drillholes. Each hole was also surveyed at its termination. Orientation data was collected electronically using an Orishot orientation device. This was routinely done at

Criteria	Section 1 – Commentary
	the end of each HQ drill run where the driller judged he would be able to appropriate to obtain usable information. Drill runs normally ran with the core barrel length of between 1.5 metres and 3.0 metres. Orientation data was supplied electronically to prevent transcription errors. • All drillhole collars were surveyed by registered surveyors using differential GPS and or total station, and recorded in the database. All surveys are based on registered and recognised survey stations in the area, including the Land & Survey check station on top of the Jugan deposit. • Historic drillholes collars were captured by the then registered surveyors (by theodolite or total station) working on the project with the majority of the drillholes be resurveyed and checked by current surveyors (as per above); majority of the drillholes were within reasonable survey tolerances, with those outside being adjusted to the re-surveyed value. • Downhole surveys are checked mathematically and visually in the database and in 3D in the CAE Mining Studio geological and mining software package. Any surveys with recorded errors of unacceptable deviations were excluded from the downhole desurvey process. • Topographic digital terrain models were created and used to check the drillhole collars, based on a grid point and topographic surveys, with any obvious errors being resurveyed. • Historic drillholes did not have down hole surveys conducted and only had drillhole orientation conducted at the collar; the majority of these holes are shallow (<100m) and vertical, and any deviation is considered minor. • Channels/trenches were surveyed at start and end by registered surveyors and orientation and dip along the channel recorded; channels were checked against the topographic surveys.
Data spacing and distribution	• Besra drilling at Jugan has been undertaken on nominal NW-SE 25m spaced section lines. • Majority of historic drilling at Jugan and BYG-Krian is vertical on a nominal 25-50m grid, with a number of generations of drillholes creating a near surface drillhole spacing of less than 25m • Besra drilling at BYG-Krian was undertaken on nominal W-E 50m spaced section lines, with infill drilling in the main part of the orebody at 25m intervals; drilling of orebody extensions to the W were partially infilled with 25m spaced drillholes. • All Besra drillholes (Jugan and BYG-Krian) are angled and orientated core drilling used – the predominant drillhole angle is 60°, with a few drillholes drilled flatter at 45-55° and steeper up to 70° mainly due to practical and accessibility reasons. • 252 drillholes were drilled on and around the Jugan deposit with 206 drillholes intercepting mineralisation; of this 206 only 17 were RC drillholes • For BYG-Krian 288 drillholes were drilled in and around the deposit; of these 203 drillholes intercepted mineralisation; of these only 59 being RC; these RC holes were only used, in conjunction with diamond holes, to define the inferred zone areas. • 93-94% of all recent Besra drillholes intercepted mineralisation at Jugan and BYG-Krian • 1m assay composites were used, except where ore mineralisation boundaries limit the drillhole length to less than 1m. • Channel/trench was nominally orientated perpendicular the long axis of the hill outcrop at Jugan and spaced at 20-25m laterally; a few ad-hoc trenches were orientated obliquely due to practical, access reasons and orebody outcrop orientation.

Criteria	Section 1 – Commentary
Orientation of data in relation to geological structure	• Besra drilling at Jugan has been undertaken on nominal NW-SE 25m spaced section lines which is perpendicular to the orebody strike; infill holes and twin holes are done on an ad-hoc basis and orientation to check and validate the historic drillholes whilst trying to maintain a NW/SE orientation • All Besra drillholes (Jugan and BYG-Krian) are angled and orientated core drilling used – the predominant drillhole angle is 60°, with a few drillholes drilled flatter at 45-55° and steeper up to 70° mainly due to practical and accessibility reasons. • Majority of historic drilling at Jugan and BYG-Krian is vertical. • There is no expected bias due to the orientation of the drilling and the orebody strike continuity. • The great majority of the drilling is drilled through the orebody/deposit mineralised structures.
Sample security	• All samples are packaged in secure cloth bags and transported to SGS approximately 300 metres to SGS where they are received by SGS staff. The samples are recorded, batch numbers assigned by SGS and they pass into their system. Once samples are prepped the split for Fire Assay is retained at SGS for analysis while the split for ICP is sent via SGS's secure transport systems to SGS Perth or Port Klang via their freight system using DHL in Kuching. • Having the gold analyses carried out at SGS's laboratory on the Bau Mine Site eliminates a lot of security issues. • Only authorized NBG personnel are allowed access to the SGS sample preparation and laboratory areas and release of data only comes from the authorized laboratory manager to specific authorized senior personnel at NBG the Geology Manager, General Manager and Exploration Director. • The geologists fill out standard instruction forms for SGS and the samples are delivered to the SGS lab sample reception area where they pass into the SGS sample preparation and processing system. Besra sample dispatch numbers and SGS lab batch numbers are used to track and cross-check samples.
Audits or reviews	• Lab audits and checks by Besra have shown no material issues • Historic data has been audited in 2010 by Stevens & Associates geological consultant and Terra Mining Consultants Ltd, with no matters that were serious or were likely to impair the validity of the sampling data and any subsequent use in the Mineral Resource estimates or Ore Reserve work. • SGS conduct their own internal audits and reviews which are relayed to Besra. • Previous validation and review of the historic data has been conducted by a number of parties including Snowden & Associates, Australia and Ashby Consultants, New Zealand with no material problems being raised.

Section 2: Reporting of Exploration Results

No exploration results have been reported in this release, and thus, this section is not material to this report on Ore Reserves.

Section 3: Estimation & Reporting of Mineral Resources

No Mineral Resource results or updates have been reported in this release, and thus, this section is not material to this report on Ore Reserves.

Section 4: Estimation & Reporting of Ore Reserves

Criteria	Section 4 – Commentary
Mineral Resource estimate for conversion to Ore Reserves	• Mineral Resources used for conversion to Ore Reserves are from the Measured or Indicated category. Any Inferred material that may fall within the reserve is treated and reported as waste. • The mineral resources used were defined and updated between August 2010 and November 2012 using the JORC 2004 Code. • Mineral Resources are reported inclusive of the Ore Reserves
Site visits	• Competent person is on site on a permanent basis and supervised or undertook directly work on the exploration, resource drilling and Feasibility Study. The competent person has been intricately involved in the project for the past 4 years. The sites are located in flat lying agricultural land with no water or topographic features that may influence the modifying factors of the Ore Reserve.
Study status	• A full detailed Feasibility Study was conducted and released with the announcement. • As part of this feasibility study, a number of mine optimisations and plans were developed with the base case option and various alternates being economically viable. The mine plan considered mining, geotechnical, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental modifying factors which are detailed in the Feasibility Study.
Cut-off parameters	• Cut-off grades were determined using suitable financial parameters, mining parameters, etc. in the pit optimisations. The cutoff values range from 0.39 g/t to 0.44 g/t for Jugan pit and 0.58 g/t to 0.65 g/t for BYG-Krian pit.
Mining factors or assumptions	• The mining method is planned as traditional open pit mining utilising hydraulic excavators and in-pit trucks for haulage to ROM, dump or TSF construction. Rock breaking will be a combination of free digging, rip and dig using dozer and drill-and-blast depending upon the rock characteristics. Two ramps are designed, one carrying ore and the other waste and positioned relative to ROM and dump/TSF. A surface traffic system has been designed to handle traffic flows. • As the deposit is near surface an open pit mining method is selected. The deposit outcrops on a hill with little or no waste cover, therefore no pre-strip is applicable. • Both contract-mining and owner-operator methods investigated, with contract

Criteria	Section 4 – Commentary
	mining the preferred option at this stage. • Both pit optimisation and detailed designs were undertaken, with very small differences occurring between these. Therefore the pit optimisations have been accepted as being suitable due to the block and data resolution. • Detailed geotechnical logging of drillholes and 3D modelling of geotechnical parameters was undertaken and the slope and bench parameters resulting from this were used in the pit design elements and optimisation slope angles. Slope angles, configurations and zoning are based on the geotechnical domains and 3D locations within the designed pit and scheduled extraction. • For open pit inventory, the resource block model estimation methodology incorporates dilution and provides a reasonable estimate of mined tonnage and grades. Due to the nature of the orebody there are small waste zones, which are unable to be modeled discretely, and are incorporated within the overall ore zone. These can be found in the grade model with no or minor Au grade. This internal dilution is included within the overall reserves and would form the highest percentage of dilution. However, an additional 5% dilution is added. • A 95% mining recovery factor is used. • A minimum mining width of 50m was applied, with a minimum volume used in the optimisation to prevent unpractical islands or pit configurations. • It has been assumed industry standard grade control techniques would be used, but these have not been defined in detail. • Strip ratios for Jugan were 1.6/1.47 for owner-operator and contract-mining options, respectively; for BYG-Krian the strip ratios were 4.4/3.9. • 24/7 mining operations assumed • An average gold price of $1,300/oz was used in the cost modelling, with a range of gold prices used from $1,100 - $2,000/oz in the optimisation and cost model analyses. $1,300/oz Au was used as being a conservative value below the 2013 average ($1,415.48). • US$ used in all pricing; where local Malaysian pricing applicable a MYR : USD exchange rate of 3.2 : 1 • Mining costs used are $1.74/t for the base mining cost (overburden stripping) with MCAF of 1.52 for ore and 1.34 for waste • Processing costs used are $7.57/t for the base case concentrate option (processing costs for other process methods were $30.49 for BIOX, $27.56 for POX and $37.28 for Albion) • G&A and other costs were estimated at $0.16/g Au in the optimisation • A variety of production tonnage options were investigated with the base case option of 8,000tpd average used in the schedules and cost models, and the reserves. Suitable ramp up and tail off in production rates were incorporated. • Any minor amounts of inferred material that inadvertently fall within the open pit

Criteria	Section 4 – Commentary
	and reserve model are treated as waste with no content. • Inferred Resources were investigated internally but are not included in the Reserves. Inferred material may be included with further resource definition work to varying degrees. • Infrastructure requirements for the selected mining methods were taken into consideration as part of the feasibility study – include, but not limited to, TSF, haul roads, waste dump, mine offices, pumping requirements, etc., etc.

Metallurgical factors or assumptions	• A number of metallurgical processes were investigated including POX, BIOX and Albion. However, the selected option is the creation of a gold concentrate from a simple crush, grind and flotation process, with a drying/bagging of the concentrate for shipment.
	• These processes and the one selected are not novel in nature and well tested.
	• Detailed metallurgical work has been conducted and detailed optimisation work is still underway. Factors applicable to the metallurgical process have been modelled in 3D in the resource model along with the Au. These are As, Fe and S insitu content. Future metallurgical factors are proposed to be included in the model.
	• Overall recovery is estimated to be 77% for base case flotation option. The concentrate recovery option is based on a flotation recovery, recovery for contract processing facility and their percentage of metal content. Note, contract processing recoveries are not provided as these are commercially sensitive and under negotiation at present.
	• High levels of clay are present and processes to remove this (de-sliming, etc.) before flotation have been incorporated and further optimisation work is ongoing.
	• Bulk samples from near surface and drillcore from resource drilling as well as specific metallurgical drillholes have been used for all the metallurgical testing at recognised laboratories or in-house. Samples used are from across the full strike length and depth of the orebody. Detailed mineralogy and gold deportment studies have been undertaken.
	• Base case flotation summary:
	  o The Jugan ore exhibits a very low abrasion index and moderate bond ball mill work index (12.3 kWh/t).
	  o The assay data for the Jugan ore zones indicate that there is very little difference with respect to mineral distributions in the ore zones apart from minor variations in arsenic and gold contents. The increases in arsenic coincide with increases in gold showing an evident correlation. Based on sulphide sulphur and arsenic assays the ore is estimated to contain between 2 and 2.5 wt % arsenopyrite and 4.5 to 5 wt % pyrite with a combined arsenopyrite-pyrite in the feed in the range 6.5 to 7.5 wt %.
	  o The mineral assemblage is identical for all the Jugan ore zones tested across the deposit. The bulk of the Jugan ore feeds comprise non-sulphide gangue

Criteria	Section 4 – Commentary
	which is dominated by very fine grained illite (mica) and silica. This results in production of excessive slimes after fine grinding. o Gold deportment testing showed that very little gold is leached in whole ore cyanidation (0.6 to 2%). About 70% of the gold is associated with the arsenopyrite, 25% with the pyrite and 5% with silica. o In excess of 95% of the gold can be recovered in rougher – scavenging flotation. Due to varying slime entrainment the mass pull varied between 17 and 33 wt%. To mitigate the effect of feed slimes the flotation feed will be first deslimed by cyclone or a continuous gravity concentration. Flotation feed desliming test work is still in progress. o Bulk rougher-scavenger followed by cleaner flotation without prior desliming has shown that 90% of the gold can be recovered in a mass pull of 10 wt %. This corresponds to a gold upgrading ratio of 9:1 with respect to the feed grade. Mineralogical composition of a cleaner concentrate showed that the arsenopyrite and pyrite account for 67.4 wt % of the cleaner flotation concentrate. o Results indicate that inclusive of a desliming step, the flotation gold upgrade factor in the rougher circuit will be approximately 9 and in the cleaner stage greater than 2, giving an anticipated concentrate grade of +30 g/tAu
Environmental	• Waste rock and ore material have been tested for their NAF/PAF potential – both static and kinetic testing. Their treatment and impoundment (including neutralization, lining and containment) have been considered to prevent any acid mine drainage issues. • Baseline and preliminary EIA studies have been completed and the EIA Report and submission to local government will happen shortly. The only baseline work not completed to date is the geo-hydrology – awaiting drilling completion. • An initial conceptual MRP and ongoing updates have been submitted to the relevant authorities and have been accepted. A detailed MRP based on the Feasibility Study will be submitted along with the EIA.
Infrastructure	• The project area is centred on the township of Bau some 40 km WSW of the state capital and port of Kuching. • The Bau Project generally has good infrastructural aspects both within Bau Township and in Kuching. The main infrastructural features are: o Regular and reliable international air services to Kuching from Kuala Lumpur, Singapore, Hong Kong and Indonesia. Airport is only a thirty-five to forty (35-40) minute drive from the project area; o Two (2) ports with good dock and storage facilities (port has a capacity for vessels up to 17,000 tonnes); o Two (2) main sealed trunk roads from Kuching for delivery of supplies, heavy

Criteria	Section 4 – Commentary
	plant and equipment to the plant site; o Excellent labour and engineering support services; o Easy Accessibility – project extremities are less than a twenty (20) minute drive from the exploration base, and all important mines and gold prospects are linked by road; o Area is serviced with power and water; o The official language in Sarawak is Bahasa Malaysia, but most local communities speak English as a second language and have their own local dialects; o Well educated workforce (90% of population have received a secondary education); o An active quarrying industry focused mainly on limestone and marble for roading aggregates and agricultural purposes; o Ready supply of earthmoving equipment that supports the quarrying industry; o A local labour source with mining experience gained from the quarrying industry and past gold mining activity.
Costs	• Detailed Feasibility Study Capital and Operating costing has been applied. Costs are based on detailed quotes and/or derived from first principles. A full cost model incorporating all capital and operating costs has been compiled and based on the mining schedule(s). Quantities and amounts involved in the costing are derived from detailed designs, equipment configurations, layouts and usage quantities. Suitable factors have been applied to cover practical and reasonable variations to the costing, and where applicable conservative approaches and values have been used. Benchmarking of costs has been undertaken for key cost items. • Initial Capital - $92.1M; ongoing capital - $42.8M; total capital of $134.9M • Operating cost per tonne averages $31.38 & all in sustaining cost per ounce is $1,030.61 • Exchange rates used are as supplied by credible institutions including our current actual exchange rates realised. • Concentrate processing is based on supplied letters form potential processors and refining charges also, including penalties and costs, along with metal content payable. The concentrate processing details are not published here as Besra is awaiting additional offers and negotiating with suppliers of current payables and TC's. This information is commercially sensitive and details are not included for that reason. • Import duties are applied where applicable, or materials sourced (particularly from within Malaysia) are already inclusive of import taxes. There is scope for savings in this area as some imported items (associated with mining) are exempt from import taxes.

Criteria	Section 4 – Commentary
	• All royalties have been catered for – there currently is zero royalty on gold and the export of gold concentrate does incur any export duties. Licence fees for associated tenements have been paid to date.
Revenue factors	• A range of gold prices have been used in the cost modelling and optimisation work to determine the impacts and variances. • An average gold price of \$1,300/oz was used in the cost modelling and schedule, with a range of gold prices used from \$1,200 - \$2,000/oz in the optimisation and cost model analyses. \$1,300/oz Au was used as being a conservative value below the 2013 average (\$1,415.48). Note, all pricing is in US\$
Economic	• A discount rate of 8% has been used in all calculations and pit optimisations. • No inflation rates have been applied to the costing. • A range of sensitivities were conducted – gold price from \$1,100 to \$2,000/oz; + and – percentage ranges on processing costs, mining costs, capital cost, average mined grade and process recovery – both in terms of the effect on NPV and IRR • Resultant economics for the base case option(s) are NPV_8 of \$91.4M and IRR of 38.0% for contract mining, and NPV_8 of \$97.3M and IRR of 34.3% for owner-operator • The estimate inputs for the flotation concentrate base case (operating and capital costs) are at ± 15% and is as expected for this study case. Other processing methods were assessed at PFS level (±25%) and primarily used as a comparison to the preferred flotation concentrate option. • Gold price, grade and recovery show the highest level sensitivities, with lower sensitivities for the other elements analysed. • A number of tax incentives are available and these are currently being investigated. No tax incentives were applied to the cost model, and this may provide some upside to the project. • 650 cost model scenarios were developed with the main 40 scenarios investigated in further detail. Sensitivities and impacts were analysed across the main scenarios with the base case options receiving the most detailed analysis and these are outlined in the Feasibility Study report.
Social	• External and internal studies indicate no impediment for a social licence to operate.
Other	• Risk assessments were conducted and a risk matrix developed as part of Feasibility Study, with no major risk determined that is likely to limit or stop the project. • All tenements covering the mining and plant areas are fully granted for the 20 year maximum period. Part of the infrastructure is on a currently granted tenement that expires in Nov 2014. This tenement has been re-applied for a year in advance (Nov 2103) and will be an application renewal after the expiry date, with existing use

Criteria	Section 4 – Commentary
	rights and priority in time status. It is expected that the licence renewal will be issued soon and should be well in place before operations commence in late 2015.
Classification	• Based on the above and the detailed work in the Feasibility Study the Measured Resources have been converted to Proven Reserves and the Indicated Resources to Probable. No downgrading of Measured Resources to Probable Reserves has been done. This competent person considers the result is reflected appropriately in the classification of Reserves.
Audits or reviews	• A high level review and risk assessment has been undertaken by a third party, along with suitable benchmarking with other sites/projects and internal reviews/checks undertaken.

A16-1. Pit Optimisation – Economic Model Parameters

ECONOMIC MODEL PARAMETERS USED FOR PIT OPTIMISATION

- Metal (AU) Price fixed at US$ 1500/oz in all options
- Metallurgical Recovery changes relative to process options
- Dilution & Mining Recovery – fixed relative to mining rates & process options
- Mining Costs (ore & Waste) – changes relative to mining rates
- Processing Costs – changes relative to process options
- Parameters are the same for Jugan and BYG-Krian, except the concentrate shipping cost

Economic Model Parameters – For 4000 TPD

Parameters	Units	Flotation	POX	BIOX	ALBION
Gold Price	$/oz	1,500	1,500	1,500	1,500
Selling Cost	$/g	0.16	0.45	0.45	0.45
Mining Recovery	%	95	95	95	95
Mining Dilution	%	5	5	5	5
Base Mining Cost (Owner Mining)	$/tonne	2.366	2.366	2.366	2.366
MCAF – Ore		1.273	1.273	1.273	1.273
MCAF – Waste/Intrusive		1.228	1.228	1.228	1.228
Base Mining Cost (Contractor)	$/tonne	3.056	3.056	3.056	3.056
MCAF – Ore		1.291	1.291	1.291	1.291
MCAF – Waste/Intrusive		1.243	1.243	1.243	1.243
Incremental Cost per Bench	$/tonne	-	-	-	-
Rehab Cost	$/tonne	0.10	0.10	0.10	0.10
Process Cost	$/tonne	7.19	26.92	29.38	38.81
Process Recovery	%	77	85	80	80
Concentrate Shipping Cost (Jugan)	$/g	2.91	-	-	-
Concentrate Shipping Cost (BYG)	$/g	1.90	-	-	-

Economic Model Parameters – For 6000 TPD

Parameters	Units	Flotation	POX	BIOX	ALBION
Gold Price	$/oz	1,500	1,500	1,500	1,500
Selling Cost	$/g	0.16	0.45	0.45	0.45
Mining Recovery	%	95	95	95	95
Mining Dilution	%	5	5	5	5
Base Mining Cost (Owner Mining)	$/tonne	2.108	2.108	2.108	2.108
MCAF – Ore		1.321	1.321	1.538	1.321
MCAF – Waste/Intrusive		1.286	1.286	1.341	1.286
Base Mining Cost (Contractor)	$/tonne	2.724	2.724	2.293	2.724

Parameters	Units	Flotation	POX	BIOX	ALBION
MCAF – Ore		1.342	1.342	1.576	1.342
MCAF – Waste/Intrusive		1.304	1.304	1.365	1.304
Incremental Cost per Bench	$/tonne	-	-	-	-
Rehab Cost	$/tonne	0.10	0.10	0.10	0.10
Process Cost	$/tonne	7.19	26.92	29.38	38.81
Process Recovery	%	77	85	80	80
Concentrate Shipping Cost (Jugan)	$/g	2.91	-	-	-
Concentrate Shipping Cost (BYG)	$/g	1.90	-	-	-

Economic Model Parameters – For 8000 TPD (base case mining rate)

Parameters	Units	Flotation	POX	BIOX	ALBION
Gold Price	$/oz	1,500	1,500	1,500	1,500
Selling Cost	$/g	0.16	0.45	0.45	0.45
Mining Recovery	%	95	95	95	95
Mining Dilution	%	5	5	5	5
Base Mining Cost (Owner Mining)	$/tonne	1.787	1.787	1.787	1.787
MCAF – Ore		1.538	1.538	1.538	1.538
MCAF – Waste/Intrusive		1.341	1.341	1.341	1.341
Base Mining Cost (Contractor)	$/tonne	2.293	2.293	2.293	2.293
MCAF – Ore		1.576	1.576	1.576	1.576
MCAF – Waste/Intrusive		1.365	1.365	1.365	1.365
Incremental Cost per Bench	$/tonne	-	-	-	-
Rehab Cost	$/tonne	0.10	0.10	0.10	0.10
Process Cost	$/tonne	7.19	26.92	29.38	38.81
Process Recovery	%	77	85	80	80
Concentrate Shipping Cost (Jugan)	$/g	2.91	-	-	-
Concentrate Shipping Cost (BYG)	$/g	1.90	-	-	-

Economic Model Parameters – For 10000 TPD

Parameters	Units	Flotation	POX	BIOX	ALBION
Gold Price	$/oz	1,500	1,500	1,500	1,500
Selling Cost	$/g	0.16	0.45	0.45	0.45
Mining Recovery	%	95	95	95	95
Mining Dilution	%	5	5	5	5
Base Mining Cost (Owner Mining)	$/tonne	1.692	1.692	1.692	1.692
MCAF – Ore		1.445	1.445	1.445	1.445

Parameters	Units	Flotation	POX	BIOX	ALBION
MCAF – Waste/Intrusive		1.339	1.339	1.339	1.339
Base Mining Cost (Contractor)	$/tonne	2.168	2.168	2.168	2.168
MCAF – Ore		1.478	1.478	1.478	1.478
MCAF – Waste/Intrusive		1.364	1.364	1.364	1.364
Incremental Cost per Bench	$/tonne	-	-	-	-
Rehab Cost	$/tonne	0.10	0.10	0.10	0.10
Process Cost	$/tonne	7.19	26.92	29.38	38.81
Process Recovery	%	77	85	80	80
Concentrate Shipping Cost (Jugan)	$/g	2.91	-	-	-
Concentrate Shipping Cost (BYG)	$/g	1.90	-	-	-

Economic Model Parameters – For 12000 TPD

Parameters	Units	Flotation	POX	BIOX	ALBION
Gold Price	$/oz	1,500	1,500	1,500	1,500
Selling Cost	$/g	0.16	0.45	0.45	0.45
Mining Recovery	%	95	95	95	95
Mining Dilution	%	5	5	5	5
Base Mining Cost (Owner Mining)	$/tonne	1.614	1.614	1.614	1.614
MCAF – Ore		1.495	1.495	1.495	1.495
MCAF – Waste/Intrusive		1.363	1.363	1.363	1.363
Base Mining Cost (Contractor)	$/tonne	2.063	2.063	2.063	2.063
MCAF – Ore		1.532	1.532	1.532	1.532
MCAF – Waste/Intrusive		1.391	1.391	1.391	1.391
Incremental Cost per Bench	$/tonne	-	-	-	-
Rehab Cost	$/tonne	0.10	0.10	0.10	0.10
Process Cost	$/tonne	7.19	26.92	29.38	38.81
Process Recovery	%	77	85	80	80
Concentrate Shipping Cost (Jugan)	$/g	2.91	-	-	-
Concentrate Shipping Cost (BYG)	$/g	1.90	-	-	-

A16-2. Pit Optimisation – Ultimate Pit Results Summary

SUMMARY OF JUGAN (OWNER-OPERATOR) ULTIMATE PITS

Mining Rate/Process Option			ULTIMATE PIT		RESERVES (Meas+Ind)		Measured		Indicated		Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	g/t	tonnes	g/t	tonnes	g/t	tonnes	tonnes	tonnes	tonnes	tonnes	Ratio
Owned	4000	Flotation	**Pit 67**	289,281,216	10,218,951	1.546	3,451,000	1.469	6,767,950	1.586	16,821,544	222,321	47,494	40,442	16,511,287	1.646
Owned	6000	Flotation	**Pit 68**	317,202,906	10,282,949	1.543	3,452,216	1.469	6,830,733	1.580	17,302,983	222,321	48,515	40,442	16,991,705	1.683
Owned	8000 (base)	Flotation	**Pit 68**	335,570,199	12,916,266	1.439	3,458,755	1.468	9,457,511	1.428	42,927,735	222,954	87,093	66,808	42,550,880	3.324
Owned	10000	Flotation	**Pit 67**	352,341,031	13,109,196	1.433	3,459,404	1.467	9,649,792	1.420	44,961,818	223,062	87,941	66,810	44,584,005	3.430
Owned	12000	Flotation	**Pit 67**	361,415,102	13,113,111	1.433	3,459,404	1.467	9,653,707	1.420	45,028,302	223,062	87,941	66,810	44,650,489	3.434
Owned	4000	POX	**Pit 70**	216,723,334	8,672,518	1.700	2,906,871	1.641	5,765,648	1.729	15,043,386	697,058	427,146	37,855	13,881,327	1.735
Owned	6000	POX	**Pit 65**	235,640,250	8,784,612	1.693	2,914,090	1.639	5,870,523	1.720	15,647,253	713,367	454,131	37,855	14,441,900	1.781
Owned	8000 (base)	POX	**Pit 64**	247,869,297	8,851,758	1.688	2,917,673	1.638	5,934,085	1.713	15,933,155	719,303	475,197	37,855	14,700,800	1.800
Owned	10000	POX	**Pit 65**	257,518,385	8,875,793	1.687	2,917,673	1.638	5,958,120	1.710	16,066,146	719,303	483,089	37,855	14,825,899	1.810
Owned	12000	POX	**Pit 64**	262,359,417	8,888,787	1.686	2,918,018	1.638	5,970,769	1.710	16,235,774	719,303	483,089	37,855	14,995,527	1.827
Owned	4000	BIOX	**Pit 58**	176,538,837	7,996,941	1.759	2,667,258	1.720	5,329,684	1.779	13,595,784	892,360	496,698	26,922	12,179,804	1.700
Owned	6000	BIOX	**Pit 61**	191,282,711	8,099,591	1.754	2,673,238	1.718	5,426,353	1.771	14,188,762	908,225	543,031	26,922	12,710,584	1.752
Owned	8000 (base)	BIOX	**Pit 62**	201,131,233	8,164,716	1.755	2,674,847	1.718	5,489,870	1.772	15,042,586	908,717	558,285	36,013	13,539,571	1.842
Owned	10000	BIOX	**Pit 69**	209,263,505	8,191,231	1.753	2,675,521	1.718	5,515,710	1.770	15,182,332	908,941	571,173	37,855	13,664,363	1.853
Owned	12000	BIOX	**Pit 64**	213,083,158	8,204,847	1.752	2,675,521	1.718	5,529,326	1.769	15,325,952	908,941	575,738	37,855	13,803,418	1.868
Owned	4000	ALBION	**Pit 65**	124,307,365	6,556,497	1.904	2,152,051	1.905	4,404,446	1.903	12,330,016	1,362,470	863,828	23,828	10,079,890	1.881
Owned	6000	ALBION	**Pit 62**	133,643,289	6,680,178	1.904	2,152,988	1.905	4,527,191	1.903	13,558,842	1,362,470	921,851	23,847	11,250,674	2.030
Owned	8000 (base)	ALBION	**Pit 59**	140,373,134	6,733,720	1.9015	2,153,289	1.905	4,580,431	1.900	13,905,966	1,365,266	959,351	23,847	11,557,502	2.065
Owned	10000	ALBION	**Pit 63**	146,380,312	6,744,459	1.901	2,156,309	1.904	4,588,150	1.899	13,933,548	1,367,876	963,908	23,847	11,577,917	2.066
Owned	12000	ALBION	**Pit 64**	148,846,492	6,796,850	1.901	2,156,309	1.904	4,640,541	1.899	14,583,515	1,367,876	999,421	26,922	12,189,296	2.146

SUMMARY OF JUGAN (CONTRACT MINING) ULTIMATE PITS

Mining Rates/Process Option			ULTIMATE PIT		RESERVES (Meas+Ind)		Measured		Indicated		Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	g/t	tonnes	g/t	tonnes	g/t	tonnes	tonnes	tonnes	tonnes	tonnes	Ratio
Contract	4000	Flotation	**Pit 68**	272,889,678	10,005,517	1.555	3,442,369	1.471	6,563,148	1.599	15,054,310	222,182	39,842	37,855	14,754,431	1.505
Contract	6000	Flotation	**Pit 62**	299,705,583	10,031,949	1.553	3,444,909	1.470	6,587,040	1.597	15,203,805	222,321	39,905	37,855	14,903,724	1.516
Contract	8000 (base)	Flotation	**Pit 65**	317,428,122	10,114,132	1.552	3,445,104	1.470	6,669,028	1.594	16,047,317	222,321	40,749	37,855	15,746,392	1.587
Contract	10000	Flotation	**Pit 67**	331,365,992	10,201,613	1.548	3,449,679	1.469	6,751,934	1.588	16,742,496	222,321	47,494	40,442	16,432,239	1.641
Contract	12000	Flotation	**Pit 66**	338,503,255	10,234,559	1.546	3,451,000	1.469	6,783,559	1.585	17,002,572	222,321	47,494	40,442	16,692,315	1.661
Contract	4000	POX	**Pit 66**	201,853,276	8,395,704	1.711	2,890,409	1.645	5,505,295	1.745	13,161,062	672,356	360,832	23,847	12,104,027	1.568
Contract	6000	POX	**Pit 67**	219,762,953	8,473,028	1.707	2,897,012	1.643	5,576,016	1.740	13,575,206	680,649	386,411	26,922	12,481,224	1.602
Contract	8000 (base)	POX	**Pit 68**	231,895,164	8,547,655	1.704	2,898,811	1.643	5,648,844	1.735	14,028,218	684,377	400,551	26,922	12,916,368	1.641
Contract	10000	POX	**Pit 69**	242,188,005	8,626,888	1.703	2,901,562	1.642	5,725,326	1.734	14,886,085	686,871	415,186	37,855	13,746,173	1.726
Contract	12000	POX	**Pit 70**	246,964,779	8,672,519	1.700	2,906,871	1.641	5,765,648	1.729	15,043,386	697,058	427,146	37,855	13,881,327	1.735
Contract	4000	BIOX	**Pit 59**	162,338,205	7,790,118	1.761	2,655,727	1.723	5,134,391	1.781	11,863,887	890,603	438,540	23,828	10,510,916	1.523
Contract	6000	BIOX	**Pit 65**	176,285,524	7,858,315	1.759	2,662,806	1.721	5,195,509	1.779	12,284,817	891,374	445,372	23,828	10,924,243	1.563
Contract	8000 (base)	BIOX	**Pit 62**	185,992,988	7,923,629	1.763	2,664,505	1.721	5,259,124	1.784	13,183,729	891,374	462,023	23,847	11,806,485	1.664
Contract	10000	BIOX	**Pit 59**	194,835,041	7,988,857	1.759	2,666,426	1.720	5,322,431	1.779	13,502,549	892,360	493,073	26,922	12,090,194	1.690
Contract	12000	BIOX	**Pit 63**	198,605,464	7,996,942	1.759	2,667,258	1.720	5,329,684	1.779	13,595,784	892,360	496,698	26,922	12,179,804	1.700
Contract	4000	ALBION	**Pit 69**	111,047,932	6,320,734	1.908	2,138,530	1.909	4,182,204	1.908	10,842,626	1,346,828	785,884	12,464	8,697,450	1.715
Contract	6000	ALBION	**Pit 67**	120,055,210	6,440,384	1.910	2,142,633	1.908	4,297,751	1.911	11,784,711	1,351,339	833,755	12,464	9,587,153	1.830
Contract	8000 (base)	ALBION	**Pit 68**	126,634,883	6,462,553	1.908	2,145,015	1.9073	4,317,538	1.909	11,847,101	1,353,327	848,814	12,464	9,632,496	1.833
Contract	10000	ALBION	**Pit 70**	133,253,906	6,545,900	1.904	2,150,843	1.906	4,395,057	1.904	12,266,003	1,362,470	863,828	12,464	10,027,241	1.874
Contract	12000	ALBION	**Pit 66**	135,692,831	6,555,289	1.904	2,150,843	1.906	4,404,446	1.903	12,329,602	1,362,470	863,828	23,828	10,079,476	1.881

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) ULTIMATE PITS

Mining Rates/Process Option			ULTIMATE PIT		RESERVES (Ind)		Total Waste	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	(g/t)	tonnes	tonnes	tonnes	tonnes	Ratio
Owned	4000	Flotation	**Pit 67**	82,644,747	1,046,785	3.086	4,608,922	8,736	22,264	4,577,922	4.403
Owned	6000	Flotation	**Pit 68**	84,540,929	1,050,274	3.080	4,642,227	8,736	22,267	4,611,224	4.420
Owned	8000 (base)	Flotation	**Pit 65**	86,432,838	1,060,194	3.065	4,807,623	8,736	22,482	4,776,405	4.535
Owned	10000	Flotation	**Pit 67**	87,673,375	1,217,365	2.754	5,648,898	14,098	24,307	5,610,493	4.640
Owned	12000	Flotation	**Pit 66**	88,252,404	1,219,778	2.752	5,699,221	14,098	24,307	5,660,816	4.672
Owned	4000	POX	**Pit 58**	78,946,125	922,578	3.393	4,232,607	49,245	14,544	4,168,818	4.588
Owned	6000	POX	**Pit 53**	80,617,377	929,787	3.382	4,345,149	49,626	15,004	4,280,519	4.673
Owned	8000 (base)	POX	**Pit 59**	82,314,966	934,804	3.373	4,423,212	50,056	19,018	4,354,138	4.732
Owned	10000	POX	**Pit 61**	83,384,318	944,328	3.354	4,531,414	51,261	19,917	4,460,236	4.799
Owned	12000	POX	**Pit 62**	83,849,018	945,094	3.353	4,558,339	51,261	19,917	4,487,161	4.823
Owned	4000	BIOX	**Pit 56**	70,106,874	866,332	3.531	3,912,503	64,846	12,265	3,835,392	4.516
Owned	6000	BIOX	**Pit 58**	71,580,182	874,773	3.516	4,026,913	66,990	12,353	3,947,570	4.603
Owned	8000 (base)	BIOX	**Pit 54**	73,172,040	884,136	3.511	4,301,995	71,802	12,980	4,217,213	4.866
Owned	10000	BIOX	**Pit 60**	74,170,171	888,309	3.501	4,335,007	71,823	13,908	4,249,276	4.880
Owned	12000	BIOX	**Pit 56**	74,593,785	889,040	3.499	4,342,076	72,237	14,433	4,255,406	4.884
Owned	4000	ALBION	**Pit 55**	63,058,614	742,791	3.901	3,441,575	105,033	10,211	3,326,331	4.633
Owned	6000	ALBION	**Pit 51**	64,260,706	744,714	3.898	3,480,024	105,067	10,418	3,364,539	4.673
Owned	8000 (base)	ALBION	**Pit 56**	65,596,076	774,909	3.848	4,120,208	129,469	10,999	3,979,740	5.317
Owned	10000	ALBION	**Pit 64**	66,505,550	776,894	3.844	4,156,575	129,631	11,080	4,015,864	5.350
Owned	12000	ALBION	**Pit 61**	66,883,831	779,400	3.841	4,222,916	129,631	11,532	4,081,753	5.418

SUMMARY OF BYG-KRIAN (CONTRACT MINING) ULTIMATE PITS

Mining Rates/Process Option			ULTIMATE PIT		RESERVES (Ind)		Total Waste	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	(g/t)	tonnes	tonnes	tonnes	tonnes	Ratio
Contract	4000	Flotation	**Pit 63**	78,149,600	1,004,058	3.141	3,947,382	7,199	16,126	3,924,057	3.931
Contract	6000	Flotation	**Pit 64**	80,111,816	1,012,325	3.127	4,030,187	7,199	19,422	4,003,566	3.981
Contract	8000 (base)	Flotation	**Pit 63**	82,234,736	1,026,886	3.109	4,251,086	7,953	21,597	4,221,536	4.140
Contract	10000	Flotation	**Pit 64**	83,650,458	1,046,247	3.087	4,602,848	8,736	22,264	4,571,848	4.399
Contract	12000	Flotation	**Pit 63**	84,253,340	1,046,916	3.086	4,611,456	8,736	22,267	4,580,453	4.405
Contract	4000	POX	**Pit 49**	74,924,926	869,185	3.482	3,498,384	36,840	12,124	3,449,420	4.025
Contract	6000	POX	**Pit 53**	76,595,985	881,141	3.456	3,599,401	38,115	12,795	3,548,491	4.085
Contract	8000 (base)	POX	**Pit 55**	78,477,697	908,996	3.412	3,993,529	46,330	14,349	3,932,850	4.393
Contract	10000	POX	**Pit 54**	79,727,227	921,391	3.395	4,207,701	48,045	14,544	4,145,112	4.567
Contract	12000	POX	**Pit 57**	80,262,467	924,568	3.393	4,294,132	49,245	14,997	4,229,890	4.644
Contract	4000	BIOX	**Pit 56**	66,370,944	820,619	3.619	3,351,712	49,212	11,391	3,291,109	4.084
Contract	6000	BIOX	**Pit 54**	67,897,251	827,037	3.607	3,426,029	53,791	11,391	3,360,847	4.143
Contract	8000 (base)	BIOX	**Pit 50**	69,589,828	836,701	3.585	3,511,167	55,017	11,484	3,444,666	4.196
Contract	10000	BIOX	**Pit 52**	70,698,385	858,778	3.542	3,781,291	62,516	11,646	3,707,129	4.403
Contract	12000	BIOX	**Pit 54**	71,170,612	865,705	3.533	3,911,968	64,846	12,265	3,834,857	4.519
Contract	4000	ALBION	**Pit 56**	59,524,980	717,409	3.973	3,242,051	93,691	8,773	3,139,587	4.519
Contract	6000	ALBION	**Pit 56**	60,860,293	723,490	3.956	3,292,573	94,692	9,149	3,188,732	4.551
Contract	8000 (base)	ALBION	**Pit 51**	62,403,483	731,175	3.934	3,351,646	96,967	9,620	3,245,059	4.584
Contract	10000	ALBION	**Pit 55**	63,415,415	741,147	3.907	3,437,451	105,033	9,620	3,322,798	4.638
Contract	12000	ALBION	**Pit 56**	63,816,104	742,791	3.901	3,441,575	105,033	10,211	3,326,331	4.633

A16-3. Pit Optimisation – Optimal Pit Results Summary

SUMMARY OF JUGAN (OWNER-OPERATOR) OPTIMAL PITS

Mining Rate/Process Option			OPTIMAL PIT		RESERVES (Meas+Ind)		Measured		Indicated		Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	grade (g/t)	tonnes	g/t	tonnes	g/t	tonnes	tonnes	tonnes	tonnes	tonnes	Ratio
Owned	4000	Flotation	**Pit 52**	288,557,077	9,951,932	1.557	3,445,955	1.470	6,505,977	1.604	14,751,345	222,321	39,131	36,632	14,453,261	1.482
Owned	6000	Flotation	**Pit 55**	316,517,503	10,055,787	1.552	3,446,387	1.470	6,609,401	1.594	15,331,911	222,321	39,905	37,855	15,031,830	1.525
Owned	8000 (base)	Flotation	**Pit 54**	334,526,740	10,157,774	1.549	3,452,670	1.469	6,705,104	1.590	16,288,378	222,415	40,749	37,860	15,987,354	1.604
Owned	10000	Flotation	**Pit 54**	347,897,970	10,216,606	1.547	3,453,349	1.469	6,763,256	1.587	16,830,913	222,523	47,494	40,442	16,520,454	1.647
Owned	12000	Flotation	**Pit 61**	360,574,282	12,618,903	1.446	3,459,239	1.467	9,159,664	1.437	39,518,338	223,062	72,943	51,982	39,170,351	3.132
Owned	4000	POX	**Pit 56**	216,446,115	8,476,356	1.707	2,902,274	1.642	5,574,082	1.741	13,604,476	686,488	379,605	26,922	12,511,461	1.605
Owned	6000	POX	**Pit 53**	235,143,601	8,517,818	1.704	2,905,073	1.642	5,612,745	1.736	13,751,875	690,672	389,409	26,922	12,644,872	1.614
Owned	8000 (base)	POX	**Pit 56**	247,674,286	8,701,011	1.698	2,912,748	1.640	5,788,262	1.727	15,133,808	706,000	439,463	26,922	13,961,423	1.739
Owned	10000	POX	**Pit 54**	257,196,908	8,725,423	1.696	2,912,748	1.640	5,812,675	1.724	15,255,154	706,000	440,768	26,922	14,081,464	1.748
Owned	12000	POX	**Pit 54**	261,991,821	8,732,592	1.695	2,913,094	1.640	5,819,498	1.723	15,289,681	706,000	441,974	26,922	14,114,785	1.751
Owned	4000	BIOX	**Pit 54**	176,509,263	7,970,702	1.759	2,667,258	1.720	5,303,444	1.779	13,346,172	892,360	477,345	23,847	11,952,620	1.674
Owned	6000	BIOX	**Pit 55**	191,223,426	7,993,195	1.759	2,669,067	1.720	5,324,128	1.779	13,522,084	892,360	493,073	26,922	12,109,729	1.692
Owned	8000 (base)	BIOX	**Pit 59**	201,126,428	8,150,746	1.755	2,674,218	1.718	5,476,528	1.774	14,964,108	908,225	557,029	26,922	13,471,932	1.836
Owned	10000	BIOX	**Pit 62**	209,237,143	8,156,922	1.755	2,675,521	1.718	5,481,401	1.773	15,002,431	908,906	557,160	26,922	13,509,443	1.839
Owned	12000	BIOX	**Pit 57**	213,048,275	8,162,360	1.755	2,675,521	1.718	5,486,839	1.773	15,035,982	908,906	557,172	26,922	13,542,982	1.842
Owned	4000	ALBION	**Pit 59**	124,258,564	6,506,472	1.905	2,152,051	1.905	4,354,421	1.905	11,983,653	1,362,155	856,442	12,464	9,752,592	1.842
Owned	6000	ALBION	**Pit 57**	133,566,243	6,550,169	1.904	2,152,988	1.905	4,397,182	1.903	12,265,811	1,362,470	868,524	12,464	10,022,353	1.873
Owned	8000 (base)	ALBION	**Pit 56**	140,313,292	6,686,129	1.903	2,153,289	1.905	4,532,840	1.902	13,573,728	1,362,470	923,573	23,847	11,263,838	2.030
Owned	10000	ALBION	**Pit 58**	146,261,353	6,696,248	1.902	2,156,309	1.904	4,539,939	1.901	13,591,508	1,365,080	928,129	23,847	11,274,452	2.030
Owned	12000	ALBION	**Pit 57**	148,692,588	6,697,479	1.902	2,156,309	1.904	4,541,170	1.901	13,598,063	1,365,080	928,144	23,847	11,280,992	2.030

SUMMARY OF JUGAN (CONTRACT-MINING) OPTIMAL PITS

Mining Rates/Process Option			OPTIMAL PIT		RESERVES (Meas+Ind)		Measured		Indicated		Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	g/t	tonnes	g/t	tonnes	g/t	tonnes	tonnes	tonnes	tonnes	tonnes	Ratio
Contract	4000	Flotation	**Pit 61**	272,797,845	9,913,621	1.560	3,442,369	1.471	6,471,252	1.607	14,575,626	222,182	39,130	26,922	14,287,392	1.470
Contract	6000	Flotation	**Pit 53**	299,476,065	9,917,605	1.560	3,444,386	1.470	6,473,219	1.607	14,583,646	222,182	39,130	26,922	14,295,412	1.470
Contract	8000 (base)	Flotation	**Pit 52**	316,737,006	9,920,498	1.559	3,444,581	1.470	6,475,917	1.607	14,605,704	222,182	39,130	26,922	14,317,470	1.472
Contract	10000	Flotation	**Pit 61**	331,290,877	10,092,966	1.554	3,445,104	1.470	6,647,862	1.597	15,966,499	222,321	40,749	37,855	15,665,574	1.582
Contract	12000	Flotation	**Pit 59**	338,364,094	10,094,006	1.554	3,445,955	1.470	6,648,051	1.597	15,970,492	222,321	40,749	37,855	15,669,567	1.582
Contract	4000	POX	**Pit 55**	201,588,692	8,189,576	1.715	2,889,480	1.645	5,300,096	1.753	11,733,410	671,390	314,264	12,464	10,735,292	1.433
Contract	6000	POX	**Pit 63**	219,708,634	8,396,940	1.711	2,891,393	1.645	5,505,547	1.745	13,169,131	672,356	360,832	23,847	12,112,096	1.568
Contract	8000 (base)	POX	**Pit 59**	231,726,051	8,432,274	1.709	2,892,655	1.645	5,539,619	1.743	13,387,954	672,356	378,097	26,922	12,310,579	1.588
Contract	10000	POX	**Pit 60**	241,916,116	8,472,537	1.707	2,899,483	1.643	5,573,054	1.741	13,591,234	682,451	379,593	26,922	12,502,268	1.604
Contract	12000	POX	**Pit 58**	246,573,925	8,475,565	1.707	2,901,483	1.642	5,574,082	1.741	13,600,129	682,452	379,605	26,922	12,511,150	1.605
Contract	4000	BIOX	**Pit 53**	162,253,438	7,727,498	1.763	2,654,581	1.723	5,072,917	1.784	11,522,584	883,239	422,049	12,464	10,204,832	1.491
Contract	6000	BIOX	**Pit 54**	176,048,762	7,740,633	1.762	2,661,659	1.721	5,078,974	1.783	11,555,602	884,010	424,001	12,464	10,235,127	1.493
Contract	8000 (base)	BIOX	**Pit 59**	185,986,135	7,912,835	1.763	2,664,505	1.721	5,248,330	1.785	13,103,977	891,374	459,472	23,847	11,729,284	1.656
Contract	10000	BIOX	**Pit 57**	194,787,547	7,943,170	1.761	2,666,426	1.720	5,276,744	1.782	13,211,436	892,360	468,243	23,847	11,826,986	1.663
Contract	12000	BIOX	**Pit 59**	198,529,289	7,944,160	1.761	2,667,258	1.720	5,276,902	1.782	13,218,215	892,360	468,243	23,847	11,833,765	1.664
Contract	4000	ALBION	**Pit 65**	110,891,728	6,178,660	1.909	2,137,162	1.9088	4,041,498	1.909	9,947,341	1,346,828	736,277	12,464	7,851,772	1.610
Contract	6000	ALBION	**Pit 62**	119,881,240	6,331,948	1.907	2,140,966	1.908	4,190,982	1.907	10,859,780	1,349,053	789,096	12,464	8,709,167	1.715
Contract	8000 (base)	ALBION	**Pit 64**	126,612,877	6,430,553	1.910	2,145,015	1.9073	4,285,538	1.912	11,747,257	1,353,327	824,052	12,464	9,557,414	1.827
Contract	10000	ALBION	**Pit 64**	133,216,238	6,505,264	1.905	2,150,843	1.906	4,354,421	1.905	11,983,239	1,362,155	856,442	12,464	9,752,178	1.842
Contract	12000	ALBION	**Pit 60**	135,627,522	6,505,264	1.905	2,150,843	1.906	4,354,421	1.905	11,983,239	1,362,155	856,442	12,464	9,752,178	1.842

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) OPTIMAL PITS

Mining Rates/Process Option			OPTIMAL PIT		RESERVES (Ind)		Total Waste	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	(g/t)	tonnes	tonnes	tonnes	tonnes	Ratio
Owned	4000	Flotation	**Pit 61**	82,599,543	1,036,976	3.088	4,331,056	8,420	21,597	4,301,039	4.177
Owned	6000	Flotation	**Pit 62**	84,502,745	1,044,129	3.086	4,520,067	8,420	21,606	4,490,041	4.329
Owned	8000 (base)	Flotation	**Pit_56**	86,405,519	1,051,312	3.077	4,637,900	8,736	22,385	4,606,779	4.412
Owned	10000	Flotation	**Pit 58**	87,612,405	1,060,487	3.062	4,773,386	8,736	22,522	4,742,128	4.501
Owned	12000	Flotation	**Pit 56**	88,127,290	1,060,720	3.062	4,777,133	8,736	22,522	4,745,875	4.504
Owned	4000	POX	**Pit 57**	78,945,277	922,020	3.393	4,216,139	48,045	14,544	4,153,550	4.573
Owned	6000	POX	**Pit 49**	80,604,588	924,908	3.388	4,245,780	49,587	14,552	4,181,641	4.590
Owned	8000 (base)	POX	**Pit 52**	82,309,179	931,535	3.378	4,359,797	49,769	15,636	4,294,392	4.680
Owned	10000	POX	**Pit 51**	83,363,218	936,021	3.367	4,379,772	50,395	16,528	4,312,849	4.679
Owned	12000	POX	**Pit 50**	83,819,199	936,487	3.366	4,385,425	50,395	16,528	4,318,502	4.683
Owned	4000	BIOX	**Pit 54**	70,105,382	861,631	3.535	3,800,329	63,151	11,646	3,725,532	4.411
Owned	6000	BIOX	**Pit 55**	71,573,667	870,967	3.520	3,943,342	66,865	12,346	3,864,131	4.528
Owned	8000 (base)	BIOX	**Pit 46**	73,013,175	869,054	3.516	3,844,040	64,482	11,916	3,767,642	4.423
Owned	10000	BIOX	**Pit 55**	74,165,295	886,374	3.504	4,299,970	71,802	13,812	4,214,356	4.851
Owned	12000	BIOX	**Pit 50**	74,586,371	886,642	3.503	4,302,338	72,215	14,337	4,215,786	4.852
Owned	4000	ALBION	**Pit 54**	63,057,848	742,295	3.902	3,428,855	105,033	10,211	3,313,611	4.619
Owned	6000	ALBION	**Pit 48**	64,254,785	743,193	3.898	3,431,289	105,033	10,211	3,316,045	4.617
Owned	8000 (base)	ALBION	**Pit 53**	65,593,587	770,764	3.854	4,025,982	127,944	10,992	3,887,046	5.223
Owned	10000	ALBION	**Pit 58**	66,487,939	771,907	3.851	4,037,092	128,230	11,073	3,897,789	5.230
Owned	12000	ALBION	**Pit 55**	66,854,870	772,022	3.851	4,039,385	128,230	11,073	3,900,082	5.232

SUMMARY OF BYG-KRIAN (CONTRACT-MINING) OPTIMAL PITS

Mining Rates/Process Option			ULTIMATE PIT		RESERVES (Ind)		Total Waste	Ind (w)	Inf (w)	Waste	Strip
Mining	TPD	PROCESS	Pit Shell	NPV	tonnes	(g/t)	tonnes	tonnes	tonnes	tonnes	Ratio
Contract	4000	Flotation	**Pit 49**	77,953,734	972,764	3.177	3,532,824	7,133	15,804	3,509,887	3.632
Contract	6000	Flotation	**Pit 56**	80,099,575	1,005,425	3.137	3,948,698	7,199	16,126	3,925,373	3.927
Contract	8000 (base)	Flotation	**Pit 50**	82,146,335	1,007,380	3.133	3,963,619	7,199	16,282	3,940,138	3.935
Contract	10000	Flotation	**Pit 46**	83,463,536	1,008,087	3.132	3,968,161	7,199	16,282	3,944,680	3.936
Contract	12000	Flotation	**Pit 53**	84,142,459	1,021,034	3.116	4,160,614	7,953	21,593	4,131,068	4.075
Contract	4000	POX	**Pit 49**	74,924,926	869,185	3.482	3,498,384	36,840	12,124	3,449,420	4.025
Contract	6000	POX	**Pit 51**	76,590,008	874,158	3.469	3,522,677	36,840	12,795	3,473,042	4.030
Contract	8000 (base)	POX	**Pit 48**	78,459,678	901,235	3.419	3,832,527	45,394	13,752	3,773,381	4.253
Contract	10000	POX	**Pit 47**	79,671,110	906,610	3.405	3,845,758	46,009	13,940	3,785,809	4.242
Contract	12000	POX	**Pit 47**	80,172,393	907,239	3.404	3,854,196	46,009	13,940	3,794,247	4.248
Contract	4000	BIOX	**Pit 49**	66,339,467	814,266	3.628	3,264,141	47,356	11,301	3,205,484	4.009
Contract	6000	BIOX	**Pit 48**	67,841,783	816,923	3.620	3,273,378	49,212	11,301	3,212,865	4.007
Contract	8000 (base)	BIOX	**Pit 42**	69,467,843	818,861	3.616	3,292,697	49,212	11,394	3,232,091	4.021
Contract	10000	BIOX	**Pit 41**	70,550,082	828,120	3.592	3,341,520	50,624	11,468	3,279,428	4.035
Contract	12000	BIOX	**Pit 51**	71,166,090	861,004	3.537	3,799,794	63,151	11,646	3,724,997	4.413
Contract	4000	ALBION	**Pit 52**	59,509,737	711,614	3.980	3,140,913	90,705	8,637	3,041,571	4.414
Contract	6000	ALBION	**Pit 51**	60,829,628	716,966	3.967	3,197,491	93,574	8,954	3,094,963	4.460
Contract	8000 (base)	ALBION	**pit 45**	62,339,436	722,377	3.951	3,230,046	94,898	9,530	3,125,618	4.471
Contract	10000	ALBION	**Pit 49**	63,397,191	733,809	3.923	3,347,265	100,639	9,620	3,237,006	4.561
Contract	12000	ALBION	**Pit 49**	63,786,568	734,133	3.922	3,344,627	100,639	10,211	3,233,777	4.556

A16-4. Pit Optimisation – Schedule Results

SUMMARY OF JUGAN (OWNER-OPERATOR) SCHEDULES - FLOTATION

Jugan + Flotation + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,119,559	1,460,186	1,460,186	-	659,372	120,554	-	-	538,818	1.557	1.557	-	0.452
	2	2,495,207	1,460,603	1,180,506	280,097	1,034,604	85,045	3,411	-	946,147	1.509	1.457	1.730	0.708
	3	2,855,098	1,461,263	629,465	831,798	1,393,835	13,332	575	9,914	1,370,014	1.510	1.331	1.645	0.954
	4	3,661,857	1,458,024	175,797	1,282,227	2,203,834	3,390	5,726	23,836	2,170,882	1.636	1.332	1.678	1.512
	5	3,703,321	1,461,304	1	1,461,304	2,242,017	-	4,465	2,882	2,234,671	1.592	2.016	1.592	1.534
	6	7,760,554	1,460,800	-	1,460,800	6,299,754	-	6,874	-	6,292,880	1.439	-	1.439	4.313
	7	2,107,680	1,189,752	-	1,189,752	917,929	-	18,079	-	899,849	1.682	-	1.682	0.772
6000 tpd	1	3,176,289	2,192,379	2,134,426	57,954	983,910	187,157	-	-	796,753	1.586	1.561	2.512	0.449
	2	4,484,686	2,188,923	1,180,032	1,008,891	2,295,763	32,072	4,004	10,032	2,249,656	1.448	1.302	1.618	1.049
	3	6,392,179	2,190,787	131,929	2,058,858	4,201,392	3,093	6,795	23,719	4,167,786	1.664	1.489	1.675	1.918
	4	7,059,649	2,188,485	-	2,188,485	4,871,164	-	11,441	4,105	4,855,619	1.501	-	1.501	2.226
	5	4,274,895	1,295,213	-	1,295,213	2,979,682	-	17,665	-	2,962,016	1.563	-	1.563	2.301
8000 tpd	1	4,455,458	2,921,899	2,513,565	408,335	1,533,559	202,508	3,411	-	1,327,639	1.532	1.518	1.614	0.525
	2	6,852,307	2,919,440	936,981	1,982,459	3,932,867	19,906	6,995	32,171	3,873,795	1.563	1.337	1.669	1.347
	3	9,775,375	2,921,238	2,124	2,919,114	6,854,138	-	11,833	5,690	6,836,615	1.550	0.587	1.551	2.346
	4	5,363,011	1,395,196	-	1,395,196	3,967,815	-	18,510	-	3,949,305	1.554	-	1.554	2.844
10000 tpd	1	5,842,881	3,651,816	3,020,957	630,860	2,191,065	217,015	3,411	-	1,970,639	1.489	1.481	1.530	0.600
	2	11,985,794	3,650,235	431,677	3,218,558	8,335,560	5,508	11,460	36,332	8,282,259	1.643	1.383	1.678	2.284
	3	9,218,843	2,914,554	716	2,913,839	6,304,289	-	32,623	4,110	6,267,556	1.498	1.666	1.498	2.163
12000 tpd	1	8,177,570	4,381,607	3,227,909	1,153,698	3,795,963	217,747	879	13,331	3,564,006	1.528	1.477	1.672	0.866
	2	18,547,524	4,379,068	227,447	4,151,621	14,168,456	5,315	25,088	38,005	14,100,047	1.566	1.344	1.578	3.236
	3	25,412,145	3,858,227	3,882	3,854,345	21,553,918	-	46,975	645	21,506,297	1.215	1.141	1.215	5.587

Jugan + Flotation + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,119,559	1,460,186	1,460,186	-	659,372	120,554	-	-	538,818	1.557	1.557	-	0.452
	2	4,614,766	2,920,790	2,640,693	280,097	1,693,976	205,599	3,411	-	1,484,965	1.533	1.512	1.730	0.580
	3	7,469,864	4,382,053	3,270,158	1,111,895	3,087,812	218,931	3,987	9,914	2,854,979	1.525	1.477	1.666	0.705
	4	11,131,721	5,840,076	3,445,955	2,394,121	5,291,645	222,321	9,713	33,750	5,025,861	1.553	1.470	1.672	0.906
	5	14,835,043	7,301,380	3,445,955	3,855,425	7,533,663	222,321	14,177	36,632	7,260,532	1.561	1.470	1.642	1.032
	6	22,595,597	8,762,180	3,445,955	5,316,225	13,833,417	222,321	21,052	36,632	13,553,412	1.540	1.470	1.586	1.579
	7	24,703,277	9,951,932	3,445,955	6,505,977	14,751,345	222,321	39,131	36,632	14,453,261	1.557	1.470	1.604	1.482
6000 tpd	1	3,176,289	2,192,379	2,134,426	57,954	983,910	187,157	-	-	796,753	1.586	1.561	2.512	0.449
	2	7,660,975	4,381,302	3,314,458	1,066,844	3,279,673	219,228	4,004	10,032	3,046,409	1.517	1.469	1.667	0.749
	3	14,053,154	6,572,089	3,446,387	3,125,703	7,481,065	222,321	10,798	33,750	7,214,195	1.566	1.470	1.672	1.138
	4	21,112,803	8,760,574	3,446,387	5,314,187	12,352,229	222,321	22,239	37,855	12,069,814	1.550	1.470	1.602	1.410
	5	25,387,698	10,055,787	3,446,387	6,609,401	15,331,911	222,321	39,905	37,855	15,031,830	1.552	1.470	1.594	1.525
8000 tpd	1	4,455,458	2,921,899	2,513,565	408,335	1,533,559	202,508	3,411	-	1,327,639	1.532	1.518	1.614	0.525
	2	11,307,765	5,841,340	3,450,546	2,390,794	5,466,426	222,415	10,407	32,171	5,201,434	1.547	1.469	1.660	0.936
	3	21,083,140	8,762,577	3,452,670	5,309,908	12,320,563	222,415	22,239	37,860	12,038,049	1.548	1.469	1.600	1.406
	4	26,446,151	10,157,774	3,452,670	6,705,104	16,288,378	222,415	40,749	37,860	15,987,354	1.549	1.469	1.590	1.604
10000 tpd	1	5,842,881	3,651,816	3,020,957	630,860	2,191,065	217,015	3,411	-	1,970,639	1.489	1.481	1.530	0.600
	2	17,828,676	7,302,051	3,452,634	3,849,418	10,526,625	222,523	14,871	36,332	10,252,898	1.566	1.468	1.654	1.442
	3	27,047,519	10,216,606	3,453,349	6,763,256	16,830,914	222,523	47,494	40,442	16,520,454	1.547	1.469	1.587	1.647
12000 tpd	1	8,177,570	4,381,607	3,227,909	1,153,698	3,795,963	217,747	879	13,331	3,564,006	1.528	1.477	1.672	0.866
	2	26,725,094	8,760,676	3,455,357	5,305,319	17,964,419	223,062	25,967	51,336	17,664,053	1.547	1.468	1.599	2.051
	3	52,137,239	12,618,903	3,459,239	9,159,664	39,518,337	223,062	72,943	51,982	39,170,351	1.446	1.467	1.437	3.132

SUMMARY OF JUGAN (OWNER-OPERATOR) SCHEDULES - BIOX

Jugan + BIOX + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,251,142	1,461,923	1,461,923	-	789,219	444,148	-	-	345,071	1.83	1.83	-	0.540
	2	3,448,898	1,458,359	798,452	659,907	1,990,539	153,254	51,637	12,133	1,773,514	1.69	1.59	1.82	1.365
	3	2,991,534	1,462,054	373,381	1,088,673	1,529,481	290,204	72,469	-	1,166,808	1.72	1.60	1.76	1.046
	4	5,769,620	1,459,372	33,501	1,425,871	4,310,248	4,754	78,818	11,695	4,214,980	1.77	1.47	1.78	2.954
	5	5,717,640	1,458,626	-	1,458,626	4,259,014	-	172,827	19	4,086,168	1.66	-	1.66	2.920
	6	1,138,040	670,367	-	670,367	467,672	-	101,594	-	366,078	2.02	-	2.02	0.698
6000 tpd	1	3,708,113	2,191,472	2,009,282	182,190	1,516,641	564,426	12,491	-	939,724	1.727	1.748	1.500	0.692
	2	5,218,759	2,190,725	622,017	1,568,708	3,028,035	323,980	122,322	9,914	2,571,819	1.805	1.638	1.871	1.382
	3	7,110,548	2,188,233	37,768	2,150,465	4,922,315	3,954	145,483	17,008	4,755,870	1.688	1.556	1.690	2.249
	4	5,477,859	1,422,765	-	1,422,765	4,055,094	-	212,778	-	3,842,316	1.846	-	1.846	2.850
8000 tpd	1	5,676,336	2,921,198	2,424,075	497,123	2,755,139	712,857	37,324	-	2,004,958	1.699	1.703	1.682	0.943
	2	7,993,105	2,921,497	250,143	2,671,354	5,071,609	195,368	220,817	26,922	4,628,502	1.790	1.867	1.783	1.736
	3	9,445,413	2,308,052	-	2,308,052	7,137,361	-	298,888	-	6,838,473	1.783	-	1.783	3.092
10000 tpd	1	8,021,558	3,650,584	2,637,753	1,012,831	4,370,974	904,952	64,634	9,914	3,391,474	1.761	1.720	1.866	1.197
	2	11,107,008	3,650,868	37,768	3,613,100	7,456,141	3,954	357,855	17,008	7,077,324	1.697	1.556	1.698	2.042
	3	4,030,786	855,470	-	855,470	3,175,316	-	134,671	-	3,040,646	1.979	-	1.979	3.712
12000 tpd	1	9,776,099	4,381,303	2,675,520	1,705,782	5,394,797	908,906	160,961	14,999	4,309,931	1.741	1.718	1.776	1.231
	2	13,422,243	3,781,057	1	3,781,057	9,641,186	-	396,211	11,923	9,233,052	1.771	2.016	1.771	2.550

Jugan + BIOX + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,251,142	1,461,923	1,461,923	-	789,219	444,148	-	-	345,071	1.829	1.829	-	0.540
	2	5,700,040	2,920,283	2,260,376	659,907	2,779,757	597,402	51,637	12,133	2,118,585	1.761	1.743	1.822	0.952
	3	8,691,574	4,382,336	2,633,757	1,748,580	4,309,238	887,606	124,106	12,133	3,285,393	1.748	1.723	1.785	0.983
	4	14,461,194	5,841,709	2,667,258	3,174,451	8,619,486	892,360	202,924	23,828	7,500,374	1.754	1.720	1.783	1.476
	5	20,178,834	7,300,335	2,667,258	4,633,077	12,878,500	892,360	375,751	23,847	11,586,542	1.735	1.720	1.744	1.764
	6	21,316,874	7,970,702	2,667,258	5,303,444	13,346,172	892,360	477,345	23,847	11,952,620	1.759	1.720	1.779	1.674
6000 tpd	1	3,708,113	2,191,472	2,009,282	182,190	1,516,641	564,426	12,491	-	939,724	1.727	1.748	1.500	0.692
	2	8,926,872	4,382,197	2,631,299	1,750,898	4,544,675	888,406	134,812	9,914	3,511,543	1.766	1.722	1.832	1.037
	3	16,037,420	6,570,430	2,669,067	3,901,363	9,466,990	892,360	280,295	26,922	8,267,413	1.740	1.720	1.754	1.441
	4	21,515,279	7,993,195	2,669,067	5,324,128	13,522,084	892,360	493,073	26,922	12,109,729	1.759	1.720	1.779	1.692
8000 tpd	1	5,676,336	2,921,198	2,424,075	497,123	2,755,139	712,857	37,324	-	2,004,958	1.699	1.703	1.682	0.943
	2	13,669,442	5,842,694	2,674,218	3,168,477	7,826,747	908,225	258,141	26,922	6,633,460	1.745	1.718	1.767	1.340
	3	23,114,854	8,150,746	2,674,218	5,476,528	14,964,108	908,225	557,029	26,922	13,471,932	1.755	1.718	1.774	1.836
10000 tpd	1	8,021,558	3,650,584	2,637,753	1,012,831	4,370,974	904,952	64,634	9,914	3,391,474	1.761	1.720	1.866	1.197
	2	19,128,566	7,301,452	2,675,521	4,625,931	11,827,115	908,906	422,490	26,922	10,468,797	1.729	1.718	1.735	1.620
	3	23,159,352	8,156,922	2,675,521	5,481,401	15,002,431	908,906	557,160	26,922	13,509,443	1.755	1.718	1.773	1.839
12000 tpd	1	9,776,099	4,381,303	2,675,520	1,705,782	5,394,797	908,906	160,961	14,999	4,309,931	1.741	1.718	1.776	1.231
	2	23,198,342	8,162,360	2,675,521	5,486,839	15,035,983	908,906	557,172	26,922	13,542,982	1.755	1.718	1.773	1.842

SUMMARY OF JUGAN (OWNER-OPERATOR) SCHEDULES - POX

Jugan + POX + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,156,234	1,460,973	1,460,973	-	695,262	323,398	-	-	371,864	1.721	1.721	-	0.476
	2	3,141,111	1,460,430	1,020,419	440,011	1,680,680	165,692	26,245	-	1,488,743	1.609	1.580	1.676	1.151
	3	3,470,073	1,461,131	380,917	1,080,214	2,008,943	195,689	61,425	9,914	1,741,914	1.750	1.522	1.830	1.375
	4	3,423,089	1,458,661	39,965	1,418,696	1,964,428	1,708	64,148	16,989	1,881,584	1.703	1.507	1.709	1.347
	5	4,584,089	1,460,217	-	1,460,217	3,123,872	-	98,872	19	3,024,981	1.619	-	1.619	2.139
	6	5,306,236	1,174,945	-	1,174,945	4,131,291	-	128,916	-	4,002,375	1.873	-	1.873	3.516
6000 tpd	1	3,291,890	2,191,309	2,030,933	160,376	1,100,581	422,973	10,043	-	667,564	1.690	1.702	1.546	0.502
	2	5,517,533	2,190,863	834,175	1,356,688	3,326,670	265,991	78,454	9,914	2,972,310	1.696	1.503	1.814	1.518
	3	6,906,884	2,190,075	39,965	2,150,110	4,716,809	1,708	86,818	17,008	4,611,275	1.686	1.507	1.689	2.154
	4	6,553,387	1,945,571	-	1,945,571	4,607,816	-	214,093	-	4,393,723	1.750	-	1.750	2.368
8000 tpd	1	5,316,213	2,920,418	2,600,788	319,630	2,395,796	536,533	23,103	-	1,836,160	1.627	1.633	1.582	0.820
	2	10,004,870	2,921,728	311,960	2,609,768	7,083,142	169,467	156,831	26,903	6,729,941	1.748	1.694	1.755	2.424
	3	8,513,734	2,858,865	-	2,858,865	5,654,870	-	259,529	19	5,395,322	1.717	-	1.717	1.978
10000 tpd	1	7,659,398	3,651,331	2,715,014	936,316	4,008,067	668,504	43,184	9,914	3,286,465	1.697	1.665	1.792	1.098
	2	9,644,551	3,650,652	197,734	3,452,918	5,993,899	37,496	230,576	17,008	5,708,818	1.655	1.295	1.676	1.642
	3	6,676,628	1,423,440	-	1,423,440	5,253,188	-	167,007	-	5,086,181	1.796	-	1.796	3.691
12000 tpd	1	9,421,175	4,381,446	2,912,388	1,469,058	5,039,729	704,582	85,666	9,914	4,239,567	1.680	1.640	1.760	1.150
	2	14,601,097	4,351,146	706	4,350,440	10,249,952	1,418	356,308	17,008	9,875,218	1.711	0.711	1.711	2.356

Jugan + POX + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,156,234	1,460,973	1,460,973	-	695,262	323,398	-	-	371,864	1.721	1.721	-	0.476
	2	5,297,345	2,921,403	2,481,392	440,011	2,375,942	489,090	26,245	-	1,860,607	1.665	1.663	1.676	0.813
	3	8,767,418	4,382,533	2,862,309	1,520,225	4,384,885	684,780	87,669	9,914	3,602,522	1.693	1.644	1.786	1.001
	4	12,190,507	5,841,194	2,902,274	2,938,921	6,349,313	686,488	151,817	26,903	5,484,105	1.696	1.642	1.749	1.087
	5	16,774,596	7,301,411	2,902,274	4,399,137	9,473,185	686,488	250,689	26,922	8,509,086	1.680	1.642	1.706	1.297
	6	22,080,832	8,476,356	2,902,274	5,574,082	13,604,476	686,488	379,605	26,922	12,511,461	1.707	1.642	1.741	1.605
6000 tpd	1	3,291,890	2,191,309	2,030,933	160,376	1,100,581	422,973	10,043	-	667,564	1.690	1.702	1.546	0.502
	2	8,809,422	4,382,172	2,865,108	1,517,064	4,427,250	688,964	88,497	9,914	3,639,874	1.693	1.644	1.786	1.010
	3	15,716,306	6,572,247	2,905,073	3,667,174	9,144,059	690,672	175,316	26,922	8,251,149	1.691	1.642	1.729	1.391
	4	22,269,693	8,517,818	2,905,073	5,612,745	13,751,875	690,672	389,409	26,922	12,644,872	1.704	1.642	1.736	1.615
8000 tpd	1	5,316,213	2,920,418	2,600,788	319,630	2,395,796	536,533	23,103	-	1,836,160	1.627	1.633	1.582	0.820
	2	15,321,084	5,842,146	2,912,748	2,929,398	9,478,938	706,000	179,934	26,903	8,566,101	1.688	1.640	1.736	1.623
	3	23,834,818	8,701,011	2,912,748	5,788,262	15,133,808	706,000	439,463	26,922	13,961,423	1.698	1.640	1.727	1.739
10000 tpd	1	7,659,398	3,651,331	2,715,014	936,316	4,008,067	668,504	43,184	9,914	3,286,465	1.697	1.665	1.792	1.098
	2	17,303,948	7,301,983	2,912,748	4,389,235	10,001,966	706,000	273,761	26,922	8,995,283	1.676	1.640	1.701	1.370
	3	23,980,577	8,725,423	2,912,748	5,812,675	15,255,154	706,000	440,768	26,922	14,081,464	1.696	1.640	1.724	1.748
12000 tpd	1	9,421,175	4,381,446	2,912,388	1,469,058	5,039,729	704,582	85,666	9,914	4,239,567	1.680	1.640	1.760	1.150
	2	24,022,272	8,732,592	2,913,094	5,819,498	15,289,681	706,000	441,974	26,922	14,114,785	1.695	1.640	1.723	1.751

SUMMARY OF JUGAN (OWNER-OPERATOR) SCHEDULES - ALBION

Jugan + Albion + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,675,634	1,460,699	1,456,808	3,891	1,214,936	765,152	-	-	449,784	1.965	1.962	3.066	0.832
	2	4,312,179	1,459,302	682,551	776,751	2,852,877	594,519	149,874	-	2,108,484	1.918	1.792	2.029	1.955
	3	3,902,551	1,462,212	12,691	1,449,520	2,440,339	2,485	291,817	12,464	2,133,573	1.838	1.449	1.842	1.669
	4	4,771,860	1,459,418	-	1,459,418	3,312,442	-	312,650	-	2,999,792	1.799	-	1.799	2.270
	5	2,827,902	664,841	-	664,841	2,163,061	-	102,101	-	2,060,960	2.123	-	2.123	3.254
6000 tpd	1	4,899,514	2,191,777	1,980,236	211,541	2,707,737	1,155,693	35,496	-	1,516,549	1.889	1.890	1.877	1.235
	2	6,721,824	2,190,135	172,752	2,017,383	4,531,689	206,777	387,067	12,464	3,925,381	1.954	2.077	1.943	2.069
	3	7,194,643	2,168,257	-	2,168,257	5,026,385	-	445,962	-	4,580,424	1.868	-	1.868	2.318
8000 tpd	1	7,099,330	2,921,449	2,129,525	791,924	4,177,881	1,359,696	156,069	-	2,662,116	1.941	1.909	2.029	1.430
	2	9,026,380	2,920,194	23,764	2,896,431	6,106,186	2,774	606,513	23,847	5,473,050	1.811	1.577	1.813	2.091
	3	4,134,147	844,485	-	844,485	3,289,662	-	160,990	-	3,128,672	2.090	-	2.090	3.896
10000 tpd	1	8,559,386	3,651,224	2,130,291	1,520,934	4,908,162	1,362,305	307,371	12,133	3,226,352	1.926	1.908	1.952	1.344
	2	11,728,370	3,045,024	26,019	3,019,006	8,683,346	2,774	620,758	11,714	8,048,100	1.874	1.573	1.876	2.852
12000 tpd	1	12,319,452	4,380,612	2,156,309	2,224,303	7,938,840	1,365,080	411,219	19,409	6,143,133	1.920	1.904	1.935	1.812
	2	7,976,091	2,316,867	-	2,316,867	5,659,224	-	516,926	4,439	5,137,860	1.869	-	1.869	2.443

Jugan + Albion + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,675,634	1,460,699	1,456,808	3,891	1,214,936	765,152	-	-	449,784	1.965	1.962	3.066	0.832
	2	6,987,813	2,920,001	2,139,359	780,642	4,067,812	1,359,670	149,874	-	2,558,268	1.942	1.908	2.034	1.955
	3	10,890,364	4,382,213	2,152,051	2,230,162	6,508,151	1,362,155	441,691	12,464	4,691,841	1.907	1.905	1.909	1.669
	4	15,662,224	5,841,631	2,152,051	3,689,580	9,820,593	1,362,155	754,341	12,464	7,691,632	1.880	1.905	1.866	2.270
	5	18,490,125	6,506,472	2,152,051	4,354,421	11,983,653	1,362,155	856,442	12,464	9,752,592	1.905	1.905	1.905	3.254
6000 tpd	1	4,899,514	2,191,777	1,980,236	211,541	2,707,737	1,155,693	35,496	-	1,516,549	1.889	1.890	1.877	1.235
	2	11,621,338	4,381,912	2,152,988	2,228,924	7,239,426	1,362,470	422,563	12,464	5,441,930	1.921	1.905	1.937	1.652
	3	18,815,981	6,550,169	2,152,988	4,397,182	12,265,812	1,362,470	868,524	12,464	10,022,353	1.904	1.905	1.903	1.873
8000 tpd	1	7,099,330	2,921,449	2,129,525	791,924	4,177,881	1,359,696	156,069	-	2,662,116	1.941	1.909	2.029	1.430
	2	16,125,710	5,841,644	2,153,289	3,688,355	10,284,066	1,362,470	762,583	23,847	8,135,166	1.876	1.905	1.859	1.761
	3	20,259,857	6,686,129	2,153,289	4,532,840	13,573,728	1,362,470	923,573	23,847	11,263,838	1.903	1.905	1.902	2.030
10000 tpd	1	8,559,386	3,651,224	2,130,291	1,520,934	4,908,162	1,362,305	307,371	12,133	3,226,352	1.926	1.908	1.952	1.344
	2	20,287,756	6,696,248	2,156,309	4,539,939	13,591,508	1,365,080	928,129	23,847	11,274,452	1.902	1.904	1.901	2.030
12000 tpd	1	12,319,452	4,380,612	2,156,309	2,224,303	7,938,840	1,365,080	411,219	19,409	6,143,133	1.920	1.904	1.935	1.812
	2	20,295,543	6,697,479	2,156,309	4,541,170	13,598,064	1,365,080	928,144	23,847	11,280,992	1.902	1.904	1.901	2.030

SUMMARY OF JUGAN (CONTRACT-MINING) SCHEDULES - FLOTATION

Jugan + Flotation + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,992,212	1,461,713	1,461,713	-	530,499	122,354	-	-	408,145	1.558	1.558	-	0.363
	2	2,475,459	1,460,862	1,272,738	188,123	1,014,598	83,500	2,465	-	928,632	1.492	1.462	1.689	0.695
	3	3,026,723	1,459,588	432,887	1,026,701	1,567,135	12,762	575	9,914	1,543,883	1.570	1.271	1.696	1.074
	4	4,187,639	1,459,075	275,030	1,184,045	2,728,565	3,566	3,683	5,085	2,716,231	1.591	1.360	1.645	1.870
	5	3,937,253	1,460,156	1	1,460,156	2,477,097	-	6,745	11,904	2,458,448	1.603	2.016	1.603	1.697
	6	5,164,331	1,461,101	-	1,461,101	3,703,229	-	8,077	19	3,695,134	1.521	-	1.521	2.535
	7	3,705,630	1,151,125	-	1,151,125	2,554,504	-	17,586	-	2,536,919	1.592	-	1.592	2.219
6000 tpd	1	3,098,347	2,190,020	2,139,513	50,507	908,327	192,535	-	-	715,791	1.593	1.581	2.101	0.415
	2	4,832,699	2,191,136	1,172,078	1,019,058	2,641,563	29,598	3,041	9,914	2,599,010	1.490	1.310	1.696	1.206
	3	4,925,090	2,190,459	132,795	2,057,664	2,734,631	49	9,535	16,989	2,708,058	1.589	1.099	1.621	1.248
	4	9,906,803	2,188,872	-	2,188,872	7,717,931	-	8,969	19	7,708,944	1.534	-	1.534	3.526
	5	1,738,313	1,157,119	-	1,157,119	581,195	-	17,586	-	563,609	1.622	-	1.622	0.502
8000 tpd	1	4,352,256	2,920,168	2,648,616	271,552	1,432,089	209,977	2,465	-	1,219,646	1.532	1.513	1.717	0.490
	2	6,610,469	2,920,096	793,841	2,126,255	3,690,374	12,205	7,247	25,706	3,645,215	1.576	1.329	1.669	1.264
	3	9,521,135	2,920,551	2,124	2,918,427	6,600,584	-	11,832	1,216	6,587,535	1.559	0.587	1.560	2.260
	4	4,042,340	1,159,682	-	1,159,682	2,882,658	-	17,586	-	2,865,073	1.586	-	1.586	2.486
10000 tpd	1	5,753,001	3,651,911	3,118,592	533,319	2,101,091	217,375	3,428	-	1,880,287	1.492	1.486	1.530	0.575
	2	11,402,516	3,649,386	326,512	3,322,873	7,753,131	4,946	10,734	33,750	7,703,700	1.634	1.320	1.664	2.125
	3	8,903,947	2,791,669	-	2,791,669	6,112,278	-	26,587	4,105	6,081,586	1.530	-	1.530	2.190
12000 tpd	1	7,647,834	4,382,336	3,262,906	1,119,430	3,265,499	218,931	4,004	10,749	3,031,815	1.525	1.479	1.659	0.745
	2	13,657,972	4,378,917	183,050	4,195,868	9,279,055	3,390	18,746	27,106	9,229,813	1.575	1.312	1.586	2.119
	3	4,758,692	1,332,753	-	1,332,753	3,425,939	-	18,000	-	3,407,939	1.581	-	1.581	2.571

Jugan + Flotation + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,992,212	1,461,713	1,461,713	-	530,499	122,354	-	-	408,145	1.558	1.558	-	0.363
	2	4,467,671	2,922,574	2,734,451	188,123	1,545,097	205,854	2,465	-	1,336,777	1.525	1.513	1.689	0.529
	3	7,494,394	4,382,163	3,167,338	1,214,824	3,112,231	218,616	3,041	9,914	2,880,660	1.540	1.480	1.695	0.710
	4	11,682,033	5,841,238	3,442,368	2,398,870	5,840,796	222,182	6,723	14,999	5,596,891	1.553	1.471	1.670	1.000
	5	15,619,287	7,301,394	3,442,369	3,859,026	8,317,893	222,182	13,468	26,903	8,055,340	1.563	1.471	1.645	1.139
	6	20,783,617	8,762,496	3,442,369	5,320,127	12,021,122	222,182	21,545	26,922	11,750,473	1.556	1.471	1.611	1.372
	7	24,489,247	9,913,621	3,442,369	6,471,252	14,575,626	222,182	39,130	26,922	14,287,392	1.560	1.471	1.607	1.470
6000 tpd	1	3,098,347	2,190,020	2,139,513	50,507	908,327	192,535	-	-	715,791	1.593	1.581	2.101	0.415
	2	7,931,045	4,381,156	3,311,591	1,069,565	3,549,889	222,133	3,041	9,914	3,314,801	1.541	1.485	1.715	0.810
	3	12,856,135	6,571,615	3,444,386	3,127,229	6,284,520	222,182	12,576	26,903	6,022,859	1.557	1.470	1.653	0.956
	4	22,762,938	8,760,486	3,444,386	5,316,101	14,002,452	222,182	21,545	26,922	13,731,803	1.551	1.470	1.604	1.598
	5	24,501,251	9,917,605	3,444,386	6,473,219	14,583,647	222,182	39,130	26,922	14,295,412	1.560	1.470	1.607	1.471
8000 tpd	1	4,352,256	2,920,168	2,648,616	271,552	1,432,089	209,977	2,465	-	1,219,646	1.532	1.513	1.717	0.490
	2	10,962,725	5,840,264	3,442,457	2,397,807	5,122,462	222,182	9,713	25,706	4,864,862	1.554	1.471	1.674	0.877
	3	20,483,860	8,760,815	3,444,581	5,316,234	11,723,046	222,182	21,545	26,922	11,452,397	1.556	1.470	1.612	1.338
	4	24,526,201	9,920,497	3,444,581	6,475,917	14,605,704	222,182	39,130	26,922	14,317,470	1.559	1.470	1.607	1.472
10000 tpd	1	5,753,001	3,651,911	3,118,592	533,319	2,101,091	217,375	3,428	-	1,880,287	1.492	1.486	1.530	0.575
	2	17,155,517	7,301,296	3,445,104	3,856,193	9,854,221	222,321	14,163	33,750	9,583,987	1.563	1.470	1.646	1.350
	3	26,059,464	10,092,965	3,445,104	6,647,862	15,966,499	222,321	40,749	37,855	15,665,574	1.554	1.470	1.597	1.582
12000 tpd	1	7,647,834	4,382,336	3,262,906	1,119,430	3,265,499	218,931	4,004	10,749	3,031,815	1.525	1.479	1.659	0.745
	2	21,305,806	8,761,253	3,445,955	5,315,298	12,544,554	222,321	22,750	37,855	12,261,628	1.550	1.470	1.601	1.432
	3	26,064,498	10,094,007	3,445,955	6,648,051	15,970,492	222,321	40,749	37,855	15,669,567	1.554	1.470	1.597	1.582

SUMMARY OF JUGAN (CONTRACT-MINING) SCHEDULES - BIOX

Jugan + BIOX + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,249,071	1,460,283	1,460,283	-	788,788	465,118	-	-	323,670	1.844	1.844	-	0.540
	2	3,194,467	1,460,377	805,037	655,340	1,734,089	157,754	49,018	8,353	1,518,965	1.710	1.586	1.864	1.187
	3	2,815,256	1,459,659	368,071	1,091,588	1,355,597	255,613	67,102	-	1,032,882	1.698	1.567	1.742	0.929
	4	5,611,498	1,460,016	21,190	1,438,826	4,151,482	4,754	90,274	4,111	4,052,342	1.759	1.328	1.765	2.843
	5	4,811,742	1,460,728	-	1,460,728	3,351,014	-	168,886	-	3,182,128	1.711	-	1.711	2.294
	6	568,048	426,434	-	426,434	141,613	-	46,769	-	94,844	2.082	-	2.082	0.332
6000 tpd	1	3,747,570	2,190,082	2,048,998	141,084	1,557,487	580,231	10,652	-	966,604	1.751	1.769	1.487	0.711
	2	4,718,556	2,191,595	591,478	1,600,116	2,526,962	299,185	124,690	8,353	2,094,734	1.779	1.569	1.856	1.153
	3	7,001,734	2,190,609	21,183	2,169,426	4,811,125	4,593	139,435	4,111	4,662,986	1.684	1.328	1.687	2.196
	4	3,828,375	1,168,347	-	1,168,347	2,660,027	-	149,224	-	2,510,803	1.897	-	1.897	2.277
8000 tpd	1	5,493,567	2,922,595	2,430,011	492,585	2,570,972	727,853	30,836	-	1,812,282	1.706	1.709	1.689	0.880
	2	7,772,491	2,917,636	234,494	2,683,141	4,854,856	163,521	197,072	23,847	4,470,416	1.798	1.841	1.794	1.664
	3	7,750,754	2,072,604	-	2,072,604	5,678,150	-	231,564	-	5,446,586	1.795	-	1.795	2.740
10000 tpd	1	7,781,156	3,650,734	2,635,481	1,015,253	4,130,422	888,406	55,546	12,133	3,174,337	1.761	1.723	1.862	1.131
	2	12,303,162	3,650,691	30,945	3,619,746	8,652,471	3,954	332,215	11,714	8,304,588	1.714	1.490	1.716	2.370
	3	1,070,288	641,745	-	641,745	428,544	-	80,482	-	348,061	2.025	-	2.025	0.668
12000 tpd	1	7,758,916	4,380,034	2,590,763	1,789,271	3,378,882	887,605	128,973	-	2,362,304	1.751	1.723	1.792	0.771
	2	13,403,459	3,564,125	76,495	3,487,631	9,839,334	4,755	339,270	23,847	9,471,461	1.773	1.611	1.776	2.761

Jugan + BIOX + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,249,071	1,460,283	1,460,283	-	788,788	465,118	-	-	323,670	1.844	1.844	-	0.540
	2	5,443,538	2,920,660	2,265,320	655,340	2,522,878	622,872	49,018	8,353	1,842,635	1.777	1.752	1.864	0.864
	3	8,258,794	4,380,319	2,633,391	1,746,929	3,878,474	878,484	116,120	8,353	2,875,517	1.751	1.726	1.787	0.885
	4	13,870,292	5,840,335	2,654,581	3,185,755	8,029,956	883,239	206,394	12,464	6,927,860	1.753	1.723	1.777	1.375
	5	18,682,034	7,301,064	2,654,581	4,646,483	11,380,970	883,239	375,280	12,464	10,109,987	1.744	1.723	1.756	1.559
	6	19,250,081	7,727,498	2,654,581	5,072,917	11,522,583	883,239	422,049	12,464	10,204,832	1.763	1.723	1.784	1.491
6000 tpd	1	3,747,570	2,190,082	2,048,998	141,084	1,557,487	580,231	10,652	-	966,604	1.751	1.769	1.487	0.711
	2	8,466,126	4,381,677	2,640,477	1,741,201	4,084,449	879,417	135,342	8,353	3,061,338	1.765	1.724	1.826	0.932
	3	15,467,860	6,572,286	2,661,659	3,910,627	8,895,574	884,010	274,777	12,464	7,724,323	1.738	1.721	1.749	1.354
	4	19,296,234	7,740,633	2,661,659	5,078,974	11,555,601	884,010	424,001	12,464	10,235,127	1.762	1.721	1.783	1.493
8000 tpd	1	5,493,567	2,922,595	2,430,011	492,585	2,570,972	727,853	30,836	-	1,812,282	1.706	1.709	1.689	0.880
	2	13,266,059	5,840,231	2,664,505	3,175,726	7,425,828	891,374	227,908	23,847	6,282,698	1.752	1.721	1.778	1.272
	3	21,016,812	7,912,835	2,664,505	5,248,330	13,103,978	891,374	459,472	23,847	11,729,284	1.763	1.721	1.785	1.656
10000 tpd	1	7,781,156	3,650,734	2,635,481	1,015,253	4,130,422	888,406	55,546	12,133	3,174,337	1.761	1.723	1.862	1.131
	2	20,084,318	7,301,425	2,666,426	4,634,999	12,782,893	892,360	387,761	23,847	11,478,925	1.738	1.720	1.748	1.751
	3	21,154,606	7,943,169	2,666,426	5,276,744	13,211,437	892,360	468,243	23,847	11,826,986	1.761	1.720	1.782	1.663
12000 tpd	1	7,758,916	4,380,034	2,590,763	1,789,271	3,378,882	887,605	128,973	-	2,362,304	1.751	1.723	1.792	0.771
	2	21,162,375	7,944,159	2,667,258	5,276,902	13,218,216	892,360	468,243	23,847	11,833,765	1.761	1.720	1.782	1.664

SUMMARY OF JUGAN (CONTRACT-MINING) SCHEDULES - POX

Jugan + POX + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,178,540	1,462,498	1,462,498	-	716,042	317,869	-	-	398,173	1.722	1.722	-	0.490
	2	3,287,342	1,459,616	1,074,663	384,953	1,827,726	256,005	27,050	-	1,544,671	1.592	1.574	1.645	1.252
	3	3,094,619	1,459,526	331,517	1,128,009	1,635,093	95,946	55,068	8,353	1,475,726	1.813	1.562	1.887	1.120
	4	3,387,017	1,459,221	20,801	1,438,419	1,927,796	1,569	55,103	4,111	1,867,012	1.685	1.265	1.691	1.321
	5	4,241,091	1,460,396	-	1,460,396	2,780,695	-	105,751	-	2,674,944	1.614	-	1.614	1.904
	6	3,734,376	888,318	-	888,318	2,846,057	-	71,291	-	2,774,766	1.961	-	1.961	3.204
6000 tpd	1	3,241,133	2,190,972	2,027,163	163,810	1,050,160	421,900	9,172	-	619,088	1.692	1.705	1.532	0.479
	2	5,359,006	2,190,829	831,088	1,359,741	3,168,177	248,748	76,005	12,133	2,831,291	1.702	1.506	1.821	1.446
	3	6,811,063	2,188,203	33,142	2,155,061	4,622,860	1,708	88,930	11,714	4,520,507	1.686	1.436	1.690	2.113
	4	6,154,870	1,826,936	-	1,826,936	4,327,934	-	186,724	-	4,141,210	1.773	-	1.773	2.369
8000 tpd	1	5,190,587	2,920,620	2,471,773	448,847	2,269,967	474,958	24,983	-	1,770,026	1.669	1.666	1.686	0.777
	2	7,163,921	2,920,591	420,882	2,499,709	4,243,330	197,398	132,446	26,922	3,886,563	1.712	1.521	1.744	1.453
	3	9,465,719	2,591,062	-	2,591,062	6,874,657	-	220,667	-	6,653,990	1.753	-	1.753	2.653
10000 tpd	1	6,781,840	3,650,430	2,615,749	1,034,682	3,131,410	533,987	47,647	9,914	2,539,862	1.668	1.634	1.753	0.858
	2	12,418,319	3,650,810	283,734	3,367,076	8,767,509	148,464	162,916	17,008	8,439,121	1.698	1.728	1.696	2.402
	3	2,863,613	1,171,297	-	1,171,297	1,692,316	-	169,031	-	1,523,286	1.860	-	1.860	1.445
12000 tpd	1	9,211,667	4,380,477	2,901,482	1,478,995	4,831,190	682,452	60,997	9,914	4,077,827	1.696	1.642	1.801	1.103
	2	12,864,027	4,095,088	1	4,095,088	8,768,939	-	318,609	17,008	8,433,323	1.719	2.016	1.719	2.141

Jugan + POX + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,178,540	1,462,498	1,462,498	-	716,042	317,869	-	-	398,173	1.722	1.722	-	0.490
	2	5,465,882	2,922,114	2,537,161	384,953	2,543,768	573,875	27,050	-	1,942,844	1.657	1.659	1.645	0.871
	3	8,560,502	4,381,640	2,868,679	1,512,962	4,178,862	669,821	82,118	8,353	3,418,570	1.709	1.648	1.825	0.954
	4	11,947,518	5,840,861	2,889,480	2,951,381	6,106,658	671,390	137,222	12,464	5,285,582	1.703	1.645	1.760	1.046
	5	16,188,609	7,301,257	2,889,480	4,411,777	8,887,352	671,390	242,972	12,464	7,960,526	1.685	1.645	1.712	1.217
	6	19,922,985	8,189,575	2,889,480	5,300,096	11,733,409	671,390	314,264	12,464	10,735,292	1.715	1.645	1.753	1.433
6000 tpd	1	3,241,133	2,190,972	2,027,163	163,810	1,050,160	421,900	9,172	-	619,088	1.692	1.705	1.532	0.479
	2	8,600,139	4,381,801	2,858,251	1,523,550	4,218,338	670,648	85,178	12,133	3,450,379	1.697	1.647	1.790	0.963
	3	15,411,202	6,570,004	2,891,393	3,678,612	8,841,197	672,356	174,107	23,847	7,970,886	1.693	1.645	1.732	1.346
	4	21,566,071	8,396,940	2,891,393	5,505,547	13,169,131	672,356	360,832	23,847	12,112,096	1.711	1.645	1.745	1.568
8000 tpd	1	5,190,587	2,920,620	2,471,773	448,847	2,269,967	474,958	24,983	-	1,770,026	1.669	1.666	1.686	0.777
	2	12,354,508	5,841,211	2,892,655	2,948,556	6,513,297	672,356	157,429	26,922	5,656,589	1.690	1.645	1.735	1.115
	3	21,820,227	8,432,274	2,892,655	5,539,619	13,387,954	672,356	378,097	26,922	12,310,579	1.709	1.645	1.743	1.588
10000 tpd	1	6,781,840	3,650,430	2,615,749	1,034,682	3,131,410	533,987	47,647	9,914	2,539,862	1.668	1.634	1.753	0.858
	2	19,200,159	7,301,240	2,899,483	4,401,757	11,898,918	682,451	210,562	26,922	10,978,983	1.683	1.643	1.709	1.630
	3	22,063,772	8,472,537	2,899,483	5,573,054	13,591,235	682,451	379,593	26,922	12,502,268	1.707	1.643	1.741	1.604
12000 tpd	1	9,211,667	4,380,477	2,901,482	1,478,995	4,831,190	682,452	60,997	9,914	4,077,827	1.696	1.642	1.801	1.103
	2	22,075,693	8,475,565	2,901,483	5,574,082	13,600,129	682,452	379,605	26,922	12,511,150	1.707	1.642	1.741	1.605

SUMMARY OF JUGAN (CONTRACT-MINING) SCHEDULES - ALBION

Jugan + Albion + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,553,331	1,461,210	1,461,210	-	1,092,121	720,404	-	-	371,718	1.980	1.980	-	0.747
	2	3,512,471	1,458,881	522,436	936,446	2,053,590	439,102	147,815	8,353	1,458,320	1.821	1.639	1.923	1.408
	3	4,734,871	1,460,920	153,516	1,307,404	3,273,950	187,322	229,240	-	2,857,387	1.986	2.152	1.967	2.241
	4	4,877,434	1,459,680	-	1,459,680	3,417,754	-	310,593	4,111	3,103,050	1.799	-	1.799	2.341
	5	447,894	337,969	-	337,969	109,925	-	48,628	-	61,297	2.123	-	2.123	0.325
6000 tpd	1	4,274,784	2,190,797	1,778,956	411,841	2,083,987	1,012,364	76,116	-	995,507	1.932	1.935	1.921	0.951
	2	6,885,038	2,190,429	362,011	1,828,418	4,694,610	336,689	352,424	12,464	3,993,033	1.896	1.776	1.919	2.143
	3	6,031,905	1,950,723	-	1,950,723	4,081,182	-	360,555	-	3,720,627	1.893	-	1.893	2.092
8000 tpd	1	6,907,578	2,921,256	2,128,945	792,312	3,986,321	1,346,127	178,333	-	2,461,861	1.917	1.911	1.931	1.365
	2	10,393,807	2,919,110	16,070	2,903,040	7,474,696	7,201	568,708	12,464	6,886,324	1.855	1.402	1.858	2.561
	3	876,426	590,186	-	590,186	286,240	-	77,011	-	209,229	2.153	-	2.153	0.485
10000 tpd	1	8,408,144	3,652,192	2,134,773	1,517,419	4,755,953	1,354,955	296,463	8,353	3,096,182	1.930	1.909	1.960	1.302
	2	10,080,360	2,853,073	16,070	2,837,002	7,227,287	7,201	559,979	4,111	6,655,996	1.873	1.402	1.876	2.533
12000 tpd	1	11,883,268	4,381,227	2,150,843	2,230,384	7,502,041	1,362,155	437,135	12,464	5,690,286	1.906	1.906	1.906	1.712
	2	6,605,236	2,124,037	-	2,124,037	4,481,199	-	419,307	-	4,061,892	1.904	-	1.904	2.110

Jugan + Albion + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,553,331	1,461,210	1,461,210	-	1,092,121	720,404	-	-	371,718	1.980	1.980	-	0.747
	2	6,065,802	2,920,091	1,983,645	936,446	3,145,711	1,159,505	147,815	8,353	1,830,038	1.901	1.890	1.923	1.077
	3	10,800,673	4,381,011	2,137,162	2,243,850	6,419,662	1,346,828	377,056	8,353	4,687,425	1.929	1.909	1.948	1.465
	4	15,678,107	5,840,692	2,137,162	3,703,530	9,837,415	1,346,828	687,649	12,464	7,790,475	1.897	1.909	1.889	1.684
	5	16,126,001	6,178,660	2,137,162	4,041,498	9,947,341	1,346,828	736,277	12,464	7,851,772	1.909	1.909	1.909	1.610
6000 tpd	1	4,274,784	2,190,797	1,778,956	411,841	2,083,987	1,012,364	76,116	-	995,507	1.932	1.935	1.921	0.951
	2	11,159,823	4,381,226	2,140,966	2,240,259	6,778,597	1,349,053	428,540	12,464	4,988,540	1.914	1.908	1.920	1.547
	3	17,191,728	6,331,948	2,140,966	4,190,982	10,859,779	1,349,053	789,096	12,464	8,709,167	1.907	1.908	1.907	1.715
8000 tpd	1	6,907,578	2,921,256	2,128,945	792,312	3,986,321	1,346,127	178,333	-	2,461,861	1.917	1.911	1.931	1.365
	2	17,301,384	5,840,367	2,145,015	3,695,352	11,461,018	1,353,327	747,041	12,464	9,348,185	1.886	1.907	1.873	1.962
	3	18,177,810	6,430,553	2,145,015	4,285,538	11,747,258	1,353,327	824,052	12,464	9,557,414	1.910	1.907	1.912	1.827
10000 tpd	1	8,408,144	3,652,192	2,134,773	1,517,419	4,755,953	1,354,955	296,463	8,353	3,096,182	1.930	1.909	1.960	1.302
	2	18,488,504	6,505,264	2,150,843	4,354,421	11,983,240	1,362,155	856,442	12,464	9,752,178	1.905	1.906	1.905	1.842
12000 tpd	1	11,883,268	4,381,227	2,150,843	2,230,384	7,502,041	1,362,155	437,135	12,464	5,690,286	1.906	1.906	1.906	1.712
	2	18,488,504	6,505,264	2,150,843	4,354,421	11,983,240	1,362,155	856,442	12,464	9,752,178	1.905	1.906	1.905	1.842

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) SCHEDULES - FLOTATION

Jugan + Flotation + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,942,377	364,268		364,268	1,578,110		5,963	13,087	1,559,060	2.050		2.050	4.332
	2	1,969,337	364,176		364,176	1,605,161		2,457	7,387	1,595,317	3.653		3.653	4.408
	3	1,456,317	308,533		308,533	1,147,784		-	1,122	1,146,662	3.648		3.648	3.720
6000 tpd	1	2,841,784	546,079		546,079	2,295,704		5,963	14,051	2,275,691	2.857		2.857	4.204
	2	2,722,412	498,049		498,049	2,224,362		2,457	7,555	2,214,350	3.337		3.337	4.466
8000 tpd	1	4,270,238	728,268		728,268	3,541,970		8,736	20,570	3,512,664	2.741		2.741	4.864
	2	1,418,974	323,043		323,043	1,095,930		-	1,815	1,094,115	3.833		3.833	3.393
10000 tpd	1	5,251,037	910,471		910,471	4,340,566		8,736	21,289	4,310,541	3.024		3.024	4.767
	2	582,836	150,016		150,016	432,820		-	1,233	431,587	3.297		3.297	2.885
12000 tpd	1	5,837,853	1,060,720		1,060,720	4,777,133		8,736	22,522	4,745,875	3.062		3.062	4.504

Jugan + Flotation + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,942,377	364,268		364,268	1,578,110		5,963	13,087	1,559,060	2.050		2.050	4.332
	2	3,911,715	728,444		728,444	3,183,271		8,420	20,475	3,154,377	2.851		2.851	4.370
	3	5,368,031	1,036,976		1,036,976	4,331,055		8,420	21,597	4,301,039	3.088		3.088	4.177
6000 tpd	1	2,841,784	546,079		546,079	2,295,704		5,963	14,051	2,275,691	2.857		2.857	4.204
	2	5,564,195	1,044,129		1,044,129	4,520,066		8,420	21,606	4,490,041	3.086		3.086	4.329
8000 tpd	1	4,270,238	728,268		728,268	3,541,970		8,736	20,570	3,512,664	2.741		2.741	4.864
	2	5,689,211	1,051,312		1,051,312	4,637,900		8,736	22,385	4,606,779	3.077		3.077	4.412
10000 tpd	1	5,251,037	910,471		910,471	4,340,566		8,736	21,289	4,310,541	3.024		3.024	4.767
	2	5,833,873	1,060,487		1,060,487	4,773,386		8,736	22,522	4,742,128	3.062		3.062	4.501
12000 tpd	1	5,837,853	1,060,720		1,060,720	4,777,133		8,736	22,522	4,745,875	3.062		3.062	4.504

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) SCHEDULES - BIOX

Jugan + BIOX + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,909,115	364,559		364,559	1,544,556		42,751	10,115	1,491,691	3.216		3.216	4.237
	2	2,305,247	363,496		363,496	1,941,751		16,327	424	1,925,000	3.917		3.917	5.342
	3	447,597	133,576		133,576	314,021		4,074	1,107	308,840	3.370		3.370	2.351
6000 tpd	1	3,056,880	546,393		546,393	2,510,486		29,432	7,351	2,473,702	3.943		3.943	4.595
	2	1,757,429	324,574		324,574	1,432,855		37,432	4,994	1,390,429	2.808		2.808	4.415
8000 tpd	1	3,863,990	728,863		728,863	3,135,127		39,624	8,924	3,086,579	3.785		3.785	4.301
	2	849,104	140,191		140,191	708,913		24,858	2,992	681,063	2.118		2.118	5.057
10000 tpd	1	5,186,344	886,374		886,374	4,299,969		71,802	13,812	4,214,356	3.504		3.504	4.851
12000 tpd	1	5,188,980	886,642		886,642	4,302,338		72,215	14,337	4,215,786	3.503		3.503	4.852

Jugan + BIOX + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	1,909,115	364,559		364,559	1,544,556		42,751	10,115	1,491,691	3.216		3.216	4.237
	2	4,214,363	728,055		728,055	3,486,307		59,077	10,538	3,416,691	3.566		3.566	4.789
	3	4,661,960	861,631		861,631	3,800,329		63,151	11,646	3,725,532	3.535		3.535	4.411
6000 tpd	1	3,056,880	546,393		546,393	2,510,486		29,432	7,351	2,473,702	3.943		3.943	4.595
	2	4,814,309	870,967		870,967	3,943,342		66,865	12,346	3,864,131	3.520		3.520	4.528
8000 tpd	1	3,863,990	728,863		728,863	3,135,127		39,624	8,924	3,086,579	3.785		3.785	4.301
	2	4,713,093	869,054		869,054	3,844,039		64,482	11,916	3,767,642	3.516		3.516	4.423
10000 tpd	1	5,186,344	886,374		886,374	4,299,969		71,802	13,812	4,214,356	3.504		3.504	4.851
12000 tpd	1	5,188,980	886,642		886,642	4,302,338		72,215	14,337	4,215,786	3.503		3.503	4.852

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) SCHEDULES - POX

Jugan + POX + Owner-Operator (Incremental Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	2,339,397	364,465		364,465	1,974,932		19,583	7,562	1,947,787	2.998		2.998	5.419
	2	1,557,365	363,797		363,797	1,193,568		5,523	2,744	1,185,300	4.339		4.339	3.281
	3	1,241,397	193,758		193,758	1,047,639		22,938	4,238	1,020,462	2.362		2.362	5.407
6000 tpd	1	3,199,491	546,574		546,574	2,652,917		21,156	7,456	2,624,306	3.819		3.819	4.854
	2	1,971,197	378,333		378,333	1,592,863		28,431	7,096	1,557,336	2.764		2.764	4.210
8000 tpd	1	3,932,798	728,180		728,180	3,204,619		24,511	9,660	3,170,448	3.664		3.664	4.401
	2	1,358,533	203,355		203,355	1,155,178		25,258	5,976	1,123,944	2.353		2.353	5.681
10000 tpd	1	5,236,760	910,111		910,111	4,326,649		48,393	15,947	4,262,309	3.351		3.351	4.754
	2	79,032	25,910		25,910	53,122		2,002	581	50,540	3.900		3.900	2.050
12000 tpd	1	5,321,911	936,487		936,487	4,385,424		50,395	16,528	4,318,502	3.366		3.366	4.683

Jugan + POX + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	2,339,397	364,465		364,465	1,974,932		19,583	7,562	1,947,787	2.998		2.998	5.419
	2	3,896,762	728,262		728,262	3,168,500		25,106	10,307	3,133,087	3.668		3.668	4.351
	3	5,138,159	922,020		922,020	4,216,139		48,045	14,544	4,153,550	3.393		3.393	4.573
6000 tpd	1	3,199,491	546,574		546,574	2,652,917		21,156	7,456	2,624,306	3.819		3.819	4.854
	2	5,170,688	924,908		924,908	4,245,780		49,587	14,552	4,181,641	3.388		3.388	4.591
8000 tpd	1	3,932,798	728,180		728,180	3,204,619		24,511	9,660	3,170,448	3.664		3.664	4.401
	2	5,291,331	931,535		931,535	4,359,796		49,769	15,636	4,294,392	3.378		3.378	4.680
10000 tpd	1	5,236,760	910,111		910,111	4,326,649		48,393	15,947	4,262,309	3.351		3.351	4.754
	2	5,315,792	936,021		936,021	4,379,771		50,395	16,528	4,312,849	3.367		3.367	4.679
12000 tpd	1	5,321,911	936,487		936,487	4,385,424		50,395	16,528	4,318,502	3.366		3.366	4.683

SUMMARY OF BYG-KRIAN (OWNER-OPERATOR) SCHEDULES - ALBION

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip Ratio
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	
4000 tpd	1	2,267,688	364,071		364,071	1,903,617		53,320	7,295	1,843,003	3.971		3.971	5.229
	2	1,861,995	364,494		364,494	1,497,502		51,713	2,218	1,443,571	3.845		3.845	4.108
	3	41,467	13,731		13,731	27,736		-	698	27,038	3.573		3.573	2.020
6000 tpd	1	3,083,610	546,206		546,206	2,537,403		58,608	6,728	2,472,067	4.256		4.256	4.646
	2	1,090,872	196,987		196,987	893,885		46,425	3,482	843,978	2.907		2.907	4.538
8000 tpd	1	4,465,733	728,120		728,120	3,737,614		122,321	10,740	3,604,552	3.907		3.907	5.133
	2	331,013	42,645		42,645	288,369		5,623	252	282,494	2.952		2.952	6.762
10000 tpd	1	4,808,999	771,907		771,907	4,037,092		128,230	11,073	3,897,789	3.851		3.851	5.230
12000 tpd	1	4,811,407	772,022		772,022	4,039,385		128,230	11,073	3,900,082	3.851		3.851	5.232

Jugan + Albion + Owner-Operator (Cumulative Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip Ratio
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	
4000 tpd	1	2,267,688	364,071		364,071	1,903,617		53,320	7,295	1,843,003	3.971		3.971	5.229
	2	4,129,683	728,565		728,565	3,401,119		105,033	9,512	3,286,573	3.908		3.908	4.668
	3	4,171,150	742,295		742,295	3,428,855		105,033	10,211	3,313,611	3.902		3.902	4.619
6000 tpd	1	3,083,610	546,206		546,206	2,537,403		58,608	6,728	2,472,067	4.256		4.256	4.646
	2	4,174,482	743,193		743,193	3,431,289		105,033	10,211	3,316,045	3.898		3.898	4.617
8000 tpd	1	4,465,733	728,120		728,120	3,737,614		122,321	10,740	3,604,552	3.907		3.907	5.1
	2	4,796,747	770,764		770,764	4,025,982		127,944	10,992	3,887,046	3.854		3.854	5.2
10000 tpd	1	4,808,999	771,907		771,907	4,037,092		128,230	11,073	3,897,789	3.851		3.851	5.230
12000 tpd	1	4,811,407	772,022		772,022	4,039,385		128,230	11,073	3,900,082	3.851		3.851	5.232

SUMMARY OF BYG-KRIAN (CONTRACT-MINING) SCHEDULES - FLOTATION

Jugan + Flotation + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	1,702,026	364,423		364,423	1,337,604		6,296	14,323	1,316,985	1.405		1.405	3.671
	2	1,966,275	363,761		363,761	1,602,514		837	647	1,601,030	4.605		4.605	4.405
	3	837,287	244,581		244,581	592,706		-	834	591,872	3.695		3.695	2.423
6000 tpd	1	2,935,457	546,037		546,037	2,389,420		7,199	14,490	2,367,731	1.986		1.986	4.376
	2	2,018,665	459,388		459,388	1,559,277		-	1,635	1,557,642	4.506		4.506	3.394
8000 tpd	1	3,856,619	728,432		728,432	3,128,187		7,199	14,806	3,106,182	2.882		2.882	4.294
	2	1,114,380	278,948		278,948	835,432		-	1,477	833,956	3.791		3.791	2.995
10000 tpd	1	4,701,831	910,139		910,139	3,791,692		7,199	15,185	3,769,308	3.096		3.096	4.166
	2	274,417	97,948		97,948	176,469		-	1,097	175,372	3.464		3.464	1.802
12000 tpd	1	5,181,648	1,021,034		1,021,034	4,160,614		7,953	21,593	4,131,068	3.116		3.116	4.075

Jugan + Flotation + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	1,702,026	364,423		364,423	1,337,604		6,296	14,323	1,316,985	1.405		1.405	3.671
	2	3,668,301	728,183		728,183	2,940,118		7,133	14,970	2,918,015	3.003		3.003	4.038
	3	4,505,588	972,764		972,764	3,532,824		7,133	15,804	3,509,887	3.177		3.177	3.632
6000 tpd	1	2,935,457	546,037		546,037	2,389,420		7,199	14,490	2,367,731	1.986		1.986	4.376
	2	4,954,123	1,005,425		1,005,425	3,948,697		7,199	16,126	3,925,373	3.137		3.137	3.927
8000 tpd	1	3,856,619	728,432		728,432	3,128,187		7,199	14,806	3,106,182	2.882		2.882	4.294
	2	4,970,999	1,007,380		1,007,380	3,963,619		7,199	16,282	3,940,138	3.133		3.133	3.935
10000 tpd	1	4,701,831	910,139		910,139	3,791,692		7,199	15,185	3,769,308	3.096		3.096	4.166
	2	4,976,248	1,008,087		1,008,087	3,968,161		7,199	16,282	3,944,680	3.132		3.132	3.936
12000 tpd	1	5,181,648	1,021,034		1,021,034	4,160,614		7,953	21,593	4,131,068	3.116		3.116	4.075

SUMMARY OF BYG-KRIAN (CONTRACT-MINING) SCHEDULES - BIOX

Jugan + BIOX + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	1,972,480	364,659		364,659	1,607,822		17,559	6,191	1,584,073	3.522		3.522	4.409
	2	1,766,737	363,391		363,391	1,403,347		29,197	4,305	1,369,845	3.802		3.802	3.862
	3	339,189	86,217		86,217	252,972		601	805	251,566	3.340		3.340	2.934
6000 tpd	1	2,781,133	546,061		546,061	2,235,072		20,874	6,728	2,207,470	4.058		4.058	4.093
	2	1,309,168	270,862		270,862	1,038,306		28,339	4,573	1,005,395	2.738		2.738	3.833
8000 tpd	1	3,605,913	728,421		728,421	2,877,492		31,377	9,443	2,836,672	3.825		3.825	3.950
	2	505,644	90,439		90,439	415,205		17,835	1,950	395,419	1.938		1.938	4.591
10000 tpd	1	4,169,641	828,120		828,120	3,341,520		50,624	11,468	3,279,428	3.592		3.592	4.035
12000 tpd	1	4,660,798	861,004		861,004	3,799,794		63,151	11,646	3,724,997	3.537		3.537	4.413

Jugan + BIOX + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock	Total Ore	Meas	Ind	Total Waste	Meas (w)	Ind (w)	Inf (w)	Waste	Ave_Grade	Meas_Grade	Ind_Grade	Strip
		(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	(t)	g/t	g/t	g/t	Ratio
4000 tpd	1	1,972,480	364,659		364,659	1,607,822		17,559	6,191	1,584,073	3.522		3.522	4.409
	2	3,739,217	728,049		728,049	3,011,168		46,755	10,496	2,953,917	3.662		3.662	4.136
	3	4,078,407	814,266		814,266	3,264,141		47,356	11,301	3,205,484	3.628		3.628	4.009
6000 tpd	1	2,781,133	546,061		546,061	2,235,072		20,874	6,728	2,207,470	4.058		4.058	4.093
	2	4,090,301	816,923		816,923	3,273,378		49,212	11,301	3,212,865	3.620		3.620	4.007
8000 tpd	1	3,605,913	728,421		728,421	2,877,492		31,377	9,443	2,836,672	3.825		3.825	3.950
	2	4,111,558	818,861		818,861	3,292,697		49,212	11,394	3,232,091	3.616		3.616	4.021
10000 tpd	1	4,169,641	828,120		828,120	3,341,520		50,624	11,468	3,279,428	3.592		3.592	4.035
12000 tpd	1	4,660,798	861,004		861,004	3,799,794		63,151	11,646	3,724,997	3.537		3.537	4.413

SUMMARY OF BYG-KRIAN (CONTRACT-MINING) SCHEDULES - POX

Jugan + POX + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,077,792	365,149		365,149	1,712,642		17,604	9,334	1,685,704	2.627		2.627	4.690
	2	1,506,422	363,300		363,300	1,143,121		259	712	1,142,151	4.796		4.796	3.147
	3	783,356	140,735		140,735	642,620		18,977	2,078	621,566	2.306		2.306	4.566
6000 tpd	1	2,924,835	546,469		546,469	2,378,366		17,605	10,543	2,350,218	3.639		3.639	4.352
	2	1,472,000	327,689		327,689	1,144,311		19,236	2,252	1,122,823	3.186		3.186	3.492
8000 tpd	1	3,800,462	728,086		728,086	3,072,376		19,384	7,970	3,045,022	3.780		3.780	4.220
	2	933,300	173,149		173,149	760,151		26,010	5,782	728,359	1.905		1.905	4.390
10000 tpd	1	4,752,369	906,610		906,610	3,845,758		46,009	13,940	3,785,809	3.405		3.405	4.242
12000 tpd	1	4,761,435	907,239		907,239	3,854,196		46,009	13,940	3,794,247	3.404		3.404	4.248

Jugan + POX + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,077,792	365,149		365,149	1,712,642		17,604	9,334	1,685,704	2.627		2.627	4.690
	2	3,584,213	728,449		728,449	2,855,764		17,863	10,046	2,827,854	3.709		3.709	3.920
	3	4,367,569	869,185		869,185	3,498,384		36,840	12,124	3,449,420	3.482		3.482	4.025
6000 tpd	1	2,924,835	546,469		546,469	2,378,366		17,605	10,543	2,350,218	3.639		3.639	4.352
	2	4,396,835	874,158		874,158	3,522,677		36,840	12,795	3,473,042	3.469		3.469	4.030
8000 tpd	1	3,800,462	728,086		728,086	3,072,376		19,384	7,970	3,045,022	3.780		3.780	4.220
	2	4,733,762	901,235		901,235	3,832,527		45,394	13,752	3,773,381	3.419		3.419	4.253
10000 tpd	1	4,752,369	906,610		906,610	3,845,758		46,009	13,940	3,785,809	3.405		3.405	4.242
12000 tpd	1	4,761,435	907,239		907,239	3,854,196		46,009	13,940	3,794,247	3.404		3.404	4.248

SUMMARY OF BYG-KRIAN (CONTRACT-MINING) SCHEDULES - ALBION

Jugan + Albion + Contract-Mining (Incremental Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,371,656	364,366		364,366	2,007,290		81,000	7,432	1,918,857	3.591		3.591	5.509
	2	1,480,870	347,248		347,248	1,133,623		9,705	1,204	1,122,713	4.387		4.387	3.265
6000 tpd	1	2,969,564	546,188		546,188	2,423,376		58,192	7,438	2,357,746	4.241		4.241	4.437
	2	944,893	170,778		170,778	774,115		35,383	1,516	737,217	3.092		3.092	4.533
8000 tpd	1	3,952,423	722,377		722,377	3,230,046		94,898	9,530	3,125,618	3.951		3.951	4.471
10000 tpd	1	4,081,073	733,809		733,809	3,347,264		100,639	9,620	3,237,006	3.923		3.923	4.562
12000 tpd	1	4,078,759	734,133		734,133	3,344,626		100,639	10,211	3,233,777	3.922		3.922	4.556

Jugan + Albion + Contract-Mining (Cumulative Schedules)

Production Level	Year	Rock (t)	Total Ore (t)	Meas (t)	Ind (t)	Total Waste (t)	Meas (w) (t)	Ind (w) (t)	Inf (w) (t)	Waste (t)	Ave_Grade g/t	Meas_Grade g/t	Ind_Grade g/t	Strip Ratio
4000 tpd	1	2,371,656	364,366		364,366	2,007,290		81,000	7,432	1,918,857	3.591		3.591	5.509
	2	3,852,527	711,614		711,614	3,140,913		90,705	8,637	3,041,571	3.980		3.980	4.414
6000 tpd	1	2,969,564	546,188		546,188	2,423,376		58,192	7,438	2,357,746	4.241		4.241	4.437
	2	3,914,456	716,966		716,966	3,197,491		93,574	8,954	3,094,963	3.967		3.967	4.460
8000 tpd	1	3,952,423	722,377		722,377	3,230,046		94,898	9,530	3,125,618	3.951		3.951	4.471
10000 tpd	1	4,081,073	733,809		733,809	3,347,264		100,639	9,620	3,237,006	3.923		3.923	4.562
12000 tpd	1	4,078,759	734,133		734,133	3,344,626		100,639	10,211	3,233,777	3.922		3.922	4.556

A16-5. Mine Equipment Lists by Production & Mining Type

Equipment for Base Case_8000 TPD Owner-Operator

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
2	Production Drill, Sandvik DX800, 76mm to 127mm hole, crawler
2	Hydraulic Shovel, 7m3, CAT6015/FS
1	Wheel Loader or FEL, 6.4 m3 for pit operation
1	Wheel Loader or FEL, 6.4 m3 for Stockpile operation
1	CAT_D10T Dozer with ripper
1	D6W Tractor (CAT_D6R XL)
9	Hauling Truck, Rigid Rear Dump CAT_772G
2	Road Grader, CAT_12K
2	Water Truck (10,000 liters)
2	Compactor, CAT CS533E for haul road maintenance
2	Explosive Truck (1000 kg cap) or Mobile Mixing Unit
1	Cable Bolter (Surface Drill + grouting machine combo)
2	Service/Tire Truck (off highway road)
5	4WD LV Toyota Hi-lux
Note: Equipment for Waste Dump operation are not included	
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
4	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
22	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
100	Caplamps with charger
65	Handheld Radios

Equipment for 4000 TPD Owner-Operator

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
1	Production Drill, Sandvik DX800, 76mm to 127mm hole, crawler
1	Hydraulic Shovel, 7m3, CAT6015/FS
1	Wheel Loader or FEL, 6.4 m3 for pit operation
1	Wheel Loader or FEL, 6.4 m3 for Stockpile operation
1	CAT_D10T Dozer with ripper
1	D6W Tractor (CAT_D6R XL)
5	Hauling Truck, Rigid Rear Dump CAT_772G
1	Road Grader, CAT_12K
1	Water Truck (10,000 liters)
1	Compactor, CAT CS533E for haul road maintenance
1	Explosive Truck (1000 kg cap) or Mobile Mixing Unit
1	Cable Bolter (Surface Drill + grouting machine combo)
1	Service/Tire Truck (off highway road)
4	4WD LV Toyota Hi-lux
Note: Equipment for Waste Dump operation are not included	
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
3	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
1	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
500	HDPE Pipes with fittings (for air & water), 6m length
12	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
50	Caplamps with charger
35	Handheld Radios

Equipment for 6000 TPD Owner-Operator

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
2	Production Drill, Sandvik DX800, 76mm to 127mm hole, crawler
2	Hydraulic Shovel, 7m3, CAT6015/FS
1	Wheel Loader or FEL, 6.4 m3 for Stockpile operation
1	CAT_D10T Dozer with ripper
1	D6W Tractor (CAT_D6R XL)
8	Hauling Truck, Rigid Rear Dump CAT_772G
2	Road Grader, CAT_12K
2	Water Truck (10,000 liters)
2	Compactor, CAT CS533E for haul road maintenance
2	Explosive Truck (1000 kg cap) or Mobile Mixing Unit

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
1	Cable Bolter (Surface Drill + grouting machine combo)
2	Service/Tire Truck (off highway road)
4	4WD LV Toyota Hi-lux
Note: Equipment for Waste Dump operation are not included	
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
4	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
18	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
60	Caplamps with charger
50	Handheld Radios

Equipment for 10000 TPD Owner-Operator

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
3	Production Drill, Sandvik DX800, 76mm to 127mm hole, crawler
3	Hydraulic Shovel, 7m3, CAT6015/FS
1	Wheel Loader or FEL, 6.4 m3 for pit operation
1	Wheel Loader or FEL, 6.4 m3 for Stockpile operation
2	CAT_D10T Dozer with ripper
2	D6W Tractor (CAT_D6R XL)
11	Hauling Truck, Rigid Rear Dump CAT_772G
3	Road Grader, CAT_12K
3	Water Truck (10,000 liters)
3	Compactor, CAT CS533E for haul road maintenance
3	Explosive Truck (1000 kg cap) or Mobile Mixing Unit
1	Cable Bolter (Surface Drill + grouting machine combo)
2	Service/Tire Truck (off highway road)
6	4WD LV Toyota Hi-lux
Note: Equipment for Waste Dump operation are not included	
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
5	Mobile Light Plant (13kW)
2	Pit Dewatering Pump, centrifugal 75 li/sec
2	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
26	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
115	Caplamps with charger
75	Handheld Radios

Equipment for 12000 TPD Owner-Operator

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
3	Production Drill, Sandvik DX800, 76mm to 127mm hole, crawler
3	Hydraulic Shovel, 7m3, CAT6015/FS
1	Wheel Loader or FEL, 6.4 m3 for pit operation
1	Wheel Loader or FEL, 6.4 m3 for Stockpile operation
2	CAT_D10T Dozer with ripper
2	D6W Tractor (CAT_D6R XL)
13	Hauling Truck, Rigid Rear Dump CAT_772G
3	Road Grader, CAT_12K
3	Water Truck (10,000 liters)
3	Compactor, CAT CS533E for haul road maintenance
3	Explosive Truck (1000 kg cap) or Mobile Mixing Unit
2	Cable Bolter (Surface Drill + grouting machine combo)
3	Service/Tire Truck (off highway road)
6	4WD LV Toyota Hi-lux
Note: Equipment for Waste Dump operation are not included	
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
6	Mobile Light Plant (13kW)
2	Pit Dewatering Pump, centrifugal 75 li/sec
2	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
30	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2

Open Pit Equipment (Mining Fleet for Owner-Operator Option)	
No. of Units	**Description and Specification**
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
120	Caplamps with charger
80	Handheld Radios

Equipment for Base Case_8000 TPD Contract Mining Option

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
4	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
22	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
100	Caplamps with charger
65	Handheld Radios

Equipment for 4000 TPD Contract Mining Option

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
3	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
1	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
12	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
50	Caplamps with charger
35	Handheld Radios

Equipment for 6000 TPD Contract Mining Option

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
4	Mobile Light Plant (13kW)
1	Pit Dewatering Pump, centrifugal 75 li/sec
1	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
18	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
1	Set of First Aid Equipment & paraphernalias
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
60	Caplamps with charger
50	Handheld Radios

Equipment for 10000 TPD Contract Mining Option

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
5	Mobile Light Plant (13kW)
2	Pit Dewatering Pump, centrifugal 75 li/sec
2	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
26	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
115	Caplamps with charger
75	Handheld Radios

Equipment for 12000 TPD Contract Mining Option

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
Fixed Plant & Capital Services	
2	Surface Blaster (i-kon)/Exploder
6	Mobile Light Plant (13kW)
2	Pit Dewatering Pump, centrifugal 75 li/sec
2	Pit Dewatering Pump, centrifugal 40 li/sec
1	Dewatering Pump, diaphragm type 20 li/sec
2	Vacuum Pump for blasthole dewatering
1	Butt Welder for HDPE pipes
1	Set of Workshop Tools & Equipment
500	HDPE Pipes with fittings (for air & water), 6m length
30	Fire Fighting Equipment for each mobile machine
Offices, Workshops and Stores	
2	Field Office (mine & maintenance)
1	Workshop, 1000 m2
1	Explosive Magazine & ANFO Bin
4	Portable Stores (container vans)
Health-Safety and Environment	
1	Set of First Aid Equipment & paraphernalias

Open Pit Equipment (No Mining Fleet for Contract Mining Option)	
No. of Units	**Description and Specification**
10	Fire Fighting Equipment - Fixed
1	Fire Hydrant System
1	Ambulance
Mine Services: (mine planning, survey & geology)	
1	Survey Equipment
1	GeoMIMS System for pit operation
5	Computer / Laptops
Communication & Security	
1	Telephone System
1	Base Radio for pit operation
5	Wireless Camera System
5	Motorbikes for Security personnel
Sundries	
1	Office Furniture (one lot)
4	Workshop Racks & Storage
5	Oxy-acetylene Equipment
120	Caplamps with charger
80	Handheld Radios

A16-6. Mine Equipment Selection – Calculations & Parameters

Single Period Operating Parameters - For Shovel & Truck Match-up Simulation

For Brand New Equipment	Period	Loader	Trucks
Period = 1 year		1	1
Days in Period	days	365	365
Days operated	days/wk	7	7
Shifts per day	shifts/day	3	3
Hours operating	hrs/day	24	24
Holidays (shutdowns)	days in period	16	16
Not scheduled - days	days in period	0	0
Not scheduled - shifts	days in period	0	0
Other	days in period	1	1
SCHEDULED TIME	**hrs in period**	**8,352**	**8,352**
Working days in 1 year period	days in period	348	348
Major overhaul or Repair	days in period	3	3
AVAILABLE DAYS	**days in period**	**345**	**345**
Maintenance - Planned	hrs in period	336	384
Planned - Out of Scheduled time	hrs in period	192	192
Maintenance - Breakdown	hrs in period	312	312
Breakdown - Out of Scheduled Time	hrs in period	156	156
AVAILABLE TIME (AT)	**hrs in period**	**7,284**	**7,236**
Industrial Delay	days in period	1	1
Weather Delay	days in period	5	5
Not manned	hrs/day	0.3	0.3
Safety	hrs/day	0.5	0.5
No power	hrs/day	0.1	0.1
Shift changes	hrs/day	0.6	0.5
Total meal break losses	hrs/day	1.5	1.5
Blasting	hrs/day	0.5	0.5
Other	hrs/day	0.1	0.1
UTILISED TIME - UT (OH)	**UT hrs in period**	**5,919.6**	**5,905.5**
Wait	hrs/day	0.5	0.5
Prestart checks	hrs/day	0.25	0.25
Daily service	hrs/day	0.5	0.75
Refuel	hrs/day	0.5	0.5
Tyres Check	hrs/day	0.25	0.25
Clean-up	hrs/day	0.5	0.5
Loader Move	hrs/day	0.75	0.5
Other	hrs/day	0.5	0.5
OPERATED HRS - OT (DOH)	OT hrs in period	**4,648**	**4,634**
Equipment Availability	%	87.2	86.6
Use of Availability	%	81.3	81.6

Shovel and Truck Specifications Relative to Productivity

Loader Type (hydraulic)	Dipper (heap) cm	Rated load limit (RSL) t	Max Cut Height m	Dump Radius m	Fill Factor %	Swing 90° cycle secs	Fuel Rate lit/UT
SHOVEL CAT6015FS	7.0	15.0	11	10.5	95	30	55
BACK-HOE CAT390DL	6.0	13.0	12	8	90	30	51
TRUCK TYPE		**Rated Tray (heap)**	**Load limit**	**Operating Width**	**Turning Radius**	**Fuel Rate**	
RIGID	CAT 772G	31.2	56	3.7	10.5	40	
ARTICULATED	CAT 740B	24	40	3.5	8.14	32	
Transmission			**CAT 772G**	**CAT 740B**			
Gear1	Forward	km/hr	12.9	8.90			
Gear2	Forward	km/hr	17.7	12.10			
Gear3	Forward	km/hr	24.0	16.40			
Gear4	Forward	km/hr	32.2	22.00			
Gear5	Forward	km/hr	43.6	30.00			
Gear6	Forward	km/hr	58.7	40.00			
Gear7	Forward	km/hr	79.7	54.70			
Gear8	Reverse1	km/hr	16.9	8.40			
Gear9	Reverse2	km/hr		11.60			

Loader and Truck Productivity Modifier - Using CAT 6015FS Shovel & CAT 772G Truck

Periodic Targets Single Period	1 yr	Indicated loader efficiency	%	94
Loading Method (Double Side Loading)	DSL	Actual Dipper Fill Factor	%	95
Dipper Capacity, cm	7	Actual swing cycle time	secs	32
Modified Fill Factor (Shovel)	95%	Volume in dipper	cm	6.7
Modified Fill Factor (Backhoe)	90%	Weight in the dipper	t	14.2
Modified Tray Cap._CAT 772G	28.08	Percent of dipper load limit	%	94
Modified Tray Cap._CAT 740B	21.6	Nom passes by volume		4.12
Bench Height, m	15	Nom passes by weight		3.86
Panel Width, m	30	Limited by		Weight
Density (SG)	2.60	Actual passes		4.0
Swell in Dipper	1.20	Last pass load factor	%	86
Swell in Tray	1.25	Truck load volume	cm	26
Adjusted Swing Cycle, sec	32.00	Truck load weight	t	55
		Percent of tray load limit	%	98
Operator Skills Modifier		Truck load time (loader)	secs	128

Operator	Prodn	Truck load time (truck)	secs	96
Skill	%	Operator skills factor		4
1	45%	Diggability factor		4
2	50%	Loader time modified (op & dig)	secs	158
3	75%	Truck load time modified (op/dig)	secs	119
4	90%	Loaded haul distance	m	1,400
5	100%	Empty haul distance	m	1,400
		Truck Dump Time	secs	18
Diggability Modifier		Ave spot at dump	secs	15
Diggability	Prodn	Ave wait at dump	secs	30
Index	%	Ave loaded cycle (excl spot & dump)	secs	232
1	45%	Ave spot at loader	secs	30
2	50%	Ave empty cycle (travel)	secs	179
3	75%	Ave wait at loader	secs	30
4	90%	Bunching character		3
5	100%	Nominal loaders allocated		2.0
		Nominal trucks allocated		9.0
Bunching Character		**Fleet Productivity by period**		
Severe	1	Calculated Match Factor		1.14
Average	2	Instantaneous loader capacity	t/OThr	2,490
Light: 1 loader/truck fleet	3	Calculated loader capacity	Mt	11.6
			Mbcm	4.5
		Indicated loader efficiency from MF	%	95.8
		Indicated truck efficiency from MF	%	84.0
		Efficiency adjusted for truck OT	%	95.6
		Resultant fleet capacity	Mt	11.06

Cycle Time of Shovel and CAT_772G Off-Highway Truck (RIGID)

Truck Hauling Speed					
Jugan Ore Hauling	Haul Distance (m)	Haul Speed (km/h)		Transmission	
From Pit to ROM Area	1400	Loaded	Empty	Loaded	Empty
From Load/Dump	20	12.9	12.9	1st gear	1st gear
Flat Road	900	24	32.2	3rd gear	4th gear
Ramp	480	17.7	21	2nd gear	2&3 gear
Average Speed		**21.7**	**28.1**		
TOP SPEED SPECS		71.7	79.7		7th gear
Hauling Time in Minutes					
Haul Distance	1.4				
Average Haul Time		3.9	3.0		

Haul Time (Loaded + Empty)		6.9		
TOTAL CYCLE TIME	**Truck**	**Loader**		
Loading				
Actual Swing Cycle time		32		
No. of Dipper Passes		4		
Dipper Cyle (Loading)	128	128		
Average Spotting	30		before loading	
Total Load Cycle	158	128		
Loading Cyle Adjusted	**195**	**158**	adjusted relative to operator skill and diggability	
Haul Time	411.9			
Average Spotting	15		before dumping	
Ave. Dump Time	18			
Ave. Waiting Time	30		before loading	
Ave. Waiting Time	30		before dumping	
Total Cycle Time (sec)	**699.98**	**158.02**		
Cycle Time in minutes	**11.67**	**2.63**		

Cycle Time For Shovel and CAT_740B Articulated Off-Highway Truck

Average Speed in km/hr					
Jugan Ore Hauling	**Haul Distance (m)**	**Haul Speed (km/h)**		**Transmission**	
From Pit to ROM Area	**1400**	**Loaded**	**Empty**	**Loaded**	**Empty**
From Load/Dump	20	8.9	8.9	1st gear	1st gear
Flat Road	900	22	30	4th gear	5th gear
Ramp	480	17	21	2-4 gear	2-5 gear
Average Speed		**20.10**	**26.61**		
TOP SPEED SPECS		54.7	54.7		7th gear
Hauling Time in Minutes					
Haul Distance	1.4				
Average Haul Time		4.2	3.2		
Haul Time (Loaded + Empty)		7.3			
TOTAL CYCLE TIME	Truck	Loader			
Loading					
Actual Swing Cycle time		31			
No. of Dipper Passes		4			

Average Speed in km/hr					
Jugan Ore Hauling	Haul Distance (m)	Haul Speed (km/h)		Transmission	
From Pit to ROM Area	1400	Loaded	Empty	Loaded	Empty
Dipper Cyle (Loading)	126	125.61			
Average Spotting	30		before loading		
Total Load Cycle	156	125.61			
Loading Cyle Adjusted	192	155.07	adjusted relative to operator skill & diggability		
Haul Time	440.1				
Average Spotting	15		before dumping		
Ave. Dump Time	18				
Ave. Waiting Time	30		before loading		
Ave. Waiting Time	30		before dumping		
Total Cycle Time (sec)	**725.25**	**155.07**			
Cycle Time in minutes	**12.09**	**2.585**			

Shovel & Truck Match-up Data Based on Hauling Distance

Hauling Distance	meters	800	1000	1200	1400	1600
Shovel_CAT6015	**units**	**2**	**2**	**2**	**2**	**2**
Truck_CAT 772G	**units**	**7**	**8**	**8**	**9**	**10**
Loader Efficiency	%	92.7	93.9	89.3	90.8	92.0
Truck Efficiency	%	87.7	86.5	90.6	89.4	88.4
Net Fleet Efficiency	%	92.4	93.6	89.0	90.5	91.7
Fleet Capacity	Mtonnes	10.96	11.1	10.56	10.74	10.88
Match Factor (MF)	%	1.06	1.09	0.99	1.02	1.04
Modified MF	%	1.24	1.25	1.12	1.14	1.16
Loader Capacity	Mtonnes	11.6	11.6	11.6	11.6	11.6
Loader Eff from MF	%	98.4	98.7	95.1	95.8	96.4
Truck Eff from MF	%	79.5	78.9	85.0	84.0	83.2
Fleet Efficiency	%	98.1	98.4	94.8	95.6	96.1
Resultant Fleet Capacity	Mtonnes	11.36	11.39	10.98	11.06	11.12

Back-hoe/Excavator & Truck Match-up Data Based on Hauling Distance

Hauling Distance	m	800	1000	1200	1400	1600
Loader_CAT390 DL	**units**	**3**	**3**	**3**	**3**	**3**
Truck_CAT 740B	**units**	**10**	**11**	**13**	**14**	**15**
Loader Efficiency	%	88.1	87.3	90.7	89.9	89.2
Truck Efficiency	%	91.5	92	89.4	90.1	90.7
Net Fleet Eff.	%	87.9	87	90.5	89.6	88.9

Hauling Distance	m	800	1000	1200	1400	1600
Fleet Capacity	Mtonnes	11.23	11.13	11.57	11.46	11.37
Match Factor (MF)	%	0.96	0.95	1.01	1.00	0.98
Modified MF	%	1.12	1.09	1.15	1.11	1.09
Loader Eff from MF	%	95.2	93.9	96.0	94.9	94
Truck Eff from MF	%	84.9	86.4	83.8	85.2	86.3
Fleet Efficiency	%	94.9	93.6	95.7	94.7	93.7
Resultant Fleet Capacity	Mtonnes	11.85	11.68	11.95	11.81	11.69

CAT_6015 Shovel & CAT_772G Truck Productivity Data for Base Case (8000 TPD)

Jugan Open Pit		Yr 0	Yr 1	Yr 2	Yr3	Yr4
Mining Days		60	365	365	365	180
Hauling Distance		800	1000	1400	1400	1600
ORE	tpd		8,000	8,000	8,000	8,000
STRIP RATIO	W:O		0.90	2.60	2.60	2.50
WASTE	tpd	9,000	7,200	20,800	20,800	20,000
ORE + WASTE	tpd	9,000	15,200	28,800	28,800	28,000
Annual Production	Mtonnes	**0.54**	**5.55**	**10.51**	**10.51**	**5.04**
Loader_CAT6015	units	**1**	**1**	**2**	**2**	**2**
Truck_CAT 772G	units	**4**	**4**	**9**	**9**	**9**
Loader Efficiency	%		94	90.8	90.8	90.8
Truck Efficiency	%		86	89.4	89.4	89.4
Net Fleet Efficiency	%		94	90.5	90.5	90.5
Fleet Capacity	**Mtonnes**	**5.55**	**5.55**	**10.74**	**10.74**	**5.05**
Match Factor (MF)	%		1.09	1.02	1.02	1.02

CAT_390DL Loader & CAT_740B Truck Productivity Data for Base Case (8000 TPD)

Jugan Open Pit		Yr 0	Yr 1	Yr 2	Yr3	Yr4
Mining Days		60	365	365	365	180
Hauling Distance		800	1000	1400	1400	1600
ORE	tpd		8,000	8,000	8,000	8,000
STRIP RATIO	W:O		0.90	2.60	2.60	2.50
WASTE	tpd	9,000	7,200	20,800	20,800	20,000
ORE + WASTE	tpd	9,000	15,200	28,800	28,800	28,000
Annual Production	**Mtonnes**	**0.54**	**5.55**	**10.51**	**10.51**	**5.04**
Loader_CAT390 DL	**units**	**2**	**2**	**3**	**3**	**3**
Truck_CAT 740B	**units**	**7**	**7**	**14**	**14**	**15**
Loader Efficiency	%		84.7	89.9	89.9	89.2
Truck Efficiency	%		93.6	90.1	90.1	90.7
Net Fleet Efficiency	%		84.5	89.6	89.6	88.9

Jugan Open Pit		Yr 0	Yr 1	Yr 2	Yr3	Yr4
Fleet Capacity	**Mtonnes**	**7.20**	**7.2**	**11.46**	**11.46**	**5.61**
Match Factor (MF)	%		0.91	1.00	1.00	0.98

A16-7. Drill & Blast Tables & Calculations

A. Drill and Blast Design – Calculation of Burden, B (Table 1.1, Table 1.2 & Table 1.3)

Where; B – Burden
B1 - based on specific gravity of rock and explosive
B2 - based on relative bulk energy of explosive (REE)

Calculated Burden (B) Using Anfo

Blasthole Diameter		BURDEN (in meters)		B1 (corrected), meters		B2 (corrected), meters		B
mm	inches	B1	B2	For RMR =	For RMR=	For RMR =	For RMR =	Ave.
		m	m	(fair/good)	(poor)	(fair/good)	(poor)	M
76	3.0	1.94	2.06	2.14	2.53	2.27	2.68	**2.4**
89	3.5	2.27	2.41	2.49	2.95	2.65	3.13	**2.8**
89	3.5		2.41			2.65	3.13	**2.9**
102	4.0	2.59	2.75	2.85	3.37	3.03	3.58	**3.2**
115	4.5	2.92	3.09	3.21	3.79	3.40	4.02	**3.6**
127	5.0	3.24	3.44	3.56	4.21	3.78	4.47	**4.0**

Calculated Burden (B) Using Bulk Emulsion Explosive (Orica Fortis)

Blasthole Diameter		BURDEN in meters		B1 (corrected), meters		B2 (corrected), meters		B
mm	inches	B1	B2	For RMR =	For RMR =	For RMR =	For RMR =	Ave.
		m	m	(fair/good)	(poor)	(fair/good)	(poor)	m
76	3.0	2.17	2.35	2.39	2.83	2.59	3.06	**2.7**
89	3.5	2.54	2.74	2.79	3.30	3.02	3.57	**3.2**
89	3.5		2.74			3.02	3.57	**3.3**
102	4.0	2.90	3.13	3.19	3.77	3.45	4.07	**3.6**
115	4.5	3.26	3.53	3.59	4.24	3.88	4.58	**4.1**
127	5.0	3.62	3.92	3.99	4.71	4.31	5.09	**4.5**

Calculated Burden (B) Using Packaged Emulsion Explosive (PowerFrag/Powerpac)

Blasthole Diameter		BURDEN in meters		B1 (corrected), meters		B2 (corrected),meters		B
mm	inches	B1	B2	For RMR = (fair/good)	For RMR = (poor)	For RMR = (fair/good)	For RMR = (poor)	Ave.
76	3.0	1.89	2.52	2.08	2.46	2.78	3.28	**2.6**
89	3.5	2.33	2.94	2.56	3.02	3.24	3.83	**3.2**
89	3.5		2.94			3.24	3.83	**3.5**
102	4.0	2.91	3.36	3.20	3.78	3.70	4.37	**3.8**
115	4.5	3.20	3.65	3.52	4.16	4.01	4.74	**4.1**
127	5.0	3.52	4.05	3.87	4.57	4.46	5.27	**4.5**

B. Drill and Blast Design – Calculation of Stemming, Subdrill, Stiffness Ratio & Spacing

Where; T – Stemming

J – Subdrill
SR – Stiffness ratio
S – Spacing
L – Bench or Flitch Height

Stemming (T), Subdrill (J), Stiffness Ratio (SR) & Spacing (S) - Using ANFO

Blasthole Diameter		Burden, B	Stemming	Subdrill	SR, if L=10m	SR, if L=5m	SPACING S=(L+7B)/8	
mm	inches	average	T=0.7B	J=0.3B	SR=L/B	SR=L/B	L=10	L=5
		m	m	m	m	m	m	m
76	3.0	2.4	1.7	0.72	4.2	2.1	3.4	3.4
89 (o)	3.5	2.8	2.0	0.84	3.6	1.8	3.7	3.1
89 (w)	3.5	2.9	2.0	0.87	3.5	1.7	4.0	3.2
102	4.0	3.2	2.2	0.96	3.1	1.6	4.1	3.4
115	4.5	3.6	2.5	1.08	2.8	1.4	4.4	3.8
127	5.0	4.0	2.8	1.20	2.5	1.2	4.8	4.1

Stemming (T), Subdrill (J), Stiffness Ratio (SR) & Spacing (S) - For Bulk Emulsion

Blasthole Diameter		Burden, B	Stemming	Subdrill	SR, if L=10m	SR, if L=5m	SPACING S=(L+7B)/8	
mm	inches	average	T=0.7B	J=0.3B	SR=L/B	SR=L/B	L=10	L=5
		m	m	m	m	m	m	m
76	3.0	2.7	1.9	0.81	3.7	1.8	3.6	3.0
89 (o)	3.5	3.2	2.2	0.95	3.2	1.6	4.0	3.4
89 (w)	3.5	3.3	2.3	0.99	3.0	1.5	4.6	4.6
102	4.0	3.6	2.5	1.09	2.8	1.4	4.4	3.8
115	4.5	4.1	2.9	1.22	2.5	1.2	4.8	4.2
127	5.0	4.5	3.2	1.36	2.2	1.1	5.2	4.6

Stemming (T), Subdrill (J), Stiffness Ratio (SR) & Spacing (S)-For Packaged Emulsion

Blasthole Diameter		Burden, B	Stemming	Subdrill	SR, if L=10m	SR, if L=5m	SPACING S=(L+7B)/8	
mm	inches	average	T=0.7B	J=0.3B	SR=L/B	SR=L/B	L=10	L=5
		m	m	m	m	m	m	m
76	3.0	2.6	1.9	0.79	3.8	1.9	3.6	2.9
89 (o)	3.5	3.2	2.2	0.95	3.2	1.6	4.0	3.4
89 (w)	3.5	3.5	2.5	1.06	2.8	1.4	4.3	3.7
102	4.0	3.8	2.6	1.13	2.7	1.3	4.5	3.9
115	4.5	4.1	2.9	1.23	2.4	1.2	4.8	4.2
127	5.0	4.5	3.2	1.36	2.2	1.1	5.2	4.6

C. Drill and Blast Design - Calculation of Powder Column, BCM and Powder Factor

Where; PC – Powder Column
BCM – volume in bcm
PF – Powder Factor

Calculated Powder Column (PC) and Powder Factor (PF) Using ANFO

Blasthole Diameter		Powder Column		Volume, BCM		Powder Factor (PF)	
		PC=L+J-T		V = B*S*L		Density*(PC/BCM)	
mm	inches	L=10	L=5	L=10	L=5	L=10	L=5
		m	m	bcm	bcm	kg/m³	kg/m³
76	3.0	9.0	4.0	80.9	40.5	0.407	0.364
89 (o)	3.5	8.9	3.9	103.9	43.2	0.425	0.446
89 (w)	3.5	8.8	3.8	116.7	45.5	0.377	0.420
102	4.0	8.7	3.7	130.0	55.0	0.435	0.439
115	4.5	8.6	3.6	158.8	68.2	0.443	0.429
127	5.0	8.4	3.4	190.5	82.7	0.447	0.416

Calculated Powder Column (PC) & Powder Factor (PF) For Bulk Emulsion

Blasthole Diameter		Powder Column		Volume, BCM		Powder Factor (PF)	
		PC=L+J-T		V = B*S*L		Density*(PC/BCM)	
mm	inches	L=10	L=5	L=10	L=5	L=10	L=5
		m	m	bcm	bcm	kg/m³	kg/m³
76	3.0	8.9	3.9	98.4	40.7	0.475	0.504
89 (o)	3.5	8.7	3.7	127.4	53.8	0.490	0.496
89 (w)	3.5	8.7	3.7	151.6	75.8	0.409	0.347
102	4.0	8.6	3.6	159.9	68.6	0.499	0.483
115	4.5	8.4	3.4	196.0	85.3	0.504	0.466
127	5.0	8.2	3.2	235.7	103.7	0.506	0.448

Calculated Powder Column (PC) and Powder Factor (PF) for Packaged Emulsion

Blasthole Diameter		Powder Column		Volume, BCM		Powder Factor (PF)	
		PC=L+J-T		V = B*S*L		Density*(PC/BCM)	
mm	inches	L=10	L=5	L=10	L=5	L=10	L=5
		m	m	bcm	bcm	kg/m³	kg/m³
76	3.0	8.9	3.9	94.5	39.0	0.359	0.384
89 (o)	3.5	8.7	3.7	127.0	53.6	0.379	0.383
89 (w)	3.5	8.6	3.6	153.3	65.6	0.308	0.301
102	4.0	8.5	3.5	171.0	73.7	0.481	0.458
115	4.5	8.4	3.4	199.1	86.7	0.487	0.449
127	5.0	8.2	3.2	237.5	104.5	0.449	0.396

Blastability Index (by Lilly and Powder Factor

Blastability Index, BI	From Table 7.10	
BI= (RMD + JPS + JPO + SGI + H)/2	case1	case2
RMD	15	15
JPS	10	10
JPO	20 dip out of face	40 dip into face
SGI	15.5	15.5

Blastability Index, BI	From Table 7.10	
BI= (RMD + JPS + JPO + SGI + H)/2	case1	case2
H	3	3
BI	**31.75**	**41.75**
Powder Factor relative to BI (from Figure 3.1)		
PF in kg/tonne	0.13	0.17
PF in kg/m³	**0.341**	**0.445**

D. Drill and Blast Design - Calculation of Cost per Tonne of Explosives

Calculated Explosive Costs Based on Powder Factor (Bench Height, L=10)

Blasthole Diameter		ANFO (at $1.48/kg)		FORTIS (at $2.35/kg)		Powerfrag (at $3.08/kg)		
mm	inches	PF	$/tonne	PF	$/tonne	PF	$/tonne	
76	3.0	0.407	0.23	0.475	0.43	0.359	0.42	
89	3.5	0.425	0.24	0.490	0.44	0.379	0.44	ore
89	3.5	0.377	0.21	0.409	0.37	0.308	0.36	waste
102	4.0	0.435	0.25	0.499	0.45	0.481	0.56	
115	4.5	0.443	0.25	0.504	0.45	0.487	0.57	
127	5.0	0.447	0.25	0.506	0.45	0.449	0.53	

Calculated Explosive Costs Based on Powder Factor (Flitch Height, L=5)

Blasthole Diameter		ANFO (at $1.48/kg)		FORTIS (at $2.35/kg)		Powerfrag (@$3.08/kg)		
mm	inches	PF	$/tonne	PF	$/tonne	PF	$/tonne	
76	3.0	0.364	0.20	0.504	0.45	0.384	0.45	
89	3.5	0.446	0.25	0.496	0.44	0.383	0.45	ore
89	3.5	0.420	0.24	0.347	0.31	0.301	0.35	waste
102	4.0	0.439	0.25	0.483	0.43	0.458	0.54	
115	4.5	0.429	0.24	0.466	0.42	0.449	0.53	
127	5.0	0.416	0.23	0.448	0.40	0.396	0.47	

E. Drill and Blast Design – Price of Three (3) Major Explosive Products

Exlosive Products		FOB	Freight	Mixing	Fuel Oil	Others	Total Cost
Name	Type	(by Orica)	20%	(mmu)		30%	
		$/kg	$/kg	$/kg	$/kg	$/kg	$/kg
PPAN	Porous Prilled AN	0.77	0.15			0.23	1.16
ANFO	Mixed	0.77	0.15	0.25	0.07	0.23	1.48
FORTIS	Bulk Emulsion	1.40	0.28	0.25		0.42	2.35
POWER FRAG	Packaged Emulsion	2.05	0.41			0.62	3.08
Others – include cost of permits, storage/magazine, security and land transport							

F. Drill and Blast Design – Powder Factor Relative to the Desired Fragmentation

Kutznetsov Formula (1973) and Kuz-Ram Fragmentation Model

Where;

Xm - Desired Fragmentation in cm
A - Rock Factor = 8.5 from Table 7.11
Q - Mass of explosive in the hole = BCM x PF
WS - Weight Strength relative to ANFO
K-0.8 = (Xm/(A*(Q1/6)*(115/RWS(19/20)))
K - Powder Factor relative to desired fragmentation, kg/m3
K = K-0.8^(1/-0.8)

Powder Factor K, Relative to the Desired Fragmentation Xm - Using ANFO

Blasthole	**BCM**	**PF**	**Xm**	Kutznetsov Formula (1973) & Ram-Kuz Model				
Diameter	V=BxSxL	in PC	Desired	**A**	**Q**	**RWS**	$K^{-0.8}$	**K**
mm	m^3	kg/m^3	X_m in cm		kg			kg/m^3
76	80.90	0.407	50	8.5	32.95	100.00	2.88	0.27
89	103.88	0.425	50	8.5	44.12	100.00	2.74	0.28
89	116.74	0.377	50	8.5	43.96	100.00	2.74	0.28
102	129.96	0.435	50	8.5	56.56	100.00	2.63	0.30
115	158.84	0.443	50	8.5	70.29	100.00	2.54	0.31
127	190.54	0.447	50	8.5	85.09	100.00	2.46	0.33
76	80.90	0.407	40	8.5	32.95	100.00	2.30	0.35
89	103.88	0.425	40	8.5	44.12	100.00	2.19	0.37
89	116.74	0.377	40	8.5	43.96	100.00	2.19	0.37
102	129.96	0.435	40	8.5	56.56	100.00	2.10	0.39
115	158.84	0.443	40	8.5	70.29	100.00	2.03	0.41
127	190.54	0.447	40	8.5	85.09	100.00	1.96	0.43
76	80.90	0.407	30	8.5	32.95	100.00	1.73	0.51
89	103.88	0.425	30	8.5	44.12	100.00	1.64	0.54
89	116.74	0.377	30	8.5	43.96	100.00	1.65	0.54
102	129.96	0.435	30	8.5	56.56	100.00	1.58	0.57
115	158.84	0.443	30	8.5	70.29	100.00	1.52	0.59
127	190.54	0.447	30	8.5	85.09	100.00	1.47	0.62

Powder Factor K, Relative to the Desired Fragmentation Xm - Using Fortis Emulsion

Blasthole	**BCM**	**PF**	**Xm**	Kutznetsov Formula (1973) & Ram-Kuz Model				
Diameter	V=BxSxL	in PC	Desired	**A**	**Q**	**RWS**	$K^{-0.8}$	**K**
mm	m^3	kg/m^3	X_m in cm		kg			kg/m^3
76	98.43	0.475	50	8.5	46.76	103.0	2.79	0.28
89	127.37	0.490	50	8.5	62.37	103.0	2.66	0.29
89	151.61	0.409	50	8.5	62.02	103.0	2.66	0.29
102	159.90	0.499	50	8.5	79.79	103.0	2.55	0.31

Blasthole Diameter	BCM V=BxSxL	PF in PC	Xm Desired	Kutznetsov Formula (1973) & Ram-Kuz Model				
				A	Q	RWS	$K^{-0.8}$	K
mm	m^3	kg/m^3	X_m in cm		kg			kg/m^3
115	196.01	0.504	50	8.5	98.71	103.0	2.46	0.32
127	235.71	0.506	50	8.5	119.31	103.0	2.39	0.34
76	98.43	0.475	40	8.5	46.76	103.0	2.23	0.37
89	127.37	0.490	40	8.5	62.37	103.0	2.13	0.39
89	151.61	0.409	40	8.5	62.02	103.0	2.13	0.39
102	159.90	0.499	40	8.5	79.79	103.0	2.04	0.41
115	196.01	0.504	40	8.5	98.71	103.0	1.97	0.43
127	235.71	0.506	40	8.5	119.31	103.0	1.91	0.45
76	98.43	0.475	30	8.5	46.76	103.0	1.67	0.52
89	127.37	0.490	30	8.5	62.37	103.0	1.60	0.56
89	151.61	0.409	30	8.5	62.02	103.0	1.60	0.56
102	159.90	0.499	30	8.5	79.79	103.0	1.53	0.59
115	196.01	0.504	30	8.5	98.71	103.0	1.48	0.61
127	235.71	0.506	30	8.5	119.31	103.0	1.43	0.64

Powder Factor K, Relative to Desired Fragmentation Xm – For Powerfrag Emulsion

Blasthole Diameter	BCM V=BxSxL	PF in PC	Xm Desired	Kutznetsov Formula (1973) & Ram-Kuz Model				
				A	Q	RWS	$K^{-0.8}$	K
mm	m^3	kg/m^3	X_m in cm		kg			kg/m^3
76	94.45	0.359	50	8.5	33.92	121.0	3.43	0.21
89	127.01	0.379	50	8.5	48.09	121.0	3.24	0.23
89	153.31	0.308	50	8.5	47.28	121.0	3.25	0.23
102	170.96	0.481	50	8.5	82.16	121.0	2.96	0.26
115	199.06	0.487	50	8.5	96.86	121.0	2.88	0.27
127	237.45	0.449	50	8.5	106.53	121.0	2.84	0.27
76	94.45	0.359	40	8.5	33.92	121.0	2.74	0.28
89	127.01	0.379	40	8.5	48.09	121.0	2.59	0.30
89	153.31	0.308	40	8.5	47.28	121.0	2.60	0.30
102	170.96	0.481	40	8.5	82.16	121.0	2.37	0.34
115	199.06	0.487	40	8.5	96.86	121.0	2.30	0.35
127	237.45	0.449	40	8.5	106.53	121.0	2.27	0.36
76	94.45	0.359	30	8.5	33.92	121.0	2.06	0.41
89	127.01	0.379	30	8.5	48.09	121.0	1.94	0.44
89	153.31	0.308	30	8.5	47.28	121.0	1.95	0.43
102	170.96	0.481	30	8.5	82.16	121.0	1.78	0.49
115	199.06	0.487	30	8.5	96.86	121.0	1.73	0.50
127	237.45	0.449	30	8.5	106.53	121.0	1.70	0.51

G. References and Specifications

Specific Gravity by Nominal Rock Classification

Rock	SPECIFIC GRAVITY		
Classification	Min	Max	Jugan
Basalt	1.8	3.0	
Dibase	2.6	3.0	
Diorite	2.8	3.0	
Dolomite	2.8	2.9	
Gneiss	2.6	2.9	
Granite	2.6	2.9	
Gypsum	2.3	2.8	
Hematite	4.5	5.3	
Limestone	2.4	2.9	
Marble	2.1	2.9	
Quatzite	2.0	2.8	
Sandstone	2.0	2.8	
SHALE	2.4	2.8	2.62
Slate	2.5	2.8	
Trap Rock	2.6	3.0	

Correction Factors for Burden Distance

Rock Deposition	Kd	
Bedding steeply dipping into cut	1.18	
Bedding steeply dipping into face	0.95	
Other cases of deposition	1	
Rock Structure	**Ks**	**RMR**
Heavily cracked, frequent weak joints, weakly cemented layers	1.3	POOR
Thin, well-cemented layers with joints	1.1	FAIR to good
Massive intact rocks	0.95	very good & >

Stiffness Ratio's Effect on Blasting

Stiffness Ratio (RS)	1	2	3	4 & >4
Fragmentation	POOR	FAIR	GOOD	EXCELLENT
Air Blast	SEVERE	FAIR	GOOD	EXCELLENT
Flyrock	SEVERE	FAIR	GOOD	EXCELLENT
Ground Vibration	SEVERE	FAIR	GOOD	EXCELLENT

Blasthole Size/Diameter

Rock Type	Diameter	Diameter	Drill Type	Machine Option
	mm	inches		Sandvik or CAT
SHALE (Jugan)	76	3.0	Top Hammer	DX800 or MD5075
SHALE (Jugan)	89	3.5	Top Hammer	DX800 or MD5075
SHALE (Jugan)	102	4.0	Top Hammer	DX800 or MD5075

Rock Type	Diameter	Diameter	Drill Type	Machine Option
	mm	inches		Sandvik or CAT
SHALE (Jugan)	115	4.5	Top Hammer	DX800 or MD5075
SHALE (Jugan)	127	5.0	Rotary	Sandvik DR Series
If problem of collapsing hole persists, consider 127mm drill hole by Rotary Drill				

Technical Data of ANFO

Explosive Property	**ANFO**
Density (g/cm^3)	**0.82**
Minimum Blasthole Diameter (mm)	**76**
Maximum Blasthole Depth(m)	**80**
Maximum Charge Length (m)	**75**
Diameter of explosive (De) = Diameter of Blasthole	
Hole Type	**DRY**
Delivery System	**augured/blowloaded**
Recommended booster for 76 – 102mm hole dia	**Pentex H**
Recommended booster for >102mm hole dia	**Pentex PPP**
Typical VOD (km/s)	**2.5 - 4.8**
Relative Effective Energy (REE)(3)	
Relative Weight Energy	**100**
Relative Bulk Strength	**100**
CO2 Output (kg/tonne)	**182**
Sleep Time	**42 days**

Technical Data of FORTIS (Bulk) Explosive - usually mixed at site

Explosive Property	**Fortis™ Advantage System**			
Density (g/cm3)	1.10	1.15	1.20	1.25
Minimum Blasthole Dia. (mm)	89	89	89	89
Maximum Blasthole Depth (m)	30	30	30	30
Maximum Charge Length (m)	25	25	25	25
Hole Type	Dry, Wet or Dewatered			
Delivery System	Pumped			
Booster for min hole diameter	Pentex H	Pentex H	Pentex H	Pentex H
Typical VOD (km/s)-Fortis S	3.7-5.9	3.7-6.1	3.7-6.3	3.7-6.5
Relative Effective Energy (REE)				
Relative Weight Strength	97	100	104	107
Relative Bulk Strength	133	144	156	167
CO2 output (kg/tonne)	137	145	133	133
Typical VOD (km/s) - **Fortis**	3.7-5.9	3.7-6.1	3.7-6.3	3.7-6.5
Relative Effective Energy (REE)				

Explosive Property	Fortis™ Advantage System			
Relative Weight Strength	100	103	107	110
Relative Bulk Strength	137	148	160	172
CO2 output (kg/tonne)	142	140	136	135
Fortis™ Advantage H				
Typical VOD (km/s) - Fortis H	3.7-5.9	3.7-6.1	3.7-6.3	3.7-6.5
Relative Effective Energy (REE)				
Relative Weight Strength	103	107	110	113
Relative Bulk Strength	142	154	165	177
CO2 output (kg/tonne)	154	151	149	148
Sleep Time	21 days			

Technical Data of Senatel TM POWERFRAG (packaged emulsion explosive)

Explosive Property		Nominal	Nominal	Nominal
Senatel POWERFRAG	Diameter	Density g/cc	Length (mm)	Mass (g)
Powerfrag (65mm)	65	1.21	300	1175
Powerfrag (80mm)	80	1.21	400	2275
PowerPac		1.18	250	1000
	PowerFrag		PowerPac	
Relative Effective Energy	REE		REE	
Relative Weight Strength	121		111	
Relative Bulk Strength				
to ANFO @ 0.82g/cc	183		164	
to ANFO @ 0.95g/cc	139		124	
Min. Velocity of Detonation	3.4km/s		5.5	
CO_2[3]	184 kg/t		181	

Explosive Loading Density Chart (Given: Explosive Specific Gravity)

Column Diameter	Explosive Specific Gravity (ANFO & FORTIS)				
Note: For ANFO & Emulsion, column dia = blasthole dia	0.80	1.10	1.15	1.20	1.25
	Density	Density	Density	Density	Density
3.0"	2.45	3.37	3.525	3.68	3.83
76mm	3.65	5.01	5.25	5.48	5.70
3.5"	3.34	4.59	4.8	5.01	5.215
89mm	4.97	6.83	7.14	7.45	7.76
4.0"	4.36	6	6.27	6.54	6.81
102mm	6.49	8.93	9.33	9.73	10.13
4.5"	5.52	7.58	7.925	8.27	8.615
115mm	8.21	11.28	11.79	12.31	12.82
5.0"	6.81	9.36	9.79	10.22	10.645
127mm	10.13	13.93	14.57	15.21	15.84

Explosive Loading Density Chart (Given: Explosive Specific Gravity)

Column Diameter Note: For Packaged Emulsion	**Explosive Specific Gravity (Powerfrag, Powerpac)**				
	0.80	1.10	1.15	1.20	
Explosive diameter in mm				Density	
2.56"				2.55	lb/ft
65				3.79	kg/m
3.15"				3.70	lb/ft
80				5.51	kg/m
3.94"				6.50	lb/ft
100				9.67	kg/m
4.33"				7.79	lb/ft
110				11.59	kg/m
4.75"				8.75	lb/ft
121				13.02	kg/m

Ratings for the Blastability Index Parameters (after Lilly (1986))

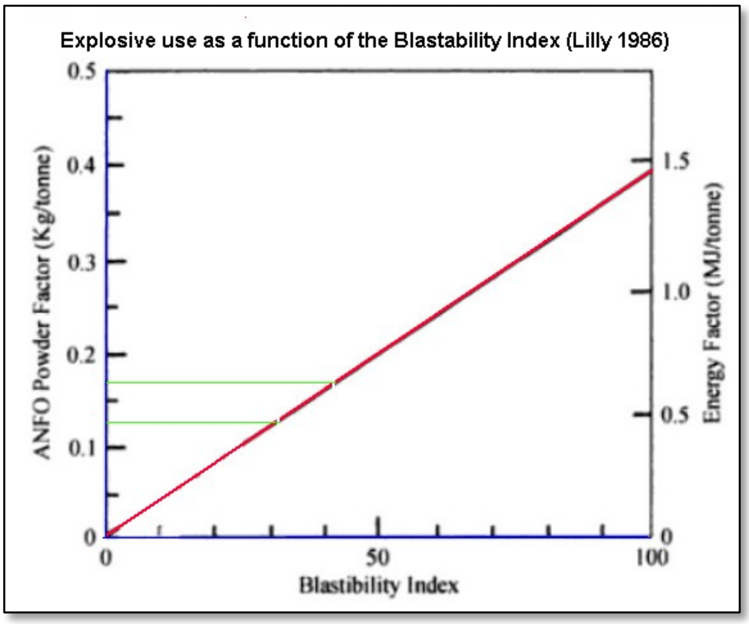
Parameter			**Rating**
1. Rock mass description (RMD)			
	1.1	Powdery/Friable	10
	1.2	Blocky	20
	1.3	Totally Massive	50
2. Joint Plane Spacing (JPS)			
	2.1	Close (<0.1 m)	10
	2.2	Intermediate ().1 to 1.0 m)	20
	2.3	Wide (>1.0 m)	50
3. Joint Plane Orientation (JPO)			
	3.1	Horizontal	10
	3.2	Dip out of face	20
	3.3	Strike normal to face	30
	3.4	Dip into face	40
4. Specific Gravity Influence (SGI)			
	SGI =	(25xSG)-50, wwhere SG is specific gravity of rock	
5. Hardness (H) = 3		H value from Moh's hardness scale (max for shale)	

Rock Factor per Rock Type

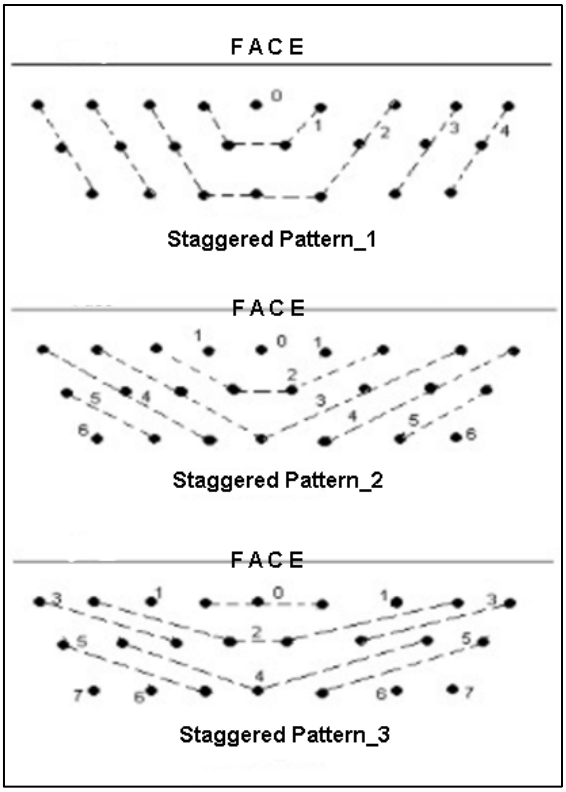
Table 1: Guide to powder factors and rock factors for various rock types

General Category	Rock type	Powder factor (kg/m^3)	Rock factor A
Hard (+200)	Andesite Dolerite Granite Ironstone Silcrete	0.70	12 -14
Medium (100 – 200)	Dolomite Hornfels Quartzite Serpentinite Schist	0.45	10 -11
Soft (50 – 100)	Sandstone Calcrete Limestone Shale	0.30	8 - 9
Very soft (-50)	Coal	0.15 – 0.25	6

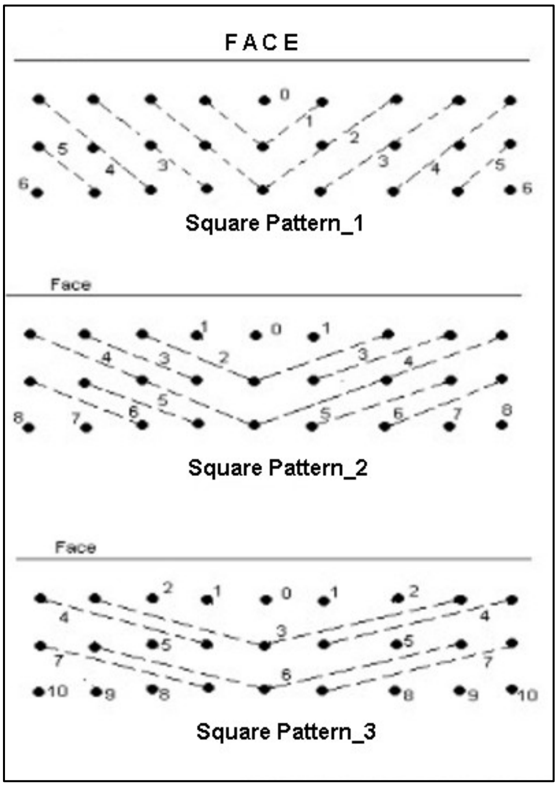
<u>Blastability Index Graph</u>



24-Holes Staggered Drilling Pattern



27-Holes Square Drilling Pattern



A21-1. Calculation Parameters – CAPEX/OPEX Costing

Unit/Factor Description	Value	Units
Mining / Milling Days	365	days
Mining / Milling Days per Quarter	91.25	days
Mining Rate_Base Case	8000	tonnes/day
Density, Ore	2.62	t/m^3
Density, Waste	2.60	t/m^3
Stripping Ratio (average)	2.3	W:O
Cut-off Grade (mining)		g/t
Mining Call Factor	100%	
Pit Optimization: Pit Slope Angle	from RMR model	
Mining Dilution_Jugan Pit	5%	
Mining Dilution_Bukit Young Pit	5%	
Metallurgical Recovery (Ave: Flotation & CIL)	**85%**	
Gold Price Used	**$ 1,500**	US$/Oz
Payable Gold (Sales)	99%	
Refining Charges	2.50	US$/Oz
Freight/Shipment Cost	4.50	US$/Oz
Royalties	0.00	
Income Tax	-	
Depreciation Rate	8%	
No. of shift/mining crew	3	
No. of Shift for hauling on public road	2	
Additional Consumable Usage Factor	1.2	
General Spares Factor	0.2	
US$-RM Rate-of-Exchange	0.3282	
US$-A$ Rate-of-Exchange	1.0319	
US$-**€** Rate-of-Exchange	1.2940	
Contingency (Capex and Opex)	**0%**	
Annual Cost Escalation	0%	
Equipment Resale %	25%	
Equipment Resale Value		
Resale Value	$	
International Freight Dbn-Malaysia - 20'	800.00	US$
International Freight Dbn-Malaysia - 40'	1,050.00	US$
Local Freight & Customs - 20'	1,450.00	RM
Local Freight & Customs - 40'	1,950.00	RM

Unit/Factor Description	Value	Units
Fuel Price_Subsidised	$ 0.66	per liter
Fuel_No subsidy	$ 0.90	per liter
Power Cost	$ 0.068	per kWhr
Operator & Maintenance Labour	$ 3.50	per hour
Labour based on machine hours	$ 4.375	per UT hour
Labour based on maintenance hours	$ 4.32	per MT hour

A21-2. Equipment Data Parameters – CAPEX/OPEX Costing

Unit/Factor Description	Value	Units
Equipment Data Inputs		
Total Mobile Machinery (for 8000 tpd)	40	units
Capital Replacement Factor	15%	
Average Equipment Capacity	90%	
Net Fleet Efficiency	90.5%	
Operating Cost Allocation (+5% losses)	90.0%	
Allowance for extra equipment capacity	10%	
Other Equipment		
Road Grader	US $ 80	US$ /UT
Water Truck	US $ 90	US$ /UT
Service/Tyre Truck	US $ 80	US$ /UT
Explosive (Bulk) Truck	US $ 90	US$ /UT
Compactor	US $ 80	US$ /UT
Complete Mining Equipment - For Base Case, 8000 TPD		
Loader (Shovel/Excavator)		
No. of Units for Basecase (CAT_6015FS)	2	units
Capacity	7	m3
Unit Cost	$ 1,476,765	US$
Material Cost	60	US$/UT
Fuel Rate	55	litres
Replace Hours	50000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time (machine hours) from Table 5	5,920	UT hours
Maintenance Time	2,103	hours
Annual Production/Unit	5,370,000	tonnes
Rigid Dump Truck for Ore		
No. of Units for Basecase (CAT_772G)	4	units
Capacity	30	m3
Unit Cost	$ 662,903	US$
Material Cost	30	US$/UT
Fuel Rate	42	litres
Replace Hours	50000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time	5,906	UT hours
Maintenance Time	2,237	hours
Average Hauling Distance	1,600.0	meters
Annual Production/Unit	1,044,167	tonnes
Rigid Dump Truck for Waste		

Unit/Factor Description	Value	Units
No. of Units for Basecase (CAT_772G)	5	units
Capacity	30	m3
Unit Cost	$ 662,903	US$
Material Cost	30	US$/UT
Fuel Rate	42	litres
Replace Hours	50000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time	5,906	UT hours
Maintenance Time	2,237	hours
Average Hauling Distance	1,200.0	meters
Annual Production/Unit	1,392,222	tonnes
Dozer/Ripper CAT_D10		
No. of Units for Basecase (CAT_772G)	1	unit
Capacity	18	m3
Unit Cost	$ 1,670,385	US$
Material Cost	62	US$/UT
Fuel Rate	56	litres
Replace Hours	60000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time	5,838	UT hours
Maintenance Time	2,151	hours
Production/Unit	9,636,000	tonnes
Tractor D6R		
No. of Units for Basecase (CAT_D6R)	2	units
Capacity	6	m3
Unit Cost	$ 274,022	US$
Material Cost	21	US$/UT
Fuel Rate	20	litres
Replace Hours	50000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time	4800	UT hours
Maintenance Time	2500	hours
Production/Unit		tonnes
Production Drill		
No. of Units for Basecase (Sandvik DX800)	2	units
Hole Dia. min 76mm, max 127mm	89	mm
Unit Cost	$ 565,920	US$
Material Cost	60	US$/UT
Fuel Rate	46	litres
Replace Hours	50000	hours
MT/AMT	1.23	

Unit/Factor Description	Value	Units
Ratio: AT/UT	1.25	
Utilised Time	5,920	UT hours
Maintenance Time	2,103	hours
Production/Unit	5,370,000	tonnes
Road Grader	2	units
Blade width	2	m
Unit Cost	$ 308,480	US$
Material Cost	15	US$/UT
Fuel Rate	20	litres
Replace Hours	40000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time	4,800	UT hours
Maintenance Time	2,193	hours
Wheel Loader	2	units
Capacity	6.4	m3
Unit Cost	$ 820,425	US$
Material Cost	59	US$/UT
Fuel Rate	54	litres
Replace Hours	50000	hours
MT/AMT	1.23	
Ratio: AT/UT	1.25	
Utilised Time		UT hours
Maintenance Time		
Compactor	2	units
Capacity		m3
Unit Cost	$ 95,169	US$
Fuel Rate		litres
Replace Hours	4800	hours
Utilised Time		UT hours
Maintenance Time		
Water Truck	2	units
Capacity	10	m3
Unit Cost	$ 88,606	US$
Fuel Rate		litres
Replace Hours		hours
Utilised Time	1650	UT hours
Service/Tyre Truck	2	units
Capacity		m3

Unit/Factor Description	Value	Units
Unit Cost	$ 90,000	US$
Fuel Rate		litres
Replace Hours	5595	hours
Utilised Time	4380	UT hours
Cable Bolter (identical with production drill)	1	unit
Capacity		m3
Unit Cost	$ 565,920	US$
Fuel Rate		litres
Replace Hours		hours
Utilised Time		UT hours
Explosive Truck	2	units
Capacity		m3
Unit Cost	$ 50,000	US$
Fuel Rate		litres
Replace Hours		hours
Utilised Time	3105	UT hours
Maintenance Time		
Arsenic Smelting Penalty	$ 2.00	/per 0.1% > 0.2%
Aluminium Smelting Penalty	$ 1.25	/per 1% > 3%
Au Feed - Au Concentrate Ratio	7.6	

A21-3. Mining Labour Costing – Direct & Indirect

Labour Cost Item Description	Qty		Unit Cost (MYR)		Unit Cost (US$/mth)		Total Cost (US$/mth)
Direct Labour (pit operations) - costing included in OPEX1_Mining							
Equipment Operators	74	staff	RM 3,500	/mth	$ 1,148.60	/mth	$84,996.03
Shop Mechanics	10	staff	RM 3,500	/mth	$ 1,148.60	/mth	$11,485.95
Service Mechanics	4	staff	RM 3,500	/mth	$ 1,148.60	/mth	$4,594.38
Shop Electrician	4	staff	RM 3,500	/mth	$ 1,148.60	/mth	$4,594.38
Service Electrician	3	staff	RM 3,500	/mth	$ 1,148.60	/mth	$3,445.79
Helper/Utility	12	staff	RM 2,000	/mth	$ 656.34	/mth	$7,876.08
Direct Labour	**107**						**$116,992.61**
Manager & Supervision Staff Labour:							
Mine Manager Expat	1	staff			$20,000.00	/mth	$20,000.00
Mine Shift Foreman	3	staff	RM 20,000	/mth	$6,563.40	/mth	$19,690.20
Planning Engineer	1	staff	RM 18,000	/mth	$5,907.06	/mth	$5,907.06
Shift Supervisor	6	staff	RM 15,000	/mth	$4,922.55	/mth	$29,535.30
Pit Geologist	2	staff	RM 15,000	/mth	$4,922.55	/mth	$9,845.10
Resource/Reserve Geologist	1	staff	RM 18,000	/mth	$5,907.06	/mth	$5,907.06
Geotech Engineer	1	staff	RM 18,000	/mth	$5,907.06	/mth	$5,907.06
Chief Surveyor	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Safety Manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Safety Supervisor	3	staff	RM 5,000	/mth	$1,640.85	/mth	$4,922.55
Fleet Maintenance Manager	1	staff	RM 15,000	/mth	$4,922.55	/mth	$4,922.55
Mechanical Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Maintenance Supervisor	3	staff	RM 5,000	/mth	$1,640.85	/mth	$4,922.55
Maintenance Planner	1	staff	RM 6,000	/mth	$1,969.02	/mth	$1,969.02
Electrical Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Electrical Supervisor (maint)	3	staff	RM 5,000	/mth	$1,640.85	/mth	$4,922.55
Warehouse Manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Warehouse Supervisor	2	staff	RM 5,000	/mth	$1,640.85	/mth	$3,281.70
Environment Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Tailings Dam Manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Supervisor (tailings dam)	3	staff	RM 5,000	/mth	$1,640.85	/mth	$4,922.55
Mine Overhead Labour	**38**						**$149,627.15**
Mine Service Department							
Safety Officer/Trainer	2	staff	RM 5,000	/mth	$1,640.85	/mth	$3,281.70
Mine Clerk/Statisticians	2	staff	RM 5,000	/mth	$1,640.85	/mth	$3,281.70
Grade Control Technician	3	staff	RM 2,700	/mth	$886.06	/mth	$2,658.18
Samplers	6	staff	RM 2,700	/mth	$886.06	/mth	$5,316.35
Surveyor	1	staff	RM 5,000	/mth	$1,640.85	/mth	$1,640.85
Survey crew	4	staff	RM 2,700	/mth	$886.06	/mth	$3,544.24

Labour Cost Item Description	Qty		Unit Cost (MYR)		Unit Cost (US$/mth)		Total Cost (US$/mth)
Geotech crew	2	staff	RM 2,700	/mth	$886.06	/mth	$1,772.12
Security manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Security guards	12	staff	RM 2,700	/mth	$886.06	/mth	$10,632.71
Mine Services Labour	**33**						**$35,409.55**
Engineering Services							
Engineering Manager	1	staff			$15,000.00	/mth	$15,000.00
Civil Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Mechanical Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Electirlcal Engineer	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Engineering Labour	**4**						**$24,845.10**
Admin, PR & HR							
Mine Admin Manager	1	staff			$15,000.00	/mth	$15,000.00
HR Manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
PR Manager	1	staff	RM 10,000	/mth	$3,281.70	/mth	$3,281.70
Office Personnel	9	staff	RM 2,500	/mth	$820.43	/mth	$7,383.83
Admin Labour	**12**						**$28,947.23**
Procurement, Accounting & Finance and ICT							
Procurement Manager	1	staff			$15,000.00	/mth	$15,000.00
Procurement Staff/ Buyer	3	staff	RM 3,000	/mth	$984.51	/mth	$2,953.53
Finance Mgr/Comptroller	1	staff	RM 12,000	/mth	$3,938.04	/mth	$3,938.04
Accountant	1	staff	RM 6,000	/mth	$1,969.02	/mth	$1,969.02
Cashier	1	staff	RM 3,000	/mth	$984.51	/mth	$984.51
Accounting Staff	2	staff	RM 3,000	/mth	$984.51	/mth	$1,969.02
IT Manager	1	staff	RM 12,000	/mth	$3,938.04	/mth	$3,938.04
IT Technician	2	staff	RM 4,000	/mth	$1,312.68	/mth	$2,625.36
PAFI Labour	**12**						**$33,377.52**
Tailings Dam Labour:							
Tailings Dam Crew	6	staff	RM 2,500	/mth	$820.43	/mth	$4,922.55
Total Labour Costs:							**$277,129.10**
Labour_Staff Onsite Costs	15	%					$41,569
Labour_Travel & Accommodation	15	%					$41,569
Contractual Expats/Consultants							$50,000
Grand Total Labour/Overhead							**$410,267**

Labour Cost Item Description	Qty		Unit Cost (MYR)		Unit Cost (US$/mth)		Total Cost (US$/mth)
Total Annual Labour Costs:							$4,923,205
Personnel with PPEs	***188***						
Labour Cost per tonne (for MCAF)							**$ 0.62**

A21-4. Mine Engineering Services Costing

Engineering Cost Item Description	Qty		Unit Cost (US$)		Total Cost (US$)	Cost/Tonne (US$/t)
Services:						
Water Pipe - Service Water	2,400	m	$ 12.15	/m	$ 29,160.00	$ 0.010
HDPE Pipe - pit dewatering pipes	2,400	m	$ 12.15	/m	$ 29,160.00	$ 0.010
Water Pipe Clamps	960	units	$ 8.67	each	$ 8,323.20	$ 0.003
Water Pipe - Bends	10	units	$ 10.67	each	$ 106.70	$ 0.000
Water Pipe - Valves	5	units	$ 83.33	each	$ 416.65	$ 0.000
LT Equipment	4	units	$ 1,925	/unit	$ 7,700.00	$ 0.003
LT Equipment - Frames	4	units	$ 226.36	/unit	$ 905.44	$ 0.000
Pipe Support	1,200	m	$ 20.87	/m	$ 25,044.00	$ 0.009
Electric Cable - 70mm XLPE	2,000	m	$ 19.83	/m	$ 39,660.00	$ 0.014
Elec Cable - 70mm XLPE 1000/600V		m	$ 260.87	/m	$	$ -
Electric Cable - 4C/16mm	2,000	m	$ 2.96	/m	$ 5,920.00	$ 0.002
Luminaires	500	units	$ 2.87	each	$ 1,435.00	$ 0.000
Bulbs	500	units	$ 0.52	each	$ 260.00	$ 0.000
Dewatering pump consumables	1.0	lot	$ 8,000	/lot	$ 8,000.00	$ 0.003
Total Services:					***$ 156,090.99***	***$ 0.05***
Electricity						
Workshop & equipment (70kW)	430,080	kWhr	$ 0.068		$ 29,245.44	$ 0.010
Mobile Light Plant for pit (6 x 13kW)	239,600	kWhr	$ 0.068		$ 16,292.80	$ 0.006
Offices & accommodation (20kW)	122,880	kWhr	$ 0.068		$ 8,355.84	$ 0.003
Electricity for pumps (in opex1)						
Total Electricity	***53.76***				***$ 53,894.08***	***$ 0.02***
Sundries						
Potable Water	3,200	m^3	$ 0.49	/m3	$ 1,575.22	$ 0.001
Water for Workshop	4,800	m^3	$ 0.49	/m3	$ 2,362.82	$ 0.001
Cleaners - Degreasing	24	mths	$ 2,088.00	/mth	$ 50,112.00	$ 0.017
Total Sundries:					***$ 54,050.04***	***$ 0.02***
TOTAL ENGINEERING COSTS					**$ 264,035.11**	**$ 0.09**

A21-5. Technical Services, Health & Safety and Sundry Mining Costing

Cost Item Description	Qty		Unit Cost (MYR)		Unit Cost (US$)		Total Cost (US$)	Cost/Tonne (US$/t)
Health & Safety:								
Boots	451	units	RM 110.00	/pair	$ 36.10	/pair	$ 16,287.73	$ 0.004
Hard Hats	451	units	RM 25.00	/unit	$ 8.20	/unit	$ 3,701.76	$ 0.001
Overalls	451	units	RM 43.00	/unit	$ 14.11	/unit	$ 6,367.02	$ 0.002
Gloves	451	units	RM 0.65	/pair	$ 0.21	/pair	$ 96.25	$ 0.000
Belts	451	units	RM 180.00	/unit	$ 59.07	/unit	$ 26,652.65	$ 0.007
Ear Muffs	451	units	RM 45.00	/unit	$ 14.77	/unit	$ 6,663.16	$ 0.002
Glasses	451	units	RM 28.00	/unit	$ 9.19	/unit	$ 4,145.97	$ 0.001
First Aid Materials	78	units	RM 200.00	/unit	$ 65.63	/unit	$ 5,119.45	$ 0.001
Reflector Jackets	451	units	RM 40.00	/unit	$ 13.13	/unit	$ 5,922.81	$ 0.002
Danger Tape	320	/20m	RM 19.50	/100m	$ 6.40	/100m	$ 2,047.78	$ 0.001
Hand Torches	76	units	RM 45.00	/unit	$ 14.77	/unit	$ 1,122.34	$ 0.000
Safety Signage	200	units	RM 100.00	/unit	$ 32.82	/unit	$ 6,563.40	$ 0.002
Total Health & Safety:							***$ 84,690.33***	***$ 0.02***
Mining Services:								
Sampling Materials								
Sample Bags	19,246	bag	RM 2.50	/bag	$ 0.82	/bag	$ 15,789.57	$ 0.005
Hammers	12.0	unit	RM 15.00	/unit	$ 4.92	/unit	$ 59.07	$ 0.000
Spray Paint	600.0	can	RM 8.00	/can	$ 2.63	/can	$ 1,575.22	$ 0.001
Measuring Tape	12.0	tape	RM 6.00	/tape	$ 1.97	/tape	$ 23.63	$ 0.000
Survey Materials								$ -
Survey Pegs	800	each	RM 4.80	each	$ 1.58	each	$ 1,260.17	$ 0.000
Spray Paint	600.0	can	RM 8.00	/can	$ 2.63	/can	$ 1,575.22	$ 0.001
Measuring Tape	12.0	tape	RM 6.00	/tape	$ 1.97	/tape	$ 23.63	$ 0.000
Geology Materials								$ -
Sample Bags	1440.0	pcs	RM 2.50	/pcs	$ 0.82	/pcs	$ 1,181.41	$ 0.000
Geology Hammers	6.0	unit	RM 20.00	/unit	$ 6.56	/unit	$ 39.38	$ 0.000
Spray Paint	600.0	can	RM 8.00	/can	$ 2.63	/can	$ 1,575.22	$ 0.001
Measuring Tape	12.0	tape	RM 6.00	/tape	$ 1.97	/tape	$ 23.63	$ 0.000
Office Items/Supplies								$ -
Software Licenses/ Maintenance	3	sets		/set	$ 10,000	/set	$ 30,000.00	$ 0.010
Office Supplies	60	reams	RM 100.00	/ream	$ 32.82	/ream	$ 1,969.02	$ 0.001
Total Mining Services:							***$ 55,095.16***	***$ 0.02***
Sundries:								
Paint	60.0	litre	RM 20.00	/litre	$ 6.56	/litre	$ 393.80	$ 0.0001
Spray Paint	800	cans	RM 8.00	/can	$ 2.63	/can	$ 2,100.29	$ 0.0007
Measuring Tapes	60.0	tapes	RM 6.00	/tape	$ 1.97	/tape	$ 118.14	$ 0.0000
Hand Tools	120.0	pcs	RM 50.00	/pc	$ 16.41	/pcs	$ 1,969.02	$ 0.0007
Pad Locks	120.0	locks	RM 10.00	/lock	$ 3.28	/lock	$ 393.80	$ 0.0001
Shovels & Picks	120.0	units	RM 18.00	/unit	$ 5.91	/unit	$ 708.85	$ 0.0002

Cost Item Description	Qty		Unit Cost (MYR)		Unit Cost (US$)		Total Cost (US$)	Cost/Tonne (US$/t)
Hammers	120.0	units	RM 15.00	/unit	$ 4.92	/unit	$ 590.71	$ 0.0002
Heavy Duty Plastic	60.0	units	RM 600.00	/20m	$ 196.90	/20m	$ 11,814.12	$ 0.0040
Cement	2400.0	bags	RM 13.40	/25kg	$ 4.40	/25kg	$ 10,553.95	$ 0.0036
Nails, Nuts & Bolts	60.0	kgs	RM 11.20	/kg	$ 3.68	/kg	$ 220.53	$ 0.0001
Battery Fluid	2000	litre	RM 1.00	litre	$ 0.33	litre	$ 656.34	$ 0.0002
Oxygen	144	tank	RM 55.64	/10.7m^3	$ 18.26	/10.7m^3	$ 2,629.35	$ 0.0009
Acetylene	72.0	tank	RM 92.80	/6.4m^3	$ 30.45	/6.4m^3	$ 2,192.70	$ 0.0008
Washers	10	box	RM 200.00	/box	$ 65.63	/box	$ 656.34	$ 0.0002
Gaskets	10	box	RM 500.00	/box	$ 164.09	/box	$ 1,640.85	$ 0.0006
Total Sundries:							***$ 36,638.79***	***$ 0.01***
TOTAL GENERAL:							**$ 176,424.28**	**$ 0.05**

A21-6. Process Plant Equipment List

Item No	Op	S'by	Title	Inst. kW ea	Total. kW	VSD/ Fixed	Description	Manufacturer	Supplier	Model №	Total Cost
					14,128					TOTAL	$29,895,500
			CRUSHING MODULE								
01-BN-01	1		Primary crusher feeder Bin				Mild steel hopper with hardox liner,	Metso	Metso		$ 175,000
	1		Crusher main Feeder	30	30	Fixed	Length 6100 x W 1300,Max rock 900 mm,VF 561-2V	Metso	Metso	VF 561-2V	
	1		Apron Feeder Spillage Chute					Local	Local		$ 12,000
	1		Jaw Crusher	160	160	Fixed	C 125,Jaw portal-1250x950,Max rock 800mm,Cr capacity 670Ton/hr,Screen130-200mm	Metso	Metso	C 125	$ 490,000
			Main support structure crusher				Heay duty steel suuport structure with working platform	Local	Local		$ 162,000
	1		Hanging Electro Magnet	10	10	Fixed	1500X1450X1360 mm,Wt 3100kg,Exciting Power 8.4kw,Oil cooled,700Gs at 300mm gap Mag Intensity	Metso	Metso		$ 45,000
	1		Primary Crusher Maintenance Hoist				10t SWL Electric hoist-Over head crane	Demag,Germ/Viet	Demag		$ 58,000
	1		Conveyor Jaw CR to Stockpile	75	75	Fixed	90 meter,1400 mm wide, 1.2 M/s,1400x5x4x2 mm belt	Metso	Metso		$ 102,000
	1		Ore Bin Feed Conveyor from grizzly	30	30	Fixed	30 meter,1200mm width,1.2m/s,1200x5x4x2mm belt	Metso	Metso		$ 68,000
	1		Jaw Crusher Building				Pree fabricated building	PEB	PEB		$ 56,000
	1		Stockpile Ore Bin				Mild steel hopper with epoxy paint,size	Local	Local		$ 85,000
	1		Stockpile Building				Pree fabricated building	PEB	PEB		$ 58,000
	1	3	Ore Bin Tail Gate				Air actuated tail gate box	Metso	Metso		$ 62,000
	1	3	Vibratory small feeder	1.5	6		Vibratory feeder for tunnel feeder conveyor	Metso	Metso		$ 84,000
	1	3	Feeder Conveyor	4.0	16	VSD	2 meter,1000mm wide,1.0 m/s,1000x5x4x2 mm	Metso	Metso		$ 56,000
	1		Tunnel Conveyor	45	45	Fixed	35 meter,1400mm width,1.2m/s,1400x5x4x2mm belt	Metso	Metso		$ 52,000
			Conveyoor Supports				Schedule 40 pipe supports with suppoirt brackets	Local	Local		$ 75,000
	4		Belt Scrapper Tunnel CV	1.5	6.0	Fixed	Motor connected rotary brush	Metso	Metso		$ 32,000
	1		Weighto meter				Caliberated weightometer.				$ 52,000
	1		Dust Collector	75	75	Fixed	Hopper,blower with full control and connected pipings	Metso	Metso		$ 82,000
					453						$ 1,806,000
			GRINDING MODULE								
	1		SAG Mill Feed Conveyor	30	30	Fixed	29 meter,1400mm width,1.0 m/s,1400x5x4x2mm belt	Metso	Metso		$ 36,000
	1		Belt Scrapper SAG Mill Feed CV	1.5	1.5	Fixed	Motor connected rotary brush	Metso	Metso		$ 8,000
	1		SAG Mill Feed Retractive Chute				Mild steel chute with motorised diversion plate	Metso	Metso		$ 48,000
	1		SAG Mill - complete set	6200	6200	Fixed	8.54 m diameter x 4.87 m long,400 tph feed rate,	Metso	Metso		$ 7,230,000
	1		SAG Mill discharge coarse vibrating screen				Step deck,1.6x3.2M	Metso	Metso		$ 87,000
	1		Pebble Crusher	75	75		60 Tons/hr	Metso	Metso		$ 125,000
	1		Oversize CV to Pebble crusher	15	15		25 meter,800 x 5x 4x 2 conveyor	Metso	Metso		$ 35,000
	1		Gound return CV from Pebble crusher	15	15		16 meter ,800 width,5x4x2 conveyor	Metso	Metso		$ 25,000
	1		SAG Mill Discharge hopper				MD Steel, Epoxy coated, 18m3	Local	Local		$ 41,000
	1		SAG Mill Area Platform				Frame structure with coloums and cross beams.Top is fully secured with GI Gratings.	Local	Local		$ 325,000
	1		Media Loading system				Mechanised ball charger system	Metso	Metso		$ 68,000
	1		Liner handler				Hydraulic Liner handling system	Metso	Metso		$ 165,000
	1		Overhead Crane 15T				15t SWL Electric hoist-Over head crane	Demag,Malaysia	Demag,Malaysia		$ 74,000
					6337						$ 8,267,000
			GRAVITY/DESLIME MODULE								
	1	1	SAG Mill Discharge Pump	150	300	VSD	12/10 D-AH,Centrifugal metal liner pump with gland water,1600 rpmY 250M,6/37 KW,IP54	Warman	Warman		$ 105,000
	1	1	BM Discharge Pump,Gland water system					Local	Local		$ 1,200
	1	1	10" Tech Taylor Valve				10" Tech-Taylor Valve connected to SAG Mill discharge pumps.	Fluid smith,Australia	Fluid Smith		$ 48,000
	1	1	Pump Gland water system					Local	Local		$ 1,200
	1		Cyclone Cavex 4 X 500CV X10				Primary 500mm Cyclone for T/Hr,3 Operating,1 standby	Metso	Metso	Cavex 4x500CVx10	$ 132,000
	6		Control knifegate VALVE				Air actuated lina knife gate valves	Metso			
	1		Cyclone pressure gauge				150 kpa readable pressure gauge	Metso			
	1		Cyclone feed flow meter				10" Pipe Size slurry flow meter,Yokogawa	Yokogawa	Yokogawa		$ 17,500
	1		Cyclone feed Density gauge				10" Pipe size,Nuclear Density Gauge	Australia			$ 38,000
	1		300 T/Hr CVD 64 Knelson Concentrator	150	150	VSD	CVD 64 ,300T/Hr capacity,Cast Urethane G5 Inner Bowl (Desliming)	Knelson	Knelson		$ 475,000
	1		300 T/Hr CVD 64 Knelson Concentrator	150	150	VSD	CVD 64,300 T/Hr capacity,Cast Urethane G5 Inner Bowl (Desliming)	Knelson	Knelson		$ 475,000
	1		Gravity Sump Pump	22	22	VSD	4/4 Vertical sump pump,warman	Warman			$ 28,000
	1		Plant Air receiver				LV 1011L 11BAR CE, 1 M3 Capacity hot dipped air receiver	Atlaas Copco			$ 5,100
	1		Gravity equipment structure				Fabricated stell structure based on supplier drawing for cyclone and Knelson	Local	Local		$ 175,000
	1		BallMill/Gravity Building				Pree fabricated building	PEB Steel			$ 240,000
					622						$ 1,741,000

Item No	Op	S'by	Title	Inst. kW ea	Total. kW	VSD/ Fixed	Description	Manufacturer	Supplier	Model №	Total Cost
					14,128					TOTAL	$29,895,500
			FLOTATION[Rougher/Scavenger]MODULE								
	1		Flotation Condition Tank,100m3				4 m Dia x 5 m height,100 m3 open topped cylidrical mild steel epoxy painted	Metso	Metso		$ 170,000
	1		Rake assembly	90	90	Fixed	Axial flow type agitator	Metso	Mixtec		
	1		Flotation Cell,				RCS 200,8 Cells WITH AGITATOR [FB-Feed Box,PV-Pinch Valve]	Metso	Metso		$ 5,800,000
	8		Flotation cell drive unit Teco motor	200	1600	Fixed	8 Units of agitator on each cell	Metso			
	1		Flow level control Pinch valve					Metso	Metso		
	1	1	Rougher Concentrate pump metso VF250	45	90	Fixed	VF 250 Metso Sala,fixed speed pump	Metso			$ 92,000
	1	1	Scavenger Concentrate pump Metso VF200	30	60	Fixed	VF 200 Metso Sala,fixed speed pump	Metso			$ 88,000
	1		Flotation Tail Sump				15 m3 Open topped consep mild steel painted,inside rubber lined Hopper	Local	Local		$ 42,000
	1		Level Transmitter				Seimens Milltronics Ultrasonic level transmitter	Seimens	Seimens		$ 12,000
	1	1	Flotation Tails pump	150	300	VSD	10/8 Warman,150 kW,Slurry pump	Warman	Warman		$ 105,000
	1		Flotation Floor sump pump	22	22	VSD	4/4 vertical sump pump Warman	Warman			$ 28,000
	1		Flotation Tails Flow meter				10" Pipe Size slurry flow meter,Yokogawa	Yokogawa	Yokogawa		$ 17,500
	1		Floation Tails Desity gauge				10" Pipe size,Nuclear Density Gauge	Australia			$ 38,000
	1		Tech Taylor Valve				10" Tech-Taylor Valve connected to 2 Cyclone feed hopper lina pumps.	Fluid smith,Australia	Fluid Smith		$ 48,000
	5		Flotation Air Blower	200	1000	Fixed	Blower,200 Kw Positive displacement Blower with blow off valve and silencer	Denvar			
			Overflow launders and sumps				Rubber lined steel fabricated sumps and launders with epoxy cpaint coated	Local	Local		$ 46,000
	1		Support structure and working Platform				Steel structure as per supplier drawing with working platform and hand rail	Local	Local		$ 162,000
	1		Building				Pree fabricated building	PEB Steel	PEB		$ 250,000
			Overhead Crane 15T				15t SWL Electric hoist-Over head crane	Demag,Malaysia	Demag,Malaysia		$ 74,000
					3162						$ 6,972,500
			REGRIND MODULE								
	1		Regrind BM	1350	1350		3.6 Dia x 7 m Long Wet Over Flow Ball Mill	Metso	Metso		$ 1,970,000
	1		Regrind BM Slow speed Drive	15	15	Fixed		Metso	Metso		
	1		Regrind BM Air Clutch					Metso	Metso		
	4		Regrind BM Low/High Lube System	7.7	31	Fixed	Drawing	Metso	Metso		
	1		Regrind BM Spray Lube system	2.2	2	Fixed	Air spary and Oil sray pumps	Metso	Metso		
	1		Regrind BM Air Clutch Air receiver					Metso	Metso		
	1		Regrind BM Trommel Screen				Mild Steel circular with 8mm aperature SS mesh fitted	Metso	Metso		$ 52,000
	1		Regrind BM Trash Bin					Local	Local		$ 3,500
	1		Regrind BM Discharge Hopper				12 m3 Mild steel rectangular ,epoxy painted hopper	Local	Local		$ 41,000
	1		Regrind BM Steel Ball Charger Hopper				Circular Mild steel hopper with supporting stand and opening arrangements.	Metso	Metso		$ 65,000
			Regrind Floor sump pump	15	15	Fixed	3/3 vertical sump pump Warman	Warman			$ 23,000
	1		Regrind Ball Mill Platform/ladder				Frame structure with coloums and cross beams.Top is fully secured with GI Gratings.	Local	Local		$ 165,000
					1413						$ 2,319,500
			SECONDARY CYCLONE								
	1	1	Cyclone feed pump	75.0	150		6/4" Warman slurry pump	Warman	Warman		$ 85,000
	1		Cyclone feed flow meter				8" Pipe Size slurry flow meter,Yokogawa	Yokogawa	Yokogawa		$ 17,500
	1		Cyclone feed Density gauge				8" Pipe size,Nuclear Density Gauge	Australia			$ 38,000
	1		Tech Taylor Valve				8" Tech-Taylor Valve connected to 2 Cyclone feed hopper PUMPS	Fluid smith,Australia	Fluid Smith		$ 42,000
	1		Cyclone feed distribution box				Distribution box to 3 cyclone cluster	Metso	Metso		$ 49,500
	3		Cyclone Cavex 6 X 250CV X10				250mm Cyclone for T/Hr,5 Operating,1 standby	Metso	Metso	Cavex6x250 CVx10	$ 194,000
	1		Cyclone pressure gauge				150 kpa readable pressure gauge	Metso			
	1		Cyclone structure				Steel structure as per supplier drawing	Local	Local		$ 115,000
					150						$ 541,000

Item No	Op	S'by	Title	Inst. kW ea	Total. kW	VSD/ Fixed	Description	Manufacturer	Supplier	Model №	Total Cost
					14,128					TOTAL	$29,895,500
			CLEANER FLOTATION MODULE								
	1		Flotation Cell,				RCS 70,4 Cells WITH AGITATOR [FB-Feed Box,PV-Pinch Valve]	Metso	Metso		$ 1,290,000
	4		Flotation cell drive unit Teco motor	90	360	Fixed	4 Units of agitator on each cell	Metso			
	1		Flow level control Pinch valve					Metso	Metso		
	1	1	Cleaner Concentrate pump metso VF250	30	60	Fixed	VF 200 Metso Sala,fixed speed pump	Metso			$ 88,000
	1		Flotation Tail Sump				8 m3 Open topped consep mild steel painted,inside rubber lined Hopper	Local	Local		$ 24,000
	1		Level Transmitter				Seimens Milltronics Ultrasonic level transmitter	Seimens	Seimens		$ 12,000
	1	1	Flotation Tails pump	75	150	VSD	8/6 Warman,75 kW,Slurry pump	Warman	Warman		$ 85,000
	1		Flotation Floor sump pump	11	11	VSD	3/3 vertical sump pump Warman	Warman	Warman		$ 23,000
	1		Flotation Tails Flow meter				8" Pipe Size slurry flow meter,Yokogawa	Yokogawa	Yokogawa		$ 16,500
	1		Floation Tails Desity gauge				8" Pipe size,Nuclear Density Gauge	Australia			$ 38,000
	2		Flotation Air Blower				Blower,100 Kw Positive displacement Blower with blow off valve and silencer	Metso	Metso		
	1		Support structure				Steel support structure ,working platform and hand rail	Local	Local		$ 80,000
			Flotation/Reggrinding Building				Pree fabricated building	PEB Steel	PEB Steel		$ 190,000
					581						$ 1,846,500
			FILTER PRESS THICKENER MODULE								
	1		Thickener	4.0	4	Fixed	8 meter Dia Tank,with Rake mechanism,Hydraulic lift system	Metso	Metso		$ 181,000
	1	1	Overflow pump	22.0	22	VSD	4/3D-AH Centrifugal pump	Metso	Metso		$ 58,000
	1	1	Discharge Pump	25.0	50	VSD	VF 125 Hose Pump,55 m3/hr @65% solids	Metso	Metso		$ 116,000
	1		Flow Meter				6" Size slurry flow meter	Yokogawa	Yokogawa		$ 17,500
	1		Density Gauge				6" Pipe size,Nuclear Desity GAUGE	Australia			$ 38,000
	1		Thickener Areal Sump Pump	30	30	VSD	4/4 Vertical sump pump,warman	Warman	Warman		$ 28,000
	1		Platform and ladder and hand rail				Steel support structure ,working platform and hand rail				$ 46,000
					106						$ 484,500
			FILTER PRESS								
	1		Concentrate feed hopper				4.5 m Diameter x 5 m height vertical tank with Agitator	Metso	Metso		$ 191,000
	1		Rake assembly	132	132	Fixed	Axial flow type agitator	Metso	Metso		
	1	1	Feed Pump	45.0	90	VSD	Heavy duty slurry pump ,6/4 Warman	Warman	Warman		$ 81,000
	1		Filter Press				Metso VPA 1540-40 Air Membrane Filter	Metso	Metso		$ 1,700,000
	1	1	Low pressure [pump	45.0	45	Fixed		Metso	Metso		
	1	1	High pressure pump	22.0	22	Fixed		Metso	Metso		
	1		Oil free compressor	200.0	200	Fixed		Metso	Atlascopco		
	1		Air receiver				35 m3 tested high pressure air receiver	Metso	Atlascopco		
	1		Cloth wash system					Metso	Metso		$ 289,000
	1		Pumps/Coveyors	7.5	7.5						$ 310,000
			Bag packaging system				Custamized packaging system	Metso	Metso		$ 525,000
	1		Support structure				Steel support structure ,working platform and hand rail	Local	Local		$ 72,500
	1	1	Filter press Area Sump Pump	22	22	VSD	4/4 Vertical sump pump,warman	Warman	Warman		$ 56,000
			Filter press area Building				Pree fabricated building	PEB Steel	PEB Steel		$ 185,000
			Overhead Crane 10T				10t SWL Electric hoist-Over head crane	Demag,Malaysia	Demag,Malaysia		$ 58,000
					519						$ 3,467,500
			TAIL THICKENER MODULE								
	1		Thickener Tank	7.5	8	Fixed	16 meter Dia Tank,with Rake mechanism,Hydraulic lift system	Metso	Metso		$ 475,000
	1		Overflow pump	22.0	22	VSD	4/3D-AH Centrifugal pump	Metso	Metso		$ 72,000
	1	1	Discharge Pump	45.0	90	VSD	Hose Pump,35 m3/hr	Metso	Metso		$ 116,000
	1		Flow Meter				8" Size slurry flow meter	Yokogawa	Yokogawa		$ 17,500
	1		Density Gauge				8" Pipe size,Nuclear Desity GAUGE	Australia			$ 38,000
	1		Thickener Area Sump Pump	11	11	VSD	4/4 Vertical sump pump,warman	Warman	Warman		$ 28,000
	1		Platform and ladder and hand rail				Steel support structure ,working platform and hand rail				$ 42,000
					131						$ 788,500

Item No	Op	S'by	Title	Inst. kW ea	Total. kW	VSD/ Fixed	Description	Manufacturer	Supplier	Model №	Total Cost
					14,128					TOTAL	$29,895,500
			REAGENT MODULE								
	1		CuSO4 Mixing Tank				18 m3 SS Circular agitated tank with top and loading arrangement,size 2.8 M Dia x 3.5 M High				$ 28,500
	1		CuSO4 Storage Tank				25 m3 SS Circular tank with top				$ 37,500
	1		CuSO4 Agitator	2.25	2.25		Mixtec,motor 2.25kw,double blade agitator				$ 8,750
	1		CuSO4 Feed box				Mild steel box with loading arrangements				$ 3,800
	1		CuSO4 Transffer Pump	1.5	1.5		Close loop piping system				$ 6,500
	1		CuSO4 Dozing Pump	1.5	1.5						$ 4,800
	1		CuSO4 Flow meter								$ 5,200
					5.3						$ 95,050
	1		CMC Mixing Tank				18 m3 SS Circular tank with top and loading arrangement,size 2.8 M Dia x 3.5 M High				$ 28,500
	1		CMC Storage Tank				25 m3 SS Circular tank with top				$ 37,500
	1		CMC Feed box								$ 8,750
	1		CMC Agitator	1.50	1.5		Mixtec,motor 1.5kw				$ 3,800
	1		CMC Transffer Pump	3.0	3.0		Close loop piping system				$ 6,500
	1		CMC Dozing Pump	1.5	1.5						$ 4,800
	1		CMC Flow meter								$ 5,200
					6.0						$ 95,050
	1		PAX Mixing Tank								$ 28,500
	1		PAX Storage Tank				18 m3 SS 304 Circular top closed with opening agitated Tank,,size 2.8 M Dia x 3.5 M High				$ 37,500
	1		PAX Feed system				25 m3 SS 304 Circular top closed with opening Tank,3.4 M Dia x 3.6 M High				$ 8,750
	1	1	PAX Agitator	1.50	1.5		Mixtec				$ 3,800
	1		PAX Transfer Pump	3.0	3.0		Close loop piping system				$ 6,500
	1		PAX Dozing Pump	1.50	1.50						$ 4,800
	1		PAX Flow meter								$ 5,200
					6.0						$ 95,050
	1		CMC Mixing Tank				18 m3 SS Circular agitated tank with top and loading arrangement,size 2.8 M Dia x 3.5 M High				$ 28,500
	1		CMC Storage Tank				30 m3 SS Circular tank with top ,size 3.4 M Dia x 4 M high				$ 45,000
	1		CMC Feed box								$ 8,750
	1		CMC Agitator	1.50	1.5		Mixtec,motor 2 kw,Double blade agitator				$ 3,800
	1		CMC Transffer Pump	3.0	3.0		Close loop piping system				$ 6,500
	1		CMC Dozing Pump	1.50	1.50						$ 4,800
	1		CMC Flow meter								$ 5,200
					6.0						$ 102,550
	1		Flocculant Mixing Tank				10 m3 SS Circular agitated tank with top and loading arrangement,size 2.8 M Dia x 3.5 M High				$ 19,500
	1		Flocculant Storage Tank				20 m3 SS Circular tank with top ,size 3.4 M Dia x 4 M high				$ 37,500
	1		Flocculant Feed system								$ 8,750
	1		Flocculant Agitator	1.50	1.5		Mixtec,motor 2 kw,Double blade agitator				$ 3,800
	1		Flocculant Transffer Pump	3.0	3.0		Close loop piping system				$ 6,500
	1		Flocculant Dozing Pump	1.50	1.50						$ 4,800
	1		Flocculant Flow meter								$ 5,200
	1		Floor sump pump	11.0	11.0		3/3 vertical sump pump Warman				$ 4,850
					17.0						$ 86,050
			Reagent Platform & Handrail				Galvanized steel support structure with safety hand rail and GI gratings				$ 150,000
			Exhaust sustem				Exhaust and ventitation system				$ 26,250
			Reagent are Building				Pree fabricated building	PEB Steel	PEB Steel		$ 81,500
											$ 257,750

Item No	Op	S'by	Title	Inst. kW ea	Total. kW	VSD/ Fixed	Description	Manufacturer	Supplier	Model №	Total Cost
					14,128					**TOTAL**	**$29,895,500**
			PLANT AIR MODULE								
	1	1	High Pressure Air Compressor	75	150		GA 75+ Air cooled compressor,7.5 bar,519 cfm,Oil injected Rotary Screw compressor,IP 55	Atlas Copco	Atlas Copco		$ 150,000
	1		Refrigerant Dryer air cooled				FD 185	Atlas Copco	Atlas Copco		$ 7,400
	1		Main line Filter				DD 520	Atlas Copco	Atlas Copco		$ 1,400
	1		After Filter				PD 520	Atlas Copco	Atlas Copco		$ 950
	3		Automatic Drain Valve				WD 80	Atlas Copco	Atlas Copco		$ 750
	1		Vertical Air Receiver,4m3				LV 4011 L ,11 Bar CE,4 m3,Both side hot dip galvanized,with safety valve,Pr gauge etc	Atlas Copco	Atlas Copco		$ 17,500
	2		Vertical Air Receiver,1m3				LV 1011 L ,11 Bar, CE,1 m3,,Both side hot dip galvanized,with safety valve,Pr gauge etc	Atlas Copco	Atlas Copco		$ 4,500
	1	1	Low Pressure Air Compressor	90	180		ZE3L-2-50,Max pr 2 bar,735 cfm air delivery,Oil free screw compressor	Atlas Copco	Atlas Copco		$ 250,000
	1		Vertical Air Receiver,4 m3				Both side dish end painted 4 m3 compressor with pressure gauge,safety valve and drain	HGPT,Vietnam	HGPT		$ 17,500
			Plant area compressor area building				Pree fabricated building	PEB Steel	PEB Steel		$ 32,000
					330						$ 482,000
			WATER TANK								
	2		Water Tank,350 m3				8 Dia x 7.5 meter height,top closed steel tank with epoxy painting	Local			$ 300,000
	2	1	Discharge Pump	75	225		NBG 200-150,500M3/Hr,Head 20M,2900 RPM	Grundfos,Singapore			$ 147,000
	1	1	Discharge Pump	30	60		NBG 150-100,190M3/Hr,Head 25.6M,1450 RPM	Grundfos,Singapore			$ 75,750
	4		Water pressure gauge				Connected to two Discharge lines.[2 at pump side & 2 at plant main line]				$ 3,000
	1		Platfor,ladder and handrail				steel painted structure with galvanised gratings and pipe hand rails	Local			$ 85,000
	1		Pipings/valves								$ 95,000
					285						$ 705,750

A21-7. Process Plant Building List

Buildings	Description
Met Lab & Office Building	2 Story civil building,First floor Met lab and second floor all offices with false ceiling.Outside buiding is fully cladded with Aluminium cladding sheet.
Plant Work Shop	Preefabricated PEB building ,Concrete floor and all sides constructed 1.2 meter plasered brick wall.Installed 3 Ton mono rail crane.One rolling door.
Plant Warehouse	Preefabricated PEB building ,Concrete floor and all sides constructed,one rolling shutter and one single man door.
Plant Chemical Store Building	Prefabricated PEB building,1.2 meter plastered brick wall,2 sumps at corners,concrete floor,4 motorised rolling shutters are installed.
Dress Change Room & Security	Civil building with concrete columns and brick wall construction,Roof with sandwich panel sheet ,False ceilings are also provided.1 AC,Bath rooms with fittings.
Generator House	
Crusher Building	
Crusher Control Room	
MCCB & Control Room Building	
SAG/Ball Mill Plant Building	
Process Flotation Plant Building	
Filter press/Reagent Building	
Stockpile Building	
New warehouse building	
Plant Compressor Building	
SOS Building	
Main Security Building	
Workers Queue Shed Building.	
New Kitchen & Office Building	

A21-8. Process Plant – Ancilliary Equipment Lists

Bau-8,000 TPD Flotation Concentrate Plant

SCHECDULE OF CONCRETE WORK

Description	Drawing	Qty	Units	Unit Rate	Total (US$)	Details
General						
Miscellaneous Concrete,wall,trench etc		980.0	m3	$ 180.00	$ 176,400	
Miscellaneous Earth works		17500.0	m3	$ 12.00	$ 210,000	
					$ 386,400	
Raw Water Pump Station						
Earthworks		387.5	m3	$ 13.00	$ 5,038	15x15x1.5
Back filling & Compaction		245.0	m3	$ 15.00	$ 3,675	15x15x1
Installation of Concrete		38.8	m3	$ 180.00	$ 6,984	156+38 X.2
Install DN200 pipe		36.0	m	$ 105.00	$ 3,780	
Installation of concrete		28.0	m3	$ 180.00	$ 5,040	
Installation of reinforcing bar / mesh		4,000.0	kg	$ 1.65	$ 6,600	Added rebar work
HD Bolts		1.0	LS	$ 1,000.00	$ 1,000	
					$ 32,117	
Piperacks						
Earthworks		50.0	m3	$ 13.00	$ 650	
Installation of Concrete		35.0	m3	$ 180.00	$ 6,300	
Installation of reinforcing bar / mesh		2,500.0	kg	$ 1.65	$ 4,125	
Holding Down Bolts		1.0	LS	$ 1,000.00	$ 1,000	
					$ 12,075	
Fuel Storage						
Earthworks		331.0	m3	$ 13.00	$ 4,303	
Back filling & Compaction		128.0	m3	$ 15.00	$ 1,920	14x14x.5
Install concrete ring beams		37.0	m3	$ 312.00	$ 11,544	
Install concrete slab/sump		224.0	m3	$ 180.00	$ 40,320	20x14x.8
Install bund walls		16.8	m3	$ 245.00	$ 4,116	14x14x.2x1.5
Install U drain		30.0	m	$ 148.00	$ 4,440	
Install DN 150 u/g pipe		20.0	m	$ 105.00	$ 2,100	
Install concrete vehicle slab		17.0	m3	$ 180.00	$ 3,060	
Install concrete pump slab/stair plinth		9.5	m3	$ 180.00	$ 1,710	
Supply and install bollards		6.0	ea	$ 180.00	$ 1,080	
Install concrete sumps		2.0	ea	$ 180.00	$ 360	
Install oil separator pit		1.0	Ls	$ 2,025.00	$ 2,025	
Installation of reinforcing bar / mesh		14,250.0	kg	$ 1.65	$ 23,513	
					$ 100,491	
Power Station						
Earthworks		510.0	m3	$ 13.00	$ 6,630	30x17x1
Back filling & Compaction		408.0	m3	$ 15.00	$ 6,120	30x17x0.8
Generator pedestals		120.0	m3	$ 312.00	$ 37,440	4x0.5.x10x6
Column pedestals		35.0	m3	$ 312.00	$ 10,920	
Slab and kerb, including cable pits		50.0	m3	$ 180.00	$ 9,000	
Install oil separator pit		1.0	Ls	$ 2,025.00	$ 2,025	
Installation of reinforcing bar / mesh		16,000.0	kg	$ 1.65	$ 26,400	
					$ 98,535	
Service Sub Station						
Earthwork		225.0	m3	$ 13.00	$ 2,925	15x15x1
Selective soil Back filling & Compaction		180.0	m3	$ 15.00	$ 2,700	15x15x0.8
Install concrete footings		42.0	m3	$ 180.00	$ 7,560	
Installation of reinforcing bar / mesh		2,500.0	kg	$ 1.65	$ 4,125	
HD Bolts		1.0	LS	$ 1,000.00	$ 1,000	
					$ 18,310	
Reinforced Earthwall						
Install reinforced earthwall		225.0	m3	$ 180.00	$ 40,500	400/m3
Supply, place and compact fill behind wall		15,000.0	m3	$ 6.00	$ 90,000	
					$ 130,500	
Crushing Station						
Earthwork		4,000.0	m3	$ 13.00	$ 52,000	50x20x4
Install retaining wall concrete		285.0	m3	$ 180.00	$ 51,300	
Selective soil Back filling & Compaction		1,000.0	m3	$ 15.00	$ 15,000	50x2.5x8
Install concrete footings/beams		52.5	m3	$ 245.00	$ 12,863	
Install concrete for crushing slabs		80.0	m3	$ 245.00	$ 19,600	10x10x0.8
Install run on slab		12.5	m3	$ 180.00	$ 2,250	
Installation of reinforcing bar / mesh		36,000.0	kg	$ 1.40	$ 50,400	
Floor concrete		240.0	m2	$ 42.00	$ 10,080	24x10
					$ 213,493	

Bau-8,000 TPD Flotation Concentrate Plant						
SCHECDULE OF CONCRETE WORK						
Description	**Drawing**	**Qty**	**Units**	**Unit Rate**	**Total (US$)**	**Details**
Crushing Station Control Room						
Earthwork		50.0	m3	$ 13.00	$ 650	
Selective soil Back filling & Compaction		40.0	m3	$ 24.00	$ 960	
Install concrete footings/floor		16.0	m3	$ 180.00	$ 2,880	10x5x.2
Installation of reinforcing bar / mesh		1,200.0	kg	$ 1.40	$ 1,680	
					$ 6,170	
Stockpile Conveyor CV 01						
Earthwork		64.0	m3	$ 13.00	$ 832	
Install Rebar		350.0	kg	$ 1.40	$ 490	
Install concrete footings		24.0	m3	$ 180.00	$ 4,320	
					$ 5,642	
Stockpile Reclaim Tunnel						
Earthwork		3,675.0	m3	$ 13.00	$ 47,775	[50x25x1.5]+[30x12x5]
Install multi plate tunnel form work		468.0	m2	$ 24.00	$ 11,232	25x6x2x2+200
Place and compact stabilized sand mix		1,288.0	m3	$ 25.00	$ 32,200	30x12x1
Install tunnel concrete encasement		375.0	m3	$ 275.00	$ 103,125	top slab also
Install concrete floor slab		285.0	m3	$ 180.00	$ 51,300	38x25x0.3
Install concrete end walls		18.0	m3	$ 275.00	$ 4,950	
Place and compact fill around tunnel		2,025.0	m3	$ 15.00	$ 30,375	
Installation of reinforcing bar / mesh		84,000.0	kg	$ 1.40	$ 117,600	
					$ 398,557	
SAG Mill Feed Conveyor CV02/CV03						
Earthwork		621.0	m3	$ 13.00	$ 8,073	27x23x1
Place and compact stabilized sand mix		497.0	m3	$ 38.00	$ 18,886	
Install concrete footings		68.0	m3	$ 180.00	$ 12,240	
Floor concrete		532.0	m2	$ 42.00	$ 22,344	
Installation of reinforcing bar / mesh		6,500.0	kg	$ 1.40	$ 9,100	
					$ 70,643	
Grinding Area						
Earthwork		6,075.0	m3	$ 13.00	$ 78,975	[30x27x5]+[15x27x5]
Place and compact fill around		1,815.0	m3	$ 15.00	$ 27,225	
Place and compact stabilized sand mix		815.0	m3	$ 38.00	$ 30,970	
Install concrete SAG Mill foundation		575.0	m3	$ 245.00	$ 140,875	
Install concrete Ball Mill foundation		385.0	m3	$ 245.00	$ 94,325	
Install concrete footings and plinths		117.0	m3	$ 180.00	$ 21,060	
Install concrete floor slab		160.0	m3	$ 210.00	$ 33,600	90+70
Install Pump Pit concrete		68.0	m3	$ 180.00	$ 12,240	
Install concrete bund wall		32.0	m3	$ 225.00	$ 7,200	
Install concrete sumps		3.0	ea	$ 525.00	$ 1,575	
Installation of reinforcing bar / mesh		265,000.0	kg	$ 1.40	$ 371,000	
HD Bolts		1.0	LS	$ 4,500.00	$ 4,500	
					$ 823,545	
Thickener Area						
Earthwork		240.0	m3	$ 13.00	$ 3,120	20x12x1
Place and compact stabilized sand mix		192.0	m3	$ 38.00	$ 7,296	
Install concrete raft footings		37.0	m3	$ 180.00	$ 6,660	
Install pedestals/plinths		30.0	m3	$ 184.00	$ 5,520	
Install concrete bund wall		17.0	m3	$ 225.00	$ 3,825	
Install concrete sump		2.0	ea	$ 525.00	$ 1,050	
Installation of reinforcing bar / mesh		31,000.0	kg	$ 1.40	$ 43,400	
Floor concrete		210.0	m2	$ 42.00	$ 8,820	
HD Bolts		1.0		$ 3,800.00	$ 3,800	
					$ 83,491	
Cyclone Area						
Earthwork		405.0	m3	$ 13.00	$ 5,265	15x27x1
Place and compact stabilized sand mix		324.0	m3	$ 38.00	$ 12,312	
Install concrete raft footings		35.0	m3	$ 180.00	$ 6,300	
Install pedestals/plinths		28.0	m3	$ 184.00	$ 5,152	
Install concrete bund wall		18.0	m3	$ 225.00	$ 4,050	
Install concrete sump		2.0	ea	$ 525.00	$ 1,050	
Installation of reinforcing bar / mesh		28,000.0	kg	$ 1.40	$ 39,200	
Floor concrete		325.0	m2	$ 42.00	$ 13,650	
HD Bolts		1.0	LS	$ 3,200.00	$ 3,200	
					$ 90,179	

Bau-8,000 TPD Flotation Concentrate Plant

SCHEDULE OF CONCRETE WORK

Description	Drawing	Qty	Units	Unit Rate	Total (US$)	Details
Flotation Area						
Earthwork		984.0	m3	$ 13.00	$ 12,792	41x24x1
Place and compact stabilized sand mix		787.0	m3	$ 38.00	$ 29,906	41x24x.8
Install concrete ring beam		482.0	m3	$ 225.00	$ 108,450	
Install concrete raft footings/slab		135.0	m3	$ 180.00	$ 24,300	
Install concrete bund wall		14.0	m3	$ 225.00	$ 3,150	
Install concrete sump		26.0	m3	$ 184.00	$ 4,784	
Install pedestals/plinths		34.0	m3	$ 225.00	$ 7,650	
Installation of reinforcing bar / mesh		192,000.0	kg	$ 1.40	$ 268,800	
Floor concrete		984.0	m2	$ 42.00	$ 41,328	
HD Bolts		1.0	Ls	$ 5,150.00	$ 5,150	
					$ 506,310	
Filter Press Area						
Earthwork		423.0	m3	$ 13.00	$ 5,499	25x13x1
Place and compact stabilized sand mix		260.0	m3	$ 38.00	$ 9,880	
Install concrete raft footings/slab		285.0	m3	$ 166.00	$ 47,310	
Install pedestals/plinths		53.0	m3	$ 184.00	$ 9,752	
Install concrete bund wall		26.0	m3	$ 225.00	$ 5,850	
Install concrete sump		2.0	ea	$ 525.00	$ 1,050	
Floor concrete		275.0	m2	$ 42.00	$ 11,550	
Installation of reinforcing bar / mesh		24,000.0	kg	$ 1.40	$ 33,600	
HD Bolts		1.0	LS	$ 3,800.00	$ 3,800	
					$ 128,291	
Reagents Area						
Earthwork		325.0	m3	$ 13.00	$ 4,225	25x13x1
Place and compact stabilized sand mix		260.0	m3	$ 38.00	$ 9,880	
Install concrete footings		145.0	m3	$ 180.00	$ 26,100	
Install all other concrete		85.0	m3	$ 180.00	$ 15,300	
Install concrete sumps		3.0	ea	$ 525.00	$ 1,575	
Install epoxy coating		325.0	m2	$ 53.00	$ 17,225	
Install concrete bund wall		5.4	m3	$ 225.00	$ 1,215	
Installation of reinforcing bar / mesh		8,500.0	kg	$ 1.40	$ 11,900	
					$ 87,420	
Water Area						
Earthwork		380.0	m3	$ 13.00	$ 4,940	38x10
Place and compact stabilized sand mix		100.0	m3	$ 38.00	$ 3,800	
Install concrete ring beams		94.0	m3	$ 284.00	$ 26,696	
Install pump footings		24.0	m3	$ 180.00	$ 4,320	
Installation of reinforcing bar / mesh		6,150.0	kg	$ 1.40	$ 8,610	
Concrete Base slab		90.0	m3	$ 180.00	$ 16,200	
Install concrete bund wall		8.0	m3	$ 225.00	$ 1,800	
HD Bolts		1.0	LS	$ 750.00	$ 750	
					$ 67,116	
Plant Air						
Earthwork		448.0	m3	$ 13.00	$ 5,824	23x13x1.5
Place and compact stabilized sand mix		240.0	m3	$ 38.00	$ 9,120	
Install concrete fondation		57.0	m3	$ 180.00	$ 10,260	
Installation of reinforcing bar / mesh		3,950.0	kg	$ 1.40	$ 5,530	
Floor concrete		285.0	m2	$ 42.00	$ 11,970	
Install concrete bund wall		8.0	m3	$ 225.00	$ 1,800	
Sump and Oil trap pit		2.0	ea	$ 225.00	$ 450	
HD Bolts		1.0	LS	$ 500.00	$ 500	
					$ 45,454	

Bau-8,000 TPD Flotation Concentrate Plant						
SCHECDULE OF CONCRETE WORK						
Description	Drawing	Qty	Units	Unit Rate	Total (US$)	Details
Control Room & Plant Office						
Earthwork		335.0	m3	$ 13.00	$ 4,355	
Place and compact stabilized sand mix		125.0	m3	$ 58.00	$ 7,250	
Install concrete		89.0	m3	$ 180.00	$ 16,020	
Installation of reinforcing bar / mesh		5,670.0	kg	$ 1.40	$ 7,938	
Two story concrete building		360.0	m3	$ 275.00	$ 99,000	
Cable trenches at first floor		80.0	m	$ 180.00	$ 14,400	
					$ 148,963	
Other Construction Details						
Concrete & Granite Retaining Wall		756.0	m3	$ 165.00	$ 124,740	90*12*.7
Measonary Granite Retaining Wall		450.0	m2	$ 82.00	$ 36,900	
Gabion Basket granite retaing wall		400.0	m2	$ 62.00	$ 24,800	
Open Trench		660.0	m	$ 42.00	$ 27,720	
Concrete Cover Trench		280.0	m	$ 106.00	$ 29,680	
Grating coverd double trench		125.0	m	$ 145.00	$ 18,125	
Plant surronding floor concrete,200mm thick		10,114.0	m2	$ 42.00	$ 424,788	
Plant area security Fence		660.0	m	$ 95.00	$ 62,700	
GI Safety Barrier		380.0	m	$ 85.00	$ 32,300	
Tailing trench to the Tailing dam		520.0	m	$ 42.00	$ 21,840	
Concrete pipe supports and Inspection box		18.0	m3	$ 180.00	$ 3,240	
Return Water Pump station Concrete Platform		12.0	m3	$ 225.00	$ 2,700	
Concrete intermediate Storage tank		24.0	m3	$ 225.00	$ 5,400	
Metal Clamp		50.0	Nos	$ 5.50	$ 275	
					$ 815,208	
Total cost for all area					$ 4,268,909	
Overheads/Miscellaneous,10%					$ 426,891	
Total Concrete & Civil cost					$ 4,695,799	
						Variance
Cost as per CAPEX R5					$ 4,765,800	$ 70,001

Total Earth Works	m3	64,493
Total Concrete	m3	9,806
Total Steel reinforce bar	Ton	731

Bau-8,000 TPD Flotation Concentrate Plant

SCHEDULE OF STRUCTURAL WORK

Area/ Item	Description	Qty	Units	Material Rate US$	Total Mtl US$	Fabrication US$	Total Fab US$	Install Rate US$	Total Rate US$
20	**Pipe rack**								
B1-20-1	Steelwork	62	tonnes	$ 1,300.00	$ 80,600	$ 1,050.00	$ 65,100	$ 725.00	$ 44,950
B1-20-2	GI Ready made rack	1200	m	$ 31.00	$ 37,200	$ 24.00	$ 28,800	$ 4.00	$ 4,800
B1-20-3	Grating	350	m2	$ 63.00	$ 22,050	$ 72.00	$ 25,200	$ 9.00	$ 3,150
B1-20-4	Stair Treads	68	ea	$ 25.00	$ 1,700	$ 27.00	$ 1,836	$ 7.50	$ 510
B1-20-5	Handrail	700	m	$ 49.00	$ 34,300	$ 38.00	$ 26,600	$ 13.50	$ 9,450
					$ 175,850		**$ 147,536**		**$ 62,860**
27	**Substation**								
B1-27-1	Steelwork	8	tonnes	$ 1,300.00	$ 10,400	$ 1,050.00	$ 8,400	$ 725.00	$ 5,800
B1-27-2	Grating	12	m2	$ 63.00	$ 756	$ 72.00	$ 864	$ 9.00	$ 108
B1-27-3	Fencing	80	m	$ 65.00	$ 5,200	$ 27.00	$ 2,160	$ 18.00	$ 1,440
					$ 16,356		**$ 11,424**		**$ 7,348**
30	**Crushing Station**								
B1-30-1	Steelwork	54	tonnes	$ 1,300.00	$ 70,200	$ 1,050.00	$ 56,700	$ 725.00	$ 39,150
B1-30-2	ROM Bin Platework	32	tonnes	$ 1,400.00	$ 44,800	$ 1,175.00	$ 37,600	$ 850.00	$ 27,200
B1-30-3	ROM Liner	9.5	tonnes	$ 3,500.00	$ 33,250	$ 1,250.00	$ 11,875	$ 850.00	$ 8,075
B1-30-4	Grating	320	m2	$ 63.00	$ 20,160	$ 72.00	$ 23,040	$ 9.00	$ 2,880
B1-30-5	Stair Treads	100	ea	$ 25.00	$ 2,500	$ 27.00	$ 2,700	$ 7.50	$ 750
B1-30-6	Handrail	340	m	$ 49.00	$ 16,660	$ 38.00	$ 12,920	$ 13.50	$ 4,590
					$ 187,570		**$ 144,835**		**$ 82,645**
30	**Conveyor CV01**								
B1-30-10	Steelwork	12	tonnes	$ 1,300.00	$ 15,600	$ 1,050.00	$ 12,600	$ 725.00	$ 8,700
B1-30-11	Grating	42	m2	$ 63.00	$ 2,646	$ 72.00	$ 3,024	$ 9.00	$ 378
B1-30-12	Stair Treads	18	ea	$ 25.00	$ 450	$ 27.00	$ 486	$ 7.50	$ 135
B1-30-13	Handrail	35	m	$ 49.00	$ 1,715	$ 38.00	$ 1,330	$ 13.50	$ 473
					$ 20,411		**$ 17,440**		**$ 9,686**
30	**Conveyor CV02**								
B1-30-20	Steelwork	48	tonnes	$ 1,300.00	$ 62,400	$ 1,050.00	$ 50,400	$ 725.00	$ 34,800
B1-30-21	Grating	132	m2	$ 63.00	$ 8,316	$ 72.00	$ 9,504	$ 9.00	$ 1,188
B1-30-22	Stair Treads	24	ea	$ 25.00	$ 600	$ 27.00	$ 648	$ 7.50	$ 180
B1-30-23	Handrail	60	m	$ 49.00	$ 2,940	$ 38.00	$ 2,280	$ 13.50	$ 810
					$ 74,256		**$ 62,832**		**$ 36,978**
31	**Reclaim Tunnel - Platforms**								
B1-31-1	Steelwork	14	tonnes	$ 1,300.00	$ 18,200	$ 1,050.00	$ 14,700	$ 725.00	$ 10,150
B1-31-2	Grating	32	m2	$ 63.00	$ 2,016	$ 72.00	$ 2,304	$ 9.00	$ 288
B1-31-3	Stair Treads	12	ea	$ 25.00	$ 300	$ 27.00	$ 324	$ 7.50	$ 90
B1-31-4	Handrail	25	m	$ 25.00	$ 625	$ 27.00	$ 675	$ 13.50	$ 338
					$ 21,141		**$ 18,003**		**$ 10,866**
31	**Conveyor CV02**								
B1-31-10	Steelwork	28	tonnes	$ 1,300.00	$ 36,400	$ 1,050.00	$ 29,400	$ 725.00	$ 20,300
B1-31-11	Grating	60	m2	$ 63.00	$ 3,780	$ 72.00	$ 4,320	$ 9.00	$ 540
B1-31-12	Stair Treads	3	ea	$ 25.00	$ 75	$ 27.00	$ 81	$ 7.50	$ 23
B1-31-13	Handrail	75	m	$ 49.00	$ 3,675	$ 38.00	$ 2,850	$ 13.50	$ 1,013
					$ 43,930		**$ 36,651**		**$ 21,875**
40	**Grinding**								
B1-32-1	Steelwork	82	tonnes	$ 1,300.00	$ 106,600	$ 1,050.00	$ 86,100	$ 725.00	$ 59,450
B1-32-2	Grating	343	m2	$ 63.00	$ 21,609	$ 72.00	$ 24,696	$ 9.00	$ 3,087
B1-32-3	Stair Treads	85	ea	$ 25.00	$ 2,125	$ 27.00	$ 2,295	$ 7.50	$ 638
B1-32-4	Handrail	232	m	$ 49.00	$ 11,368	$ 38.00	$ 8,816	$ 13.50	$ 3,132
					$ 141,702		**$ 121,907**		**$ 66,307**
41	**Milling& Cyclone**								
B1-40-1	Steelwork	38	tonnes	$ 1,300.00	$ 49,400	$ 1,050.00	$ 39,900	$ 725.00	$ 27,550
B1-40-2	Grating	180	m2	$ 63.00	$ 11,340	$ 72.00	$ 12,960	$ 9.00	$ 1,620
B1-40-3	Stair Treads	82	ea	$ 25.00	$ 2,050	$ 27.00	$ 2,214	$ 7.50	$ 615
B1-40-4	Handrail	156	m	$ 49.00	$ 7,644	$ 38.00	$ 5,928	$ 13.50	$ 2,106
					$ 70,434		**$ 61,002**		**$ 31,891**
50	**Rougher/Scavenger Flotation**								
B1-50-1	Steelwork	41	tonnes	$ 1,300.00	$ 53,300	$ 1,050.00	$ 43,050	$ 725.00	$ 29,725
B1-50-2	Grating	380	m2	$ 63.00	$ 23,940	$ 72.00	$ 27,360	$ 9.00	$ 3,420
B1-50-3	Stair Treads	96	ea	$ 25.00	$ 2,400	$ 27.00	$ 2,592	$ 7.50	$ 720
B1-50-4	Handrail	190	m	$ 49.00	$ 9,310	$ 38.00	$ 7,220	$ 13.50	$ 2,565
					$ 88,950		**$ 80,222**		**$ 36,430**

Bau-8,000 TPD Flotation Concentrate Plant

SCHEDULE OF STRUCTURAL WORK

Area/ Item	Description	Qty	Units	Material Rate US$	Total Mtl US$	Fabrication US$	Total Fab US$	Install Rate US$	Total Rate US$
60	**Regrind/Cyclone**								
B1-60-1	Steelwork	34	tonnes	$ 1,300.00	$ 44,200	$ 1,050.00	$ 35,700	$ 725.00	$ 24,650
B1-60-2	Grating	128	m2	$ 63.00	$ 8,064	$ 72.00	$ 9,216	$ 9.00	$ 1,152
B1-60-3	Stair Treads	75	ea	$ 25.00	$ 1,875	$ 27.00	$ 2,025	$ 7.50	$ 563
B1-60-4	Handrail	190	m	$ 49.00	$ 9,310	$ 38.00	$ 7,220	$ 13.50	$ 2,565
					$ 63,449		**$ 54,161**		**$ 28,930**
70	**Cleaner Flotation**								
B1-70-1	Steelwork	28	tonnes	$ 1,300.00	$ 36,400	$ 1,050.00	$ 29,400	$ 725.00	$ 20,300
B1-70-2	Grating	290	m2	$ 63.00	$ 18,270	$ 72.00	$ 20,880	$ 9.00	$ 2,610
B1-70-3	Stair Treads	84	ea	$ 25.00	$ 2,100	$ 27.00	$ 2,268	$ 7.50	$ 630
B1-70-4	Handrail	150	m	$ 49.00	$ 7,350	$ 38.00	$ 5,700	$ 13.50	$ 2,025
					$ 64,120		**$ 58,248**		**$ 25,565**
80	**Cocentrate Thickener**								
B1-80-1	Steelwork	12	tonnes	$ 1,300.00	$ 15,600	$ 1,050.00	$ 12,600	$ 725.00	$ 8,700
B1-80-2	Grating	72	m2	$ 63.00	$ 4,536	$ 72.00	$ 5,184	$ 9.00	$ 648
B1-80-3	Stair Treads	24	ea	$ 25.00	$ 600	$ 27.00	$ 648	$ 7.50	$ 180
B1-80-4	Handrail	72	m	$ 49.00	$ 3,528	$ 38.00	$ 2,736	$ 13.50	$ 972
					$ 24,264		**$ 21,168**		**$ 10,500**
90	**Filter Press/Packaging**								
B1-90-1	Steelwork	28	tonnes	$ 1,300.00	$ 36,400	$ 1,050.00	$ 29,400	$ 725.00	$ 20,300
B1-90-2	Grating	162	m2	$ 63.00	$ 10,206	$ 72.00	$ 11,664	$ 9.00	$ 1,458
B1-90-3	Stair treads	45	ea	$ 25.00	$ 1,125	$ 27.00	$ 1,215	$ 7.50	$ 338
B1-90-4	Handrail	104	m	$ 49.00	$ 5,096	$ 38.00	$ 3,952	$ 13.50	$ 1,404
					$ 52,827		**$ 46,231**		**$ 23,500**
100	**Reagents**								
B1-100-1	Steel work	29	tonnes	$ 1,300.00	$ 37,700	$ 1,950.00	$ 56,550	$ 725.00	$ 21,025
B1-100-2	Grating	175	m2	$ 63.00	$ 11,025	$ 72.00	$ 12,600	$ 9.00	$ 1,575
B1-100-3	Stair treads	30	ea	$ 25.00	$ 750	$ 27.00	$ 810	$ 7.50	$ 225
B1-100-4	Handrail	88	m	$ 49.00	$ 4,312	$ 38.00	$ 3,344	$ 13.50	$ 1,188
					$ 53,787		**$ 73,304**		**$ 24,013**
110	**Tailing Area**								
B1-110-1	Structural steel	7	tonnes	$ 1,300.00	$ 9,100	$ 1,050.00	$ 7,350	$ 725.00	$ 5,075
B1-110-2	Ponton plate work	4	tonnes	$ 1,400.00	$ 5,600	$ 1,250.00	$ 5,000	$ 9.00	$ 36
B1-110-3	Grating	40	m2	$ 63.00	$ 2,520	$ 72.00	$ 2,880	$ 12.00	$ 480
B1-110-4	Stair Treads	18	ea	$ 25.00	$ 450	$ 27.00	$ 486	$ 7.50	$ 135
	Handrails	40	m	$ 49.00	$ 1,960	$ 38.00	$ 1,520	$ 13.50	$ 540
					$ 19,630		**$ 17,236**		**$ 6,266**
120	**Raw/Process/Fire Water**								
B1-120-1	Steel work	25	tonnes	$ 1,300.00	$ 32,500	$ 1,050.00	$ 26,250	$ 725.00	$ 18,125
B1-120-2	Grating	140	m2	$ 63.00	$ 8,820	$ 72.00	$ 10,080	$ 9.00	$ 1,260
B1-120-3	Stair treads	72	ea	$ 25.00	$ 1,800	$ 27.00	$ 1,944	$ 7.50	$ 540
B1-120-4	Handrail	126	m	$ 49.00	$ 6,174	$ 38.00	$ 4,788	$ 13.50	$ 1,701
					$ 49,294		**$ 43,062**		**$ 21,626**
130	**Plant Air**								
B1-130-1	Steelwork	16	tonnes	$ 1,300.00	$ 20,800	$ 1,050.00	$ 16,800	$ 725.00	$ 11,600
B1-130-2	Grating	32	m2	$ 63.00	$ 2,016	$ 72.00	$ 2,304	$ 9.00	$ 288
B1-130-3	Stair treads	12	ea	$ 25.00	$ 300	$ 27.00	$ 324	$ 7.50	$ 90
B1-130-4	Handrail	40	m	$ 49.00	$ 1,960	$ 38.00	$ 1,520	$ 13.50	$ 540
					$ 25,076		**$ 20,948**		**$ 12,518**
	TOTAL AMOUNT				**$ 1,193,047**		**$ 1,036,210**		**$ 519,802**
							GRAND TOTAL		**$ 2,749,059**
							BUDGET		**$ 2,859,480**
							VARIANCE		**$ 110,422**

Bau-8,000 TPD Flotation Concentrate Plant

PIPING WORK WITH ACCESSORIES

Description	Value
Pipe G01	$ 58,119
Pipe S01	$ 43,260
Pipe C01	$ 131,718
HDPE P01	$ 59,358
Mine Hose	$ 149,660
Moulded Elbows P02	$ 5,936
Sweep Bends C01	$ 4,749
HDPE Tailing Spigotting	$ 4,155
HDPE Pipe fittings/Flange	$ 5,936
Fire Protection System	$ 35,000
Stainers	$ 7,500
Muff coupling for mine hose	$ 27,760
	$ 533,150

Sl No	Details	Value as per Calculation	Value Included in Capex	Net Value after Adjustment with Capex
1	Piping Work	$ 533,150	$ -	$ 533,150
2	Valves	$ 733,130	$ -	$ 733,130
3	Pumps	$ 1,735,000	$ 852,000	$ 883,000
		$ 3,001,280	**$ 852,000**	**$ 2,149,280**

Bau-8,000 TPD Flotation Concentrate Plant - Pumps

Sl No	Area	Details	Qty	Unit Price	US$ Total Cost	Remarks
A	Crusher Module					
1	Sump Pump	4/4 Vertical sump pump,warman	1	$ 28,000	$ 28,000	Included in CR Capex
					$ -	
B	SAG Mill Area				$ -	
1	SAG Mill Discharge Pump	12/10 D-AH,Centrifugal metal liner pump with gland water,1600 rpmY 250M,6/37 KW,IP54	2	$ 52,500	$ 105,000	
2	Sump Pump	4/4 Vertical sump pump,warman	1	$ 28,000	$ 28,000	
					$ -	
C	SAG Mill Cyclone area				$ -	
1	Cyclone feed pump	12/10 D-AH,Centrifugal metal liner pump with gland water,1600 rpmY 250M,6/37 KW,IP54	2	$ 52,500	$ 105,000	Included in Cyclone Capex
2	Sump pump	4/4 Vertical sump pump,warman	1	$ 28,000	$ 28,000	
D	Rougher/Scavenger Flotation				$ -	
1	Concentrate discharge pump	VF 250 Metso Sala,fixed speed pump	2	$ 46,000	$ 92,000	Included in Flotation Capex
2	Sump Pump	4/4 Vertical sump pump,warman	1	$ 28,000	$ 28,000	included
3	Flotation Tails Pump	12/10 D-AH,Centrifugal metal liner pump with gland water,1600 rpmY 250M,6/37 KW,IP54	2	$ 52,500	$ 105,000	Included
E	Regrind Ball Mill/Cyclone area				$ -	
1	Ball Mill Discharge pump	6/4" Warman slurry pump	2	$ 42,500	$ 85,000	
2	Sump Pump	3/3 vertical sump pump Warman	1	$ 23,000	$ 23,000	Included in RGM Capex
					$ -	
F	Cleaner Flotation				$ -	
1	Cleaner Flotation concentrate discharge pump	VF 200 Metso Sala,fixed speed pump	2	$ 44,000	$ 88,000	
2	Sump Pump	3/3 vertical sump pump Warman	1	$ 23,000	$ 23,000	
3	Flotation Tails Pump	6/4" Warman slurry pump	2	$ 42,500	$ 85,000	
					$ -	
G	Thickener Area					
1	Thickener Discharge Pump	VF 125 Hose Pump,55 m3/hr @65% solids	2	$ 58,000	$ 116,000	
2	Sump Pump	3/3 vertical sump pump Warman	1	$ 23,000	$ 23,000	
H	Filter press Feed Tank/Filter press					
	Feed Discharge pump	VF 125 Hose Pump,55 m3/hr @65% solids	2	$ 58,000	$ 116,000	Included in Filter Press Capex
	Filter press discharge pump	6/4" Warman slurry pump	2	$ 42,500	$ 85,000	Included in Filter Press Capex
	Sump Pump	4/4 Vertical sump pump,warman	2	$ 28,000	$ 56,000	Included in Filter Press Capex
I	RAW/Process water area					
1	Raw water pump	NBG 150-100,190M3/Hr,Head 25.6M,1450 RPM	2	$ 37,500	$ 75,000	
2	Process water pump	NBG 200-150,500M3/Hr,Head 20M,2900 RPM	2	$ 49,000	$ 98,000	Included in Water Tank Capex
					$ -	
J	Tailings Discharge pump					
1	Tails discharge pump	12/10 D-AH,Centrifugal metal liner pump with gland water,1600 rpmY 250M,6/37 KW,IP54	2	$ 52,500	$ 105,000	
2	Sump Pump	4/4 Vertical sump pump,warman	1	$ 28,000	$ 28,000	
					$ -	
K	Tailing water Return pump					
1	Pontoon submercible pump	Grundfos submercible Pump	3	$ 24,500	$ 73,500	
2	High capacity process water return pump	NBG 250-200,500M3/Hr,Head 50M,2900 RPM	2	$ 57,000	$ 114,000	
					$ -	
L	Fire & Safety					
1	Fire & Safety Pump	Grundfos High Pressure Fire Pump	1	$ 22,500	$ 22,500	
					$ -	
					$ -	
					$ -	$ 852,000
	TOTAL		42		$ 1,735,000	
			Net Ammount		$ 883,000	

Bau-80,000 TPD Flotation Concentrate Plant

SCHEDULE OF PIPING WORK RATE

Item	Description	Size NB	Qty	Units	Unit Rate US$	Total Rate US$
B3-C01	Carbon Steel - Spec C01	15	42	m	$ 9.00	$ 378.00
B3-C02		20	18	m	$ 4.00	$ 72.00
B3-C03		25	480	m	$ 6.00	$ 2,880.00
B3-C04		32	92	m	$ 85.00	$ 7,820.00
B3-C05		40	80	m	$ 51.00	$ 4,080.00
B3-C06		50	440	m	$ 23.00	$ 10,120.00
B3-C07		80	318	m	$ 46.00	$ 14,628.00
B3-C08		100	312	m	$ 92.00	$ 28,704.00
B3-C09		150	240	m	$ 103.00	$ 24,720.00
B3-C10		200	66	m	$ 145.00	$ 9,570.00
B3-C11		250	62	m	$ 195.00	$ 12,090.00
B3-C12		300	48	m	$ 347.00	$ 16,656.00
SUB TOTAL - I						$ 131,718.00
B3-G01	Galvanised Spec G01	15	165	m	$ 3.00	$ 495.00
B3-G02		25	560	m	$ 9.00	$ 5,040.00
B3-G03		40	240	m	$ 16.00	$ 3,840.00
B3-G04		50	480	m	$ 18.00	$ 8,640.00
B3-G05		80	36	m	$ 59.00	$ 2,124.00
B3-G06		100	120	m	$ 114.00	$ 13,680.00
B3-G07		150	180	m	$ 135.00	$ 24,300.00
SUB TOTAL - II						$ 58,119.00
B3-R01	Mine hose Spec R01	50	500	m	$ 35.00	$ 17,500.00
B3-R02		75	325	m	$ 56.00	$ 18,200.00
B3-R03		100	280	m	$ 86.00	$ 24,080.00
B3-R04		125	120	m	$ 120.00	$ 14,400.00
B3-R05		150	280	m	$ 136.00	$ 38,080.00
B3-R06		200	50	m	$ 220.00	$ 11,000.00
B3-R07		400	20	m	$ 1,320.00	$ 26,400.00
SUB TOTAL - III						$ 149,660.00
B3-P01	HDPE Pipe - Spec P01	32	50	m	$ 3.00	$ 150.00
B3-P02		63	1800	m	$ 12.00	$ 21,600.00
B3-P03		75	60	m	$ 14.00	$ 840.00
B3-P04		90	360	m	$ 24.00	$ 8,640.00
B3-P05		110	120	m	$ 30.00	$ 3,600.00
B3-P06		160	144	m	$ 58.00	$ 8,352.00
B3-P07		200	96	m	$ 74.00	$ 7,104.00
B3-P08		250	84	m	$ 108.00	$ 9,072.00
SUB TOTAL - IV						$ 59,358.00
B3-S01	Stainless - Spec S01	15	90	m	$ 27.00	$ 2,430.00
B3-S02		25	72	m	$ 30.00	$ 2,160.00
B3-S03		50	240	m	$ 93.00	$ 22,320.00
B3-S04		80	78	m	$ 175.00	$ 13,650.00
B3-S05		1"	120	m	$ 15.00	$ 1,800.00
B3-S06		1/2"	90	m	$ 10.00	$ 900.00
SUB TOTAL - V						$ 43,260.00
TOTAL AMOUNT						$ 442,115.00

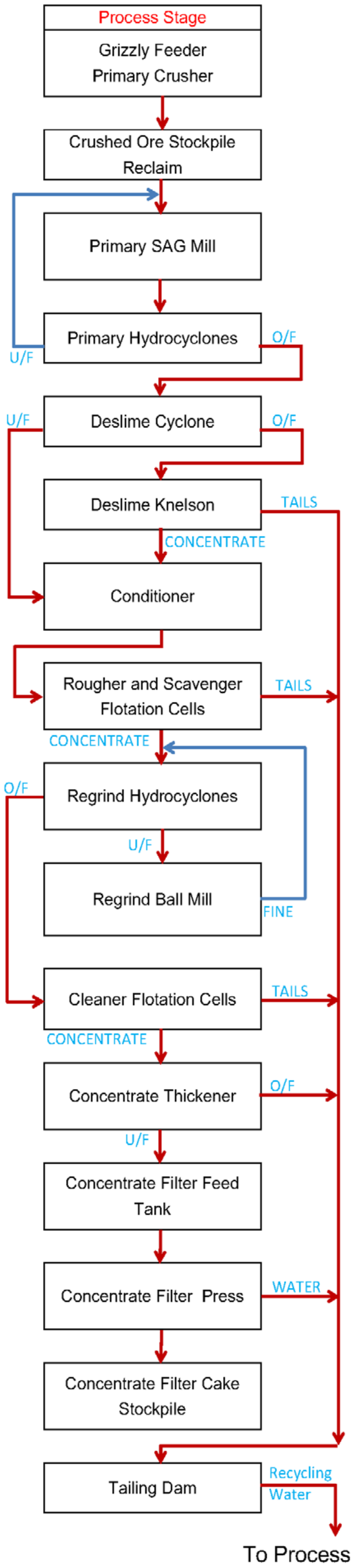
Bau-8,000 TPD Flotation Concentrate Plant

Sl No	Location / Description		KNIFE GATE VALVE-AIR ACTUATED 250	200	150	100	80	50	40	25	PINCH VALVE 200	150	100	80	50	BALL VALVE 100	80	50	25	15	BUTTERFLY 150	100	80	50	25	TECH- TAYLOR 250	200	150	100	80
1	SAG/Ball Mill Module																													
	SAG/Ball Mill		4	4	6	8											5	10	12	8	2	4	4			2	2	1	1	
2	Cyclone &Knelson																													
	Cyclone			4	4	2						1				3	4	8			2	4						1	1	
	Knelson				2																		2							
3	Rougher/Scavenger Flotation																													
				4	4	6	6	4								1	8	10	12		2	8	8					1		
4	To high capacity thickener																													
					4	4	6					1					6	8	8	4	2	4	4						1	1
5	Cleaner Flotation /Cyclone																													
					4	4	6	3									6	8	8	8		2	4	6				1	1	1
6	Filter Press Module																													
					2	4	6	4				1					8	10	12	8		4	4	4					1	
7	Reagent area																													
																	8	10	12	12		2	3							
8	Raw & Process water tanks/Crusher area																													
					4	6										4	12	14	18	13										
		Qty	4	12	30	34	24	11	0	0	0	3	0	0	0	8	57	78	82	53	8	28	29	10	0	2	2	4	5	2
		Spare	1	1	1	1	1	1	0	0		1	0	0	0	1	1	3	5	4	1	2	3	4	0	0	0	0	0	0
		Total	**5**	**13**	**31**	**35**	**25**	**12**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**9**	**58**	**81**	**87**	**57**	**9**	**30**	**32**	**14**	**0**	**2**	**2**	**4**	**5**	**2**
		Unit Price	4550	3600	3050	2700	2350	2150	0	0		4350	3625	2450	0	1250	950	690	250	135	495	350	275	210	150	21050	16750	11500	8500	6300
		Total Cost	22,750	46,800	94,550	94,500	58,750	25,800	-	-	-	17,400	-	-	-	11,250	55,100	55,890	21,750	7,695	4,455	10,500	8,800	2,940	-	42,100	33,500	46,000	42,500	12,600
	Total Valve Cost	715,630																												
	Non Return Valve & Reducer	17,500																												
	Total Valve+Reducer+Non return valve	733,130																												

B. Enclosures

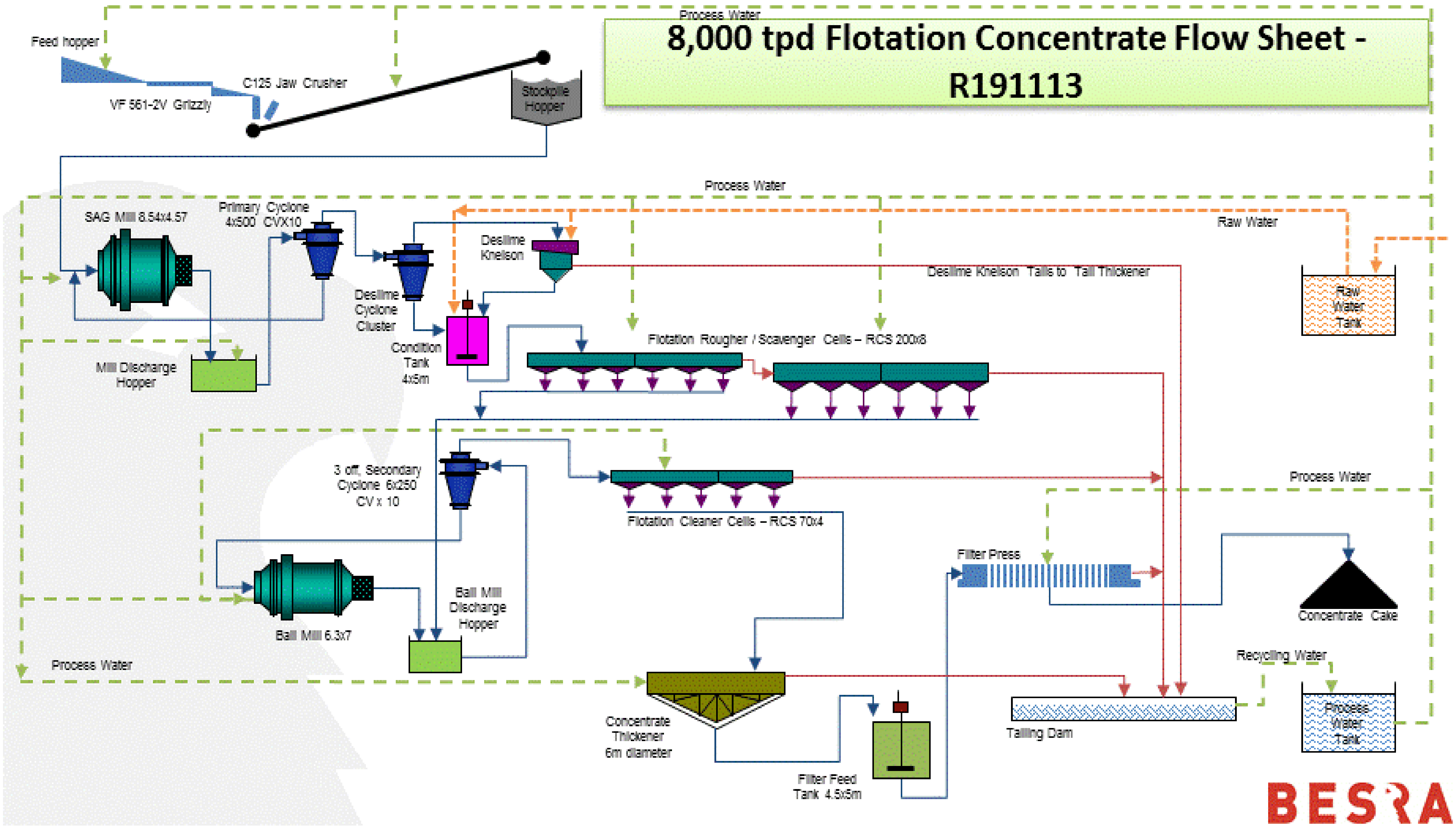
B17-1. 8,000 tpd Flotation Concentrate Flow Schematic

BESRA BAU GOLDFIELD PROJECT - 8,000 TPD PROCESS FLOW SCHEMATIC



Process Stage	Design Duties	Suggested Equipment
Grizzly Feeder Primary Crusher	Design feedrate 670 tph ROM with 15 hours/day design operation and 90% availability factor applied. ROM top size 800mm, P100 = 210mm, P80 = 130mm, Solids SG 2.8, CWi not stated, ore assumed moderate/soft, free moisture not stated assumed 3-4%	VF561-2V Grizzly Feeder ,30 Kw motor, C125 Jaw Crusher with 160 Kw MOTOR ,Rock Breaker,Conveyors and dust control systems
Crushed Ore Stockpile Reclaim	Minimum 12,000 Tons of Ore ,Stockpile concreted yard & Store area	No stacking or reclaim equipment is not considered at this stage
Primary SAG Mill	Design feedrate 400tph after 95% availability factor and 1.15SF applied. F80 = 130mm, P80 = 150um. Closed circuit operation. Ore BRMWi = 13.2kWh/t, BBMWi = 14.1kWh/t, SPI = 26.4mins. Ore BD not stated, SG 2.8	SAG Mill 28ft (8.54m) internal diameter x 16ft (4.87m) effective grinding length Semi Autogenous Grinding Mill with 6200 Kw MOTOR,Media loading system,Liner handler etc
Primary Hydrocyclones	250-300% recirculating load assume, cyclone overflow p80 = 150um, 35% solids in overflow.	Cavex 4 x 500CVX10 Cyclone Cluster- 3 Operating and 1 Standby
Deslime Cyclone	400tph new feed, 35% solids, F80=150um, 85% solids in underflow	Cavex 8 x 400CVX10 Dewatering Cyclone Cluster- 6 Operating and 2 Standby
Deslime Knelson	743m3/h of slurry Feed with 8% solid concentrate	2xKnelson CVD64
Conditioner	400tph solids, 30% solids w/w, solids SG=2.8, slurry SG = 1.26, 993 m3/h slurry flowrate, p80= 150um, max particle size 250um, 3 mins residence time	4m diameter x 5m side wall height conditioning tank with 90 kW agitator,Reagents system etc
Rougher and Scavenger Flotation Cells	435tph solids, 27% solids w/w, solids SG=2.9, 1347 m3/h slurry, p80= 150um, max particle size assume 250um, 30 mins residence time each for rougher & scavenger stages. Air hold up 15%	RCS 200 Flotation Machine, 8 cells, 200m3 effective volume per cell,200 Kw motor ,Air blowers,level and Air control systems and launder sprays and reagents systems
Regrind Hydrocyclones	73tph new feed, 500% recirculating load assume,15% solids, F80 130 and cyclone overflow p80 = 30um, 65% solids in underflow.	3 off ,Cavex 6 x 250CVX 10 Cyclone Cluster - 5 Operating and 1 standby cyclone each cluster
Regrind Ball Mill	73 tph solids new feed, reverse closed circuit operation 500% recirculation load,F80 = 130um, P80= 30um, solids SG 3.2.	3.6 m internal diameter x 7 m effective grinding length Overflow Discharge Ball Mill.1350 Kw SC motor,Media charging system,feed Chute etc
Cleaner Flotation Cells	73 tph solids, 10% solids w/w, solids SG=3.2, Slurry SG 1.026,flow rate 683 m3/h slurry, p80= 30 um, max particle size assume 250um, 20 mins residence. Air hold up 15%	RCS 70 Flotation Machine, 4 cells, 70m3 effective volume per cell ,90 Kw MOTOR ,Air blowers,level and Air control systems and launder sprays and reagents systems
Concentrate Thickener	40 tph solids, solids SG = 3.2, 8% solids w/w, slurry SG = 1.06, 473m3/h slurry, assume p80 = 30 um, underflow 65% solids w/w. 2 Hours residence time.	High rate thickener, 6m diameter,Automatic Rake,2.2 Kw MOTOR.Flocculant system and control systems
Concentrate Filter Feed Tank	40 tph solids, solids SG = 3.2, 65% solids w/w, slurry SG = 1.81, 35 m3/h slurry, p80 = 30um, max particle size 150um, 2 hours residence time.	4.5m in diameter x 5m side wall height slurry tank with 110 kW agitator
Concentrate Filter Press	40 tph solids, solids SG = 3.2, 65% solids w/w, slurry SG = 1.81, 35 m3/h slurry, p80 = 30um, max particle size assume 120um, filter cake moisture assume 9% w/w	Metso VPA 1540-40 Air Membrane Pressure Filter.Compressed Air system,Hydraulic and control system,Cloth was water/filterate tank and belt conveyors
Concentrate Filter Cake Stockpile	Stockpile area is included	Conveyor and bagging system is included
Tailing Dam	Tailing Storage Facility	Recycling Tank and pumps are included

B17-2. 8,000 tpd Flotation Concentrate Flow Sheet



B22-1. Cost Model Cashflow Worksheets

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Mined Ore Tonnes	*10,927,500*	240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-	-
Mined Au Grade	*1.70*	1.53	1.53	1.53	1.53	1.53	1.58	1.58	1.58	1.58	1.56	1.56	1.56	1.56	1.59	2.11	3.24	-	-	-	-	-
Mined Au Ounces	*598,830*	11,870	24,090	35,960	35,960	35,960	36,990	36,990	36,990	36,990	36,600	36,600	36,600	36,600	37,190	48,940	74,500	-	-	-	-	-
Cumulative Mined Ore Tonnes		240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000	5,840,000	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-	-
Cumulative Mined Au Grade		1.53	1.53	1.53	1.53	1.53	1.54	1.55	1.55	1.55	1.55	1.56	1.56	1.56	1.56	1.60	1.70	-	-	-	-	-
Cumulative Mined Au Ounces		11,870	35,960	71,920	107,880	143,840	180,830	217,820	254,810	291,800	328,400	365,000	401,600	438,200	475,390	524,330	598,830	-	-	-	-	-
Processed Ore Tonnes	*10,927,500*		240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000	730,000	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-
Recovered Au Grade	*1.32*		1.19	1.19	1.19	1.19	1.19	1.22	1.22	1.22	1.22	1.21	1.21	1.21	1.21	1.23	1.63	2.51	-	-	-	-
Recovered Au Ounces	*463,650*		9,190	18,650	27,840	27,840	27,840	28,640	28,640	28,640	28,640	28,340	28,340	28,340	28,340	28,800	37,890	57,680	-	-	-	-
Cumulative Processed Ore Tonnes		-	240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000	5,840,000	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-
Cumulative Recovered Au Grade		-	1.19	1.19	1.19	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.21	1.24	1.32	-	-	-	-
Cumulative Recovered Au Ounces		-	9,190	27,840	55,680	83,520	111,360	140,000	168,640	197,280	225,920	254,260	282,600	310,940	339,280	368,080	405,970	463,650	-	-	-	-
Waste Volume		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Tonnes	*18,569,000*	118,100	239,900	358,000	358,000	358,000	922,600	922,600	922,600	922,600	1,650,100	1,650,100	1,650,100	1,650,100	1,813,000	2,320,900	2,712,300	-	-	-	-	-
Cumulative Waste Tonnes		118,100	358,000	716,000	1,074,000	1,432,000	2,354,600	3,277,200	4,199,800	5,122,400	6,772,500	8,422,600	10,072,700	11,722,800	13,535,800	15,856,700	18,569,000	-	-	-	-	-
Strip Ratio	*1.70*	*0.49*	*0.49*	*0.49*	*0.49*	*0.49*	*1.26*	*1.26*	*1.26*	*1.26*	*2.26*	*2.26*	*2.26*	*2.26*	*2.49*	*3.22*	*3.79*	-	-	-	-	-
Cumulative Strip Ratio		*0.49*	*0.49*	*0.49*	*0.49*	*0.49*	*0.65*	*0.75*	*0.82*	*0.88*	*1.03*	*1.15*	*1.25*	*1.34*	*1.43*	*1.55*	*1.70*	-	-	-	-	-
Capital Costs:																						
Capital Development/Pre-stripping																						
Capital Costs Relative to Option																						
Capital Cost - Mining	$ 4,304,495	$ 4,304,495																				
Capital Cost - Processing (Main)	$ 58,547,853	$ 58,547,853																				
Capital Cost - Processing (Addn CIL Circuit)	$ -																					
Capital Cost - Processing (Heap Leach)	$ -																					
Capital Cost - Transport	$ -	$ -																				
Capital Cost - Other	$ 60,205,555	$ 29,087,341	$ -	$ -	$ 11,356,641	$ 8,469,245	$ 5,646,164	$ -	$ -	$ -	$ -	$ -	$ 2,823,082	$ 2,823,082	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Rehabilitation (Stage 1&2)	$ 7,160,750		$ -	$ -	$ -	$ -	$ -	$ -	$ 2,403,780	$ -	$ -	$ -	$ -	$ -	$ 3,166,970	$ -	$ 795,000	$ 795,000	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Process	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Land Acqisition	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - TSF & Other	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Rehabilitation	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Condemnation/Resource Drilling	$ 180,000	$ 180,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Sustaining Capital	$ 4,479,262		$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ -	$ -	$ -	$ -	$ -
Total Capital Costs	$ 134,877,915	$ 92,119,690	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 3,121,699	$ 3,465,587	$ 298,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -	$ -
Cumulative Capital Costs		$ 92,119,690	$ 92,418,307	$ 92,716,925	$ 104,372,183	$ 113,140,046	$ 119,084,827	$ 119,383,444	$ 122,085,842	$ 122,384,459	$ 122,683,077	$ 122,981,694	$ 126,103,394	$ 129,225,093	$ 132,690,680	$ 132,989,298	$ 134,082,915	$ 134,877,915	$ -	$ -	$ -	$ -
Operating Costs:																						
Mining - Waste	$ 50,525,000	$ 321,342	$ 652,752	$ 974,094	$ 974,094	$ 974,094	$ 2,510,333	$ 2,510,333	$ 2,510,333	$ 2,510,333	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,933,051	$ 6,315,013	$ 7,379,986	$ -	$ -	$ -	$ -	$ -
Mining - Ore	$ 33,862,504	$ 746,509	$ 1,515,640	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,260,289	$ 2,236,428	$ 2,218,765	$ -	$ -	$ -	$ -	$ -
Labour (Mine Overhead)	$ 18,872,319	$ 410,268	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ -	$ -	$ -	$ -	$ -
General Costs	$ 584,299	$ 12,881	$ 26,152	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,039	$ 39,039	$ 39,039	$ 39,039	$ 39,001	$ 38,590	$ 38,285	$ -	$ -	$ -	$ -	$ -
Engineering Costs	$ 988,097	$ 21,783	$ 44,226	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,018	$ 66,018	$ 66,018	$ 66,018	$ 65,955	$ 65,258	$ 64,743	$ -	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Main)	$ 196,325,629	$ -	$ 4,307,431	$ 8,745,221	$ 13,052,652	$ 13,052,652	$ 13,052,652	$ 13,068,652	$ 13,068,652	$ 13,068,652	$ 13,068,652	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,061,581	$ 13,111,576	$ 13,409,805	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Addn CIL)	$ -																					
Metallurgical/Processing Costs (Heap Leach)	$ -																					
Transport Cost to Central Plant/Port	$ 35,796,851	$ -	$ 789,152	$ 1,602,218	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,389,405	$ 2,364,181	$ 2,345,509	$ -	$ -	$ -	$ -
General Overhead (BESRA)	$ 6,010,125	$ 132,495	$ 269,005	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,555	$ 401,555	$ 401,555	$ 401,555	$ 401,170	$ 396,935	$ 393,800	$ -	$ -	$ -	$ -	$ -
Total Operating Costs	$ 342,964,825	$ 1,645,278	$ 8,835,161	$ 15,321,027	$ 20,417,610	$ 20,417,610	$ 21,953,849	$ 21,969,849	$ 21,969,849	$ 21,969,849	$ 23,949,707	$ 23,945,746	$ 23,945,746	$ 23,945,746	$ 24,386,331	$ 25,734,013	$ 26,802,138	$ 15,755,314	$ -	$ -	$ -	$ -
Operating Cost per Tonne Ore	$ 31.39	$ 6.83	$ 18.06	$ 20.99	$ 27.97	$ 27.97	$ 30.07	$ 30.10	$ 30.10	$ 30.10	$ 32.80	$ 32.80	$ 32.80	$ 32.80	$ 33.43	$ 35.66	$ 37.43	$ -	$ -	$ -	$ -	$ -
Cumulative Operating Costs		$ 1,645,278	$ 10,480,439	$ 25,801,466	$ 46,219,077	$ 66,636,687	$ 88,590,536	$ 110,560,385	$ 132,530,234	$ 154,500,083	$ 178,449,789	$ 202,395,536	$ 226,341,282	$ 250,287,028	$ 274,673,359	$ 300,407,372	$ 327,209,511	$ 342,964,825	$ -	$ -	$ -	$ -
Total Costs:																						
Total Costs	$ 477,842,740	$ 93,764,968	$ 9,133,779	$ 15,619,644	$ 32,072,869	$ 29,185,473	$ 27,898,630	$ 22,268,466	$ 24,672,246	$ 22,268,466	$ 24,248,324	$ 24,244,364	$ 27,067,445	$ 27,067,445	$ 27,851,919	$ 26,032,631	$ 27,895,756	$ 16,550,314	$ -	$ -	$ -	$ -
Total Cumulative Costs		$ 93,764,968	$ 102,898,746	$ 118,518,391	$ 150,591,260	$ 179,776,733	$ 207,675,363	$ 229,943,829	$ 254,616,076	$ 276,884,542	$ 301,132,866	$ 325,377,230	$ 352,444,675	$ 379,512,121	$ 407,364,039	$ 433,396,670	$ 461,292,426	$ 477,842,740	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore	$ 43.73	$ 389.23	$ 18.67	$ 21.40	$ 43.94	$ 39.98	$ 38.22	$ 30.50	$ 33.80	$ 30.50	$ 33.21	$ 33.21	$ 37.07	$ 37.07	$ 38.18	$ 36.07	$ 38.96	$ -	$ -	$ -	$ -	$ -
Total Cost per Ounce	$ 1,030.61	$ -	$ 993.88	$ 837.51	$ 1,152.04	$ 1,048.33	$ 1,002.11	$ 777.53	$ 861.46	$ 777.53	$ 846.66	$ 855.48	$ 955.10	$ 955.10	$ 982.78	$ 903.91	$ 736.23	$ 286.93	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore (incl. Resale)	$ 41.29																					
Total Cost per Ounce (incl. Resale)	$ 973.14																					
Revenue:																						
Mine Call Factor	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-
Capital Equipment Resale/Salvage	$ 8,291,104		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,291,104	$ -	$ -	$ -	$ -
Asset Resale	$ 18,354,167	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,354,167	$ -	$ -	$ -
Gold Revenue	$ 602,745,000	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 74,984,000	$ -	$ -	$ -	$ -
Marketing & Royalties																						
Freight/Transport	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refining	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Marketing Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenue Before Tax	$ 629,390,272	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 83,275,104	$ 18,354,167	$ -	$ -	$ -
Cumulative Revenue		$ -	$ 11,947,000	$ 36,192,000	$ 72,384,000	$ 108,576,000	$ 144,768,000	$ 182,000,000	$ 219,232,000	$ 256,464,000	$ 293,696,000	$ 330,538,000	$ 367,380,000	$ 404,222,000	$ 441,064,000	$ 478,504,000	$ 527,761,000	$ 611,036,104	$ 629,390,272	$ -	$ -	$ -
Annual Revenue before Tax	$ 629,390,272	$ -	$			108,576,000	$			147,888,000	$			147,758,000	$			206,814,104	$			18,354,167
Annualised Cumulative Revenue		$ -	$			108,576,000	$			256,464,000	$			404,222,000	$			611,036,104	$			629,390,272
Quarterly Cash Flow	$ 151,547,532	($ 93,764,968)	$ 2,813,221	$ 8,625,356	$ 4,119,131	$ 7,006,527	$ 8,293,370	$ 14,963,534	$ 12,559,754	$ 14,963,534	$ 12,983,676	$ 12,597,636	$ 9,774,555	$ 9,774,555	$ 8,990,081	$ 11,407,369	$ 21,361,244	$ 66,724,791	$ 18,354,167	$ -	$ -	$ -
Cumulative Cash Flow		($ 93,764,968)	($ 90,951,746)	($ 82,326,391)	($ 78,207,260)	($ 71,200,733)	($ 62,907,363)	($ 47,943,829)	($ 35,384,076)	($ 20,420,542)	($ 7,436,866)	$ 5,160,770	$ 14,935,325	$ 24,709,879	$ 33,699,961	$ 45,107,330	$ 66,468,574	$ 133,193,364	$ 151,547,532	$ -	$ -	$ -
Annualised Cashflow	$ 151,547,532	($ 93,764,968)	$			22,564,235	$			50,780,191	$			45,130,421	$			108,483,485	$			18,354,167
Annualised Cumulative Cashflow		($ 93,764,968)	($			71,200,733)	($			20,420,542)	$			24,709,879	$			133,193,364	$			151,547,532
Yearly NPV @	$ 91,407,216																					
8%																						
Yearly IRR	38.0%																					
Estimated Dates for Project (Assuming Start Date)		30/06/2014	30/09/2015	31/12/2015	31/03/2016	30/06/2016	30/09/2016	31/12/2016	31/03/2017	30/06/2017	30/09/2017	31/12/2017	31/03/2018	30/06/2018	30/09/2018	31/12/2018	31/03/2019	30/06/2019	30/09/2019	31/12/2019	31/03/2020	30/06/2020
Period NPV @	$ 88,666,062																					
8%																						
Period IRR	29.5%																					

Figure B-1 - Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Cashflow Item	Totals	Yr -1 Pre-Mining	Yr 1 Qtr1	Yr 1 Qtr2	Yr 1 Qtr3	Yr 1 Qtr4	Yr 2 Qtr1	Yr 2 Qtr2	Yr 2 Qtr3	Yr 2 Qtr4
Mined Ore Tonnes	10,927,500	240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000	730,000
Mined Au Grade	1.70	1.53	1.53	1.53	1.53	1.53	1.58	1.58	1.58	1.58
Mined Au Ounces	598,830	11,870	24,090	35,960	35,960	35,960	36,990	36,990	36,990	36,990
Cumulative Mined Ore Tonnes		240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000	5,840,000
Cumulative Mined Au Grade		1.53	1.53	1.53	1.53	1.53	1.54	1.55	1.55	1.55
Cumulative Mined Au Ounces		11,870	35,960	71,920	107,880	143,840	180,830	217,820	254,810	291,800
Processed Ore Tonnes	10,927,500		240,900	489,100	730,000	730,000	730,000	730,000	730,000	730,000
Recovered Au Grade	1.32		1.19	1.19	1.19	1.19	1.19	1.22	1.22	1.22
Recovered Au Ounces	463,650		9,190	18,650	27,840	27,840	27,840	28,640	28,640	28,640
Cumulative Processed Ore Tonnes		-	240,900	730,000	1,460,000	2,190,000	2,920,000	3,650,000	4,380,000	5,110,000
Cumulative Recovered Au Grade		-	1.19	1.19	1.19	1.19	1.19	1.19	1.20	1.20
Cumulative Recovered Au Ounces		-	9,190	27,840	55,680	83,520	111,360	140,000	168,640	197,280
Waste Volume			-	-	-	-	-	-	-	-
Waste Tonnes	18,569,000	118,100	239,900	358,000	358,000	358,000	922,600	922,600	922,600	922,600
Cumulative Waste Tonnes		118,100	358,000	716,000	1,074,000	1,432,000	2,354,600	3,277,200	4,199,800	5,122,400
Strip Ratio	1.70	0.49	0.49	0.49	0.49	0.49	1.26	1.26	1.26	1.26
Cumulative Strip Ratio		0.49	0.49	0.49	0.49	0.49	0.65	0.75	0.82	0.88
Capital Costs:										
Capital Development/Pre-stripping										
Capital Costs Relative to Option										
Capital Cost - Mining	$ 4,304,495	$ 4,304,495								
Capital Cost - Processing (Main)	$ 58,547,853	$ 58,547,853								
Capital Cost - Processing (Addn CIL Circuit)	$ -									
Capital Cost - Processing (Heap Leach)	$ -									
Capital Cost - Transport	$ -	$ -								
Capital Cost - Other	$ 60,205,555	$ 29,087,341	$ -	$ -	$ 11,356,641	$ 8,469,245	$ 5,646,164	$ -	$ -	$ -
Capital Cost - Rehabilitation (Stage 1&2)	$ 7,160,750		$ -	$ -	$ -	$ -	$ -	$ -	$ 2,403,780	$ -
Capital Cost - Stage 3 - Process	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Land Acqisition	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - TSF & Other	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Rehabilitation	$ -		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Condemnation/Resource Drilling	$ 180,000	$ 180,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Sustaining Capital	$ 4,479,262		$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617
Total Capital Costs	$ 134,877,915	$ 92,119,690	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617
Cumulative Capital Costs		$ 92,119,690	$ 92,418,307	$ 92,716,925	$ 104,372,183	$ 113,140,046	$ 119,084,827	$ 119,383,444	$ 122,085,842	$ 122,384,459
Operating Costs:										
Mining - Waste	$ 50,525,000	$ 321,342	$ 652,752	$ 974,094	$ 974,094	$ 974,094	$ 2,510,333	$ 2,510,333	$ 2,510,333	$ 2,510,333
Mining - Ore	$ 33,862,504	$ 746,509	$ 1,515,640	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149	$ 2,262,149
Labour (Mine Overhead)	$ 18,872,319	$ 410,268	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803
General Costs	$ 584,299	$ 12,881	$ 26,152	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033	$ 39,033
Engineering Costs	$ 988,097	$ 21,783	$ 44,226	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009	$ 66,009
Metallurgical/Processing Costs (Main)	$ 196,325,629	$ -	$ 4,307,431	$ 8,745,221	$ 13,052,652	$ 13,052,652	$ 13,052,652	$ 13,068,652	$ 13,068,652	$ 13,068,652
Metallurgical/Processing Costs (Addn CIL)	$ -									
Metallurgical/Processing Costs (Heap Leach)	$ -									
Transport Cost to Central Plant/Port	$ 35,796,851	$ -	$ 789,152	$ 1,602,218	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371	$ 2,391,371
General Overhead (BESRA)	$ 6,010,125	$ 132,495	$ 269,005	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500	$ 401,500
Total Operating Costs	$ 342,964,825	$ 1,645,278	$ 8,835,161	$ 15,321,027	$ 20,417,610	$ 20,417,610	$ 21,953,849	$ 21,969,849	$ 21,969,849	$ 21,969,849
Operating Cost per Tonne Ore	$ 31.39	$ 6.83	$ 18.06	$ 20.99	$ 27.97	$ 27.97	$ 30.07	$ 30.10	$ 30.10	$ 30.10
Cumulative Operating Costs		$ 1,645,278	$ 10,480,439	$ 25,801,466	$ 46,219,077	$ 66,636,687	$ 88,590,536	$ 110,560,385	$ 132,530,234	$ 154,500,083
Total Costs:										
Total Costs	$ 477,842,740	$ 93,764,968	$ 9,133,779	$ 15,619,644	$ 32,072,869	$ 29,185,473	$ 27,898,630	$ 22,268,466	$ 24,672,246	$ 22,268,466
Total Cumulative Costs		$ 93,764,968	$ 102,898,746	$ 118,518,391	$ 150,591,260	$ 179,776,733	$ 207,675,363	$ 229,943,829	$ 254,616,076	$ 276,884,542
Total Cost per Tonne Ore	$ 43.73	$ 389.23	$ 18.67	$ 21.40	$ 43.94	$ 39.98	$ 38.22	$ 30.50	$ 33.80	$ 30.50
Total Cost per Ounce	$ 1,030.61	$ -	$ 993.88	$ 837.51	$ 1,152.04	$ 1,048.33	$ 1,002.11	$ 777.53	$ 861.46	$ 777.53
Total Cost per Tonne Ore (incl. Resale)	$ 41.29									
Total Cost per Ounce (incl. Resale)	$ 973.14									
Revenue:										
Mine Call Factor	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capital Equipment Resale/Salvage	$ 8,291,104		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Asset Resale	$ 18,354,167	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gold Revenue	$ 602,745,000	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000
Marketing & Royalties										
Freight/Transport	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refining	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Marketing Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenue Before Tax	$ 629,390,272	$ -	$ 11,947,000	$ 24,245,000	$ 36,192,000	$ 36,192,000	$ 36,192,000	$ 37,232,000	$ 37,232,000	$ 37,232,000
Cumulative Revenue		$ -	$ 11,947,000	$ 36,192,000	$ 72,384,000	$ 108,576,000	$ 144,768,000	$ 182,000,000	$ 219,232,000	$ 256,464,000
Annual Revenue before Tax	$ 629,390,272	$ -				$ 108,576,000				$ 147,888,000
Annualised Cumulative Revenue		$ -				$ 108,576,000				$ 256,464,000
Quarterly Cash Flow	$ 151,547,532	($ 93,764,968)	$ 2,813,221	$ 8,625,356	$ 4,119,131	$ 7,006,527	$ 8,293,370	$ 14,963,534	$ 12,559,754	$ 14,963,534
Cumulative Cash Flow		($ 93,764,968)	($ 90,951,746)	($ 82,326,391)	($ 78,207,260)	($ 71,200,733)	($ 62,907,363)	($ 47,943,829)	($ 35,384,076)	($ 20,420,542)
Annualised Cashflow	$ 151,547,532	($ 93,764,968)				$ 22,564,235				$ 50,780,191
Annualised Cumulative Cashflow		($ 93,764,968)				($ 71,200,733)				($ 20,420,542)
Estimated Dates for Project (Assuming Start Date)		30/06/14	30/09/15	31/12/15	31/03/16	30/06/16	30/09/16	31/12/16	31/03/17	30/06/17

Cashflow Item	Yr 3 Qtr1	Yr 3 Qtr2	Yr 3 Qtr3	Yr 3 Qtr4	Yr 4 Qtr1	Yr 4 Qtr2	Yr 4 Qtr3	Yr 4 Qtr4	Yr 5 Qtr1	Yr 5 Qtr2	Yr 5 Qtr3	Yr 5 Qtr4
Mined Ore Tonnes	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-	-
Mined Au Grade	1.56	1.56	1.56	1.56	1.59	2.11	3.24	-	-	-	-	-
Mined Au Ounces	36,600	36,600	36,600	36,600	37,190	48,940	74,500	-	-	-	-	-
Cumulative Mined Ore Tonnes	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-	-
Cumulative Mined Au Grade	1.55	1.56	1.56	1.56	1.56	1.60	1.70	-	-	-	-	-
Cumulative Mined Au Ounces	328,400	365,000	401,600	438,200	475,390	524,330	598,830	-	-	-	-	-
Processed Ore Tonnes	730,000	730,100	730,100	730,100	730,100	729,400	721,700	716,000	-	-	-	-
Recovered Au Grade	1.22	1.21	1.21	1.21	1.21	1.23	1.63	2.51	-	-	-	-
Recovered Au Ounces	28,640	28,340	28,340	28,340	28,340	28,800	37,890	57,680	-	-	-	-
Cumulative Processed Ore Tonnes	5,840,000	6,570,100	7,300,200	8,030,300	8,760,400	9,489,800	10,211,500	10,927,500	-	-	-	-
Cumulative Recovered Au Grade	1.20	1.20	1.20	1.20	1.20	1.21	1.24	1.32	-	-	-	-
Cumulative Recovered Au Ounces	225,920	254,260	282,600	310,940	339,280	368,080	405,970	463,650	-	-	-	-
Waste Volume	-	-	-	-	-	-	-	-	-	-	-	-
Waste Tonnes	1,650,100	1,650,100	1,650,100	1,650,100	1,813,000	2,320,900	2,712,300	-	-	-	-	-
Cumulative Waste Tonnes	6,772,500	8,422,600	10,072,700	11,722,800	13,535,800	15,856,700	18,569,000	-	-	-	-	-
Strip Ratio	2.26	2.26	2.26	2.26	2.49	3.22	3.79	-	-	-	-	-
Cumulative Strip Ratio	1.03	1.15	1.25	1.34	1.43	1.55	1.70	-	-	-	-	-
Capital Costs:												
Capital Development/Pre-stripping												
Capital Costs Relative to Option												
Capital Cost - Mining												
Capital Cost - Processing (Main)												
Capital Cost - Processing (Addn CIL Circuit)												
Capital Cost - Processing (Heap Leach)												
Capital Cost - Transport												
Capital Cost - Other	$ -	$ -	$ 2,823,082	$ 2,823,082	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Rehabilitation (Stage 1&2)	$ -	$ -	$ -	$ -	$ 3,166,970	$ -	$ 795,000	$ 795,000	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Process	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Land Acqisition	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - TSF & Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Stage 3 - Rehabilitation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Cost - Condemnation/Resource Drilling	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Sustaining Capital	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ -	$ -	$ -	$ -	$ -
Total Capital Costs	$ 298,617	$ 298,617	$ 3,121,699	$ 3,121,699	$ 3,465,587	$ 298,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -	$ -
Cumulative Capital Costs	$ 122,683,077	$ 122,981,694	$ 126,103,394	$ 129,225,093	$ 132,690,680	$ 132,989,298	$ 134,082,915	$ 134,877,915	$ -	$ -	$ -	$ -
Operating Costs:												
Mining - Waste	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,489,811	$ 4,933,051	$ 6,315,013	$ 7,379,986	$ -	$ -	$ -	$ -	$ -
Mining - Ore	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,262,458	$ 2,260,289	$ 2,236,428	$ 2,218,765	$ -	$ -	$ -	$ -	$ -
Labour (Mine Overhead)	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ 1,230,803	$ -	$ -	$ -	$ -	$ -
General Costs	$ 39,039	$ 39,039	$ 39,039	$ 39,039	$ 39,001	$ 38,590	$ 38,285	$ -	$ -	$ -	$ -	$ -
Engineering Costs	$ 66,018	$ 66,018	$ 66,018	$ 66,018	$ 65,955	$ 65,258	$ 64,743	$ -	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Main)	$ 13,068,652	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,064,363	$ 13,061,581	$ 13,111,576	$ 13,409,805	$ -	$ -	$ -	$ -
Metallurgical/Processing Costs (Addn CIL)												
Metallurgical/Processing Costs (Heap Leach)												
Transport Cost to Central Plant/Port	$ 2,391,371	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,391,698	$ 2,389,405	$ 2,364,181	$ 2,345,509	$ -	$ -	$ -	$ -
General Overhead (BESRA)	$ 401,555	$ 401,555	$ 401,555	$ 401,555	$ 401,170	$ 396,935	$ 393,800	$ -	$ -	$ -	$ -	$ -
Total Operating Costs	$ 23,949,707	$ 23,945,746	$ 23,945,746	$ 23,945,746	$ 24,386,331	$ 25,734,013	$ 26,802,138	$ 15,755,314	$ -	$ -	$ -	$ -
Operating Cost per Tonne Ore	$ 32.80	$ 32.80	$ 32.80	$ 32.80	$ 33.43	$ 35.66	$ 37.43	$ -	$ -	$ -	$ -	$ -
Cumulative Operating Costs	$ 178,449,789	$ 202,395,536	$ 226,341,282	$ 250,287,028	$ 274,673,359	$ 300,407,372	$ 327,209,511	$ 342,964,825	$ -	$ -	$ -	$ -
Total Costs:												
Total Costs	$ 24,248,324	$ 24,244,364	$ 27,067,445	$ 27,067,445	$ 27,851,919	$ 26,032,631	$ 27,895,756	$ 16,550,314	$ -	$ -	$ -	$ -
Total Cumulative Costs	$ 301,132,866	$ 325,377,230	$ 352,444,675	$ 379,512,121	$ 407,364,039	$ 433,396,670	$ 461,292,426	$ 477,842,740	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore	$ 33.21	$ 33.21	$ 37.07	$ 37.07	$ 38.18	$ 36.07	$ 38.96	$ -	$ -	$ -	$ -	$ -
Total Cost per Ounce	$ 846.66	$ 855.48	$ 955.10	$ 955.10	$ 982.78	$ 903.91	$ 736.23	$ 286.93	$ -	$ -	$ -	$ -
Total Cost per Tonne Ore (incl. Resale)												
Total Cost per Ounce (incl. Resale)												
Revenue:												
Mine Call Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-
Capital Equipment Resale/Salvage	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,291,104	$ -	$ -	$ -	$ -
Asset Resale	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 18,354,167	$ -	$ -	$ -
Gold Revenue	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 74,984,000	$ -	$ -	$ -	$ -
Marketing & Royalties												
Freight/Transport	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refining	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Marketing Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Revenue Before Tax	$ 37,232,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 36,842,000	$ 37,440,000	$ 49,257,000	$ 83,275,104	$ 18,354,167	$ -	$ -	$ -
Cumulative Revenue	$ 293,696,000	$ 330,538,000	$ 367,380,000	$ 404,222,000	$ 441,064,000	$ 478,504,000	$ 527,761,000	$ 611,036,104	$ 629,390,272	$ -	$ -	$ -
Annual Revenue before Tax				$ 147,758,000				$ 206,814,104				$ 18,354,167
Annualised Cumulative Revenue				$ 404,222,000				$ 611,036,104				$ 629,390,272
Quarterly Cash Flow	$ 12,983,676	$ 12,597,636	$ 9,774,555	$ 9,774,555	$ 8,990,081	$ 11,407,369	$ 21,361,244	$ 66,724,791	$ 18,354,167	$ -	$ -	$ -
Cumulative Cash Flow	($ 7,436,866)	$ 5,160,770	$ 14,935,325	$ 24,709,879	$ 33,699,961	$ 45,107,330	$ 66,468,574	$ 133,193,364	$ 151,547,532	$ -	$ -	$ -
Annualised Cashflow				$ 45,130,421				$ 108,483,485				$ 18,354,167
Annualised Cumulative Cashflow				$ 24,709,879				$ 133,193,364				$ 151,547,532
Estimated Dates for Project (Assuming Start Date)	30/09/17	31/12/17	31/03/18	30/06/18	30/09/18	31/12/18	31/03/19	30/06/19	30/09/19	31/12/19	31/03/20	30/06/20

Yearly NPV @ 8%	$ 91,407,216
Yearly IRR	38.0%
Period NPV @ 8%	$ 88,666,062
Period IRR	29.5%

Figure B-2 - Cashflow Model - Option 452 (8,000tpd Owner-Operator)

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Stage		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*2*	*0*	*0*	*0*	*0*	*0*
Tax - No Incentives																						
Opening Capital/Deferred Exploration		$ 7,500,000																				
Capital Expenditure (Stage 1&2)	*$ 134,877,915*	$ 92,119,690	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 3,121,699	$ 3,465,587	$ 298,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -	$ -
Capital Expenditure (Stage 3)	*$ -*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	*$ 22,942,709*	$ 22,942,709	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Depreciable Capital		$ 99,619,690	$ 99,918,307	$ 93,972,030	$ 99,362,487	$ 101,033,029	$ 99,206,039	$ 91,237,486	$ 85,645,567	$ 77,379,628	$ 69,080,509	$ 60,744,063	$ 55,188,039	$ 49,111,731	$ 42,754,973	$ 32,364,847	$ 22,670,182	$ 12,130,091	$ -	$ -	$ -	$ -
Depreciation	142,377,915	$ -	$ 6,244,894	$ 6,264,802	$ 7,097,320	$ 7,771,771	$ 8,267,170	$ 8,294,317	$ 8,564,557	$ 8,597,736	$ 8,635,064	$ 8,677,723	$ 9,198,006	$ 9,822,346	$ 10,688,743	$ 10,788,282	$ 11,335,091	$ 12,130,091	$ -	$ -	$ -	$ -
Depreciation Quarters			16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	-	-	-	-
Closing Depreciable Capital		**$ 99,619,690**	**$ 93,673,413**	**$ 87,707,228**	**$ 92,265,166**	**$ 93,261,258**	**$ 90,938,869**	**$ 82,943,169**	**$ 77,081,010**	**$ 68,781,891**	**$ 60,445,445**	**$ 52,066,339**	**$ 45,990,032**	**$ 39,289,385**	**$ 32,066,229**	**$ 21,576,565**	**$ 11,335,091**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Disposal of Plant & Equipment	*$ 8,291,104*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 8,291,104*	$ -	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	*$ 8,291,104*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 8,291,104*	$ -	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	*$ 18,354,167*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 18,354,167*	$ -	$ -	$ -
Write-Off @ Project End			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 4,588,542*	$ -	$ -
Balance of Non-Depreciable Capital (after disposal)			**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 4,588,542**	**$ -**	**$ -**	**$ -**
Debt Drawdowns	*$ 64,483,783*	$ 64,483,783																				
Interest Counter		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Quarters Production		-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	-	-	-	-
Principal Repayment Sweep %			0.00%	0.00%	0.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Principal Repayments	*($ 64,483,783)*		$ -	$ -	$ -	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	($ 6,448,378)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Outstanding		$ 64,483,783	$ 64,483,783	$ 64,483,783	$ 64,483,783	$ 58,035,404	$ 51,587,026	$ 45,138,648	$ 38,690,270	$ 32,241,891	$ 25,793,513	$ 19,345,135	$ 12,896,757	$ 6,448,378	$ 0	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Interest	*($ 13,283,659)*	($ 3,611,092)	($ 1,289,676)	($ 1,289,676)	($ 1,289,676)	($ 1,160,708)	($ 1,031,741)	($ 902,773)	($ 773,805)	($ 644,838)	($ 515,870)	($ 386,903)	($ 257,935)	($ 128,968)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA	*$ 259,780,175*	($ 1,645,278)	$ 3,111,839	$ 8,923,973	$ 15,774,390	$ 15,774,390	$ 14,238,151	$ 15,262,151	$ 15,262,151	$ 15,262,151	$ 13,282,293	$ 12,896,254	$ 12,896,254	$ 12,896,254	$ 12,455,669	$ 11,705,987	$ 22,454,862	$ 59,228,686	$ -	$ -	$ -	$ -
Depreciation	*($ 142,377,915)*	$ -	($ 6,244,894)	($ 6,264,802)	($ 7,097,320)	($ 7,771,771)	($ 8,267,170)	($ 8,294,317)	($ 8,564,557)	($ 8,597,736)	($ 8,635,064)	($ 8,677,723)	($ 9,198,006)	($ 9,822,346)	($ 10,688,743)	($ 10,788,282)	($ 11,335,091)	($ 12,130,091)	$ -	$ -	$ -	$ -
Interest	*($ 13,283,659)*	($ 3,611,092)	($ 1,289,676)	($ 1,289,676)	($ 1,289,676)	($ 1,160,708)	($ 1,031,741)	($ 902,773)	($ 773,805)	($ 644,838)	($ 515,870)	($ 386,903)	($ 257,935)	($ 128,968)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of P&E	*$ 8,291,104*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,291,104	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	*$ -*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Earnings	*$ 112,409,705*	($ 5,256,370)	($ 4,422,731)	$ 1,369,495	$ 7,387,394	$ 6,841,910	$ 4,939,241	$ 6,065,061	$ 5,923,789	$ 6,019,577	$ 4,131,359	$ 3,831,628	$ 3,440,312	$ 2,944,940	$ 1,766,926	$ 917,704	$ 11,119,771	$ 55,389,699	$ -	$ -	$ -	$ -
Carry Forward Losses (if applicable)		($ 5,256,370)	($ 9,679,101)	($ 8,309,606)	($ 922,212)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Adjusted Taxable Earnings		**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,919,698**	**$ 4,939,241**	**$ 6,065,061**	**$ 5,923,789**	**$ 6,019,577**	**$ 4,131,359**	**$ 3,831,628**	**$ 3,440,312**	**$ 2,944,940**	**$ 1,766,926**	**$ 917,704**	**$ 11,119,771**	**$ 55,389,699**	**$ -**	**$ -**	**$ -**	**$ -**
Tax with No Incentives	*($ 26,978,329)*	$ -	$ -	$ -	$ -	($ 1,420,728)	($ 1,185,418)	($ 1,455,615)	($ 1,421,709)	($ 1,444,698)	($ 991,526)	($ 919,591)	($ 825,675)	($ 706,786)	($ 424,062)	($ 220,249)	($ 2,668,745)	($ 13,293,528)	$ -	$ -	$ -	$ -
After Tax Cashflow	*111,285,543*	*($ 32,892,277)*	*$ 1,523,546*	*$ 7,335,680*	*$ 2,829,455*	*($ 2,023,287)*	*($ 372,167)*	*$ 6,156,768*	*$ 3,915,861*	*$ 6,425,619*	*$ 5,027,901*	*$ 4,842,765*	*$ 2,242,566*	*$ 2,490,423*	*$ 2,117,641*	*$ 11,187,120*	*$ 18,692,499*	*$ 53,431,263*	*$ 18,354,167*	*$ -*	*$ -*	*$ -*
Cumulative After Tax Cashflow		*($ 32,892,277)*	*($ 31,368,731)*	*($ 24,033,051)*	*($ 21,203,596)*	*($ 23,226,883)*	*($ 23,599,049)*	*($ 17,442,282)*	*($ 13,526,421)*	*($ 7,100,802)*	*($ 2,072,901)*	*$ 2,769,864*	*$ 5,012,430*	*$ 7,502,853*	*$ 9,620,494*	*$ 20,807,614*	*$ 39,500,113*	*$ 92,931,376*	*$ 111,285,543*	*$ -*	*$ -*	*$ -*
Annualised Cashflow	*111,285,543*	*($ 32,892,277)*	*$*			*9,665,394*	*$*			*16,126,081*	*$*			*14,603,655*	*$*			*85,428,523*	*$*			*18,354,167*
		-$ 93,764,968				*$ 21,143,507*				*$ 45,272,751*				*$ 41,686,844*				*$ 91,876,901*				*$ 18,354,167*
Yearly NPV: Tax No Incentive	**$ 71,983,893**																					
8%																						
Yearly IRR: Tax No Incentive	32.6%																					

Table B-3 - After-Tax Cashflow Model - Option 484 (8,000tpd Contractor-Mining)

Cashflow Item	Totals	Yr -1	Yr 1				Yr 2				Yr 3				Yr 4				Yr 5			
		Pre-Mining	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4	Qtr1	Qtr2	Qtr3	Qtr4
Stage		*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*2*	*2*	*0*	*0*	*0*	*0*
Tax - No Incentives																						
Opening Capital/Deferred Exploration		$ 7,500,000																				
Capital Expenditure (Stage 1&2)	*$ 156,166,540*	$ 112,314,696	$ 298,617	$ 298,617	$ 11,655,259	$ 8,767,863	$ 5,944,781	$ 298,617	$ 2,702,397	$ 298,617	$ 298,617	$ 298,617	$ 298,617	$ 3,121,699	$ 6,288,669	$ 298,617	$ 1,093,617	$ 1,093,617	$ 795,000	$ -	$ -	$ -
Capital Expenditure (Stage 3)	*$ -*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Non-Depreciable Capital	*$ 22,942,709*	$ 22,942,709	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Depreciable Capital		$ 119,814,696	$ 120,113,314	$ 113,346,442	$ 117,917,548	$ 118,824,241	$ 116,281,576	$ 107,635,457	$ 101,368,233	$ 92,451,557	$ 83,505,019	$ 74,525,301	$ 65,508,256	$ 59,271,633	$ 55,681,696	$ 44,843,975	$ 34,726,598	$ 24,244,683	$ 12,917,342	$ -	$ -	$ -
Depreciation	163,666,540	$ -	$ 7,065,489	$ 7,084,153	$ 7,861,170	$ 8,487,446	$ 8,944,737	$ 8,969,621	$ 9,215,294	$ 9,245,156	$ 9,278,335	$ 9,315,663	$ 9,358,322	$ 9,878,605	$ 11,136,339	$ 11,210,994	$ 11,575,533	$ 12,122,342	$ 12,917,342	$ -	$ -	$ -
Depreciation Quarters			17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	-	-	-
Closing Depreciable Capital		**$ 119,814,696**	**$ 113,047,825**	**$ 106,262,290**	**$ 110,056,378**	**$ 110,336,795**	**$ 107,336,840**	**$ 98,665,836**	**$ 92,152,939**	**$ 83,206,401**	**$ 74,226,683**	**$ 65,209,638**	**$ 56,149,933**	**$ 49,393,027**	**$ 44,545,357**	**$ 33,632,981**	**$ 23,151,066**	**$ 12,122,342**	**$ -**	**$ -**	**$ -**	**$ -**
Disposal of Plant & Equipment	*$ 12,330,106*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 12,330,106*	$ -	$ -	$ -
Tax Profit/(loss) from Disposal of P&E	*$ 12,330,106*	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 12,330,106*	$ -	$ -	$ -
Proceeds from Disposal of Non-Depreciable Capital (land)	*$ 18,354,167*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 18,354,167*	$ -	$ -
Write-Off @ Project End			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 4,588,542*	$ -
Balance of Non-Depreciable Capital (after disposal)			**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 22,942,709**	**$ 4,588,542**	**$ -**	**$ -**
Debt Drawdowns	*$ 78,620,288*	$ 78,620,288																				
Interest Counter		1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Quarters Production		-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	-	-	-
Principal Repayment Sweep %			0.00%	0.00%	0.00%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	9.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Principal Repayments	*($ 78,620,288)*		$ -	$ -	$ -	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	($ 7,147,299)	$ -	$ -	$ -	$ -	$ -	$ -
Debt Outstanding		$ 78,620,288	$ 78,620,288	$ 78,620,288	$ 78,620,288	$ 71,472,989	$ 64,325,690	$ 57,178,391	$ 50,031,092	$ 42,883,793	$ 35,736,494	$ 28,589,195	$ 21,441,897	$ 14,294,598	$ 7,147,299	$ 0	$ -	$ -	$ -	$ -	$ -	$ -
Interest	*($ 16,981,982)*	($ 4,402,736)	($ 1,572,406)	($ 1,572,406)	($ 1,572,406)	($ 1,429,460)	($ 1,286,514)	($ 1,143,568)	($ 1,000,622)	($ 857,676)	($ 714,730)	($ 571,784)	($ 428,838)	($ 285,892)	($ 142,946)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA	*$ 292,880,457*	($ 1,238,988)	$ 3,933,149	$ 10,175,134	$ 17,021,472	$ 17,021,472	$ 16,051,925	$ 16,755,361	$ 16,755,361	$ 16,755,361	$ 15,571,942	$ 15,282,184	$ 15,282,184	$ 15,282,184	$ 14,719,818	$ 15,122,031	$ 10,617,662	$ 44,909,689	$ 32,862,514	$ -	$ -	$ -
Depreciation	*($ 163,666,540)*	$ -	($ 7,065,489)	($ 7,084,153)	($ 7,861,170)	($ 8,487,446)	($ 8,944,737)	($ 8,969,621)	($ 9,215,294)	($ 9,245,156)	($ 9,278,335)	($ 9,315,663)	($ 9,358,322)	($ 9,878,605)	($ 11,136,339)	($ 11,210,994)	($ 11,575,533)	($ 12,122,342)	($ 12,917,342)	$ -	$ -	$ -
Interest	*($ 16,981,982)*	($ 4,402,736)	($ 1,572,406)	($ 1,572,406)	($ 1,572,406)	($ 1,429,460)	($ 1,286,514)	($ 1,143,568)	($ 1,000,622)	($ 857,676)	($ 714,730)	($ 571,784)	($ 428,838)	($ 285,892)	($ 142,946)	($ 0)	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of P&E	*$ 12,330,106*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 12,330,106	$ -	$ -	$ -
Taxable Profits/(Losses) on Disposal of Land	*$ -*		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Earnings	*$ 124,562,041*	($ 5,641,724)	($ 4,704,746)	$ 1,518,576	$ 7,587,897	$ 7,104,567	$ 5,820,675	$ 6,642,172	$ 6,539,445	$ 6,652,530	$ 5,578,876	$ 5,394,738	$ 5,495,024	$ 5,117,687	$ 3,440,532	$ 3,911,038	($ 957,871)	$ 32,787,347	$ 32,275,278	$ -	$ -	$ -
Carry Forward Losses (if applicable)		($ 5,641,724)	($ 10,346,470)	($ 8,827,894)	($ 1,239,997)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	($ 957,871)	$ -	$ -	$ -	$ -	$ -
Adjusted Taxable Earnings		**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,864,569**	**$ 5,820,675**	**$ 6,642,172**	**$ 6,539,445**	**$ 6,652,530**	**$ 5,578,876**	**$ 5,394,738**	**$ 5,495,024**	**$ 5,117,687**	**$ 3,440,532**	**$ 3,911,038**	**$ -**	**$ 31,829,476**	**$ 32,275,278**	**$ -**	**$ -**	**$ -**
Tax with No Incentives	*($ 29,894,890)*	$ -	$ -	$ -	$ -	($ 1,407,497)	($ 1,396,962)	($ 1,594,121)	($ 1,569,467)	($ 1,596,607)	($ 1,338,930)	($ 1,294,737)	($ 1,318,806)	($ 1,228,245)	($ 825,728)	($ 938,649)	$ -	($ 7,639,074)	($ 7,746,067)	$ -	$ -	$ -
After Tax Cashflow	*120,521,318*	*($ 39,336,133)*	*$ 2,062,126*	*$ 8,304,111*	*$ 3,793,808*	*($ 1,730,646)*	*$ 276,370*	*$ 6,571,756*	*$ 4,335,576*	*$ 6,855,162*	*$ 6,072,365*	*$ 5,969,747*	*$ 6,088,624*	*$ 3,499,049*	*$ 315,176*	*$ 6,737,466*	*$ 9,524,045*	*$ 36,176,997*	*$ 36,651,553*	*$ 18,354,167*	*$ -*	*$ -*
Cumulative After Tax Cashflow		*($ 39,336,133)*	*($ 37,274,007)*	*($ 28,969,896)*	*($ 25,176,088)*	*($ 26,906,734)*	*($ 26,630,365)*	*($ 20,058,609)*	*($ 15,723,033)*	*($ 8,867,871)*	*($ 2,795,506)*	*$ 3,174,241*	*$ 9,262,866*	*$ 12,761,915*	*$ 13,077,091*	*$ 19,814,557*	*$ 29,338,601*	*$ 65,515,598*	*$ 102,167,151*	*$ 120,521,318*	*$ -*	*$ -*
Annualised Cashflow	*120,521,318*	*($ 39,336,133)*	*$*			*12,429,399*	*$*			*18,038,863*	*$*			*21,629,786*	*$*			*52,753,683*	*$*			*55,005,720*
		-$ 113,553,684				*$ 25,723,374*				*$ 50,916,438*				*$ 52,220,225*				*$ 67,191,227*				*$ 55,005,720*
Yearly NPV: Tax No Incentive	**$ 76,106,036**																					
8%																						
Yearly IRR: Tax No Incentive	29.4%																					

Table B-4 - After-Tax Cashflow Model - Option 452 (8,000tpd Owner-Operator)

B22-2. Project Risk Register

No.	Risk Group	Risk Description	Description of Consequence or Impact	Probability	Consequence	Score	Estimated Cost Impact	Mitigation Measures
1	Processing/Plant	Low Concentrate Grade	Concentrate grade too low	HIGH	HIGH	6	>$5million	Test existing and new metallurgical processes with a focus on slimes removal and flotation technologies (flash flotation, arsenopyrite/pyrite separation, ultrasonics). Develop testwork programme to gain understanding of deposit geometallurgy. Utilise information in design of plant to optimise concentrate grade.
2	Processing/Plant	Concentrate Specs Not Met	Concentrate produced does not meet the required specs of processor/smelter	HIGH	HIGH	6	>$5million	As above.
3	Processing/Plant	Clay in Ore	Clay affecting mining, crushing and processing of ore; do we require roll crusher before jaw crusher	HIGH	HIGH	6	>$5million	Investigate existing and new metallurgical processes for slimes removal and clay mitigation. Plant design to account for high clay content. Develop testwork programme to gain understanding of deposit geometallurgy.
4	Processing/Plant	More Metallurgical Testwork Required for Economics	More detailed testwork required help define requirements for plant and associated costs or economics	HIGH	MEDIUM	5	>$1million	Develop project testwork programme to gain understanding of deposit geometallurgy using both in-house and external expertise. Assign budget to geometallurgical programme. Utilise test results in plant design and project economics.
5	Processing/Plant	Metallurgical Characteristics Incomplete for Design	Incomplete understanding of metallurgical charactersitics	HIGH	MEDIUM	5	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design and project economics.
6	Construction & Implementation	Construction/Commission Delays	Delays in construction and/or commissioning schedule	MEDIUM	HIGH	5	>$5million	Incorporate both penalties and bonuses into construction contracts to discourage delays.
7	Geotechnical	Pit Slope Instability/Failure(s)	Pit instability or failures affecting pit production	MEDIUM	HIGH	5	>$5million	Measure geotechnical properties of orebody. Incorporate these measurements into mine design.
8	Geotechnical	Landform/Slope Stability or Failure	Landform instability or failures affecting the TSF, waste dump and plant/infrastructure	MEDIUM	HIGH	5	>$1million	As above.
9	Processing/Plant	Low Concentrate Recovery	Concentrate recovery too low	MEDIUM	HIGH	5	>$1million	Test existing and new metallurgical processes with a focus on slimes removal and flotation technologies (flash flotation, arsenopyrite/pyrite separation, ultrasonics). Develop testwork programme to gain understanding of deposit geometallurgy. Utilise information in design of plant to maximise concentrate recovery.
10	Processing/Plant	Plant Design Specifications Not Met	Plant operation not meet design specifications	MEDIUM	HIGH	5	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design.
11	Procurement & Capital Items	Delivery Schedule Delay	Delay in capital item delivery or delays due to other impacts (customs, shipping, etc.)	LOW	HIGH	4	>$5million	Order critical items asap. Incorporate penalties and bonuses into delivery contract. Track delivery status on a regular basis.
12	Permits/Approvals	Mining Certificate/Lease Delays	Inability or delays of Gladioli to obtain MC/ML renewal covering part of the mine operational area (mainly TSF and waste landform)	LOW	HIGH	4		Ensure regular and ongoing liaison with Gladioli. Track progress of permits and ensure deadlines are met.'
13	External Factors	Political Change/Government Interference	Changes in the current political situation or interference from government officials	LOW	HIGH	4		Communicate regularly with all parties and promote the project to ensure positive views. Monitor political communications for any negative communications
14	Geology/Resource	Missing or Incomplete Resource Data	Possible missing elements affecting process; Zonation of mineralogical characteristics unknown; Incomplete key element data (particularly S & Fe)	MEDIUM	MEDIUM	4		Ensure data is captured in future drilling and if applicable in any grade control work.
15	Geology/Resource	Oxidised Layer	Impact of partial oxidative layer - amount and volume of oxidated material	MEDIUM	MEDIUM	4		Geological mapping and grade control to monitor the oxidised layer. Track plant performance and recovery.
16	Environmental & Rehab	EIA Delayed/Rejected	Process of obtaining EIA delayed/rejected	LOW	HIGH	4		Ensure EIA basline work is comprehensive enough. That the EIA report and EIA consultant have clearly identified the effects and applied suitable mitigation measures. Track the EIA schedule and timeline closely. Ensure open and clear communications with all parties.

No.	Risk Group	Risk Description	Description of Consequence or Impact	Probability	Consequence	Score	Estimated Cost Impact	Mitigation Measures
17	Environmental & Rehab	MRP Delayed/Rejected	Process of obtaining or acceptance of MRP is delayed or rejected	LOW	HIGH	4		As above.
18	General	Inflationary Impacts	Inflationary effects on pricing due to delays	HIGH	LOW	4	>$1million	Use of hedge instruments. Incorporate inflationary estimates into economic model.
19	Permits/Approvals	Building/Construction Permit Delays	Delays in building/construction permits issued by local government	LOW	HIGH	4		As per EIA, MRP and other government processes
20	Geology/Resource	Lower Average Grade	Resource grade lower on average than in model	MEDIUM	MEDIUM	4		Monitor through geological investigations and grade control
21	Processing/Plant	Plant Operational/Throughput Problems	Problems affecting the plant throughput - bottlenecks, breakdowns, under-performance	MEDIUM	MEDIUM	4	>$5million	Design project testwork programme to gain understanding of deposit geometallurgy and incorporate results into plant design. Assign budget to geometallurgical programme. Utilise test results in plant design.
22	External Factors	Gold Export Rule Change	Increase in current export rates for gold concentrate > 0%	LOW	MEDIUM	3		
23	Environmental & Rehab	Acid Mine Drainage	Leakage or levels above permitted	LOW	MEDIUM	3	>$1million	Containment of PAF material and control of site drainage. Incorporation of lime dosage.
24	Environmental & Rehab	Mine Closure Rehab Delayed/Rejected	Non-acceptance of mine closure rehab or delays due to rectification	LOW	MEDIUM	3		As per EIA, MRP and other government processes
25	Hydrology & Water Management	Severe Weather Events	Impact of severe weather events on the mining operations or other operations (power disruption, flooding preventing staff getting to work, etc.)	MEDIUM	LOW	3	>$100,000	Incorporate weather forecasts in routine operational planning.
26	Finance/Costs	Operating Cost Increases	Increase in some or all of operating costs	LOW	MEDIUM	3	>$1million	Maintain tight control on contract negotiations/costs; minimise unit costs and usage.
27	Mining/Operations	Production Delays	Delays in reaching full/ongoing production	LOW	MEDIUM	3		Regular and detailed project schedule to ensure no delays. Develop alternate options list should delaying events occur ahead of tme to ensure quick remedy
28	General	Major Negative Event	Major event e..g fire, loss of power supply, etc.	LOW	MEDIUM	3		Regular monitoring of all hazards, regular checks and detailed H&S training. Develop a H&S strategy to deal with any incident
29	External Factors	Royalty Rate Increase	Increase in current royalty rate >0%	LOW	MEDIUM	3		Communicate benefits of no increase and constantly monitor government opinion. Develop strategies to mitigate
30	Tailings Facility	Insufficient Waste Material	Insufficient construction material at point in time	LOW	LOW	2		Develop alternate plans and sources of material. Ensure detailed and regular short term planning to ensure no problem with waste aterial balance and supply
31	External Factors	Illegal Miners	Illegal miners stealing gold/ore or impacting operations	LOW	LOW	2	>$10,000	Employ security team to keep deposit secure; regular contact with local police; physical barriers to exclude miners (fence).
32	External Factors	Anti-Mining & Environmental Disruption	Protests or other interference from anti-mining groups or environmental groups	LOW	LOW	2	>$10,000	Regular monitoring of these groups. Good communications strategy to government and local residents. Good security and regular communications with the police.
33	Environmental & Rehab	Excessive Rehabilitation Bond	Excessive rehabilitation bond and restrictive rehab conditions	LOW	LOW	2	>$1million	Design closure plan in accordance with best practice; use of reasonable examples in bond application.
34	Contracts	Contract Conditions Not Met	Contract conditions with service provider not met on consistent basis	LOW	LOW	2	>$100,000	Close contract management - penalties and bonuses to encourage contract obeyance.
35	Contracts	Poor Contractual Terms	Poor, inconsistent or vague contract terms	LOW	LOW	2	>$100,000	Legal review of contract conditions.
36	Transport	Transport Security Issues	Security issues with concentrate transport - theft	LOW	LOW	2	>$100,000	Monitoring of vehicles, personnel and concentrate bags. Good security measures and plans
37	Transport	Transport Disruption	Disruption due to ship unavailability, road issues, truck unavailability, etc.	LOW	LOW	2	>$100,000	Develop a strategy and plan to deal with any disruptions. Ensure suitable equipment, transport, personnel and other options to meet any problems
38	Mining/Operations	Low Mine Production	Various factors impacting the mine production	LOW	LOW	2		Regular planning and operational monitoring to ensure no impacts on mine production
39	General	Labour Issues	Insufficient labour, skills level and training	LOW	LOW	2		Develop a detailed labour, training and HR policy plan. Ensure good instructors and training material available