PROSPECTING RIGHT APPLICATION

BASIC SOIL, LAND USE AND LAND CAPABILITY STUDY

Basic Soil, Land Use and Land Capability Study for the Proposed Prospecting Right Application on the Farm ST Helena 67 HT, situated under the Mkhondo Magisterial District, Mpumalanga Province.

REPORT PREPARED BY:

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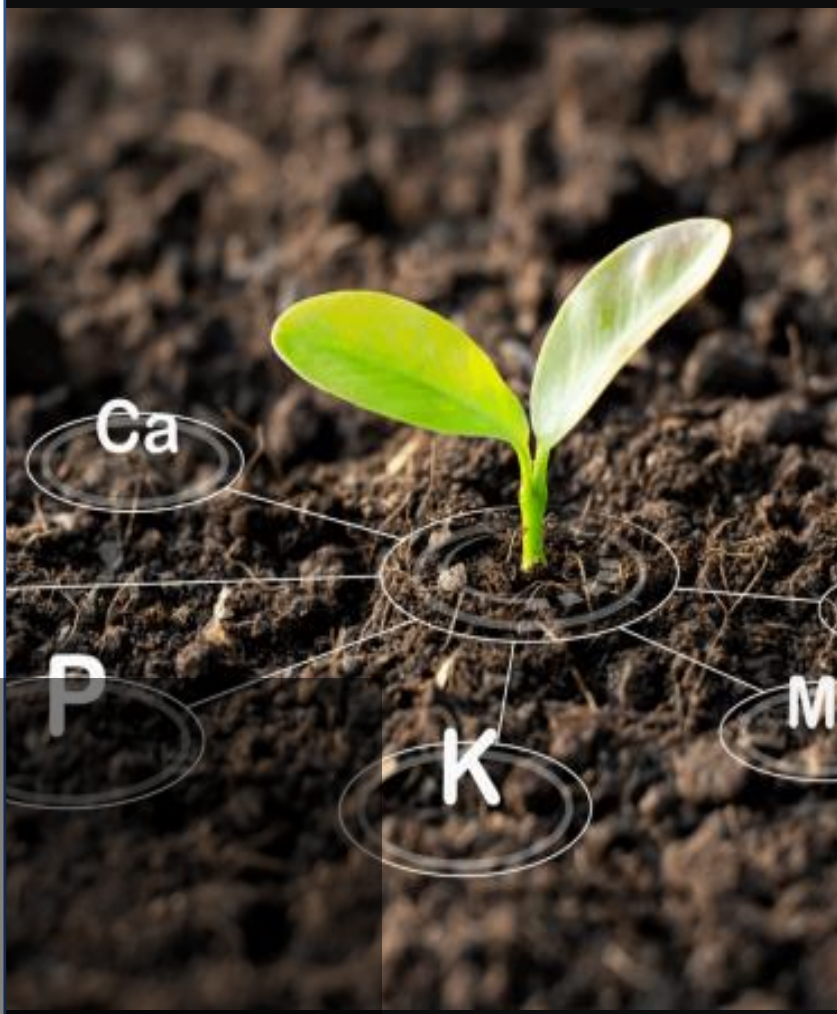

NOTRE Coal

DMRE REF: MP 30/5/1/1/2/ 17548 PR

Report Credentials.

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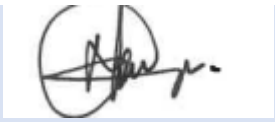
Project details	
Report type	**Basic Soil, Land Use and Land Capability Study for a Prospecting Right application**
Project title	Basic Soil, Land Use and Land Capability Study for the proposed Prospecting Right application on the Farm ST Helena 67 HT, situated under the Mkhondo magisterial district, Mpumalanga Province, South Africa.
Mineral (s)	Coal Resources.
Client	Notre Coal (Pty) Ltd
Site location	Farm ST Helena 67 HT, situated under the Mkhondo magisterial district, Mpumalanga Province, South Africa.
Version	1
Date	29 August 2022
	Electronic signatures
Compiled by	Mueletshedzi Nndwammbi (Hydrogeologist Intern) Singo Consulting (Pty) Ltd 
Reviewed by	Mutshidzi Munyai (Hydrogeologist) Singo Consulting (Pty) Ltd (Water Resources Science (Candidate Natural Scientist), Environment Science (Candidate Natural Scientist) (SACNASP Registration Number 122464) 
Final review and approval	Dr. Kenneth Singo (Principal Consultant of Singo Consulting (Pty) Ltd) 

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Table 1: Critical Report Information

Critical Information incorporated within the Basic Soil, Land Use and Land Capability Study:	Relevant section in report
Details of the specialist who prepared the report	Project details, P: 3
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix A, 36
Project Background Information, including the proposed activities description	Introduction, P: 9
An indication of the scope of, and the purpose for which, the report was prepared	Scope of work, P: 9-10
An indication of the quality and age of base data used for the specialist report	Project details, P: 3
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Environmental impact assessment, P: 13
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Project details, P: 3
A description of the methodology implemented in preparing the report or carrying out the specialised process comprehensive of equipment and modelling used;	Methodology, P: 12
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	N/A
An identification of any areas to be avoided, including buffers	N/A
A map overlaying the proposed activity including the associated infrastructures on the environmental sensitivities of the site including containing buffer zones	N/A
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Soil Impact assessment, P: 30
Any mitigation and conditions measures for inclusion in the EMPr	Soil management plan, P: 32
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Soil management plan, P: 32
An analytic opinion as to whether the proposed activity or portions thereof should be Authorised-i.e. specific recommendations	Recommendations, P: 34
Regarding the acceptability of the proposed activity or activities; and	Refer to the bar
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Soil management plan, P: 32
A description of any consultation process that was undertaken during carrying out the study	Refer to the Bar
Any other information requested by the competent authority.	N/A

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1 INTRODUCTION

1.1 Project Background Information

Singo Consulting (Pty) Ltd was appointed by Notre Coal (Pty) Ltd to conduct a basic soil study for the prospecting right application which has been submitted with **DMRE Ref: 30/5/1/1/2/ 17548 PR** for the prospecting of coal and is situated within the Farm ST Helena 67 HT, situated under the Mkhondo magisterial district, Mpumalanga Province.

The main aim of conducting this study is to find information with regards to the soil potential, current land use as well as land capability. This report is not planned to be an intensive description of the proposed project; however, it is conducted as a specialist basic soil study to evaluate the soil potential, current land use as well as land capability information required for the environmental authorizations for the proposed prospecting project.

1.2 Proposed Activities

Prospecting activities will be undertaken over a period of five (5) years and are designed in phases, each phase conditional on the success of the previous phase. Both Invasive and non-invasive methods will be implemented.

- Desktop study of the area has commenced, and this incorporates desktop geographical and geological mapping.
- This will be followed by geochemical and geotechnical surveys.
- Geotechnical surveys will be followed by detailed geophysical studies and later, a detailed drilling, sampling, assaying and mineralogical study.
- Diamond core drilling method will be utilized to prospect in situ ore deposits.
- To ensure or minimize impacts on the receiving environment, all the drilling activities will be guided by the project's EMPr.

1.3 Scope of Work

The scope of work included the following:

- Conduct a basic soil assessment of the proposed prospecting right project.
- Determine impacts of the proposed prospecting activities of coal on soil and provide associated mitigation measures.
- Classify and map soil forms according to the South African Taxonomic Soil Classification System, 1991.

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- Derive and map land capability based on soil properties.
- Map all current land uses.

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2 TERMS OF REFERENCE

The following tasks were undertaken in the compilation of the soil assessment, land use and land capability study:

2.1 Basic Soil Study

- A basic soil assessment of the proposed project development footprint areas associated within the proposed Coal prospecting site.
- The soil classification will be done according to the Taxonomic Soil Classification System for South Africa, 1991. The following attributes were included at each observation:

    - Soil form and family
    - Soil depth
    - Estimated soil texture
    - Soil structure
    - Underlying material
    - Current land use
    - Land capability

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3 METHODOLOGY

3.1 Desktop study and literature review

The main purpose is to provide as much information on the probable ground (soil) conditions, and the likely problems that they will produce due to the proposed prospecting right application, the study will focus on the farm area and its surrounding environment. Once these surveys are complete, the results should be formally presented in a report which brings together the details of:

- Site topography.
- Geology.
- Geotechnical problems and parameters.
- Groundwater conditions.
- Previous land use.
- Expected construction risks.
- Proposed ground investigation methods.

3.2 Site Assessment

The soil of the proposed prospecting right area will be investigated by means of conducting auger. The holes were drilled up to 30cm below ground level. The soils were described and classified according to the South African Taxonomic Soil Classification System.

The following procedure is followed to record soil properties and classify soils accordingly:

- Identification of applicable diagnostic horizons by stating the physical properties such as:
    - effective depth (depth of soil suitable for root development),
    - Colour (in accordance with Munsell colour chart),
    - Texture (refers to the particle size distribution),
    - Structure (aggregation of soil particles into structural units),
    - Mottling (alterations due to continued exposure to wetness),
    - Concretions (cohesion of minerals into hard fragments)
    - Leaching (removal of soluble constituents by percolating water),
    - Gleying (reduction of ferric oxides under anaerobic conditions resulting in grey, low chroma soil colours), and

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- Illuviation of colloidal mater from one horizon to another resulting in the development of grey sandy E-horizons and grey clay G-horizons.

3.3 Environmental Impact Assessment

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified using the Input-Output model. It must be emphasized that the purpose of this process is not to provide an incontrovertible rating of the significance of various aspects, but rather to provide a structured, traceable, and defendable methodology of rating the relative significance of impacts in a specific context. This provides the project proponent a greater understanding of the impacts of this project and the issues which need to be addressed by mitigation and give the regulators information on which to base their decisions on.

The significance rating process follows the established impact/risk assessment formula:

Significance= Consequence x Probability

Where:

Consequence = Severity + Spatial Scale + Duration

Probability = Likelihood of an impact occurring

The matrix calculates the rating out of 147, whereby Severity, Spatial Scale, Duration and Probability are each rated out of seven as indicated in Table 2. Weighting can be applied to the various parameters. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the Environmental Management Plans (EMP). The significance of an impact is then determined and categorized into one of four categories, as indicated in Table 3, which supports Table 4. Environmental management actions will be assigned for all identified impacts. A neutral impact implies that it causes the area to return to a pre-project state. This is not regarded as positive, as there would have been no need for this activity if the operation were not carried out.

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Table 2: Impact rating assessment parameter

Rating	severity				
	Environmental	Social, Cultural and heritage	Spatial Scale	Duration	Probability
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage	International The effect will occur across international borders	Permanent: No Mitigation No mitigation measures of natural process will reduce the impact after implementation	Certain/Definite . The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat, or ecosystem	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	National Will affect the entire country	Permanent: Mitigation measures of natural process will reduce the impact	Almost certain/Highly probable It is most likely that the impact will occur
5	Very serious, long term environmental impairment of ecosystem function that may take	Very serious widespread social impacts. Irreparable damage to	Province/ Region Will affect the entire province or region	Project Life The impact will cease after the operational life span of the project	Likely The impact may occur

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	several years to rehabilitate	highly valued items			
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year	On-going serious social issues. Significant damage to structures / items of cultural significance	Municipal Area Will affect the whole municipal area	Long term 6-15 years	Probable Has occurred here or elsewhere and could therefore occur
3	derate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month	On-going social issues. Damage to items of cultural significance. Local	Local extending only as far as the development site area	Medium term 1-5 years	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and	Limited to the site and its immediate surroundings	Short term Less than 1 year	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime

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	with/ without help of external consultants	processes not affected.			of the project but has happened elsewhere. The possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures
1	Limited damage to minimal area of low significance, (e.g., ad hoc spills within plant area). Will have no impact on the environment.	Low-level repairable damage to commonplace structures	Very limited to specific isolated parts of the site.	Immediate Less than 1 month	Highly unlikely/None Expected never to happen

According to the Impact assessment parameter ratings in Table 2, the rating of the proposed area is classified as 3, since there will be a moderate, short-term effects on the environment but not affecting the ecosystem function. Rehabilitation will require intervention of external specialists and can be done in less than a month. The spatial scale of the impact is the Local area, the impact can extend only as far as the development site area. The Likelihood of an impact to occur is unlikely but there is a possibility that the impact will occur once the project has started. The duration of the impact can last between 1- 5 years.

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Table 3: Probability Consequence Matrix

Significance		Consequence (severity + scale + duration)								
		1	3	5	7	9	11	15	18	21
Probability / Likelihood	1	1	3	5	7	9	11	15	18	21
	2	2	6	10	14	18	22	30	36	42
	3	3	9	15	21	27	33	45	54	63
	4	4	12	20	28	36	44	60	72	84
	5	5	15	25	35	45	55	75	90	105
	6	6	18	30	42	54	66	90	108	126
	7	7	21	35	49	63	77	105	126	147

Table 4: Impact Significance threshold limits

Significance		
Low	0 – 35	
Low-Medium	36 – 76	
Medium- High	73 – 107	
High	108 - 147	

3.4 Land capability classification

Soils are grouped based on their capability to produce crops and pasture plants without deterioration over a long period of time. The criteria used in assessing a land are the physical properties of the land and the degree of limitation as a function of the severity with which crop growth is inhibited. It is mainly based on:

- The soil properties.
- The external land features.
- The environmental factor that limits land use.

Different factors that determine the capability of a soil are:

- Depth of soil.

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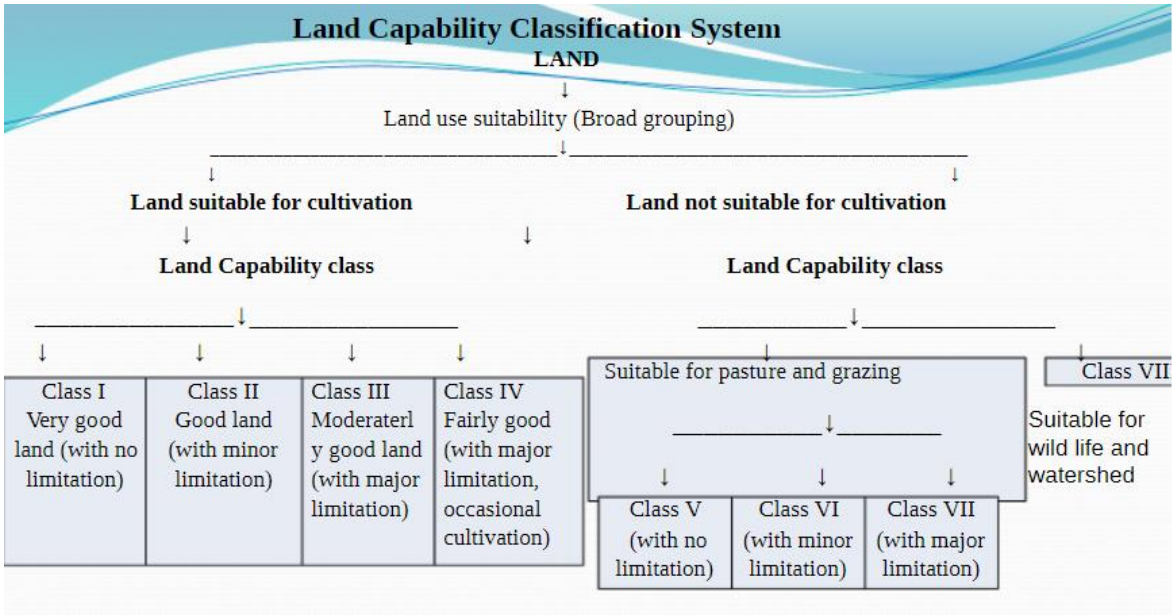
- Drainage condition of soil.
- Relief (slope)
- Intensity of soil erosion.
- Susceptibility to overflow and flooding and degree of saturation.
- Climate variation.

Table 5: Land Capability Classification System



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4 PHYSIOGRAPHICAL AND SOIL SETTING

4.1 Project Location

A locality map created by QGIS software illustrates detailed and comprehensive information regarding the surrounding settlements and infrastructure. The project area is situated within the Farm ST Helena 67 HT, situated under the magisterial district of Mkhondo, Mpumalanga Province, South Africa. The study area is situated approximately 1.75 km east of Dirkiesdorp and roughly 32.39 km northeast of Wakkerstroom.

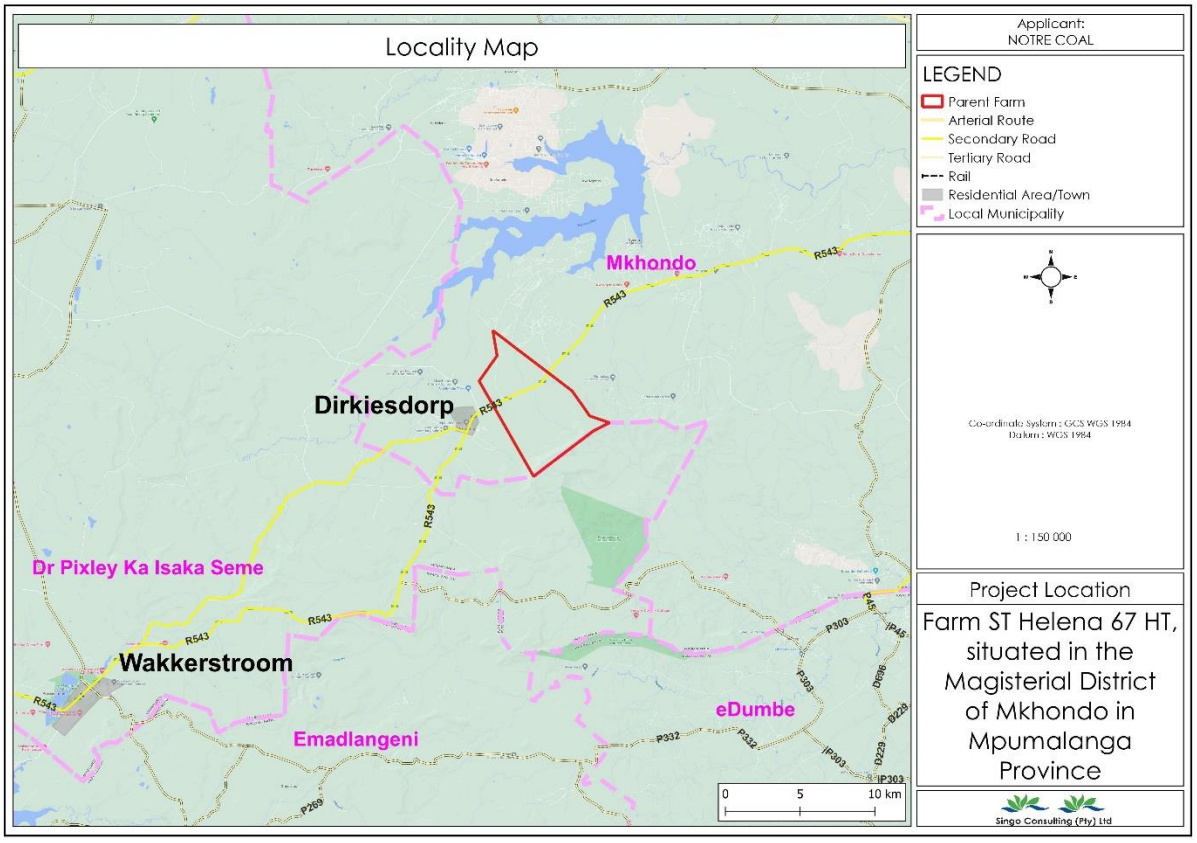

Figure 1: Locality map of the study area

4.2 Climate

Climate is the state of the atmosphere over long time periods, such as over years, decades, centuries or greater and weather is defined as atmospheric conditions of an area over a short period of time (Naomi, 2004). Climate for the purpose of the study is chosen based on the fact that it does not change over a long period of time whereas weather conditions fluctuate more rapidly, and its data cannot be relied upon. The climate here is mild, and generally warm and temperate. According to Köppen and Geiger, this climate is classified as Cwb. In Mkhondo,

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the average annual temperature is 16.1 °C. About 954 mm of precipitation falls annually. Precipitation is the lowest in June, with an average of 12 mm. The greatest amount of precipitation occurs in December, with an average of 165 mm. At an average temperature of 19.5 °C, February is the hottest month of the year. The lowest average temperatures in the year occur in July, when it is around 11.0 °C. Between the driest and wettest months, the difference in precipitation is 153 mm. The variation in temperatures throughout the year is 8.4 °C.

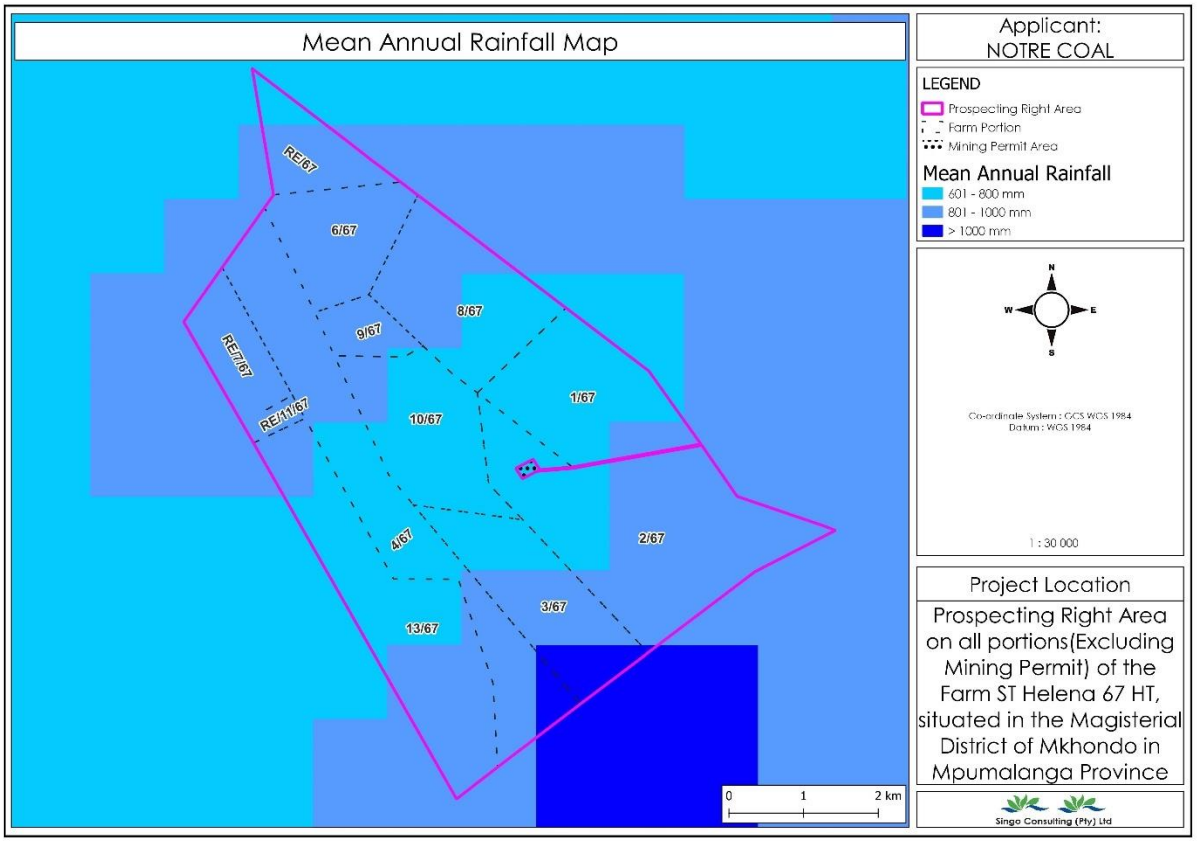

Figure 2: Mean annual rainfall map

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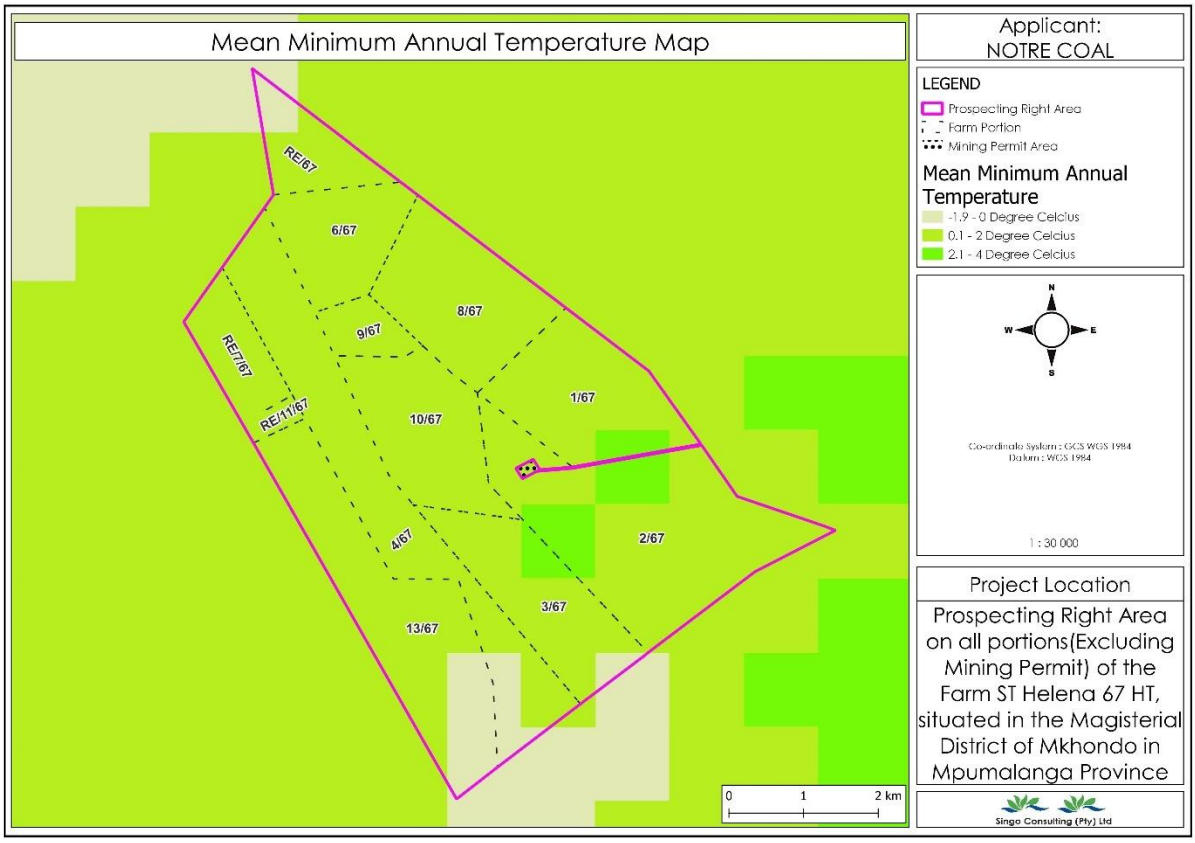

Figure 3: Mean minimum annual temperature map

4.3 Soil Classes present in the study area

The soil classes map in Figure 4, below, shows that the prospecting right area is largely covered with the **Association of classes 1 to 4: Undifferentiated structureless soils, Association of Classes 13 and 16: Undifferentiated shallow soils**. The other portion of the study area is situated on **the freely drained, structureless soils**.

<u>The Association of classes 1 to 4: Undifferentiated structureless soils, , Association of Classes 13 and 16: Undifferentiated shallow soils and the Freely drained, structureless soils:</u>

The association of classes 1 to 4: undifferentiated structureless soils, , Association of Classes 13 and 16: Undifferentiated shallow soils and the freely drained, structureless soils can be defined based on their soil depth, Soil Drainage, erodibility, and natural fertility.

Soil depth

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Depth of the soil profile is from the top to the parent material or bedrock. This type of soil can be classified as a restricted soil depth. A restricted soil depth is a nearly continuous layer that has one or more physical, chemical, or thermal properties.

Soil Drainage

Soil drainage is a natural process by which water moves across, through, and out of the soil because of the force of gravity. The soils in the proposed area have an excessive drainage due to the soils having very coarse texture. Their typical water table is less than 150.

Erodibility

Erodibility is the inherent yielding or non-resistance of soils and rocks to erosion. The freely drained structureless soils have high erodibility. A high erodibility implies that the same amount of work exerted by the erosion processes lead to a larger removal of material.

Natural Fertility

Soil fertility refers to the ability of soil to sustain agricultural plant growth, i.e., to provide plant habitat and result in sustained and consistent yields of high quality. The soil, as a nature of them, contains some nutrients which is known as 'inherent fertility'. Among the plant nutrients, nitrogen, phosphorus, and potassium is essential for the normal growth and yield of crop. The proposed area has a low natural fertility soil.

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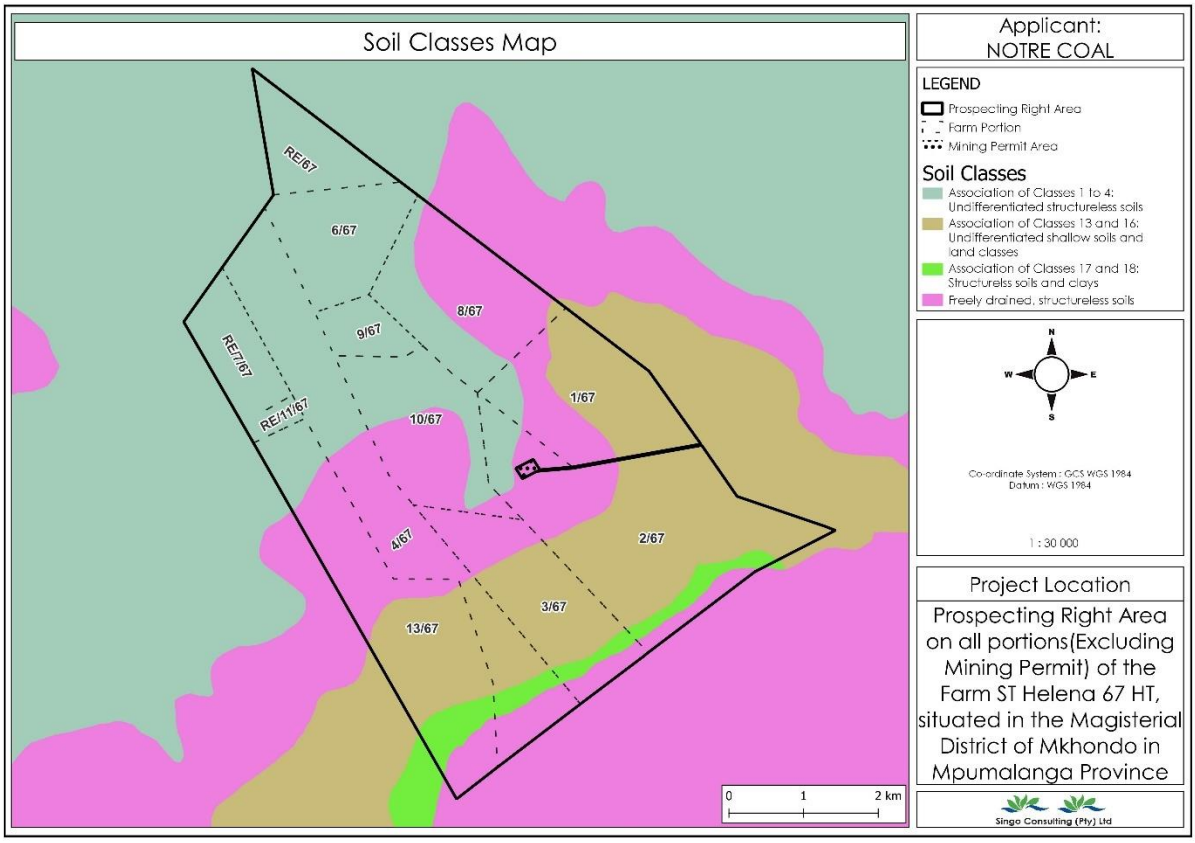

Figure 4: Soil class map of the study area

4.4 Land use

The prospecting right area is covered with natural vegetation, plantation, bare land, cultivated land and wetlands.

Natural vegetation: refers to a plant community, which has grown naturally without human aid and has been left undisturbed by humans for a long time.

Plantation: farming that specializes in cash crops. The crops grown include cotton, coffee, tea, cocoa, sugar cane, oil seeds and oil palms.

Cultivated land: This is an arable land that is worked by ploughing and sowing and raising crops.

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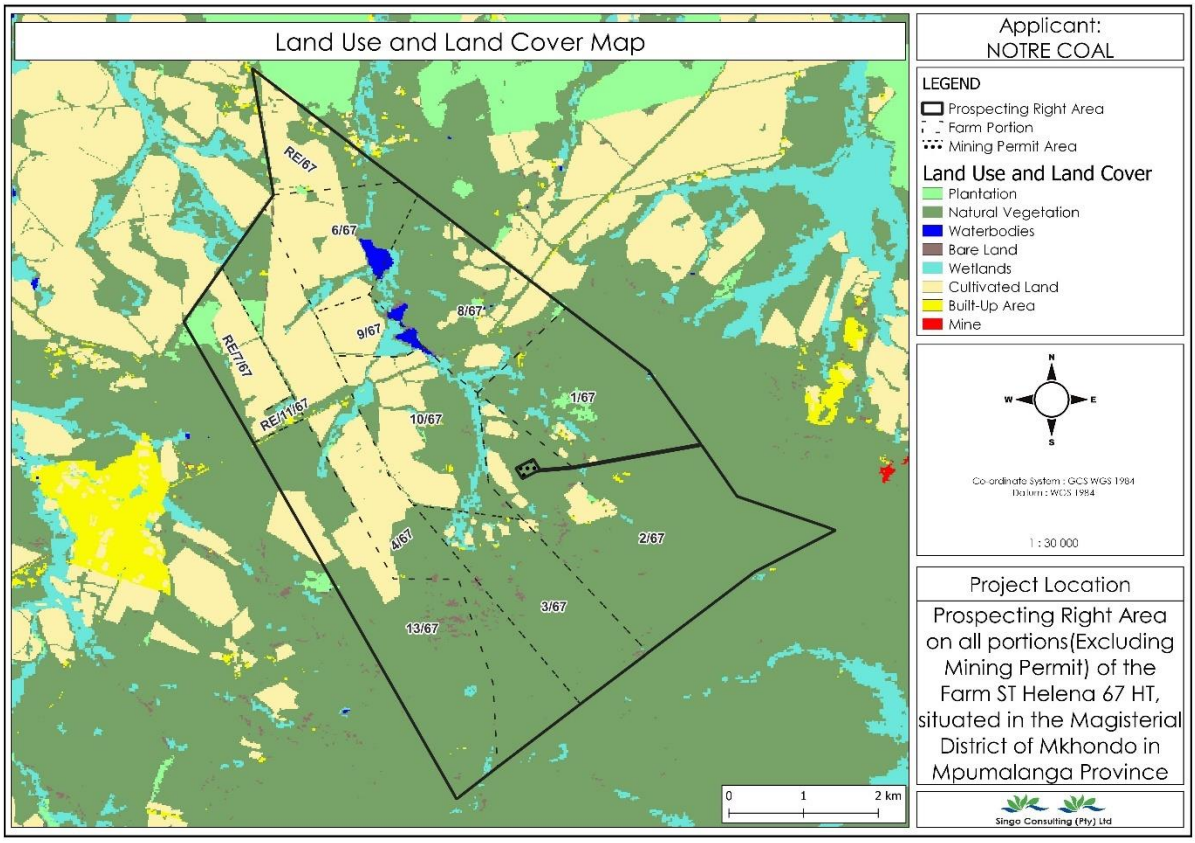

Figure 5: Land use and Land cover map

4.5 Land capability

The Land capability classification is one of several interpretation groups that was made for agricultural purposes. As with all the interpretation groups, the land capability classification starts with one soil-mapping unit, which is the building block of the system.

The land capability is classified into grazing, arable and wilderness. In this classification the arable soils are grouped according to their potentialities and limitations for sustained production of the common cultivated crops that do not require specialized site conditioning or site treatment. Nonarable soils (soils unsuitable for long time sustained use for cultivated crops) are grouped according to their potentialities and limitations to produce permanent vegetation and according to their risks of soil damage if mismanaged. The land capability of the proposed area is classified as an arable land and grazing. Arable land is any land capable of being ploughed and used to grow crops.

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The prospecting area is suitable for growing crops as it is classified as arable, and small portion of the study area is classified as Arable as seen on Figure 6: Land Capability Map.

The capability grouping of soils is designed:

0. To help landowners and others use and interpret the soil maps,
1. To introduce users to the detail of the soil map itself, and
2. To make possible broad generalizations based on soil potentialities, limitations in use, and management problems'

The capability classification provides three major categories of soil groupings:

0. Capability unit,
1. Capability subclass, and
2. Capability class.

The first category, capability unit, is a grouping of soils that have about the same responses to systems of management of common cultivated crops and pasture plants. Soils in any one capability unit are adapted to the same kinds of common cultivated and pasture plants and require similar alternative systems of management for these crops. Long-time estimated yields of adapted crops for individual soils within the unit under comparable management do not vary more than about 25 percent.

The second category, the subclass, is a grouping of capability units having similar kinds of limitations and hazards. Four general kinds of limitations or hazards are recognized: (1) Erosion hazard, (2) wetness, (3) rooting zone limitations, and (4) climate.

The third and broadest category in the capability classification places all the soils in eight capability classes. The risks of soil damage or limitations in use become progressively greater from class I to class VIII. Soils in the first four classes under good management can produce adapted plants, such as forest trees or range plants, and the common cultivated field crops ^ and pasture plants. Soils in classes V, VI, and VII are suited to the use of adapted native plants. Some soils in classes V and VI are also capable of producing specialized crops, such as certain fruits and ornamentals, and even field and vegetable crops under highly intensive management involving elaborate practices for soil and water conservation. Soils in class VIII do not return on-site benefits for inputs of management for crops, grasses, or trees without major reclamation.

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The grouping of soils into capability units, subclasses, and classes is done primarily based on their capability to produce common cultivated crops and pasture plants without deterioration over a long period of time. To express suitability of the soils for range and woodland use, the soil mapping units are grouped into range sites and woodland-suitability group.

Table 6: Relationship of soil-mapping unit to capability classification (Source: Kellogo, 1961)

Soil-mapping unit	**Capability unit**	**Capability subclass**	**Capability class**
A soil mapping unit is the part of the landscape' that has the same qualities and characteristics and whose limits are static by accurate definitions. Within the cartographic limitations and considering the purpose for which the map is made, the soil mapping unit is the unit at which the highest number of accurate statements and predictions can be done. The soil mapping units gives more information about the details of soils. The basis for all the interpretation is the basic mapping units.	A group of one or more individual soil mapping units having similar potentials and continuing limitations or hazards is termed as capability unit. The soils in a capability unit are sufficiently uniform to (1) produce similar kinds of cultivated crops and pasture plants with similar management practices, (2) require similar conservation treatment and management under the same kind and condition of vegetative cover, (3) have comparable potential productivity.	are the groupings of capability units that have the same major conservation problem are called Subclasses. The problems include— 1.E>Erosion and runoff. 2. W>Excess water. 3.S>Root-zone limitations. 4.C>Climatic limitations. The information about the involved limitations and the kind of problems related to conservation are provided by capability Subclass.	Capability classes are groups of capability subclasses or capability units that have the same relative degree of hazard or limitation. The limitation and risks of soil damage in use become more from class I to class VIII. The capability classes are useful as a means of introducing the map user to the more detailed information on the soil map. The classes show the location, amount, and general suitability of the soils for agricultural use. Only information concerning general

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They provide the information required for the development of capability units, forest site groups, crop suitability groups, range site groups, engineering groups, and other interpretation groups. The most specific management ways and estimated yields relates to the individual mapping unit.	The capability unit condenses and simplifies soils information for planning individual tracts of land, field by field. Capability units with the class and subclass furnish information about the degree of limitation, kind of conservation problems and the management practices needed.	The information about the map user relating to the limitation degree and the kind of problems involved in broad program planning, conservation need studies, and similar purposes are provided by the class and sub class.	agricultural limitations in soil use are obtained at the capability class level.

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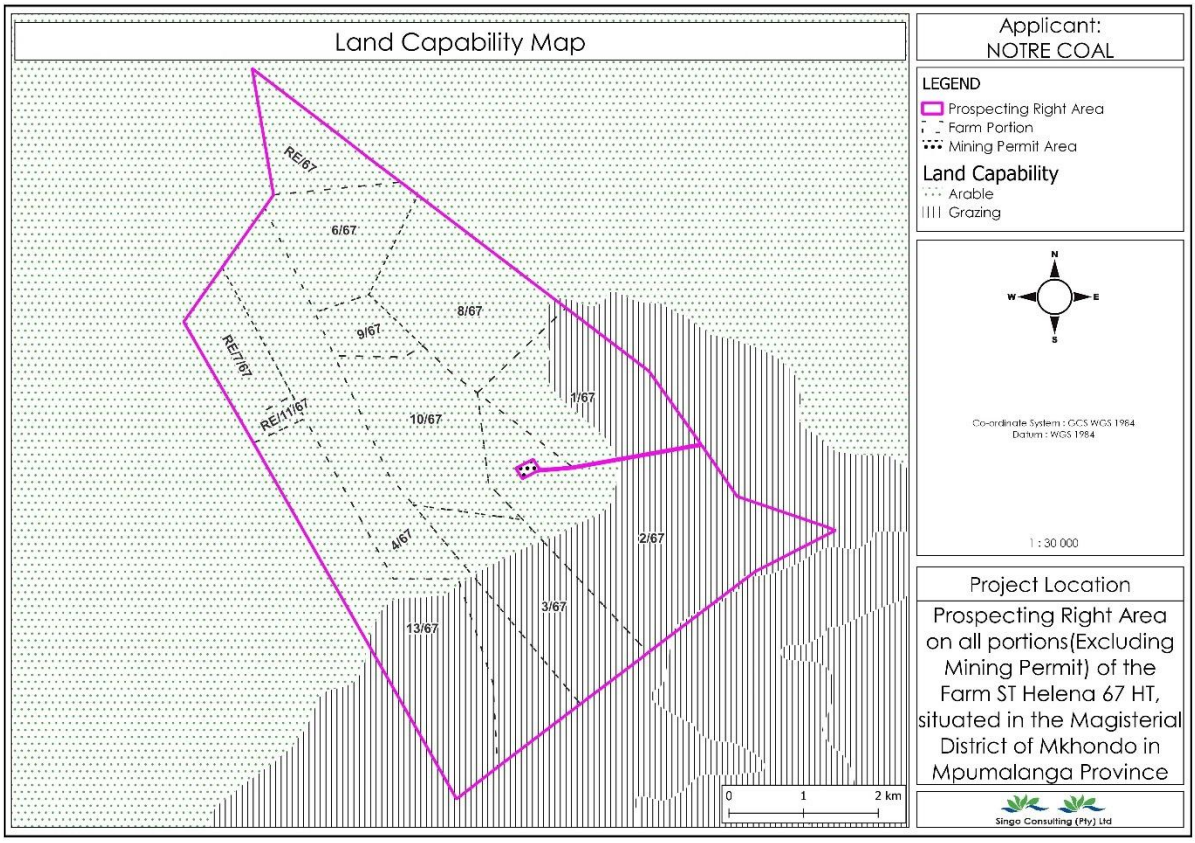

Figure 6: Land Capability Map

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5 SOIL IMPACT ASSESSMENT

5.1 Assessment methodology

The environmental impact assessment is designed to identify impacts related to prospecting activities and how to mitigate these impacts. It is anticipated that with the correct mitigation measures being put in place these impacts can be reduced. The rating of impacts is based on the type of activity that will be undertaken. Similar activities that will have the same impact to soil, land use and land capability have been grouped together and discussed for impacts, such as loss of topsoil as a resource.

When the impact rating is significantly different because of the activity, a separate rating has been given for those activities. The activities, such as chrome ore prospecting would potentially have a lower impact on soil, land capability and land use as these areas are less disturbed. For the purpose of this impact assessment activities that are located within relatively undisturbed areas have been rated together and all other activities falling within the prospecting area have been rated together with respect to the level of the impacts.

5.2 Impact assessment during prospecting project phase

Topsoil will not be removed as there will not be any mining related activities taking place. No foundation excavations will be needed for fuel storage depot as fuel will be transported to site daily during the drilling phase.

Table 7: Loss of topsoil as a resource, erosion, and compaction

Criteria	Details/Discussion
Description of impact	During diamond core drilling the land clearance and earthworks will have a minor impact. Even though soil will be cleared from most of the areas where infrastructure will be placed, areas that are not disturbed by the drilling will remain in their current land use.

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	The boreholes footprint will be minimal. The pathways to be created to provide access of the drill rig can cause compaction of soil. During clearance of vegetation there is a greater risk, when compared to other areas, that topsoil would be exposed and there are potential risks for increased erosion in these areas during rainfall events, resulting in a potential loss of soil as a resource. In addition, wind erosion would be greater as these areas are exposed as a result of the removal of vegetation
Mitigation required	• Pathways are to be stripped when the soil is dry (as far as practical possible), as to reduce compaction; and • To be stripped according to the stripping guideline and management plan, and further recommendations contained within the rehabilitation plan. • Minimize the period of exposure of soil disturbances through a planning schedule.

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6. SOIL MANAGEMENT PLAN

6.1 Soil management during the prospecting phase

More important than chemical imbalances which can be easily restored at cost, is soil compaction and volumes of replacement during soil reclamation. Heavy drill rigs equipment to be used during prospecting may lead to areas of decreased soil and land capabilities. Such areas have limited land use options and specialized management needs. However, this impact will be minimal.

6.1 Soil management during the prospecting phase

6.1.1 Terrain stability to minimise erosion potential

Contour Cultivation reduces surface flow velocity and delays soil erosion, this process involves sowing crops through the slope instead of climbing and descending from slope. Contour trimming is more effective on slopes between 2% and 10% (Suresh 2012; Meena et al. 2018a). Contour crops protects the precious upper soil by reducing the velocity of the flow of water and inducing more infiltration. The contour cultivation reduces the outflow by increasing the rough-ness of the surface perpendicular to the slope. The increased surface roughness reduces the speed of any flowing water, providing more time for infiltration and reducing erosion rate.

Contour Cultivation is a sustainable way of farming where farmers plant crops across or perpendicular to slopes to follow the contours of a slope of a field. This arrangement of plants breaks up the flow of water and makes it harder for soil erosion to occur.

Table 8: Contour Cultivation (Source: (Contour Cultivation-Bing images)

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6.1.2 Management of access and haulage roads

For the proposed prospecting right, they will not be any developments of roads infrastructure on portion 1 and a portion of the remaining extent of the farm Annysspruit 140 HT, existing path on the farm will be used. Dust suppression must be done on a regular basis.

6.1.3 Prevention of soil contamination

Toxic chemical compounds, salts, radioactive agents, toxins, and other waste contribute to soil contamination/pollution, and these results in severe negative impact on plant and animal health.

- To avoid soil pollution, it is important, that along with fertilizers, farmers should shift to bio pesticides and fungicides, also known as herbicides.
- deforestation measures must be undertaken at rapid pace.
- Ensure reduction of the use of chemical fertilizers and pesticides.
- Recycling paper, plastics, and other materials.
- Ban the use of plastic bags, which are a major cause of pollution.
- Avoiding deforestation and promoting forestation.

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7 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion and Summary

A soil, land use and land capability investigation were conducted for the proposed Coal resource prospecting project. The topographical, land use and soil type data available for the site were compiled using both desktop and field assessment data to determine the potential impacts of the prospecting activities.

The following conclusions are made in this study:

- The proposed area is covered with association of classes 1 to 4: Undifferentiated structureless soils, Association of classes 13 and 16: Undifferentiated structureless Soils and the freely drained, structureless soils.
- The study area is an arable land and has the capability of being ploughed and used to grow crops.
- The prospecting right area is covered with natural vegetation, plantation, bare land, cultivated land and wetlands.
- Absorbent Spill kits will be made available near the drill rigs during drilling activities.

7.2 Recommendations

- Pathways will be stripped when the soil is dry (as far as practical possible), as to reduce compaction; and
- The pathways will be stripped according to the stripping guideline and management plan, and further recommendations contained within the rehabilitation plan.
- The period of exposure of soil disturbances will be minimized through a planning schedule.
- Absorbent kits will be made available near the drill rigs during drilling activities to prevent oil spills from contaminating the surrounding soil.
- Drilling on steep slopes will be avoided, to prevent soil erosion.
- The exploration geologist will be advised to drill and sample more than 100m away from the waterbody on site.
- The proposed prospecting land should be returned to its origin as before prospecting activities and the rehabilitation performance assessment in the proposed land must be done progressively (annually) during the operational phase by a soil specialist.
- Dust suppression should be conducted regularly.

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8 REFERENCES

1. Schoeman, J.L., van der Walt, M., Monnik, K.A., Thackrah, A., Malherbe, J. and le Roux, R.E., 2000. The development and application of a land capability classification system for South Africa. ARC-ISCW Report No GW/A/2000/57, ARC-Institute for Soil, Climate and Water, Pretoria Soil Classification Working Group, 1991.
2. Soil Classification – a taxonomic system for South Africa. ARC-Institute for Soil, Climate and Water, Pretoria.
3. KELLOGO, C. E., 1961. LAND-CAPABILITY CLASSIFICATION. Washington D.C: s.n.
4. Land Type Survey Staff. 1972 – 2006. Land Types of South Africa: Digital map (1:250 000 scale) and soil inventory databases. ARC-Institute for Soil, Climate and Water, Pretoria.

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APPENDICES

Appendix A: Specialist's qualifications

Available upon request

Appendix B: Laboratory results

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