



Case 15: 1703

# mineral resources

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

DMR 10

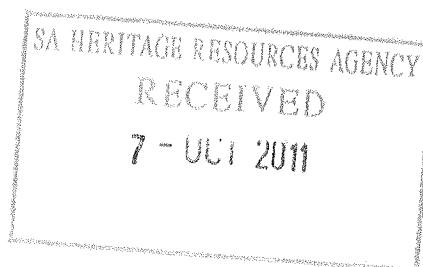
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Enquiries: D. A. Watkins  
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Reference:  
Date:

EC30/5/1/2/3/2/1(0252)EM  
22 September 2011

South African Heritage Resources Agency  
P.O. Box 4637  
CAPE TOWN  
8000



Sir / Madam

**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002: STONE AGGREGATE;  
GRAVEL MINING ON UNREGISTERED STATE LAND IN THE GXWALENI 5 ADMINISTRATIVE AREA,  
NTABANKULU MUNICIPALITY, MAXESIBENI ADMINISTRATIVE DISTRICT, EASTERN CAPE**

1. Attached herewith, a copy of the EMP received from Mr N Dreyer.
2. Any written comments or requirements your department may have in this regard can be forwarded to this office no later than **18 November 2011**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said documents. Comments may be submitted at your earliest convenience in order to reduce the turnaround time for the application process.
3. Consultation in this regard has also been initiated with other relevant State Departments.
4. Please use the reference number (EC) 30/5/1/2/3/2/1(0252) EM in all future correspondence.
5. Your co-operation is appreciated.

Sincerely,

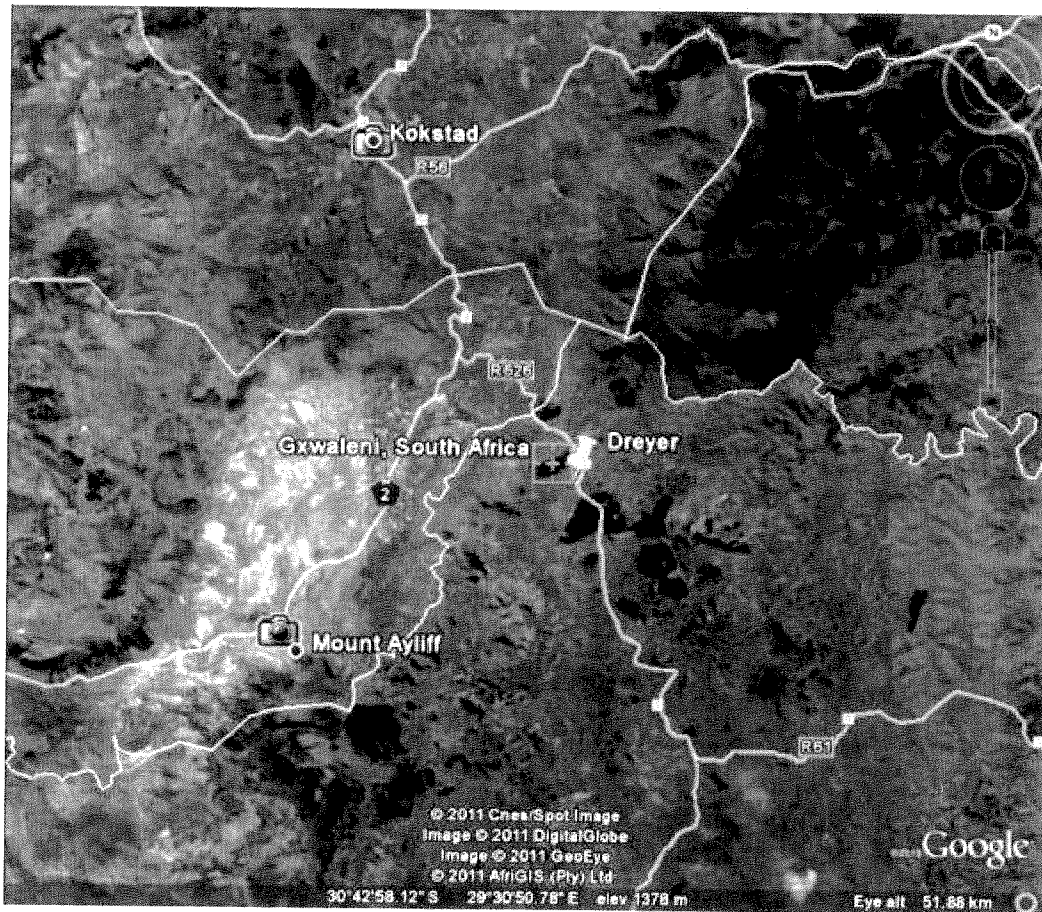
REGIONAL MANAGER

EASTERN CAPE



STELLENRYCK ENVIRONMENTAL SOLUTIONS

# ENVIRONMENTAL MANAGEMENT PLAN FOR HARD ROCK QUARRY, GWALENI



REGIONAL MANAGER  
MINERALS AND ENERGY  
EASTERN CAPE REGION  
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MINERALS EN ENERGI  
OO-KWALLEN

PREPARED FOR:

Mr. N. Dreyer  
182 Gordons Bay Road  
STRAND  
7140

SEPTEMBER 2011

Tel. & Fax: 041 3672049 · Cell 0824140464 · 4 Josephine Avenue LORRAINE 6070  
Member: J. A. van As: B.Sc (Botany & Zoology), B.Sc (Hons) (Eco-Physiology), M.Sc (Plant Physiology)

# **ENVIRONMENTAL MANAGEMENT PROGRAMME FOR HARD ROCK DOLERITE QUARRY LOCATED AT GWALENI IN THE MOUNT AILIFF AREA**

## **INTRODUCTION AND BACKGROUND**

The former Transkei and particular Pondoland is mostly a rural area, which experiences very little development due to general poverty of inhabitants and the lack of investment by previous Governments into this area. This caused infrastructure of most of the towns to be poorly developed and this also applies to the establishment of commercial quarry concerns. In turn this causes construction companies and ordinary citizens to import construction material from development centres far away from the areas of need. This inflates the price of these materials and even further hampering the growth and development of the area. Research clearly indicates that there is a dire need to establish quarry concerns in this area since the nearest quarries are in Mthatha and Kokstad and involves substantial haulage of material.

The quarries that form the subject of this application were established by the Department of Roads and Transport years ago when the roads to Flagstaff, Bizana and Port St John's were built. Mr Dreyer wants to reopen this mining site with the intention to produce stone and other by-products for the repair and construction of existing and new roads respectively. In addition these products will be utilized for the construction of low cost houses and other infrastructure required by various towns in this part of the Eastern Cape and by doing so Mr. Dreyer will engage into the partial rebuilding and upliftment of these towns as well as creating much needed job opportunities.

Dolerite reserves at the said quarries are extensive and have been established through previous prospecting phases. At the quarries the solid rock formation is clearly visible hence no further prospecting is required. A big amount of blasted rock is also already available for crushing at all three quarries and establishment of the mine can start immediately without excessive establishment costs. The quarry and plant areas are not highly visible from any road and are distant to residential areas hence visual and social impact will be limited. The development areas are also located in a non-sensitive environment and should not pose any environmental threats. Vegetation in the area constitutes common secondary grassland and no animals of value are found here. The site is used as a grazing unit for cattle of local inhabitants but the carrying capacity is very low and a very low impact on land use and land capability is predicted. Dolerite is not a water bearing rock and since only surface removal of rock is proposed no impact on groundwater is anticipated. There is no surface water in close proximity to the mine therefore the only impact predicted is that silt laden runoff from the plant area could flow over the edge of the plateau down to the stream below in the valley bordering the site to the north. Soil erosion is the only impact that needs some consideration due to the highly erodible soil that is found on site. It would be essential that unnecessary disturbance of the slope areas on which the rock stockpiles occurs be avoided at all cost. Where possible, manual retrieval of rocks must be considered. The impact is rated moderate. Due to the distance to nearby residents the impact on air quality would also be limited, provided that the necessary mitigation measures are implemented. Since the site is located on a watershed there would be limited impact on drainage lines. Public participation deemed to be completed since the GuGuGu Gwaleni Xesibe Tribal Authority and Local and District Councils approved the mining proposal and an agreement was reached with the community on the matter.

Financial support to establish and run the quarry will solely be provided by Mr. Dreyer who has already purchased two crushing plants and will therefore also provide all equipment to facilitate mining.

## TERMS OF REFERENCE

Mr. Norman Dreyer commissioned Stellenryck Environmental Solutions to compile an EMP for the establishment of a crusher and extraction of rock from existing stockpiles at three quarries located immediately east of the town of Mount Ayliff.

It was agreed that the EMP would cover all biotic and abiotic components. This will include a fauna and floral survey, an archaeological and cultural artefact survey, soil and water survey as well as a visual survey. As part of the EMP sensitive areas will be identified and recommendations will be made on the mitigation measures to reduce the impact of the crushing plant and crushed rock retrieval from existing stockpiles and to detail a rehabilitation programme for the sites at closure. Due to the relative low environmental impact that the proposed development would have no specialist reports would support the findings of this EMP at this stage.

The findings of the EMP are based on information gathered from:

Mr. N. Dreyer, the applicant,  
Deputy Director: Environment from the Department of Minerals and Energy;  
Literature on the environmental parameters identified for this site;  
Documentation prepared by Mr. J. Victor, the surveyor who prepared the mine plans;  
Site visit in March 2006

## PERSONAL PARTICULARS

### Applicant and responsible person

Norman Dreyer  
182 Gordons Bay Road  
Strand  
7140

Tel. No. 021-8457817

Cell No. 0825431400

Fax No. 021-8422312

### Provincial Land owner

Provincial Land owner: Ntabankulu Local Municipality  
P O Box 234  
Ntabankulu 5130 – Erf. 85  
Main Street.  
**5180**

Tel. No. 047-5530011

Fax No. 047-5530189

**Surface owner**

Head Lady Nyamela  
 Gugugu Gxwaleni A/A  
 Xesibe Tribal Authority  
 Mount Ayliff

**Holder of mineral rights**

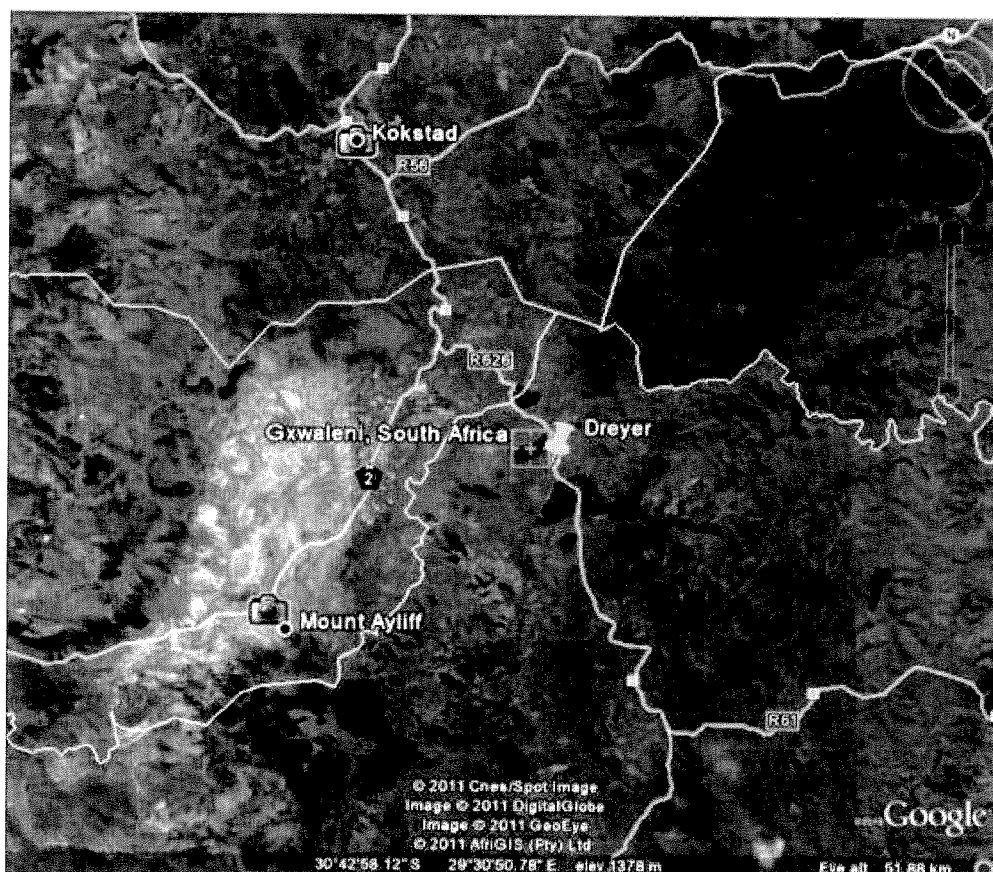
State - Dept of Land Affairs

**Title deed description**

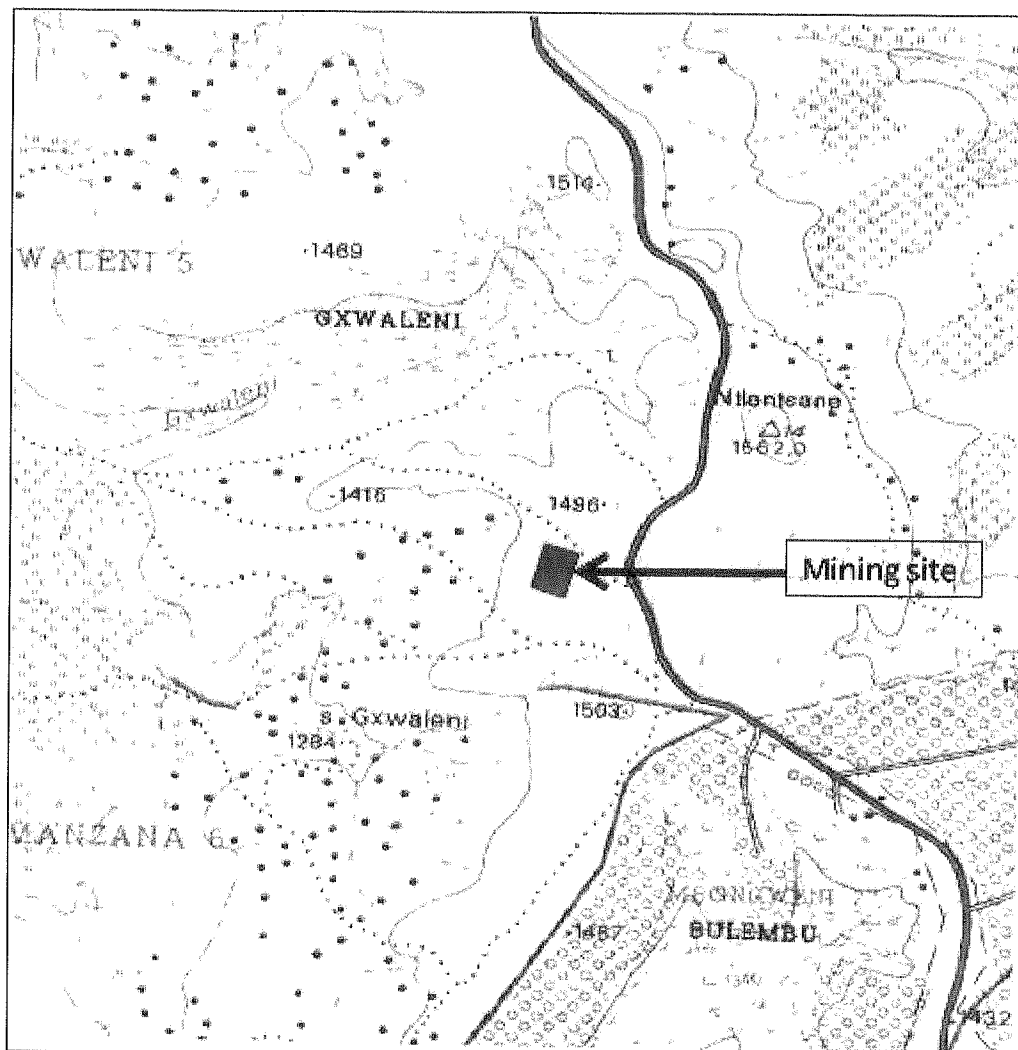
Unregistered State Land: Gugugu Gxwaleni AA NO. 5, Mount Ayliff.  
 Surface owner: Xesibe Tribal Authority.

**PROJECT DESCRIPTION****Regional setting**

The proposed site is situated in the magisterial district of Mount Ayliff and is under control of the Ntabankulu Local Municipality. Access to the site is gained from the Kokstad road onto Bizana road. The stockpile areas are located 10km from the Bizana turnoff on the right-hand side of the road. It is located approximately 15km from Mount Ayliff, 40km from Bizana and 30km from Flagstaff. It is surrounded by tribal land used for grazing cattle, sheep and horses. The Bizana-Flagstaff road situated 300-600m to the east of the three sites and access will be from this road.



Locality Map as seen by Google Maps



Site location map

### Current uses of surrounding areas

The whole area is surrounded by state land. Agriculture is the land use of the surrounding property. To the south-east and west of the site, small villages occur.

The mining site falls within the Mzimvubu River Catchment. This system drains a catchment area of approximately 19 853 sq. km. The Mzimvubu River has four main tributaries, the Tsitsa, Tina, Kinira, and the Mzintlava Rivers, all of which arise in the Drakensberg Mountains. The Mzimvubu River is the largest undeveloped river in South Africa, with no significant dams in the basin.

Presence of Servitudes: Public national road 150m east from the site. No other servitudes are present at or near the site.

## BRIEF DESCRIPTION OF THE MINING OPERATION

### Type of minerals to be mined

Stone, aggregate & gravel

### Extent of mineral deposit

The mining site is approximately 7.49 ha in extent.

Mining took place at this site since 2006 under a mining permit application and the mining operation produces an average of about 1000 m<sup>3</sup> of dolerite per month. Currently, the estimated volume of mineral remaining on this portion of land amounts to about 450 000 m<sup>3</sup>.

### Depth of the mineral

The height of the production face will not extend beyond 20m high, depending on the site. Two prominent excavations have been dug and are approximately 0.4Ha and 0.3 Ha respectively.

To date an approximate of 36000m<sup>3</sup> of dolerite was mined on average over the past three years.

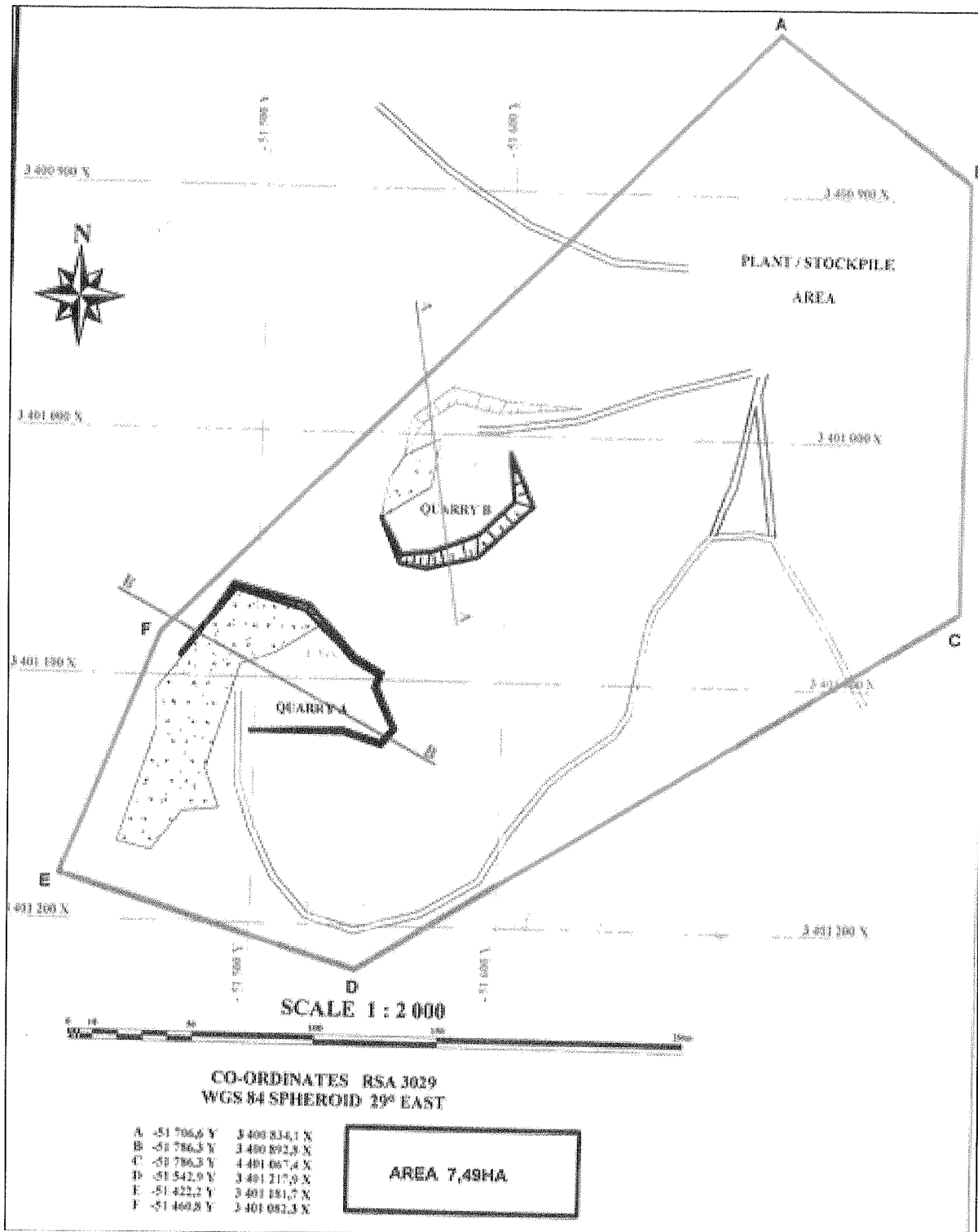
The planned lifetime of the mine was estimated to be well over 30 years and with current extraction rates and the amount of reserves still available and depending on the market.

### Construction phase

The construction phase would include the following activities:

- Construction of the loading bin and grizzly retention wall and ramp on the crusher area
- Establishment of the crusher, conveyer system
- Demarcation of product stockpiles
- Construction of an office (Container in the beginning)
- Establishment of chemical toilets
- Construction of a tool and spare shed (Container in the beginning)
- Construction of a workshop with service area
- Construction of amenities
- Upgrading of the access roads to stockpiles 1, 2 & 3 (partially in existence)
- Construction of a raised water tower (connected to crusher for reducing dust)
- Upgrading and constructing access to the Bizana-Flagstaff road.
- Bunded fuel tank with oil trap

The platform area for the crusher must be constructed but the area used previously by the Department of Roads and Transport will re-utilized. Rock stockpiles are in existence at all three quarries. Since no quarrying would be done no overburden or topsoil need to be removed and no production benches will be established. Topsoil from the plant area would be removed to the northern perimeter of the plant area to form a berm that will prevent water running from the plant over the cliff face causing erosion. The key task for mine management is to retrieve adequate from the stockpiles at the quarries and establish a large stockpile on the plant area as soon as possible.

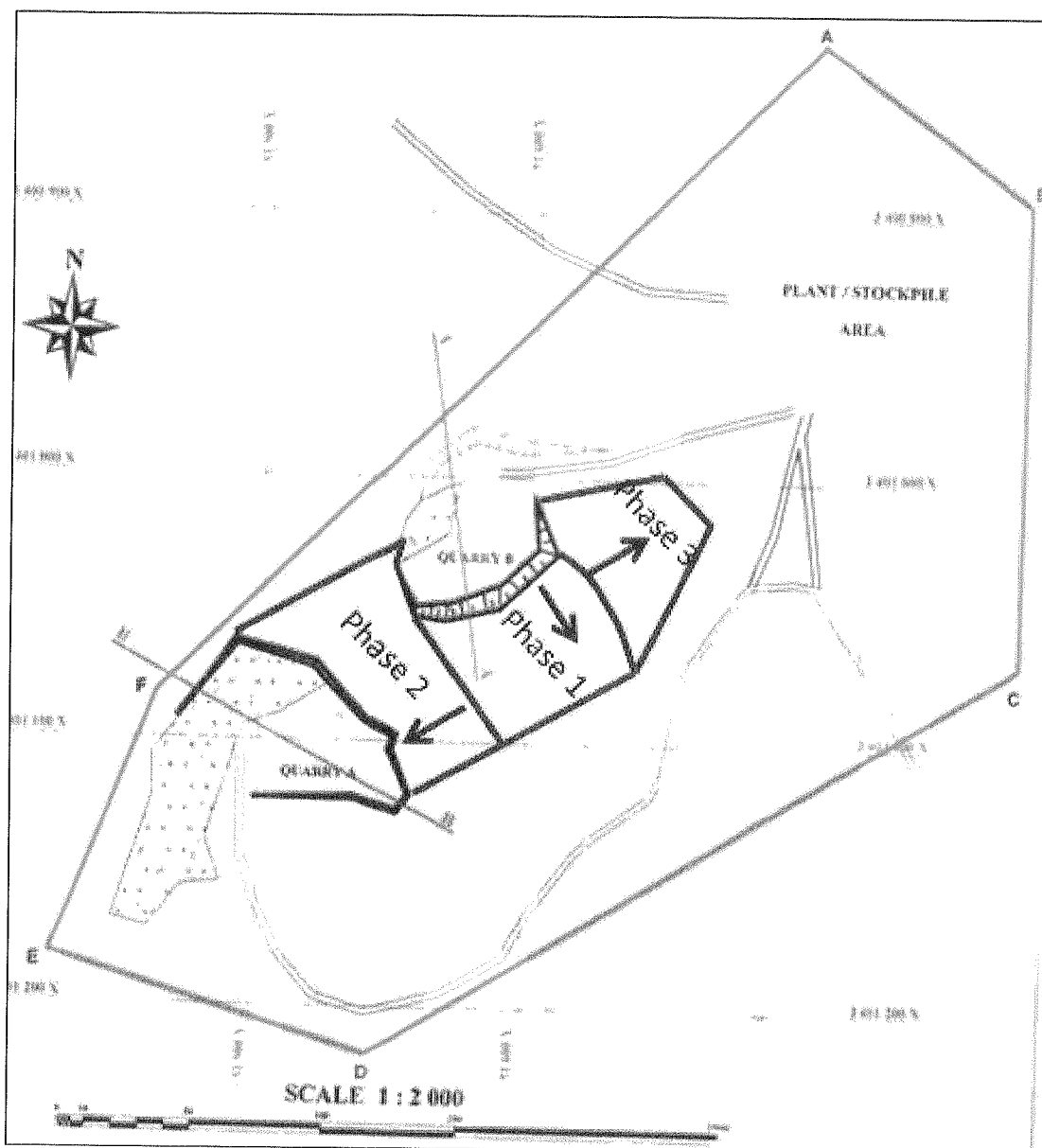


Survey Map of the Mining area



## Mining process and time frames

<b>Description of the type of equipment that will be used:</b>			
Primary crusher consisting of loading bin, grizzly feeder, Jaw crusher, two conveyors plus tunnel			
Secondary crusher consisting of three screens, conveyor and Telsmith crusher and support structures for crusher and screens			
Tertiary crusher, support structures for crusher and screens and conveyors			
Barmac crusher plus support structures			
Excavator for loading of blasted rock on two haul trucks to cart material to crusher			
Front-End Loader for loading stone onto dispatch trucks			
Delivery trucks (5-10 cubic meters)			
Possibly a weighbridge			
<b>Depth of the proposed mining operations</b>	No mining – remove existing rock stockpiles		
<b>Extent of mining areas</b>		1,5	ha
<b>Extent of cleared stockpile area before it is rehabilitated.</b>	0,3ha		
<b>Will employees prepare food<sup>1</sup> and collect fire wood<sup>2</sup>?</b>	1-Yes & 2-No		
<b>Will water be abstracted?</b>	Yes		
<b>Total water use</b>	10000 L/day		
<b>Distance of proposed operation from Gwaleni River</b>	±150m-horizontal ±300m-vertical		
<b>Estimate depth of the water table</b>	Not applicable-Dolerite is non-water bearing		
<b>Amount of potable water to be utilized by employees per day</b>	200		Litres
<b>Available toilet facilities</b>	2 Chemical toilets		
<b>Would it be necessary to construct/upgrade roads to access the proposed operations?</b>	Yes		



### **Proposed mine development plan**

Access to the tar road needs to be upgraded by constructing a Bell Mouth to ensure road safety in this area. From there access roads to the three stockpile sites need to be upgraded with a 30cm-wearing course. Crushed stone will be used for this purpose or weathered dolerite will be obtained/purchased from an approved borrow pit registered by the Department of Roads & Transport. The decision of the District Roads Engineer will be sought and implemented. The required road signage will be posted 150m from the access on both on the tarred R394 road. The section of road from the tar road to the three stockpile areas display a moderate steep incline and will be affected by rainfall and needs to be protected with side and cross drains.

### **Quarry development and mineral processing**

The crushing plant will be established on the flat crest area of the dolerite outcrop just west of Quarry C. Once the crusher is established rock will be retrieved from the stockpile located on the northern perimeter of quarry three. Once this material has been removed, the stockpile from Quarry B will be exploited followed by the removal of the stockpile at Quarry A. Large boulders that cannot be removed from the stockpiles or those that are too big for the jaw crusher will be

reduced in size through a drill and secondary blast operation. Blasting activities will therefore be minimal in comparison with standard blasting occurring at an opencast quarry. Blasting would take place every day to prevent the amount of large boulders to build up but rather include blasting costs with crushing cost. A qualified and credible blaster will be used. In the process areas currently covered with rock will be cleared and rehabilitation of these sites will follow. Once the rock stockpiles are removed an application to mine quarry A & B would be submitted. At the moment enough rock is available to sustain crushing over a two-year period. Shot rock will be removed from the stockpiles by excavator and loaded onto dumper trucks from where it will be hauled to the hopper and tipped into the holding bin of the primary crusher. Rock will be crushed via a three-stage crusher and stockpiled as concrete stone, base course, sub-base and crusher dust. If secondary blasting is deemed to be uneconomical, oversize rock will be broken down with a hydraulic hammer. The same process will be repeated at all three stockpiles.

### **Mining methodology & Operational phase**

The total mine area (Quarries A, B & C) comprises about 0,8ha whilst the extent of the plant, stockpile areas and roads is approximately 0,7 ha. The low production rate proposed would ensure a low environmental. The only impact caused by the process would be the noise and limited dust generated by the truck and crusher for approximately three days per week.

A possible 30000 cubic meters of rock would be removed over a two-year period with an excavator and two ten cubic meter haul trucks. Since the excavator will operate on the slopes extreme care need to be taken to prevent it slipping down-slope or to disturb the soil unnecessary since it could lead to soil erosion on the slopes. Once crushed, the material will be screened into the various products mentioned and be removed from the surge piles to the storage bins from where stone would be loaded on 5-10 cubic meter trucks and carted to the towns/markets in the district.

Exploitation of one stockpile at a time will result in a phased mining and rehabilitation approach. Since all work will be performed on the dolerite outcrop activities will not affect groundwater. Most of the dust and silt will be retained on the plant area hence extensive silt movement into the natural environment is not anticipated. Mining will not affect any watercourse since the nearest is approximately 300m away down-slope. Potable water would initially be tanked to site from Mount Ayliff or Kokstad. People would not reside on the mine, but will commute to work whenever mining has to be carried out. Rehabilitation will occur later during the life of quarry operations but will be dependant on the market demand.

Considering that at most six persons would be on site during the day, no waste disposal site is required. Containers with proper lids would be placed at the crusher plant for the storage of any household waste.

The proposed operation would not be continuous and activities would be dictated by local demand. Extraction will not take place during adverse weather conditions to reduce dust generation. Considering the anticipated demand this proposal is indeed achievable. Roads will be watered down with a water truck when it generates unacceptable dust quantities. In the beginning a 10000-litre tank will be positioned near the crusher to provide water for the dust suppression system on the crusher and well at stone transfer points. It will be turned on when the crusher is in operation. Considering that the crusher-dust stockpile may generate excessive dust, it will be covered during adverse weather conditions and will be bunded.

A number of private contractors will cart stone with 5-20 cubic metre trucks from the property to the various towns/markets. On average 10 trucks would leave the property per day.

The topsoil layer of approximately 30-40cm would initially be removed from the plant and stockpile area and conserved for later use during the rehabilitation phase. An average extraction rate of 1500-2000 cubic meters per month will be maintained for a two-year period. Once a rock stockpile is removed upgrading of the soil and a seeding program would follow suit.

### **Mineral processing & Residue disposal**

Mineral processing will be carried out since the blasted rock will be crushed and stockpiled in holding bins, and when markets demand, loaded onto trucks and hauled directly to these relevant markets. No residue, except for crusher dust would be produced. Crusher dust will be used for block/brick making hence no special disposal measures will be implemented. All material will be used. No overburden will be produced and no waste rock dump or slimes dam would be created. All oversize rock will be secondary blasted and passed through the crusher.

### **Solid waste management facilities**

No industrial waste would be generated therefore no management facilities need to be constructed. Household waste will be collected in drums suitably positioned at various localities on the mine area and these receptacles will be emptied on a weekly basis at an approved waste site. All scrap metal will be stored within a demarcated scrap yard fenced with diamond wire.

### **Water pollution management facilities**

No toxic substances will be used during the mining process and no effluent or contaminated/ toxic wastewaters would be generated on site, therefore no treatment facilities are needed. The only effluent that will be generated would be a limited amount of runoff water from the plant and stockpile area, which will be contained in the plant area by means of constructing topsoil berms around the site. No evaporation dams are contemplated.

Oils, lubricants and petrochemical substances would be stored on site. These would be stored in-house and/or in bunded areas with a concrete floor to prevent soil and surface water pollution. A large receptacle will be obtained from an oil recycling company and placed within a bunded area and used for storage of used oils. The company on a regular basis will empty this container at an approved facility. Normal servicing of vehicles will be done on a concrete floor fitted with a central sump where spilled oil will be collected. Emergency repairs will be performed over drip trays, which will be emptied into containers by using appropriate funnels. All used oil filters and hydraulic equipment will be placed in a container designated for this purpose. Storage of fuel will be in a 10 000L bunded tank provided with a concrete apron channelling any spillage to an oil trap.

No sewage plant is anticipated. Two chemical toilets would be provided since the subsoil does not lend itself to the construction of a French. Potable water would be obtained from the header tank on site.

No process water will be used except for allaying dust at the crusher and conveyer transfer points. As interim measure water will be stored in a 10000L raised header tank and be connected to atomiser sprayers fitted on the crusher and conveyor system. Water will be trucked in from Mount Ayliff or Kokstad and pumped into the tank. Alternatively water could be obtained from the Gwaleni River.

Since the production area is located on the crest of the dolerite dome a very small catchment area exist and little water would accumulate on the site. To prevent clean runoff from entering the mine area and become silt laden, a serious of cut-off/topsoil berms will be constructed around the site to divert water away from the plant area. The spill areas will be protected from erosion by means of dissipation beds and gabions. Considering the low water usage of the concern no water balance diagram is provided.

### **Surface infrastructure**

At approval of the EMP an Eskom service point and Telkom connection would be applied for but in the interim period a generator will be used as power source. No telephone or power lines traverse the mining site. No servitudes were registered on the property. There are no boreholes on site.

No housing would be provided on site. The night guard will use one of the containers on site for shelter and amenity.

No explosives magazine would be established on site as explosive would be trucked in when required, approximately once a week. In case a hydraulic hammer is used to deal with oversize rock, no explosives will be ordered.

### **Mine Health & Safety**

The applicant will endeavor to comply with the conditions of the Mine Health & Safety Act, Act 29 of 1996 and as a minimum will ensure the following:

- All workers will be medically tested annually as per the Mine Health and Safety Regulations.
- Operators of vehicles will have the required licenses.
- Only one excavator will extract material in the quarry and will load it onto waiting trucks to be dispatched to the screen and from there to the crushing plant. Only one or two trucks will be allowed inside the quarry at any given time.
- Vehicles will be maintained properly and reverse hooters will be fitted.
- No mining would take place during the evening or very early morning or during adverse weather conditions when visibility is poor.
- The production faces will be suitably sloped to eliminate safety risks and to retain the required slopes for easy rehabilitation as described earlier. Operators will be trained to mine dolerite.
- All safety regulations will be kept during blasting and workers will be trained in this regard.
- The mining and plant area will be a restricted area and visitors will not be allowed unsupervised access to the operations during the day. The necessary signage to this effect will be posted at the entrances to the office area and mine respectively. No foreign vehicles will be allowed in the mine or plant area but will be restricted to the office and stockpile area.
- All people working at the production faces will be provided with the required masks to prevent dust inhalation.
- The applicant will ensure that they are conversant with the requirements of the Mine Health and Safety Act 29 of 1996.
- Machine operators and workers at the plant will on a regular basis be informed on the potential health and safety issues involved and efforts will be focused on safe distances from operating vehicles, turning circles of vehicles, moving machinery parts and maintenance of guards in these areas, procedures for vehicles entering the mine area, the

stability of production faces, safe driving, mechanical safety of vehicles, blasting and medical matters.

- Through regular internal audits and inspections by Directorate: Mine Health and Safety electrical equipment, if any will be maintained to a safe standard and all cabling whether above or underground will be done to specification not to pose electrocution risks to workers and visitors.
- The placement of medical kits at the office will be implemented.
- No work will be performed within 100m of a road or structure therefore the permission from the Principle Inspector of Mines in this regard will not be required.
- The Principle Inspector of Mines will be informed on the date on which mining commences.
- Any accidents will be reported immediately to the Principle Inspector of Mines in writing in the applicable format.
- Noise generation by vehicles will be controlled through regular servicing and fitting of standard exhaust systems.
- Dust will be curbed by means of re-vegetation of disturbed areas as soon as possible and by means of water browser if required but only if property owner agrees on water use.
- A competent mine manager will be appointed.
- A risk & safety officer will be appointed if deemed necessary by the Principle Inspector of Mines.
- The necessary health equipment shall be made available on the property.
- Acceptable sanitation facilities will be provided at the quarry.
- Workers will be granted the right to refuse working in unsafe areas.
- Post rehabilitation slopes will be stable, vegetated and safe
- Mine development and applicable safety regulations will be discussed with the local community.
- Equipment will be well maintained to reduce the risks of accidents
- No foreign vehicles will be allowed in the mine area.
- The applicant will ensure that they are conversant with the requirements of the Mine Health and Safety Act 29 of 1996.

The mine development plan will facilitate the utilization of existing rock stockpiles in a phased approach and the plant area will be fenced to prevent any person to accidentally be injured by moving parts of equipment or vehicles. Danger notices will be fixed to the fencing at prominent places to prevent unintentional entry to the property. Before all secondary blasts, if any, workers will be cleared from the rock stockpile area to at least 300m. Access to the rock stockpiles will be unobstructed and only one vehicle will be allowed in the area at any given time to prevent accidents. All explosives and detonators will be removed from the property after each blast and at closure.

All moving parts on the crusher and conveyor system will be properly guarded to prevent injury and death and personnel will be trained in terms of the Mine Health and Safety provisions. Personnel working in high-risk areas with regards to dust and noise will be provided with dust masks and earmuffs respectively. Constant use of earmuffs sometimes results in build-up of moisture, which could lead to ear infection and it must be regularly removed to facilitate air circulation. Personnel will be provided with clean drinking water, and amenities and toilets.

Access to Quarry C would be restricted due to the safety hazards at the quarry in terms of loose rock and water accumulation. Access to electricity points would be restricted by means of a fence to prevent the risk of electrocution and a qualified electrician will perform the installation of all electrical cable work. Vehicles will also be maintained properly in terms of prescribed legislation; therefore no risk in this regard is contemplated. This approach would definitely ensure that noise levels are being kept below the required standards.

Gravimetric dust sampling and medical tests will be performed annually to ensure that personnel stay healthy and work in a safe environment. Dolerite deposits generate less dust and silica than quartzite deposits and therefore minimum risk is associated with this specific project.

Risks involved in the transport of the material will be partly addressed by obtaining approval from the District Roads Engineer for access to the tar road and by having information sessions with truck/front-end loader/excavator drivers to point out all possible dangers that the project might pose. In this regard it would be essential to determine the risks involved in working so close to the edge of the hill.

## **ECONOMIC VIABILITY OF PROJECT**

### **Markets**

Mr. Dreyer would be tasked to handle marketing and sales and crushed material would be delivered directly to the relevant markets. It is anticipated that sub-base material, 9mm, 13mm, 19mm and 23mm crushed stone would be produced to cater for road construction and building requirements. The rock at the quarry has already been tested by SANRA and provisional tests indicated clearly that the stone is of good quality and useable for road construction. Relevant stockpiles of crushed stone would be maintained on site to prevent shortages in the event that sales exceed supply.

In addition to crushed stone crusher dust will be used for the construction of cement bricks to cater for the construction market. It should be recognised that the entire surrounding area has no formal and approved brickyard hence there is a huge demand for bricks. The nearest cement brick producers are in Umtata and Port Shepstone, which would benefit the proposed concern since much lower transport costs would be applicable.

The former Transkei region is an underdeveloped node and with the new dispensation substantial financial assistance is being channelled to this area. These areas are also earmarked as poverty nodes and as such for rural development. In addition substantial resources have and will be directed to the upgrade of infrastructure as part of the Public Works Programme. This has already stimulated development in the areas surrounding the proposed development and as pointed out the market for construction material is satisfied by commercial sources outside the Province at excessive cost. In this light the Alfred Nzo District Municipality has rightfully indicated that the quarry will benefit the neighbouring areas with its products at affordable prices. Also in support of the project the Umzimvubu Municipality selected the applicant to supply all primary quarry products and bricks for road and housing projects.

### **Specific markets**

The quarry is centre to not less than five towns namely Mount Frere, Mount Ayliff, Bizana, Tabankulu and Flagstaff of which all has developments in the pipeline for example:

### **Housing**

1. Mount Frere – 400 middle-income houses
2. Tabankulu - 340 middle and low-income houses
3. Mt. Ayliff – 400 to 600 middle income houses
4. Rural people are also slowly replacing traditional huts with brick houses and the demand for bricks would be substantial.

It is anticipated that a minimum of 5000 bricks would be sold per month in the beginning to each town with surrounding district increasing to 10 000 per month resulting in a nett sale of 25000-50000 bricks per month, which would require approximately 100-200 cubic meters of stone per month. It should be noted that the Department of Economic Affairs has estimated that the towns mentioned above would absorb at least 140 000 bricks per annum.

### Infrastructure

Potentially the quarry can supply both the infrastructure needs of Alfred Nzo District Municipality and O. R. Tambo District Municipality, which in turn would satisfy the needs of at least 6-10 Local Municipalities. These developments would include new buildings and reconstruction of bridges, sewage systems and water reticulation. It is therefore anticipated to sell minimum of 500 cubic meters of stone for construction purposes to each town and surround resulting in a demand of 2500 cubic meters of stone. The applicant is assured of selling therefore at least 2700 cubic meters per month, which relates to the amount of blasted material available on site.

To support the above predicted sales it should be noted that 160 000 bags of cement is sold annually in the towns mentioned above, which indicate that the predicted sales are below the actual demand.

### Road Infrastructure

1. Mount Frere to Ciderville from gravel to first class – 43km
2. Mount Ayliff to Mount Fletcher from gravel to tar – one half – 60 km
3. Reconstruction of road 171080 from gravel to first class – 32km
4. Mount Frere to Kokstad resurfacing – 120km
5. Port Edward. Upgrading of the R394 between the N2 and the Wild Coast from narrow tar
6. Construction of the contentious new Wild Coast road is still a possibility.

The construction of the first five roads mentioned would require approximately 400 000 cubic meters of crushed material over the next 8 years resulting in an annual requirement of 50 000 cubic meters. Should contracts for this material be awarded, the permit will have to be converted to a mining right to enable the applicant to engage into the development of the existing quarries.



## Nett Profit

Selling price of stone delivered is approximately R145

Amount crushed per month (minimum) = 2000 m<sup>3</sup>

<b>DEVELOPMENT ACTIVITIES</b>	<b>COSTS</b>
Rehabilitation / m <sup>2</sup>	R5
Drilling & secondary blasting or Hydraulic hammer/ m <sup>3</sup>	R25
Fuel (generator) / m <sup>3</sup>	R3
Loading and internal haul/ m <sup>3</sup>	R8
Transport per m <sup>3</sup> (average)	R30
Labour	R10
Maintenance/Replacement of equipment/vehicles / m <sup>3</sup>	R20
Telephone costs & Admin / m <sup>3</sup>	R5
Accounting and bank charges per month	R5000
Instalments on loans	R10000
Sundries / m <sup>3</sup>	R5
<b>TOTAL COSTS PER MONTH</b>	<b>R237000</b>
<b>GROSS PROFIT (2000 m<sup>3</sup> x R145)</b>	<b>R290000</b>
<b>APPROXIMATE NETT PROFIT</b>	<b>R53000</b>

It is also anticipated to sell bricks at R750 per thousand whilst production cost would approximately be R450 per thousand resulting in an income of R7500 per month initially.

From the above it is clear that the required market for quarry products exist and that the proposed mine will develop into an economical sustainable concern.

## **TECHNICAL COMPETENCY OF APPLICANT**

Mr. Dreyer has no previous experience of opencast mining or crushing. Since he was involved since 2002 with the application submitted by Millennium Development Trust and with the dismantling of two crushers he has obtained limited knowledge of the legislative requirements and the functioning of a crushing plant. Since he is a developer in the Western Cape he is also not unacquainted with earthworks and the equipment involved.

Since no physical mining would be involved no technical skills are required in this regard.

Mr. Dreyer already obtained three crushers, of which one is the PPC crusher previously located at the Loerie Quarry, the other one previously located in Swaziland and the third current stationed in Oudtshoorn. Currently these crushers are in the process of being modified into mobile crushers to enable the applicant to serve the three quarries that will be legalised.

It is apparent from the way Mr. Dreyer conducts his business that he is in the financial position to obtain the remainder of the quarry infrastructure.

## FINANCIAL COMPETENCY OF APPLICANT

The applicant has spent already a substantial amount of money on the compilation of previous applications submitted by Millennium Development Trust since 2003, which failed because of non-commitment by previous trustees of the Trust. The applicant funded all the efforts. In addition the applicant has already secured two crushers to be used between the three quarries that will be legalised. The applicant is currently funding the conversion of the crushers to mobile units.

The applicant is also a bright businessman from Cape Town engaging mostly in property development and also owns a number of properties in and around Cape Town, which can be used as backup for the proposed concern. From the attached statement produced by Nedbank Mr. Dreyer's accounts reflect a turnover of approximately three million per annum, which is indicative of his financial skills and competency. Since the running of a quarry concern requires substantial financial skills, Mr. Dreyer would be ideally suited to establish the business and steer it towards profitability.

Since the quarry areas have already been disturbed the applicant is only responsible for stabilizing soils and reinstating a grass cover on the stockpile and plant areas as well as on the block yard area, rehabilitation costs would be minimal and the applicant would be able to afford the financial guarantee of between R30 000 and R50 000.

In terms of the development of the quarry the main costs for establishing the concern would be the purchase of the crusher. Since this has already taken place financial layout for the remaining equipment would be attainable.

Due to excellent market options available the possibility of the business running into financial trouble is extremely limited. The business skills of the applicant would therefore ensure that the necessary finances are generated for the development and rehabilitation of the proposed site. The proposed development would therefore also not constitute an environmental and financial risk to the DMR and rehabilitation schedules would be maintained.

Initial development activities that need to be funded are:

Removal of topsoil  $10000\text{m}^2 \times 0,2\text{m} = 2000$  cubic meters  $\times R4 = R8000$

Operational costs = R237000

Health and Safety = R10000

Establishment of crusher=R250000

Generator = R100 000

Loader = R250 000

Excavator = R350 000

2 Haul trucks = R400 000

Infrastructure = R25000

EMP = R10000

Financial guarantee = R50000

**Total development costs = R1915000**

It is anticipated that a loan for approximately R800 000 (R10 000 instalment) would be obtained whilst Mr. Dreyer would provide the remainder of the funds. From the Nedbank statement it is clear that the applicant would be able to finance the project.

## PRE-MINING ENVIRONMENT AND ENVIRONMENTAL IMPACT ASSESSMENT

### ENVIRONMENTAL IMPACT ASSESSMENT

The impacts of this development on environmental parameters will be assessed in accordance with the criteria of section 21, 22 and 26 of the Environmental Conservation Act. Impacts will be assessed according to the criteria listed below:

**Extent** Whether the impact will occur on a scale limited to the immediate site of the proposed activity, local area and immediate communities and settlements, sub-regional (municipal), regional (provincial) or national scale

**Spatial extent:** None/Insignificant (0), Site (1), Local (2), Sub-Regional (3), Regional (4)

**Duration** Whether the time span of the impact will be short term (0-5 years), medium term (5-15 years), long term (in excess of 15 years) or permanent where natural processes or mitigation processes cannot eliminate the impacts.

**Duration:** None (0), Short Term (1), Medium Term (2), Long Term (3), Permanent (4)

**Intensity**

(Magnitude) Whether the size of the impact is low, medium, high or negligible.

**Intensity:** None (0), Very Low (1), Low (2), Low-Medium (3), Medium (4), Medium-High (5), High (6), Very High (7)

**Probability** The probability of the impact actually occurring as either unlikely, probable, likely or definite

**Probability:** None (0), Unlikely (1), Probable (2), Likely (3), Definite (4)

These criteria are evaluated in terms of

- Significance (Insignificant-low-moderate-high)
- Status (positive-negative-neutral)
- Confidence (based on academic information, specialist knowledge, site evaluations, applicants approach)
- 

The significance of the impact on the parameters of the affected environment is rated as:

**Low Significance**

The project will not cause any major adverse or beneficial changes to the biophysical, social or economic environment. Impacts experienced will abate almost immediately after cessation of activities and the biophysical, social or economic system should recover and return more or less to the natural state. No expensive mitigating measures will be needed to address any of these impacts. Ecological functions will continue undisturbed and no complaints

from Interested and Affected Parties (I&APs) are anticipated. No rare and endangered species or sensitive areas exist in the area.

#### Moderate Significance

The project will induce moderate short to medium term changes to the biophysical, social or economic environment. The impact would be induced outside the development area and also possibly on a sub-regional level. Over the medium term the impacts could fade away but the implementation of mitigation measures are normally required to eliminate these impacts. The impacts would be experienced for some time after cessation of activities but would not affect the biophysical, social or economic environment severely. With mitigation the biophysical, social or economic system should recover but the return to the natural state would be very slow and in some instances may not be achieved. I&APs might express some concerns and complaints may be received on an *ad hoc* basis. Rare and endangered species or sensitive areas may exist in the area and could be marginally affected.

#### High Significance

The project will induce extensive long-term changes to the biophysical, social or economic environment. The impact would be induced outside the development area and also possibly on a regional to national level. The possibility of secondary impacts arising from the project is high. Over the long term the impacts could fade away but the implementation of expensive mitigation measures are normally required to eliminate or mitigate these impacts. These impacts would be experienced after cessation of activities and could affect the biophysical, social or economic environment severely. With mitigation the biophysical, social or economic system could possibly recover but the return to the natural state would be or normally not be achieved. Ecological functions will be permanent disturbed and major complaints from Interested and Affected Parties (I&APs) could be expected. Rare and endangered species or sensitive areas exist in the area might be critically affected.

**Significance:** 0-6 = Insignificant; 7-15 = Very Low; 15-22 = Low; 23-31 = Low-Moderate;

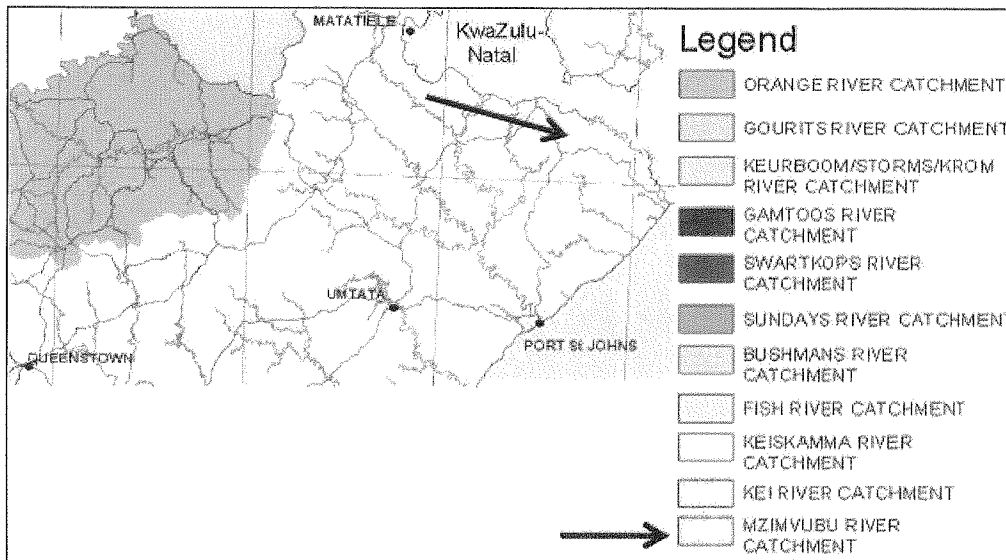
32-40 = Moderate; 41-47 = Moderate-High; 48-55 = High; above 55 = Very High

The significance weight figures are calculated by adding the spatial extent, the duration and intensity and multiplying that by the probability figure.

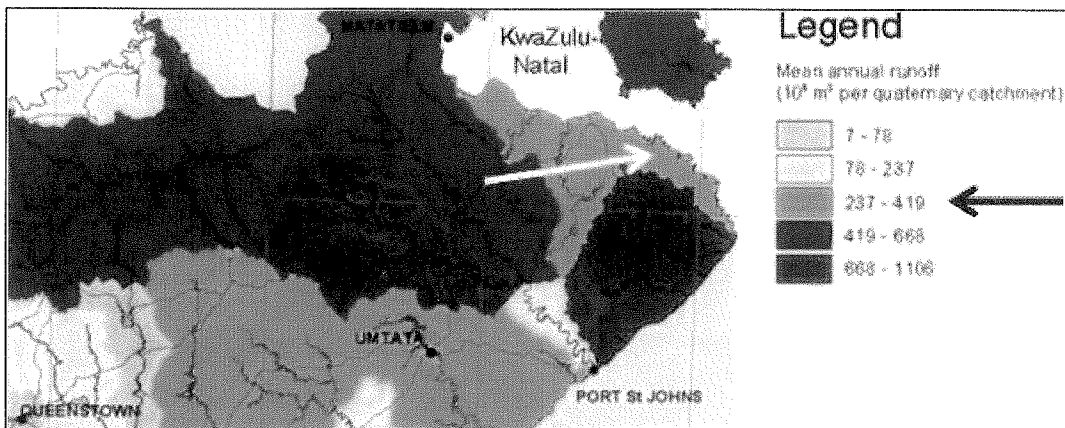
Should the impact assessment as a minimum reflect 2-3 impacts of high significance and 2-3 impacts of moderate significance the project shall be viewed as a potentially flawed and continuation of the project should be seriously reconsidered or special engineering or biophysical/social intervention must be implemented.

**NAME OF THE RIVER CATCHMENT IN WHICH THE SITE IS SITUATED**

The mining site falls within the Mzimvubu River Catchment. The Mzimvubu River catchment area receives between  $78-237 \times 10^5 \text{ m}^2$  mean annual runoff.



**Catchment area**



**Primary Catchment runoff**

**Geology and available reserves**

The larger area involved can be divided into three physiographical units namely the coastal plateau, the Drakensberg and the inland plateau. The proposed mining area falls within the latter area. The inland plateau rises from 1000m in the east to 2000m in the west and display an uneven surface dominated by several mountain ranges formed by massive intrusions of dolerite sheets. On top of the mentioned mountains the entire inland area is characterised by the presence of numerous intrusive dolerite sills and dykes, which are responsible for the undulating topography of the area since they form the resistant capping of most of the hills, including the area under application.

Except for the numerous dolerite intrusion the rocks of the area consists of the Karoo Supergroup, with the Adelaide Subgroup (Pa on map) the most prominent to the west and the Ecca Subgroup (Pe on map) the most dominant to the east and south of the proposed mine area. The Adelaide

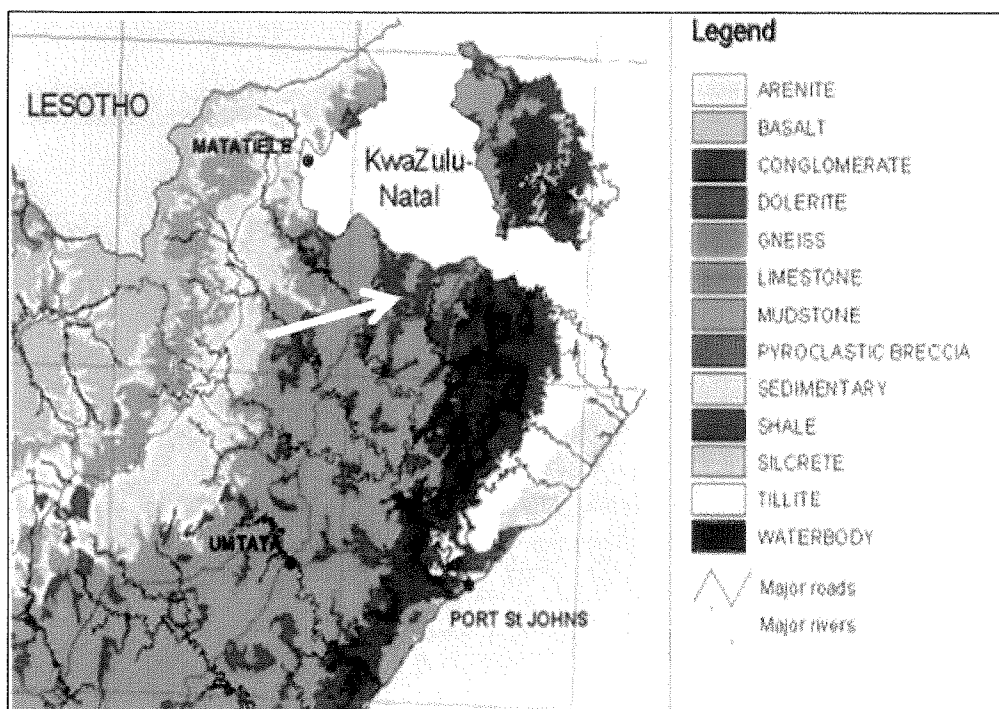
Subgroup mainly consists of mudstones of various colours alternating with subordinate litho-feldspathic sandstones, whilst the Ecca Subgroup consists of three shale formations. Since the two mentioned Subgroups have no relevance to the mineral to be mined in will not be discussed in more detail.

Dolerites as already pointed out occur extensively throughout the area and constitute up to 40% of the total rock outcrop. The size of the dolerite intrusions increases towards the south where several extensive massifs were formed of which the Embongweni massif found in the Brooks Nek area constitutes the mining area. The dolerite consists of pyroxene and plagioclase that are either optically or sub-optically intergrown, sometimes displaying small amounts of olivine, quartz and micropegmatite. Due to the extent of the intrusions in the study area the dolerite of this area are of the finest in the Eastern Cape and provide excellent road construction material.

The area under application displays an extensive dolerite sill running east-west and is more than 100m wide and displays three quarry sites developed by the former Department of Roads & Transport. All three sites display extensive reserves hence there is no need for a prospecting phase to prove the reserves. It should also be acknowledged that at all three quarry sites a large amount of blasted rock reserves are available for direct crushing and where needed secondary blasting. Quarry A disposes of approximately 9000m<sup>3</sup>, Quarry B of 3000m<sup>3</sup> and Quarry C of 12000 m<sup>3</sup> of blasted rock and would generate approximately 32000m<sup>3</sup> of crushed material. No physical extraction of material would therefore be necessary during the first two-three years of the quarry's existence.

Please refer to the surveyed map and geological map for more detail on the proposed development areas and proof of mineral reserves.

Since no physical mining will be done except for crushing existing stockpiles no impact on the geology is anticipated. Dolerite is also neither a scarce resource nor a resource of major economic value. The small section of land to be mined as well as the occurrence of similar geological features throughout this part of the Transkei areas renders the impact as insignificant.

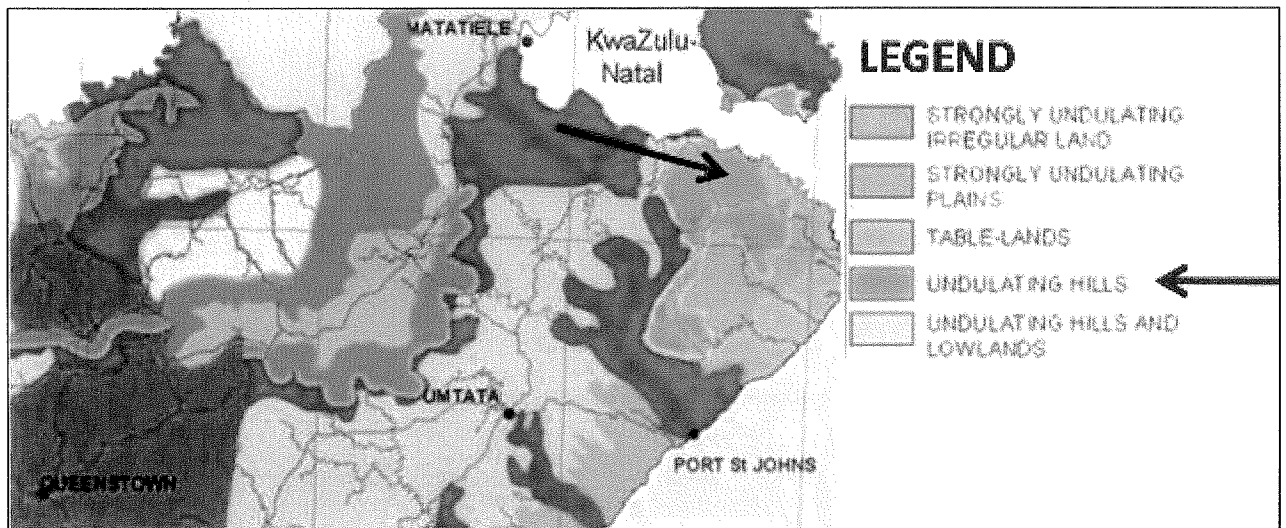


General Geological Map outlay of the area

## Topography

The area concerned is defined as Coastal Plateau and extends to the rugged inland escarpment. The inland plateau displays an uneven surface dominated by several mountain ranges formed by massive intrusions of dolerite sheets. In addition the entire inland area is characterised by the presence of numerous intrusive dolerite sills and dykes, who are responsible for the undulating topography of the area since they form the resistant capping of most of the grass covered hills, including the area under application. In-between the resistant dolerite caps the softer mudstones and shales were eroded away by larger rivers that have cut deeply insized valley areas with very steep slopes into the landscape.

The Gxwaleni mine area is characterised by a massive dolerite cap consisting of two outcrops that fall away steeply at the sides down into the valleys below. The greater area displays elevation levels of between 1200m a.m.s.l and 11475m a.m.s.l. with drainage lines in the valleys below. Due to the numerous hills in the area, it is characterised by a large number of dry watercourses draining them and that interlink at the toes of the hills to direct runoff to the major rivers of the area namely the Umtamvuna River and Umzimhlava River. The structural topography of the mining area has been disturbed significantly through the development of the three quarries, which were left in an unrehabilitated state. All three quarries were developed on the northern sided of the dolerite cap. The topography of surrounding areas is relatively intact except for the numerous residences and communal buildings erected on the hills and in the valleys.



### General Topography of the site

The elevation of the mining sites in question range from 1465-1475m a.m.s.l. and comprise only blasted rock stockpiles left behind at each quarry site. These stockpiles area all located on the northern perimeters of the quarry areas that constitute one of the may major dolerite outcrops found in this area. Attached please refer to the attached topographic map. The development of the quarry areas resulted in rather flat platforms that can be utilized in future for mining related activities. At Quarry A portion of the rock stockpiles are located on the edge of the quarry platform whilst the other portion is scattered over a 30m area on the slope below. At Quarry B most of the rock is scattered on the slope below the quarry platform. At Quarry C the entire rock stockpile is partly located in the quarry and partly on the perimeter of the quarry platform. The slope below Quarries A & B displays a gradient of approximately 1:4 and 1:3 respectively. The

plant area located immediately west of Quarry C displays a gentler slope 1:20. The mining area is drained to the north by the Gwaleni River located in the valley below and forms the lowest point in the immediate landscape. To the west, north and east of the drainage line the land rise sharply again to form the slopes of the many other hills in the landscape. To the south of the plant area the land again falls away forming another valley area. The grasslands that cover the site and surrounds result in a landscape with a soft texture that is abruptly interrupted by domelike dolerite outcrops.

Retrieving and crushing of the rock stockpiles from the slopes and quarry edges will not affect the topography of the area negatively but would improve the general appearance of these sites since the scattered rock currently has a significantly aesthetic impact. The aforementioned would even be more applicable since the area constitutes a focal point in the landscape. Removing the rocks will clear the slopes and almost reinstate the pre-mining landscape. Since the removal of the rock could disturb the soil in these areas that could stimulate erosion on the slopes it is therefore essential that these areas be provided with a vegetation cover. In such case mining would in the long run not change the texture of hill system since disturbed areas will revert back to grassland once re-vegetated.

Establishment of plant, stockpiles and infrastructure on the flat crest of the dolerite cap would cause a low but temporary impact on the micro-topography of the site. No platforms need to be established. At closure this impact would be reduced to very nil once the infrastructure is removed.

Removing the rock stockpiles would slightly change run-off patterns from the quarry platforms down slope and might also increase the velocity of water and silt movement resulting in soil erosion. Currently the rocks act as energy breakers. Due to the moderate erodibility index of the soil care should be taken that large-scale erosion does not occur on the slopes since it will permanently scar the otherwise magnificent grassy slopes. If soil erosion is left unattended in this area the topography of the landscape could be severely affected by deeply insized erosion gorges. The impact without mitigation is moderate whilst if mitigation measures are applied timeously and correctly the impact can be rated as positive.

On cessation of the mining process the affected slope areas would resemble the pre-mining status, which would cause the areas to blend in far better with the surround than what currently the case is. Aftercare needs to be implemented since post closure erosion might be a reality and the necessary funds should remain in place for this purpose.

## Climate

According to the Koppen system of climatic classification the are of proposed development falls within the Cbf zone being defined as warm and temperate with adequate precipitation throughout the year. The rainfall type is high with moderate rainfall in winter. The mean annual rainfall is approximately 1150mm and is directly related to orographic influences. In general sea-facing slopes receive a high rainfall whilst the leeward side receives a moderate rainfall of approximately 620mm. The area experiences a bimodal rainfall pattern with a pronounced maximum in early summer and autumn but statistics indicates that most rain is falling in the summer months. Dry periods may occur in the mid winter and summer. Floods and droughts are common to this area and sometimes have a severe impact on the inhabitants of the land. During these periods swollen rivers can cause extensive flood damage.

Rainfall is mostly associated with thunderstorm action and every now and then severe hailstorms are experienced. Development of thick mist covers is common to this area in winter and in certain cases cause spectacular views when mist covers are descending into the valley areas.



MONTH	MEAN RAINFALL	MONTH	MEAN RAINFALL
January	219	July	12
February	179	August	27
March	159	September	38
April	66	October	79
May	19	November	127
June	16	December	167
<b>TOTAL =1099</b>			

The temperature is considered to be mild throughout the year and according to the Kopke classification system the climate is determined as sub-tropical. The mean annual temperature is  $\pm 18^{\circ}\text{C}$ , with a mean maximum of  $\pm 24^{\circ}\text{C}$  and an average daily minimum of  $\pm 11^{\circ}\text{C}$ . Frost is a rare occurrence with hail approximately once a year.

Month	Av. Max Temp	Av. Min Temp	Month	Av. Max Temp	Av. Min Temp
January	27	16	July	20.7	4.2
February	27.1	16.3	August	22.1	6.7
March	26.2	15.1	September	22.9	9.1
April	25.1	12	October	23.3	11.3
May	23.1	8.1	November	24.8	13.1
June	20.6	4.4	December	26.5	15.1
<b>Average</b>	<b>24.1</b>	<b>10.9</b>			

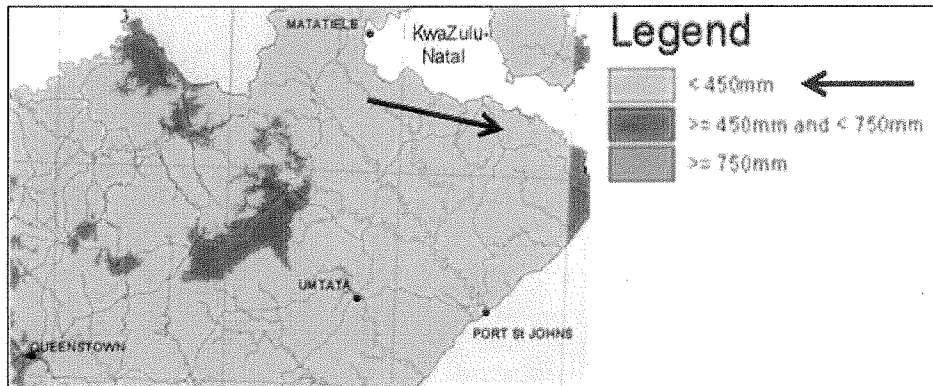
Winds are predominantly north-easterly in summer and the wind pattern is normally characterised by calm mornings up to noon where after winds strengthens. It normally subsides again during the evenings. In winter winds are predominantly north-westerly and are associated with cold fronts moving through the area. This causes temperatures to drop quickly resulting in very cold conditions. Occasionally warm north-westerly berg wind conditions develop in winter the duration thereof is of a limited nature. Rain bearing winds are predominant from the east.

Since the area experiences on an intermittent bases unstable weather conditions which results in occasional droughts, periods of high winds and heavy precipitation these conditions might in some cases induce a moderate negative impact on the re-vegetation of the area through stunting of plant growth, wind erosion and loss of soil stability. However, on average, the climatic conditions favour lush plant growth due to the bimodal rainfall that the area experiences as well as the possibility of light showers throughout the year. The surrounding valley areas displays some scars caused by weather conditions especially where disturbances of the soil was caused by human activity. It would therefore be essential to limit the extent of disturbed areas as much as possible.

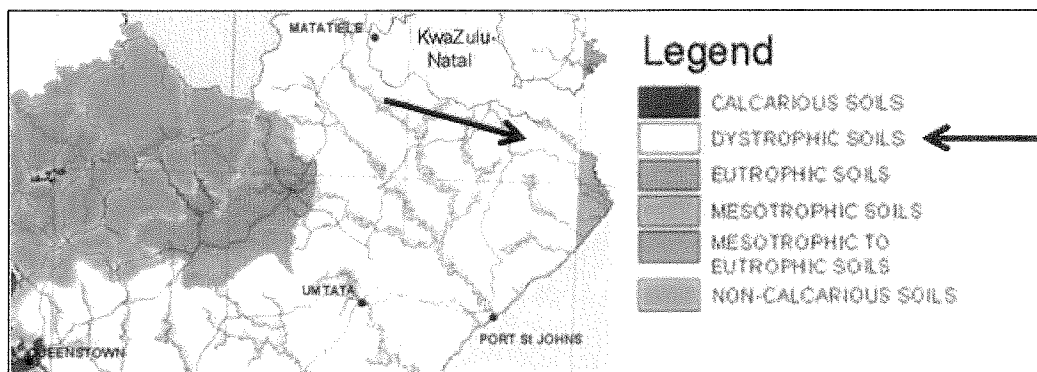
During normal climatic conditions the impact can be considered as low and insignificant if proper planning is done in terms of profiling, seeding schedules and restriction of water erosion. Due to a relative high rainfall, re-vegetation of the rock stockpiles and plant area is not envisaged to pose a problem provided that it coincides with the rain season and is correctly executed.

## Soils

The soils of the area derived from the dolerite parent material and may in some places be well developed and display a dark brown to black colour and is of Hutton and Shortlands form. These soils are normally quite fertile and sustain a lush grass cover if managed properly. The depth varies from moderate to deep in the valley areas to shallow on the dolerite outcrops. From the cuts into the dolerite it was clear that at least 30cm of soil is available for rehabilitation purposes. Soils on the proposed plant area and on the slopes below the quarries are better developed and deeper than those found on the dolerite domes hence more care should be directed to soil conservation and protection in latter area.



## Soil depth



## Soil leaching

Soils in the existing mining areas have already been disturbed and have not been conserved. Soils underneath the rock stockpiles located on the slopes below Quarry A & B is still intact and will facilitate a proper re-vegetation process. Rock at Quarry C is mostly located on the rock outcrop. Soil will have to be imported to rehabilitate this area. Soils in the plant and stockpile area were previously disturbed but are quite stable now. Care should be taken that all the soil in this area is temporarily removed prior to the commencement of crushing. This area will be subject to overland flow during heavy precipitation and erosion could develop here. Conservation of all available soil is required to reinstate the area effectively. Currently soils and exposed surfaces in this area is not subject to erosion, except for at the entrance to the mine area on previously established stockpile areas. Once the slope areas below Quarry A & B is denuded of rock it might be necessary to implement protective measures in the form of small berms along the contour where soils have been disturbed to reduce water speed and erosion of topsoil. The same should apply for the plant area. It would, however, be better if retrieval of rock is done in such a manner that the soil is not extensively disturbed. In this regard heavy equipment should be used wisely

and an excavator could be used more successful in terms of retrieval and reduced disturbance of the soil. Whilst the rock is removed from the slope it could be wise to construct a cut-off berm on the edge of the quarry platforms directing water away from the area that is being worked. It would not be applicable to quarry C. The impact on soils in this area was high, but no further development is contemplated in this area. With the implementation of re-vegetation strategies and erosion measures the potential impact could be reduced substantially.

It is vitally important that all topsoil that is removed is stored and that it is separated from the subsoil, if any, when removed. Topsoil management would be one of the key factors that would dictate the success achieved when rehabilitating the plant area. Establishment of the haul roads must be done with caution since the road will cross a minor drainage area on the southern side of the hill and will have a steep incline approaching all three quarries. Due to the high risk of erosion these roads must be properly protected against erosion with cross and side drains and should be monitored on a constant basis, especially during the rainy season. Material from the Quarry will be used to upgrade the roads.

The soil stratum around the quarry areas displays little signs of misuse but overgrazing undoubtedly decreased the fertility of soils due to a lower turnover of organic matter. As pointed out already soils were severely disturbed in the quarry areas. In terms of soil classification maps the soil has a low to medium erodibility index but near the dolerite domes the shallower soils have less structure and a lower water absorption capacity hence the erodibility of the soil is rated moderate.

Any topsoil to be removed from the plant area will be stockpiled on the northern boundary to act as cut-off berm thereby preventing water running from hard and bare surfaces over the dome faces. Should any decomposed dolerite stockpiles be found underneath the rock stockpiles it must be used to rehabilitate disturbed areas and may not be sold off.

Due to the alteration of the physical, biological and chemical properties of the soil, a reduction in soil productivity in the plant area may take place. It is expected that low nitrogen, phosphate and zinc levels would prevail and hence soils should be upgraded to reinstate and maintain nutrient cycles in the soil. Proper fertilising would reduce the impact to some extent.

The soils in question would retain nutrients over the short term since it is not easily leached and has a high adsorption capacity due to the higher clay content. Water holding capacity of the soils is average and would assist in re-vegetating disturbed areas.

The soils would, as pointed out earlier, be prone to water erosion on the slopes below the quarry and due to compaction by heavy equipment could cause draining capacity to be lower and could in turn cause the aforesaid impact to be higher than what it was before removing the rock stockpiles. Wind erosion would not be a factor that needs to be monitored since these soils are not susceptible to it due to its soil specific properties.

Taking the above into account the impact on the soil would be low-moderate and long term if no mitigating measures in place, but with mitigation the impact can be reduced to low over the long term.

### **Land capability**

The original land capability is to sustain Moist Upland Grassland for grazing purposes. The rich dolerite soils can be used for agricultural purposes other than grazing should water be available either in the form of normal rainfall or irrigation. Soils on flatter areas and in the valleys are used for maize and vegetable production. On the land in question no crop production is taking place since the soil depth is restricting this practise and no water is available. The area is also rocky

with steep slopes. If the grassland is managed well it has a moderate to good carrying capacity but overgrazing has eliminated the more palatable grasses leaving behind more hardy species with low nutritional value. This has ultimately also affected soil properties due to lower biomass accumulation and recycling. The land capability has thus already been impacted on from an ecological point of view. Removing the stockpiles would only cause a positive secondary impact by reinstating grazing capability and hence the carrying capacity of the land. In the stockpile area these parameters will be negatively affected by stripping of the topsoil but it would be temporarily at this stage. Land capability is normally amongst others directly related to the depth of the topsoil, therefore all topsoil must be conserved.

Removing the rock stockpiles would have no impact on the land capability of abutting properties/land users since impacts would be restricted to the site applied for. There is also no crop production taking place in the immediate vicinity of the quarry.

Once the soil is stripped of the plant area the biological activity in the soils would be affected slightly and thus also the nutrient cycle, which could result in a less speedy re-vegetation process. Considering the medium term for which the topsoil will be stored, most of biological processes within the soil will be maintained, provided that it is vegetated and upgraded. Upgrading of the soil with fertilisers will further assist in retaining all biological processes in the soil.

The extent of the proposed quarry areas (A, B & C) and the plant/stockpile area would only be 1,5ha hence the loss of grazing potential in this scenario is negligible considering the extent of surrounding grazing area available. Increased sheet flow on the plant area and potential gully erosion on the slopes could facilitate increased sediment transport to the Gwaleni River and may impair or disturb the ecological balance in the system, which on its turn could affect the ability of the water body to sustain the various organisms in it. Considering the large-scale erosion that is taking place in surrounding areas this impact would be very low, especially if the necessary storm water control measures are implemented and if disturbed areas are re-vegetated as soon as possible.

The platform areas will be re-vegetated and will again in future be able to sustain a grass cover to be used for grazing. The slopes below Quarry A & B will receive the same treatment. The quarry floors that will not be rehabilitated as part of this mining venture would never function again as a grazing unit due to the lack of topsoil.

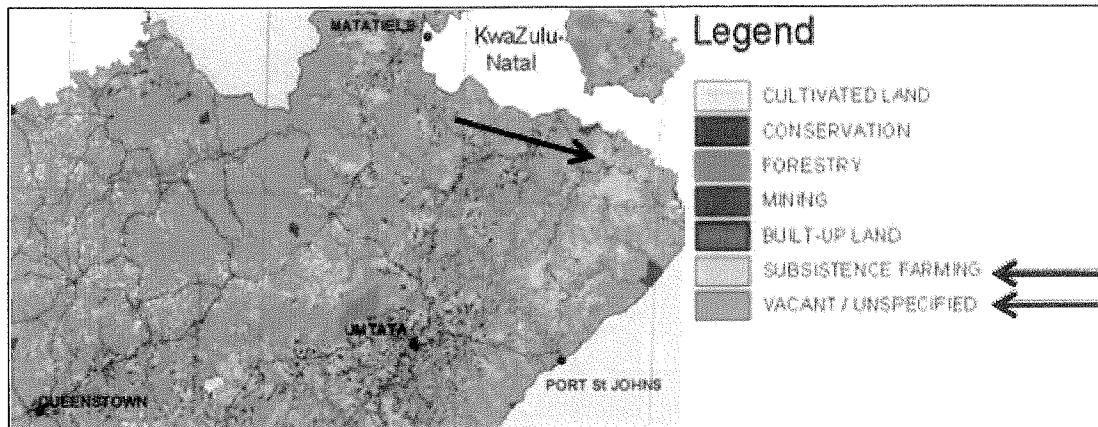
Considering the small area to be mined relative to the surrounding land, the impacts mentioned could be rated as very low and short term if the required mitigating measures are put in place.

### **Land use**

According to agricultural maps the area has been zoned as agricultural land and is extensively used for grazing cattle, sheep and horses. Due to the extent of overgrazing taking place and the fact that wildlife has mostly be eradicated in this area the land in question cannot be considered a niche for wild animals. None of the abovementioned land-uses would be permanently affected by the proposed mining venture and the impact is rated as low.

The area is also not zoned as a core green area, important public open space or as a proposed extension to any rural community therefore limited quarrying in the area seems compatible with the other farming activities especially against the background of previous mining activities. It is the author's view that the conservation of the surrounding environment can be integrated with the development of the quarry without endangering sensitive natural and cultural resources or

abutting land uses. Development of the quarry would also not compromise the needs and the well being of future generations but in fact will improve the land for future use by future generations.



### Land use

Mining would result in the mere disturbance of a small section of secondary grassland, which would result in very marginally loss of grazing and subsequently a similar loss in income to the inhabitants of surrounding communities that owns stock. On the upside a small portion of land will be made available again once the rock stockpiles were removed. It should, however be recognised that an agreement was reached with the community of Gwaleni to use the land for mining purposes. It should also be recognised that the area has been disturbed already by previous mining activities.

The loss of grazing area can be rated at this point in time as very low over the short term. If an aggressive rehabilitation strategy were to be followed the impact would be reduced to negligible. This will ensure that the former land use (grazing) would be restored on most of the areas used for quarry purposes.

### **Devaluation of property and loss of tourist potential**

The broader community does not look favourably upon mining hence a slight decrease in property value is normally experienced once a mining concern is established. To determine this impact is in most cases extremely difficult and different specialists would get different answers depending on the criteria used. It is a fact that decrease in property value, where mining is concerned, is in most cases directly related to the type of mining that is proposed, the mineral that is extracted, the activities that are associated with mining, infrastructure required, the duration of the mining process and the impacts related to the proposed mining venture. The proposed mining activity is low-keyed in terms of most of the parameters mentioned and based on this, property values should not be influenced at all due to the distance of the concern from the town or any other residence in the surrounding area. One should also be recognised that the land constitute State land hence none of the inhabitants of the area owns property but is the mere custodians thereof. Should there be any impact, it would be negligible and short term. In this regard it should be taken into account that the community has agreed to the mining venture be registered. To date no complaints about the proposed venture was received.

Closer analysis of the area revealed that in the immediate area one finds three quarries that were developed by the Department of Roads and Transport but left behind unrehabilitated. At the access to the quarry soil erosion has occurred on former stockpile areas. Large stockpiles of rock were left behind at each quarry and quarry faces were left unattended creating real safety hazards.

Taking this into consideration the area has already been severely degraded and the proposed venture can only improve this impact.

Considering the aforesaid and the specific zoning of the land, it would be wrong to classify any low-keyed activity, such as the proposed stone quarry, as undesirable just because it does not fit in with the established view of the nature of semi-rural areas. Authorities should not oppose establishment of the quarry if a sincere effort is made by the mine owner to address the most critical issues of noise and dust generation and the re-vegetation of disturbed soils.

The affected land in question is quite small and the distance to abutting residences would reduce the impact of noise and dust levels to negligible. The crushing plant and heavy vehicles will generate more noise and dust than those activities embarked on by local inhabitants of the surrounding areas and might for some not be fully compatible therewith.

The quarry area is located along the R349, which is a medium important tourist route towards the Wild Coast. Due to the specific topography of the area the plant and stockpile areas are not directly visible from the roads, except for a very short distance from the north-east and the impact would be very low, especially since tourists would not visit the surrounding area. It is not a main attraction area because of important landscapes or being of exceptional beauty. There are also no game parks or outdoor recreational areas in the surrounding area. Most of these important sites/activities are concentrated along the coast. Visual impact would therefore not impact on tourist movement and numbers. However, if the plant area is not rehabilitated it will cause a visual scar on the landscape that may offend local inhabitants. With the proposed re-vegetation strategy this impact will be reduced largely to almost negligible. Since no indigenous trees are found on exposed ground it is not possible to screen the site. Once properly rehabilitated, it will be hard to tell that a crushing plant has operated here. Removal of the stockpiles will improve the general appearance of the site and would therefore have a positive impact on the mentioned parameters.

### Vegetation

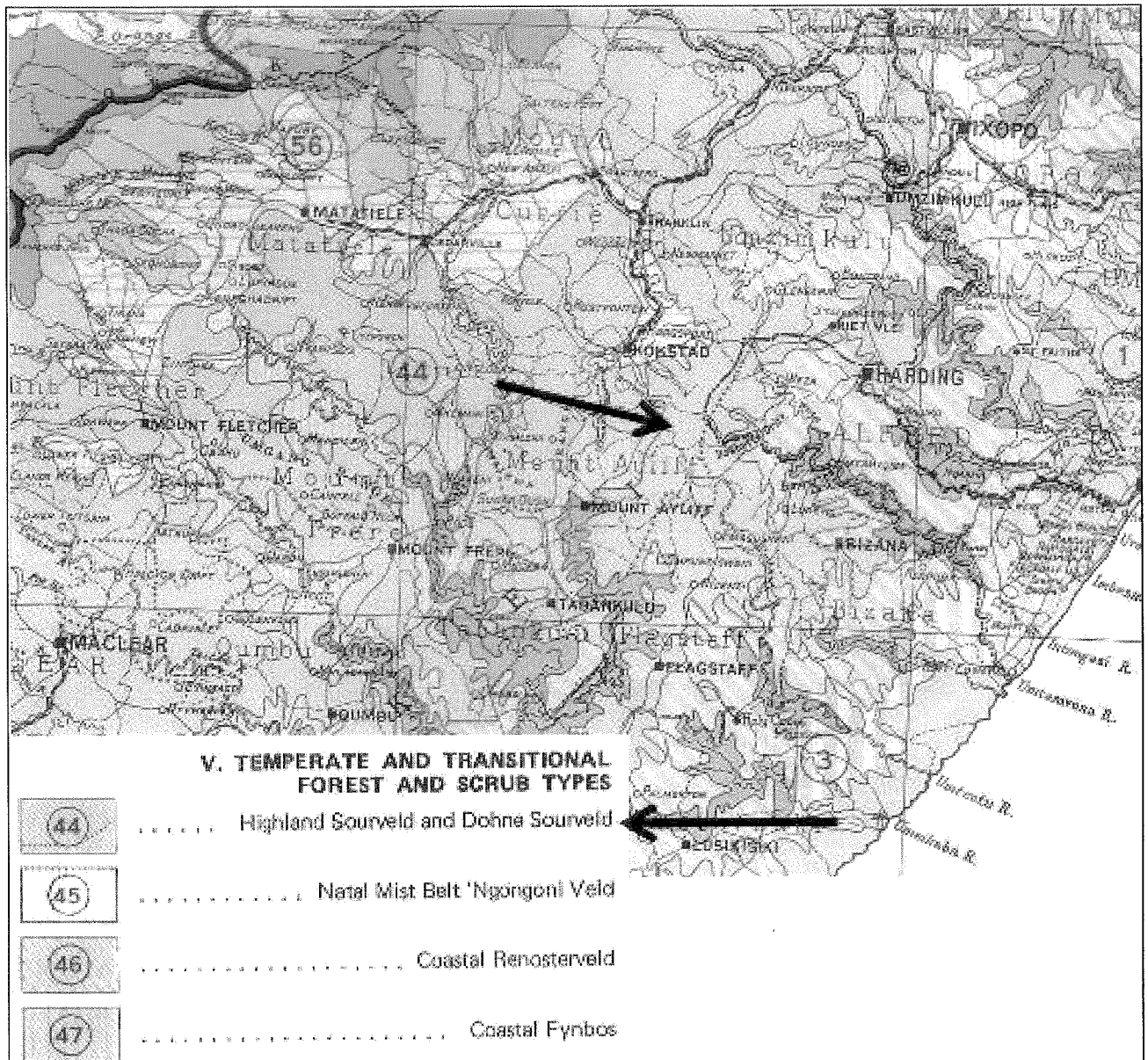
The hinterland is a transitional zone between the western temperate winter rainfall region and the eastern sub-tropical rainfall region but the study area does not show these various vegetation types associated with these regions. According to Low and Rebelo the study area lies within an area where the Moist Upland Grassland vegetation type dominates with Acocks synonyms Highland Sourveld and Dohne Sourveld. The extent of the veldtype 45688 km<sup>2</sup> of which 60% is transformed and only 2,5% is conserved. These sour grasslands occur at altitudes of approximately 600-1400m a.m.s. It occurs adjacent to Afri-montane Forest, which is restricted to the kloofs and valleys in this at these altitudes.

The climatic requirements for this veldtype are cold, moist areas with a high rainfall up to 1200mm per annum, with precipitation mainly in summer and very cold winters and very hot summers. The soil characteristic to this veldtype is shallow soils derived from Karoo Sequence sediments and dolerite parent material. This sour grassland is dominated by *Themeda triandra*, *Heteropogon contortus*, *Eragrostus curvula*, *Elionurus muticus* and *Tristachya leucothix* the most dominant species. *Hyparrhenia hirta*, *Cynodon dactylon* and *Sporobolus pyramidalis* are also in some areas dominant. It is therefore anticipated that all disturbed areas will be seeded with an appropriate grass mixture to mimic the surrounding vegetation. Trees are absent on the mine area hence tree planting is not considered. On the mine area and surrounds the following forbes species could be found such as *Walafrida densiflora*, *Cucumis hirsutus*, *Berkheya onopordifolia*, *Ricardia brasiliensis*, *Spermacoce natalensis*, *Cucumis zeyheri*, *Helichrysum coriaceum*, *Helichrysum rugulosum*, *Kohautia cynanchica*, *Tephrosia macropoda*, *Oxalis pes-caprae*, *Tephrosia multijuga*, *Conyza obscura*, *Cirsium vulgare*, *Corchorus confusus*, *Phyllanthus glaucophyllus*, *Gomphrena celosioides*, *Aster bakerianus*, and *Alysicarpus rugosus*. In some areas



Fynbos elements such as *Cliffortia* and *Erica* species and *Anthospermum aethiopicum* are found.

On some of the dolerite outcrops the vegetation differ slightly and could include the following species *Maytenus heterophylla*, *Grewia occidentalis*, *Zanthoxylum capense*, *Ziziphus mucronata*, *Rhus rehmanniana* and *Acacia sieberiana*.

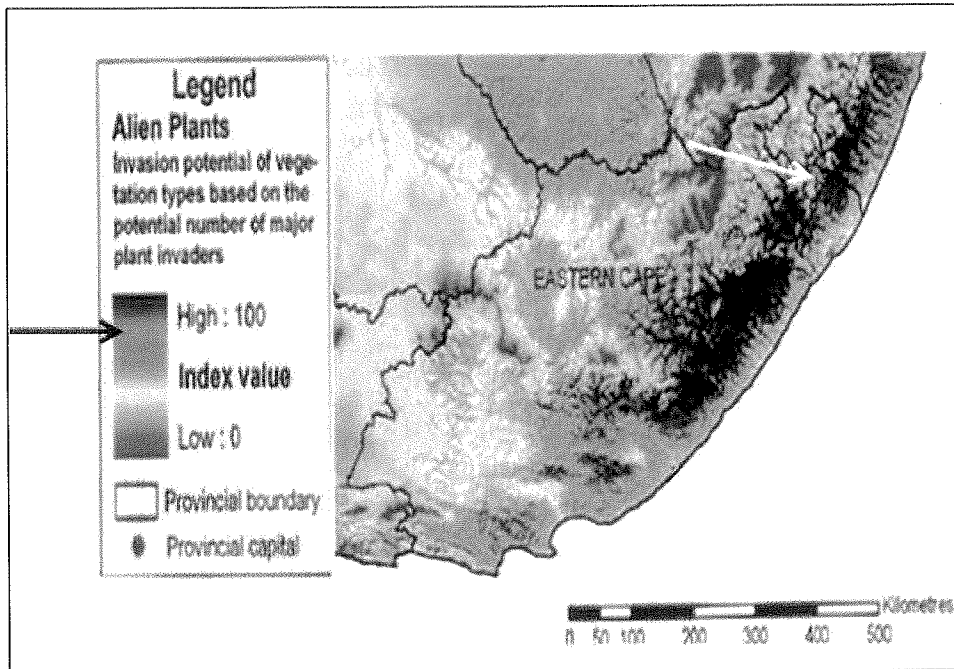


**Vegetation**

Due to overgrazing the area is susceptible to invasion by weeds species such as *Senecio retrorsus* and *Helichrysum argyrophyllum*, *Solanum mauritianum* and *Solanum*. To the north of the quarry areas various alien tree species are commercially cultivated.

As pointed out the flora of the Gugugu Gxwaleni area constitutes transformed Moist Upland Grassland where unpalatable species with low nutritional value such as *Elionurus muticus*, *Eragrostis plana* and *Felicia filifoli* has replaced the better grasses. The flora of the area under application has been severely impacted on by overgrazing and no species of special concern was found on site. The anticipated impact of quarry activities on the grassland would be low since only the portion on which the plant will be located, will be temporarily affected. It is important

that all topsoil that is removed be conserved and be seeded to main its fertility and to eventually be successfully used in the re-vegetation process. Re-vegetation of the slope areas below Quarries A & B will reclaim a portion of the current degraded grassland. With the anticipated re-vegetation process the impact will be reduced to negligible. Mining would not have any impact on flora outside the mine since activities would be restricted to the approved mine area. The limited dust generation would not impact on the vegetation outside the mine area and will be washed off the leaves during the rain period and photosynthetic rates would be maintained.



### **Alien invasion potential**

Conserving the topsoil together with the grass cover would ensure that the area would be able to some extent re-vegetated naturally to an acceptable standard upon spreading of the topsoil at the completion of mining activities. The more or less consistent rainfall that the area receives together with the favourable soil fertility factor would further ensure a successful rehabilitation process. The spread of invasive herbaceous weeds is always a threat and an irradiation programme must be implemented from the start. Soil erosion below the plant area and quarries A & B could lead to an additional loss of plant cover and these areas must be protected by means of storm water control measures and the infill and re-vegetation of erosion rills and gullies.

To re-vegetate disturbed areas as speedily as possible, mined out areas will be seeded with a seed mix during the periods September to March to ensure a successful re-vegetation process. This would encourage biomass accumulation, improve the humus content and stabilise the soil, which would in turn improve percentage of surface cover.

### **Animal life**

The proposed mining area has been extensively disturbed by grazing activities and displays secondary grassland with remnant pockets of stunted shrubs of thicket origin associated with the dolerite outcrops in the area. No large wild mammals were noticed on site since they have been hunted to extinction. It would, however, be incorrect to say that no form of wild life visits or exists in the area. In this regard one specifically refer to rodents, members of the *Annilida* family and smaller reptiles, hares, moles and mole rats. Taking into account the low frequency of such



occurrences as well as the slow speed whereby mining is to proceed; the impact is rated as temporary, local and insignificant. A number of bird species were identified in the surrounding area namely *Streptopelia capicola*, *Corvus capensis*, *Bubulcus ibis*, *Bostrychia hagedash*, *Elanus caeruleus*, *Spermestes cucullatus* and *Dicurus adsimilis* of which none is of conservation concern but it is not anticipated that they use the area for food or breeding.

The surrounding areas do not form a corridor for wild life movement and hence the impact on animal movement is also low. Due to the degraded vegetation cover the area would also not form a niche for animals to rest, breed or find shelter in.

Noise generated by the crushing plant and vehicle movement might affect bird life and other animals in the area and they will simply relocate to adjoining land and if applicable re-colonize these areas. Once crushing operations have ceased and disturbed areas has been rehabilitated they will return to the site. The rock stockpiles will definitely form a specific habitat for rock rabbits, rabbits, lizards etc. but none were noticed on the day of the site visit. Rehabilitating the site would be of more benefit than this artificial microhabitat. The quarry operations could pose a danger to domestic stock hence the plant area must be fenced in.

### Surface water

According to hydrology maps the area falls within the Primary Drainage Area and more specifically within the drainage area and is administered under the Water Management Area: There is no surface water on site hence the impact is nil.

The immediate mining area is drained by the Gwaleni River located in the valley to the north whilst the greater area is drained to the east by the Umtamvuna River and to the west by the Umzimhlava River. Due to the topography of the slopes below the quarries various small drainage lines are found on these slopes and it is therefore important that the soils on the slope is not disturbed unnecessary by mining activities. Retrieval of the rock stockpiles and development of the plant/stockpile area may increase surface flow and run-off speed, which could result in erosion gullies to establish below the quarries. This in turn could impact on the water quality in terms of sediment load and turbidity. The risk is, however rated low due to the small areas involved and the type of operation that will be embarked on. However, should the necessary storm water control be implemented then no impact is anticipated.

Care should therefore be taken that the internal haul roads are protected by means of side and cross drains. The placement of a proper wearing course could assist in preventing erosion in this area. Diversion berms as discussed under 'soil' must be considered on the slope areas to reduce the flow speed of runoff.

The total catchment area of Quarry C and the plant area is not more than 10ha whilst that of Quarries A & B is not more than 5ha. Runoff volumes would therefore be very low. Due the nature of the upper and lower geological strata the area is drained by means of surface as well as sub-surface flow runoff of which both could contribute to development of erosion during adverse weather conditions. Mining would lead to a slight alteration of the area's drainage pattern due to topographical changes and the construction of diversion berms.

For the interim period potable water will be brought onto the property since no borehole water is available. Potable water will be imported from the nearest town and process water (sanitation, ablution and the mining process *per se*) will be obtained in small quantities from the nearby river systems. Water will be stored in an elevated tank, which will be connected to the onsite reticulation system.

### Ground water

The quarry areas host no boreholes therefore no information on groundwater characteristics is available. It is well known that dolerite intrusions are not water bearing rocks therefore the proposed mining activity would not have any impact on groundwater quality, recharge or capacity. In addition it is not anticipated that any groundwater would be abstracted. Groundwater resources would rather be found at the basis of the surrounding hills or at Quarry C hence the impact that the concern pose is rated insignificant.

Since the mine area is underlain by solid parent rock no secondary or perched aquifer would be found here. Water will accumulate at the interface of the rock and topsoil but it would not be of any significance due to the limited water it would trap. During drier periods it would loose the capacity to hold water due to movement of water along gravity lines and evaporation. This aquifer would not be is not a reliable source of water since it is highly dependent on precipitation and thus susceptible to even short periods of droughts. The proposed establishment of the crushing plant and stockpile area would thus affect the movement of water along the interface and would cut off sheet flow in certain areas resulting surface water runoff to increase. Due to the small surface area of the mine, this impact can be rated as very low.

Maintenance, refuelling or cleaning of vehicles or equipment might cause oil, fuel and lubricant spills to take place on the property. The same apply to the storage of petrochemical substances on site. Since no groundwater is found on site the potential for groundwater pollution is nil. Considering the soils to be permissive, leaks from earth moving equipment should be prevented or immediately been addressed to prevent the perched aquifer or soil to become contaminated. Petrochemicals should be stored on concrete floors fitted with a trap with adequate capacity. Washing bays need to be established and also fitted with an oil/silt trap. A specific code of conduct should be established on the handling of petrochemical substances. Crushing stone would generate fine rock powder that will infiltrate into the secondary aquifer but since the water of this aquifer would be limited and unused the impact is rated insignificant. Due to the extensive amount of intact material positioned between the crushing plant and the Gwaleni River no impact in this regard is anticipated.

Considering the fact that no groundwater will be used for mining activities and the insignificant loss in recharge potential, all-over impact is rated as insignificant.

### Air quality

The air quality in the immediate surroundings of the mine area is very good due to its rural status. Decreases in air quality is short term and in most cases related to short term increases in dust due to ploughing of lands, use of gravel roads or an increase in smoke due to the burning of domestic waste or veld/cooking fires. Due to the nature of the topsoil layer disturbance thereof will not generate a substantial amount of dust. The gravel roads in the area would generate far more dust. In addition, waste would not be burnt on site hence the impact on air quality is deemed to be limited.

Since no formal blasting is anticipated fine rock dust would not be released into the air. Secondary blasting of rock will not produce any dust. Crushing of material would cause a continuous cloud of dust to be generated at the crushers and conveyer transfer points. It is therefore essential that rubber shoots are fitted at the end of conveyers and that a micro-sprayer system is fitted at the crushing plant and transfer points. The generation of dust would be continuous for certain periods but the distance to nearby houses in the valley below and on the southern side of the hill is in excess of 400m and would prevent any impact on them. During

periods of high winds some of the fines could reach residences but dispersing dynamics would prevent crushing activities to have a major impact on air quality or cause any social inconvenience. The crushing plant would be located on the crest of the dolerite hill that also forms the high point on the landscape and would be susceptible to wind erosion.

It should be recognised that a mobile crusher would be used and it is anticipated that crushing would take place at an ad hoc basis therefore the impact would not be continuous but perhaps for one month per quarter. A major source of dust would be crushed stone stockpiles and more specifically the crusher dust stockpile. The amount of dust generated would increase with wind speed hence the generation of dust during adverse climatic conditions must be contained at source. Quarry management must therefore contemplate installation of a sprinkler system. It would also assist if the crusher dust stockpile were placed in a semi-bunded area or to cover it with Hessian or shade cloth to reduce the wind erosion factor. Hauling on the mine area as well as loading of material would also generate a fair amount of dust, which would also increase with wind speed. The use of a sprayer system or wetting roads with a water cart would reduce this impact largely. In conclusion it can be indicated that the cumulative dust impact could pose a low to moderate impact on air quality but with mitigation the impact can be reduced to low.

Dolerite dust generated on the mine area is not a harmful substance since it contains very low amounts of silica and should thus not cause any discomfort to people. In terms of the Mine Health and Safety Act, the silica content can be established to determine whether any special precautionary measures are required. The impact can be rated as intermittent (based on wind direction and speed), local and very low, considering the amount of people that might be affected. It would, however, be in the interest of DMR to request that gravimetric dust sampling be done on both calm and windy days to establish the real impact.

The vehicular emissions of the few vehicles on site would be very low and the impact can be rated as insignificant.

No people would reside on the property, therefore no burning of waste or any other form of chemical air pollution is envisaged. Replacing of topsoil on the crusher area at closure would be a source of dust and would require initial wetting to let it stabilize. The overall impact on air quality could be rated as low to moderate, but with the necessary care, mitigation and continuous re-vegetation process this impact can be reduced to low.

### Noise

The semi-rural nature of the area would cause the ambient noise levels on average to be between 30 and 40dB. The R394 flanking the site to the east would increase noise levels in the area intermittently to as high as 50dB. Taking into account that it is also a farming/rural community, noise generated by trucks and tractors etc. is a common phenomenon and quarry activities would, to an extent, fit in with the lifestyle of local inhabitants. Similarly vehicle movement on site and hauling of material would fit in well with the daily transport activities taking place in the rural areas.

On site noise levels will be raised to 70dB by haul trucks/front-end loaders whilst the crusher will push up levels to above 80dB, but would drop considerably outside the 100m zone to about 50dB and at 200m it should be below 40dB. However, due to the extensive distance to the surrounding residences and that operations would only occur one month per quarter would prevent the operation to impact on people. Loading and hauling of material as well as construction and earthmoving activities would generate noise levels of below 65dB. Since no person resides within 400m from the site the cumulative noise impact would be less than 45dB, which is acceptable for rural areas and would not cause a social nuisance impact. As such, noise impact need only to be

mitigated in so far as employee health is concerned. In order to reduce the noise impact all moving parts of the plant must be well maintained and lubricated and all vehicles must be fitted with the required exhaust systems. It is expected that at most 3-4 truckloads per hour would leave the mine. Most of the noises would be low pitched and would therefore be more acceptable. Mr. Dreyer should as a management principle, ensure that all vehicles visiting the site comply with the relevant legislation on exhaust systems.

Seeing that no employee camp would be established on the mining area, no noise would be generated at night that could become a nuisance. In order to accommodate abutting residences working hours could be adjusted as outlined in the management plan to coincide more or less with the daily activities of the inhabitants of the area. Due to the rather low anticipated demand for stone it seems a given fact that mining over the weekends would not be considered and will ensure that the tranquillity of the area will at least be maintained during this period. If demand necessitates mining on Saturdays, permission must be sought from DMR but should not be extended to beyond 13h00.

Exercising proper road and onsite etiquette by employees is vitally important to maintain low noise levels. Hooting, shouting and clapping tailgates could become extremely irritating over long periods of time and will be avoided. Controlling human beings is not an easy task and the best that the mine owner can do is to have regular meetings with all contractors and their drivers and to include them in an environmental awareness programme. With the necessary commitment of mine management this impact can be reduced to low.

With the necessary mitigating measures in place the all-over impact can be rated as intermittent, low and local and should rather been seen as a nuisance.

### Waste

Domestic waste will be generated by staff, office and personnel amenities. Waste bins will therefore be provided at these strategic points. Taking into consideration the limited amount of workers on site and the low profile concern to be established the waste stream would be small and the impact rated low. Bins will be provided with a scavenger proof lid and be emptied on a regular basis at an approved waste site at the nearest town. Management would not entertain on-site dumping and burial. Due to the exposure of the site to wind action littering must be properly controlled.

All hard rock quarries generate industrial waste but considering the low profile of the proposed concern, this waste stream would also be small and the impact rated low to moderate if no mitigation takes place. Scrap metal will be stored in a demarcated scrap yard and sold off regularly and the impact is rated low due to the size of the operation. Oil stained cloth, used oil filters and lubricants containers could cause soil and water pollution and would be stored in a bunded area in receptacles with lids that seals properly and will be emptied regularly. Used oils and lubricants would be retained in large containers and the contents sold to recycling companies for example Oilcol. These containers will be placed in a bunded area provided with an oil trap that is regularly cleaned. Servicing and cleaning of vehicles must take place in a wash-bay area fitted with a central sump. Emergency repairs outside the workshop will be done over a drip pan. Chemicals and fuels will be stored in bunded areas and the necessary authorizations to store it will be obtained from DEAET if still applicable under the new promulgated regulations.

Spillage of petrochemical substances will cause soil and possibly water pollution but due to the limited amount of these substances that will be used/stored on site the impact can be rated as low to moderate due to the shallow soils involved and the distance to surface water. It is essential that a spill-containing agent (peat-sorb or sawdust) is used and available to retain spills and

contaminated soils will be immediately scooped and removed to an approved waste site. With mitigation the impact can be rated low.

No solid quarry waste will be produced, as all products will be sold. Since mineral processing will not take place no wastewaters will be produced. It is not anticipated that stone will be washed, but should this activity be decided on at a later stage a sediment trap will be installed below the washing screen.

This operation would be smaller than the one in Qumbu and will not cater for amenities hence no sewage stream is anticipated and due to the sub-soil profile no conservancy tank or septic tanks would be constructed on site. If these are decided on at a later stage a surface treatment plant will be installed on site and clean water will be released into the environment. In such case the effluent will be analysed on a monthly to three monthly basis. Due to the nature of the sub-soil only chemical toilets will be provided on site.

### **Sites and structures of archaeological and cultural interest**

No evidence of archaeological or cultural artefacts was found on site. The site is also heavily impacted on by previous mining activities hence any such artefacts would have been destroyed long ago. In addition prehistoric activities would rather have occurred in the valley areas and not on the exposed and elevated dolerite domes. No need was identified to investigate this parameter any further. Considering that no medicinal plants or an area of congregation were found on the site no impact on the cultural activities of people is expected.

### **Visual impact and aesthetic acceptability**

Visual impact in this case can be separated in three categories namely the visual impact from the R394, residential areas and from the air. Visual impact would be analysed on a local scale since the quarry could affect areas within a maximum radius of 2-3km.

#### **R394**

The general topography of the quarry landscape and plant area would limit the visibility thereof from the road to a few hundred meters on the north-eastern and south-eastern side. Only rock stockpile C would be visible from the north-eastern side. Due to the height of the crushing plant, infrastructure and stockpiles (material & topsoil) and the fact that it would be situated on the crest of the dolerite dome it would be a bit more visible. The visual impact from the road is rated as low. The blue-grey and brownish colour of materials might marginally clash with the green colour of the surrounding grassland but due to the limited visuals the impact is still rated low. It should be acknowledged that the quarry would not be in the direct line of sight of motorists on the road. Dust generated on site would cause a plume in the air that would be moderately highly visible from all areas and even more so because of the exposure to wind action hence proper dust control mechanisms must be in place to mask this impact.

#### **Rural communities**

There are no residences in close proximity to the mine. The only abutting communities that would be able to see the quarry activities and dust generation are those located in the valley to the north, and north-west. Due to the difference in elevations the mine would not be in direct line of sight and the distance involved would cause the impact to be low. Communities to the south

would not be able to see the operations due to the difference in elevations and the fact that the crest of the hill cut off the direct line of site. Only the limited dust plume would be marginally visible under severe climatic conditions. Due to the absence of indigenous trees at this elevation levels the quarry be screened off. The only mitigation measures available are to limit the disturbed areas to those that are essential for the operation to exist and to rehabilitate disturbed areas concurrently with mining activities. At closure the impact would be low if proper rehabilitation of the plant and stockpile area has been effected.

### Air

Mining activities would be highly visible from the air and might be rated as the most crucial component of the visual impact, but due to the homogeneity of the vegetation on the surrounding hills the impact would be less significant. In addition the current visual impact caused by the unrehabilitated quarries and stockpile areas would mask all other activities on site. Removing the rock stockpiles and clearing the slopes below Quarry A & B would largely improve the visuals of the area. Dust generated by the quarry would be very visible and the impact is rated as moderate. Considering that the nearest town is 20 km away and that there is no airstrip in the immediate surrounds or is situated en route to other major airports or tourist destinations the impact can be rated as low. It is, however, important that a phased approach should be followed to ensure that the minimum area is denuded at any one time. At closure the impact will be positive.

### General

Although people of the area might see it differently, the unrehabilitated quarries and rock debris left behind on the valley slopes have degraded the sense of place of the area. The proposed quarry activities will to some extent, rectify this situation.

The study area has a moderate visual absorption capacity due to the rugged topography and uniform texture of the vegetation type found in this area hence the visual impact would be low. The fact that the dolerite dome constitutes a focal point in the landscape will on the other hand increase visual impact and large and continuous operation could cause a dramatic change in character of the area. Fortunately the operation proposed would be low-key and intermittent and since it is not extensively visible from the road or residential areas the impact is still rated low. Since the hill is a focal point in the landscape and has a uniform texture quarry infrastructure could result in a moderate visual intrusion but since it is not extensively visible from the road or residential areas the impact is still rated low. Once closure has been granted and all infrastructures have been removed the impact will be marginally positive in relation to the current impact.

Analysis of the above parameters indicate that the visual impact can be rated as low and with rehabilitation being done concurrently with mining and infrastructure removed at closure, the impact will result in a low positive impact.

### Loss of quality of life

Quarry activities could potentially impact on the quality of life of people through unacceptable visual impact, noise and dust generation (deterioration in ambience), restriction of outdoor activities and loss of income through loss of grazing land. Since no person reside within 400m from the quarry, the proposed activities would not have any impact on the quality of life of people staying in this area.

Housekeeping and management at the quarry must be good and authorities must to the best of their ability enforce the necessary environmental legislation. It is essential that no houses be build outside the quarry area to ensure that the nil impact is maintained. It should be recognised that the community of Gwaleni has approved the establishment of the quarry hence no complaints ought to be received.

### **Sosio-economic impact**

The Gwaleni area can be classified as rural and is characterised by numerous houses on the landscape. The area is sparsely populated and sheep, horse, goat and cattle farming are the most prominent activities. Rural areas are in need of development and proper infrastructure to create job opportunities since the unemployment rate is around 60%. Currently development in Mount Ayliff, Bizana, Flagstaff and rural settlements is hampered by high prices for construction material. The establishment of the quarry would therefore constitute major progress in the latter regard and the concern would play an important role in the building and civil-engineering industry in the mentioned areas.

At least 4-6 new job opportunities would be created and a number of downstream opportunities will follow. This could be seen as a high positive impact. Quite a number of external jobs could also be maintained in the building industry, which would be vitally important for the towns mentioned. The availability of crusher dust will later on facilitate the establishment of a cement block/brick yard on site and an additional 4-6 job opportunities will be created with a vast number of downstream opportunities in the building industry. The EMP will be amended at a later stage to address any environmental impacts associated with the project if it is established on the mining area.

The quarry does not pose any direct threat to any existing or proposed businesses. The proposed quarry is also not situated near any schools, residential areas and hospitals and would therefore have no negative impact on these concerns. Due to the absence of services like water supply and sewage no impact is envisaged on these services. The only negative impact of the proposed activity is the prolonged impact on the road infrastructure and the inconvenience to motorists and pedestrians using the roads.

### **Transport Impact**

Heavy vehicles with capacities between 5 and 10 cubic meters would exit the mining area on a daily basis and it is anticipated that all roads would experience an increase of at least 6-8 trips per hour. With regard to the surface quality of the R365 this impact is rated of low significance over the short term since this road was build to withstand the impact of heavy vehicles. Irrespective thereof it would be essential that quarry management engage with the District Roads Engineer on the matter in order to obtain his views and to perform regular inspection on the road and for him to assist in maintaining the road. To protect all roads overloading must be avoided at all cost.

The increase in traffic on the road and the potential for exceeding of speed limits by the trucks servicing the quarry would impact to some extent on the safety of motorists but more so on pedestrians and cyclists. With further reference to the latter, this road is used quite frequently for people going to or coming from surrounding towns and hence put a responsibility on the quarry owner to accommodate these people by enforcing applicable speed limits and demand courteous road etiquette from truck drivers.

The impact of vehicles associated with the quarry activities on the road is, however not controlled by DMR but by the Department of Public Works. The required heavy vehicle signs must

therefore be erected on both sides, 150m from the access to the quarry in conjunction with the District Roads Engineer and if required necessary, a levy payable to the aforesaid department can be negotiated. . The line of visibility to the north is not so good whilst it is better to the south. Extreme care therefore needs to be exercised when slow moving vehicles are to turn onto the tar road in order to prevent accidents. The exact locality of the access needs to be established in conjunction with the DRE concerned.

The fact that no restrictions is placed on the use of the road as well as the fact that heavy vehicles from farmers and business concerns also make use of this road suggest that approval will be obtained from the DRE to use the access to the tar roads for hauling of quarry products.

### **Sensitive areas**

The land in question forms part of the Moist Upland Grassland, which is common to a very large area of the former Transkei. The vegetation on site was extensively disturbed by previous mining and transformed by poor grazing practices hence the land has very little conservation value, if any. The area is therefore not a sensitive landscape. The valley areas and surrounding kloofs are more sensitive from a soil conservation view. The drainage lines bordering the quarry area to the north and north-east can be classified as marginally sensitive areas and should not be disturbed through water pollution or silt deposition. However, due to the medium erodibility of these soils the area can be described as medium sensitive in that sense and all possible must be done to curb erosion. Dolerite outcrops are numerous in the area but still constitute an area of beauty, however the sense of place has already been disturbed by previous mining activities. It is advisable that these quarries be mined in future to improve the sense of place.

Considering the facts that the quarry is distant from any naturally occurring sensitive environment the impact can be rated as low, provided that erosion is contained.

### **Interested and affected parties**

All government departments will be supplied with a copy of the environmental management programme through the Department of Minerals and Energy for comment.

An additional public scoping process seems unnecessary at this point in time since:

1. This is an existing mining area that will be resuscitated.
2. The previous quarry activities had no impact on people.
3. A land availability agreement was signed with the Gugugu-Gwaleni community and Ntabankulu Local Municipality.
4. Community meetings/information sessions were held.
5. The Department of Mineral Resources has advertised the application and no objections were received.

The DRE will still be consulted and the response be submitted to the DMR within 45 days.

In conclusion it is the author's opinion that all impacts, after mitigation, would fall within acceptable limits and no complaints from town residents or rural communities would be received.



### **Project alternatives**

Dolerite deposits are numerous in this area and there would be other available reserves that can be exploited. These would, however, require the development of an entire quarry with blasting activities, which would result in much higher establishment costs. Currently the applicant cannot afford that and since this is a pilot project and it still needs to be established whether local markets will sustain quarry activities. From an economic and environmental point of view the utilization of existing quarries is a much more sustainable option. In this regard the clearing of rock debris from the three quarries would be a positive outcome. In addition the quarry area is located halfway between Mount Ayliff and Flagstaff, which cause the site applied for ideally situated. Since rock stockpiles are already available on site the applicant can start immediately with production without having to use finances for blasting activities, which would also result in a lower environmental impact. The site in question would also have no negative social impacts and finding such sites is a rare occurrence.

From an environmental perspective it would be a poor decision to abandon the existing site and to disturb another green area hence other alternatives were not considered.

### **"No-go" option**

The no go option would cause the applicant to engage into a new desktop study phase to determine other possible sites for exploitation. This would also result in an ensuing prospecting phase to determine the quality of the stone in such area, which will incur costs that the applicant cannot afford. It should be recognised that the applicant has paid all expenses related to the project for at least three years, including the purchase of three crushers and is not willing to incur any further unnecessary costs. It might cause him to abandon the project entirely.

It would also result in the current application to be withdrawn and will set back the establishment of the project with at least another year. The latter would not be acceptable to the community since they have been waiting for the project to come off the ground for almost three years since previous partners have not committed themselves 100% to the project. It would also prevent the community receiving an income for at least another year and would withhold jobs from them for the same period. In addition every one engaging in construction work would still have pay exorbitant fees for construction materials and cement bricks that have to be imported from the bigger centre such as Mthatha and Kokstad. This would maintain the current negative economic impact on the community as a whole.

This option would also result in the current site to be left unrehabilitated since Roads Department abandoned the sites years ago. This will result in the current scar to remain on the landscape and maintain the impact on the sense of place. In terms of locality, environmental and social considerations a golden opportunity would be lost if the option has to be pursued and should not be considered against the background of the need for development in this area.

Considering the above, very little is to be gained by following the no go option. It was therefore not investigated any further.

### **Track record of applicant**

The applicant has not operated a mining concern previously hence a track record is not applicable in this instance. The applicant has not mined illegally previously hence has no record of transgressing the provisions of the MPRDA.

## CONCLUSION

Evaluation of the environmental impacts that this project pose did not portrait any fatal flaws and all relevant impacts can be mitigated. The remote locality of the mine causes it not to have any negative social impacts. The market for the material is untapped since there is no approved commercial mining concern in an area of 250 square kilometres resulting which will result in the concern to be economically sustainable. Positive indicators like the financial stability of the applicant and the joint venture with the community and a BEE company ensures a smooth establishment phase. The fact that this project will create a number of jobs directly and also facilitate downstream spin-offs is a much-needed economic injection for this poverty stricken rural area where unemployment is rive.

With all the proposed mitigating measures outlined in the management programme, human health will be protected, biological diversity will be preserved, cultural and natural resources will be protected and the economic management of natural resources will be ensured. Based on the aforesaid the project should go ahead.

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