



**mineral resources**

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Mineral Resources  
REPUBLIC OF SOUTH AFRICA

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Reference:  
Date:

EC30/5/1/3/3/2/1/0412EM  
12 April 2010

South African Heritage Resources Agency  
P.O. Box 758  
GRAHAMSTOWN  
6140

ATTENTION: MR. T. LUNGILE

CaseID: 2491

Dear Sir

**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002: STONE AGGREGATE; GRAVEL MINING ON FARM 286, DIVISION OF BEDFORD, EASTERN CAPE**

1. The above refers.
2. Attached, a copy of the preliminary Heritage Impact assessment report received from Bas-War Trading Cc.
3. Any written comments or requirements your department may have in this regard can be forwarded to this office no later than **5 June 2010**. 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 e.g. 30 days from the date hereof in order to reduce the turn around time for the application process.
4. Consultation in this regard has also been initiated with other relevant State Departments.
5. Please use the reference numbers as indicated in all future correspondence.
6. Your co-operation is appreciated.

Yours faithfully

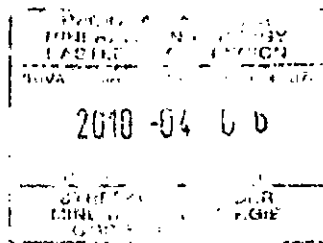
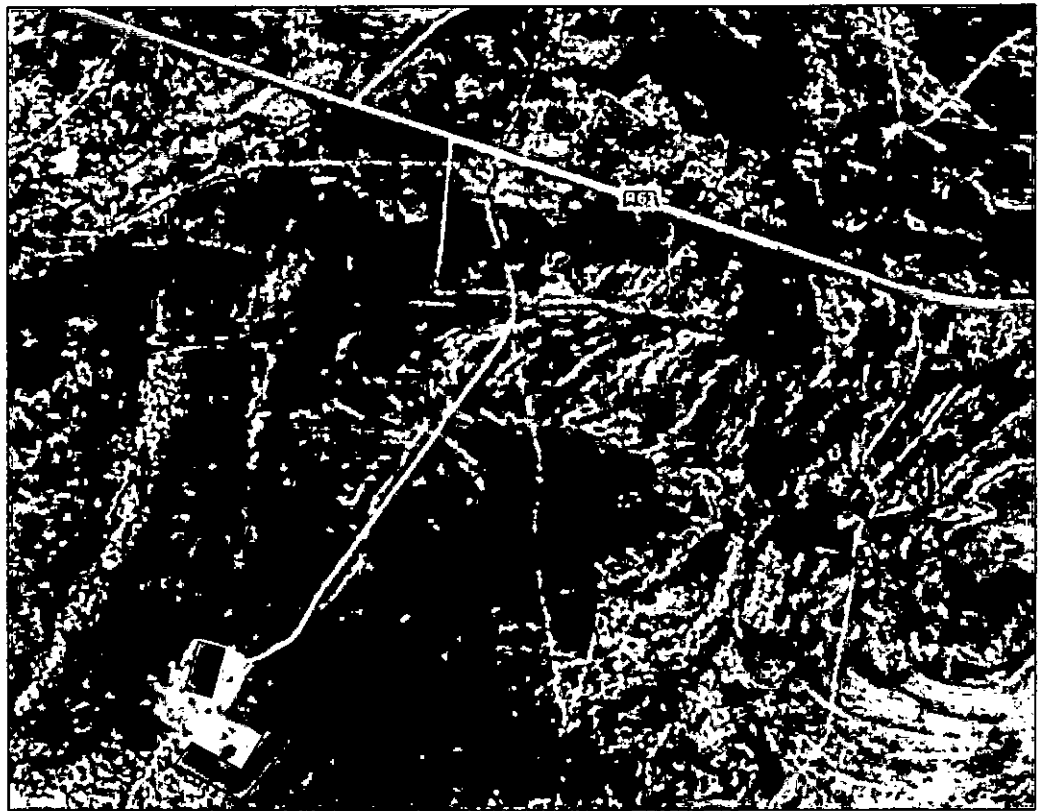
REGIONAL MANAGER

EASTERN CAPE



STELLENRYCK ENVIRONMENTAL SOLUTIONS

**PRELIMINARY HERITAGE IMPACT ASSESSMENT  
FOR PRIMESTON HARD ROCK QUARRY**



PREPARED FOR:

**BAS-WAR TRADING  
11 Market Street  
ADELAIDE  
5760**

APRIL 2010

**PROJECT DESCRIPTION****Applicant**

BAS-WAR TRADING CC  
11 Market Street  
ADELAIDE  
5760

Reg No. 1999/043893/23

Tel No 043 7406053

Fax No. 043 7405966

**Responsible person**

W. J. Raath  
P.O. Box 15517  
Beacon Bay  
5205

Tel No. 043 740 6053

Cell 0836083546

Fax No. 043 7405966

**Mine manager**

Mr. A. Peters  
Quarry Operations Manager  
Independent Group  
5 Leo Laden Road  
Wilsonia  
5241

Tel No. 043-7451014

Fax No. 043-7451245

**Surface owners**

Mr. D. L. C. Girdwood  
P.O. Box 89  
Bedford  
5750

**Holder of mineral rights**

State

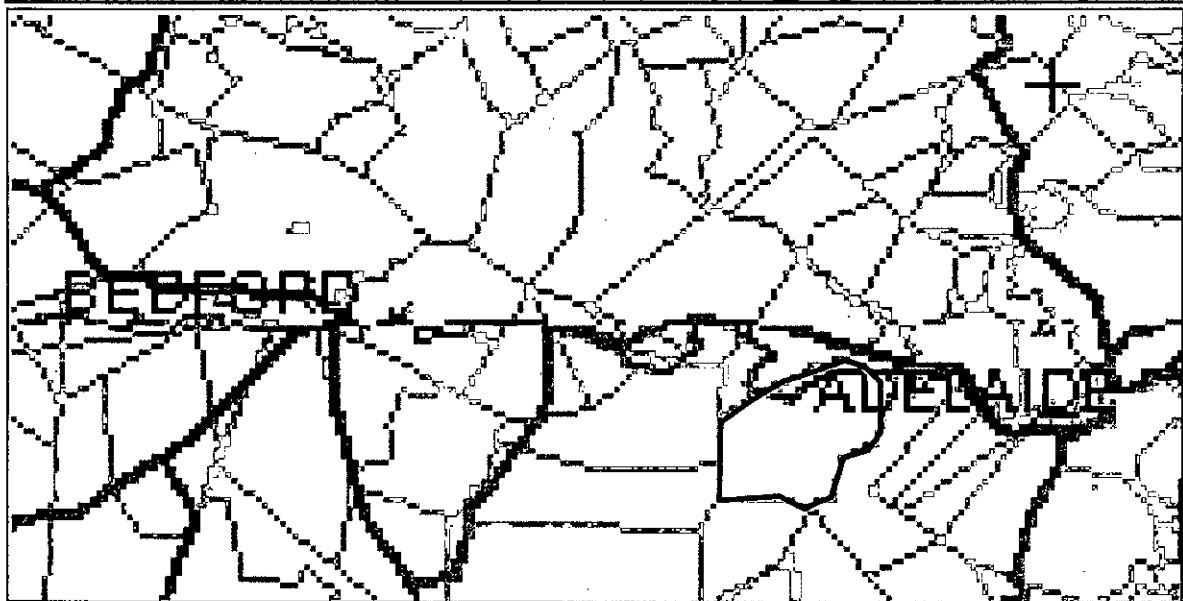
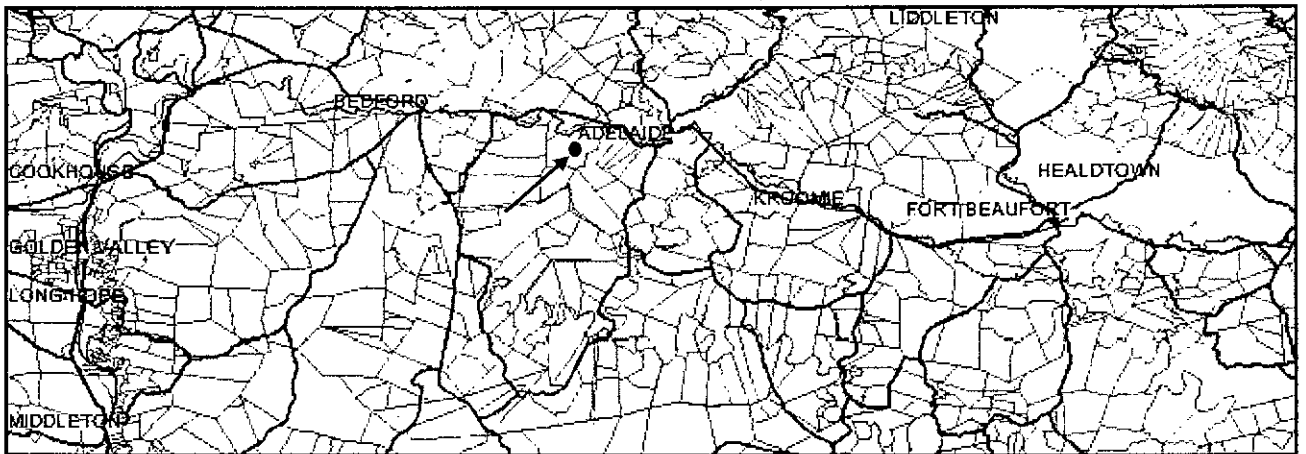
**Title deed description**

T73889/91  
Farm 286, Bedford

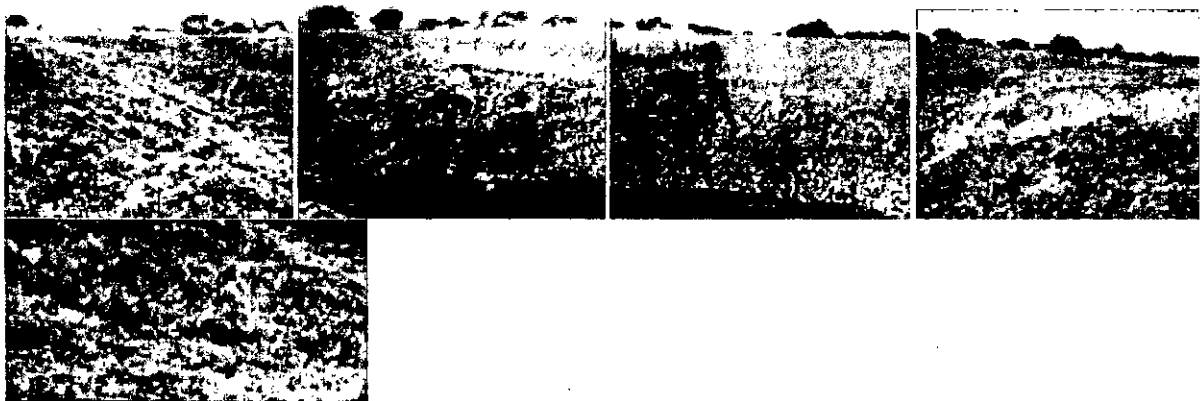
**LAND DESCRIPTION / INFORMATION****Regional setting**

The proposed hard rock quarry is situated within the boundaries of the Adelaide Municipality and magisterial district of Bedford. Main access to the quarry is via the R63. The site is located approximately 7,5km west of

Adelaide and 14,5km from Bedford and is accessed via a gravel turnoff from the R63 to the left over a railway crossing.



**Current excavation at the Primeston quarry**



**Mining methodology**

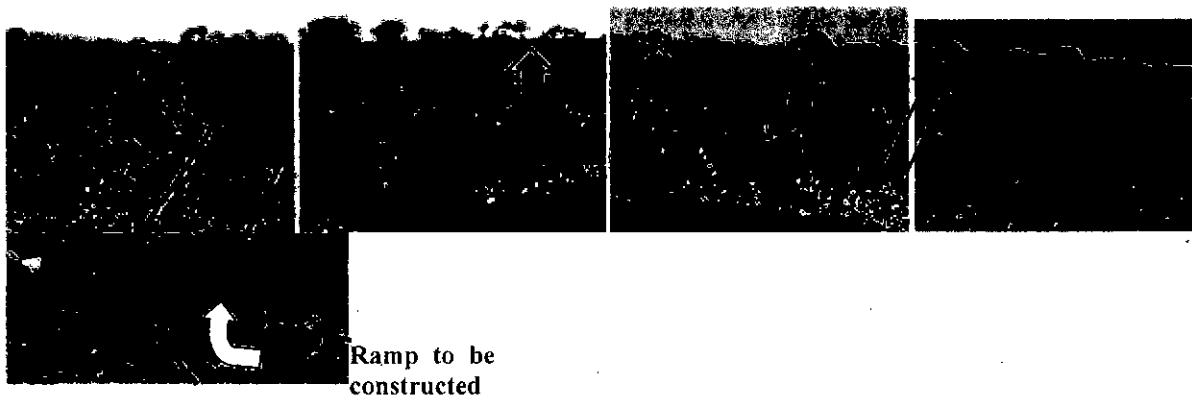
An existing gravel farm road constructed by the Department of Roads & Transport during the previous mining phase links the quarry and stockpile area with the R63 to the east. This road is in fair condition but will require minor upgrading at the top section (diversion berms to be constructed) as well as upgrading on the bottom section linking with the Bell mouth (road has been eroded). Access to the R63 already exists and the Bell-mouth is tarred and needs no upgrading.

The mine area is located a hill, adjoining the excavation previously mined by Haw & Inglis. On the western side a contour drains runoff into the veld. An operational railway line is located  $\pm 1,8$ km from the quarry and 400m from the Bell mouth entrance and needs to be traversed to reach the quarry. This line needs to be protected but an appropriate crossing was established during the Provincial road construction activity by Haw & Inglis. Taking the distance to the quarry into consideration, no mitigating measures with regards to blasting should be necessary, although the following should be implemented:

- A burden/spacing assessment as well as risk assessment will be done to ensure that safety standards are upheld.
- Blasting will be synchronized with rail schedules and if required will be closed off 15 minutes before blasting in conjunction with Spoornet, if necessary.
- The rail crossing will be maintained according to Spoornet's requirements.
- Truck drivers will be trained with regards to safety aspects related to rail crossing.

The total mine area comprises about 1,5ha of which 1ha will be used for mining and the remaining 0,5ha as stockpile and crusher area. Average depth of the excavation will be approximately 5-6 meter. The existing southern and eastern faces will be split developed in that a bench will be established starting at the southern face and be extended to the eastern face. The bench will be approximately 20m wide to facilitate safe access for quarry machinery/vehicles and to facilitate final perimeter profiling. The current water within the excavation will be used for dust suppression. Production blasts will be performed by a contractor, which holds an opencast blasting qualification. Normal blasting procedures and pattern will be applicable since there is no infrastructure in close proximity to the quarry that needs to be protected. Overburden and spacing will typically be 3m x 3m with drill holes of 76mm. P101 slurry will be used as explosives and primed with pentolite boosters. Since more than one shot hole will be fired at a time, shock tube assemblies of the Nonel and handidet systems will be used to ensure controlled blasting conditions and limits flyrock and PPV readings. Average stemming of 0,75m will be used to reduce flyrock.

**Mining will progress into hill in southern direction**



The above development approach will result in the existing profiled face to be split in two 6-7 meter faces, of which the bottom face for the time being will remain profiled since only the sandstone will be targeted.

Shot rock will be loaded on dumper trucks with an excavator and transported to the diesel powered mobile crusher and screening plant located on the existing plant area north-north-west of the mining area. It is anticipated to blast approximately 5000m<sup>3</sup> once a month if only local markets and proposed brickyard are to be served. If any DRT projects are secured, frequency of blasts will increase or production blasts will increase to approximately 10000m<sup>3</sup> per month.

Once crushed, the material will be stockpiled and then loaded onto 5-12m<sup>3</sup> tipper trucks and hauled to Adelaide, Bedford and Somerset East and the brickyard. A weighbridge would be installed and aggregate products will be stockpiled accordingly.

All shot rock would be utilized except for oversize, which will be returned to the excavation for profiling of the sides. Alternatively, these blocks can be reduced in size by fitting a hydraulic hammer to the excavator or perform secondary blasting unless proved to be uneconomical.

Topsoil will be removed as explained under the construction phase. The nature of this sedimentary rock will result in mining to remain above any primary or perched aquifer.

Considering the low volumes required, crushing will not be continuous but be restricted to 5 days per month, depending on the demand and working hours from 7.00am to 5pm five days a week. Transport of aggregate will be continuous from the stockpiles created.

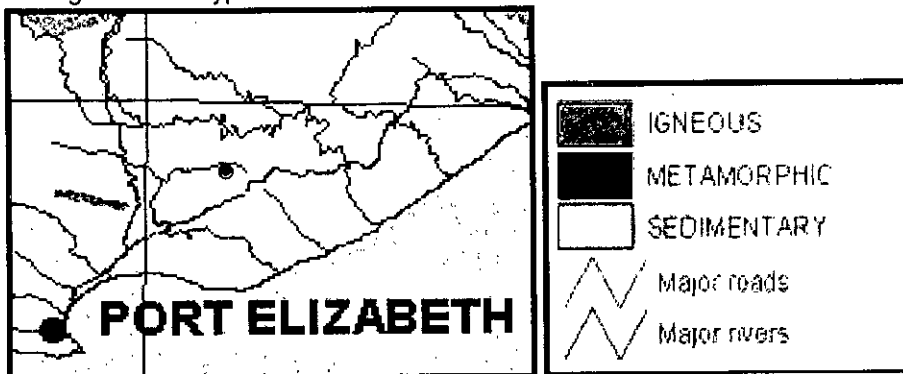
A thickness of 1600m ( $\pm 300m$ )\* has been obtained for the Middleton Formation south of Fort Beaufort, while 2150m ( $\pm 300m$ ) was measured for the Balfour Formation north of Fort Beaufort. Duplication of strata through undetected faulting may have inflated these figures somewhat.

Except for some grey shale in the middle part of the Balfour Formation ( $\pm 5\%$  of the total thickness); the Adelaide subgroup consists of alternating layers a few metres to a few tens of metres thick of grey, fine-grained sandstone ( $\pm 25\%$  and greenish-grey, bluish-grey or (in the Middleton Formation only) greyish-red, mudstone ( $\pm 70\%$ ). Fining-upwards cycles are common.

Sandstones show horizontal lamination ("flat-bedded") with primary current lineation on the bedding-planes, through cross-bedding and micro-cross-lamination. The mudstones are poorly stratified or massive. Wave-formed ripple-marks are fairly common in the shales of the Balfour Formation. Cut- and-fill structures are common.

The top of the Adelaide Subgroup can be defined as a horizon above which sandstone predominates over mudstone. Red mudstone is relatively abundant in the mudstones immediately below the boundary (over a vertical interval of 500-100m), in contrast to its absence in the rest of the Balfour Formation, while the change in sandstone colour from grey in the Balfour to pinkish-grey in the Katberg, is also diagnostic.

**Geological Rock Type**



Middleton Formation

The Middleton Formation consists of mudstone and fine-grained lithofeldspathic sandstone, the latter constituting between 20% and 30% of the whole. It is very similar to the underlying Koonap Formation, except that reddish mudstone tends to be more common in the Middleton Formation. Furthermore, large-scale trough cross-bedding and clay-pellet conglomerate seem to be more abundant in this unit, whereas ripple-drift cross-lamination appears to be practically absent. The Middleton sandstones are generally slightly lighter coloured than those of the underlying Koonap Formation and less often mottled. They also tend to be more lenticular, and definite infilled channels are exposed in places.

Since the Middleton Formation mostly occupies the rather flat terrain in the southern and central parts of the map area, its total thickness is difficult to determine. It is estimated to be in the order of 1500m.

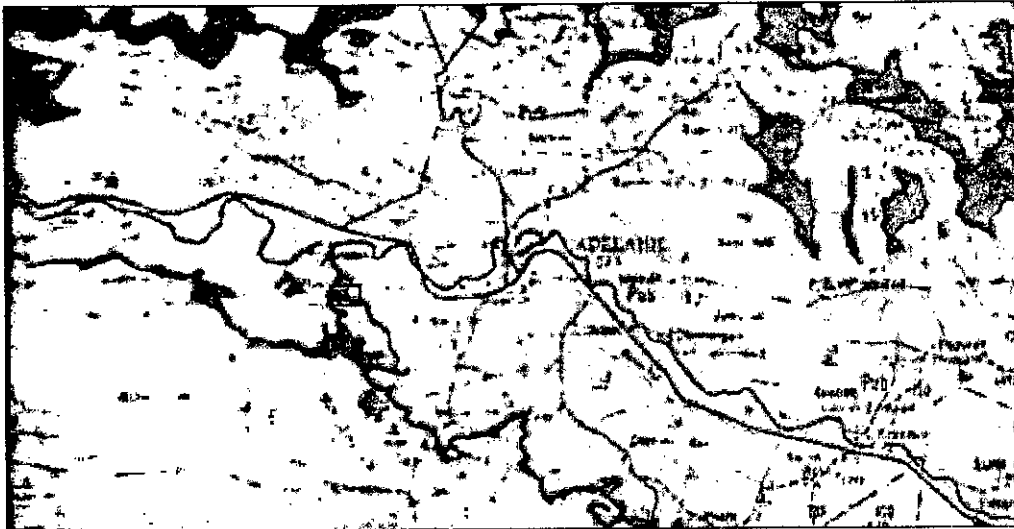
The sandstones of the Middleton Formation are considered to be mainly point-bar deposits, whereas the mudstones accumulated on flood plains during overbank flooding. The fine-grained nature of the sandstones and high mudstone-to-sandstone ratios point to meandering rather than braided rivers. Overall transport direction appears to have been towards the northwest.

Balfour Formation

Like the underlying formations of the Adelaide Subgroup, the Balfour Formation also consists mainly of mudstone with intercalated fine-grained lithofeldspathic sandstone.

Dolerite

The dolerite (Jd) intrusions occur as concordant sill, transgressive sheets, curved sheets, dykes, bell-jar intrusions and laccoliths. The dolerite weathers positively and forms either ridges in low-lying areas, as in the study or cappings on many mountains and hills. The southernmost dolerites, intruding the Middleton Formation, are crescentic dykes, as in the study area and transgressive sheets with easterly strikes and dipping towards the north. The dykes in the area vary from a few centimetres in width with mean orientation from west-north-west with thickness up to 100m. Petrographically, the dolerites are rather fine grained and compose of ophitically intergrown augite and plagioclase in almost equal amounts. Dolerite intrusions caused metamorphism of adjacent Karoo strata and mudstone were turned into hornfels and sandstones became more quartzitic.



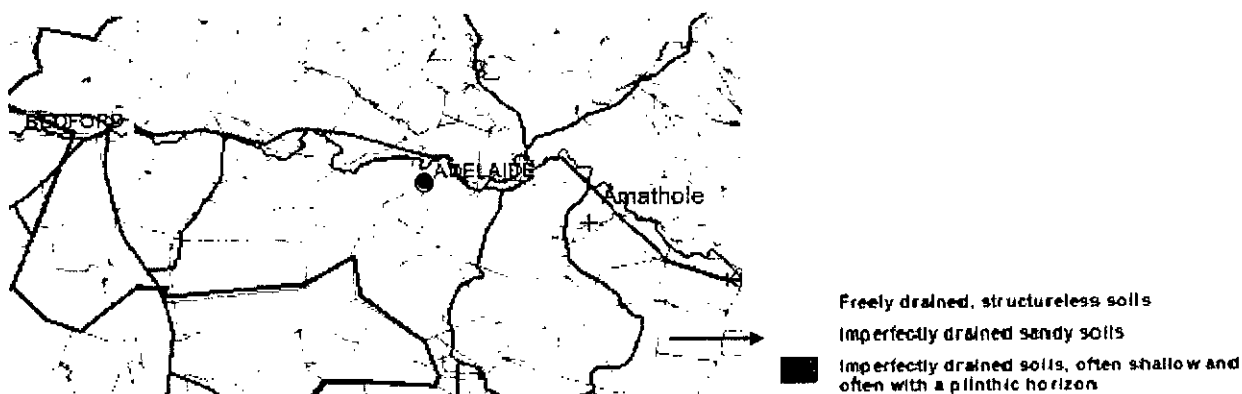
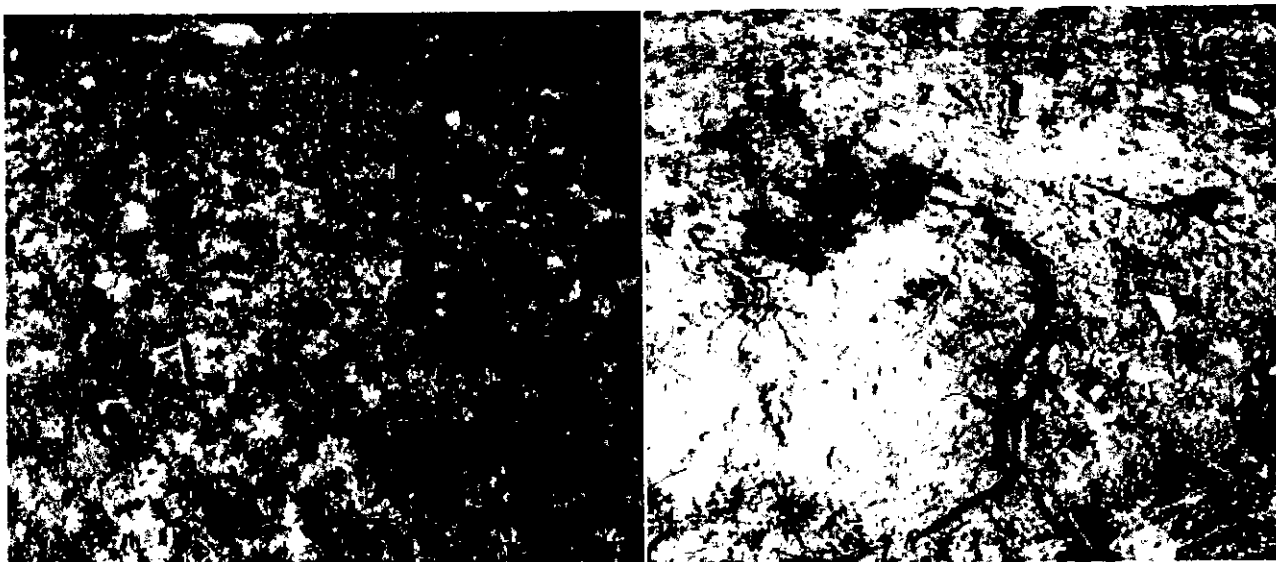
VLAZINGSKAP IN WATERS VERBODEN	ARIJ AFDWIT	Doleriet Dolerite			
	OORDE TIND LEWY IN TROSK	Rib	"Roel" en grye moddersteen, sandsteen "Roel" and gray mudstone, sandstone	Formasie Burgerdorp Burgerdorp Formation	Subgroep Tarkastad Tarkastad Subgroep
	OORDE TIND LEWY IN TROSK	Rik	Sandsteen Sandstone	Formasie Katsberg Katsberg Formation	GROEP BEAUFORTI BEAUFORTI GROEP
	OORDE TIND LEWY IN TROSK	Pub	Grye moddersteen, stobie sandsteen Gray mudstone, oblate sandstone	Formasie Balfour Balfour Formation	
OORDE TIND LEWY IN TROSK	Pum	Grye en "roel" moddersteen, sandsteen Gray and "roel" mudstone, sandstone	Formasie Middleton Middleton Formation	Subgroep Adelaide Adelaide Subgroep	

**Impact on geology**

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Site Specific	1	Site Specific	1	Site Specific	1
Duration	Long Term	3	Long Term	3	Long Term	3
Intensity	Low	1	Negligible	0,5	Negligible	0
Probability	Definite	3	Definite	3	Definite	3
Status	Negative		Negative		Negative	
Confidence	High		High		High	
Significance	Moderate	15	Low-Moderate	13,5	Low-Moderate	12







Incorrect stockpiling of soil can cause its physical nature to deteriorate and become sterile due to compaction, loss of nutrients, texture and structure, chemical properties and decline in biological activity. Soil heaps may therefore not exceed 2m and must be vegetated or be returned to disturbed areas as quickly as possible. Due to the nature of the soils in the study area this alteration of the physical, biological and chemical properties will not be extensive over the short term (3-9 months) and a low reduction in soil productivity is anticipated during the storage period. Topsoil onsite will, according to the rehab schedule, be stored at least for 12-18 months and must therefore be seeded after removal from mining areas to main the fertility.

AS the study area hosts grassland it produces very fine organic matter, which will be recycled at an expedited rate. Supplementation with organic matter should be considered when reinstating topsoil in mined out areas. The AEC & CEC of these soils are normally good and it is anticipated that both important macro as well as micro elements will be well represented and in addition good and calcium: magnesium ratios should be present. The pH-values might be lower due to the influence of the sandstone and lime should be applied to ensure an effective nutrient cycle and mineral absorption, which in turn will stimulate plant growth. pH will not be affected by mining activities.

The potential of soils to rehabilitate is defined by its depth, structure and texture and sequence of soil horizons. On the slopes and valleys soil depth is in excess of 45cm but on the influence of the rock layer directly underneath the soil on the crest of the hills resulted in a much shallower soil depth, but has suitable textural and structural features and it would be amenable to physical rehabilitation. The topsoil is therefore suited to support plant life as demonstrated onsite and is therefore better than sandy/leached soils derived from pure sandstone parent material. Soil will only be placed on the slopes and not the quarry floor as it will be flooded. This will result in increased soil depth on the slopes that in turn will provide for better establishment of vegetation.

Topsoil removed from the mining area will be temporarily stored soil from the plant area will be positioned on the perimeter of the area.

#### Impact on soil properties

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Site Specific	1	Site Specific	1
Duration	Long Term	3	Medium Term	2	Short Term	1
Intensity	Low	1	Low	1	Low	1
Probability	Likely	2	Likely	2	Unlikely	1
Status	Negative		Negative		Negative	
Confidence	Medium		Medium		High	
Significance	Moderate	12	Low	8	Very Low	3

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

Archaeological and cultural sites represent the heritage of communities and are therefore protected in terms of current legislation. In addition all structures older than 60 years are protected. The study area revealed no caves, stone features, shelters or any rock art. The fact that the quarry area reveals very thin soil and almost no overburden rules out the potential to find any archaeological deposits such as human skeletal material and shell middens. The East-London-Transkei area is, however rich in archaeological sites and since the mining site constitute a highpoint in the landscape it is anticipated that Stone Age tools and artefacts could possibly be found in the area. None has been observed from a layman's point of view but the site should nevertheless be inspected by a professional in this field. As sandstone is a sedimentary rock it is possible that fossil bone or plant and animal fossils will be present in the rock. Current rock faces revealed no such findings. The site revealed no historical artefacts or features such as graves, foundations of buildings or other features that relates to domestic and military activities.

It is the author's opinion that the geological nature of the area would prevent the area to reveal any natural heritage or cultural sites and the impact of the proposed quarry is rated preliminary as insignificant. Since the site hosts a common grass cover, it would have very little value to local communities with regards to obtaining vegetation for medicinal purposes. Since the Khoisan and Xhosa people inhabited the study area historically and because the greater has revealed in the past some archaeological findings of importance the following general rules will apply during the operational phase:

1. The operator of the excavator should be briefed regarding this aspect and a reporting channel must be developed.
2. Management will be informed when anything of interest is observed on the site and it will be reported immediately to Dr. Binneman at the Albany Museum in Grahamstown and SAHRA's office in East London. In such case all operations would be suspended immediately.
3. Any finding will be fenced off immediately.

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