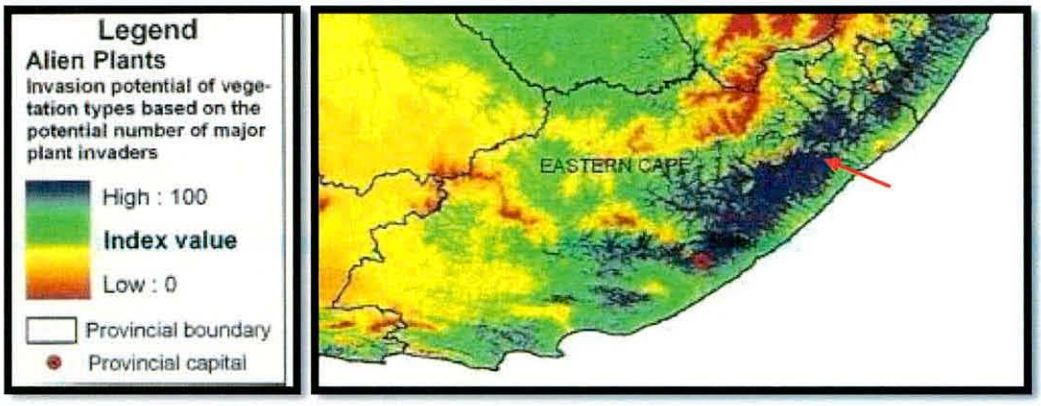
Considering the ecological status of the mining area the impact of mining on vegetation of the area is rated of low-moderate significance if no mitigation measures are implemented and of very low significance if the area is seeded and infill planting is done.

Alien vegetation in the form of Lantana camara, and is present onsite and the threat of invasion of disturbed areas seems high. In terms of the index provided this area are highly susceptible to infestation. The re-vegetation process needs to be conducted and controlled properly otherwise rehabilitated areas could be subjected to infestation, which would jeopardize the sustainability of the project and land capability at closure.



The study area constitute a minor vocal point in the landscape and taking the impact of the current excavation into consideration, the extension area should be rehabilitated to a better standard in order for the disturbances to be effectively absorbed in the landscape. In following this approach the setting of the area will not be detrimentally affected. Concurrent rehabilitation of the disturbed mine area is important to achieve this goal and adequate time and funding should be devoted to the rehabilitation process. It is imperative that a phased approach be followed to ensure that vegetation disturbance is restricted to the minimum and to set definite targets for the applicant. Import of additional soil is advised to achieve the above mentioned rehabilitation goals.

From the above analysis it is clear that this vegetation type can withstand some loss of natural areas through development. Taking into consideration that a very small area will be affected and that this area will be reinstated within the next 3-4 years, the impact is rated as low.

Impact on flora

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Site Specific	1	Site Specific	1
Duration	Permanent	4	Medium Term	2	Short Term	1
Intensity	Very Low	1	Very Low	2	Negligible	0
Probability	Definite	4	Likely	3	Probable	2
Status	Negative		Negative		Negative	
Confidence	High		High		High	
Significance	**Low-Moderate**	**28**	Very Low	10	Insignificant	4

Remedial measures to be implemented are:

It will be possible to restore the grassland vegetation over the short to medium term. A positive factor is that the mine area is abutted by tracts of similar vegetation that could act as a seed bank for newly rehabilitated areas and in combination with seeding will ensure the successful rehabilitation of the site. Species diversity

will improve over time but will be a long term process. The success rate of re-vegetation will, however, depend on a concurrent rehabilitation approach and a post closure maintenance programme.

- Mining will be restricted to the areas demarcated by the mine plans.
- No indigenous vegetation outside the demarcated mine boundaries will be removed.
- Shot rock, overburden and soils must be properly stabilized through compaction, before topsoil is reintroduced to the slopes and seedbed is prepared.
- All natural vegetative matter removed will be reintroduced into the soil to possibly re-sprout or as mulch to improve soil properties.
- Only the approved haul road will be used and vehicles will not traverse virgin land.
- Disturbed areas will be re-vegetated with a grass cover by seeding with:

Eragrostis curvula/capensis	*Themeda trianda*	*Sporobolus africanus*
Digitaria eriantha	*Cynodon dactylon*	*Heteropogon contortus*
Microchloa caffra	*Paspalum dilatatum*	

- These grasses are all natural to the area. Seeding would take place in the spring from late September to February at an application rate of 3-5kg/ha of each species.
- Seed will be broadcasted by hand and areas will be raked over to cover seed and protect it from birds feeding in the area. Seeding, germination and surface cover will be monitored on a continuous basis. This vegetation cover would require the minimum maintenance and within a short time will improve the visual appearance of the site. Maintenance will be carried out until closure was granted.
- Each phase should reveal a 40% basal cover within the first 12 months, a 70% cover at the end of the two year period and 80-90% cover at the end of the aftercare period.
- Once a groundcover has been established, limited infill planting will follow to mask the topographical changes brought about by mining and further improve the visuals of the site. For each tree a planting hole of at least 0,4m x 0,4m x 0,4m deep will be prepared and filled with adequate topsoil and compost and a very light application of 2:3:2. Each hole will be properly watered before planting takes place.
-

Acacia natalitia;	*Acacia robusta;*	*Boscia albitrunca;*	*Cussonia Spicata*
Brachylaena ellptica	*Erithrina caffra*		

  These trees should be planted in a staggered manner along the edges of profiled high walls. *Acacia natalitia* can be planted at random on the quarry floor.

- Water for irrigation purposes will be obtained from the nearby streams.
- Once the area has been vegetated, a continuous alien control programme will be implemented by pulling any seedlings on a weekly basis with specific emphasis on *Acacia mearnsii, Acacia longifolia, Acacia saligna, Rucinus comunis, Lantana camara and Solanum species*. No alien tree/shrub will be left until it reaches seed bearing age.
- Once an area is vegetated, no traffic will be permitted in such area.
- Veld fires will be prevented since it could affect the vegetation and grazing capacity of the farm, as well the abutting farms and in the process impact on soil stability and land use. Fires will only be permitted on bare soil in a designated area and appropriate appliances. Fire extinguishers will be made available within the office and cabin of selected vehicles. A fire control programme will be included in the environmental awareness programme.
- Should re-vegetation be exceptionally slow due to dry conditions, the seeded area will be irrigated weekly until a sufficient ground cover has been established
- A phased re-vegetation programme as discussed under 'mine development' will be followed to ensure timeous rehabilitation of disturbed areas in order to increase control over the process and to limit irrigation required.
- Should re-vegetation fail due to climatic conditions, it will be repeated the following growing season.

- Grazing of domestic stock on re-vegetated areas will not be permitted and the mine area will remain fenced until closure was granted. This aspect must be discussed with the communities involved to ensure that the quarry is granted a fair chance to be integrated in the landscape.
- No vegetation/wood outside the mine area shall be removed for fire making purposes.

FAUNA

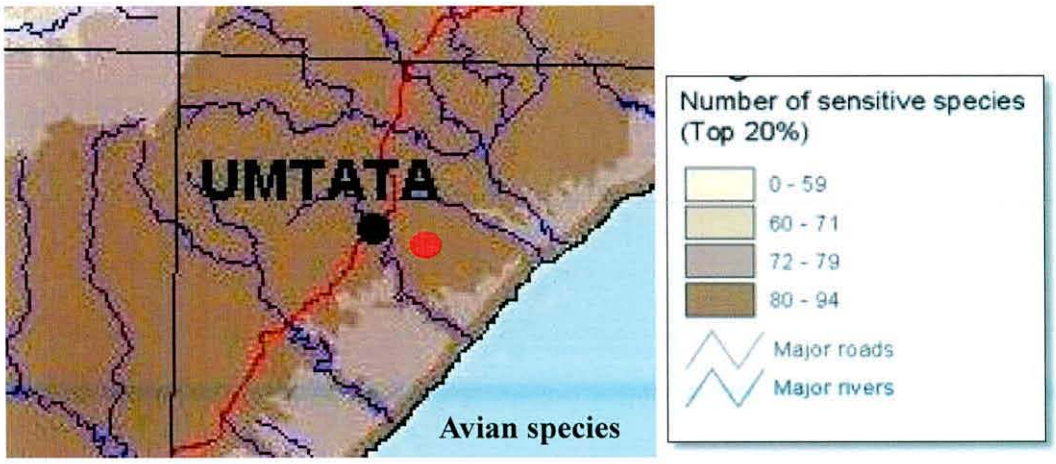
Animals play an important role in maintaining ecosystems for example pollination, spreading of seeds, eradication of pests/insects, forming part of a specific food chain, trimming of vegetation and therefore determining penetrability of vegetation and generation of manure that impacts on soil fertility etc.

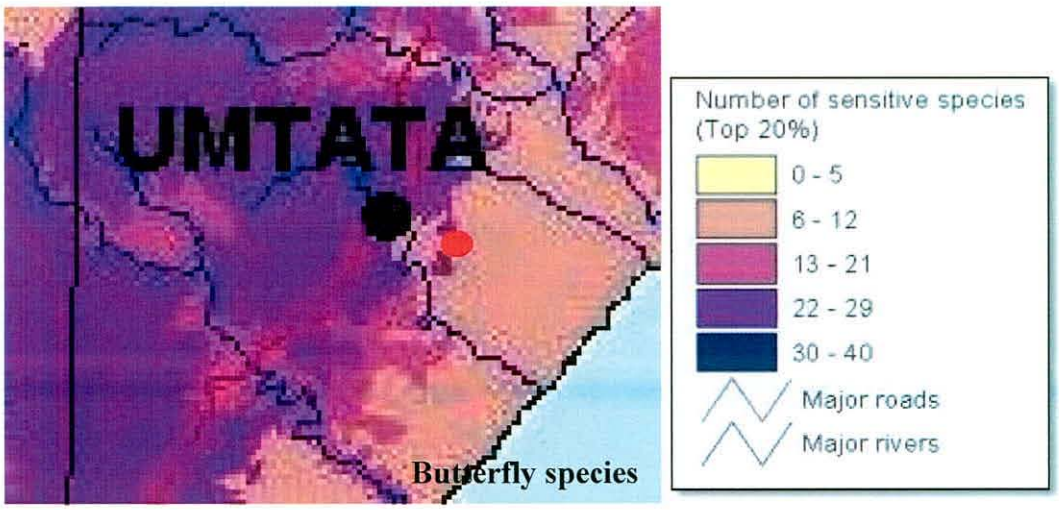
In terms of the vegetation analysis the site hosts Bisho Thornveld, which covers an extensive area and due to the extensive food sources that it provides, it should hosts a diverse array of herbivorous mammals. Animals found within this biome tend to be somewhat smaller than those found in thickets but in the Transkei they have vacated the grasslands and is generally confined to protected/secluded habitats because of uncontrolled/excessive hunting.

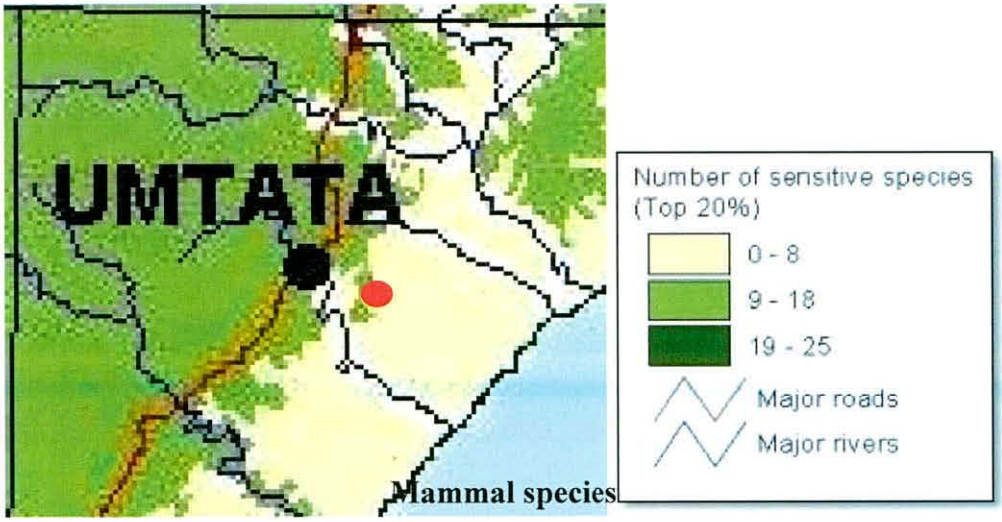
The intact portion of the study area therefore constitutes a non-important niche for fauna due to the limited nesting place and protected areas as well as the limited food source available, which is mostly the result of overgrazing. Since the site is located close to large human settlements, the environment experiences extensive pressures through pastoralism and hunting it does not warrant special consideration. Based on the above the intact portion of the study area constitutes a niche of very low ecological value. In addition, the area to be affected is limited and mining should pose negligible impact on species diversity or migration patterns. Despite this assessment destruction of natural habitat should, still be avoided as much as possible.

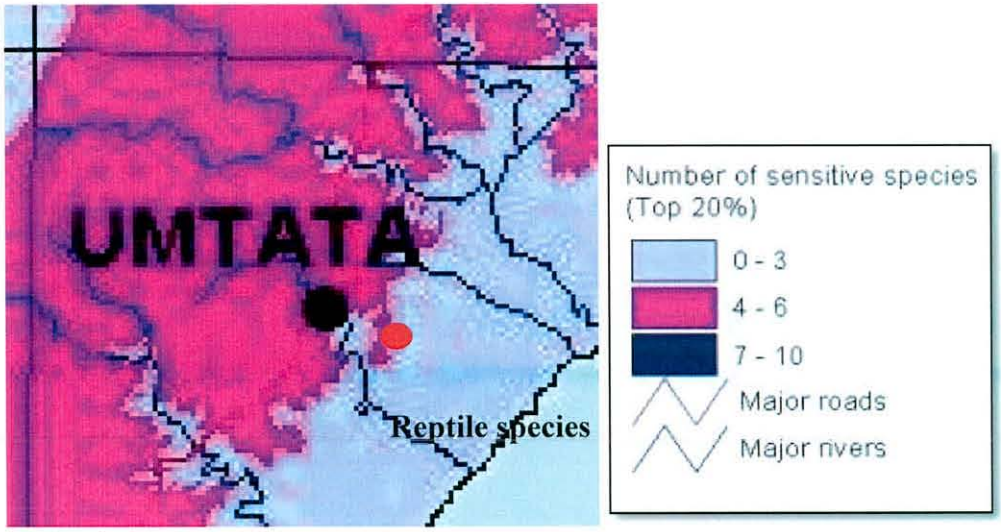
In the study area no large mammal species were detected but few avian species, reptiles (lizards), rodent droppings and insects were observed. This however is not indicative of the absence of animals since only a few hours were spent onsite and it has been observed that, due to farming pressures, most animal species has turned nocturnal and would be restricted to the lower lying valley areas and steep valley sides. Considering the poor faunal status of the area a formal survey was not deemed essential.

In order to assess the faunal sensitivity of the site and thus the potential impact on faunal assemblages, reference is made to the broad EMPAT assessment as well as the broad Eastern Cape State of the Environment Report.

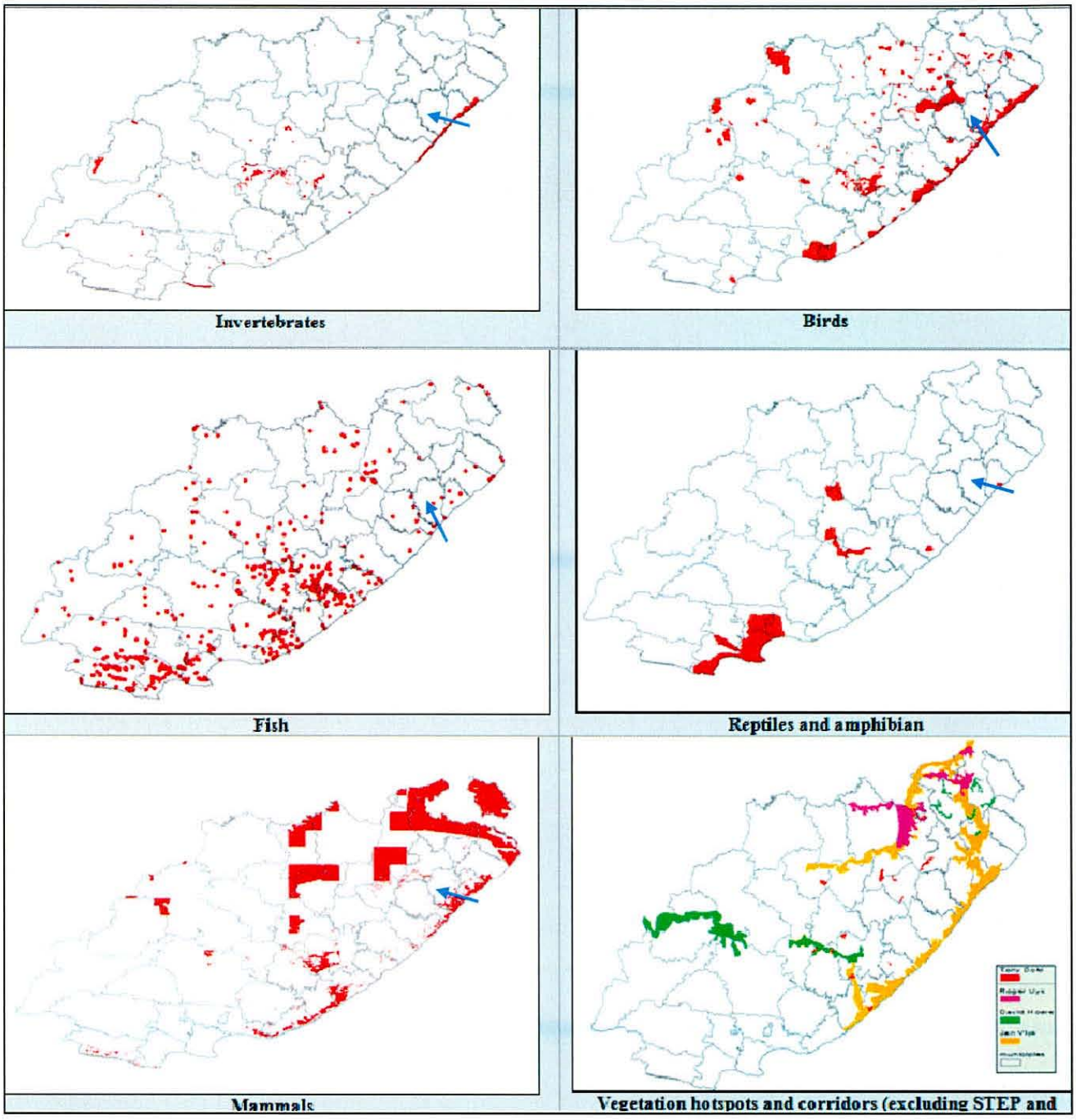








From the above EMPAT maps it seems if the number of sensitive species in this biome is low-medium, except for bird species, which is high. This is too some extent confirmed by the Eastern Cape State of the Environment Report. However, no avian fauna were observed onsite and considering the small area to be involved, the potential risk of affecting species of concern is rather low.



Below follow a list of animals obtained from the ECSOER with a status ranging from vulnerable to endangered that possibly could occur within the greater study area. Considering their distribution it seems if the proposed mining area is not located within a critical zone and the potential impact on the animals listed seems of very low significance.

Table 5.4: Threatened and endemic reptiles and frogs (Burger, *pers comm.* 2003)

	Species	Threatened	EC Endemic	Distribution
AMPHIBIANS	*Heleophryne hewitti*	CR	X	Longmore Forest, only four rivers in the Elandsberg range
	Anhydrophryne rattrayi	EN	X	Amatola forests, e.g. Katberg, Stutterheim, Keiskammahoek
	Bufo amatolicus	EN	X	Winterberg and Amatola mountains, Katberg to Keiskammahoek
	Leptopelis xenodactylus	EN		
	Natalobatrachus bonebergi	EN		
	Afrixalus spinifrons	EN		
	Bufo pardalis		X	Wide distribution from Eastern seaboard from Port Elizabeth to East London and inland to Amatola region
REPTILES	*Bitis albanica*	RDB candidate	X	Restricted to Algoa Bay
	Acontias meleagris orientalis		X	Sundays River valley and Cradock
	Acontias pusilus		X	Border EC KZN; Kokstad
	Acontias percivali tasmani		X	Algoa basin
	Scelotes anguinius		X	Algoa basin
	Nucras taeniolata			Algoa basin and Albany centre
	Tropidosaura montana subsp rangeri		X	From Amatola mountains as S to Albany region
	Tetradactylus africanus fitzsimonsi	RDB candidate	X	Algoa basin
	Cordylus tasmani		X	Algoa basin
	Bradypodion. caffrum		X	Wild Coast
	B. contanicum		X	Centani
	B. taeniabroncum	Possibly EN	X	Van Stadens Berg and near Kareedouw
	B. ventrali		X	Coast to Karoo and Thicket
	Afroedura amatolica		X	Amatole and Katberg mountains
	Afroedura karroica		X	Inland mountains in Karoo; Tarkastad to Graaff-Reinett regions
	Afroedura tembulica		X	Mountains around Queenstown
	Afroedura sp nova		X	Kouga Mountains and Cockscomb
	Cryptactites peringueyi	RDB candidate	X	From Chelsea Point near P.E., east to Kromme estuary
	Goggia essexi		X	Upland areas in Albany region, Suurberg to Great Fish River

Table 5.5: Threatened large- to medium-sized mammals in the Eastern Cape Province (Smithers, 1986)

Latin Name	Name	Status
Lycaon pictus	Wild dog	Endangered
Hyaena brunnea	Brown hyaena	Rare
Proteles cristatus	Aardwolf	Rare
Felis nigripes	Black-footed cat	Rare
Felis serval	Serval	Rare
Panthera pardus	Leopard	Rare
Philantomba monticola	Blue duiker	Rare
Mellivora capensis	Honey badger	Vulnerable
Felis lybica	African wild cat	Vulnerable
Orycteropus afer	Aardvark	Vulnerable
Equus zebra	Cape Mountain zebra	Vulnerable
Diceros bicornis	Black rhinoceros	Vulnerable
Ourebia ourebi	Oribi	Vulnerable
Manis temminckii	Pangolin	Vulnerable
Felis nigripes nigripes	Small-spotted cat	Rare

Birds

The Eastern Cape Province contains 62 threatened bird species (Table 5.6). Many of them are associated with wetlands or are grassland species, highlighting the declining condition of these ecosystems. As can be expected from this highly mobile group there are no Eastern Cape endemic birds, although nine bird species are South African endemics.

Table 5.6: Threatened bird species in the Eastern Cape Province (Barnes, 2000)

Common Name	Latin Name	Conservation Status	
Bearded Vulture	*Gypaetus barbatus*	Endangered	
Bittern	*Botaurus stellaris*	Critical	
Black Harrier	*Circus maurus*	Near-threatened	*
Black Oystercatcher	*Haematopus moquini*	Near-threatened	
Black Stork	*Ciconia nigra*	Near-threatened	
Blackbellied Korhaan	*Eupodotis melanogaster*	Near-threatened	
Blackbrowed Albatross	*Diomedea melanophris*	Near-threatened	
Blackwinged Plover	*Vanellus melanopterus*	Near-threatened	
Blue Crane	*Anthropoides paradisea*	Vulnerable	*
Blue Korhaan	*Eupodotis caerulescens*	Near-threatened	*
Broadtailed Warbler	*Schoenicola brevirostris*	Near-threatened	
Bush Blackcap	*Lioptilus nigricapillus*	Near-threatened	*
Cape Cormorant	*Phalacrocorax capensis*	Near-threatened	
Cape Gannet	*Morus capensis*	Vulnerable	
Cape Parrot	*Poicephalus robustus*	Endangered	
Cape Vulture	*Gyps coprotheres*	Vulnerable	*
Caspian Tern	*Hydroprogne caspia*	Near-threatened	
Chestnutbanded Plover	*Charadrius pallidus*	Near-threatened	
Corncrake	*Crex crex*	Vulnerable	
Crowned Eagle	*Stephanoaetus coronatus*	Near-threatened	
Damara Tern	*Sterna balaenarum*	Endangered	
Delegorgue's Pigeon	*Columba delegorguei*	Vulnerable	
Finfoot	*Podica senegalensis*	Vulnerable	
Grass Owl	*Tyto capensis*	Vulnerable	
Greater Flamingo	*Phoenicopterus rubber*	Near-threatened	
Grey Petrel	*Procellaria cinerea*	Near-threatened	
Ground Hornbill	*Bucorvus leadbeateri*	Vulnerable	
Halfcollared Kingfisher	*Alcedo semitorquata*	Near-threatened	
African Penguin	*Spheniscus demersus*	Vulnerable	
Knysna Warbler	*Bradypterus sylvaticus*	Vulnerable	*
Knysna Woodpecker	*Campethera notata*	Near-threatened	*
Kori Bustard	*Ardeotis kori*	Vulnerable	
Lanner	*Falco biarmicus*	Near-threatened	
Lesser Flamingo	*Phoenicopterus minor*	Near-threatened	
Lesser Kestrel	*Falco naumanni*	Vulnerable	
Ludwig's Bustard	*Neotis ludwigii*	Vulnerable	
Mangrove Kingfisher	*Halcyon senegaloides*	Vulnerable	
Marabou	*Leptoptilos crumeniferus*	Near-threatened	
Marsh Harrier	*Circus ranivorus*	Vulnerable	
Martial Eagle	*Polemaetus bellicosus*	Vulnerable	
Melodious Lark	*Mirafra cheniana*	Near-threatened	*
Orange Thrush	*Turdus gurneyi*	Near-threatened	
Painted Snipe	*Rostratula benghalensis*	Near-threatened	
Pallid Harrier	*Circus macrourus*	Near-threatened	
Peregrine	*Falco peregrinus*	Near-threatened	
Roseate Tern	*Sterna dougallii*	Endangered	
Rudd's Lark	*Mirafra ruddi*	Critical	
Secretary bird	*Sagittarius serpentarius*	Near-threatened	
Shy Albatross	*Diomedea cauta*	Vulnerable	
Southern Giant Petrel	*Macronectes giganteus*	Near-threatened	
Stanley's Bustard	*Neotis denhami*	Vulnerable	
Striped Flufftail	*Sarothrura affinis*	Vulnerable	
Tawny Eagle	*Aquila rapax*	Vulnerable	
Wandering Albatross	*Diomedea exulans*	Vulnerable	
Wattled-Crane	*Burgeranus carunculatus*	Endangered	
White Pelican	*Pelecanus onocrotalus*	Near-threatened	
Whitebacked Night Heron	*Gorsachias leuconotus*	Vulnerable	
Whitebellied Korhaan	*Eupodotis cafra*	Vulnerable	
Whitechinned Petrel	*Procellaria aequinoctialis*	Near-threatened	
Whitecrowned plover	*Vanellus albiceps*	Near-threatened	
Yellowbilled Stork	*Mycteria ibis*	Near-threatened	
Yellowbreasted Pipit	*Anthus chloris*	Vulnerable	*

Note: SA endemic indicated by a *

In order to ensure that the minimum impact is imposed on any animal species, a mindful mining approach will be followed. Mining would be restricted to the smallest area possible and the slow extraction rate would provide adequate time for migration of any animals remaining on site to be sustained in similar adjoining habitats. In addition, noise generated by vehicles and the crusher will cause most animals to vacate the site on a temporary basis. Noise levels on site will to range between 55 and 80 decibels at the mine boundaries and will tend to drive animals away from it, which would preclude them, getting affected within the mine area. Blasting (120-140 dB) on the other hand could startle domestic as well as wild animals with the potential result of stampeding them. It is therefore important to ensure that no domestic animals and are within 300m of the site during blasts. Although the higher noise levels could drive animals away, it will not necessarily harm them since they get used to living in noisy areas. If certain species were to be affected they would simply vacated the proposed mining areas during the day and return during the night and over the weekends.

Indiscriminate hunting/trapping/poaching could be a potential problem and the necessary discipline has to be enforced and monitoring must take place. The applicant will take responsibility for any animal that is proved to be killed by quarry staff or quarry activities. Strict management measures will be put in place and severe penalties will be applicable if any animal on site is poached.

Since the site does not constitute a definite corridor for animal movement migration patterns of animals will not be detrimentally affected. The close proximity to roads and almost continuous traffic will also cause animals to vacate the surrounds.

Limited hydrocarbon spillages anticipated would not detrimentally affect fauna on site as it would be localized and dealt with in an expedited manner. Storage of hydrocarbons and the servicing of vehicles will be strictly controlled within the plant area where no wild life will be present hence no impact is anticipated. Since the plant and quarry area is not directly linked to any drainage channel and movement of vehicles will not take place in close proximity to stream environments, no aquatic fauna will be affected. With regards to silt transport all silt will be trapped within the excavation or within the depression and will not pose any impact on faunal species.

The post mining vegetation cover will, from an ecological point of view, provide over time for limited protection, forage and nesting possibilities and would constitute an improved ecological niche which, will provide the opportunity for animals to return to the rehabilitated environment especially when infill planting is done.

In conclusion, it is the author's opinion that the removal of the vegetation in the study area will not result in the extinction of any specie or decrease in species numbers and the impact on the faunal diversity of the site is rated insignificant.

The positive socio-economic impact of the proposed operation will definitely outweigh the negative impact on fauna and flora of the area, provided that the rehabilitation proposals are followed. Subject to that animals are not disturbed/hunted by humans, it is known that animals grow accustomed to noises and would eventually return to their former niche area during quieter times or when disturbed areas are adequately rehabilitated.

Impact on Fauna with mitigation

	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	2	Very Low	1	Very Low	1
Probability	Probable	2	Unlikely	1	Probable	2
Status	Negative		Negative		**Positive**	
Confidence	Medium		High		High	
Significance	Very Low	14	Insignificant	4	Very Low	6

Remedial measures to be implemented are:

- Vehicles will not display fuel, oil or lubricants leaks and will be maintained to an acceptable standard offsite.
- Any fuel spills will be cleaned up immediately and the contaminated soil removed to the closest waste facility.
- Handling/storage of fuels will be in accordance with all applicable protocols & legislation to prevent pollution incidents.
- Movement of vehicles will be restricted to the authorized mine area.
- No animals entering or settling in the mine area will be disturbed or killed and this requirement will be included in the environmental awareness programme, to be developed for the workforce
- No hunting or snaring would be allowed outside or inside the mine area and the applicant will implement a severe penalty system for people transgressing this requirement. In addition, the owner or manager will remove any of the staff caught interfering with stock/wildlife from the site immediately. The surrounding area will be inspected for snares on a regular basis.
- All animals found in working areas where they might be injured, will be relocated to areas outside the mine area.
- Nesting sites will be temporarily excluded from the mine area or be carefully relocated. No eggs from any nest may be removed.
- Clearing of vegetation on site will be restricted to the minimum area required for optimal extraction of stone.
- Areas to be cleared will be swept by a competent/responsible person before vegetation is removed. Relocate any herpentofauna and slow moving animals to areas outside the mining areas.
- Disturbed areas will be properly rehabilitated as per the process outlined in the re-vegetation programme.
- No vegetation outside the mine areas will be removed and spread of alien vegetation will be prevented.
- Veld fires will be prevented by only allowing cooking fires in designated areas in appropriate appliances. The applicant will take full responsibility for any financial losses in this regard that is the result of negligence.
- Mining area will be clearly demarcated and areas outside it will be out of bounds.
- Production faces will be profiled properly to ensure that it does not pose any danger to animals and to facilitate proper re-vegetation.
- Mining will not impact on any surface water area.
- Pesticides/poisons will not be used in a careless or uncontrolled manner and only approved pesticides should be used for example on rodents in the office area. No poisons may be placed outside the office or in the veld.
- The area within 300m from the mine will be cleared of any domestic stock before blasting takes place. The communities to be affected will be informed of the time of blasting on the day of the blast.
- Blasting schedules will be limited to what is necessary for optimum extraction and should be restricted to early afternoon and sunny days to limit air over pressure impact. Blasting should not occur with a low cloud cover in place as it will amplify the noise generated by the blast.
- Noise generation will be curbed by servicing and maintain mining equipment properly.

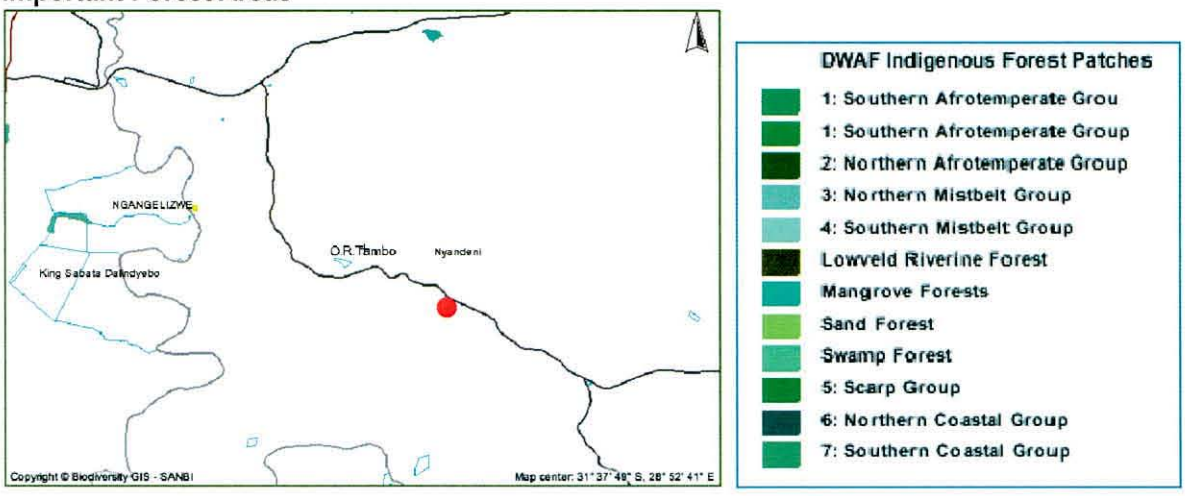
SENSITIVE ENVIRONMENTS/CONSERVATION STATUS

More than 50% of the study area constitutes transformed land whilst the remainder forms part of the Bisho Thornveld. In order to ensure that development is not affecting sensitive environments an overview is provided on the ecological status of the proposed quarry area.

National

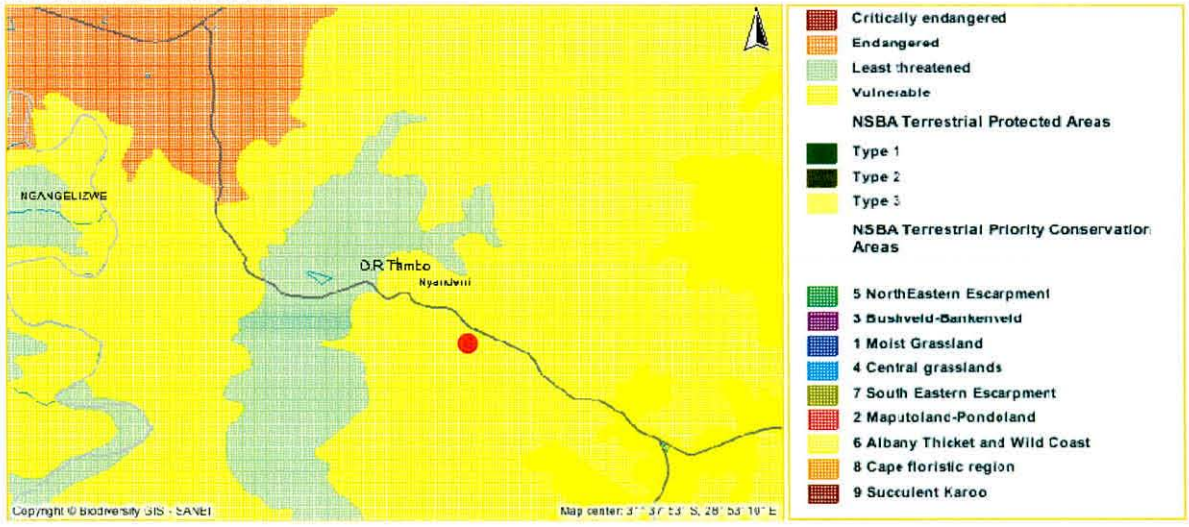
In terms of DWAF statistics the quarry area is not located close to any indigenous forest patches, but two minor, isolated Transkei Mistbelt Forest (southern Misbelt Group) sites are located to the distant east and north and will thus not be affected.

Important Forest Areas



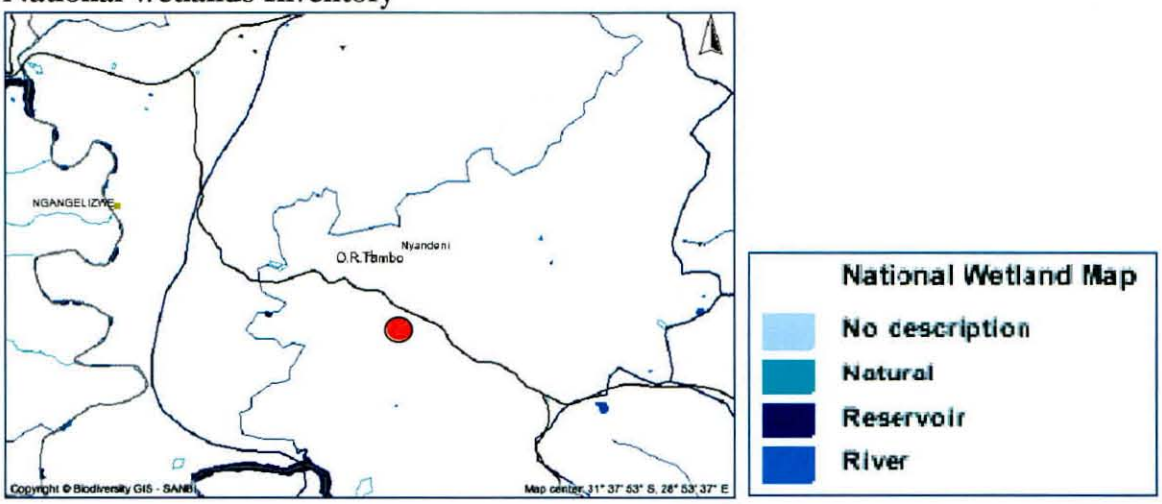
In terms of the NSBA terrestrial ecosystem status the quarry site is not located within a Terrestrial Priority Conservation Area or Protected Area. The study areas concerned have the status of 'Vulnerable' hence the areas are not subject to any direct ecological threat and can sustain limited further development provided that the necessary mitigation measures are applied.

NSBA Protected Areas



In terms of the NSBA River Ecosystem Status, as presented under the chapter on 'Surface Water' the quarry site is not located near any river system that is under pressure or endangered but very distant to a vulnerable watercourse. Being situated almost at the crest of a high hill the mining site does not host any off-stream or in-stream wetlands of importance hence the proposed development will impose a zero impact on sensitive aquatic systems.

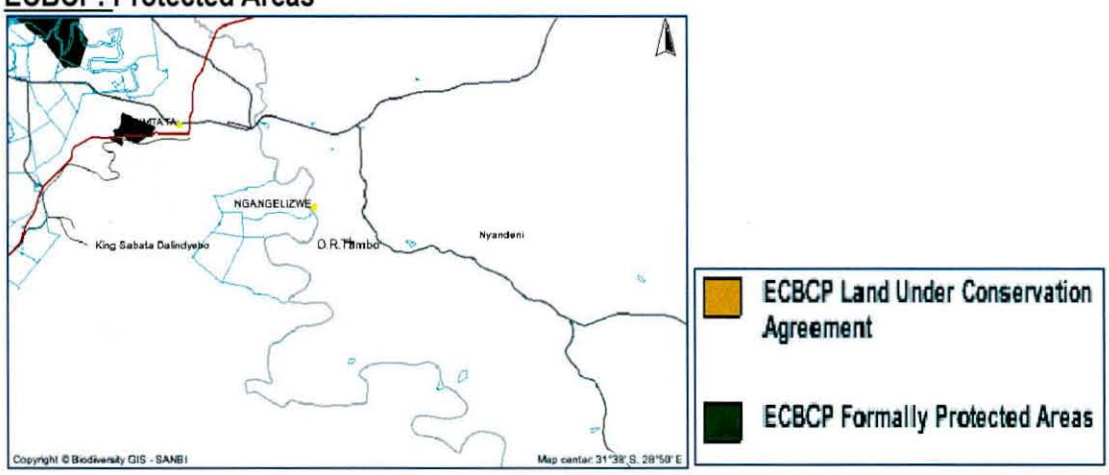
National Wetlands Inventory



Provincial

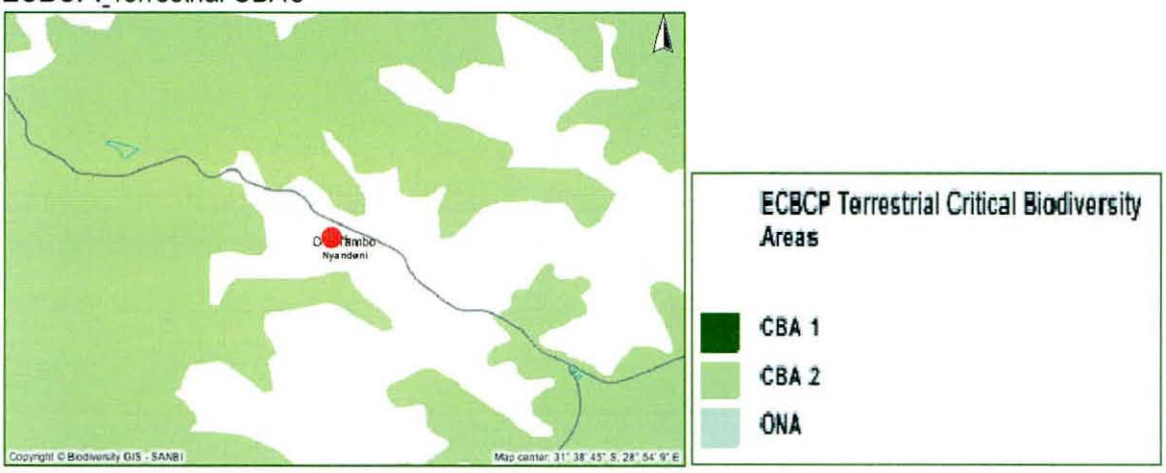
In terms of the Eastern Cape Biodiversity Conservation Plan the area concerned is not incorporated within a formally protected area or land under formal conservation agreement. The nearest site is located near Mthatha.

ECBCP: Protected Areas



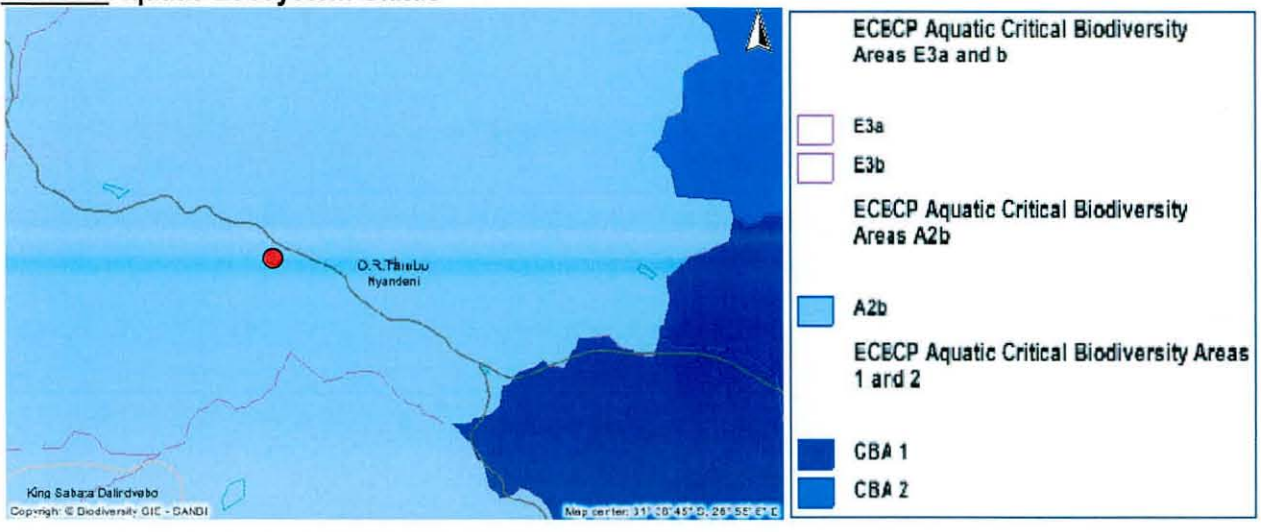
The study area is not located within a Terrestrial Critical Biodiversity Area hence minor environmental impacts in terms of vegetation and soil are deemed acceptable. The study area therefore also does not constitute an important ecological corridor and would not affect migration of plant and animal species. Limited transformation of the natural environment is therefore acceptable.

ECBCP: Terrestrial CBA's

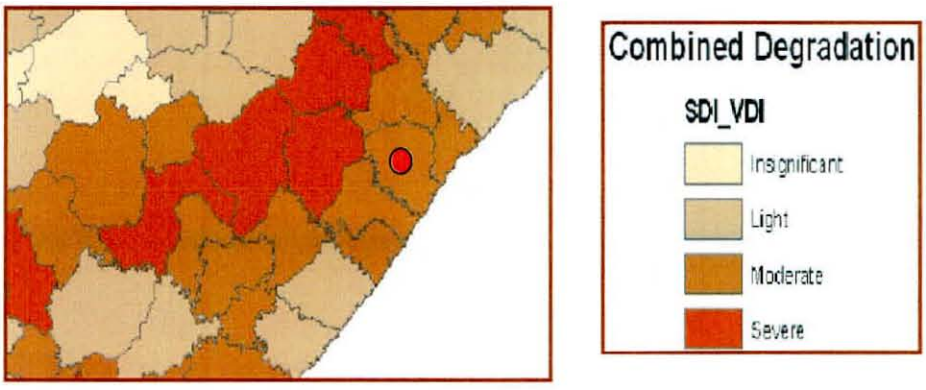


In terms of ECBCP the study areas fall inside an A2b area, which indicate that the proposed development will not impact on any aquatic system but still requires that terrestrial impacts within the catchment must be restricted to the minimum to prevent excessive silt, nutrient and chemical transport to sensitive surface water systems. Considering that no water will leave the quarry and that the process area will be protected from erosion, the objectives of the ECBCP will be achieved.

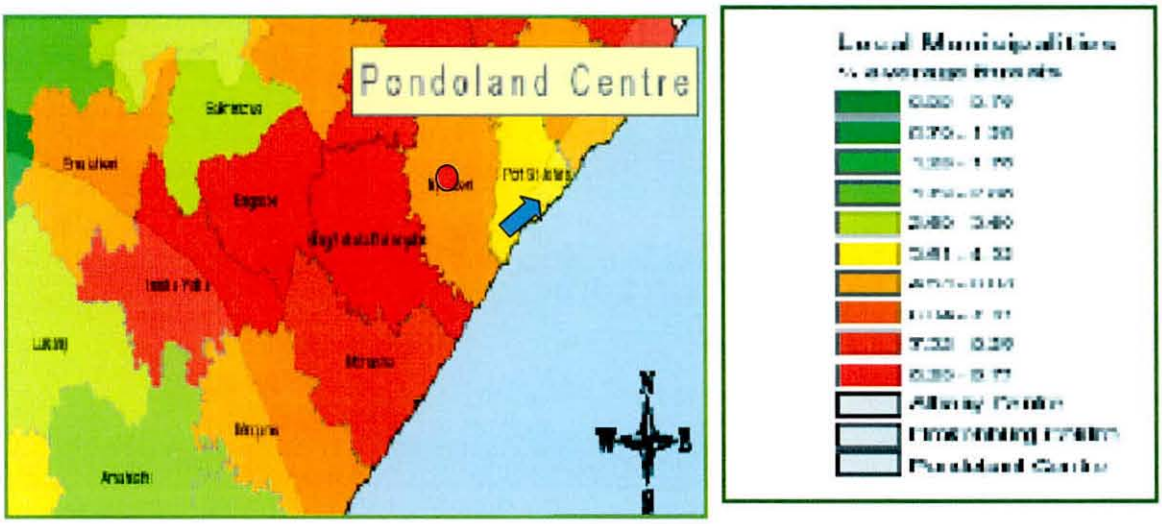
ECBCP: Aquatic Ecosystem Status



In terms of the Eastern Cape State of the Environment the veld in the study area in terms of soil and veld degradation, is deemed to be moderately degraded as was noticed on site, mainly due to overgrazing. With this in mind it is important that the quarry site is properly rehabilitated to a functional portion of land. The conditions of this report is geared towards such end use

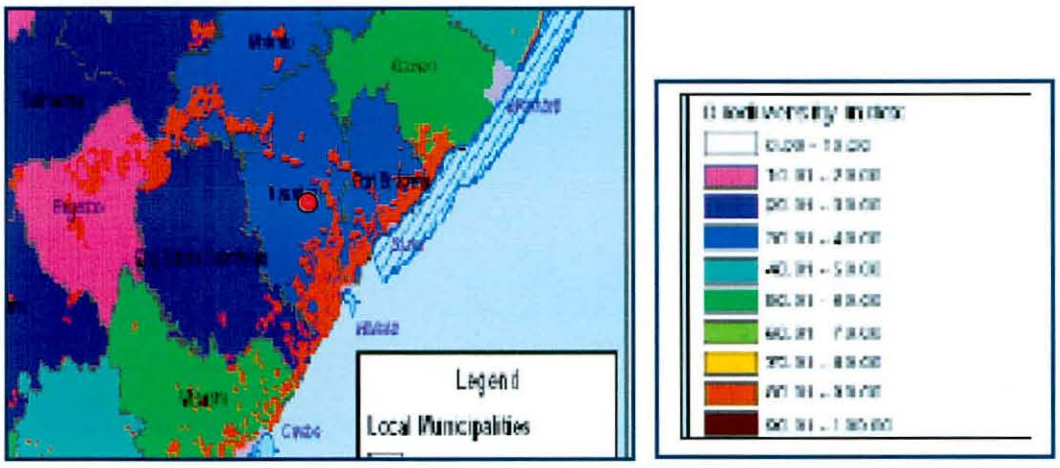


The study area is also not located near any important centre of endemism. The Pondoland Centre is located to the distant south-east hence the site should not host important endemic or near endemic species or species with Red Data status. However, the Nyandeni Municipality experience a moderate to high percentage of ecological threats to natural systems due to residential development and agricultural practices. Disturbances should therefore be kept to the minimum or be adequately rehabilitated.

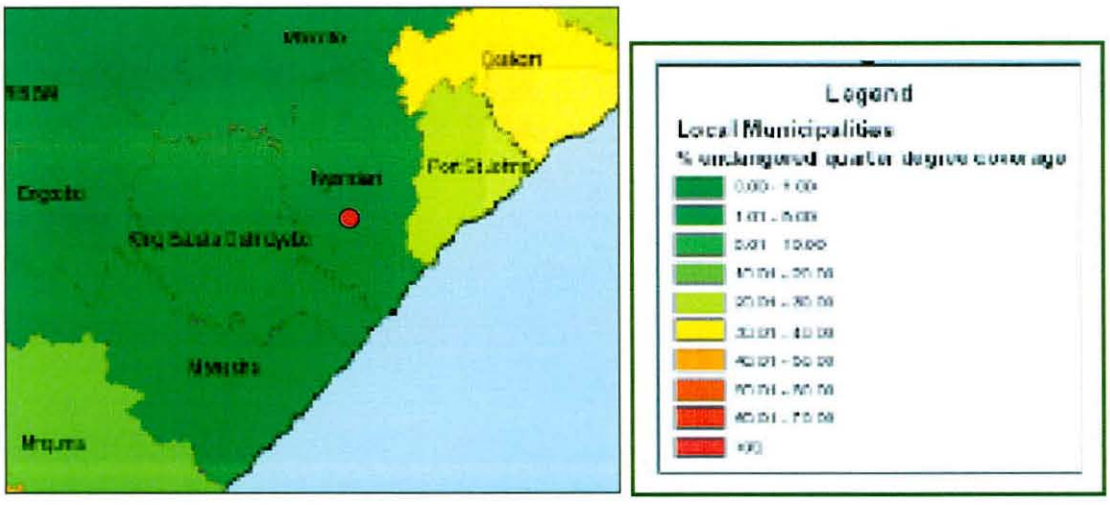


With regards to biodiversity importance the site falls within an area with a very low biodiversity index which cause the municipal area then also to host a negligible percentage endangered species and a very low percentage of vulnerable species.

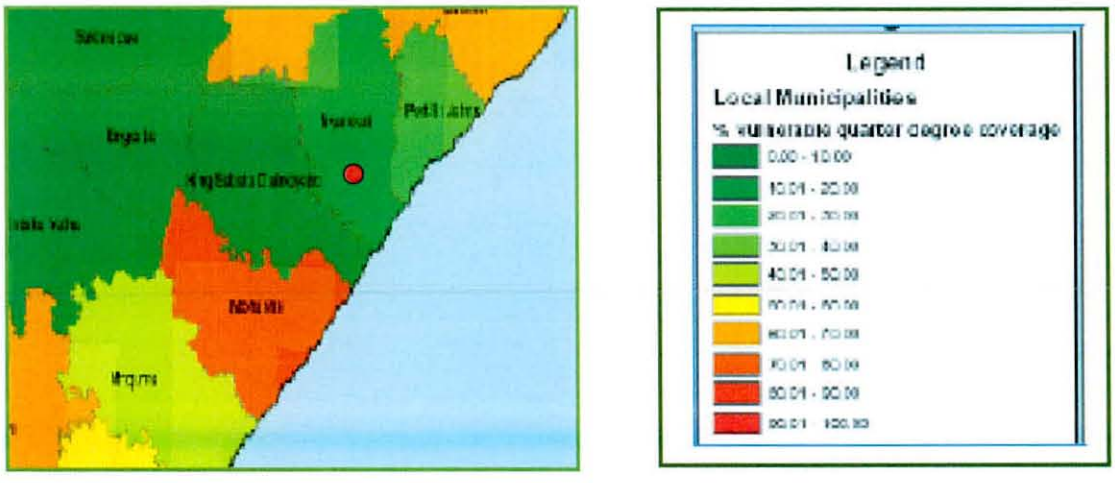
Biodiversity Index



Percentage endangered plant species per Municipal area



Percentage of vulnerable plant species per Municipal area



Considering the environmental status of the quarry area and immediate surrounds, as well as the distance to protected areas, it is the opinion that the proposed development will not detrimentally affect the ecological

functionality of any sensitive environments and the impact is rated very low no additional mitigation measures other than rehabilitating the quarry to an acceptable standard is required.

SURFACE & GROUNDWATER

SURFACE WATER

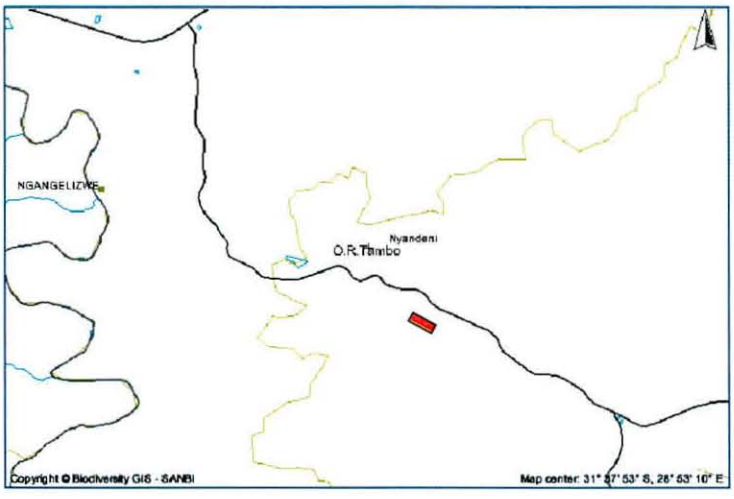
The site is located in quaternary sub-catchment T20E within the Mthatha River Catchment area and is administered under the Water Management Area: Umzimvubu to Keiskamma. There is no water transfer scheme in close proximity to the site.

According to hydrology maps the area receives an annual precipitation of approximately 750mm per annum and experiences annual evaporation of approximately 1410mm with a MAP-MAR response of 4, which is directly related to topography, vegetation cover and penetrability of soils. The catchment area is characterized by steep sides hills which will increase velocity of runoff rates and same can be expected within the study area and storm water control structures must be able to accommodate this increase in runoff during high precipitation rates. The moderate rainfall that the area receives would assist re-vegetation processes during the summer periods and irrigation thereof might not be necessary during normal climatic conditions.

Mean annual quaternary catchment runoff in the map area varies between 237--419 mil.m^3 indicating good infiltration and positive water balances during the rainy season. However, due to the thin topsoil in the study area being positioned on solid rock, increased runoff volumes along the stone cutoff layer can be expected. Runoff volumes will increase substantially when topsoil has been removed and the northern face need to be protected by means of a cut-off berm as disused earlier in the EMP. Fortunately the catchment area is relatively small and will result in low runoff volumes. This explains why the quarry holds very little water and does not overflow.

The study area is not located close to any drainage system and should therefore not affect surface water quality in the area, provided that the area below the quarry on the southern and south-western end is not disturbed since the headwaters of a secondary dry drainage channel is found here. The study area is drained by means of overland surface flow and most of the runoff from the area above the quarry will be concentrated in the excavation. In order to prevent clean water to enter the quarry and protect the north-western face once freshly rehabilitated, a diversion berm will be constructed ahead of the face diverting the water west and eastward along the contour where it can be spilled safely.

The dry water course to the south-west confluence approximately 4km to the north-west with the perennial Cumngce River, which in turn confluence 5km to the west with the Mthatha River. The former mentioned river is a Class D river and largely modified and dispose of a sensitivity status of 'Vulnerable'. It is therefore important that the system is not further affected by developments. Since the proposed mining site is located a few hundred meters from the dry water course and since no water will egress from the quarry, the surface water quality of the Cumngce River will not be affected. It should be mentioned that the Mthatha River carries a substantial silt load most of the year due to extensive soil erosion in its catchment therefore minor silt transport of silt from the surrounding quarry area would not negatively affect the ecological status of the river nor its water quality.



NSBA Rivers Ecosystem Status

- **Critically endangered**
- **Endangered**
- **Least threatened**
- **Vulnerable**

Since the crushing plant and stockpiles will either be located in the quarry or in the depression north-east of the quarry no sediment flow will occur to the natural environment and hence no surface water would be affected. TSS and TDS load of the dry water course will only be affected by sediment transport from the access road but due to the grassland buffer between the watercourse and road and distance involved it will be filtered out before it reaches the Cumngce River. Based on the small catchment area involved it is not anticipated that the study area will experience extensive runoff volumes.

No water would egress from the plant area (in the depression) due to the embankments around it hence crushing sediment will not enter the natural environment. Potentially runoff could also be contaminated with hydrocarbons but this impact is rated very low considering that polluted water will remain in the depression and the solid dolerite foundation will prevent downward percolation into the main aquifers. Extraction of the rock will obviously increase runoff from the sides of the excavation but it will all be retained in the excavation with no detrimental impact on surface water quality. The excavation will not be free draining.

To limit runoff in the quarry it will be developed and rehabilitated in phases, which will also prevent the silt load of water in the excavation being increased and will still be good for animal consumption.

Sewage

Potentially, the toilet facilities could cause coliform contamination of surface runoff, but due to the limited number of people onsite and the fact that it is a closed system will cause this impact to be of low significance

provided that it is correctly maintained. The site is not located near any abstraction points or cultivation areas therefore any minor spills that might occur, will impose a negligible effect.

Hydrocarbons

Only a small maintenance area for machinery/vehicles will be established in the form of a concrete slab fitted with a central sump for capturing any spilled hydrocarbons therefore the potential for hydrocarbon spills to occur is limited. The limited number of equipment/vehicles to be used onsite and the fact that the applicant will perform major maintenance work off-site, will further reduce the risk of surface water pollution. Vehicles will also not be cleaned onsite hence oil contaminated wash water will not be a consideration.

Bulk fuel storage facilities will be housed onsite therefore water pollution can potentially occur. If major spills occur due to destabilization of the fuel tank or used hydrocarbon storage facility, it will be retained in the depression and surface layers will be severely affected. The solid rock foundation will preclude an impact on the main aquifer. The same impact would be applicable if the plant is located within the quarry. The impermeable foundation will render it possible to retrieve much of the mentioned spill but will still result in a negative impact on any remaining vegetation within the depression. It is therefore essential that all storage areas are being protected with bund walls and sumps to contain spills effectively. Emergency repairs onsite could lead to limited contamination of surface water but the limited amount of vehicles and low extraction rate as well as the use of appropriate receptacles such as drip pans will cause this impact to be of low significance.

Waste

Since no processing plant will be housed on site no contaminated or toxic wastewater will be generated; therefore no treatment facilities for this purpose are needed. Due to the low number of workers that will be onsite and the ad hoc crushing activities limited amounts of household or industrial waste would be generated and therefore management facilities would be restricted to one or two waste bins in the plant area.

Water Consumption

Potable water will be brought to site from the nearest Municipal reticulation network whenever required and will be stored in a JoJo tank, which will also replace the lost communal water abstraction point in the quarry. If it is required to irrigate vegetated areas during extreme dry periods, *ad hoc* consumption will not exceed $30m^3$ per week and will be obtained from the excavation or nearby river systems. Water for dust suppression at the plant and stockpile area will be required and will be obtained from similar sources. During worst case climatic conditions water consumption will not exceed 10 cubic meters per day whilst during periods of low wind speeds it will not exceed 5 cubic meters per day. Under non-draught conditions the mentioned water consumption should not impose any major impact on water availability from any of the river systems.

The impact of water abstraction from natural surface water sources is rated insignificant during normal climatic conditions and low extraction rates but will increase to low during periods dominated by high winds and high extraction rates.

Haul Road

It is unlikely that the haul road would be a source of increased silt laden runoff, but if such scenario develop, it will be controlled by cross and side drains directing runoff to the grassland where silt will be filtered out. A negligible impact on surface water quality is anticipated.

Stockpiles and Production Faces

Topsoil and material stockpiles will be a source of silt, which will increase the silt load of runoff considerably. As referred to previously, grey water from the plant area will be retained either in the excavation or in the depression with no negative environmental impact. Topsoil berms will be seeded and stabilized and vegetation covers will mostly prevent any sediment transport, especially in light of the small catchments that are involved

Based on the abovementioned factors the impact of the quarry operation on natural surface water is rated of very low significance but could increase marginally if the applicant engages into full time crushing and relocation of the plant area and impacts should be reassessed under such conditions.

Impact on surface water quality and quantity

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Local	2	Site Specific	1
Duration	Medium Term	2	Short Term	1	Short Term	1
Intensity	Low	2	Very Low	1	Very Low	1
Probability	Likely	3	Probable	2	Unlikely	1
Status	Negative		Negative		Negative	
Confidence	Medium		High		Medium	
Significance	Low	18	Very Low	8	Insignificant	3

GROUNDWATER

The main groundwater aquifer in this area is restricted to the sandstones at depth. Since the target material is dolerite, which is not a water bearing rock, a negligible impact on groundwater is anticipated. Although the topsoil is directly positioned on top of the dolerite it would pose no threat to groundwater sources in terms of silt generation or hydrocarbon spills. Mining will only take place within the upper dolerite layer and it will not affect the main aquifer within the sandstones at the base of the dolerite dome. Dolerites also do not foster the existence of perched aquifers hence no impact is anticipated in this regard. Dolerite is also mostly impenetrable and do not contribute to aquifer recharge. This may well take place along the contact zone of mudstones/sandstones with the dolerite dome, but these areas will not be disturbed

Blasting could result in a reduction in borehole capacity due to movement of sub-layers however; there are no boreholes in the immediate surrounds.

Groundwater capacity/quality

Silt production

The plant area will produce silt, but infiltration into the rock is impossible and since the area is surrounded by natural material, it will filter out any sediment when percolating through this material. Taking the extent of the operation as well as locality into consideration, infiltration of sediment into the soil will not affect the primary aquifer due to the depth thereof and the retention capacity of the dolerite rock reserves. This impact is rated of negligible.

Sewage facilities

The proposed chemical toilets are closed systems and only negligible contamination of topsoil and subsequent perched aquifers could be applicable. However, percolation through the rock will result in dilution and bio-remediation and will prevent any impact on the main groundwater aquifers, especially since the facilities will not be located close to any borehole. It is essential that the soil in the toilet area is not removed to increase the absorption capacity of the substrate on top of the dolerite. Any potential plume will then be localized in the top layer. It will be essential that the toilet(s) are serviced regularly to maintain the low impact. The fact that the area has a very negative water balance would reduce any potential impact, but would not be applicable during periods of heavy precipitation.

Hydrocarbons

Only a small maintenance area for machinery/vehicles will be established in the form of a concrete slab fitted with a central sump for capturing any spilled hydrocarbons therefore the potential for hydrocarbon spills to occur is limited. The limited number of equipment/vehicles to be used onsite and the fact that the applicant will perform major maintenance work off-site, will further reduce the risk of ground water pollution.

Bulk fuel storage facilities will be housed onsite therefore ground water pollution can potentially occur. If major spills occur due to destabilization of the fuel tank or used hydrocarbon storage facility, spillages will tend to percolate into the dolerite, but would not reach primary or perched groundwater sources. Considering the likelihood that the latter will occur with the storage areas being protected by bund walls and servicing being done on a concrete floor with a sump, this impact is rated negligible. In the absence of mitigation measures the impact is rated of low significance.

Waste

During the crushing cycle the site will generate small volumes of waste that could affect groundwater quality but if controlled properly it should not pose any groundwater impact due to the reasons already provided. The waste stream will be restricted to household waste and used hydrocarbons and contaminated vehicle/equipment parts, which will be deposited in acceptable receptacles fitted with a proper lid and protected by bund walls. If disposed of regularly in the correct manner, it should not pose a negative groundwater impact. 'Industrial waste' will be restricted to limited scrap metal and machine parts and will pose similarly a negligible impact if the correct recycling procedures are followed. Considering the above, no treatment facilities are required for the site. During the 'no crushing' period negligible amounts of waste will be generated and similar impact on groundwater is anticipated

Water consumption

As pointed out, dolerite is not a water-bearing rock hence no abstraction will take place.

Impact on ground water quality and reserves

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Site specific	1	Site Specific	1	Site Specific	1
Duration	Short Term	1	Short Term	1	Short Term	1
Intensity	Low-Medium	3	Low	2	Negligible	0
Probability	Probable	2	Unlikely	1	Unlikely	1
Status	Negative		Negative		Negative	
Confidence	Medium		High		High	
Significance	Very Low	10	Insignificant	4	Insignificant	2

Remedial measures to be implemented are:

- Mining will be restricted to the proposed depth and footprint.
- The cutoff berm above the quarry and around the plant in the depression will be retained and will remain vegetated.
- Disturbed areas of the mine will be vegetated as soon as possible and as per rehabilitation plan.
- Haul roads to be protected against erosion by construction of mitre/side drains.
- Vehicles will not use alternative roads or damage vegetation outside the approved mine boundary.
- Spillage of explosives will be prevented to reduce excessive nitrogen loads to any surface or sub-surface water.
- The sewage system and/or chemical toilets will be constructed and maintained according to applicable building specifications .
- Bulk fuel containers will be positioned away of main internal haul route to reduce the risk of it being destabilized. These containers shall be bunded and a storage capacity of at least 115% of storage volume will be provided. Fuel pumps will be provided with an apron and sump to contain spills. Vehicles will be serviced on a concrete slab provided with a sump to contain spills. Wash-bays, if applicable will be provided with an oil trap. All used hydrocarbon storage will be restricted within a bunded area and where applicable under roof and provision will be made for disposal to a registered recycling facility on a regular basis.
- No foreign or unapproved material/substance will be dumped or stored within the footprint of the mine area, with specific emphasis on post closure use.
- Waste will be contained in receptacles stationed at appropriate designated areas and removed from the quarry area on a weekly basis or whenever necessary. No household or industrial waste will be burnt or buried on the site. If necessary the waste area will be lined with a durable PVC liner 20cm below ground level.
- Emergency vehicle maintenance will be done over suitable drip trays within the service area.
- Any contaminated spares, oil filters and gaskets will be placed in a suitable receptacle and removed from the property on a regular basis to an approved facility.
- If spills do occur, the affected soil will be removed to an approved waste site. Super absorbing material such as Peatsorb or Spillsorb or alternatively sawdust will be kept onsite or in vehicles onsite and used to contain larger spills when necessary.
- In case of large, critical spills the Departments of Water Affairs and DMR will be informed immediately for assistance and advice and a competent company conversant with bio-remediation will be appointed to address the possible impacts of such spill.
- Management will not entertain hydrocarbon spills on site and where necessary penalties will be imposed on workers in cases of negligence.
- No hydrocarbons or hydrocarbon-contaminated material/parts will respectively be drained in the soil or buried on the property.
- The plant area will be cleared from deposited dust and will be used in the cement brick making process.
- All dysfunctional equipment and vehicles will be removed from site immediately.
- No stockpile of any nature will be placed outside the approved mine area.

- Vehicles/equipment shall be maintained to a high standard and shall not display any major leaks.
- The applicant accepts the principle of 'polluter pays'.

AIR QUALITY

The air quality of the mine area and immediate surroundings is excellent since there are no construction or industrial activities taking place. In addition the site is not located close to any arable land that is worked on a regular basis. Minor decreases in air quality is mostly short term and related to an increase in dust generated by vehicles on the internal gravel roads or an increase in smoke related to occasional burning of domestic waste or smoke generated by cooking fires.

Considering the rural setting, it is pertinent that the applicant implement definite measures to keep disturbed areas as small as possible and reduce dust generation from topsoil/material stockpiles and crushing plant effectively. This could be achieved through expedited re-vegetation processes and dust suppression techniques. Availability of adequate water supply from the Mthatha River would render these objectives attainable.

Dust

The amount of dust generated on a mining area is directly linked to the type of material that is extracted, mechanical processes involved, traffic volumes, wind speed and soil moisture content. The finer the material (more easily airborne) and the higher the clay and silt concentrations the more severe is the impact. The dryer the soil becomes the more dust it generates therefore topsoil must be replaced, seeded and covered with organic matter as soon as possible.

Earth moving activities such as removing doleritic topsoil and overburden will generate low amounts of dust, which should not pose any discomfort or be harmful to residents due to the extensive distances involved. This potential impact can be brought under control very soon by implementing the correct re-vegetation and if possible, irrigation strategies and would be of low significance and temporary. In order to prevent the impact at source, minimum areas should be denuded and height of stockpiles must be kept to the minimum. When reintroduced to disturbed areas, topsoil should be irrigated and seeded as soon as possible or such events should coincide with wet periods.

Construction activities at the mine will be limited as explained under the construction phase and the dust impact would therefore be rated of very low significance. Dust counts along the haul road may increase by as much as 400mg/m^2/day but will abate very quickly further away from the road. In terms of DEDEA and SABS standards it should not exceed 600mg/m^2/ for any day of the year with an annual average of 50mg/m^2/day. Considering that 1) a limited amount of trips (8-15; one every 30 minute at most) per day will be undertaken, 2) crushing will only take place occasionally and 3) that no operations will take place over weekends, will cause the said target to be easily achievable. No residences are located along internal haul road and this impact is rated of low significance. This impact can be effectively reduced by dampening the road or maintaining the wearing course on a regular basis. Since dust generation is also determined by vehicle speed in conjunction with axle number, therefore large trucks could potentially generate substantial dust volumes and it is imperative, that drivers reduce haul speed to approximately 40km/h. Without mitigation the impact would be low during normal operations as only a few trips will be undertaken per day but could increase to low-moderate during extensive hauling cycles.

Drilling activities associated with blasting would cause dust liberation around the drill, but would not reach any area outside the mine boundary. Fitting dust bags to the drill rig will largely eliminate this impact and the impact is rated insignificant.

The natural product contains no silt or clay but crushing and screening will result in low-moderate dust volumes under normal climatic conditions but extensive dust volumes could be produced during adverse wind conditions. During normal operations this impact will be largely mitigated by the fact that crushing will only take place one quarter per annum and buildup of fines in the crusher area will be reduced. The *ad hoc* impact will be perceived as acceptable by landowners. It should be borne in mind that the worst-case scenario (winds exceeding 8m/s) will occur on approximate 5-10% of the year and will therefore not be a regular event. It is anticipated that the dust count at any residence will not be increased with more than 50 mg/m^2 per day during worst case scenarios and less than 20 mg/m^2 per day during normal climatic conditions due to distances involved and the wind rose of the area concerned. Under normal (calm) climatic conditions it is not anticipated that dust plumes will reach any residents. Should a major contract be awarded to Ikwezi Quarries that might require continuous crushing, this impact would increase and is rated of moderate significance (cumulative with hauling) and dust suppression on the crusher and screens is a must. If dust suppression is implemented the significance of the impact will be reduced to low.

Blasting will cause an extensive dust cloud to hang in the air above the blasting area for approximately 5 minutes where after prevailing air movement will disperse it quickly. Considering the short period that the impact will be prevalent and the intermittent nature thereof, the impact on abutting landowners is rated of very low significance and should because of distances involved, not be experienced as a nuisance by residents. The impact of both the crushing activities and blasting would be reduced through dilution when dust is dispersed over the 700-1,2km distance to the nearest residents.

Crushing the mineral will release minute silica dust particles (pm2,5-10) into the atmosphere and is rated as a harmful substance that could, with large and continuous dosages over extensive periods of time, result in discomfort and possibly silicosis if no mitigation measures are put in place. The stockpile area and crusher area over time will be covered by a thick layer of very fine dust, which should be removed on a regular basis and used in the brick manufacturing process. The distance to the abutting residences (dilution) and mitigation measures to be implemented will reduce this impact significantly. In terms of the Mine Health and Safety Act, the silica content can be established to determine whether any special precautionary measures are required but it should be noted that dolerite produces much less silica particles than quartzite/sandstone.

Under controlled circumstance respirable counts at dolerite quarries are below the threshold of 1. If the DME requires gravimetric dust sampling, it could be done to establish whether the health of abutting landowners will be adversely affected. Stockpiles and more specifically the crusher dust stockpile could generate substantial dust volumes under adverse climatic conditions hence the use of a sprinkler system is strongly advised during such periods.

Vehicular emissions will at most be related to approximately two excavators, two loaders and a number of trucks/bakkies, but it is anticipated that the impact would be less than the impact caused by traffic on the tar and gravel road. This impact will be reduced substantially under normal operations where the amount of vehicles onsite will be reduced by approximately 75%.

People would not reside on the property, therefore no burning of waste generating harmful smoke or any other form of chemical air pollution is envisaged.

With any rain, dew, or mist, dust liberated into the air will decline drastically. The amount of dust on photosynthetic activity of plants is not well researched but such impact would be negligible taking the conservation status of vegetation surrounding the mine and process area into consideration. Vegetation in the area was subjected to dust from the DRT Quarry and shows no visible impact. No odours will be generated by the mining operation as all bio-degradable waste will be removed from site to an approved waste disposal site on a weekly basis.

At closure, all aggregate and topsoil stockpiles will be removed and disturbed areas will be vegetated with the result that dust generation on site would be almost eliminated.

Impact on air quality: Dust, Emissions & Odours: Normal extraction rates

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Local	2	Site Specific	1
Duration	Medium Term	2	Short Term	1	Short Term	1
Intensity	Low	2	Low	2	Very Low	1
Probability	Definite	4	Unlikely	2	Unlikely	1
Status	Negative		Negative		Neutral	
Confidence	High		High		Medium	
Significance	**Low-Moderate**	**24**	Very Low	10	Insignificant	3

Remedial measures to be implemented

- Vehicles are to be maintained properly and fitted with standard exhaust systems and will not be left idling unnecessary and trips must be restricted to what is essential.
- No burning of waste will be allowed on the property.
- Cooking fires will be restricted to designated, safe areas and to prevent veld fires occurring.
- Bio-degradable waste will be contained in receptacles with proper lids and be removed from the process area on a weekly basis. No odours will be tolerated in the mine area.
- No chemicals that could generate odours will be stored or disposed of on site.
- Wearing course of applicable roads and process area will be upgraded when necessary to reduce dust generation.
- The gravel haul road will be dampened down whenever it is necessary.
- An irrigation system will be installed in the process area to curb dust generation with specific emphasis on the areas in-between aggregate stockpiles and the crusher dust stockpile. Equipment for this purpose must be in place before crushing activities commence.
- The crusher and screens will be fitted with atomizers with specific reference to material transfer points or transfer points should be enclosed. Rubber shutes will be installed at final transfer points if necessary.
- Blasting will be restricted to calm days and blasting design (appropriate burden and spacing and stemming) will be adapted to generate as little dust as possible. If the impact of blasting dictates, the blasting area will be dampened down prior to blasting.
- The mine will be developed in phases to reduce the extent of exposed areas and the minimum area for optimal mining will be denuded ahead of the production face.
- Disturbed mine areas will be re-vegetated as soon as possible as per the re-vegetation plan.
- If dust levels at the process area necessitates 3m high shade cloth windbreaks will be established on the northern, eastern and southern perimeter of the plant area.
- Topsoil heaps will be limited to the minimum height to reduce exposure to wind action.
- If dust generation reaches unacceptable levels Hessian cloth or shade cloth will be used to cover any stockpile that generates excessive dust volumes.
- Handling of topsoil and aggregate during periods of high wind action will be avoided as much as possible. Should irrigation be ineffective during such adverse climatic conditions, quarry operations shall cease. The management system will allow for monitoring of the situation over weekends when no workers are on site.
- Quarry activities shall not impose dust counts of more than 40 mg/m^2/per day at any residence during normal operations.
- If any complaints are received, dust counts will be conducted during crushing projects. The terms of reference for the dust counts must be determined in conjunction with the officials from the DMR.
- Since it was not perceived that the DRT Quarry (which represented a high extraction process) posed a definite dust impact baseline dust counts will not be performed.
- This impact should be addressed in an environmental awareness programme for workers.

NOISE

The impact of noise levels generated by mining activities is determined by the time of day, the consistency thereof, distance to people, whether it is a low or high-pitched noise and whether beneficiation is taking place. Noise levels are more intense in the morning and evening than during the rest of the day and are more irritating if it is high pitched. The more continuous the noise is the higher the impact.

In terms of SABS standards noise levels for rural residential areas are 45dB during the day, 40dB in the early evening and 35 at night. Noise impact is rated against the following: 1) The average person will be able to just detect a noise increase of 2dB, 2) An increase in noise levels between 2-5 will result in no or sporadic complaints from communities whilst an increase between 5-10dB will result in widespread complaints, 3) An intruding noise is defined by National Noise Regulations as disturbing if it causes the ambient noise levels at the border of the property from which it emanates to increase with 7dB, 4) An average person will perceive such an increase in the ambient noise levels as a doubling of noise levels and very strong response will be expected from communities/residents. The impacts caused by the mining operation will be evaluated against the following average noise levels (at source) associated with mining activities: Operation bulldozer (80-90 dB – low pitched); Operating loaders (65-75 dB – low pitched); Haul trucks (60-77dB – low pitched); Blasting (110-140 dB), Crushing system (75-85 dB – low pitched); Reverse sirens (60-75 dB – high pitched).

Noise impact will further be evaluated against a general accepted principle that noise levels abate on average with 5dB over 100m and the nearest residence is approximately 700m from the proposed quarry site, which will result in a reduction of approximately 35 dB of each noise level produced at the quarry.

The rural setting of the study area would, under normal circumstances, probably cause the ambient noise levels to be between 40 and 45 during the day but levels will be intermittently elevated to approximately 50-60dB within 100m from the tar road. Trucks drivers have to be sensitized on the matter and vehicle speed should be reduced where possible and use of exhaust brakes limited. During normal operations the frequency of trips will not exceed two per hour due to the low demand anticipated.

Noises generated at the quarry will generally be low-pitched if operating equipment is well maintained. There is one exception and that is the reverse sirens which produce a high pitched, irritating noise and where a number of vehicles will operate at the same time it might cause some irritation to nearest residences. Since the fitting of the sirens is a requirement of the Mine Health & Safety Act as well as OHS Act, there is no mitigation possible, except for preventing operations very early in the morning of late at night. During normal operations this noise will be produced at an ad hoc basis by only one loader. If a major aggregate contract is received all the potential noises listed above will be continuous and will last for between eight and twelve months and noise levels will most probably be constantly raised by 3-5B at the nearest residence which might cause some irritation, but it will still be below the prescribed SABS levels.

Impacts related to the use of the bulldozer will be *ad hoc* as it will only be used during the clearing of potential overburden onsite when necessary. Drilling rigs will produce noise levels up to 80dB at source, depending on the hardness of the rock and nearest residents could potentially be affected in a limited manner. However, this noise will be produced for approximately one week per month/quarter when preparing for the next blast and will therefore be temporary.

Blasting will cause a severe impact once a month/quarter. It will be essential that the necessary information on blasting schedules be submitted to the two nearest rural communities. During normal operations blasting will cause the impact to be temporary and therefore more acceptable to abutting residents. For the remainder of the time operations at the quarry will therefore be restricted to the *ad hoc* loading of products from the stockpiles stored onsite and will pose a very low impact. Maintenance of equipment where steel on steel action generates noise will cause some disturbance and should be avoided early morning or late afternoon. Mining or crushing at night-time is not contemplated.

No workers will be housed on the mine therefore no noise generation at night would be applicable. Management of this impact during the day could be achieved via an environmental awareness programme. In addition, staff and contractors would be sensitized not to engage in unnecessary hooting, shouting, flapping of tailgates and use of exhaust brakes during operational hours. Maintaining speeds below 30km/h would assist in curbing noise impact caused by haul trucks.

Noise Impact : Normal extraction rates

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Local	2	N/A	
Duration	Medium Term	2	Short Term	1		
Intensity	Low	2	Low	2		
Probability	Definite	4	Unlikely	2		
Status	Negative		Negative			
Confidence	High		High			
Significance	**Low-Moderate**	**24**	Very Low	10		

Remedial measures to be implemented

- All vehicles will be fitted with standard exhaust systems and be regularly serviced.
- Unnecessary hooting, shouting, flapping of tailgates and use of exhaust brakes will be discouraged and be penalized where necessary.
- Unnecessary idling of vehicles will be discouraged.
- Travelling speed on the internal haul road will be reduced to 40km/h.
- Moving parts of vehicles/screen/crusher will be regularly lubricated, replaced and serviced.
- Repair work that involves using grinders and hammers on steel or any other steel on steel activity will not be done early morning or early evening.
- Normal working hours will apply for weekdays (7.00am-5pm in summer and 7.30am-4.30pm in winter) and Saturdays (8am-1pm) if necessary– No work on holidays or Sundays.
- Workforce and contractors will be properly managed in terms of noise generation and be sensitized on dignified human behaviour.
- Protective hearing devices will be provided to all operators of machinery/vehicles generating noise above 55dB at source.
- Truck drivers will be tasked to use exhaust brakes sparingly.
- No campsite will be established at the quarry area.
- Blasting will be done during midday when clear skies prevail when over air pressure impact will be minimal. The minimum charges required for optimum blasting will be used. Area to be blasted must be aligned with the allowable impact on the road. More frequent blasts should be considered above large blasts. Adequate stemming should be used and abutting residents must be provided with a blasting schedule.
- If noise complaints are received, noise readings will be done for at least five working days when the quarry experience normal working schedules. The terms of reference for the noise counts must be determined in conjunction with the officials from the DMR.
- This impact should be addressed in an environmental awareness programme.

WASTE GENERATION AND MANAGEMENT

Building rubble

Construction activities related to foundations for crushers, mobile offices, mobile workshops and construction of bund walls might be applicable to this project and therefore potentially cement residue, brick residue, ceramic waste and PVC residue will be generated, but in small amounts. This material generated during the construction phase will be removed to the existing excavation. Mixing of cement will generate waste waters that could affect soils in the area and needs to be addressed.

At closure all foundations and demolished brick buildings/bund walls, etc. need to be removed to the quarry void. Any other material needs to be sold off or to be deposited at the nearest approved waste facility.

Negligible impacts on soils, water, vegetation, air quality and humans are anticipated.

Industrial waste

During the operation a medium amount of industrial waste such as batteries, tyres, contaminated filters, computer parts, cables and dysfunctional equipment will be generated. There will be a need to store this waste and remove it to approved waste sites or recycling facilitates as it might over the long term affect soils, surface and groundwater and humans through producing chemical leaching into the soil. The impact is rated of very low significance due to the limited size of the operation and distance to surface water and residences.

Domestic waste

The waste stream will consist mainly of domestic waste (food, bottles, plastic bags, paper, clothing, rags etc) and the required receptacles for this purpose need to be put in place. The waste stream will be small since no mining camp will be established in the quarry area. Poor control over domestic waste handling could lead to littering the site and therefore lowering the aesthetic appeal of the surrounds. It could also lead to livestock mortality on communal land if animals consume it. Poor management would also lead to foul odours, which must be prevented. Considering the extent of operations the minor waste stream will have a very low impact on soils, water, vegetation, air quality, animals and humans.

Mine residue

The geology of the area restricts the type of potential residue to oversize rock and crusher dust. Oversize material will be stowed away in the quarry and used to profile the sides thereof. No storage space is required for this purpose and no cumulative visual impact will be created. Crusher dust will be one of the more prominent waste products during normal operations but due to the high demand for this material at cement brick manufacturing facilities, it is not anticipated that it will build up onsite. In addition, once the brick market has been established, the applicant will consider using it at her own brickyard. With the brickyard in operation this material will be removed on a constant basis and a very low impact is envisaged since stockpiles onsite will be limited to 2-3day's supply.

The amount of surface vegetation to be removed will be negligible and will pose no impact.

Since no chemical processes, mineral processing or washing plant is required on site no chemical/mineral waste will be generated. If explosives and crusher dust stockpiles are handled correctly the operation will pose a negligible impact in terms of mine residue.

Sewage system

The ablution system will consist of chemical toilets and possibly wash basins. Possible impact would be soil and ground water contamination (coliform contamination) and foul odours. Considering the distance to surface water, primary aquifers and people the impacts are rated very low during mining operations. On average the effluent stream will not exceed 10 cubic meters of water and 1 cubic meters of solid waste per month and the impact would therefore be very low. At closure the chemical toilets will be removed from the site.

If the system is operated correctly the impacts on soils, groundwater, air and humans is rated negligible significance.

Hydrocarbons

Storage of used hydrocarbon storage, which is classified as hazardous waste, and servicing of vehicles will take place in the process area. Normally this waste is not properly controlled on mining sites and result in soil and water pollution. Although the position of the quarry is such that this type of waste will not necessarily immediately affect water sources, animals or humans, but accept from being a poor environmental approach it could affect groundwater sources and re-vegetation process detrimentally over time. It is therefore essential that designated areas for the storage of used hydrocarbons, lubricants and solvents are established. It is also important to provide the correct receptacles for storage and tools for transfer thereof. With regards to service areas it should dispose of a concrete surface with a sump.

Considering the small mining operation, emergency servicing of equipment and vehicles outside the service area should not be entertained. Used filters and gaskets or oil contaminated parts are normally dumped in domestic waste bins, which should be avoided and special receptacles must be made available. Cleaning of engines or engine parts should take place in a wash-bay area fitted with an oil trap but most probably will be done offsite in Mthatha or Ngqeleni. The correct strategies should therefore be put in place to categorized waste correctly and identify suitable waste sites for different waste types generated in the process area. Effectively controlling this impact will require that the human error factor needs to be addressed through an environmental awareness programme.

Salvage yard / Scrap metal

Since it is a mechanized operation a small amount of dysfunctional machine parts and scrap metal could be generated and will be stored within a designated fenced area and will impact on the visual appearance of the site and to a negligible extent on the heavy metal concentration in soils and over time, perched aquifers. The salvage section should be tidied up on a regular basis and usable spares must be neatly positioned; uncontrolled stacking in the area should be avoided. It is also imperative that all unusable equipment and machine parts be regularly disposed off at an appropriate recycling facility to prevent buildup. The impact is rated very low on soils and also on the aesthetics of the area since the site is topographically well screened.

At closure, all scrap metal and dysfunctional equipment will be sold to a commercial scrap yard. The post closure impact is rated insignificant.

Impact of waste on environment

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Site Specific	1	Site Specific	1
Duration	Medium Term	2	Short Term	1	Short Term	1
Intensity	Low	2	Low	2	Very Low	1
Probability	Definite	4	Likely	3	Probable	2
Status	Negative		Negative		Neutral	
Confidence	High		High		High	
Significance	**Low-Moderate**	24	Low	12	Very Low	6

Remedial measures to be implemented are:

Staff will be trained to distinguish between domestic, industrial, mine and hazardous waste.

Building rubble

- Staff would be trained to distinguish between various types of building rubble. General building rubble will be neatly stored in a demarcated area or immediately removed to the existing excavation. Other rubble that could be harmfully to the environment such as metals & PVC will be sold to a recycling company or deposited at an approved waste site.
- At closure all material generated during the demolishment of buildings and ripping of concrete surfaces will be deposited in the quarry and covered with overburden and topsoil. Any potential hazardous material will be disposed of at the closest waste facility.

Industrial waste

- An area will be cleared demarcated and fenced for industrial waste. Tyre casings will be disposed of as soon as possible at the nearest registered waste facility or be sold to a recycling facility. Dysfunctional equipment shall be sold to a recycling company or disposed of at a hazardous waste site, depending on the nature of the materials involved. All batteries shall be recycled to a facility like Midas or be removed to a hazardous waste facility. Staff will be informed on the hazards and correct manner to deal with waste stored at the quarry.

Salvage yard / Scrap metal

- The salvage yard will be fenced off and all usable material will be neatly placed in rows and separated in applicable categories.
- Unusable scrap metal or dysfunctional machinery will be positioned on one side and removed on a weekly basis to an appropriate recycling facility.

Hydrocarbons

- A designated service area fitted with a concrete slap and sump will be provided.
- No major maintenance and servicing will be done in mine or process area, but rather at an appropriate facility in town. Oils will not be drained on the concrete floor but into appropriate receptacles, which will then be emptied with funnels into the used oil receptacles.
- A designated area for the storage of used hydrocarbons will be provided. It will dispose of a bund wall (115% of volume stored and fitted with a release valve in case of heavy precipitation) and concrete floor. It will be divided in two distinct sections for used oils and contaminated parts and will be clearly marked as such. Appropriate receptacles will be provided for each type. If these receptacles are not having a proper lid, the area must be provided with a roof.
- All used hydrocarbons will be sold off on a monthly basis to a recycling company such as e.g. Oilcol.

- All hydrocarbon-contaminated material, including soil to be disposed at a hazardous waste facility. Affected soil will be treated with fertilizer/surfactants or bio-remedied by a specialist in case of any large spills.
- No hydrocarbons will be drained into the soil.
- Contaminated vehicles or machine parts will only be washed / cleaned in a wash-bay constructed for this purpose and it must dispose over an appropriately designed oil trap.

Sewage system

- The chemical toilets will be maintained according to Municipal regulations. If it produces foul odours, it shall be remedied according to available guidelines.
- If there is any doubt on the impact of the system on groundwater, groundwater analysis shall be performed. Proper care will be taken that the surrounds are not used for ablutions and the necessary penalty system will be imposed in this regard.
- One chemical toilet will be provided for every eight-ten people.

Mine residue

- At closure all concrete floors/foundations will be ripped up and the material disposed of in the quarry void and covered with overburden and topsoil.
- At closure all remaining rock and aggregate will either be returned to the excavation or sold off and the topsoil stockpiles reintroduced to disturbed quarry areas.

Domestic waste

- Large refuse bins fitted with a proper lid will be positioned at the various work stations in the process area and be emptied on a regular basis.
- Waste receptacles will be clearly marked to increase visibility and to distinguish it from hazardous waste receptacles. During normal operations the waste bins will suffice.
- Domestic waste will neither be dumped in the surrounding veld, nor burnt nor buried on site.
- Waste will on weekly basis be removed to the nearest, approved waste facility
- A cleanup will be done on a monthly basis.
- Any foul smells will be treated with the necessary disinfectants or lime can be introduced to the bottom of the receptacle

General

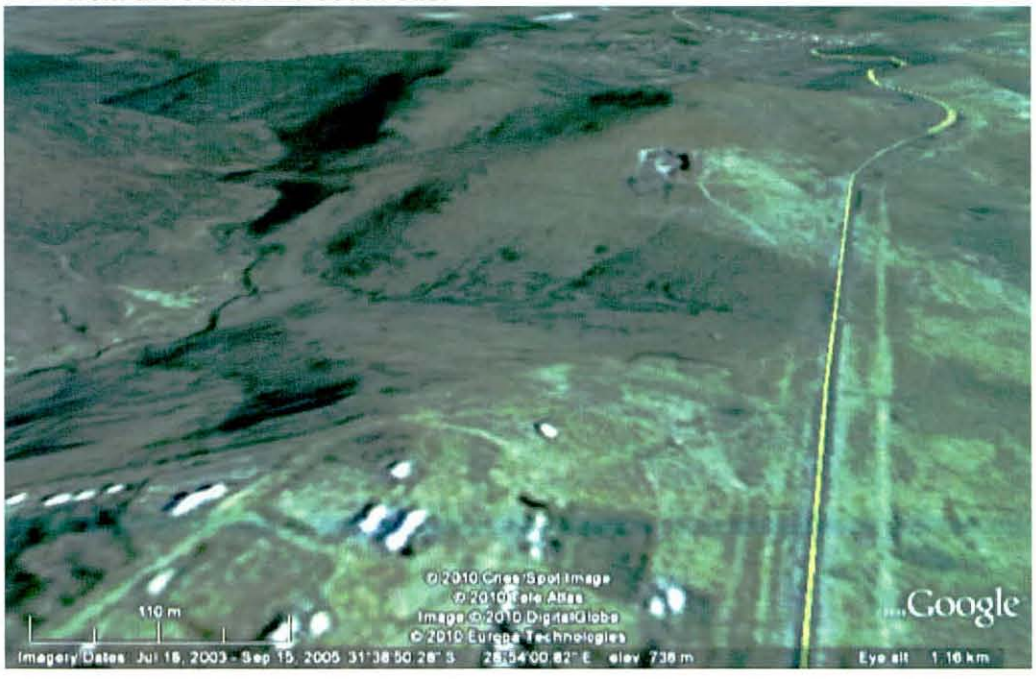
- All topsoil to be removed will be used in the rehabilitation process.
- Facilities will be maintained and kept neat on a continuous basis.
- All vegetation removed will be used as organic material in the rehabilitation process.
- A general clean up of the property will be done on a weekly basis and all staff will be involved to establish a sense of pride in achieving a clean environment.
- The handling of all waste will be included in an environmental awareness programme.

VISUAL IMPACT AND AESTHETIC ACCEPTABILITY/SETTING

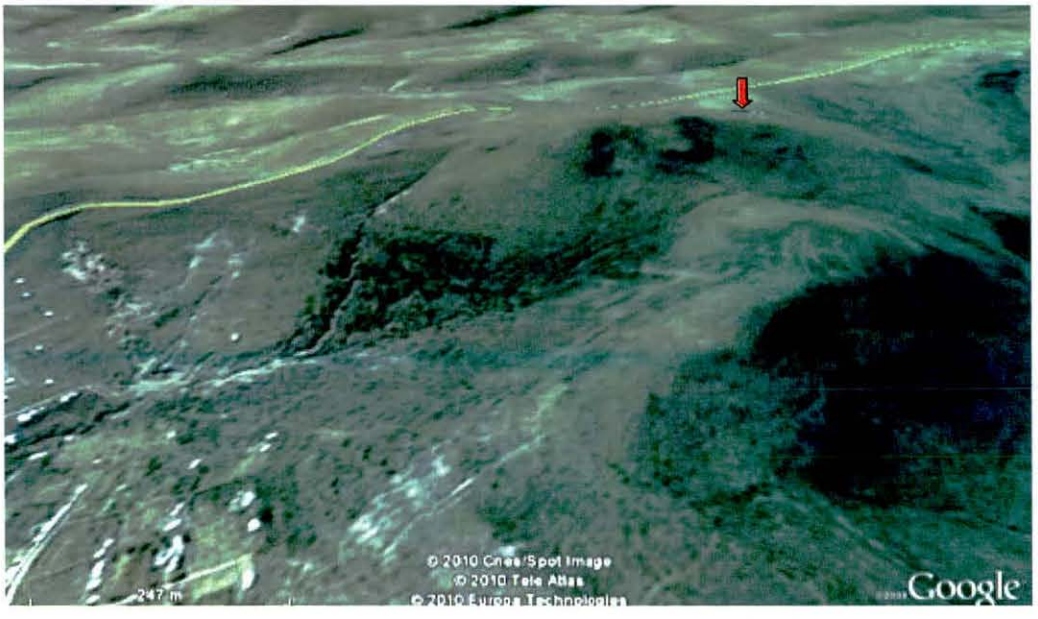
The quarry setting as described earlier constitutes large, high undulating hills with flattish crests and moderate to steep slopes reaching down to magnificent valleys. The landscape can be described as rugged and highly attractive. To the south-west a saddle is found linking the study area with the next hill to the south and also host the access road. The surrounding area reveals very little disturbance (except for the DRT Quarry & tar road), is hosting diverse vegetation communities linked to the topographically changing landscape. The immediate surrounds dispose of a high visual quality.

Being situated on the south-eastern aspect of the hill and approximately 20-30m higher than the road, the site will not be is not visible from the eastern section of the. The extensive distance of more than 4,5km would also preclude any visual impact on the residential area located to the east Due to topographical screening by the crest of the hill the site will not be visible from the northern section of the tar road or residential areas Sixhotyeni or Ntilini located to the north-west. To the west the land is uninhabited due to the ruggedness of the landscape hence no visual impact will be imposed. The site would be visible from the road track to the south-east, the northern part of Modoni village 700m to the south and from Sinwandweni 1,2km to the south-west. Since the quarry is developed within homogeneous grassland, against the contour and because the land rises moderately to the north, it will be more visible from these areas. During the initial phases the current visual impact will therefore increase, but decrease later on once the sides of the quarry is profiled and vegetated. Te distance the residential areas will mitigate the impact to some extent.

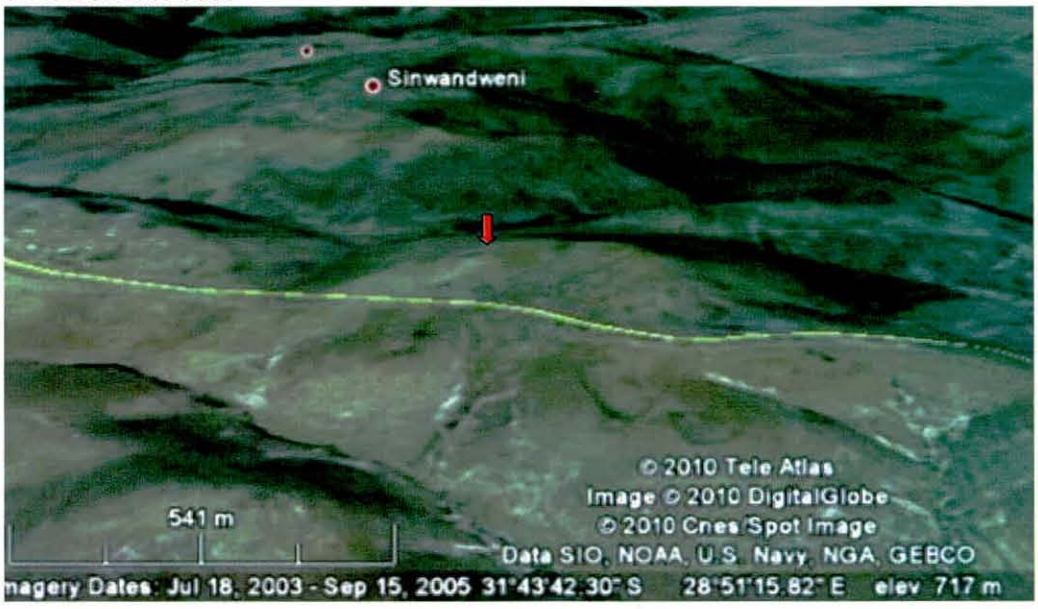
View from the south and south-east



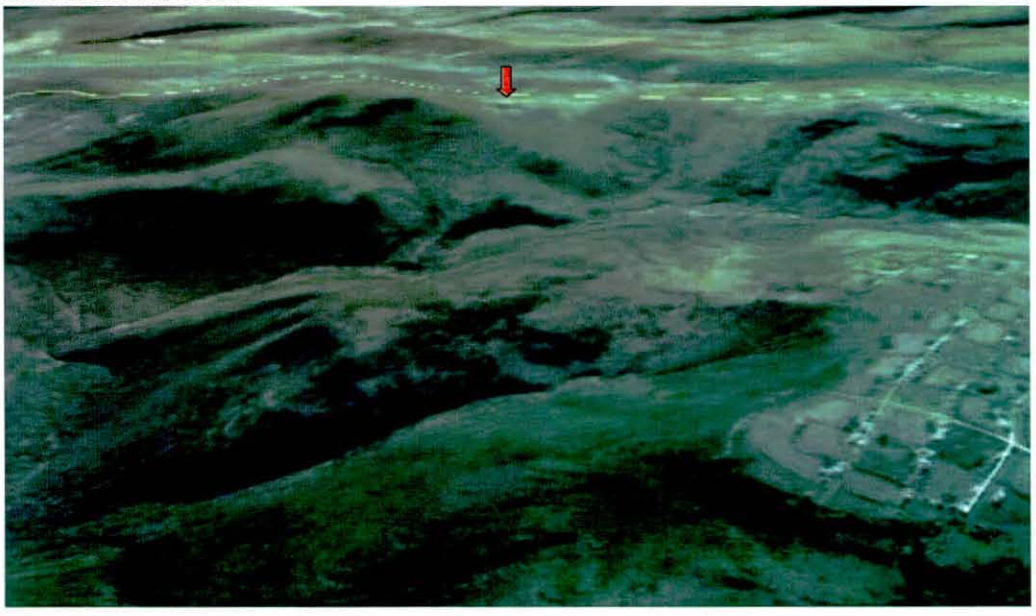
View from the north-west



View from the east



View from the west



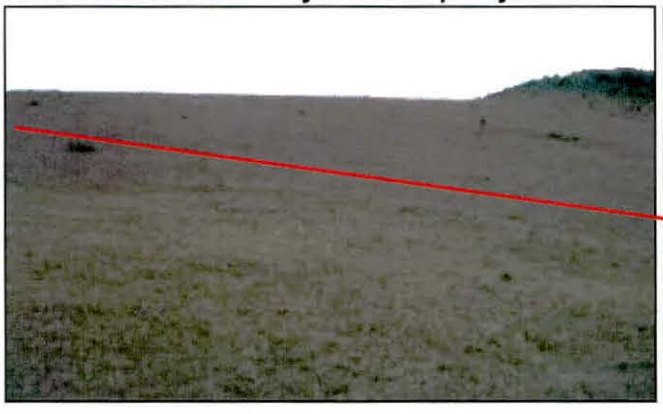
View to the west

View to the north-west

View to the north-east and east


View to the south-east and south with section of road from where quarry would be visible


View of area immediately north of quarry




Extending the existing excavation northwards against the contour will could the current visibility of the excavation to the south and south-east if no mitigation is considered. The plant and stockpile area will largely remain invisible due to topographical screening. However, only 0,5ha undisturbed land will be added to the current disturbed area at any given time hence visual impact will increase with approximately 33%, but once phase 1 has been completed, the impact will be the same as present and will decrease significantly after rehabilitation of phase 2.

The study area and immediate surrounds do not constitute a major tourist destination and the development of the quarry will not affect touristy expenditure in any way. Since the site constitute a minor focal point in the landscape, the significance of the impact will increase slightly but could be effectively mitigated through the proposed rehabilitation measures.

Since the concern is located in a grassland area, disturbances (clearing) will not be absorbed well by the landscaped. This factor is the only reason why the disturbance will be visible from the road. If rehabilitation

and specifically infill planting is affected properly it will cause the post closure landscape to largely fit into the surrounding landscape. Mining and establishment of a homogenous grass cover will change the texture (vegetated to bare) during mining but colour of the area and will not be affected by establishing a secondary grass cover. It still necessitates that production areas be profiled and re-vegetated concurrently with extraction activities. The soil in the area lend itself towards effective rehabilitation as explained previously hence it almost guarantees post closure aesthetic acceptability.

No permanent infrastructure will be erected in the mining area. Possibly two containers and water tank will be established onsite within the natural depression to the east of the quarry will only be marginally visible from the south. No post closure impact is applicable.

Stockpile areas will only be of medium extent during all phases of the quarry's development due to the relative small market that will be served, however, the change in colour from yellow/green of the grassland to whitish-blue of the stockpiles will impose a limited cumulative impact. At closure, this cumulative impact will be eliminated with the removal of the stockpiles.

Establishing the crusher will impose a further cumulative impact but will only be of significance for 35-45% of the year due to the ad hoc crushing schedule that is proposed.

No additional haul roads will be constructed that could possibly increase the visual impact. However dust plumes above the road will impact on the visibility of the activity and the aesthetics of the area in general, especially during adverse weather conditions. This impact can be significantly reduced by wetting the road, depending of course on the availability of water. The rock extraction operation *per se* will liberate insignificant dust volumes into the air but blasting will cause a highly visible plume over a large area. This impact would, however be short-lived as wind movement will disperse it quickly and will only occur only once a month or once every quarter. The crushing operation and vehicle movement in the process area will generate significant dust volumes that will cause the site to become much more visible, especially during adverse wind conditions. It is therefore essential that the necessary sprinkler system is installed in the process area and that the crusher be fitted with atomizers at transfer points.

Visibility from the air would be very low due to the irregular landforms involved and since aircraft at this chainage will be at high altitude. There is also no airport or airstrip related to the tourism industry in close proximity to the site.

Based on the above assessment, but more especially the low population density in the area, the visual impact during mining is rated of low significance if the prescribed mitigation measures are implemented. In the absence of mitigation measures the impact will increase to moderate, especially during periods of adverse climatic conditions. Post closure impact (5 years after inception of mining) is rated of very low significance if proper seeding is done.

Visual Impact

	OPERATIONAL (no mitigation)	WEIGHT	OPERATIONAL (with mitigation)	WEIGHT	CLOSURE	WEIGHT
Extent	Local	2	Local	2	Site Specific	1
Duration	Permanent	4	Medium Term	2	Medium Term	2
Intensity	Moderate	4	Low-Moderate	3	Low	2
Probability	Definite	4	Definite	4	Likely	3
Status	Negative		Negative		Negative	
Confidence	Medium		High		High	
Significance	**Moderate**	**40**	**Low-Moderate**	**28**	Low	15

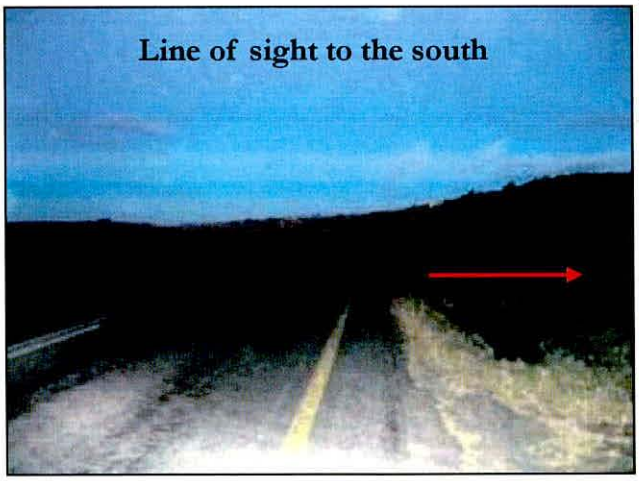
Remedial measures to be implemented are:

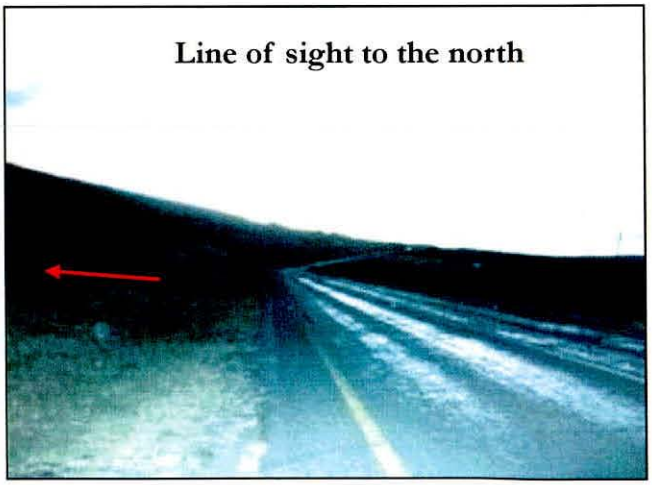
- No vegetation clearing will take place outside the proposed mine area.
- No vehicle movement will be allowed outside the mine boundaries.
- The proposed mine areas will be kept clean and free of litter on a continuous basis. A weekly clean up of the entire site will be done.
- No dumping of waste will be allowed on the property.
- Disturbed areas will be progressively developed and rehabilitated as indicated under 'quarry development'.
- Clearing of vegetation will be restricted to the minimum that is required for optimal mining.
- Mining areas will be re-vegetated as per the re-vegetation plan.
- The sides of the quarry will be profiled through precision blasting as per the quarry development plan.
- Final cuts will follow curvilinear lines, which will blend in with those of the surrounding landscape, rather than straight geometric lines.
- No erosion that could lead to head-cuts, gullies or slumping will be allowed on the mine area and disturbed areas would be made stable as soon as possible.
- The quarry may not be developed below the 775m contour line to ensure that visuals are cut off from all sides. Similarly the quarry should not be extended down slope towards the south.
- Alien vegetation will be removed on a continuous basis to ensure that established natural vegetation is not outcompeted.
- Dust plumes within the mine area or on the haul roads will be eliminated through wetting when required.
- At closure, all mobile infrastructure will be removed and disturbed areas be rehabilitated as per the re-vegetation plan.
- A 80-90% surface cover must be achieved at the end of the aftercare period.
- The prescribed schrubs and trees must be planted at the tow of profiled slopes.

TRANSPORT IMPACT

The existing gravel road to the quarry will be used for access to the site. As there are no residences along this section of road, no social impacts are anticipated in terms of road surface quality and noise and dust pollution.

Line of sight to the south and north of the access to the tar road is good but since the road does not have an appropriate shoulder, the safety impact is rated of low-moderate significance. During periods of low extraction additional traffic volume on this road would be low (5-10) of trips per day and would not alter the mentioned safety impact. However, during periods of high extraction rates (10-25 trips) per day, the significance of the safety impact would increase to moderate and drivers need to exercise special caution when turning onto the tar road.





Of importance is that truck drivers must be sensitized on safety procedures and courteous driving and must be extended to any contractor working on site. Considering that managers would be well acquainted with transport regulations and quarry operations, drivers would receive the required driving and safety training, which should reduce the significance of the safety impact.

The necessary heavy vehicle signage must be erected on both sides of the access to the tar road to sensitize road users on the presence of heavy vehicles on the road. Should high extraction rates or adverse weather conditions necessitate, a flagman must be used at the said intersection.

The internal gravel road will require upgrading of the wearing course on a regular basis, especially during the wet periods. This would be the responsibility of the applicant. Material for upgrading the road will be obtained from the proposed quarry. Due to the slope of the land, the road must be provided with cross and mitre drains.

The Ngqeleni/Mthatha road will be used as haul road to the relevant markets and there are no alternatives available. This road is a single lane road with narrow shoulders and therefore not wide enough for motorists to overtake slow moving haul trucks. It is important that the necessary safety precautions be taken when turning onto the road to prevent hampering traffic flow or causing accidents. Cyclists and pedestrians will experience a slightly higher risk than what is prevalent at this point in time and truck drivers will be sensitized on the matter and provided with the necessary training.

Blasting within 200m from the road will impose a serious safety risk to road users as fly rock may easily reach the road and the roads must be closed in conjunction with the relevant authorities during blasting. This impact is rated moderate-high with no mitigation but very low with mitigation. .

The Ngqeleni road is a major service road to various rural residential areas along the road and has been build to carry heavy vehicles. Local businessmen also use the road to cart merchandise to the relevant offset points in these residential areas. This road is currently in good condition and no major erosion in the form of potholes, corrugated areas or edge breaking was noticed. The impact on the road is rated of low significance considering the low contribution of the quarry to the overall freight that will be hauled on this road. The upgrading and maintenance of this road rests solely with the (DRE) for the Mthatha region. However, it remains essential that adequate liaison between the applicant and the DRE be established in terms of the repair of any section of the road, that has been affected by the quarry operation and that could pose a threat to the public.

Transport Impact

	OPERATIONAL (no mitigation)	**WEIGHT**	**OPERATIONAL (with mitigation)**	**WEIGHT**	**CLOSURE**	**WEIGHT**
Extent	District	3	District	3	District	3
Duration	Medium Term	2	Short Term	1	Short Term	1
Intensity	Low-medium (normal) Medium-High (High)	3 5	Low Low-Medium	2 3	Very Low	1
Probability	Likely (normal) Definite (High)	3 4	Probable Likely	2 3	Probable	2
Status	Negative		Negative		Negative	
Confidence	**Medium**		**Medium**		High	
Significance	Low-Moderate **Moderate**	24 **40**	Very Low Low	12 21	Very Low	10

Remedial measures to be implemented are:

- All vehicles will be properly maintained in accordance with Eastern Cape Roads Act 3 of 2003.
- All drivers will display the necessary road etiquette and dispose over applicable drivers licenses and this aspect will be included in the environmental awareness programme.
- Access of loaded trucks to the tar road poses a definite safety impact considering that the road does not have a wide shoulder for slow moving vehicles. Drivers will give right of way to all traffic that is observed within line of sight.
- No unnecessary hooting would be permitted along any haul road.
- Vehicles accessing the tar road will come to a complete stop before turning onto it and any transgressions in this regard will be heavily penalized. All vehicles visiting the quarry shall be road worthy. These requirements will be included in the agreement with all potential contractors.
- Overloading will not be permitted.
- Speeding will be prohibited and drivers will be penalized should it be proved that this requirement is contravened. Driving speed on the gravel road will be reduced to 40km/h for safety reasons.
- Hauling of material will only commence at 08:00 and ceases at 17:00.
- The appropriate signage (W107 & W108 –1,2m size) will be erected on both sides of the accesses to the said roads and will be maintained in collaboration with the District Roads Engineer.
- The District Roads Engineer will be consulted on the maintenance of any of the roads affected by hauling of quarry products, if required.
- If poor visibility or slow access of vehicles to any of the roads involved could result in accidents, a flagman will be used at these accesses.
- Trucks will use indicators when turning onto roads and headlights will be turned on during hauling.
- Internal haul roads must be upgraded with a 30cm wearing course on a regular basis during the mining operation reduce dust liberation and road deterioration.
- The access to the tar road will be provided with a Bell Mouth and protected with the required storm water drains and be monitored for erosion and degradation on a regular basis.
- Gates to the quarry site will be locked after-hours.
- During blasting the tar road will be closed for at least 10 minutes before and after blasting in conjunction with the local Traffic Department and the Department of Roads & Transport. No road user will be allowed within 400m from the blasting area to prevent any loss of lives or damage to vehicles. During blasting the roads will be secured by flagman and temporary stop signs as per regulations stipulated by the DRT.

SOCIO -ECONOMIC IMPACT

Increasing demand from the Ngqeleni/Dumasi for stone has indicated the existence of a small but reliable untapped market for construction material with emphasis on aggregate hence the development of the quarry poses a significant financial benefit to the applicant, especially over the medium to long term. This will enable the applicant to expand her business to other areas and increase production capacity at existing concerns, which in turn will impose a economic multiplier effect. Since the site is located in a rural tribal area, property values will not be affected.

Establishing the quarry will provide for much more affordable construction stone and cement building blocks to construction companies, town residents but also residents of the rural areas that are progressively building with bricks instead of mud bricks. This positive attribute together with the opportunity for a number of jobs at both the quarry and possibly a brickyard will culminate in a definite contribution to the upliftment of the residents in the area and to infrastructure development in general.

The establishment of the concern will have no negative impact on cultivation activities since the site is used as grazing area and hosts an unrehabilitated quarry. The site is not located near any tourist vantage point or

regularly visited by tourists therefore the impact on the local tourist industry is deemed negligible. The 'sense of place' may over the short term be affected by increased noise and dust pollution and the mitigation measures prescribed in the EMP, should be followed vigorously to reduce these potential impacts to acceptable levels. The fact that there are no residences within 500m from the site renders the mentioned impacts negligible. The potential of the concern to lure away workers from other sectors due to possible higher wagers is not a consideration taking into account the high unemployment rate in the area and the limited number of jobs that will be created at the quarry.

Blasting at the quarry should not result in structural damage to abutting residences, considering the distances (700m-2km) to residences located to the south and north-west respectively

Due to the relative close proximity to the road (200m) it is essential that blasting be carefully controlled by a specialist blaster as described under mining methodology. In order to support the anticipated low impact, a specialist report by the blaster, could be submitted by the applicant before commencement of blasting activities to detail risks and potential mitigation measures. It should be mentioned that blasting direction would be parallel with the road (phases 203) or away from the road (phase 1) hence a limited safety impact is anticipated. Nevertheless a limited risk to motorist safety will be applicable and it is essential to close the road as previously stipulated in conjunction with the local Traffic Department and Department of Roads & Transport on the days that blasting takes place.

Since blasting will be restricted to at most once a month when high extraction rates are maintained and once a quarter when low extraction rates are maintained and because of the distances involved, noise, dust and ground vibration impact will be large mitigated.

Operational hours will be restricted to normal working hours during the day therefore noise and light pollution at night is not a consideration. Dust and noise generation will be effective curbed as described earlier and should not pose a significant risk due to the distance to receptor points.

General socio-economic impact

	OPERATIONAL (no mitigation)	**WEIGHT**	**OPERATIONAL (with mitigation)**	**WEIGHT**	**CLOSURE**	**WEIGHT**
Extent	District	3	District	3	District	2
Duration	Short Term	1	Medium Term	2	Short Term	1
Intensity	Very Low	1	Low	2	Very Low	1
Probability	Probable	2	Definite	4	Likely	3
Status	**Positive**		**Positive**		**Positive**	
Confidence	Medium		High		Low	
Significance	Very Low	10	**Low-Moderate**	**28**	Very Low	12

Impact of blasting on residences & road

	OPERATIONAL (no mitigation)	**WEIGHT**	**OPERATIONAL (with mitigation)**	**WEIGHT**	**CLOSURE**	**WEIGHT**
Extent	Site Specific	1	Site Specific	1	N/A	
Duration	Short Term	1	Short Term	1		
Intensity	Medium	4	Very Low	1		
Probability	Likely	3	Unlikely	1		
Status	Negative		Negative			
Confidence	Medium		High			
Significance	**Moderate**	**24**	Insignificant	3		

Remedial measures to be implemented are:

- Those described under previous headings with specific emphasis on dust and noise impacts as well those dealing with prevention of veld fires and stock theft.
- Establishing a forum with nearby landowners to obtain their comments/concerns regarding operational procedures and impacts. Meetings should be held quarterly during the first year and six-monthly thereafter.
  Submit a specialist blasting report on the potential impact of blasting on nearby road before blasting commences.
- The first four representative blasts will be monitored with seismographs at a distance of 300m to establish average blasting impact.
- Correct burden, spacing and stemming will be used at every blast. The applicant will have to ascertain itself with blasting procedures to prevent the blaster taking shortcuts in order to reduce blasting costs and increase his personal profit.
- Smaller but more frequent blast should be considered instead of big blasts if blasting tends to affect structures in the area.
- All people and animals will be vacated within 500m from the site before every blast and the Ngqeleni Road will be closed for traffic 10 minutes before blasting until 10 minutes after blasting took place.
- Blasting will be done at the same predetermined time and a siren will announce that blasting is imminent. Blasting protocol will be discussed with community members.
- Once blasting has occurred the blaster will secure the blasting area to ensure that no misfires took place before allowing free movement of people in the quarry surrounds.
- Details of every blast will be documented in the event that a dispute with the abutting landowners develops.
- No explosives will be stored onsite and will be brought to site under the auspices and with the approval of the relevant police unit dealing with this matter.
- The quarry will be rehabilitated in such a manner that the post closure profiles do not pose a risk to residents of the l area.

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 skeleton material and shell middens. The area concerned is not rich in archaeological sites but since the mining site constitutes a highpoint in the landscape, it is anticipated that Stone Age tools and artifacts could possibly be found in the area. None has been observed from a layman's point of view, but a professional in this field was nevertheless appointed to survey the site. Since dolerite is an igneous rock it no fossil bone or plant will be present in the rock. The site revealed no historical artifacts 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. Due to the remote locality of the site and the vast adjoining tracks of similar vegetation, it would have very little value to local residents with regards to obtaining vegetation for medicinal purposes. Since the Khoisan and Xhosa people inhabited the study area historically and because the greater area, especially closer to the river systems and shore line has revealed in the past some archaeological findings the following general rules will apply during the operational phase:

1. The operators of equipment 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.

Dr. Johan Binneman has been appointed to perform the HIA and the report will be submitted within the next 60 days.

PUBLIC PARTICIPATION

The setting of the land concerned is rural and surrounded by Tribal Land. Residential areas are located to the north-west and south of the quarry concern, with the nearest residences approximately 700m from the site. Current legislation (section 27(5) of the MPRDA) requires that interested and affected parties be consulted.

Consultation with interested and affected parties

The following consultation process was/will be followed:

- The applicant has arranged for a public meeting at Dumasi. Approximately 90 people attended the meeting. The minutes of the meeting was signed off by the traditional leader of the Dumasi area and it seems if there were no objections to the meeting.
- The DME will consult with Departments of Water Affairs, Agriculture and Environmental Affairs.
- At closure, the Dumasi community and above-mentioned affected departments will be consulted on the end result of rehabilitation.

CONCLUSION: IMPACT ASSESSMENT

A. The proposed hard rock quarry can be developed without causing any major environmental or social impacts provided that the following requirements are met:

1. The applicant must follow the mitigation measures prescribed in this EMP with specific emphasis on noise, dust, profiling of production faces and re-vegetation of disturbed areas.
2. Blasting may not impact on motorists on the tar road hence road must be closed for traffic during blasting.
3. Additional topsoil must be sourced from other development sites for the re-vegetation process to be successful.
4. Visual impact must be curbed.

B. The proposed quarry would meaningfully contribute to the building industry and economic growth of the larger Ngqeleni area due to the high costs involved in transporting materials from aggregate suppliers in Mthatha. The concern would also meaningfully contribute to job creation and if possible should be linked to spin off developments such as a brickyard and transport business, which would maximize the positive social benefit of the project. Considering the vast untapped aggregate market in this area, it will result in a financially stable, which in turn would ensure a successful rehabilitation process.

C. It is proposed that the applicant be granted the mining permit.

FINANCIAL PROVISION

The amount calculated is required for the rehabilitation of environmental damage caused by the operation and makes provision for premature closure and worst-case scenario. This amount reflects the cost should the Department has to rehabilitate the area disturbed in case of liquidation or abscondence of the holder.

Analysis of rehabilitation costs: Private rates

General

Tendering process & advertisement = **R3000**
Transport of equipment = **R3000**
Supervision fees and reporting = **R13000**
Specialist blaster: R**10000**
Aftercare – erosion, alien eradication, seeding/planting and monitoring = **R25 000**
Closure documents = **R10 000**
Contingencies = **R 20000**

Sub-Total = R84 000

Mine area

Cut and fill of upper production faces (1:3) = **R60 000**
Cut and fill of middle production faces (1:2) = **R40 000**
Importing of topsoil: = **R10000**
Importing of overburden (cover shot rock) = **R10000**
Spreading of topsoil = **R13 000**
Introduction of organic material **= R5000**
Seeding and fertilizing of 1ha = **R2500**
Lime application = **R3000**
Infill planting: **R2500**

Sub-Total = R146 000

Process area

Removal of waste, scrap metal and redundant equipment etc = **R3000**
Removal of hydrocarbons and mitigation of spill areas **= R2000**
Removal of all aggregate from floor to quarry void **= R3000**
Removal of all temporary structures **= R5000**
Ripping of foundations/concrete floors and transport to quarry void= **R3000**
Removal of ramp = **R3000**
Spreading of topsoil = **R4500**
Seeding and fertilising = **R1000**

Sub-Total = R24 500

VAT @ 14 % = R35 630

Total = R R290 130

The above guarantee makes provision for the complete mining of all the reserves. Since development will be slow initially and done in three phases it is proposed that a guarantee to the amount of R80 000 for phase 1 is provided in September 2010. This should be followed by annual amendment of the guarantee with R100 000 for two consecutive years.

If the applicant demonstrates that he is able to implement the rehabilitation plan successfully for each individual phase, it should be considered to decrease the proposed guarantee contributions for ensuing phases to R50 000 per annum.

A cost calculation will be submitted annually in support of the performance assessment report

UNDERTAKING: IMPACT ASSESSMENT

I, M. Siwahla on behalf of Ikwezi Quarries declare that the above information is in my opinion true, complete and correct. I undertake to implement the measures at the quarry as described in all sections of this document. I understand that this undertaking is legally binding and that failure to give effect hereto will render me liable for prosecution in terms of Section 98 (b) and 99 (1)(g) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). I am also aware that the Regional Manager may, at any time but after consultation with me, make such changes to this plan, as he/she may deem necessary.

Signed on ..... January 2010

.....

Signature of applicant

MONITORING AND PERFORMANCE ASSESSMENT

Performance assessments are required in terms of Regulation 55 of the MPRDA 29 of 2002 and the purpose is to ensure that the conditions of the letter of approval and the approved EMP are implemented during the lifecycle of the mine. Normally an assessment is required biannually when low extraction rates are applicable. However the particular setting of the quarry might require than an annual assessment must be done.

Inspections and monitoring

- Regular monitoring of all the environmental management parameters and implementation of measures and the holder of the mining permit shall carry out certain components thereof to ensure that the provisions of this programme are adhered to.
- Ongoing and regular reporting on the progress of implementation of this programme will be done by quarry managers/contractors to the holder.
- Critical compliance areas will be identified with regard to the various impacts that the operations will have on the environment.
- Inspections and monitoring shall be carried out on a regular basis with specific emphasis on profiling of production faces, re-vegetation progress, die-off of established vegetation, re-establishing original surface flow pattern within the mine area, storm water control and dust and noise generation.

Compliance reporting / submission of information

- If operational procedures require, layout plans will be updated annually and updated copies will be submitted to the DME
- Any environmental emergency/accident will be reported immediately to DME and where applicable to DWAF/DEDEA.
- Should the assessment of environmental impacts in future be proved incorrect or should have impacts been unknown when the programme was compiled, then additional assessments shall be carried out and added as an amendment and where applicable a second opinion will be sought.
- All environmental hazards, unforeseen impacts identified, pollution incidents or environmental failures will be reported to the DME and other relevant Departments within 12 hours.
- An annual performance assessment will be compiled and submitted to the DME in September for evaluation and acceptance.
- Three months ahead of extraction being completed a closure program will be compiled to ensure that rehabilitation will be completed as per the EMP and applicable environmental legislation.
- A performance assessment report and environmental risk report will be submitted once the conditions of the EMP and closure report were implemented.
- A final performance assessment report will be submitted at the end of the maintenance period to ensure that all potential impacts are covered, that procedures followed were in line with the conditions of the management plan and that rehabilitation was completed in accordance to the management plan.

The following site specific monitoring will be executed:

- An environmental monitoring checklist should be developed immediately after approval to facilitate a formal assessment process. It should be in line with environmental matters addressed in the EMP.
- All activities will be monitored on a fortnight basis until closure is granted and reporting structure will be defined at commencement of activities.

- The mining/rehabilitation activities will be regularly visited by the holder to ensure that:
  - Mining is taking place within approved boundaries,
  - Mining related activities are not taking place outside the mine area.
  - Production faces are profiled and stabilized, provided with topsoil, vegetated and fertilized.
  - The minimum vegetation and topsoil are removed ahead of the mining face.
  - Topsoil is conserved and not showing signs of erosion or degradation.
  - That vegetation cover and species diversity are adequate
  - Re-vegetation process is successful and that alien vegetation is removed.
  - Storm water control measures are in place and are functional.
  - Storm water control structures have been built and maintained according to specification.
  - Dumping of waste in unauthorized areas is not taking place.
  - Handling of hydrocarbons is according to approved guidelines, that the necessary precautionary measures for spills are adequate and that spills are effectively treated.
  - General waste control mechanism is in place and is handled correctly and effectively.
  - That the mine area is clean and tidy.
  - Blasting is not impacting on any structures and that seismograph readings are within acceptable limits.
  - Blasting is not affecting livestock.
  - Surrounding residents are advised timeously on time of blasts
  - Haul roads have been demarcated and is maintained properly
  - Vehicles and equipment are maintained to prevent environmental impacts.
  - Road safety is upheld through courteous driving and posted signage
  - Fly rock has been removed from surrounding areas.
  - Remedial measures that have failed have been adapted to suit circumstances or alternatives would be found in conjunction with the officials in affected Departments or with private experts.
  - An environmental awareness programme is introduced to make employees and contractors aware of EMP requirements.
  - Should serious environmental misconduct by workers occur, the specific activity would be stopped, remedied and penalties will be imposed.

REHABILITATION: TIME FRAMES

Time frames for certain activities were discussed in the document therefore the following general guidelines will be provided.

Quarry

1. Complete re-vegetation (vegetation established but not complete cover) within 24 months after mining has ceased.
2. Profiling of sides within 6 months after mining has ceased.
3. Profiling and preparation of seedbeds must be completed during autumn and winter.
4. Seeding and infill planting must be done during spring and summer.
5. Complete rehabilitation in 2014

Process area

6. Remove all infrastructures within 3 months after mining has ceased.
7. Remove any waste and scrap metal within 4 months after rehabilitation was completed
8. Remove all stockpiles and concrete floors/foundations within 5 months after mining ceased.
9. Final cleanup of area within 6 months after mining ceased.
10. Rehabilitation of process area within 12 months (area cannot be rehabilitated when rehabilitation of quarry still takes place because of vehicle movement in the area) after mining ceased.

11. Complete rehabilitation in 2013

General

12. Submit closure plan & risk assessment six months before mining operations are to cease.
13. Submit performance assessment within 3 months after process area has been completed.
14. Aftercare/maintenance – Two years after rehabilitation was successfully completed.
15. Quarterly eradication of alien vegetation until closure certificate is issued
16. Light application of fertilizers and lime in September and February for duration of mining, rehabilitation and aftercare phases.

CLOSURE OBJECTIVES

Closure objectives will be based on the following:

1. identify the key objectives for mine closure to guide the project design, development and management of environmental objectives;
2. provide broad future land use objective(s) for the site; and
3. provide proposed closure cost.

The following closure objectives should be reached as a minimum:

- All stockpiles, infrastructure and equipment will be removed. Other residue deposits, if any will be removed to a registered waste site.
- All waste will be removed to a registered waste facility and scrap metal will be sold off to a recycling company.
- Hydrocarbons, and contaminated soil, if any, will be safely removed from site.
- Production faces at the quarry will be profiled to either 1:2 and 1: 3 slope by cut & fill blasting method with the top edge rounded off to create a flowing landscape.
- Post mining topography will as far as possible aligned with the natural topography of the area.
- Faces will be profiled in such a manner that soft lines are created and sharp corners are prevented in order to blend the quarry with surrounding fluvial landscape.
- Safe drainage of the area must be restored.
- The sides of the quarry will be provided with topsoil, ripped, fertilised and seeded to ensure that soils are stabilised with at least an 80% vegetation cover.
- The re-vegetated areas will display adequate species diversity and revert back to a semi-functional grazing unit and wetland system.
- Animals must be able to return safely to the site.
- The internal access road will be obliterated and rehabilitated.
- The mine will not become a dumping area.
- Alien vegetation will not degrade existing vegetation or the aesthetics of the area.
- Surface and ground water quality will be maintained.
- A sustainable land-use, which will be grazing will be achieved within 4 years after rehabilitation has been completed.
- Abutting landowners will not be subjected to any post closure social impacts.

CONTENTS OF CLOSURE PLAN

Closure would be affected by the submission of the following documents to the DME 60 days before cessation of mining activities.

- An application for closure form,
- A risk assessment,
- A closure plan that includes the following:

(a) a description of the closure objectives and how these relate to the mine operation and its environmental and social setting;
(b) a plan contemplated in Regulation 2(2), coordinated according to generally accepted standards, showing the land or area under closure;
(c) a summary of the regulatory requirements and conditions for closure negotiated and documented in the environmental management programme or plan;
(d) a summary of the results of the environmental risk report and details of identified residual and latent impacts;
(e) a summary of the results of progressive rehabilitation undertaken;
(f) a description of the methods to decommission each mining component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts;
(g) details of any long-term management and maintenance expected;
(h) details of financial provision for monitoring, maintenance and post closure management, if required;
(i) a plan or sketch at an appropriate scale describing the final land use proposal and arrangements for the site;
(j) a record of interested and affected persons consulted; and
(k) technical appendices, if any.

- Once the site is rehabilitated a final performance assessment will be done

The end-state of the mining area would be consulted with interested and affected parties in terms of Regulation 52(2)(g).

The holder of the permit will be liable for any environmental damage or degradation emanating from his operation, until a closure certificate is issued in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

AFTERCARE

It is anticipated that the following aftercare will be provided over three years:

- Vegetation cover – reseed bare areas or replant shrubs and trees in October to February
- Soil erosion – obtain additional soil and sub-soil, fill in rills & gullies, compact, provide with topsoil, fertilized – May to August
- Stability of production faces – Reshape affected areas, compact, provide with topsoil, fertilized - May to August. Seeding done in October to February
- Eradication of alien vegetation – Quarterly
- Maintenance of gabion mattress – after every rain event.

POST CLOSURE MAINTENANCE

It is anticipated that the site will be completely rehabilitated but heavy rain events, veld fires or drought could affect the slope areas or vegetation cover moderately. It is anticipated that post closure maintenance be restricted to eradication of invasive vegetation, addressing erosion problems, reseeding of such affected areas and addressing face stability. In order to provide the necessary funds for this task the following guarantee needs to be secured:

Eradication of invasive vegetation = R2000 per annum x 2 years = **R4 000**
Addressing erosion/stability problems = R8 000 per annum x 2 years = **R16 000**
Re-vegetation and fertilizing of affected areas = R2000 per annum x 2 years = **R4000**
Removal of cut-off berm and gabion mattress = **R5000**

Total = R29000

Should the rehabilitated quarry require no maintenance during the aftercare period, the above post closure requirement can be waived otherwise the funds should remain in place for an additional two years.

POST CLOSURE AESTHETIC ACCEPTABILITY

The affected landscape will be re-vegetated back as a minimum to grassland and therefore a semi-functional grazing unit for mostly domestic animals. Over time, with a good soil cover and nutrient cycle in place, and as the grassland vegetation increases in maturity, natural re-vegetation will result in most of the original species establishing onsite and slowly, but not entirely eliminating the scars caused by the mining venture.

The excavation will resemble a box cut into the hill with the sides and corners rounded off by means of precision blasting and will resemble a smooth depression against the skyline. However, it is possible that, because of the unpredictable blasting characteristics of stone, not 100% of all cliff faces will be profiled and covered with grass. Such isolated portions of the production faces would for example be ideal nesting place for birds of prey/rock rabbits and will be acceptable.

The site is located close to the Ngqeleni road and the depression in the landscape would pose a minor visual impact to motorists traveling towards to Mthatha and some residences of the Modoni village located on the hill south of the study area. But with the sides profiled and displaying a full grass cover, the mining scar should fit in comfortably in the landscape and will not pose any social or safety impact or a source of dust pollution. From an aesthetic perspective the rehabilitated site would be acceptable. It is further anticipated that with the re-vegetation approach to be followed, the texture and colour of the vegetation will match that of abutting land within 5 years time and visuals will slowly revert back to the original.

To the contrary, if rehabilitation is not afforded adequate time, specialist input and finances the above assessment will change substantial and slumping production faces, die-off of vegetation, soil erosion could lead to a poor quality landscape with a high negative aesthetic and visual impact.

LEGAL PROVISIONS

Compliance with the provisions of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and its Regulations does not necessarily guarantee that holder is in compliance with other Regulations and legislation. Other legislation that will be observed includes, but isnot limited to:

* National Monuments Act, 1969 (Act 28 of 1969).
* National Parks Act, 1976 (Act 57 of 1976)
* Environmental Conservation Act, 1989 (Act 73 of 1989)
* National Environmental Management Act, 1998 (Act No. 107 of 1998)
* National Air Pollution Act (2010)
* The National Water Act, 1998 (Act 36 of 1998)
* Mine Safety and Health Act, 1996 (Act 29 of 1996)
* The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).

I, M. Siwahla on behalf of Ikwezi Quarries, take cognisance of the following penalties should I transgress any section of the MPRDA or any other Act governing any other activity on the quarry site or any condition of the EMP and will abide thereby.

Section of Act	**Penalties for failure to comply with the provisions of the MPRDA 28 of 2004**	**Penalty in terms of Section 99**
5(4)	No person may prospect, mine, or undertake reconnaissance operations or any other activity without an approved EMP, right, permit or permission or without notifying land owner	R 100 000 or two years imprisonment or both
19	Holder of a Prospecting right must: lodge right with Mining Titles Office within 30 days; commence with prospecting within 120 days, comply with terms and conditions of prospecting right, continuously and actively conduct prospecting operations; comply with requirements of approved EMP, pay prospecting fees and royalties	R 100 000 or two years imprisonment or both
20(2)	Holder of prospecting right must obtain Minister's permission to remove any mineral or bulk samples	R 100 000 or two years imprisonment or both
Section of Act	**Legislated Activity/ Instruction/ Responsibility or failure to comply**	**Penalty in terms of Section 99**
26(3)	A person who intends to beneficiate any mineral mined in SA outside the borders of SA may only do so after notifying the Minister in writing and after consultation with the Minister.	R 500 000 for each day of contravention
28	Holder of a mining right or permit must keep records of operations and financial records AND must submit to the DG: monthly returns, annual financial report and a report detailing compliance with social & labour plan and charter	R 100 000 or two years imprisonment or both
29	Minister may direct owner of land or holder/applicant of permit/right to submit data or information	R 10 000
38(1)(c)	Holder of permission/permit/right MUST manage environmental impacts according to EMP and as ongoing part of the operations	R 500 000 or ten years imprisonment or both.
42(1)	Residue stockpiles must be managed in prescribed manner on a site demarcated in the EMP	A fine or imprisonment of up to six months or both
42(2)	No person may temporarily or permanently deposit residue on any	A fine or imprisonment of

	other site than that demarcated and indicated in the EMP	up to six months or both
44	When any permit/right/permission lapses, the holder may not remove or demolish buildings, which may not be demolished in terms of any other law, which has been identified by the Minister or which is to be retained by agreement with the landowner.	Penalty that may be imposed by Magistrate's Court for similar offence
92	Authorised persons may enter mining sites and require holder of permit to produce documents/ reports/ or any material deemed necessary for inspection	Penalty as may be imposed for perjury
94	No person may obstruct or hinder an authorised person in the performance of their duties or powers under the Act.	Penalty as may be imposed for perjury
95	Holder of a permit/right may not subject employees to occupational detriment on account of employee disclosing evidence or information to authorised person (official)	Penalty as may be imposed for perjury
All sections	Inaccurate, incorrect or misleading information	A fine or imprisonment of up to six months or both
All sections	Failure to comply with any directive, notice, suspension, order, instruction, or condition issued	A fine or imprisonment of up to six months or both

ACKNOWLEDGEMENTS

Department of Water Affairs – Environmental Data
Department of Environmental Affairs and Tourism: National Biodiversity Strategy and Action Plan
: EMPAT
SANBI
AGIS
Musina & Rutherford – Vegetation analysis
Eastern Cape State of the Environment Report
Geological & Environmental Services
Mr. John Victor

UNDERTAKING

I, M. Siwahla, the undersigned and duly authorized by Ikwezi Quarries, have studied and understand the contents of this document and hereby duly undertake to adhere to the conditions as set out therein.

Signed in East London on ..... January 2010.

.....
Signature of applicant

APPROVAL

Approved in terms of Section 39(4) of the Mineral and Petroleum Resources Development Act, 2002 (Act 29 of 2002)

Signed at Port Elizabeth on this..... .day of.....2010.

.....
REGIONAL MANAGER
EASTERN CAPE