- Should re-vegetation be exceptionally slow due to dry conditions the seeded area will be irrigated once per week with a sprinkler until a sufficient ground cover has been established Water for irrigation purposes will be obtained from the Municipality.

- Should re-vegetation fail due to climatic conditions it will be repeated the following growing season. If major flood events reworked the alluvial of the mining area it will be reseeded.

- As a contribution to environmental management alien trees in close proximity to the mining area will also progressively be removed. Tree trunks will not be removed to prevent the bank being destabilized. They will be carefully painted with Garlon, dissolved in diesel. Once completed infill planting will be done and the following species will be used: *Asparagus Africana, Aloe ferox, Drosanthemum parvifolium, Euphorbia mauritanica.*

- Before planting the mentioned plants, a hole will be prepared by filling it alternatively with soil and compos and very slight application of 2:3:2. After planting these plants must be watered well and repeated every 5 days until they have established.

FAUNA

Animals play an important role in maintaining ecosystem functioning for example pollination, spreading of seeds, removing of pests, trimming of vegetation and therefore determining penetrability of vegetation and generation of manure etc.

GENERAL FAUNA OF THE AREA

FISH

Only about ten indigenous fresh-water fish occur in the Eastern Cape Province. Translocation and introduction of other South African and alien species, however has resulted in a surprisingly diverse situation, with at least 40 species recorded in the province.

However, no rivers or drainage features of note occur in the study area, and no fish are, therefore, expected to occur at the site.

REPTILES AND AMPHIBIANS

The herptefauna in the region are very diverse, as 140 taxa occur, of which 31 are endemic to the Eastern Cape Province. No reptiles were noted in the study area during site investigations. Red Data Book species, which could possibly occur in the study area, include Smith's Dwarf Chameleon and the Yellowbellied house snake.

Smith's Dwarf Chameleon (*Bradypodion taeniabronchum*) is an endangered species, with a very restricted range in the Van Stadensberg District. It is know from a single population occurring in the Fynbos at Lady Slipper. It is usually associated with Protea's, and a single specimen was found at Schoenmakerskop. The study area borders the known range of this species, and it is, therefore, not impossible that Smith's Dwarf Chameleon could occur at the site.

The Yellow-bellied house snake (*Lamprophis fuscus*) is associated with the mountainous and grassland areas of the Eastern Cape Province and is a pale olive colour with a light yellow belly. The snake is secretive and nocturnal, occurring in old termitaria and beneath stones. This species is considered rare, and could occur with the study area.

South Africa has been spared the scourge of introduced reptiles and amphibians. A number of commensal geckos have occasionally been introduced into the Eastern Cape from adjacent regions.

MAMMALS

Of the 292 terrestrial mammal species in southern Africa, 128 occur in the Eastern Cape Province. Most of the larger species occur in game reserves, and only the smaller mammals could occur in the study area. No mammal specie was noted on the day of inspection and recent investigation did not find any snares or people with packs of dogs, which might indicate that either all the animals have been hunted, or that poaching is now controlled at this site.

Species listed as vulnerable in the Red Data Book that can possibly occure in the study area is the White-tailed Mouse (*Mystromys alibicaudatus*), Honey Bager (*Mellivora capensis capensis*), African Wild Cat (*Felis lybica cafra*), and Antbear (*Oryceropus afer afer*). Rare species occurring in this region, and listed in the Red Data Book, include the Speckled Dormouse (*Graphiurus ocularis*), African Striped Weasel (*Poecilogale albinucha alibinucha*), Aardwolf (*Proteles cristatus cristatus*), Serval (*Felis serval serval*), Tree Dassie (*Denrohyrax arboreus arboreus*), and Blue Duiker (*Philantomba monticola monticola*). Occurrence of these species in the study area is, however unlikely, as human activity levels are fairly high and the natural habitat has generally been destroyed.

BIRDS

The study area and surround are fairly unimpressive from an avifaunal point of view, as the Grassy Fynbos has been extensively invaded by alien plant species. This scenario is fairly common throughout the flat marine terrace around Port Elizabeth. However, some of the grassy plains in the area, which are still vegetated with indigenous grasses, play an important role in the biology of certain bird species (francolin, guinea fowl, quail, bustard, korhaan, chat and plover to name a few).

SITE SPECIFIC

The site visit revealed no small or large animals and the removal of the grassland will not result in the extinction of any specie but could increase species diversity once rehabilitated to an improved ecological niche. Mining would be restricted to limited areas 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 will cause most animals to vacate the site on a temporary basis. 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. The impact could be rated as very low due to the number of animals and species that will be affected.

Subject to that animals are not disturbed or 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.

The noises generated on the site will be from a number of people communicating with each other and from the excavator and trucks, crushing plant and screen as well as occasional blasting. Noise levels are anticipated to range between 55 and 70 decibels at the mine boundaries. Most of the noises would be low-pitched and would have a lesser impact on animals than what high-pitched noises would have, besides the blasting. Hearing systems of animals are much more sensitive to the latter. Should animals found themselves on site the slow development process would also provide ample time for all species to migrate to abutting areas. Blasting will have the biggest impact on the animals in terms of noise. The site must be walked over and cleared of any animals before blasting may commence. Animals not found on the mining area will flee when blasting occurs and no impacts are expected. It was proved in game reserves that after a while animals could coexist with vehicle movement with indifferent neutrality.

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

Limited hydrocarbon spillages would not detrimentally affect fauna on site. In addition, storage of hydrocarbons and the servicing of vehicles will be done off site. Since movement of vehicles will also be restricted to outside the stream environment, except for at the proposed crossing it will also not impact of aquatic fauna.

Since there are very few remaining wild mammals on site, no detailed faunal survey was conducted.

During the operational phase, the impact of mining on fauna is rated low. Rehabilitating the quarry site would provide an improved ecological niche and the opportunity for animals to re-colonize the area. The impact at closure is rated to be of low positive significance.

Impact on Fauna

	OPERATIONAL (no mitigation)	**OPERATIONAL (with mitigation)**	**CLOSURE**
Extent	Local	Site Specific	Site Specific
Duration	**Medium Term**	Short Term	Long Term
Intensity	Low	Low	Low
Probability	Likely	Possible	Definite
Significance	Low	Low	Low
Status	Negative	Slightly Negative	**Positive**
Confidence	High	High	High

- Handling of fuels will be in accordance with all applicable 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, which must be discussed with workers on an annual basis by the owner of the proposed quarry but preferably by a competent environmentalist.
- 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 wildlife from the site immediately.
- All animals found on working areas where they may 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.
- Areas to be cleared will be swept before vegetation is removed. Relocate any herpentofauna and slow moving animals to areas outside the mining areas in an unharmful manner.
- Before blasting, the area will be walked over to scan for any animals and if any are found, the will be relocated unharmfully to the areas outside of the mining area.
- Disturbed areas will be properly rehabilitated as per the process outlined in the re-vegetation programme.
- Veld fires will be prevented by not allowing any open fires in the mine areas or smoking outside the mine areas.
- 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 hold any danger to animals and to facilitate proper re-vegetation.

SURFACE WATER

The catchment (area 1395ha) is bordered on the north and west by the easterly extremities of the Groot Winterhoek mountains and rapidly descend from here to the coastal plans if Port Elizabeth. The catchment consists of four tertiary catchments. The two mains channels that join to form the Swartkops River arise in two clearly demarcated sub-catchments, the Elands to the southwest and the Kwazunga to the north but both originate in the Groot Winterhoek Mountains. Multiple, narrow, well-watered ravines are found in KwaZunga but the Elands is much drier and those tributaries draining from north to south usually flow throughout the year. The Brak and the Chatty Rivers originate in the plains to the north of Port Elizabeth and join the Swartkops River below the confluence of the Elands and the Kwazunga. Within the wider catchment area there are four smaller river systems, the Bakens River, Van Stadens River, the Shark River and the Maitland River, that drains directly into the sea. Only the Van Stadens River contributes water to Port Elizabeth from three dams with a total capacity of 0.643 106m3. However some of these dams are severely silted (staff of Nelson Mandela Metropole *pers. comm.*) and consequently the capacity cited will have been compromised.

At the site, a minor drainage feature occurs at the bottom of the proposed box cut to the south. However, most of the study area is drained by means of velocity sheet wash, the majority of which drains southwards into the drainage line. Taken this into consideration, the mine development will not impact these drainage systems, since during and after the development, runoff will collect in a silt pond at the southern lowest corner of the mine area. The silt dam will drain into the southern drainage line. It is not anticipated that out let water will carry any silt into the drainage line, since the silt will be trapped in the silt dam.

Mining will not alter drainage patterns significantly. As mining progresses and the production face become larger, water will increasing run of the edges, which could result in topsoil erosion and increasing the silt load of runoff. To curb this problem, the drainage pattern of the study area will be slightly altered by diverting upslope runoff with a berm to the east and west of the mining site into well established vegetated areas; to prevent clean water from becoming contaminated and impact on the production faces. This berm will require maintenance over the medium term until disturbed areas has regained its stability and thereafter it can be removed to facilitate normal surface drainage.

Mining will also not impact on any river system or dam due to the very far distance from any surface water.

Potable water will be brought to site and will not exceed 1,5m^3 per week. If it is required to irrigate vegetated areas during extreme dry periods and dust suppression, consumption will not exceed 30m^3 per week and will be obtained form the Municipality.

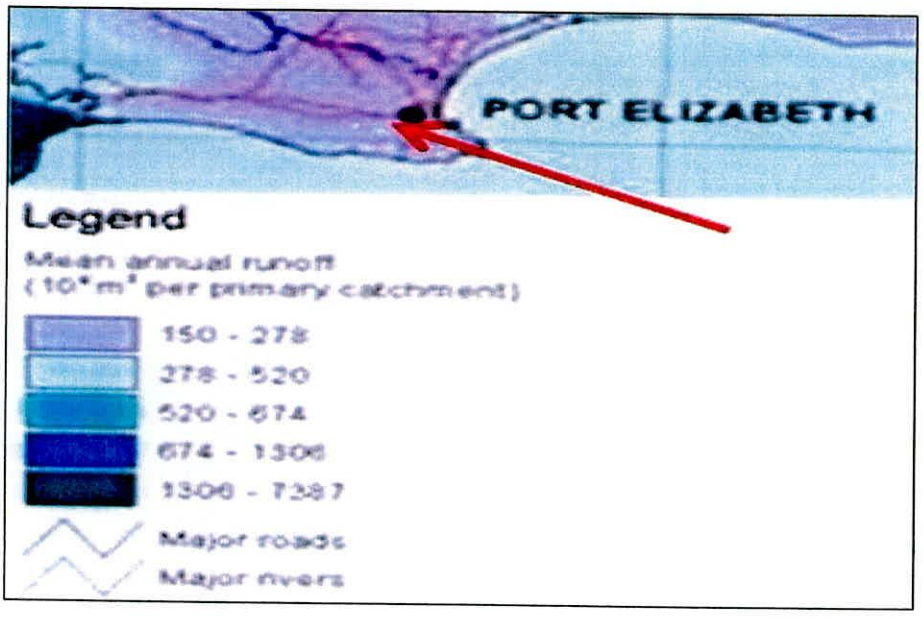

Figure 22: Primary Catchment runoff

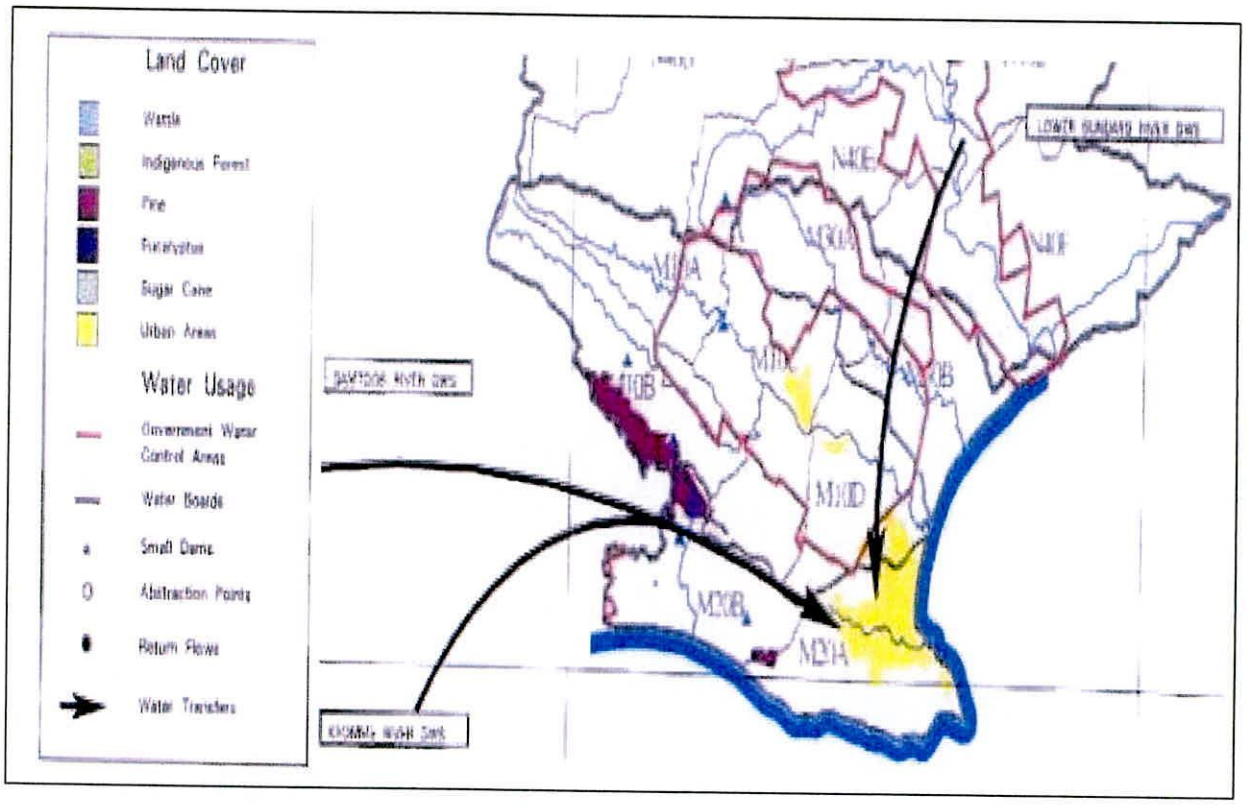

Figure 23: Water usage

Impact on surface water

	OPERATIONAL (no mitigation)	**OPERATIONAL (with mitigation)**	**CLOSURE**
Extent	Site specific	Site specific	Site specific
Duration	Short Term	Short Term	Short Term
Intensity	Low	Low	Negligible
Probability	Low	Very Low	Insignificant
Significance	Negative	Slightly Negative	Neutral
Status	High	High	High
Confidence	Site specific	Site specific	Site specific

The Table Mountain Group form secondary aquifers in which groundwater flow is stored within fractures 20-30m underground in the high lying area but are closer to the surface in lower lying areas such as at Perseverance. Groundwater flow is from the west to the east toward the sea. This is an extensive aquifer and is accessed from as far west as Humansdorp and Jeffreysbay in the immediate vicinity. Boreholes to utilize ground water in Port Elizabeth appear to be confined to the more affluent areas (cost related) and are primarily used for gardening. The outlying area groundwater supplies all water to households that fall outside the municipal reticulation system. Most borehole water appear to derive from the secondary aquifer (except in Summerstrand close to the coast) if the depth of the holes are considered (Lomberg *et al* 1997).

The site is underlain by highly fractured quartzitic sandstone, which is known as a fairly good aquifer in this region.

These perched water tables generally occurred within the loose gravelly ferricrete horizons, or at the completely weathered /high weathered quartzite sandstone interface. Water seepage rates are generally slow to moderate and contamination, if any, should be non-hazardous.

The occurrence of ferricrete and gleyed material (both of which can only form under, or as a result of perched water table activity), indicates the presence of perched water tables in the area from time to time, especially after periods of heavy or prolonged precipitation. These perched water tables will be more prominent in the lower lying areas and depressions.

However, the depth to the permanent water table appears to be about 80 m below surface in this area, and bedrock is capped by the fairly impermeable gleyed clay and completely weathered rock barrier. The permanent and perched water tables are separated by the colluvial / weathered residual material zone, which forms an aquiclude.

Mining activities will not have any negative or positive impact on the groundwater, since mining will be restricted to 10 m and will not intercede any groundwater table. Thus impact on the groundwater can be rated as insignificant.

SEWAGE FACILITIES

The proposed chemical toilet will not cause an increase in coliform levels of perched aquifers as well as the main aquifer because of the reason provided above. It needs to be taken into account that the effluent stream would not exceed 0,1 – 0,5m^3 per week, the impact would be negligible. The main aquifer is located within the Table Mountain Sandstones, which will be protected through the fairly impermeable gleyed clay and completely weathered rock barrier.

HYDROCARBONS

No hydrocarbon storage or draining would take place within the mine area therefore a negligible impact is anticipated. In addition, absorption capacity of the soil will further negate minor leaks. Vehicles will also not be cleaned onsite. It should also be recognized that hydrocarbons are biodegradable and small spills will quickly be naturally remedied

WASTE

The mining site will host very little waste that could affect groundwater quality. The waste stream will be restricted to household waste, which will be deposited in 200L drums fitted with a proper lid. When filled it will be emptied at the nearest approved waste site. 'Industrial waste' will be restricted to scrap metal and machine parts, which will not be stored and immediately disposed of at a registered recycling facility. Considering the above, no treatment facilities are required for the site. The impact is rated negligible.

WATER CONSUMPTION

No groundwater will be used.

Impact on ground water quality and reserves

	OPERATIONAL (no mitigation)	OPERATIONAL (with mitigation)	CLOSURE
Extent	Local	Site Specific	Site specific
Duration	Short Term	Short Term	Short Term
Intensity	Low	Low	Negligible
Probability	Possible	Unlikely	Definite
Significance	Very Low	Insignificant	Insignificant
Status	Slightly Negative	Slightly Negative	Neutral
Confidence	High	High	High

REMEDIAL MEASURES

- Chemical toilet will be maintained to Municipal specification, will be inspected on a regular basis and be located within the excavation.
- The excavation will not be free draining to reduce the impact on the stream environment to the minimum.
- If necessary, storm water control structures shall be constructed once a particular phase has been worked out.
- No storage of hydrocarbons will take place onsite.
- Mining will be restricted to the proposed depth and footprint.
- No foreign or unapproved material/substance will be dumped or stored within the footprint of the mine or office areas.
- No stockpile of any nature will be placed outside the mine area.
- Vehicles will not use alternative roads or damage vegetation outside the approved mine boundary.

- Waste will be contained in receptacles stationed at appropriate areas within the excavation and be 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.
- Refueling of vehicles will be done offsite.
- Only emergency repairs will take place within the mining area and must be done over a drip pan.
- Vehicles/equipment shall be maintained to a high standard and shall not display any major leaks.
- Any contaminated spares, oil filters and gaskets will be placed in a suitable receptacle and immediately removed from the property 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 and used to contain any potential spills.
- In case of large, critical spills the Departments of Water Affairs and DME will be informed immediately for assistance and advice and a competent company conversant with bio-remediation will be appointed as soon as possible to address the possible impacts of such spill. All costs would be for the account of the applicant.
- Management will not entertain hydrocarbon spills on site and where necessary, financial penalties would 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.
- All dysfunctional equipment and vehicles will be immediately removed from site.
- The applicant accepts the principle of 'polluter pays'.

AIR QUALITY

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 irrigated as soon as possible. As an alternative it could be covered.

The air quality of the immediate surroundings is good due to its rural status. During windy periods the abutting agricultural areas and the quarry operations to the north-west and south-east of this site, will liberate a limited amount of dust into the atmosphere causing a slight rise in air pollution levels. The same scenario applies when motorists are using the gravel roads, and urban development takes place with construction activities. In addition, an increase in smoke generated by household fires, especially from the Greenbushes Low-cost housing residence could also decrease the prevalent

air quality but it would be limited. Since the property involved is still zoned agricultural and rural, it would cause tolerable ambient levels to be higher than those for residential areas. It would on the other hand not exempt the applicant to implement measures to keep disturbed areas as small as possible and to reduce dust generation when and wherever possible.

The silt content of the quartzite deposits is fairly high and would cause excessive dust when handled. Since there will be a crushing plant onsite, dust levels will be elevated. The dust from the crushing plant and stockpiles may also pose health problems especially to the workers. The applicant and workers must comply with Mine Health and Safety guidelines, thus mitigating these potential health risks. On the other hand, the site is currently not situated near any residence thus very little impact is expected. Dust generation however must still be mitigated and the area can simply be irrigated once or twice per day. A sprinkler system must also be installed on the crushing plant and be used whenever the crushing plant is operating. The fact that there are no people residing immediately close to the mine negates this impact to some extent.

Mechanical processes are: mining, blasting, loading and pulverizing of quartzite; hence dust generation during normal climatic conditions would be fairly high. The strong western and eastern components of the Port Elizabeth wind rose may during dry periods (which are quite frequently experienced) liberate vast amounts of dust particles from the quarry into the atmosphere and may cause deposition of large amounts of dust at or near the neighboring farms to the west. But as indicated previously no residence are close by and this impact may be negligible. This impact would not necessarily be the result of this quarry alone since dust movement is a common phenomenon on the two other hard rock quarries during the working periods, especially because of crushing activities.

Stockpiles will be established within the excavation and the surrounding alien vegetation will reduce this impact to some extent and again distance to affected parties will preclude any major impact from occurring. Spreading of topsoil during the re-vegetation phase will result in the loose soil to become prone to wind erosion and consideration should be given to the irrigation of such areas. Once seeded, the impact from such areas would abate very soon.

Since the existing access road will be used, no additional roads needs to be constructed and no additional areas will be expose. Vehicular traffic will increase and if dust becomes a problem the road will be watered when necessary. No more than 20 truckloads would be carted from the property per day resulting in vehicle movement approximately every 15 minutes. The mining site is surrounded by alien vegetation and would filter out most of the dust generated. Since dust generation is also determined by speed in conjunction with axle number it is imperative, that the contractor reduces

haul speed to 40km/h and enforce that strictly. To the west there are no residences that could be affected by wind action. The author is confident that very little dust will be deposited at any residence and if such deposition occurs it will be below 20-30mg/m^2 per day. If need be, dust levels could be determined to ensure that dust counts are below DEDEA requirements.

People struggling with acute allergies for dust could be marginally affected. In the authors opinion pollen from the numerous alien trees in the greater area (Acacia species) would play a far more pronounced role. It would therefore be unfair to single out the proposed quarry as the sole perpetrator for causing allergies although it could cause a limited cumulative impact. With any rain, dew, or mist, which the area is frequently exposed to, the dust liberated into the air will decline drastically. In terms of the Mine Health and Safety Act, the silica content can be established to determine whether any special precautionary measures are required.

Vehicular emissions will be related to excavators, one or two frond-end loaders and a number of trucks and it is anticipated that the impact would be low. People would not reside on the property; therefore smoke generated by cooking fires would not be a consideration. No waste would be burned on site. No other form of chemical air pollution is envisaged.

No odours will be generated by the mining operation.

The overall impact on air quality is rated as low-moderate on windy days and low on calm days, considering the limited amount of people that might be affected. At closure, the disturbed area would be rehabilitated and would cause air quality to revert to original levels.

Impact on air quality

	OPERATIONAL (no mitigation)	OPERATIONAL (with mitigation)	CLOSURE
Extent	Local	Local	Site Specific
Duration	Long Term	Short Term	Short Term
Intensity	**Moderate**	Low	Negligible
Probability	Highly Likely	Likely	Unlikely
Significance	**Low-Moderate**	Low	Insignificant
Status	Negative	Negative	Neutral
Confidence	High	High	High

REMEDIAL MEASURES

- Vehicles to be maintained properly and fitted with standard exhaust systems and will not be left idling unnecessary.
- No cooking fires will be allowed on the property.
- No chemicals will be stored or disposed off on site.
- Waste will not be burnt on site. Waste will be retained in proper receptacles placed at the northern boundary of the site and removed regularly to an approved waste site. The waste stream will be limited and be removed from site weekly to prevent odours from occurring.
- The mine will be developed in phases to reduce the extent of exposed areas.
- Topsoil will be reintroduced to mine areas as soon as possible and irrigated immediately after placement.
- The chemical toilet shall be regularly serviced as per Municipal guidelines.

- Disturbed areas will be watered down by means of a sprinkler system or water cart. Equipment for this purpose must be obtained as soon as possible on approval of the EMP. If needed, shade cloth windbreaks (10m apart, 2,5m high) will be erected.
- A sprinkler system will be installed on the crushing plant and utilized when crushing takes place to eliminate crushing dust fall out.
- Should the service road liberate unacceptable dust volumes into the air a sprinkler system will be erected along applicable sections of the road.
- Stockpiles will be retained in the mining area, kept as small as possible and be watered down to mitigate source of dust.
- Handling of material during periods of high wind action will be avoided as far as possible if it leads to unacceptable dust generation. Should irrigation be ineffective during such adverse climatic conditions quarry operations shall cease. The management system will allow for monitoring the situation over weekends when no workers are on site.
- Speed of vehicles will be restricted to 40km/h.
- Mine Health and Safety guidelines must be implemented by applicant and 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 rural setting of the area causes the ambient noise levels to be low and possibly below 45dB. The tranquility of the broader area has to a large extent been affected by increased non-farming related business activities such as mining on properties to the north-west and south-east; urban development (golf estate) to the south and light industrial zone developments to the south-east. In

order not to cause any unacceptable disturbances, noise levels at the mine boundary should be kept below 60 decibels during the day (excluding blasting activities), which would be well within reach of the machinery and trucks used in the mining process, provided that they are well maintained. Sources of noise will be the excavator and trucks at the mine area and noise levels will be raised to between 60dB and 75dB at source. Within 100m from the quarry, noise levels will abate to approximately 50-60dB and within 200m to approximately 50dB. Noise levels at the nearby residence will therefore not be raised by more than 5dB. Blasting will be limited to once a week/ month depending on the market demand and would elevate noise levels. However low charge explosives can be used and can be restricted to once a week/month. It must be taken into consideration that blasting create a once-off spike in noise generation. It is not a constant frequency of noise and considering the long distance from any nearby residence this impact is rated low. In addition, Afrimat and Scribante Quarries perform blasting on a regular basis and to date no complaints have been received from residence.

The crusher that would be hosted onsite could also add to the noise impact but is rated a low impact due to the distance from any nearby residence. Work over weekends may cause a noise nuisance and should be limited from 8am to 1pm on Saturdays.

Seeing that no camp would be established on the mining area, no noise would be generated at night that could become a nuisance. Working hours would on average be from 7am to 6pm on weekdays, which would coincide well with the daily activities of the inhabitants of the area.

Adverse conditions such as low cloud cover or strong winds blowing towards recipients could increase noise levels between 3 & 7dB, but considering the residence not being in the wind path and because of the vegetation screens in place, the impact is still rated of low significance.

Trucks on the service road will cause noise disturbance of approximately 75dB all along the road. Considering that the distances to residences, it will be reduced to approximately 40dB, which is acceptable but will approximately be experienced every 15 minutes. Reduction of vehicle speed should therefore be enforced. It needs to be mentioned that these property owners had no objection to the project.

No workers will be housed on the property therefore noise generated at night would not become a nuisance. 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 40km/h would assist in curbing noise impact.

Noise Impact

	OPERATIONAL (no mitigation)	**OPERATIONAL (with mitigation)**	**CLOSURE**
Extent	Local	Local	Site Specific
Duration	Short Term	Short Term	Short Term
Intensity	Low	Low	Negligible
Probability	**Likely**	**Likely**	Unlikely
Significance	**Low-Moderate**	Low	Insignificant
Status	Negative	Negative	Neutral
Confidence	High	High	High

REMEDIAL MEASURES

- 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.
- Traveling speed on the internal haul road will be reduced to 40km/h
- Normal working hours will apply for weekdays (7am-6pm in summer and 7.30am-5pm in winter) and Saturdays (8am-1pm) if necessary (will liaise with property owners) – No work on holidays or Sundays.

- Workforce and contractors will be properly managed in terms of noise generation and be informed on acceptable behavior.
- Protective ear devices will be provided to all operators of machinery/vehicles generating noise above 50dB at source.
- Vegetation screens outside the mine area will not be removed.
- Blasting will only occur once a week/month depending on the market demand.
- Only low charge explosives may be used and neighboring residence must be notified a week in advance when blasting will occur.
- All Mine Health and Safety guidelines must be complied with.

WASTE GENERATION AND MANAGEMENT

BUILDING RUBBLE

No construction activities will take place therefore no cement residue, brick residue, corrugated plate off-cuts, ceramic waste or PVC residue would be generated.

There will be a mobile office and workshop as well as a crushing plant on the mine area. At closure there will be no infrastructure to be removed. No impacts on soils, water, vegetation, air quality and humans are anticipated.

INDUSTRIAL WASTE

Very little industrial waste will be generated and will be restricted to the odd tire casing and piece dysfunctional equipment, which will be removed from the property on a daily basis. No impacts on soils, water vegetation, air quality and humans are anticipated.

DOMESTIC WASTE

The waste stream will consist mainly of domestic waste (food, bottles, plastic bags, paper, clothing, rags etc) and will be small and deposited in the containers provided for this purpose. Refuse bins will be clearly marked and placed at the entrance to the property to encourage workers to use them. Poor control over domestic waste handling could lead to littering the site and abutting properties and must be avoided since it could lead to livestock mortality. Due to the limited number of people

anticipated on site, the limited waste stream will have negligible impacts on soils, water vegetation, air quality and humans.

MINE RESIDUE

The geology of the area restricts the type of residue to oversize boulders and root mass. The former will be returned to the excavation and be covered with gravel on a weekly basis whilst the latter will be stockpiled and worked into the topsoil as organic matter. Since no chemical processes, mineral processing or washing plant is required on site no chemical/mineral waste or effluent is generated.

The cumulative impact on soils, water quality, stream flow, vegetation, and aesthetics is rated of low significance.

SEWAGE SYSTEM

The sewage system will consist of a chemical toilet and due to the limited number of people on site, the effluent stream will be limited to approximately 0,1- 0,5m^3 per week and no impacts on soils, groundwater, surface water, air and humans are anticipated.

HYDROCARBONS

No hydrocarbon storage, transfers or handling will take place onsite. Servicing of equipment and vehicles would be done off site therefore no hydrocarbon waste such as used oil, lubricants and hydrocarbon-contaminated filters will be generated. Any such material generated during emergency repairs will be removed from site immediately.

No wash bay or oil trap will be constructed as vehicles will be washed off site and all hydrocarbon spills will be contained within large drip pans.

SALVAGE YARD / SCRAP METAL

The site will host a crushing plant, thus the spare parts and hence scrap metal that will be generated will be stored at an allocated salvage yard within the mining area. It will be kept neatly and if needed fenced off. All unusable equipment will on a monthly basis be disposed of at an appropriate recycling facility. The impact on soils, water quality and aesthetics is rated low.

At closure, all scrap metal and dysfunctional equipment that might be positioned onsite, will be sold to a commercial scrap yard. No post closure impact is anticipated.

Impact of waste on environment

	OPERATIONAL (no mitigation)	**OPERATIONAL (with mitigation)**	**CLOSURE**
Extent	Local	Property	Site Specific
Duration	Short Term	Short Term	Short Term
Intensity	**Low-moderate**	Low	Negligible
Probability	Likely	Possible	Unlikely
Significance	**Low-moderate**	Low	Insignificant
Status	Negative	Negative	Neutral
Confidence	High	High	High

REMEDIAL MEASURES

- The odd tyre casings and dysfunctional equipment that could be generated, will be disposed of immediately at the nearest registered waste facility.
- All machinery and waste, if any will be removed at closure.
- Any waste produced will be removed from the mine area on a continuous basis to the nearest waste facility with specific emphasis on household waste, plastics, unusable scrap metal and tire casings, if any.
- At closure, all waste will be removed from site.

- Vehicles may not leak any fuel, oil or lubricants and will be maintained to an acceptable standard offsite.
- Any fuel spills will be cleaned up immediately and the soil from spill areas to be removed to the waste disposal site.
- A chemical toilet will be placed at the quarry and it will be regularly serviced and emptied at an approved waste site. A Health Inspector should inspect the system and surrounds annually.
- Strict controls will be enforced to ensure that the surrounds are not use as ablutions and this aspect would be included in the environmental awareness programme.
- Strict control must be enforced to ensure that the mining area does not become an illegal dump site. This can be achieved by locking the gate to restrict access to the site.
- Domestic waste generated ancillary to the mining process will be deposited in containers with scavenger proof lids placed at quarry. It will be weekly removed from site to the nearest waste site and not dumped in the veld. Containers will be clearly marked to ensure that they are used for the right purpose. Management will provide clear management guidelines and this aspect will be included in the environmental awareness programme, if needed.
- Waste will not be burnt or buried on site.
- Staff will be equipped to distinguish between domestic waste and industrial waste.
- No day to day repairs or servicing of vehicles or equipment will take place on site.
- All hydrocarbon-contaminated material, including soil to be disposed at a hazardous waste facility and the affected area bio-remedied by a specialist in case of any large spills.
- No washing of vehicles will take place on the property.
- Facilities will be maintained and kept neat on a continuous basis.
- Any unusable scrap metal or dysfunctional machinery on the property will be collected and removed on a monthly basis and the allocated storage space will fenced off and be earmarked for this purpose.
- At closure all remaining stockpiles will be flattened and reintroduced to disturbed quarry areas and all waste will be removed off site and disposed off in an appropriate manner.
- A general clean up of the property will be done on a weekly basis and before every year end closure and all personnel will be involved to establish a sense of pride in achieving a clean environment.

Originally, the landscape would have been described as attractive and of high aesthetic quality because of the meandering status of the valley environment. However, due to alien infestation, mining and farming activities on the property and surrounding properties, the current landscape can be described as low aesthetic quality with little environmental attractiveness. Roads, telephone and power lines and residences on farms further reduced the aesthetic value of the surrounds. Onsite assessment of immediate landscapes revealed that the proposed mine is bordered by semi or completely transformed land. The site is basically surrounded by alien vegetation.

The site is not visible from any nearby residence or public road. Taken the topography and alien infestation screen into consideration, even when this mine is in operation, it will still not be visible to any residence or road traveler. The fact that the applied area was previously disturbed, does to some extent constitute a lesser focal point in the landscape and will result in the visuals of the area being marginally affected and would request a proper re-vegetation approach, irrespective thereof that surrounding areas dispose of low to medium quality landscapes. An undertaking is necessary that the ecology of the area will be restored to prevent it from reverting to the poor status. It should be taken into consideration that only 1,5 ha will be developed and a concurrent rehabilitation plan will be followed, which will improve the current state of the area and must be seen as a positive.

Mining will change the texture (vegetated/rough to bare/smooth) and color (green/brown to whitish-grey) to a small degree since most of the area have already been disturbed, but nevertheless, once operating the area will increase visibility moderately and necessitates that production areas be profiled and re-vegetated concurrently with extraction activities. This impact will be temporary. Since the land displays a hilly topography, the newly established box-cut with limited slope heights will be readily absorbed in the landscape.

Since the proposed mining site is screened by alien vegetation and general topography of the area, from the nearby roads and residences and since the area does not constitute a major tourist destination, the impact on tourist potential is rated very low but the rehabilitation programme should still be expedited as far as possible.

Infrastructure such as the mobile crusher, screen and office, will be erected in the mining area that could result in visual intrusion, but this will be a temporary impact and rated very low.

Stockpiles within the quarry would be low and not readily protrude above 1.5m. It is not expected that it would cause the quarry operation to become more visible. Dust generation from the crushing plant, stockpiles and on the internal haul road will be experienced, resulting in only a limited visual dust plume to hang in the air above the mining area and road, but as previously discussed, this impact can be positively mitigated and is rated low.

Based on the above assessment the impact during mining is rated of low significance, whilst the post closure impact is rated as positive due to the partial ecological restoration of the environment.

Figure 24: Northern view of the site

Figure 25: Eastern View of the site

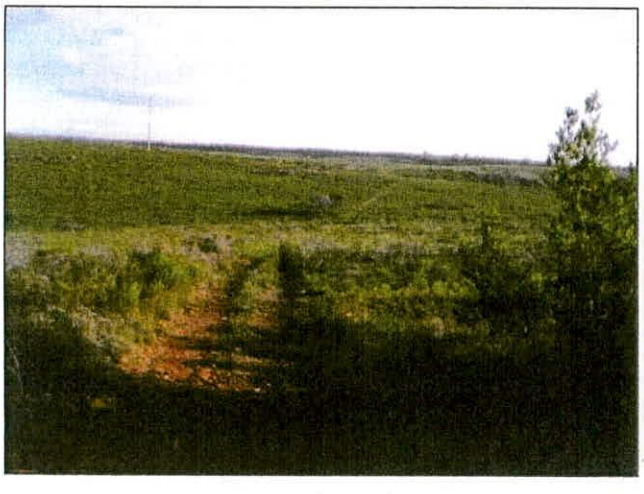

Figure 26: Southern view of the site

Figure 27: Eastern view of the site

Visual impact

	OPERATIONAL (no mitigation)	OPERATIONAL (with mitigation)	CLOSURE
Extent	Local	Local	Site Specific
Duration	**Medium Term**	Short Term	Long Term
Intensity	Low	Low	Low
Probability	Possible	Unlikely	Definite
Significance	Low	Low	Low
Status	Negative	Slightly Negative	**Positive**
Confidence	High	High	High

Remedial measures to be implemented are:

- No vegetation clearing will take place outside the proposed mine area during the mining operation.
- Reduce visual impact through proper re-vegetation and retaining tree screens.
- 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'.
- The sides of the quarries will rounded off through a cut and fill action to create a minimum slope of 1:2.
- Cuts will follow curvilinear lines, which will blend in with those of the surrounding landscape, rather than straight geometric lines.
- Alien vegetation will be removed on a continuous basis to ensure that established natural vegetation is not again out competed.

- Excessive dust plumes within the mine area or on the haul roads will be eliminated through wetting.
- At closure all stockpiles will be flattened.
- Visuals will be drastically improved at closure of the mining concern.
- At closure, all disturbed areas would have been rehabilitated as per the re-vegetation plan.

TRANSPORT IMPACT

The existing access of the mining area will be used, which links up with the Stanford gravel road and ultimately Old Cape Road. The Department of Roads and Transport can be consulted, if concern is raised. Line of sight entering the Stanford road is good and taking into consideration the low speeds that are maintained and the relatively low traffic count on this tract of the road the safety impact is rated low. Drivers will, nevertheless be sensitized on safety procedures and the drivers of the company should be already skilled. The necessary heavy vehicle signage must be erected on both sides of the access as per the specifications of the District Roads Engineer. During periods of high hauling rates, a flagman should secure the access. The access road may develop ruts during wet periods and will require upgrading. Material from the crushing plant will be used for this purpose and a wearing course of at least 30cm will be constructed. Once mining is terminated, the access road will be retained for future use.

The Stanford road connecting with the Old Cape Road will be used as haul roads to the relevant markets and there are no alternatives available. The former is a gravel road of moderate condition whilst the latter is a public tar road constructed for the handling of heavy vehicles. The gravel road will experience more impact and needs to be upgraded. However, the upgrading and maintenance of this road rest solely with the District Road Engineer (DRE) for the western region. Despite the fairly good quality of Old Cape road, safety risks for motorist would not be compromised with the slight increase in heavy vehicles due to this mining venture, since this road already provides a main carting route for many heavy vehicles of various industries for the local and national region.

Cyclists and pedestrians will experience a similar risk and truck drivers will be sensitized on the matter and provided with the necessary transport training. The quality of the Stanford Road is of intermediate status since they show signs of potholes and corrugated surface. Both the Stnford road as well as the Old Cape Road are major service roads to the western suburbs of Port Elizabeth and are being used as all purpose roads and have been built for this purpose. Farmers and businesses also use the road to cart merchandise to the relevant offset points and into town. It is understood that

heavy vehicles will slow down vehicles on these roads but since they are relatively short and show low traffic counts, the impact would be limited. The upgrading and maintenance of these roads rest solely with the District Road Engineer (DRE) for the western region.

The impact on the Stanford and Old Cape Road is rated moderate considering the contribution to the overall freight that is hauled on this road. It would therefore be essential that adequate liaison between the applicant and the DRE be established in terms of the repair of any section of the road that could pose a threat to the public. The applicant is willing to allocate R0, 50 per cubic meter sold to the DRE, if required. It should be recognized that both fuel and license fees include a levy for the repair of roads.

To accommodate the nearby property owners, material will only be carted from the property as from 08:00 to 17:00 during the week, but may result in the need to cart sand on Saturday mornings.

Road safety for motorists is of importance and truck drivers will be informed accordingly and be sensitized towards displaying proper road etiquette, the impact is therefore rated of low-moderate significance.

Traffic impact

	OPERATIONAL **(no mitigation)**	**OPERATIONAL** **(with mitigation)**	**CLOSURE**
Extent	District	District	District
Duration	**Medium Term**	**Medium Term**	**Medium Term**
Intensity	**Medium**	**Low-Medium**	**Low-Medium**
Probability	**Definite**	Likely	Likely
Significance	**Moderate-High**	**Moderate**	Low (if upgrading is done) **Moderate** (no upgrading)

Status	Negative	Negative	Negative
Confidence	High	High	High

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.
- No unnecessary hooting would be permitted.
- Vehicles entering the Stanford- or Old Cape Road will come to a complete stop before entering the road and any transgressions in this regard will be heavily penalized. All contractors will sign a letter of agreement to this effect.
- All vehicles visiting the quarry shall be road worthy and will be included in the agreement with contractors.
- Overloading will not be permitted. Speeding will be prohibited and drivers will be penalized should it be proved that this requirement is contravened.
- Hauling of material will only mostly commence at 08:00 and ceases at 17:00. No vehicles may park along the road outside the mine area before or after the said times.
- The appropriate signage (W107 & W108 –1,2m size) will be erected on both sides of the quarry entrance and access to Cape Road will be maintained in collaboration with the District Roads Engineer.
- The District Roads Engineer will be consulted on the maintenance of both roads to be used.
- If poor visibility or slow access of vehicles onto Old Cape Road could result in any accidents, a flagman will be used at the access.
- Internal haul road will be maintained to an acceptable standard to prevent erosion and maintain safety standards.

SOCIO -ECONOMIC IMPACT

Currently, the general monopoly of quartzite owned mines in Port Elizabeth caused price spiking to over 50% resulting in higher building and construction costs. Contracts between the building companies and home owners was signed before the sudden rise in construction material, which is causing the construction companies to have under quote and budget for projects. This further resulted in building companies to close down, lose contracts, or even being sued for breached of contract.

This mining concern will provide fair competition with the aim to stabilize price control over construction material in the Port Elizabeth area. This will definitely benefit other trade industries and eventually the consumers, thus having a positive socio-economical impact.

The quarry will play a low-moderate role in the development of Port Elizabeth infrastructure. It is predicted that the development of the quarry will be of value to the building sector. In addition, the quarry will generate permanent and casual work for a number of people and must be seen as a positive contributor to upliftment of inhabitants of the Metro. Establishing the concern will definitely result in certain downstream employment and other spin-offs in the building industry.

The establishment of the concern will have very limited impact on surrounding agricultural activities. It potentially could pose some social impacts on residents in terms of limited air pollution in the form of dust & noise as well as visual impact especially during periods of high winds but with the mitigation measures described elsewhere, these impacts could be reduced to acceptable levels and also baring in mind that immediate residents are far from this development. Therefore, it is expected that should the guidelines of the EMP be followed, no complaints are expected.

Since operational hours will be restricted to daytime, light pollution at night is not a consideration. Based on the above, the overall social-economic impact is rated positive.

	OPERATIONAL (no mitigation)	**OPERATIONAL (with mitigation)**	**CLOSURE**
Extent	District	District	District
Duration	Short Term	Short Term	Short Term
Intensity	Low	Low	Low
Probability	Definite	Definite	Definite
Significance	Very Low	**Low-moderate**	Low

Status	**Positive** (economic attributes outweigh the negative social impacts	**Positive** (economic attributes outweigh the negative social impacts	Negative (loss of jobs and income and less spin-offs)
Confidence	High	High	High

Remedial measures to be implemented are:

- Those described under previous headings plus establishing regular meetings with nearby neighbors.

IMPACTS EXPECTED WITH THE DEVELOPMENT OF THE MINE WITHIN THE HOPEWELL CONSERVATION PROJECT (HCP)

INTRODUCTION

Due to the controversy of this application, an assessment of the impacts related to the mining concern within the residential area of the Hopewell Conservation Project (HCP) was deemed necessary.

The developer of the HCP applied for environmental authorization from the Department of Environmental Affairs for the development of this residential and conservation area and obtained approval in 2008, thus before mining application was made to the DME. However, the developer of the HCP failed to apply to the DME for approval for the sterilization of the minerals, in accordance with Section 53 of the MPRDA; therefore according to law, this mineral may still be extorted. The applicant, Hopewell Quarries, therefore continued to apply for this mining concern and lodge the application in 2009, which is currently in process at the DME.

Upon further investigation into the development of the residential area, it was found that the developers of HCP intend to establish a residential area on the exact same area as the proposed mining site, thus creating two conflicting projects.

The developers of the HCP do not want mining to occur within their development site and they have lodged a lengthy objection which was submitted to the DME. However, it still is the right of Hopewell Quarries to apply for a mining permit.

OBJECTIVE

The objective of this discussion and assessment is not to resolve the issue, since this is a legal matter and responsibility falls upon the two leading governing agencies, namely the Department of Minerals and Department of Environmental Affairs. This case may even proceed to court.

The objective of this discussion is however:

1. To provide an assessment of impacts that might be expected should both mining and residential development proceeds.
2. To provide facts relating to the rights of the applicant in this situation.
3. To provide information for an informative decision to be made by the DME.

ASSESSMENT

Table 2 lists the impacts on all the identified environmental components which will be impacted on during the operational phase of the mining concern within the operational phase of the HCP development.

During this assessment it is presumed that the developers of HCP went ahead with the development as planned and the impacts that could be expected should mining continue. This assessment should be compared to the above assessment for a more informative approach.

*** NOTE: Although mining would negatively impact on certain areas, mining is a temporary development and by law compelled to rehabilitate during and after mining, thus all impacts related to mining is and will be experience on a temporary basis for no longer then 2-5 years (duration of the mining permit).**

Table 2: Environmental and Social Impacts of this mining concern within the Hopewell Conservation Project before and after mitigation measures.

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Topography: Mining will permanently transform 1.5ha of the development and create a benched, box-cut into the hill. This could lead to high costs for the HCP developer to either fill the site up to prepare for foundations or find alternative building methods to establish houses. This will also add at least 2 years of delay in the development, as building of houses in this phase would have to wait until mining ceases.	Site Specific	Permanent	Definite	**High**	**Moderate**	Negative	High	Site Specific	Permanent	Definite	**Moderate**	**Moderate-Low**	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**	**Extent**	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**
Geology: *Excavation & Foundation preparing*. Although mining will permanently remove some of the aggregate, the site is limited to 10m. Whether mining continues or not, foundation preparing for HCP will remain the same. Delay in house building.	Site Specific	Permanent	Definite	Low	Low	Negative	High	Site Specific	Permanent	Definite	Very Low	Low-insignificant	Neutral	High
Blasting: However, blasting could impact very negatively on the foundations and building structures.	Local	Short Term	Likely	**Moderate-High**	**Moderate-High**	Negative	High	Local	Short Term	Likely	Moderate-Low	Moderate-Low	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Soils: *Compaction of soil:* Mining would return soils for rehabilitation. Whether mining continues or not, compaction of soil to prepare construction for HCP will remain the same.	Site Specific	Permanent	Definite	Low	Low	Negative	High	Site Specific	Permanent	Definite	Low	Low-insignificant	Negative	High
Leaching capacity of soil on site (erosion potential): Mining could increase erosion on slopes and after mining, the cost would be to the HCP developer to control and mitigate erosion. However, mine closure will not be issued until all the environmental risks has not been resolved, thus this impact is highly unlikely.	Site Specific	Short Term	Probable	Low	Low	Negative	High	Site Specific	Short Term	Unlikely	Very Low	Very Low	Neutral	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Soil Pollution: Mining could attribute to soil pollution and after mining, the cost would be to the HCP developer to eliminate soil pollution. However, mine closure will not be issued until all the environmental risks has not been resolved, thus this impact is highly unlikely.	Local	Long term	Probable	Low	Low	Negative	High	Site Specific	Short term	Unlikely	Low	Insignificant	Neutral	High
Flora: *De-vegetation* to make way for mining, however, this site has already been severely impacted on, thus impact on vegetation is insignificant. De-vegetation would lead to visual impacts and dust increase; these impacts are assessed further below.	Site Specific	Long term	Definite	Low	Very Low	Negative	High	Site Specific	Short Term	Definite	Low	Very Low	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Alien invasive species to occur along disturbed areas. Any disturbance in an area that is highly infested, like this site, would lead to increased risks of alien infestation. Thus, whether mining or residential development occurs, the site will be prone to alien infestation. Mining is only 1.5 ha of the site, compared to the residential area of a 197 Ha to be developed.	Site Specific	Medium Term	Likely	**Moderate**	Low	Negative	High	Site Specific	Short term	Unlikely-probable	Low	Low	Positive	High
Fauna: Loss of habitat due to vegetation clearance. Both mining and residential development would impact on the loss of habitat, even if mining is only temporary.	Local	Short term	Definite	Low	Low	Negative	High	Local	Short term	Probable	Very Low	Low	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Surface Water: Mining will increase surface water volume and velocity due to hard surface increase and loss of vegetation cover to the south of the mining site, but water will be diverted into the silt dam and for there into the drainage line. No residential houses are planned to the immediate south of the mine, and impact will be low. It must be noted, that developing a residential area, will also increase surface water runoff; it would be on a larger scale and permanent compared to mining.	Local	Medium term	Definite	**Moderate**	**Moderate**	Negative	High	Local	Short term	Definite	Low	Low	Neutral	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Ground Water: Mining will not impact on the ground water, due to deep level of the ground water table, and the fact that mining is restricted to only 10 m.	Local	Long term	Probable	Low	Low	Negative	High	Local	Short term	Unlikely	Very Low	Very Low	Neutral-negative	High
Chemical toilet could contaminate soil and groundwater if not maintained and regularly serviced.	Local	Medium term	Probable	Low	Low	Negative	High	Local	Short term	Unlikely	Very Low	Very Low	Neutral	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Air Quality: Generation of dust during mining activities will highly impact on the residents to the west and north-west of the mining site. Wind blow dust will be high in strong winds and especially during crushing. This could cause great discomfort for people struggling with allergies, weak chest or any other asthma related medical condition. It would also highly increase the nuisance factor of cleaning and dusting households.	Local	Short term	Definite	**High**	**High**	Negative	High	Local	Short term	Likely	**Moderate**	**Moderate**	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**	**Extent**	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**
Noise: Nuisance to residents and possible pets, due to noise generated from the mining activities such as crushing, heavy vehicle movements, refers signals, and blasting.	Local	Short term	Definite	**High**	**High**	Negative	High	Local	Short term	Likely	**Moderate**	**Moderate**	Negative	High
Waste Generation: Increase in domestic, hydrocarbon and scrap metal waste.	Site Specific	Short term	Definite	Low	Low	Negative	High	Site Specific	Short term	Unlikely	Very Low	Very Low	Neutral	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**	**Extent**	**Duration**	**Probability**	**Intensity**	**Significance**	**Status**	**Confidence**
Visual: Change in texture (vegetated/rough to bare/smooth) and color (green/brown to red) as well as change in landscape due to mining. This could impact negatively on the property value of the plots – especially those in view of the proposed quarry.	Site Specific	Short term	Definite	**Moderate**	**Moderate**	Negative	High	Site Specific	Short term	Likely	Low	Low	Negative	High
Traffic: Increase in heavy vehicle traffic which could negatively impact on the safety and quality of internal roads of the HCP development and dust generation.	Local	Short term	Definite	**Moderate**	**Moderate**	Negative	High	Local	Short term	Likely	Low-moderate	Low-moderate	Negative	High

Environmental Components	Before Mitigation							After Mitigation						
	Extent	Duration	Probability	Intensity	Significance	Status	Confidence	Extent	Duration	Probability	Intensity	Significance	Status	Confidence
Socio-Economic: Increase in human activities poses a security threat to the surrounding residential community; and illegal dumping: as residents might use the quarry site after mining as a dumping site. The HCP will have high expenses to either change the development plan and obtain approval from Town Planning, delay development, or adapt own mitigation measures and implement to ensure that residents are not affected in a negative way due to mining activities. Financial loss to the developer due to decrease in property value due to mining site so close to residential area.	Local	Long term	Definite	**Moderate-High**	**Moderate**	Negative	High	Local	Short term	Likely	**Moderate**	**Moderate**	Negative	High

Issues such as: dust, noise, safety, building structures, and financial losses to the developer of HCP, increases highly if mining will continue as well as the development of the residential area. None of the other environmental issues play a significant roll.

However, as previously highlighted, the applicant, Hopewell Quarries, have every right to apply for a mining permit, taken the circumstances and MPRDA into consideration and with the current situation at the site, with no development and/or any residential household near the site, the impacts of mining will be vastly different and less. Table 2 highlight issues that are anticipated should the HCP development proceed, but are to date not yet in the phase of development.

Taken all these facts into consideration the following can be concluded:

1. The environmental application for the development of the HCP has been approved before application was made for a mining permit in the same area.
2. The developers failed to apply to the DME for sterilization of the mineral, hence the applicant, Hopewell Quarries still have the right to apply for a mining permit in this area.
3. Significant increases in social and environmental components such as air quality, noise, social-economical impacts, stability of building structures and financial losses will occur if mining proceeds together with the development of the HCP.
4. Significant decrease in social and environmental components such as air quality, noise, social-economical impacts, stability of building structures and financial losses should mining proceeds and the development of the HCP are postpone till mining cease or the HCP are terminated.
5. Increased impacts will only last for the duration of the mining lifespan, which is 5 years maximum.
6. The establishment of a residential area of this scale would also impact on certain environmental components that have not been discussed in this report, but could be viewed in a copy of the EIA and EMP of the said project, which is available at the Department of Environmental Affairs.
7. Thus with both developments, environmental impacts will be experienced, with the mining it will only be temporary for all the environmental components besides the topography and geology, since the MPRDA requires rehabilitation. But the development of a residential area will permanently impact and change the environmental at this site.

SITES AND STRUCTURES OF ARCHAEOLOGICAL AND CULTURAL INTEREST

These sites represent the heritage of communities and are therefore protected in terms of current legislation. In addition all material/buildings older than 60 years are protected. There is no known natural heritage or cultural sites close to the study area. No areas of social, cultural or historic value were identified onsite and the impact is rated insignificant in this regard. Nevertheless the operator of the excavator should be briefed regarding this aspect. Local communities may use some of the remaining vegetation for medicinal purpose but since the site is not located close to residential areas, located on private property and devoid of any medicinal plants, the impact is rated low. However the Khoisan people inhabited the study area historically and it is therefore possible that artifacts and sits of archaeological importance could be identified onsite.

Since mining will be done in an already disturbed area, it would not be necessary to complete a heritage impact assessment. This assumption is based on the fact that no important material or sites were observed during the previous mining.

Although no impact is envisaged, the operators of earthmoving equipment will be informed of the company's obligation in this regard and to inform management when anything of interest is noted on the site. Dr. Binneman at the Albany Museum in Grahamstown and SAHRA office in East London will be contacted immediately if any object of importance is observed and all operations would be suspended immediately.

PUBLIC PARTICIPATION

The landowner and all abutting landowners within 1km from the site received a consultation letter supported by a BID and registration form by means of registered post or by hand.

CONCLUSION

A. The proposed quarry can be developed in a sustainable manner provided that the following requirements are met:

   1. A phased approach must be followed and should the applicant not be able to rehabilitate Phase 1 effectively operations at the quarry must be stopped.

2. Alien trees must be prevented from establishing in the mine area.

3. The Department of Minerals & Energy must provide the necessary guidance and monitoring and where applicable enforce environmental legislation.

B. The proposed quarry can meaningfully contribute to the building industry and economic growth of the Metro. Since the quarry will be financially sustainable, it would provide ample finances for the rehabilitation process.

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. In this regard it should be noted that only one quarry will be developed at a time and this serves as an undertaking to this effect.

ANALYSIS OF REHABILITATION COSTS: PRIVATE RATES

GENERAL

Tendering process & advertisement = **R4000**

Transport of equipment = **R3000**

Supervision fees and reporting = **R15000**

Aftercare – erosion, alien eradication, seeding/planting and monitoring = **R20 000**

Closure documents = **R10000**

Contingencies = **R20000**

Sub-Total = R72000

MINE AREA (PHASE 1 – SIMILAR AMOUNTS WOULD BE REQUIRED FOR EACH ADDITIONAL PHASE)

Drilling and profile blasting @ R20/m^3 = **R50 000**

Cut and fill of production faces (1:2) 5 000m^3 @ R7/ m^3 = **R35 000**

Profiling of quarry floor = **R15 000**

Spreading of 4500m^3 of topsoil @ R5 per cubic meter = **R22500**

Seeding and fertilising of 0,4ha –@ R3000 per ha = **R1 200**

Removal of waste, scrap metal and redundant equipment etc = **R5 000**

Erosion control measures = **R5 000**

Spreading of oversize material on slopes = **R10 000**

Infill planting of indigenous vegetation = **R4 000**

Sub-Total = R147 700

Total = R219 700

A financial guarantee to the value of R220 000 will be made available to the DME before approval. It is proposed that the applicant submit two additional payments of R50 000 each before commencing with ensuing phases. Should the applicant rehabilitate each phase concurrently with mining it is proposed that the additional payments are reduced to R25 000 each.

I, Mr M. P. Headbush, declare that the above information is in my opinion true, complete and correct. I undertake to implement the measures at both quarries 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 this day_____ of _____ 20_____

_____

Signature of applicant

INSPECTIONS AND MONITORING

- Regular monitoring of all the environmental management parameters and implementation of measures will take place 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.
- Various 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 disturbed areas, re-vegetation progress, die-off of established vegetation and prevention of water quality deterioration and prevention of spreading of alien vegetation.

COMPLIANCE REPORTING / SUBMISSION OF INFORMATION

- Layout plans will be updated annually or should mining operations change drastically 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 immediately.
- A six-monthly performance assessment will be compiled and submitted to the DME in June and December for evaluation and acceptance.

- Once extraction is completed a closure program will be compiled to ensure that rehabilitation will be completed as per the EMP and applicable environmental legislation.
- A final performance assessment report will be submitted at closure 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. Should any major shortcomings be detected then an amendment to the EMP/closure plan will be drafted and submitted for approval by the DME.

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.
- The entire quarry will be monitored on a weekly basis until closure is granted.
- The mining/rehabilitation activities will be regularly visited by the holder/manager to ensure that mining is taking place within approved boundaries, that production faces are profiled and stabilized, vegetated and fertilised and that no erosion or dumping of waste on unauthorised areas are taking place on site.
- That vegetation cover and species diversity is adequate.
- All plants that can be safely transplanted will be removed to disturbed areas.
- Transplanted plants will be irrigated on a regular basis.
- The minimum vegetation is removed ahead of the mining face.
- Re-vegetation process is successful and that alien vegetation is removed.
- The area will be regularly visited by the holder/manager to ensure that the handling of hydrocarbons is according to approved guidelines and that the necessary precautionary measures for spills are adequate.
- General waste is handled correctly and effectively removed from the property.
- Dust control on the roads at the quarry is effective to limit air pollution.
- Ensure that river gravels are not polluted with hydrocarbons.
- That the mine is clean and tidy.

- Should any remedial measure fail, it will be 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 can be introduced to make employees and contractors aware of EMP requirements.
- Should serious environmental misconduct by workers occur, the specific activity would be stopped until the problem has been remedied and financial penalties will be imposed.

REHABILITATION SCHEDULE

QUARRY

1. Profiling of Phase 1/Bench 1 – continuous with mining with and completed before commencement of Phase 2/Bench 2.
2. Spreading of oversize boulders and/or overburden, if any – daily
3. Re-vegetation of Phase 2/Bench 2 must be completed within 6 months after completion of mining.
4. Submit a closure plan & risk assessment three months before mining operations are to cease.
5. Aftercare/maintenance – Two years after rehabilitation was successfully completed.

GENERAL

1. Quarterly eradication of alien vegetation until closure certificate is issued
2. Light application of fertilizers in March and September 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 mine area will be rehabilitated back to a sustainable environment. The ecology of the area will be improved by establishing scrubs and trees (thicket) within the area and thereby creating an improved niche for animal species.
- Production faces of the quarry will be profiled to 1: 2 slopes by cut & fill method with the top edge rounded off to create a flowing landscape.
- 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 soil landscape.
- The rehabilitated area will be kept clear of alien and invasive plant species.
- The area would be litter free.
- There will be no remaining stockpiles, equipment, waste, scrap metal/redundant equipment left in the soil environment.
- Hydrocarbons, and contaminated soil, if any, will be safely removed from site.
- Safe drainage of the mine must be achieved without causing erosion of the slopes and the quarry floor.
- Some animals will be able to return safely to the site
- The mining sites will not become prone to unauthorised dumping.
- The proposed land-use will be achieved within 1 year after rehabilitation has been completed.
- Nearby residents will not be subjected to any post closure social or environmental impacts.

AFTERCARE

It is anticipated that the following aftercare will be provided over one year:

- Vegetation cover – reseeds bare areas or replant shrubs and trees. – September to March
- Stability of production faces – Reshape affected areas, compact - May to August - Seeding done as from September to March
- Eradication of alien vegetation – Quarterly

POST CLOSURE MAINTENANCE

Considering that the mining area could be prone to severe scouring during extreme flows the mine area environment could be totally changed and post closure maintenance could be required. In order to provide the necessary funds for this task the following funds need to be secured:

Eradication of invasive vegetation = R4000 per annum x 2 year = **R8000**

Infill of any erosion gullies or collapse of bar walls – **R25000**

Seeding, fertilizer van infill planting – **R5000**

Total = R38 000

POST CLOSURE AESTHETIC ACCEPTABILITY

The quarry area will resemble a box cut into the hill with sloped faces reflecting gentle gradients. The area will display a heterogeneous grassland but with a substantial thicket component, which will align the site with the surrounds. The anticipated change in landform will after re-vegetation not be clearly noticeable and from an aesthetic point of view the landscape will have a higher aesthetic quality than what is currently the case. With the rehabilitation approach to be adopted, the objective is to reach 60% of remaining indigenous species diversity within 3 years and 80% within 5 years time.

If rehabilitation is not afforded adequate time and finances the above assessment will change dramatically and the area will revert to a heavily invested area reflecting poor quality landscape and extensive erosion.

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 are not 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)
* Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
* 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, Mr M. P. Headbush, take cognisance of the following penalties should I transgress any section of the MPRDA or any other Act governing any other activity on the two quarry sites 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 other site than that demarcated and indicated in the EMP	A fine or imprisonment of 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

SM Pierce & AD Mader - STEP Handbook

Department of Environmental Affairs and Tourism: National Biodeversity Strategy and Action Plan

Nelson Mandela Bay Municipality – NM MOSS Handbook

Mr John Victor

UNDERTAKING

I, Mr M. P. Headbush, the undersigned have studied and understand the contents of this document in and hereby duly undertake to adhere to the conditions as set out therein

Signed at **Port Elizabeth** on this_____ day of _____ 20____.

_____

Signature of applicant

Agency declaration: This document was compiled on behalf of the applicant by Stellenryck Environmental Solutions

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 _____ 20____.

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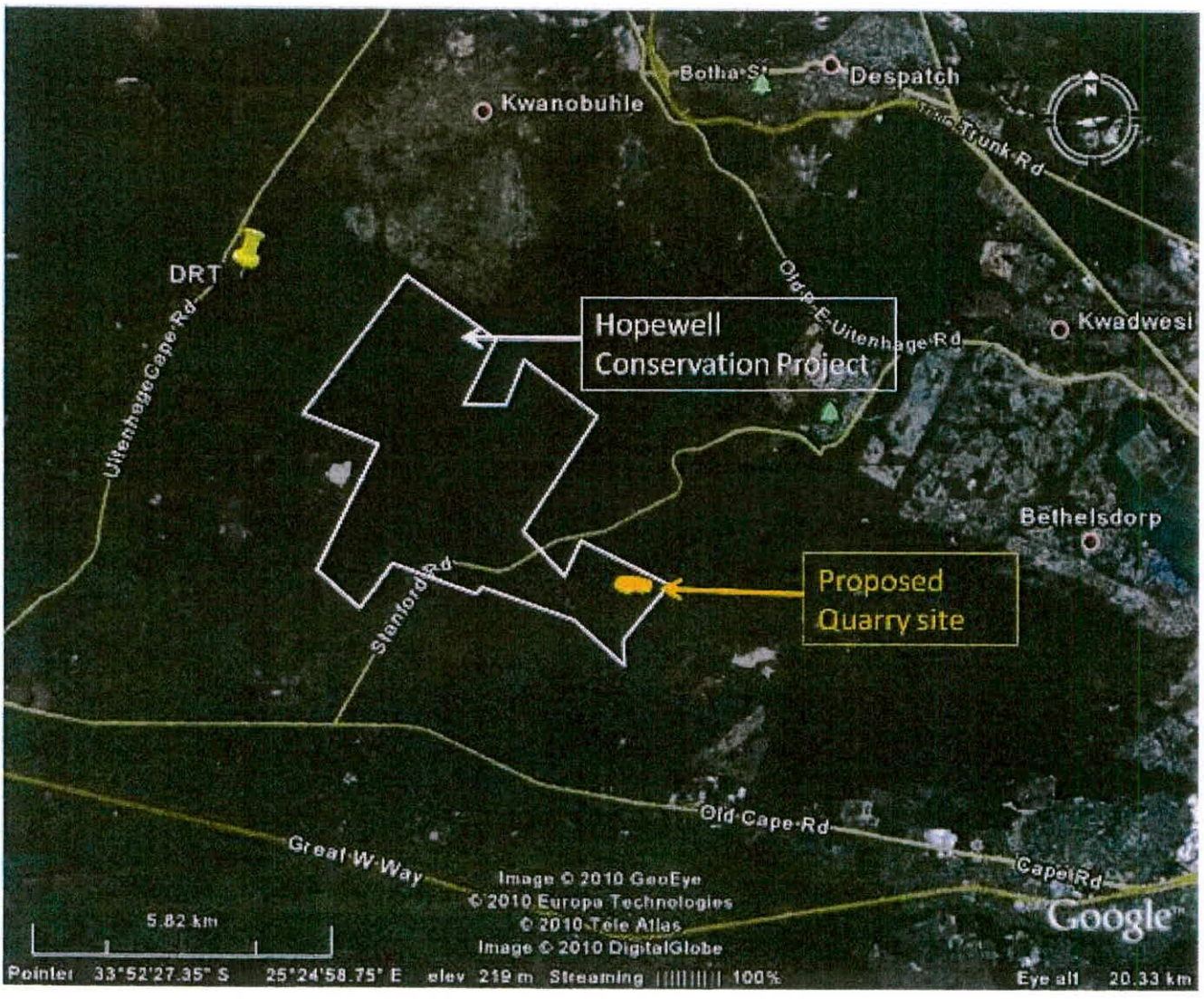
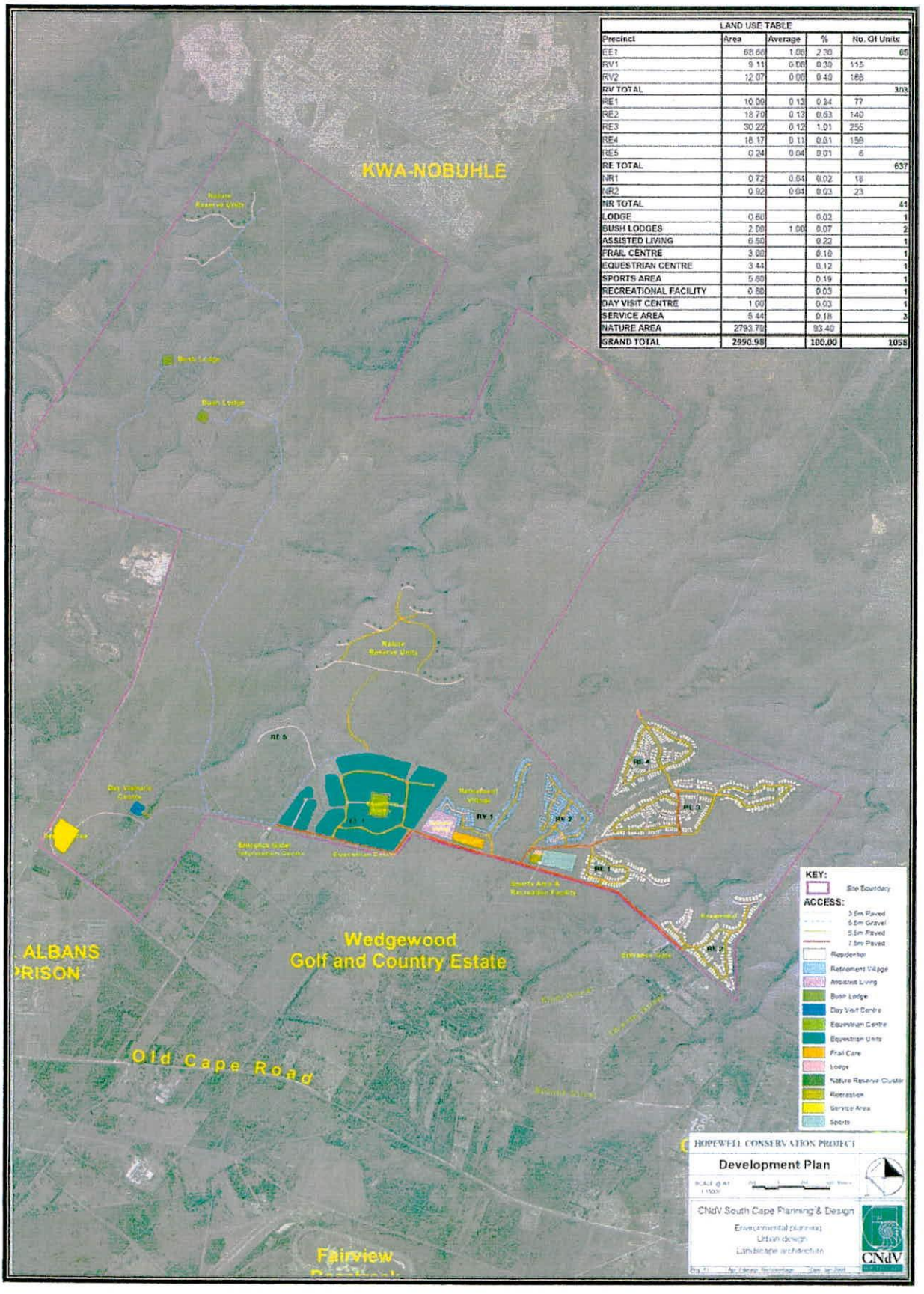
REGIONAL MANAGER

EASTERN CAPE

APPENDIX 1: HOPEWELL CONSERVATION PROJECT AND PROPOSED HOPEWELL QUARRY – MAP



Note: The residential area for the Hopewell Conservation Project fall on the exact area as the proposed quarry development area. See Figure 1-4 of the said report.



LAND USE TABLE				
Precinct	Area	Average	%	No. Of Units
EE1	68.66	1.06	2.30	65
RV1	9.11	0.06	0.30	115
RV2	12.07	0.06	0.40	188
RV TOTAL				303
RE1	10.09	0.13	0.34	77
RE2	18.79	0.13	0.63	140
RE3	30.22	0.12	1.01	255
RE4	16.17	0.11	0.01	159
RE5	0.24	0.04	0.01	6
RE TOTAL				637
NR1	0.72	0.04	0.02	18
NR2	0.92	0.04	0.03	23
NR TOTAL				41
LODGE	0.60		0.02	1
BUSH LODGES	2.00	1.00	0.07	2
ASSISTED LIVING	6.50		0.22	1
FRAIL CENTRE	3.00		0.10	1
EQUESTRIAN CENTRE	3.44		0.12	1
SPORTS AREA	5.80		0.19	1
RECREATIONAL FACILITY	0.80		0.03	1
DAY VISIT CENTRE	1.00		0.03	1
SERVICE AREA	5.44		0.18	3
NATURE AREA	2793.70		93.40	
GRAND TOTAL	2990.98		100.00	1058

Figure 1-4: The proposed layout of the development