Final

PROPOSED NGULULU OPEN CAST COAL MINE

Portion 26 of the Farm Droogenfontein No. 242 IR, Delmas, Mpumulanga Province

AGRICULTURAL IMPACT ASSESSMENT

Prepared as part of an Environmental Impact Assessment Process undertaken in terms of the National Environmental Management Act, 107 of 1998

30 OCTOBER 2013

PROJECT NO: AGRI_190913.SMS

Produced for:

Ngululu Resources

On behalf of:

Shangoni Management Services (Pty) Ltd.

Produced by:

1. INTRODUCTION

Ngululu Resources proposes an opencast coal mine with an estimated life of mine of 20 years, planned on portions 26, 46 and 47 of the farm Droogefontein 242 IR. The proposed site with corresponding farm portions is approximately 15km south-west of Delmas Town in the Victor Kanye Local Municipality (VKLM), as part of the Nkangala District Municipality (NDM), Mpumalanga Province.

The purpose of this Agricultural impact assessment is to consider the potential impacts on the agricultural potential of Portion 26 of the farm Droogefontein 242 IR under the prospecting permit MP 11645 PR. Ngululu Resources does not currently own the surface right of these portions. Portions 46 and 47 are close to residential homes, which would make it unsuitable for mining related purposes.

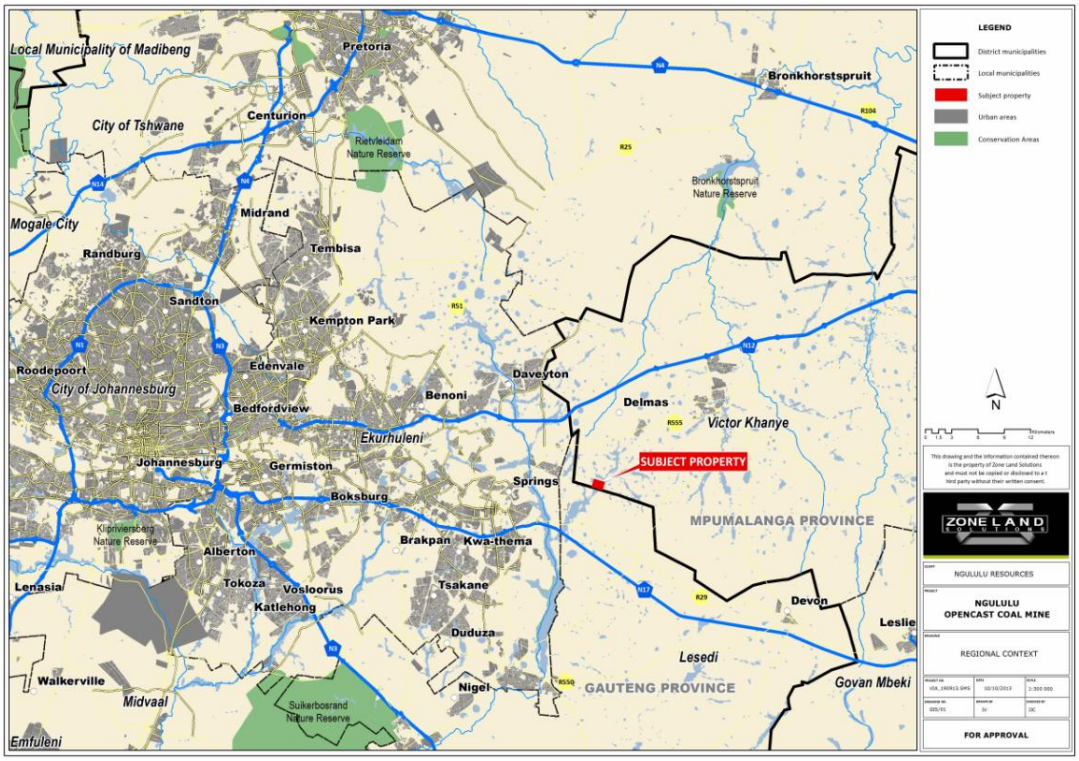

Figure 1. The regional context of Portion 26 of the farm Droogefontein 242 IR.

1.1 STUDY OBJECTIVES

The objectives of this assessment are to:

-provide agricultural, soil and land use input for the total Environment Impact Assessment report.

- study the climate, soils, terrain, land capability, and current agricultural practice.
- summarise legislation impacting on the development.

-identify major soil impacts and agricultural impacts related to the proposed development;

- compile an impact assessment.

Figure 2. The project site context of Portion 26 of the farm Droogefontein 242 IR.

1.2 PROJECT DESCRIPTION

-The whole of portion 26 will be exploited through an opencast box cut to gain access to the seams.

-The first 3 months will be dedicated to stripping and storing of topsoil and the establishment of storm water diversion channels to ensure compliance with GN 704 of 4 June 1999.

-Subsoil will be drilled and blasted and stored for later use during rehabilitation and -storm water diversion channels will be constructed to ensure compliance with GN 704 of 4 June 1999.

-During the same period MCC group will commence construction of plant and related services and will continue for the first 6 months of the initial period.

-All waste rock and overburden shall be used to backfill the open pit.

-There will likely be a waste rock dump (WRD) during operation adjacent to the open pit. This WRD location, operation and backfilling sequence must still be designed. This design will further include the WRD capacity, specifications, location, characterization and classification and the development of a code of practice for the WRD management.

-Due to the small size of portion 26, Ngululu Resources have decided not to establish a beneficiation plant but to consult with the surrounding mines in the area to wash and screen the coal.

-There will be no permanent general and hazardous waste disposal facilities. General waste shall be stored in a waste container and disposed at a licensed disposal area.

-Hazardous waste generated by the mine shall be collected by a waste contractor and disposed of at appropriately licensed hazardous waste disposal facilities.

-There is an existing access road to the proposed site. Internal roads will likely be constructed between the open pit, processing plant, and support services.

-According to the mining works programme (MWP), a plant return water dam (RWD) is required. It is currently anticipated that this dam will be required for the collection of runoff water and affected storm water collection.

-Storm water management measures will be constructed to separate clean and affected water, and to comply with the requirements of GN704 of 4 June 1999. Areas of focus will include the open pit, the stockpile areas and vehicle maintenance areas.

It is envisaged that chemical toilets or a septic tank system will be utilized. Potable water may be transported to the site from outside sources, but could also be obtained from a borehole to be located on site. Potable water tanks will be located on the site.

The following infrastructure is anticipated:

- Crusher,
- Waste rock dump,
- Bulk diesel and oil storage facilities,
- Workshop,
- Admin offices and security offices for access control,
- Septic tank system,
- Substation,
- Return water dam,
- Coal stockyard,
- Administrative building,
- Change-house, and
- Weighbridge.

2. AGRICULTURAL POTENTIAL ASSESSMENT

In terms of this study, agricultural potential is described as an area's suitability and capacity to accommodate sustainable agricultural land use. Thus the objective of this study is to broadly assess the agricultural potential of the affected land by investigating relevant climate, topography, land use and soil.

By combining these relevant data sets, one is able to broadly assess the agricultural potential of the affected land.

2.1 CLIMATE

The climate of the Delmas area is typified by warm, moist to wet summers and cool to cold, dry winters (Kotze, 1985). The main long-term climate indicators are provided in Table 1.

Table 1.Climate Data

Month	Average Rainfall (mm)	Evaporation (mm/day)	Average Min Temp (°C)	Average Max. Temp (°C)	Average frost dates
Jan	135.1	6.5	12.9	23.6	Start date: 16/06
Feb	107.5	6.0	12.8	23.3	End date: 29/07
Mar	94.0	5.5	11.9	22.6	Days with frost: 4
April	47.7	4.9	9.6	21.4	
May	20.2	4.8	6.1	19.1	
Jun	8.6	4.6	3.1	16.9	
Jul	12.89	4.9	2.9	17.2	Heat units (hrs.> 10°C)
Aug	11.9	6.0	4.8	19.6	Summer
Sep	34.5	7.0	7.7	22.0	(Oct to Mar): 1 694
Oct	81.5	6.5	9.9	22.9	
Nov	129.1	6.7	11.4	23.1	Winter
Dec	139.1	7.0	12.5	23.8	(Apr – Sept): 725
Year	821.9 (Tot)	5.78 (Ave.)	15.1°C (Ave)		

The extreme high temperature for the area is 38°C and the extreme low temperature is 7.0°C. The majority of the rainfall is received during the period November through to March. Both temperatures and rainfall are favourable for rain-fed arable cultivation of grain crops.

2.2 LAND USE AND CAPABILITY

Portion 26 of the farm Droogefontein consists of 135 hectares. The present land use on the Droogefontein site is arable crop production due to the presence of high potential soil. The proposed development area consists of cultivated maize fields and a wetland area. This soil potential on the cultivated soil of site has been improved with sophisticated fertilising methods, which is applied every season.

The average rainfall on the farm Droogefontein is 800-900mm per year.

The current average production according to the owner is:

Table 2.

Table 2Product	Tons per hectare	Potential yield per crop
Maize	9	673
Beans	3.5	235
Soya	3.5	235

(The above yield is was calculated at a conservative 50% of the actual land size to provide for the unused wetland) The land use of Portion 26 of the farm cannot be seen in isolation, as it is part of a bigger production unit. The area is serviced by farm roads.

2.3 TOPOGRAPHY

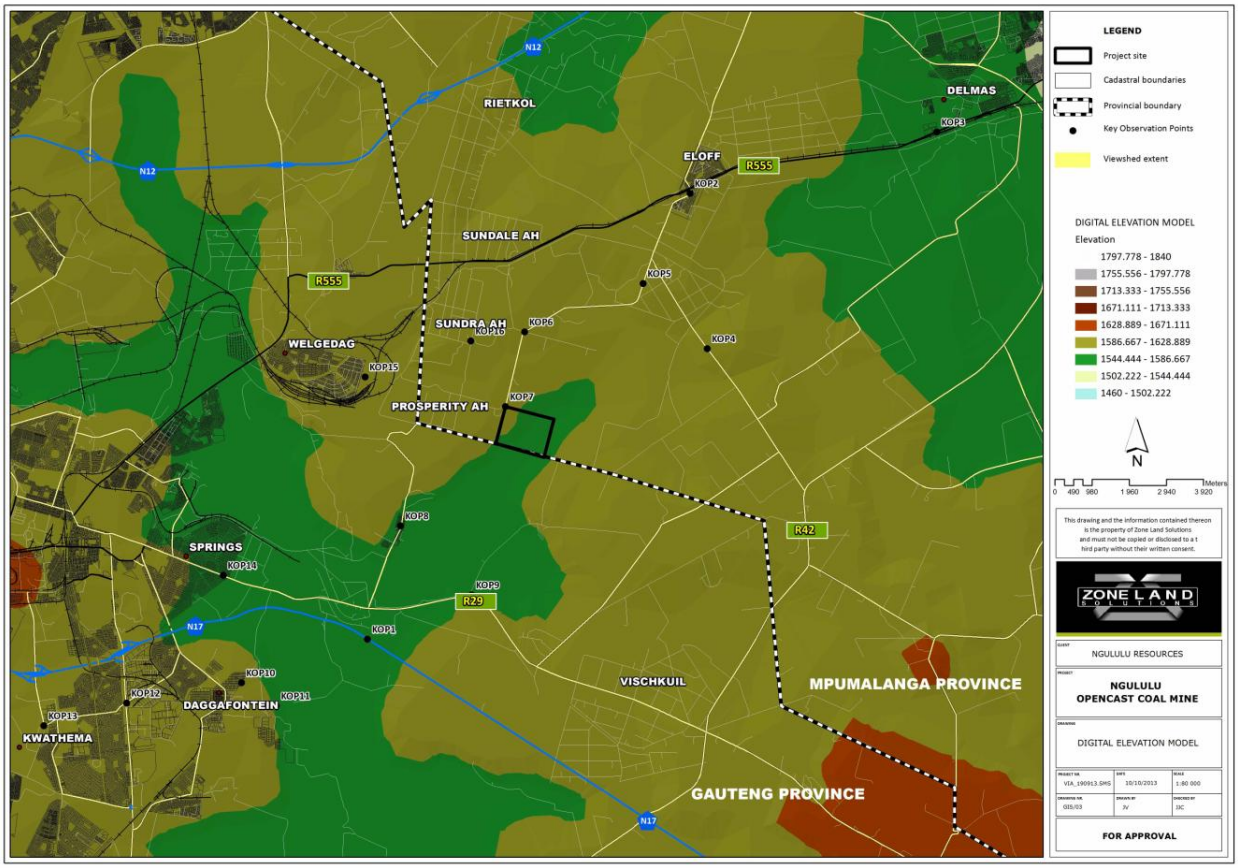

Figure 4. The digital elevation model showing the topography Portion 26 of the farm Droogefontein 242 IR.

The topography is indicated in Fig. 4 The land area is cultivated. The landscape is consists of tilled land, except for the wetland area.

The study area is characterised by flat and gently sloping topography from west to east. The topography is thus not a limiting factor for the proposed development. The relatively flat topography is easily accessible for earthworks and site preparation.

Figure 3. The arable, cultivated land showing the relatively flat topography of Portion 26.

2.4 SOIL ANALYSIS

The soil in the Mpumalanga area according to Fey, is of the Ecca Group, a stratum of the Karoo Supergroup,During the field visit the soil on top (0-300 mm) was sampled from dominating soil forms on Portion of the farm Droogefontein. Samples 1, 2, and 4 were sampled from arable land and sample 3 was sampled from the wetland.

The soil samples were analysed for physical and chemical properties as follows:

- pH (water);
- Extractable cations and Na, K, Ca, Mg
- Contain Exchange Capacity;
- Carbon content;
- Phosphorus (Bray 1)
- Soil texture namely sand, silt and clay were also determined.

Table 3. Soil Physical and Chemical Properties.

.

Sample	Soil	pH (KCl)	Resistance. (Ohm)	H^+ (cmol/ kg)	Stone (Vol %)	P Bray 1 mg/kg	K mg/kg	Exchangeable cations (cmol(+)/kg) Na	K	Ca	Mg	C %
S1	Sand	5.2	840	0.55	1	33	186	0.04	0.48	2.96	1.36	0.56
S2	Sand	4.9	880	0.64	4	30	179	0.07	0.46	2.93	1.13	0.34
S3	Clay	4.7	350	1.14	9	9	278	1.42	0.71	15.04	12.15	0.62
S4	Sand	5.1	850	0.50	1	22	187	0.05	0.48	4.34	1.50	0.73

Samples 1, 2 and 4 were taken on the cultivated land and Sample 3 was taken on the wetland.

Organic carbon (C) ranges from 0.34 – 0.73% for the cultivated soils.

Bray 1 Phosphorus is a soil testing procedure that is used to determine the level of plant-available phosphorus in soils with a pH of 7.0 or less. Phosphorus (P) status as shown in Table 3 indicates that the Phosphorus status of the soil is good. Phosphorus is a major macronutrient essential for plant growth. The uncultivated wetland area has a Phosphorus content of 9 mg/ kg, lower than the cultivated soils because no fertiliser is added to the uncultivated wetland area.

Figure 5. The sandy topsoil is well tilled. Organic material left over from the previous crop is used to mulch the soil.

The arable soil pH is 4.9 to 5.2. More acidic soil is often found in areas of high rainfall. High rainfall leaches basecations from the soil, increasing the percentage of Al^{3+} and H^{+} relative to other cations. This pH is suitable for the cultivation of maize, for which the soil is currently utilised. The soil pH is very important in arable farming because plant nutrition, and therefore yield, is influenced by soil pH.

The texture properties are described as sandy soil. Sandy soil is easily cultivated using normal agricultural equipment. The wetland soil is clay.

Figure 6. The wetland area has been burnt. It consists of heavy clay soil and is not suitable for cultivation

Figure 7. The high potential arable land of Portion 26 of the farm Droogefontein 242 IR.

2.5 AREA CAPABILITY

The area capability of Portion 26 of the farm Droogefontein is classified as high potential farm land. The agricultural potential is high due to an ideal climate, topography and high potential soil.

The level of sophistication in agricultural methods practiced on Portion 26 is high. The soil is well cultivated and well fertilised.

There is a wetland present on Portion 26, which is of low agricultural potential.

Land in the wider area currently used for agriculture has been rezoned for mining purposes.

3. APPLICABLE LEGISLATION

3.1 The Conservation of Agricultural Resource Act 43 of 1983 (CARA)

Section12: Maintenance of soil conservation works.
The section relates to the prevention of silting of dams and pollution of water. The soil conservation works must be maintained by every land user and any successor in title at his / her own expense and in a manner which, to the executive officer, will ensure the continued efficiency thereof.

3.2National Water Act 36 of 1998

Section 9: Pollution prevention.

Part 4 deals with pollution prevention and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the catchment management agency concerned may itself do whatever is necessary to prevent the pollution or to remedy its effects, and to recover all reasonable costs from the persons responsible for the pollution.

Water pollution constitutes a threat to the health of all things living and has the potential of affecting the availability of water if its usage is not regulated.

The owner or person in control of the water resource has the responsibility of avoiding pollution of the water resource. Such a person has strict liability in respect of any damage caused by such pollution for the clean-up and remedial expenses and for any benefit that the person has derived from the pollution.

The mine has to comply with certain provisions to protect the water resources, namely:
-Submit a copy of the EMPR to the Department of Water Affairs (DWAF).
-Determine construct, maintain, operate and confine a clean water system at the mine to avoid spillage into a dirty water system and vice versa for a period of at least 50 years.
-Take reasonable measures to prevent water containing waste from entering any water resource.
-Ensure that all pollution control measures are in place when the mine ceases to operate.

3.3 National Environmental Management Air Quality Act. 2004

The impact of mining on air quality is through the release of noxious gases or wind transport of fine particulate matter in the form of dust. Industrial processes produce noxious gases, fumes or dust which are addressed in NEMA and the NEMA EIA Regulations GN R385, GN R386 and GN R387.

This legislation requires that the main emission sources be identified, quantified and addressed. The National Ambient Air Quality Standard (DEA, 2009 and 2012) criteria pollutants consist of a limit value and a permitted frequency of being exceeded. The limit value is the fixed concentration level aimed at reducing the harmful effects of a pollutant.

3.4 National Veld and Forest Act 101 of 1998.

Section 12: Duty to prepare and maintain firebreaks.
A duty to prepare and maintain firebreaks is placed on all owners on whose land a veld fire may start. The firebreaks must be prepared and maintained on the owner's side of the boundary between his land and any adjoining land.

Section 13: Requirements for firebreaks
These requirements include, inter alia, that the firebreaks must be wide enough and long enough to have a reasonable change of preventing a veld fire from spreading to or from neighbouring land.

Section 15: Exemption from duty to prepare and maintain firebreaks
This section provides for the Minister, for good reason, to exempt any owner of group of owners from the duty to prepare and maintain firebreaks.

Section 17: Readiness for fire fighting.
All owners on whose land a veld fire may start must have such equipment, protective clothing and trained personnel for extinguishing fires as are prescribed.

Section 18: Action to fight fires.
Any owner who has reason to believe that a fire on his land or an adjoining land may endanger life, property or the environment must immediate notify the fire protection officer or, failing him, any member of the executive committee of the fire protection association in

the area and must do everything in his power to stop the spreading of the fire. Owners of the adjoining land must also be notified.

If it is necessary for the protection of life, property and the environment or to prevent a fire from spreading a person may, inter alia, enter upon any land, destroy trees, grass or other vegetation, break and enter any premises or forcibly remove from the scene any person who is in danger, or who obstructs him in the performance of his duties.

3.5 Fencing Act 31 of 1963

Section 6: Boundary fencing where holding an area where contributions are obligatory.
The owner of a holding situated outside any area in which contributions are obligatory, will only be liable to contribute to the cost of a boundary fence between that holding and any holding situated in any contributing area, where the former owner uses the fence for some benefit for himself.

3.6 National Environment Management: Waste Act 59 of 2008

Section 16: General duty in respect of waste management.
This section provides that the holder of waste must take all reasonable steps to, amongst other, avoid the generation of waste or minimize the toxicity and amounts of waste generated where generation cannot be avoided, and to reduce, re-use, recycle and recover waste. It also imposes a duty to prevent an employee from contravening the Act. There is a further duty on any person who sells a product that may be used by the public and that is likely to result in the generation of hazardous waste to take reasonable steps to inform the public of the impact of the waste on health and environment.

Section 17: Reduction, re-use, recycling and recovery of waste.
When reducing, re-using, recycling and recovering waste, care should be taken to ensure the fewer natural resources are used and less harm comes to the environment, than the disposal of the waste.

Section 21: General requirement for storage of waste.
This section sets out the requirements for the storage of waste in order to prevent pollution of the environment for harm to health.

Section 22: Storage of general waste.

This section sets out the obligations of the owner of occupier of premises where general waste is stored.

Section 24:
This section provides that no person may collect waste for removal from premises unless they are a municipal service provider, authorized be law if required, or not prohibited from collecting that waste.

Section 25: Duties of persons transporting waste.
This section sets out the duties of any person who transport waste.

Section 26: Prohibition of unauthorised disposal.
This section prohibits unauthorised disposal of waste or any disposal of waste that is likely to cause pollution of the environment or harm to health and well-being. Exceptions include where waste was generated as a result of normal household activities and where the waste was disposed of in order to protect human life or as a result of an emergency beyond that person's control.

Section 27: Littering
This section provides that the owner of privately owned land must take reasonable steps to ensure that, in any place to which the public has access, there are sufficient receptacles to enable the public to dispose of litter. This section prohibits certain acts with regards to litter. It further provided that litter must be disposed of before it becomes a nuisance or causes a negative impact on the environment.

4.1 POTENTIAL IMPACTS

SOIL DEGRADATION	
Nature of impact	Disturbance of the natural balance of the soil's physical and chemical characteristics. Soil compaction and topsoil loss leading to reduced fertility. The natural sequence of soil horizons are destroyed during opencast mining operations.
Legal requirements	The Conservation of Agricultural Resources Act 43 of 1983
Stage	Construction and Operation and Decommissioning
Extent of impact	Local area
Duration of impact	Permanent
Intensity	Potentially high
Probability of occurrence	Highly probable
Status of the impact	Negative
Accumulative impact	High
Level of significance	High
Mitigation measures	The project description states that the first 3 months will be dedicated to stripping and storing of topsoil and the establishment of storm water diversion channels to ensure compliance with GN 704 of 4 June 1999. According to the BFAP report, Stockpiling is a process in which the different layers of topsoil (A-G) are removed separately and dumped on separate sites, to replace them back in future as the final topsoil. The process includes the following: • The A and B-horizon should be stripped and stockpiled separately as specified by the Chamber of Mines (Guidelines for the rehabilitation of mined land, Section 3.2). Each stockpile should consist of a section for both the A and B-horizons. The A and B-horizon sections should be marked with a signboard. • The A and B-horizon should be replaced in the same sequence on top of the soft overburden material. The fairly

	higher organic carbon content of A-horizons provides a buffer against compaction and hard setting. The A-horizon is also a seed source which will escalate the re-establishment of natural species. When B-horizons are replaced on the surface, they tend to seal and compact severely, which intensifies runoff and causes erosion. • The soil fertility status should be determined by soil chemical analysis after leveling (before seeding / re-vegetation) and soil enrichment should be done advised by a soil specialist in order to correct the pH.
Level of significance after Mitigation	High
EMP Requirements	Control measures and a monitoring programme should be put in place to manage the soil quality from the start of earthworks right through to decommissioning.
Discussion	The depth of stockpile must not be more than 2.5 to 3 m. Soil should be stockpiled away from any underlying spoil material and cross-contamination should not be allowed. The soil stockpiles should be stabilised and terraced on the downslope side to avoid erosion of the stockpiles by water runoff. The stockpiles should be re-vegetated using a creeping indigenous grass seeding to ensure stability as well as possible material accumulation. Topsoil stockpiles degrade during long-term stockpiling. It loses organic content and fertility. The pH and fertility levels need to be optimal for crop production. It is expensive to reach and sustain and does not occur naturally. Rehabilitation should start as soon as possible.

SOIL EROSION	
Nature of impact	The intensity of erosion is increased by rainfall, (which is high in the Delmas region at approximately 750 mm p.a) and heavy winds.
Legal requirements	The Conservation of Agricultural Resources Act 43 of 1983
Stage	Construction Operation and Decommissioning
Extent of impact	Local
Duration of impact	Long term
Intensity	High
Probability of occur	Likely
Status of the impact	Negative
Accumulative impact	Moderate
Level of significance	High
Mitigation measures	Plan site clearance and alteration activities for the dry season Minimise the period of exposure of soil surfaces through dedicated planning. All sloped areas must be terraced, to avoid intensified run-off. Stripping operations should be done when soil moisture content is low, during dry seasons to minimise the risk of compaction ; Aim to minimise working on windy days; Stockpiling: use the 'end-tipping' method to keep the stockpiled soils loose; Stockpiles must be placed on a free draining location to limit erosion loss and waterlogging; Re-vegetate cleared areas and stockpiles to avoid wind and water erosion loss; Maintain looseness of stockpiled soil by fertilising and seeding the soil by hand; Soil stockpiles should be monitored for fertility by sampling and testing; and Monitor the condition of all unpaved roads due to the high rainfall and potential of water runoff and erosion on unpaved roads, especially during the rainy season.
Level of significance after mitigation	High
EMP Requirements	Soil erosion to be addressed in the EMP

WATER POLLUTION	
Nature of impact	Acid Mine Drainage. (AMD). AMD is metal-rich water formed from the chemical reaction between water and rocks containing sulphur-bearing minerals. The run-off formed is acidic and mostly comes from areas where coal mining activities have exposed rocks containing pyrite, a sulphur-bearing mineral. AMD is formed when the pyrite reacts with air and water to form sulphuric acid and dissolved iron. The acid water also dissolves aluminium and heavy metals (iron, manganese, copper and mercury and others) into ground and surface water. It is toxic to human, animal and plant life. As soon as the effluent comes into contact with water above pH4.3 e.g. downstream, the hydroxides and sulphides precipitate, giving the water an orange colour; and the water life of the water source is destroyed.
Legal requirements	National Water Act36 of 1998
Stage	Construction and Operation and Decommissioning
Extent of impact	Local area including the wetland
Duration of impact	Permanent
Intensity	Potentially high
Probability of occurrence	Highly probable
Status of the impact	Negative
Accumulative impact	High
Level of significance	High
Mitigation measures	Pro-active treatment includes installing a water treatment plant, where the AMD is first treated with lime to neutralise the acid and then passed through settling tanks to remove the sediment and particulate metals. Passive treatment aims to develop a self-operating system that can treat the effluent without constant human involvement. Wetland soil is to be avoided as far as possible. It is important ensure that contamination of natural drainage flow paths and subsequent downstream sediment transport (possibly with coal contamination) does not occur. Where possible, a buffer zone of at least 30 m should be established next to all stream beds. Wetlands should be

	avoided.
Level of significance after Mitigation	High
EMP Requirements	Water pollution to be addressed in the EMP

Figure 8. An example of a stream polluted by Acid Mine Drainage, showing the characteristic yellow colour.

AIR POLLUTION	
Nature of impact	Coal dust and can cause significant damage to the air, soil, water as well as adjoining agricultural areas, livestock and infrastructure. The polluting gases released during open cast mining include oxides of nitrogen and oxides of sulphur.
Legal requirements	National Environmental Management Air Quality Act. 2004
Stage	Construction Operation
Extent of impact	Local / Regional
Duration of impact	Long term
Intensity	Very high
Probability of occurrence	Likely
Status of the impact	Negative
Accumulative impact	Moderate
Level of significance	Low
Mitigation measures	Ensure proper control measures such as air quality tests. Dust levels can be controlled by spraying water on roads, stockpiles and conveyors.
Level of significance after mitigation	High
EMP Requirements	Air pollution to be addressed in the EMP Air Quality impact assessment.
Discussion Crops and buildings on the site and surrounding areas may be blackened by coal dust. Dust degrades air quality in the immediate area and has a negative impact on vegetation during the construction and operation phase. Dust is also caused by uncovered trucks which are driven on dirt roads, coal crushing operations, drilling operations and wind blowing over areas disturbed by mining. It must be ensured that the requirements of the Act are met to ensure proper management and prevention.	

FIRE	
Nature of impact	Uncontrolled fires may cause significant damage to agricultural areas and infrastructure.
Legal requirements	National Veld and Forest Fire Act 101 of 1998
Stage	Construction Oeration and Decommission
Extent of impact	Local / Regional
Duration of impact	Short term
Intensity	High
Probability of occurrence	Unlikely
Status of the impact	Negative
Accumulative impact	Moderate
Level of significance	Low
Mitigation measures	Ensure proper fire control measures on site and during hot periods Ensure that staff is trained in fire drills.
Level of significance after mitigation	Low
EMP Requirements	Fire management to be addressed in the EMP
Discussion During the construction, operational and decommissioning phase it must be ensured that the requirements of the National Veld and Forest Fire Act are met to ensure proper fire management and prevention. Veld fires may spread from the property or enter and threaten infrastructure on the site. This is however very unlikely and of low significance.	

FENCING	
Nature of impact	Without fencing of the study area animals may move to and from adjoining properties. This may cause injuries to animals, e.g. cattle, and could damage infrastructure on the site.
Legal requirements	Fencing Act 31 of 1963
Stage	Construction Operation Decommissioning
Extent of impact	Local
Duration of impact	Short term
Intensity	High
Probability of occurrence	Likely
Status of the impact	Negative
Accumulative impact	Moderate
Level of significance	Low
Mitigation measures	Ensure that notice of intention to fence is completed as per the act and that adjoining farms are informed of the construction of a new fence.
Level of significance after mitigation	Very Low
EMP Requirements	Fencing to be addressed in the EMP
Discussion The site at present is not fenced. During the construction and operational phase it must be ensured that the requirements of the Fencing Act of 1963 requirements be followed to ensure protection of property. Communication to neighbouring properties as to commencement and duration of fencing is important When these preventative measures are in place, the impact is of very low significance.	

WASTE	
Nature of impact	Uncontrolled dumping of hazardous waste will cause permanent soil damage and contaminate ground water.
Legal requirements	National Environmental Management Waste act 59 of 2008
Stage	Construction Operation and Decommission
Extent of impact	Local
Duration of impact	Long
Intensity	Medium
Probability of occurrence	Likely
Status of the impact	Negative
Accumulative impact	Moderate
Level of significance	Medium
Mitigation measures	Ensure that there is proper removal, re-use, recycling and recovery of waste.
Level of significance after mitigation	Low
EMP Requirements	Waste management to be addressed in the EMP
Discussion During the construction, operational and decommissioning phase it must be ensured that the requirements of the National Environmental Management Waste Act of 2008 are met to ensure prevention of pollution to the site and other areas. Provided that the requirements of the Act are followed, the impact will be of lower significance.	

5. SUMMARY

The initial impacts include acidification of soils, but the most severe problem is water pollution, including Acid Mine Drainage which is toxic to plant and animal life.

A Water Management Plan should be developed for the mine and would include an

-erosion and sediment control plan;

-surface water and groundwater monitoring;

-a surface water and groundwater response plan;

-water levels, yield and quality in the region, and privately owned boreholes;

-details of the groundwater monitoring program including monitoring locations, parameters and

-frequency of sampling;

-groundwater assessment criteria for investigating any potentially negative groundwater impacts;

description mitigation options to be implemented if other groundwater users are negatively affected by the mine.

Activities during construction in the Droogefontein site area could lead to the following impacts on soil:

-Soil compaction and topsoil loss leading to reduced fertility;

-Soil erosion;

-Destruction of soil organisms.

Compaction and increased erosion from increased exposure to wind and water, are likely to cause changes in soil structure and degradation of soil quality. The extent to which these occur is dependent on the properties of the soils. In the case of Droogefontein the extent will be significant due to the presence of sandy topsoil.

Air and Noise Pollution

Dust at a mining site may be caused by trucks being driven on unsealed roads, coal crushing operations, drilling operations and wind blowing over areas disturbed by mining. Dust levels can be controlled by spraying water on roads, stockpiles and conveyors. Land may be purchased around the site to act as a buffer zone.

Blasting leads to dust, shocks and noise. Animals and plant life will be negatively affected. Fowls, including chickens, may die of heart attacks. This is of particular significance because Portion 26 of the farm Droogefontein is adjoined by the broiler farms.

Fig.9. The broiler farm adjacent to Portion 26, which will be affected by noise pollution, blasting and dust.

6. CONCLUSION

The Droogefontein site is located within prime agricultural land. The land use is dominated by agriculture and has been cultivated for generations and is producing higher than average maize yields.

The potential impacts of erosion, soil degradation, water pollution will have significant risk for agriculture. The rehabilitation of the soil during operation and decommissioning is important. By following mitigation steps, one can minimise the predicted impacts on the receiving environment. Usually mined soil cannot be rehabilitated back to the original land use condition. Existing land use such as crop production is temporarily eliminated from the mining area.

Rehabilitation of the site must ensure long-term stability and not compromise post-mining land objectives of sustainable agriculture.

It can be concluded that the proposed opencast coal mine will have a significant impact on the agricultural potential of Portion 26 of the farm Droogefontein.

27

7. REFERENCES

Acts on Line. http://www.acts.co.za/

Bureau for food and agricultural policy. Evaluating the impact of coal mining on Agriculture in the Delmas, Ogies and Leandra districts. 2012.

Fey, Martin.2010. Soils of South Africa. Cambridge University Press. Cape Town.

Kotze, A.V., 1985. Climate data. In: Land types of the maps 2628 East Rand and 2630 Mbabane. Mem. Agri. Nat. Res. S. Afr. No. 5. Department of Agriculture, Pretoria.

Norman, N and Whitfield, G. 2006. Geological Journeys. Random House Struik (Pty) Cape Town.

SA Year Book, 2003. Agriculture and Land Affairs. http://www.gcis.gov.sa/ docs/publications/yearbook/agriculture.

Statistics SA, 2005. Agricultural statistics. http://www.statssa.gov.za/publications/ Report-11-02-1/Corrected Report-11-02-01.

PROPOSED NGULULU OPEN CAST COAL MINE

Portion 26 of the Farm Droogenfontein No. 242 IR, Delmas, Mpumulanga Province

ANNEXURE 1

DECLARATION OF INDEPENDENCE

30 OCTOBER 2013

PROJECT NO: AGRI_190913.SMS

Produced for:

Ngululu Resources

On behalf of:

Shangoni Management Services (Pty) Ltd.

Produced by: