ENVIRONMENTAL IMPACT STATEMENT – ALIWAL DOLERITE QUARRY (PTY) LTD
EC 30/5/1/2/2/0215 MR & EC0017MR/102

1. ENVIRONMENTAL IMPACT STATEMENT – MINING RIGHT AREA

This Environmental Impact Statement provides a summary of the actual and potential impacts of the mining activities as assessed in the 2011 EMPR on the environment, considering the implementation of management and mitigation measures. It specifically addresses the nature, duration, likelihood, and significance of these impacts.

STRIPPING OF VEGETATION AND TOPSOIL	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Destruction of vegetation **LOW-MEDIUM**	Nearly all of the ground which lies ahead of the future mining area has already been stripped. Due to the fact that the area has been subjected to mining activities since 1976, the majority of vegetation is of a disturbed nature. If possible, the indigenous vegetation on the ridge should be protected or dug up and transplanted for use in concurrent rehabilitation.
Loss of faunal habitat, due to destruction of vegetation. **LOW-MEDIUM**	Due to the fact that the area has been subjected to mining activities since 1976, only limited fauna which is accustomed to the mining activities remain on site.
Destruction of topsoil structure **LOW-MEDIUM**	Even though topsoil is either used immediately or stockpiled for use during rehabilitation, the original structure of the soils will be lost during the stripping process. The topsoil contains the seed bank of the indigenous vegetation. Destruction and loss of topsoil removes the medium required to encourage revegetation over mined out areas.
Removal of vegetation resulting in visual impacts. **MEDIUM**	The removal of vegetation will change the characteristic of the land. Due to the fact that the visibility of the area to be mined is limited through the established berms on the perimeter of the mine the offsite visual impact is limited.

STRIPPING HAULING AND STOCKPILING OF OVERBURDEN	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Dust caused by materials handling (stripping & stockpiling) and vehicle entrainment. **MEDIUM** I&AP concern of dust raises the impact to**:** **MEDIUM-HIGH**	The probability of dust being generated during overburden stripping is greater than for stripping of topsoil as there is a greater volume of material being moved. Therefore there is: Θ Increased materials handling. Θ More vehicles being used to move the material (increased vehicle entrainment). Θ Due to the initial lack of vegetating on the overburden dumps, there is more chance of windblown dust.

STRIPPING HAULING AND STOCKPILING OF OVERBURDEN	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
	Depending on the season when the overburden material is stripped, there could be more dust leaving the mining environment.
Noise caused by materials handling and vehicle movement. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	The vehicle movement associated with overburden removal and dumping generates noise. The significance of this impact can vary based on the time of day the noise has been generated. If the overburden dump is close to the perimeter of the property, it is more likely that noise from this activity will affects I&AP's.
Water impacts – greater potential for increased sediment load in stormwater run-off from the overburden dumps. **MEDIUM**	The overburden dumps will alter the surface water runoff from the site. However the impact of the overburden dumps on a catchment scale is small. Altered surface runoff patterns could result in unwanted erosion. Without storm water controls around the perimeter of the mine there is a possibility that storm water with high sediment loads can be washed of site.
Visual impacts associated with the overburden dump. **MEDIUM**	Due to the fact that the overburden dumping area is visible to surrounding home owners there is a potential visual impact.

DRILLING, BLASTING AND SECONDARY BREAKING	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Dust caused by drilling and blasting. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	When drilling activities take place, there is a possibility of the impact of the dust created during drilling activities to be realised off site. However the fact that drilling is confined to the quarry reduces the probability of an offsite impact. Although blasting occurs less frequently than drilling, the dust created as a result of a blast has a higher probability of having an offsite impact.
Noise generated during drilling and blasting. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	Although noise will be generated during drilling, the activity will take place within the quarry. Hence the probability of the aspect resulting in off-site impacts is reduced. Although blasting occurs less frequently than drilling, the noise created as a result of a blast has a higher probability of having an offsite impact.
Vibrations causing structural damage to off-site buildings as a result of vibrations.	Depending on the size of the blast and the proximity of the blast to structures, the vibration of the blast could impact on the structural integrity of buildings in close proximity to the mine.

DRILLING, BLASTING AND SECONDARY BREAKING	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
LOW I&AP concern of dust raises the impact to: **LOW-MEDIUM**	Even though the likelihood of an impact is low, the significance of an impact is high. This impact ranking has been raised to recognise the concerns of interested and affected partie
Potential for fly-rock which is a risk to humans and fauna. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	Depending on the size of the blast, blast design, implementation of the blast and nature of the rock to be blasted, fly rock could occur. It must be noted that the generation of fly rock is a safety concern, rather than a purely environmental concern. However, as there is the potential that it may impact on neighbouring properties, it has been evaluated in this report.
Water quality impacts generated as a result of blasting activities. **MEDIUM**	Blasting activities make use of explosives which could have an impact on the quality of ground water captured within the quarry. Should the impaired water be allowed to leave the mining environment, it could impact on the quality of the water in the ground water catchment area.

LOADING AND HAULING	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Dust generation from materials handling and vehicle entrainment. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	Loading and hauling of blasted material occurs every day that the mine is in operation, increasing the consequence and probability of the impact (compared with the previous activities). I&AP's have highlighted dust as a concern hence the ranking of the impact has been increased.
Noise generated by materials handling and vehicular activity. **MEDIUM** I&AP concern of dust raises the impact to: **MEDIUM-HIGH**	As indicated above, activities associated with loading and hauling blasted material occurs every day that the mine is in operation. Therefore, the consequence of the impact (compared with the previous activities) is increased. I&AP's have highlighted noise as a concern hence the ranking of the impact has been increased.

CRUSHING, SCREENING, WASHING AND STOCKPILING	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Dust generation during crushing, screening and washing. **MEDIUM** I&AP concern of dust raises the impact to**:** **MEDIUM-HIGH**	Crushing, screening, washing and stockpiling activities occur every day that the mine is in operation, increasing the consequence and probability of the impact (compared with the previous activities). The location of the plant and stockpiles will make the likelihood of the dust impacting off site higher than other areas of the mine. It should be noted that the prevailing wind is from the north reducing the potential for dust impacts north of the mine.
Noise generated during crushing, screening and stockpiling. **MEDIUM** I&AP concern of dust raises the impact to**:** **MEDIUM-HIGH**	As indicated above, crushing, screening and stockpiling activities occur every day that the mine is in operation. The location of the plant and stockpiles will make the likelihood of the noise impacting off site higher than other areas of the mine.
Water pollution as a result of increased sediment load in stormwater run-off from the plant area. **MEDIUM**	Storm water run-off over the plant and stockpile area is likely to pick up sediments from the exposed surfaces. This contaminated water will more than likely run off site.

DISPATCH OF PRODUCTS FROM SITE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Dust caused by materials handling and vehicle entrainment on roads. **MEDIUM** I&AP concern of dust raises the impact to**:** **MEDIUM-HIGH**	Loading of products for dispatch via vehicles can occurs every day that the mine is in operation, increasing the consequence and probability of the impacts (compared with some previous activities). The dispatch area is close to the boundary of the mine resulting in a higher probability of an off-site impact.
Noise generated by materials handling and vehicular activity. **MEDIUM** I&AP concern of dust raises the impact to**:** **MEDIUM-HIGH**	As indicated above, activities associated with dispatch of products occurs every day that the mine is in operation. Therefore, the consequence and probability of the impacts increases (compared with some previous activities).

DISPATCH OF PRODUCTS FROM SITE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution potentially from product spills or hydrocarbon leaks associated with the vehicles. **MEDIUM**	Storm water runoff in the dispatch area could be impacted from hydrocarbon spills associated with the trucks or from increased sediment load from small spills of products occurring in the area.
Social impacts from vehicles entering the mine affecting regional air quality. **MEDIUM**	The social impacts associated with dispatch are those resulting from vehicle or rail activities on the surrounding residents. Social impacts include; Θ Noise impacts of vehicles on the local roads Θ Impacts on the junction between the mine access and public road Θ Possibility of stones from trucks resulting in windscreen damage Θ Impacts of trucks on the local roads.

WATER SUPPLY AND USE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water loss during mining and processing. **MEDIUM**	Water is used for dust suppression in the mining section and dust suppression and washing of products in the processing section. This water is made up water collected within the quarry. Although water is recycled, ultimately some water is lost either to; Θ evaporation or Θ in the products, This loss of water resource reduces the availability of water for either other activities such as for agricultural purposes or for environmental requirements in the surrounding area.
Surface water pollution. **MEDIUM**	Surface water pollution could occur as a result of; Θ Spillage of the settling ponds due to overloading and non-maintenance of the 0.8 m freeboard.
Water reuse. **MEDIUM (+)**	The reuse of process water is positive and should be encouraged and maximised by the mine.

STORMWATER MANAGEMENT	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution (sediment) – increased sediment load in stormwater run-off. **MEDIUM**	Storm water (which does not enter into the quarry) will pick up sediment around the plant and stockpile area and then this high sediment load water could flow off site.
Water pollution (hydrocarbons) – greater potential for increased hydrocarbon pollution in stormwater run-off. **MEDIUM**	If storm water from identified dirty areas on the mine such as around the workshop is not contained and treated, or hydrocarbon spills at the vehicle parking areas then this polluted water could end up flowing off site.

SANITATION	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Ground water pollution as a result of overflowing septic tank. **MEDIUM**	If the septic tanks are not managed effectively (become blocked causing the tank to overflow), this will result in pollution of ground water resources. Given that the sewage system is used on a daily basis, the consequence of an impact on the ground water is increased, despite the probability of the impact being low.
Odour as a result of overflowing septic tanks. **LOW**	If the septic tanks are not managed effectively (emptied on a regular basis), it will overflow, emitting unpleasant odours.

WORKSHOPS & MAINTENANCE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution (hydrocarbon spills) as a result of hydrocarbon spills. **MEDIUM**	Water pollution could materialise as a result of hydrocarbon spills. Θ Minor spills during maintenance activities, Θ Major spills (emergency incident) during maintenance activities, Θ Spills from incorrectly stored vehicle parts – poor waste management.
Visual as a result of poor housekeeping. **MEDIUM**	Visual impacts resulting from poor waste management and temporary storage of waste prior being disposed of off-site.

FUEL STORE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution (hydrocarbon spills) as a result of hydrocarbon spills. **MEDIUM**	Repeated small spills and leaks, particularly in the same area, can cause hydrocarbon pollution of storm water if the spills are not cleaned up immediately. This may result in polluted water flowing off-site and / or polluted watering infiltrating into ground water.

SALVAGE YARD	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution (hydrocarbon spills) as a result of hydrocarbon spills. **MEDIUM**	This could materialise if material which has the capacity to pollute (hydrocarbons) is stored within the salvage yard area.
Visual as a result of poor housekeeping. **MEDIUM**	This could materialise if there is a build-up of useless material within the salvage yard.

WASTE	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Water pollution (hydrocarbon spills) as a result of hydrocarbon spills. **MEDIUM**	Some of the waste generated by the mine contains hydrocarbons, such as old engine parts, used oils or oily rags. Poor storage of oily waste may result in leaks onto bare ground. If these are not cleaned immediately, this will result in pollution of storm water, polluted water flowing off-site and / or polluted watering infiltrating into ground water.
Visual (waste) impacts as a result of poor waste management. **MEDIUM**	As it is not practical to dispose of all waste products quickly (within a week), mines generally accumulate waste in designated areas (such as a waste disposal yard) until they have large enough volumes to make disposal of this waste economical.
Recycling of waste. **MEDIUM (+)**	The benefits of recycling include: Θ Reducing the need for waste disposal, thereby reducing the need for disposal facilities. Θ Reducing the need for raw materials, thereby reducing the environmental impacts associated with obtaining those raw materials.

IMPACTS ASSOCIATED CLOSURE REQUIREMENTS	
DESCRIPTION OF IMPACT SIGNIFICANCE RANKING	**EXPLANATION**
Job losses as a result of retrenchment upon mine closure. **MEDIUM-HIGH**	Although mine personnel may have the necessary skills to obtain other work, when the mine closes these people may be unemployed for an undetermined period of time, resulting in negative impacts. The probability of job losses upon mine closure is definite. The consequence is fairly elevated due to the loss of income of mine employees.

2. ENVIRONMENT IMPACT ASSESSMENT METHODOLOGY – MINING RIGHT AREA

The following methodology was used in the 2011 impact assessment:

2.1 Criteria to Consider when Determining Significance

Consequence and Probability. These consider the contributing factors / criteria listed in the legislation. The definitions of each are provided below.

The Consequence of an impact resulting from an aspect is expressed as a combination of:

- **Nature of impact:** An indication of the extent of the damage (negative impacts) or benefit (positive impacts) the impact inflicts on natural, cultural, and/or social functions (environment).
- **Extent of impact:** A spatial indication of the area impacted (i.e. how far from activity the impact is realised).
- **Duration of impact:** A temporal indication of the how long the effects of the impact will persist, assuming the activity creating the impact ceases. For example, the impact of noise is short lived (impact ceases when activity ceases) whereas the impact of removing topsoil exists for a much longer period of time.
- **Frequency of the aspect occurring:** An indication of how often an aspect, as a result of a particular activity, is likely to occur. Note that this does not assess how often the impact occurs. It applies only to the aspect. For example blasting takes place monthly and haulage daily while the resultant frequency of the impacts occurring will vary based on a number of factors.

The Probability of an impact resulting from an aspect is expressed as:

- **Probability** of impact occurring: An estimated indication of the potential for an impact to occur.

The Significance of an impact: Considering Consequence and Probability (defined above). Significance is an indication of how serious a negative impact is anticipated to be and how beneficial a positive impact may be. Significance is considered to be High, Medium-High, Medium, Low-Medium or Low.

It must also be noted that the final significance ranking of an impact will take cognisance of other aspects specified in the legislation, such as:

- Cumulative impacts / Seasonality where required
- Impacts / Issues raised by interested and affected parties (I&AP).

2.2 Consequence and Probability

Using the criteria listed in the legislation, scores are assigned to each the criteria. The scoring range has been selected to represent the scale in which varying impacts can occur.

The combination of scores is then used to determine the Consequence and Probability, as described below. These are then plotted against each other on an xy-scatter chart to determine the Significance Rating of the impact.

- Consequence is expressed as the sum of all criteria in order to get a score out of 100.
- Probability of the impact occurring is expressed as a score out of 100.

Table 1: Scoring for environmental impact assessment criteria (Umhlaba 2011).

CONSEQUENCE	**NATURE OF IMPACT:**		
	Low	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are not affected.	**1**
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are affected insignificantly.	**5**
	Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are altered.	**10**
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered.	**15**
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will temporarily or permanently cease.	**25**
	EXTENT OF IMPACT:		
	On-site	Impact occurs on-site (within the boundary of the mine).	**1**
	Neighbouring	Impact occurs within a 5km radius of the site.	**5**
	Local	Impact occurs within a 20km radius of the site.	**10**
	Regional	Impact occurs within a 100km radius of the site.	**15**
	National	Impact occurs within South Africa.	**25**
	DURATION OF IMPACT:		
	Very Short-term	The impact will cease within 1 week if the activity is stopped.	**1**
	Short-term	The impact will cease within 1 year if the activity is stopped.	**5**
	Medium-term	The impact will cease within 5 years if the activity is stopped.	**10**
	Long-term	After the operational life of the operation.	**15**
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.	**25**
	FREQUENCY OF OCCURRENCE OF THE ACTIVITY:		
	Annually or less	Activity occurs at least once in a year or less frequently.	**1**
	6 months	Activity occurs at least once in 6 months.	**5**
	Monthly	Activity occurs at least once a month.	**10**
	Weekly	Activity occurs at least once a week.	**15**
	Daily	Activity occurs daily.	**25**
PROBABILITY	**PROBABILITY OF POTENTIAL OCCURRENCE OF THE IMPACT:**		
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience.	**10**
	Low	The possibility of the impact materialising is low either because of design or historic experience.	**30**
	Medium	There is a possibility that the impact will occur.	**60**
	High	There is a distinct possibility that the impact will occur.	**80**
	Definite	The impact will occur regardless of any prevention measures.	**100**

In Figure 1 the positions of the impact rating boundary curves were defined by trial and error (based on more than 18 years' experience), using qualitative measures of the perceived significance of a wide range of impacts, from catastrophic aspects through to minor nuisances. The significance of an impact is considered to be classified into one of the following; High, Medium-High, Medium, Low-Medium or Low (as shown in the Impact Significance Chart). The definition of each classification is provided below and focuses on the need for mitigation or management.

Significance:	
Low	Management measures may not be necessary, but in some instances are encouraged to ensure that the impact remains of Low significance.
Low-Medium	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance.
Medium	Management measures are required to ensure, at minimum, the significance of the impact does not increase.
Medium-High	Management measures are required to reduce the significance of the impact to, at least, Medium significance.
High	Impact should be avoided, or if not possible, managed to reduce the significance of the impact to, at least, Medium significance (where possible).

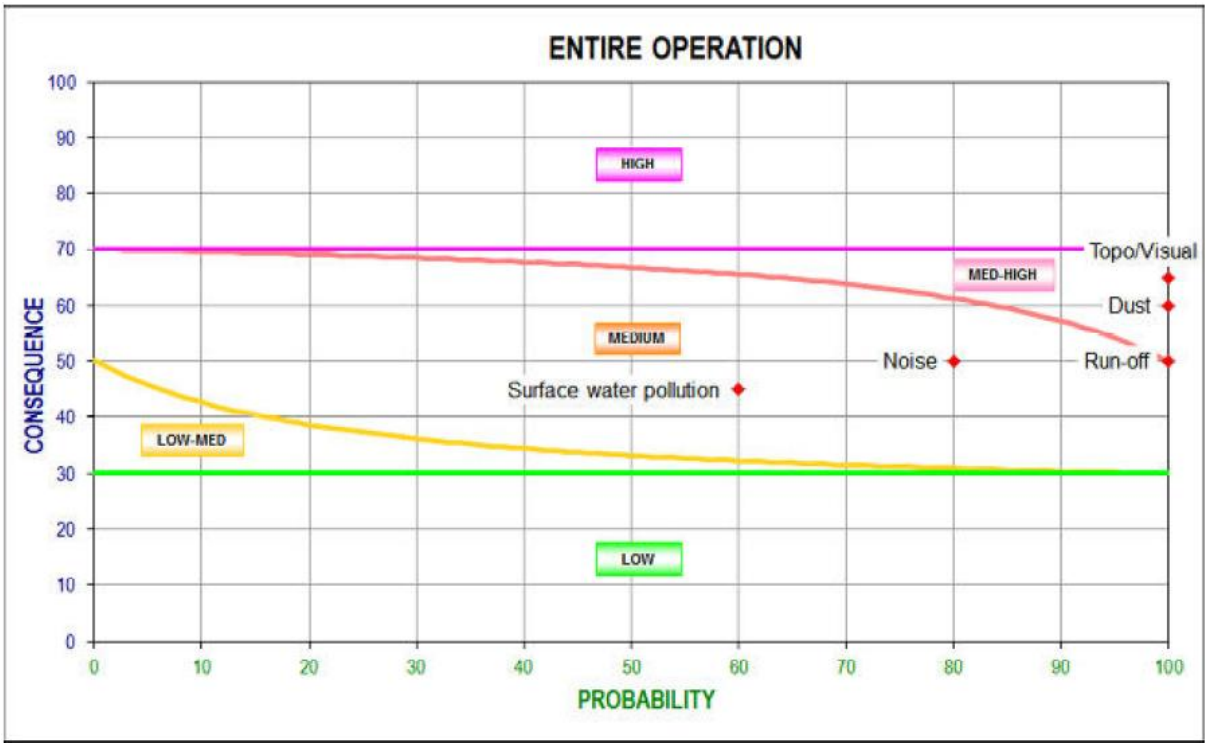

Figure 1: An example of an impact significance chart with consequence plotted as a function of Probability, with regions of varying Significance.

2.3 Additional Factors that Contribute to Significance of an Impact

Additional factors that can contribute to the significance rating of an impact after it has been scored include Cumulative Impacts and input from I&AP (explained below). In these instances, more emphasis should be placed on management measures requirement.

- **Cumulative Impacts**: Cumulative Impacts will be considered where off-site activities (not related to the operation being evaluated) will result in the same impact at the receptors being considered. For example, dust will be considered cumulatively for a mine located adjacent to an unrehabilitated gold mine tailings dam. The spatial extent for the consideration of off-site impacts will be determined individually for each impact depending on factors such as the medium of dispersal of the pollutant causing the impact.

- **Impacts / Issues raised by Interested and Affected Parties**: For new and existing operations, I&AP will be consulted, either during the compilation of the impact assessment (for new operations) or part of an existing / on-going consultation process (for existing operations). During this consultation process, I&AP will identify concerns relating to impacts resulting from activities associated with the operation. In the impact assessment tables presented for each activity, the column for I&AP will indicate whether the impact has been identified as a concern by I&AP.

3. ENVIRONMENTAL IMPACT STATEMENT – SECTION 102 EXTENSION AREA

This Environmental Impact Statement provides a summary of the actual and potential impacts of the mining activities as assessed in the 2018 Basic Assessment Report and EMPR for the environment, considering the implementation of management and mitigation measures. It specifically addresses the nature, duration, likelihood, and significance of these impacts.

Table 2: Management Measures for Environmental Impacts identified (Phanky's Environmental and Projects, 2018).

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
Geology:							
Extraction of mineral(s)	Material within the permitted mine area will be removed during mining.	Site only (1)	Permanent (5)	Definite (3)	Low (2)	Low (30)	• Mitigation of this impact is not possible.
Topography:							
Change in topography	As the topography is fairly flat, mining activities have altered the topography of the land.	Site only (1)	Permanent (5)	Definite (3)	Low (2)	Low (30)	• During mining, work will be carried out in such a way that slopes are not dangerously steep. Mine depth will not be more than 5m. • The general character of the area will be consistent with the character of the surrounding area.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							• Contours slopes stability will applied on High/dangerously steep slopes created
Soils:							
Loss of soil fertility	Soils in this area are shallow covering of Weathered dolerite material.	Site only (1)	Medium term (3)	Probable (2)	Low (2)	Very low (0 - 24)	• Before mining operation commences, vegetated top soil will removed and stockpiled at designated area to be used for rehabilitation of mined areas.
Increase in soil erosion	Soils in this area are shallow covering of Weathered dolerite material.	Site only (1)	Short term (2)	Probable (2)	Low (2)	Very low (0 - 24)	• Steep slopes at mine depth will not be more than 5m. However slopes will be battered and stabilised. • Wind erosion must be monitored. • Road surfaces must be stabilised and maintained during the mining operations. • All vehicles must remain within the designated roads to prevent soil erosion.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
Land capability:							
Reduction in the agricultural potential of the area.	Soils in this area are shallow covering of Weathered dolerite material.	Site only (1)	Long term (4)	Possible (1)	Low (2)	Very low (0 - 24)	• The mining operation will not have latent impacts upon the agriculture potential. It would be limited to a localised mining area only. The fertile topsoil will be stockpiled stored for rehabilitation purposes.
Flora:							
Loss of indigenous vegetation cover	The vegetation characteristic of the area which Aliwal falls into is within the Azonal Biome in the Upper Gariep Alluvial Vegetation.	Site only (1)	Long term (4)	Very low (0 - 24)	Very low (0 - 24))	Low (25 - 47)	• Top soil must be kept safe so it can be used for rehabilitation to re-establish indigenous vegetation • Indigenous vegetation would be re-introduced through rehabilitation
Loss of Red Data, protected or sensitive flora species	No Red Data Book species occurs on the mining site.	Site only (1)	Long term (4)	Definite (3)	Low (25-47)	Low (25 - 47)	• Top soil must be kept safe so it can be used for rehabilitation to re-establish indigenous vegetation.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
Establishment of alien species	The current alien species identified onsite is the port black wattle.	Site only (1)	Medium term (3)	Possible (1)	Low (2)	Very low (0 - 24)	• The mining area must be monitored for the occurrence of alien plant species on regular basis and such alien species must be appropriately removed. • Rehabilitated areas must be monitored on a continuous basis for the occurrence of alien plant species until 90% of the natural vegetation cover is established.
Fauna:							
Loss of habitat	Habitat loss will occur within the mine area. .	Site only (1)	Medium term (3)	Possible (1)	Low (2)	Very low (0 - 24)	• Implement concurrent rehabilitation. • Removal of exotic vegetation. • Disturbance should be limited to minimum mining footprint. Indigenous plant species must be planted during rehabilitation to attract

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							indigenous fauna back to the area.
Loss of Red Data, protected - or sensitive fauna species	There are no Red Data, Protected or sensitive fauna on site.	Site only (1)	Medium term (3)	Possible (1)	Low (2)	Very low (0 - 24)	• No faunal species are allowed to be collected, hunted or killed on the site. • Illegal poaching and/or hunting must be addressed through an Environmental Awareness Plan.
Surface water resources:							
Contamination of surface water through spillage of diesel or hydrocarbon chemicals.	The no natural watercourse within 100m from the identified mine area.	Site only (1)	Very short term (1)	Possible (1)	Very Low (1)	Very low (0 - 24)	• Diesel / hydrocarbons stored onsite must be managed according DWA&F Minimum Requirements for the Handling and Storage and Disposal of Hazardous Waste. • No significant impacts on the water courses are expected to occur. • Drip trays must be used during refuelling of machineries on site,

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							• maintenance of machineries takes place at a demarcated area.
Contamination of surface water through waste / grey water	Wastewater generated on site has the potential to contaminate surface water. The mining operation does not use water in its process and no waste water will be produced.	Local (2)	Long term (4)	Probable (2)	High (4)	Very low (0 - 24)	• The mining operation utilise limited water in its process, hence no wastewater would be generated on site. • No significant impacts on the water courses are expected to occur.
Contamination of surface water as a result of inappropriate management of waste	Inappropriate management of waste on site has the potential to impact on surface water resources.	Local (2)	Long term (4)	Probable (2)	Low (2)	Low (25 - 47)	The following WASTE MANAGEMENT PRINCIPLES must be implemented: • Waste must be stored, transported and disposed of at a registered waste disposal site. • Waste handling/ storage areas must be restricted to a

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							designated waste handling area. • Waste bins must be weather and scavenger proof and securely placed to avoid waste overflows.
Groundwater resources:							
Dewatering / Decanting of the aquifer	The mining operation is not expected to have any significant impacts on the aquifers.	Site only (1)	Medium term (3)	Possible (1)	Low (2)	Very Low (24)	• The mining operation is not expected to have any significant impacts on the aquifers.
Potential increase in recharge to the lower aquifer due to excavations	As a result of the mining activities, topsoil and minerals will be removed. This will however, not lead to a significant increase in recharge to the aquifer from direct rainfall into the area.	Site only (1)	Medium term (3)	Possible (1)	Very low (1)	Very low (0 - 24)	• The mining operation is not expected to have any significant impacts on the aquifers.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
Potential contamination of groundwater from poor quality leachate	The mining process does not utilise water and no leachate is expected to occur.	Site only (1)	Medium term (3)	Possible (1)	Very low (1)	Very low (0 - 24)	• The mining operations are not expected to have any significant impacts on the aquifers.
Hydrocarbon contamination during mining operations	Diesel and oil spillages might occur in the event of a burst hydraulic pipe / hose. .	Site only (1)	Short term (2)	Possible (1)	Low (2)	Very low (0 - 24)	• Appropriate spill response kits and plans must be in place to react appropriately and timeously in the case of an accidental spill. • Wall/floor on the area around Diesel tank/pump must be bounded.
Air Quality:							
Increase in dust emissions	An increase in dust emission is likely to result from mining activities and from increased vehicular traffic.	Site only (1)	Medium term (3)	Probable (2)	Very low (1)	Very low (0 - 24)	• Dust from gravel roads can be reduced through the use of appropriate dust suppression measures, such as wetting of the roads. • Dust fallout must be monitored by an independent consultant, in compliance with

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							the Mine Health and Safety Act.
Increase in gaseous emissions	Increased gaseous emissions may result at a local level from vehicles operating at the site and from those moving to and from the site.	Local (2)	Short term (2)	Definite (3)	Low (2)	Very low (0 - 24)	• Vehicles must be maintained in a road worthy condition so as to limit excessive emissions to air.
Noise:							
Increase in ambient noise levels in the surrounding areas	Noise is generated from a number of activities being undertaken as part at the mining operation. For the duration of the mining operations, sources of noise resulting from activities at the	Site only (1)	Medium term (3)	Probable (2)	Low (2)	Very low (0 - 24)	• Equipment operating on site must be maintained in a workable condition in order to minimise noise emissions.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
	quarry include Loading, hauling and Screening. Vehicle transport of final product to customers						
Impacts of rock Blasting	Blasting has effect of ground vibrations and noise on the human beings and sometimes also cause damage to the property	local	Short term (2)	Probable (2)	Low (2)	Low (2)	the ground vibrations can be controlled either by controlling the charge per delay or by controlling delay interval, if spacing and burden are within acceptable ranges. **See attached ANNEXTURE 3** for detailed assessment
Visual impacts	This mining area is positioned in a outskirt of the residents households with flat topography and therefore the visual impact would be limited. This mine would therefore pose a visual impact as a result of excavated areas, stock piles on site	Local (2)	Short term (2)	Definite (3)	Low (2)	Very low (0 - 24)	• General housekeeping must be implemented to avoid excessive visual impact. • Top stockpiles will be staked in way that will obscure visual from the piggery position
Archaeological , cultural and heritage sites:							
Loss of sites of archaeological, cultural or historical importance.	Mining could destroy subsurface sites unbeknown. In this case the area is highly disturbed and it is therefore unlikely for heritage disturbance to occur	Site only (1)	Permanent (5)	Definite (3)	Medium (3)	Low (25 - 47)	• Mining must continually monitor the mine workings for any encountering of archaeological artefacts
Post mitigation		Site only (1)	Short term (2)	Possible (1)	Low (2)	Very low (0 - 24	• Removal of artefacts with significant conservation prior to mining
Socio-economic:							
Increase in employment / financial status of the local communities.	The mine employs 21 Permanent employees, increasing their	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE	• No mitigation required

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
	financial status and social upliftment in the process.						
Benefits to the local economy	There is a great demand of gravel in the area in area. The mine supply both the rural community for dosmetic use and established contractors in town. This is considered to have a positive impact on the local economy.	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE	• No mitigation required
Safety and security for local inhabitants	Upon mine closure the mine excavations could pose a safety hazard to local inhabitants and animals.	Site only (1)	Long term (4)	Possible (1)	Low (2)	Very low (0 - 24)	• Rehabilitation must ensure that no dangerous excavations are left in an unsafe condition. • Entry and exist to the mining area must be controlled.

DESCRIPTION OF IMPACT	NATURE	EXTENT	DURATION	PROBABILITY / LIKELIHOOD	INTENSITY	SIGNIFICANCE	MITIGATION / MANAGEMENT MEASURES
							• No fires will be allowed on the mine area. • The required heavy vehicle signs must be erected at the access to the mining area as per the **Road Traffic Act** in order to ensure road safety.

4. ENVIRONMENT IMPACT ASSESSMENT METHODOLOGY – SECTION 102 EXTENSION AREA

Methodology used in determining and ranking the Nature , Significance , Consequences , Extent , Duration and Probability of Potential Environmental Impacts and Risks.

The ranking of impacts / determination of significance is estimated consider the factors / criteria listed in the legislation. The definitions of each of the Assessment Criteria are provided below:

i. Extent of impact:
A spatial indication of the area impacted (i.e., how far from activity the impact is realised).

ii. Duration of impact:

A temporal indication of how long the effects of the impact will persist, assuming the activity creating the impact ceases. For example, the impact of noise is short lived (impact ceases when activity ceases) whereas the impact of removing topsoil exists for a much longer period of time.

iii. Probability of impact occurring:

An estimated indication of the potential for an impact to occur.

iv. Intensity of the impact:

The magnitude of the impact in relation to the sensitivity of the receiving environment, taking into consideration the degree to which the impact may cause irreplaceable loss of resources.

v. Significance of an impact:

Considering the factors defined above, Significance is an indication of how serious a negative impact is anticipated to be and how beneficial a positive impact may be.

Category	Category	Rating	Description
Extent	Site only	1	Project site
	Local	2	Effects immediate surrounding areas
	Municipal	3	Effects municipal area
	Regional	4	Effects regional area
	National	5	Effects R.S.A.
Duration	Very short term	1	Less than 1 year
	Short term	2	1 to 5 years
	Medium term	3	5 to 20 years
	Long term	4	Longer than 20 years
	Permanent	5	Permanent
Probability / Likelihood	Improbable	0	Less than 30% chance
	Possible	1	30 to 50% chance
	Probable	2	50 to 75% chance
	Definite	3	Greater than 75% chance
Intensity	Very low	1	No effect on natural, cultural or social conditions
	Low	2	Marginal effect on natural, cultural or social conditions
	Moderate	3	Modification of natural, cultural or social conditions
	High	4	Temporary threat to existence of natural, cultural or social conditions
	Very high	5	Permanent Threat to existence of natural, cultural or social conditions
Significance	Very low	0 to 24	The Significance is a measurement of the product of the individual ratings of the Extent, Duration, Probability and Intensity.
	Low	25 to 47	
	Medium	48 to 94	
	High	95 to 188	
	Very high	189 to 375	

-END-