LAND CAPABILITY AND SOIL ASSESSMENT FOR THE PROPOSED STEAMBOAT MINE

LIMPOPO PROVINCE

May 2021

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DECLARATION

The observations, conclusions and recommendations made in this report are based on the best available data and on best scientific and professional knowledge of the directors of INDEX (Pty) Ltd. The report is based on GIS programming and utilises satellite tracking to map survey points. Survey points are normally accurate to within 3 metres; which must be considered in the use of the information.

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General declaration:

- INDEX acted as the independent specialist in this application;
- Performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- There were no circumstances that may compromise INDEX's objectivity in performing such work;
- INDEX have expertise in conducting the specialist report relevant to this application, including knowledge of NEMA and its regulations and any guidelines that have relevance to the proposed activity;
- Have no and will not engage in conflicting interests in the undertaking of the activity.

The study was undertaken by Dr Andries Gouws. He is a registered member of SACNASP in the category of Agriculture.

Signature of specialist

For INDEX (PTY) LTD

May 2021

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1 BACKGROUND

The survey area for this study is located on the farms Steamboat 306-MR and Inkom 305-MR, which is situated approximately 36km south-west of Alldays and 54km north-west of Vivo in the Blouberg Local Municipality, Capricorn District of Limpopo Province.

Index was appointed by DIPHORORO as the Independent Agricultural Specialist to do a soil mapping exercise and undertake an agricultural potential assessment of the mine application area with a specific focus of the area where the first phase on the mine will be developed.

This is in line with the requirements of the scoping and EIA process prescribed by the 2014 EIA Regulations for activities listed under GN983, GN984, GN 985 and GN921; as amended. This report constitutes the Soil and Land Capability Impact Assessment, in the EIA process.

The main output will be to determine the impact of the proposed projects on the agricultural potential of the land;

- Indicate the present land uses and farming infrastructure, if any;
- Indicate land capability (potential);
- Determine the farming patterns of farmers in the region;
- Indicate the impact of the proposed projects on agriculture.

The size of the Project Area investigated is 1 476 hectares of which the footprint of the mining area is 27 hectares.

Results of the land and soil investigation are based on a site visit in April 2019.

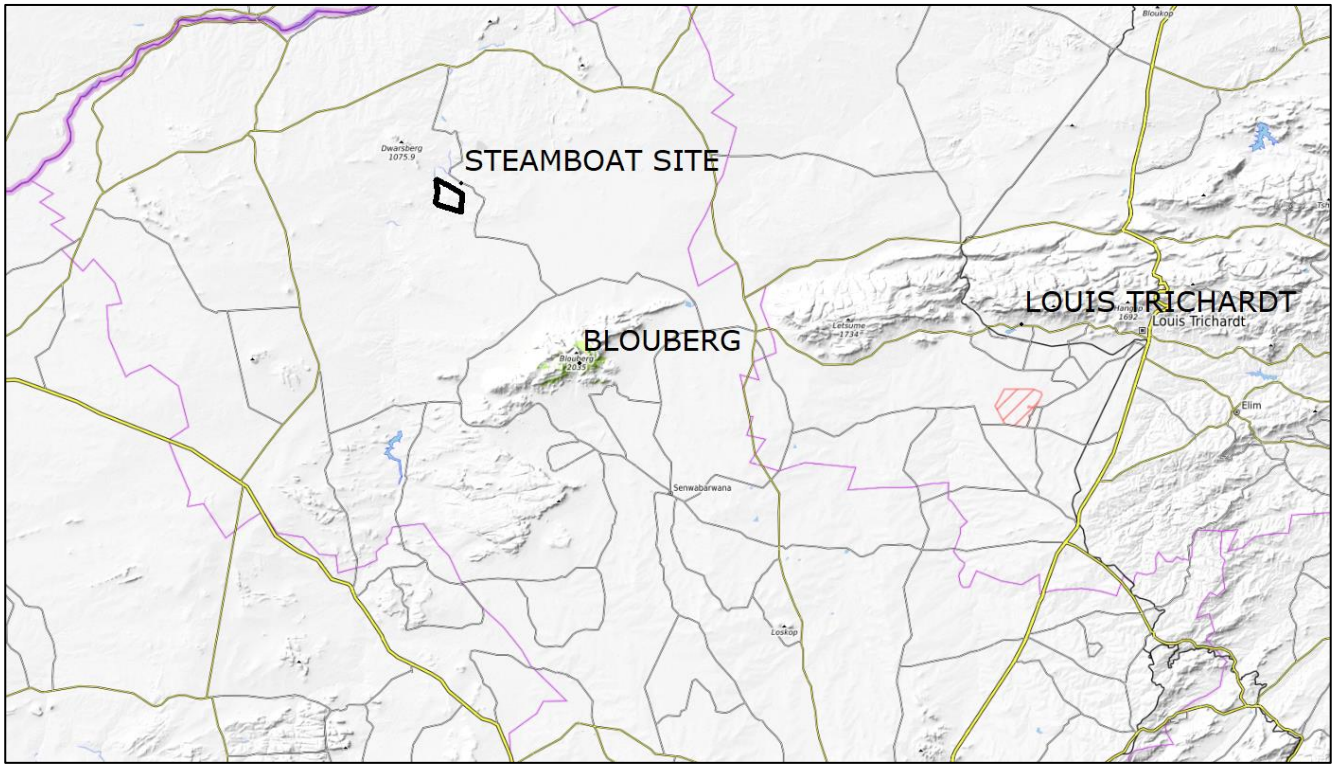


Figure 1. Location of the Project Area

2 PROPOSED DEVELOPMENT

Cuchron (Pty) Ltd holds a valid Prospecting Right No LP/5/1/1/2/10321PR for Graphite over the farm's Steamboat 306-MR and Inkom 305-MR, covering an area of 1 453 hectares. The prospecting programme identified graphite resources on the property, and application was made for a Mining Right; which was accepted by the DMR on 12 November 2020. Two Environmental Authorisation Applications was submitted:

- Cuchron applied for Environmental Authorisation for the Mine Development and Associated Infrastructure, and
- Steamboat Graphite applied for the Environmental Authorisation for the Beneficiation Plant and associated infrastructure.

Approval has been received from DMR to follow a joint and consolidated approach to the Environmental Impact Assessment Process, and produce combined reports for the two applications as envisaged in terms of Regulation 11(4) of the EIA regulations 2014 (as amended).

The mining area and mining footprint is indicated in Figure 2.

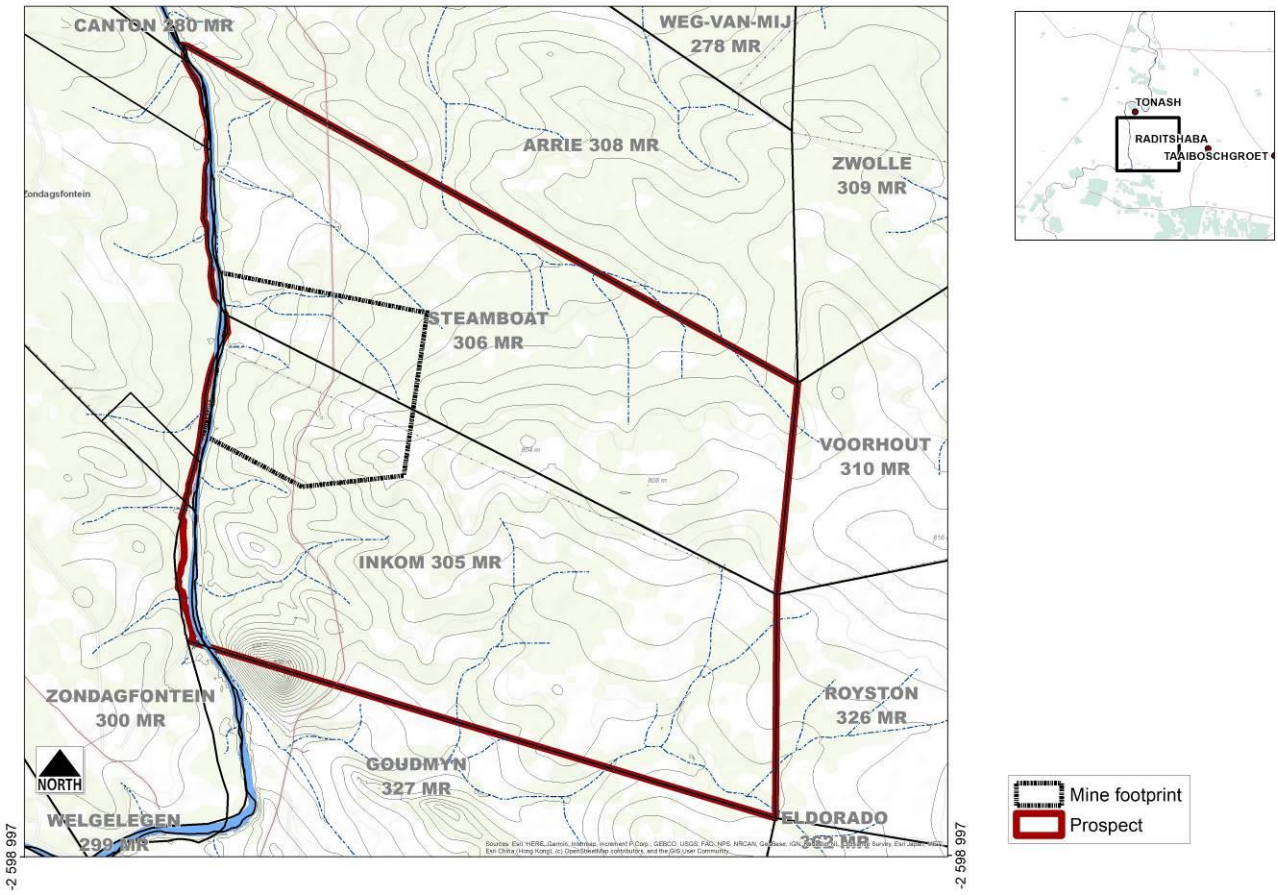


Figure 2. Proposed development

3 PROCESS OF THE ASSESSMENT

Satellite imagery from Quickbird and Google was used for the regional assessment whilst drone photography was used to generate a high resolution orthophoto from which land uses and topographical properties of the

site could be determined with sub-meter accuracy. Photogrammetry was used to generate a Digital Elevation Model (DEM), from which contours were generated.

A reconnaissance level soil survey was done for the mining area and a more detailed survey was done for the mine footprint area based on two diagonally sighted traverses, to determine soil and land characteristics. For the mining area, the following process was followed:

- The soils were classified according to the binomial soil classification system for Southern Africa.
- Soil capability is described according to the system used by the Department of Agriculture, Land Reform and Rural Development (DALRRD).
- The agricultural sensitivity description is according to the screening tool, published by the Department of Environment, Forestry and Fisheries (DEFF) in Government Notice 320 of Government Notice 43310 on 20 March 2020 (DEFF Screening Tool).

4 REGIONAL LAND USES

The land is used for livestock production. There are a number of irrigation farms west of the Mogalakwena River that receives water from the river.

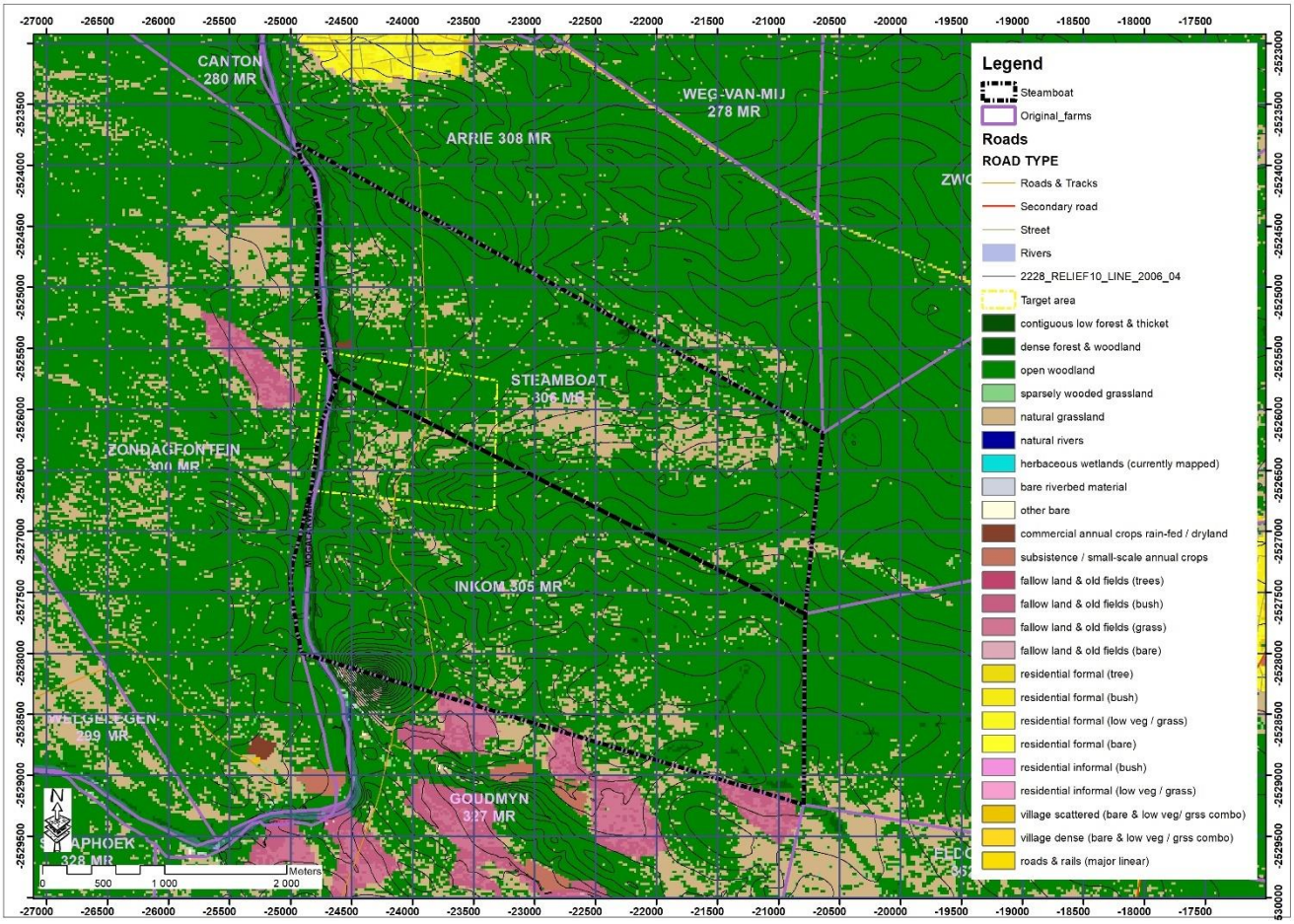


Figure 3. Land cover

5 AGRICULTURAL LAND USE OF THE MINING AREA AND MINE TARGET AREA

The entire mining area is natural vegetation and is used as grazing and browsing for livestock. From the vegetation status it is certain that the land has not been cultivated in the past and that it is virgin land. There is no irrigation on the property and the site has no water allocation.

The site is fenced but has no other infrastructure. Handling facilities are on the adjoining properties. About 27 hectares will be fenced for mining purposes and will be excluded from agriculture due to the possible dangerous conditions and movement of vehicles.

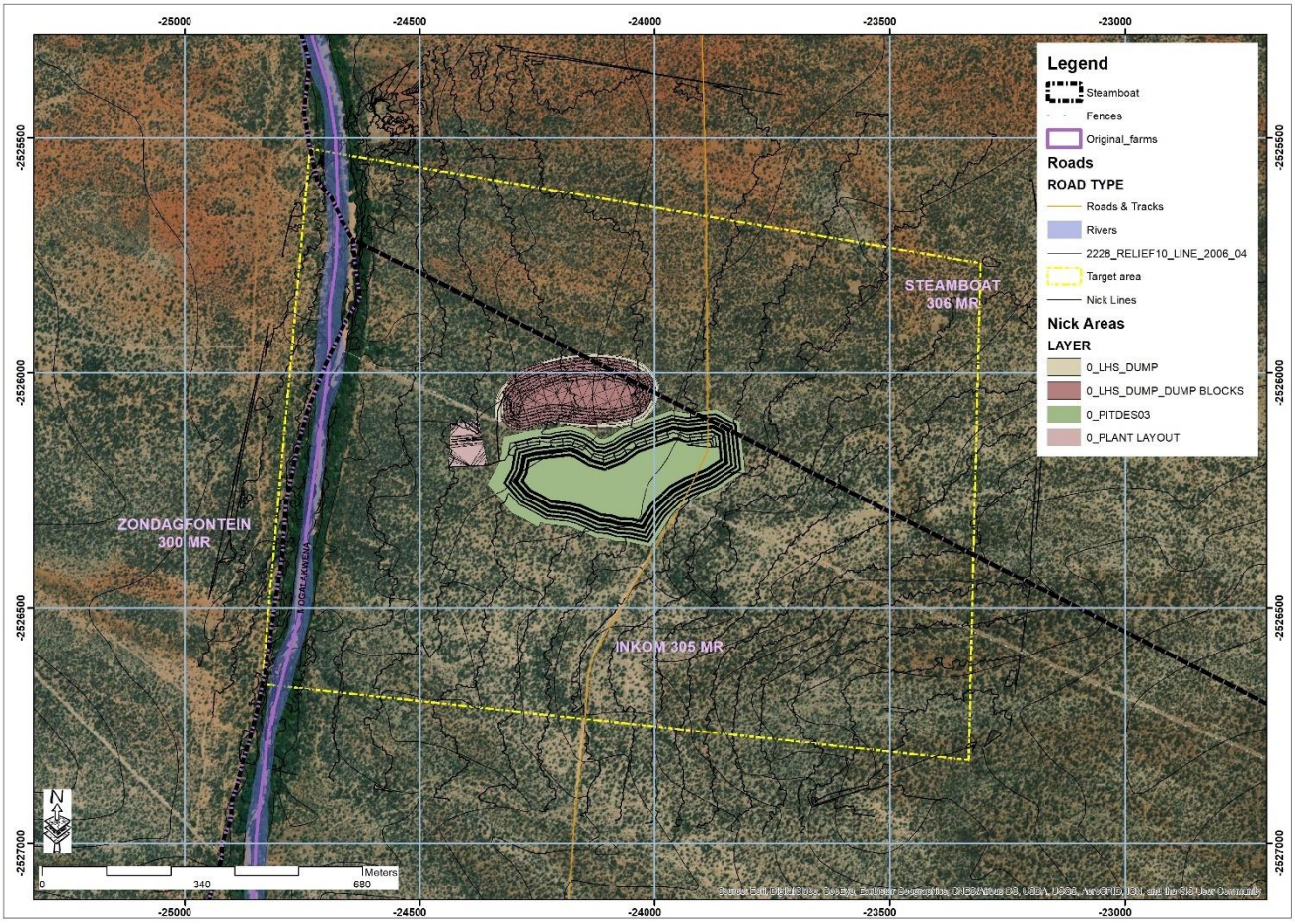


Figure 4 Target area and mine footprint

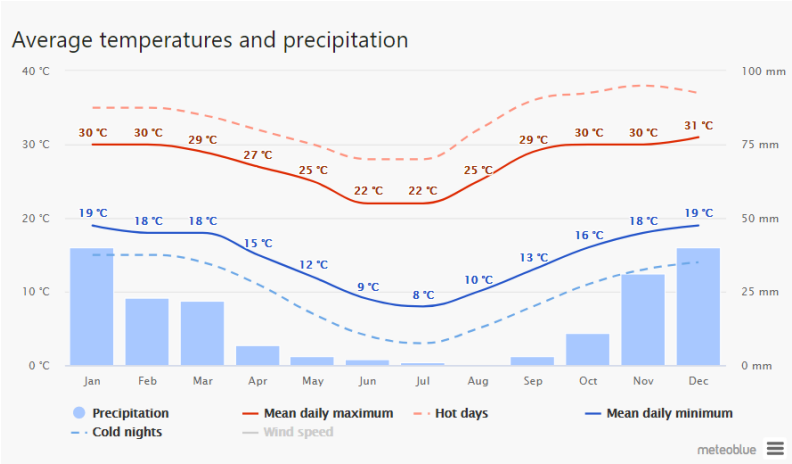
6 NATURAL RESOURCES

6.1 Climate

6.1.1 Regional climate

Limpopo Province falls in the summer rainfall region, with the western part semi-arid and the eastern part largely sub-tropical. The western and far northern parts experience frequent droughts. Winter throughout Limpopo is mild and mostly frost-free. The climatic conditions vary from the Waterberg Mountains in the south, northwards to the hot, dry Limpopo River valley on the border with Zimbabwe and Botswana. The mean annual temperature ranges between 16°C in the south to more than 22°C in the north with an average of 20°C. Maximum temperatures are usually experienced in January, and minimum temperatures occur on average in July.

The largest portion of the Limpopo Province has a mean annual rainfall of between 300 and 500 mm. The south-western part has an annual rainfall of up to 700 mm, and in the Lowveld, the rainfall can exceed 1 000 mm a year in places. The BLM, in which the projects will be located, is a hot area, with annual rainfall varying between 380 and 550mm. Most rainfall is experienced during the summer months. During the rainy season, a maximum of 8 to 12 rain days per month is typically expected, whilst in the dry season, a maximum of 1 rain day may be expected per month. The rainfall is mainly in the form of thunderstorms. Hail, which is often associated with thunderstorms, does occur during the hot summer months. In accordance with the rainfall patterns, the relative humidity is higher in summer than in winter. Humidity is generally highest in February (the daily mean ranges from 64% in the west to above 70% in the east).



6.1.2 Site climate

The predominant wind direction is from north-northwest, with the secondary component from the northwest and west northwest. Contributions from the north and northeast quadrant are observed. Wind speeds vary between 6 – 11 kilometres per hour.

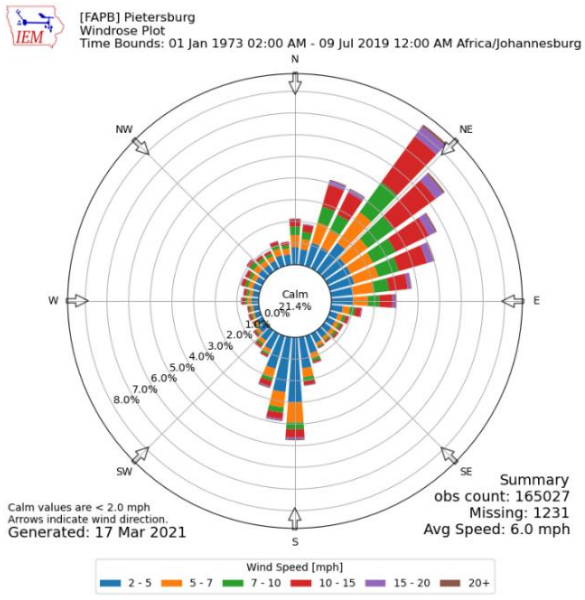


Figure 5 Windrose for Polokwane

Annual maximum, minimum and average monthly evaporation, the annual maximum, minimum and average monthly evaporation rates for the project area averages at about 2 – 5mm per day. The highest monthly

maximum evaporation (322 mm) occurs for October. The rate decreases significantly down to 109 mm in June. The monthly minimum evaporation ranges between 180 mm in October and 68 mm in April.

6.2 Vegetation

6.2.1 Regional vegetation

Musina and Rutherford describes the regional vegetation as Limpopo Sweet Bushveld (SVcb 19). The vegetation type extends from the lower reaches of the Crocodile and Marico Rivers around Makoppa and Derdepoort, respectively, down the Limpopo River Valley including Lephalale and into the tropics past Tom Burke to the Usutu border post and Taaiboschgroet area in the north. Altitude about 700–1 000 m. The unit also occurs on the Botswana side of the border.

The conservation status is Least Threatened. Less than 1% is statutorily conserved and is limited to reserves straddling the south-eastern limits of the unit, for example the D'Nyala Nature Reserve. Very little conserved in other reserves. About 5% transformed, mainly by cultivation. Erosion is low to high.

6.2.2 Site vegetation

Except for the riverine area the total study area consists mostly of one large woodland vegetation unit but has been divided into two vegetation units based mainly on the topography and the soil present namely:

- Low-lying woodland
- Rocky woodland, and
- Riverine area

6.2.2.1 Low-lying woodland

The low-lying woodland is low-medium sensitivity and is characterised by an open to closed woodland with a degraded herbaceous layer. The woody species *Terminalia prunelloides, Dichrostachys cinerea, Grewia flava, Grewia flavescens, Vachellia tortilis* and *Dovyalis caffra* are prominent throughout this unit in the woody layer. The herbaceous layer is sparse and include the grasses *Enneapogon scoparius, Schmidtia pappophoroides, Aristida stipitata* and the forbs *Blepharis subvolubilis, Evolvulus alsinoides, Thesium utile, Bidens pilosa, Sansevieria aethiopica, Kyphocarpa angustifolia* and *Ipomoea crassipes.* There are no red data plants in this vegetation unit.

6.2.2.2 Rocky woodland

The rocky woodland is medium sensitive characterised by a relatively dense woody vegetation layer and a degraded herbaceous layer. The vegetation is dominated by the woody species *Vachellia tortilis, Terminalia prunelloides, Dichrostachys cinerea, Catophractes alexandri, Vachellia robusta, Senegalia senegal,* while *Senegalia nigrescens, Combretum apiculatum* and *Cadaba aphylla* are locally prominent. The herbaceous layer is degraded though patches of the grasses *Enneapogon scoparius, Schmidtia pappophoroides* and *Eragrostis lehmanniana* are present in-between dense woody clumps. There are no red data plants in this vegetation unit.

6.2.2.3 Riverine area

The riverine area is a high conservation priority. The vegetation is dominated by the trees *Combretum erythrophyllum, Faidherbia albida, Ficus sur,* and *Senegalia ataxacantha,* while the tree *Ziziphus mucronata* is prominent. The herbaceous layer is degraded with the alien invasive weed *Ricinus communis* and *Xanthium strumarium* forming dense clumps all along the embankments. Other species present include the woody species *Senegalia erubescens, Gymnosporia buxifolia, Terminalia prunelloides*, the grasses *Brachiaria deflexa, Panicum*

maximum, Urochloa panicoides, and the forbs *Alternanthera pungens, Gomphocarpus fruticosus*, and *Gomphrena celosioides*. No red data species were noted within this unit.

6.2.3 Grazing capacity

The grazing capacity for livestock of the natural veld, according to the DALRRD, is estimated at 12 hectares per large stock unit (LSU). Game will utilise the leaves of trees and shrubs for browsing.

6.2.4 Vegetation growing season

When the rainfall is plotted against the potential evaporation (PET) at a ratio of 1:2, the resulting graph indicates the growing season. See the climatogram below. At 40% precipitation in relation to PET, the growing season starts in December and lasts until middle February. This indicates that plants are under stress for most of the rainy season. The growing season is in the summer and follows rain. The winter period is dry, with little vegetative growth.

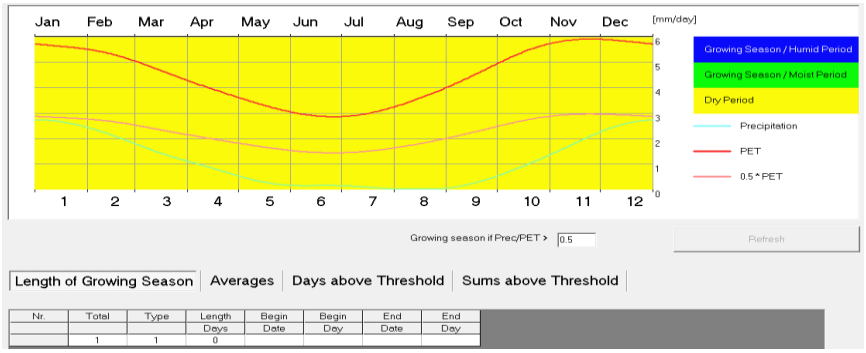


Figure 6 Climatogram

6.3 Geology

The regional geology consists of gneiss and marble.

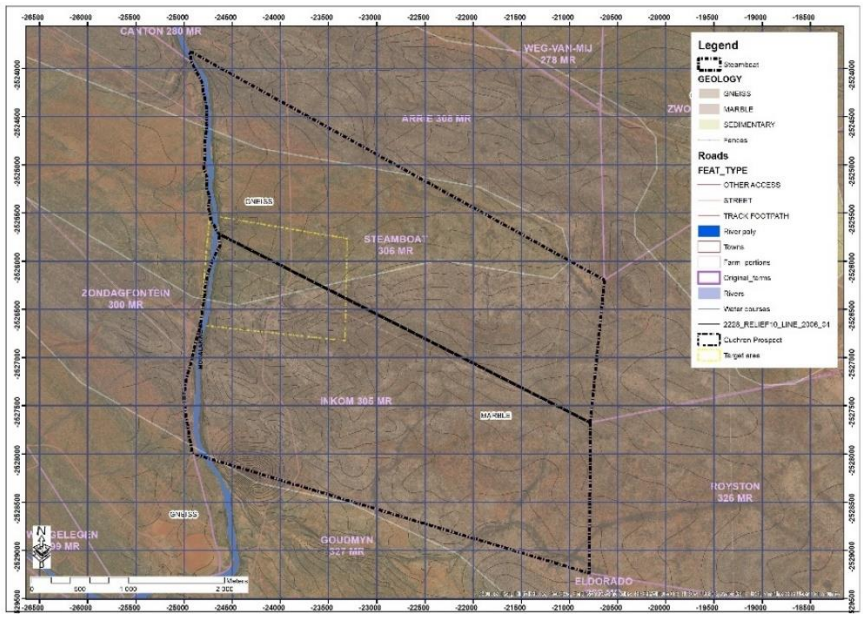


Figure 7 Regional geology

The graphite mineralisation on Steamboat and Inkom is located within the Gumbu Group of the Beit Bridge Complex. The Gumbu Group is characterised by predominantly calc-silicate rocks and marbles, and the occurrence of fine-grained metapelites. Quartzites and quartzofeldspathic gneisses are rare whereas marbles grading into calc-silicate rocks and compositional banding of layers richer and poorer in silicate are common. Rocks may contain calcite, dolomite, olivine, phlogopite, diopside, plagioclase, microcline, quartz and graphite, depending on their composition. Recent studies indicated that carbonate rocks from the Gumbu Group in the area east of Mesina in part display a positive carbon isotope anomaly that occurs worldwide in strata between 2000 and 2200 Ma old. As a result, lithostratigraphic units of the Gumbu Group seem to be of early Proterozoic age. (Kramers et al., 2006). The rocks in the area have been intensely deformed and sheared. Folding is abundant and occurs as tight, isoclinal folds. This is especially evident in the northern most units of the area. Graphite mineralisation of the proposed deposit occurs within a graphitic gneiss unit which is found in an E-W trending structure.

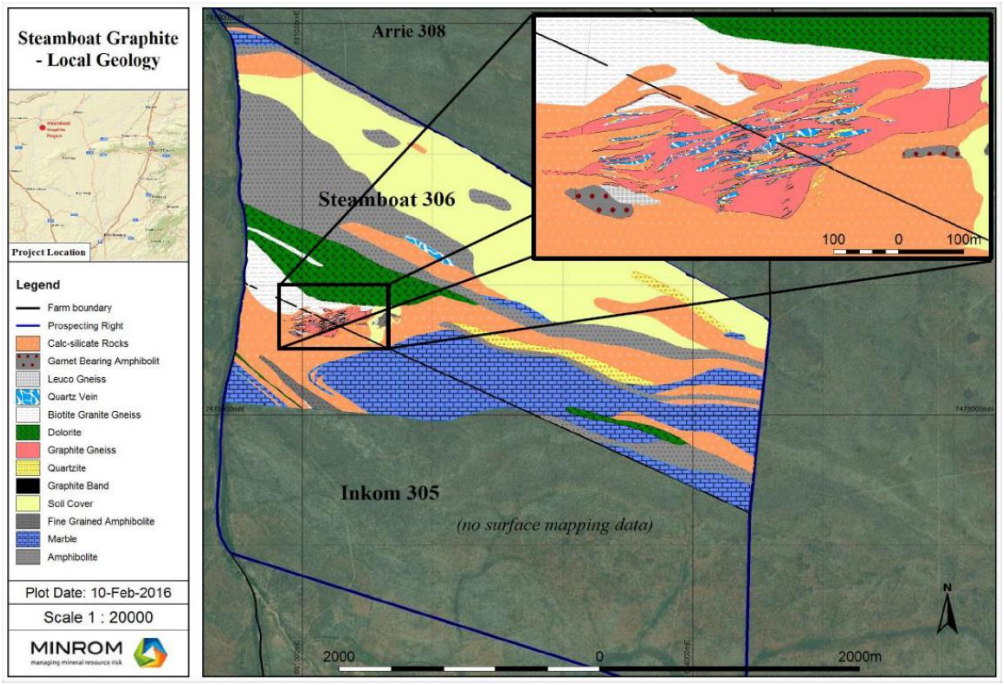


Figure 8 Geology of the mining prospect

6.4 Soil

6.4.1 Mining area

The regional soil type is Glenrosa or Mispah soil forms of varying depth. Lime is generally present in the entire landscape.

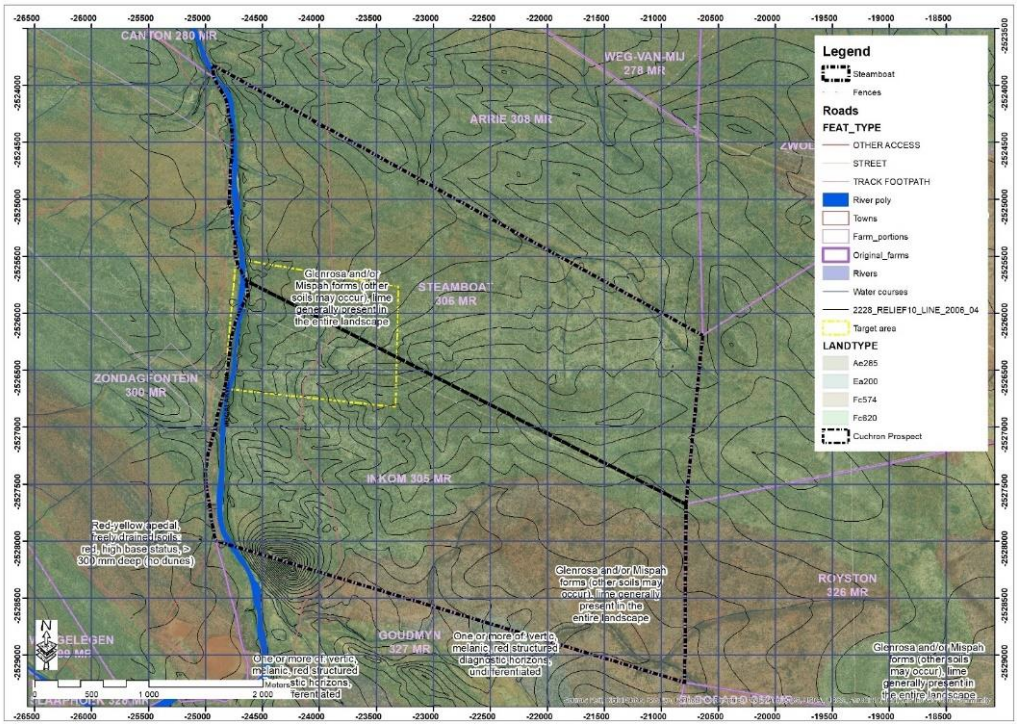


Figure 9 Land types

6.4.2 Mining footprint

The northern part of the site is quaternary sands. They are reddish coloured with rocky outcrops where the schist outcrops. All the other soils are on schist, which is metamorphic rock and is the material in which the graphite is captured.

Most of the land is covered by medium grained sand. There are many loose stones and rock throughout the prospecting area. All the land in the region that is cultivated occurs on the quaternary sands. They are all irrigated, and mostly from the Mogalakwena River. Further discussion is confined the mining area, because this is the only portion that will be impacted on by the mining activities.

Four soil types were identified, they are as follows:

Table 1. Soil descriptions

Map symbol	Description	Dominant soil form
Gs350R	Greyish to light brown, sandy loam grainy structured topsoil that overlies partially weathered schist. Nodules and course fragments are common. The soil depth is generally less than 400 mm. Rocky outcrops occur in many places.	Glenrosa, Mispah, Hutton, Rock
Hu450R	Reddish brown and yellowish sandy loam topsoil that overlies brown sands with a blocky structure. The general geology is alluvium. Loose rock and stones are common.	Hutton, Glenrosa, Oakleaf
R	Rocky outcrops and shallow rocky soils	Rock, Mispah Glenrosa
WC	Watercourse. It is the Mahalakwna river that drains the area. It has well developed riparian vegetation. The banks are alluvium.	

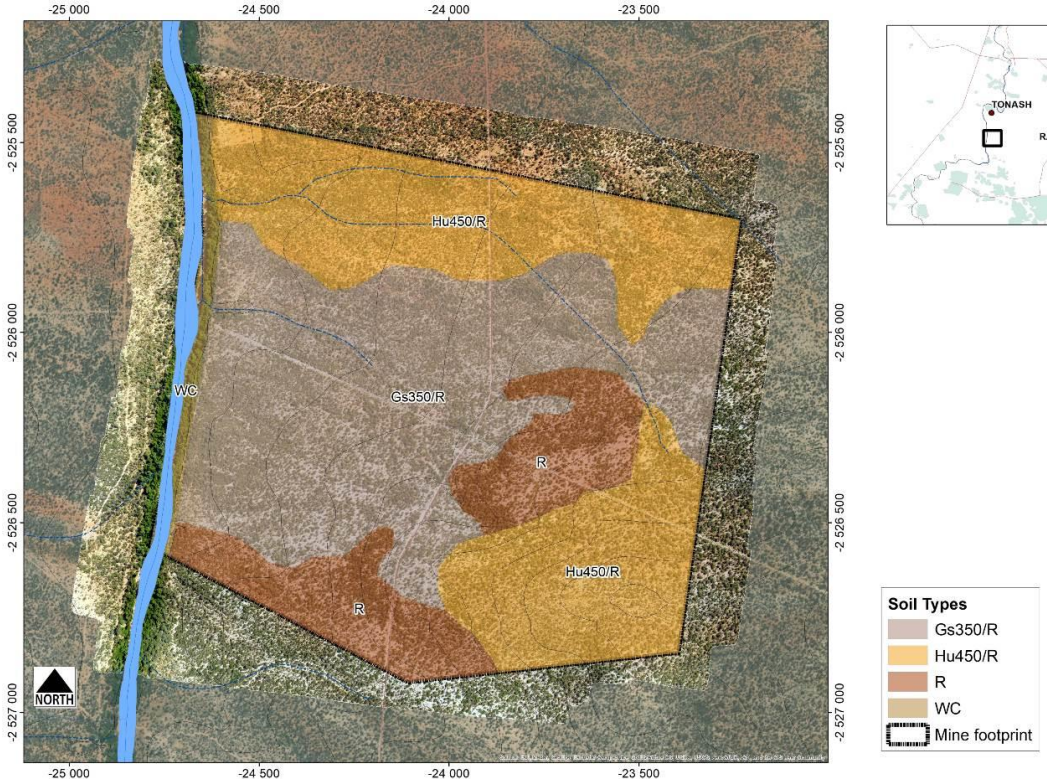


Figure 10 Generalised soil map

Photo 1. Rocky outcrops found throughout the mining area

Photo 2. Sandy plains with frequent stone and rock outcrops

6.5 High potential land

In terms of the mandate of the DALRRD, high potential land must be protected. It is, therefore, necessary to define what high potential land is.

The potential of land is defined in terms of a viable farming unit, as described in CARA and HUAL and other legislation and guidelines that are used by DALRRD.

As background the following:

Norms and standards in terms of CARA and HUAL (National Policy of the Preservation of High Potential Land)

The National policy on the protection of high potential and unique agricultural land, published by then Department of Agriculture, Fisheries and Forestry (DAFF) (now DALRRD) in 2006, relates to subdivision of land and changes in land use. It states that: '*Protection of high potential agricultural land for food security remains the primary responsibility of the Department of Agriculture'*.

The Draft Policy on the Preservation and Development of Agricultural Land Framework Bill was published for discussion in 2014. Although not finally approved, it does, however, indicate DALRRD intentions for land uses, rezoning and of the protection of agricultural land.

In terms of the Bill, high potential cropping land means land best suited to, and capable of, consistently producing acceptable levels of goods and services for a wide range of agricultural enterprises in a sustainable manner, taking into consideration expenditure of energy and economic resources; and includes:

- Land capability classes I to III;
- Unique agricultural land;
- Irrigated land; and
- Land suitable for irrigation.

Essentially, the Bill's objective is to protect high potential land from being exploited for non-farming purposes. The definitions in the Bill states that:

- *High Potential Agricultural Land* means the best land available for, suited to and capable of consistently producing optimum yields of a wide range of agricultural products (food, feed, forage, fibre and oilseed), with minimum environmental damage; and
- *Unique Agricultural Land* means land that is or can be used to produce specific high value crops. It is not usually of high potential but important to agriculture due to a specific combination of location, climate or soil properties that makes it highly suited for a specific crop when managed with specific farming or conservation methods. This includes land of high local importance, where it is useful and environmentally sound to encourage continued agricultural production, even if some or most of the land is of mediocre quality for agriculture and not used for particularly high value crops.

The Bill emphasises that irrigated land is automatically viewed as high potential land. This then necessitates that the water use authorisations granted by the DHSWS under the NWA will determine the extent of cultivation that may take place on any piece of land.

7 LAND CAPABILITY

Land capability classes are interpretive groupings of land with similar potential and limitations or similar hazards. It is considered by many land use planners as one of the only methods to describe the potential of land for development.

The evaluation involves consideration of:

- Difficulties in land use owing to physical land characteristics;
- The risks of land damage from erosion and other causes; and
- Climate.

The classic eight-class land capability system (Klingebiel & Montgomery, 1961) was adapted for use with Agriculture Geographic Information System (AGIS) in South Africa.

Land capability is classified according to guidelines published by the DALRRD in AGIS.

Land Capability is determined by the collective effects of soil, terrain and climate features and shows the most intensive long-term use of land for rain-fed agriculture. At the same time, it indicates the permanent limitations associated with the different land-use classes (refer to Table 2).

- Order A: Arable land – high potential land with few limitations (Classes i and ii)
- Order B: Arable land – moderate to severe limitations (Classes iii and iv)
- Order C: Grazing and forestry land (Classes v, vi and vii)
- Order D: Land not suitable for agriculture (Class viii)

Table 2. Land capability classes – intensity of land uses

LAND CAPABILITY				Grazing and Forestry			Crop production			
Order		Class	Wildlife	Forestry	Veld	Pastures	Limited	Moderate	Intensive	Very
Arable	A	i	■	■	■	■	■	■	■	■
		ii	■	■	■	■	■	■	■	
	B	iii	■	■	■	■	■	■		
		iv	■	■	■	■	■			
Non arable	C	v	■	■	■	■				
		vi	■	■	■	■				
		vii	■	■	■					
	D	viii	■	■						

Note: the shaded area indicate the suitable land use

7.1 DALRRD evaluation

According to AGIS, the official web site of the DALRRD (http://www.arcgis.com), the Project Area is classified as 'low/moderate *potential arable land*'. Because of the rock outcrops and shallow soils, coupled with the climatic constraints, this is considered optimistic – dryland crop production on the Project Area is not feasible, unless it the land is irrigated.

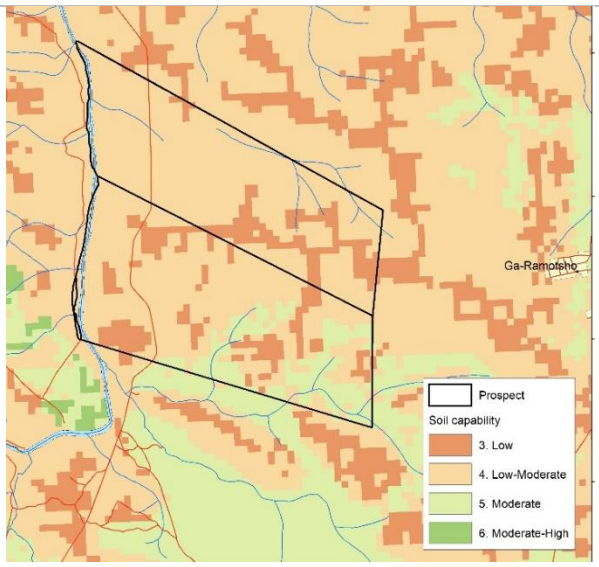


Figure 11. Soil capability

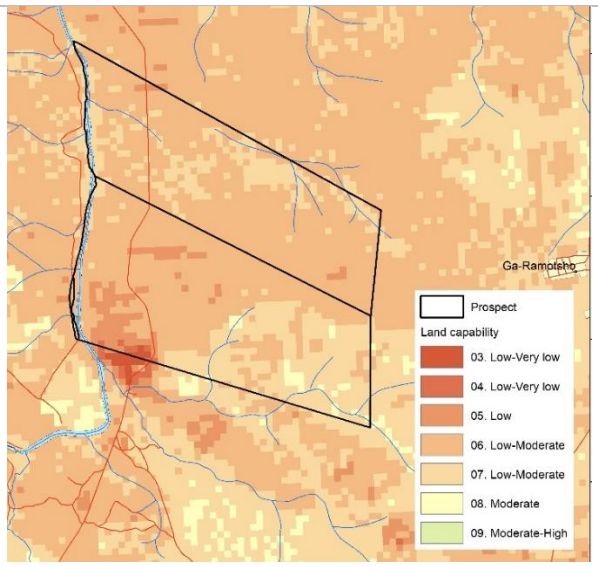


Figure 12. Land capability

7.2 Soil use capability on the mining target area

The land falls into the non-arable group; it is not suitable for cultivation and should be reserves for livestock and game. The land use capability is Class v, mainly due to soil depth, rockiness and climate.

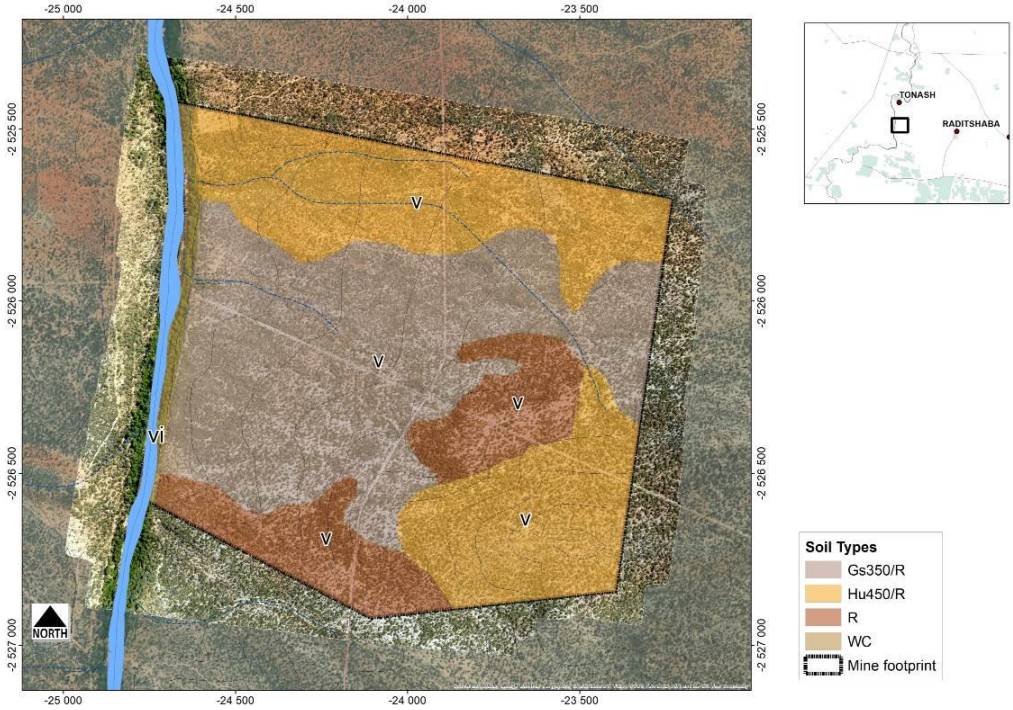


Figure 13 Land capability determined for the mine target area (INDEX)

8 SENSITIVITY ANALYSIS

The 2014 EIA Regulations require a sensitivity analyses in an application for an EA. A sensitivity tool was developed by the Department of Environment Affairs (DEFF). The DEFF Screening Tool, although not perfect in terms of describing the impact that the land use change will have on farming, it is, nevertheless, useful in evaluating what the impact will be of a proposed activity.

The DEFF tool indicated the following:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme				X
Defence Theme				X
Palaeontology Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, an agricultural specialist study is required.

Figure 14. Indicates the result of the DEFF Screening Tool, overlain on the proposed development footprint of the mining area.

Figure 14. Agricultural sensitivity of the land that will be mined (Screening Tool)

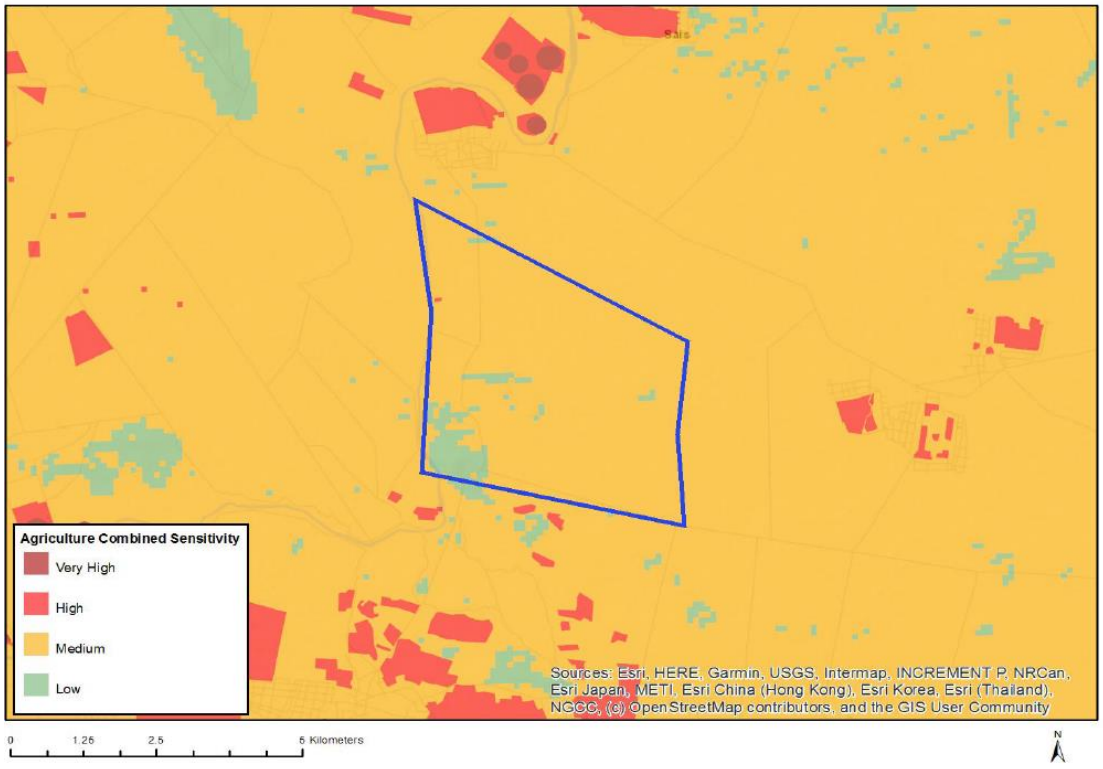


Table 3. Agricultural sensitivity of the mining footprint according to the Screening Tool

DESCRIPTION	Area (ha)
Low: 01: Very low, 02: Very low. 03: Low-Very low. 04: Low-Very low. 05: Low	0
Medium: 06: Low-Moderate. 07: Low-Moderate. 08: Moderate	60 ha

A soil and climate evaluation found that the land is not arable and that the Screening Tool's designation of '*Medium'* is not realistic. It should be '*Low'*.

The results of the Screening Tool are provided in the addenda.

9 IMPACT ASSESSMENT

9.1 Assumptions

Land use potential classes

High potential land is defined as follows:

Land best suited to and capable of consistently producing acceptable levels of goods and services for a wide range of agricultural enterprises in a sustainable manner, taking into consideration expenditure of energy and economic resources; and includes:

- Land Capability Classes i, ii and iii;
- Unique agricultural land;
- Irrigated land; and
- Land suitable for irrigation (deep well-drained soils and assuming irrigation water is available).

9.2 Rating criteria

The following rating was used to indicate impacts:

Extent

- 1: *Local* - extend to the site and its immediate surroundings.
- 2: *Regional* - impact on the region but within the province.
- 3: *National* - impact on an interprovincial scale.
- 4: *International* - impact outside of South Africa.

Probability

- 1: *Rare/Remote* - the event may occur only in exceptional circumstances.
- 2: *Unlikely* - the event could occur at some time.
- 3: *Moderate* - the event should occur at some time.
- 4: *Likely* - the event will probably occur in most circumstances.
- 5: *Almost certain* - the event is expected to occur in most circumstances.

Reversibility

- 1: Totally reversible.
- 2: Partially reversible.

- 3: Partially reversible but some remnants of the development remains.
- 4: Not reversible.

Irreplaceability

- 1: Rare/Remote - the event may occur only in exceptional circumstances.
- 2: Unlikely - the event could occur at some time.
- 3: Moderate - the event should occur at some time.
- 4: Likely - the event will probably occur in most circumstances.

Duration

- 1: *Short term*: 0-5 years.
- 2: *Medium term*: 5-11 years.
- 3: *Long term*: impact ceases after the operational life cycle of the activity, either because of natural processes or by human intervention.
- 4: *Permanent*: mitigation by either natural process or human intervention will not occur in such a way or timespan that the impact can be considered transient.

Magnitude

Degree to which impact may cause irreplaceable loss of resources.

- 1: *Low* - natural and social functions and processes are not affected or minimally affected.
- 2: *Medium* - affected environment is notably altered; natural and social functions and processes continue, albeit in a modified way.
- 3: *High* - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.
- 4: *Very high* – Will affect the continued viability of the system/environment.

Significance

Provides an overall impression of an impact's importance and the degree to which it can be mitigated. The range for significance ratings is as follows:

- 0 – Impact will not affect the environment.
- 1 – No impact.
- 2 – Residual impact.
- 3 – Impact cannot be mitigated.

9.3 Impact rating

The significance of each potential impact is calculated using the following formula:

Significance points = (duration + extent + irreplaceable + reversibility + magnitude) x probability

The maximum value is 105 SP (significance points). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per Table 4 below.

Score	Significance	Description of Rating
2 – 10	Low Significance	No specific management action required
10 – 20	Medium-low significance	Administrative management actions required
20 – 40	Medium significance	Management and monitoring action plans required
40 – 60	Medium-high significance	Specific management and monitoring plans required
>60	High significance	Detailed plans required, potential red flag impact

IMPACT	Before mitigation								MITIGATION	Significance after mitigation
	Extent	Probability	Reversibility	Irreplaceable	Duration	Magnitude	TOTAL (SP)	Significance		
LOSS OF HIGH POTENTIAL LAND										
Loss of land	1	1	1	1	1	0	**4**	**L**	The land is not cultivated and has never been. The land has only moderate potential. There will be no loss and no mitigation is necessary.	**L**
LOSS OF GRAZING LAND										
Loss of land	1	4	2	1	2	1	**28**	**M**	Grazing land is not protected in terms of HUAL policy. The loss on regional scale is low. Some grazing on a local scale will be lost, but the land is only sufficient to carry 2 LSU. No mitigation is possible.	**ML**
LOSS OF AGRICULTURAL PRODUCTION										
Loss of crop production	1	1	1	1	1	0	**4**	**L**	The land is not cultivated and has never been. Therefore, no loss of production will occur. There will be no loss and no mitigation is necessary.	**L**
Loss of animal production	1	4	2	1	2	1	**28**	**M**	Some grazing on a local scale will be lost. The potential income from livestock is estimated at R16 000 per year.	**L**
LOSS OF AGRICULTURAL INFRASTRUCTURE										
Direct loss	1	1	1	1	1	1	**5**	**L**	There is now no agricultural infrastructure.	**L**

LOSS OF JOB OPPORTUNITIES										
Direct loss	1	1	1	1	1	1	**5**	**L**	The mine footprint is approximately 24 hectares and the area which will be fenced and excluded for safety and security purposes will be ~27 hectares. The labour requirement for livestock is one per 200 to 400 ha. The development may lead to the loss of one job opportunity. Clearing the land for mining can produce firewood for use by the local community or even sold in the towns and cities to generate an income. This could create employment or business opportunities for the local population. Further, it is estimated that approximately 78 jobs can be created by the mine.	**L**

9.4 Conclusions

The actual loss or sensitivity related to high potential land, grazing land, agricultural production or the loss of farming infrastructure due to the mine is very small and insignificant.

There is a very high unemployment rate in the region, the only jobs available is in the services industry. Establishing the mine will create much needed employment and income for the local people.

10 SUMMARY AND CONCLUSIONS

Cuchron has applied for a mining permit and processing plant on Steamboat 306-MR and Inkom 305-MR to mine and process the graphite.

The entire site is natural vegetation and is used as grazing and browsing for livestock. From the vegetation status it is certain that the land has not been cultivated in the past and that it is virgin land.

Rainfed crop production is not viable and is not practiced due to low rainfall and high summer temperatures.

The growing season is in the summer and follows rain with a dry winter period during which little vegetative growth takes place. The grazing capacity for livestock of the natural veld is estimated at 12 hectares per large stock unit (LSU). The project area is 27 hectares, which is sufficient grazing for 2 LSU.

The northern part of the site is quaternary sands. They are reddish coloured with rocky outcrops where the schist outcrops. All the other soils are on schist, which is metamorphic rock and is the material in which the graphite is captured. Rocky outcrops occur in many places. Dominant soil forms found are Glenrosa, Mispah, Hutton and rock outcrops

Soil use capability on the mining area

The land falls into the non-arable group; it is not suitable for cultivation and should be reserves for livestock and game. The land use capability is Class v, mainly due to soil depth, rockiness and climate.

According to DALRRD the site is classified as 'low/moderate *potential arable land*'. Because of the rock outcrops and shallow soils, coupled with the climatic constraints, this is considered optimistic – dryland crop production on the Project Area is not feasible, unless it the land is irrigated.

Sensitivity analysis

A soil and climate evaluation found that the land is not arable and that the Screening Tool's designation of '*Medium'* is not realistic. It should be '*Low'*.

11 ADDENDA

11.1 References

1) Grieser, J., 2006. Local Climate Estimator. Agromeeoolgy Group, FAO. Rome
2) Grondklassifikasie Werkgroep, 1991. Grondklassifikasie, 'n Taksonomiese sisteem vir Suid Afrika, Departement van Landbou-ontwikkeling, Pretoria.
3) Department of Agriculture, 2019. http://daffarcgis.nda.agric.za/Comp_Atlas_v2/
4) South African Atlas of Agrohydrology and Climatology, Water Research Commission, Pretoria

11.2 Compliance statement in terms of 2014 EIA regulations

I, Dr Andries Gouws, set out below the information, as required the screening tool, published by the Department of the Environment, Forestry and Fisheries (DEFF) in Government Notice 320 of Government Notice 43310 on 20 March 2020 (DEFF Screening Tool).

1. I compiled the Land Capability and Soil Assessment for the proposed mine.
2. I am a qualified soil scientist and land use evaluation specialist and registered with SACNASP in agricultural. My SACNASP registration certificate and CV are attached, which include my contact details and SACNASP registration number.
3. A signed statement of independence is provided in the preamble to the Report.
4. I undertook a sensitivity analyses for the development footprint of the proposed projects, as defined above, in accordance with the DEFF Screening Tool's requirements.
5. There will be no transformation of high potential agricultural land and the land uses will essentially remain the same.
6. Given that the land capability of the Project Area is of a "low" to "medium" sensitivity for agriculture, a compliance statement regarding the Project Area is required under the DEFF Screening Tool, which is set out below.
7. A map showing the Project Area and its present uses is provided in Figure 2;
8. The size of the mining area land is 177 ha. Only the footprints of the opencast mining area will be lost until rehabilitation is completed;
9. The detailed assessment of the farming resources found deviations regarding sensitivity of the site, as indicated on the web-based Screening Tool. The deviations are because the soils have a *low* Capability rating, contrary to the Screening Tool's rating of *low-medium*;
10. Micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities was unnecessary.
11. There are no gaps in information or specific areas of concern that needs of significance.
12. The proposed project is acceptable; and it is recommended that the Department of Mineral Resources and Energy grants the Environmental Application.
13. No specific condition for implementing the proposed mine is required or recommended.

11.3 CV of the author of this report

Dr. Andries Gouws

1. PERSONAL DATA
Family name: Johan Andries Gouws Year of birth: 12 April 1955 Nationality: South African **Contact details:** Tel: +27 12 346 5307 (South Africa) E-mail: index@iafrica.com Country of permanent residence: South Africa

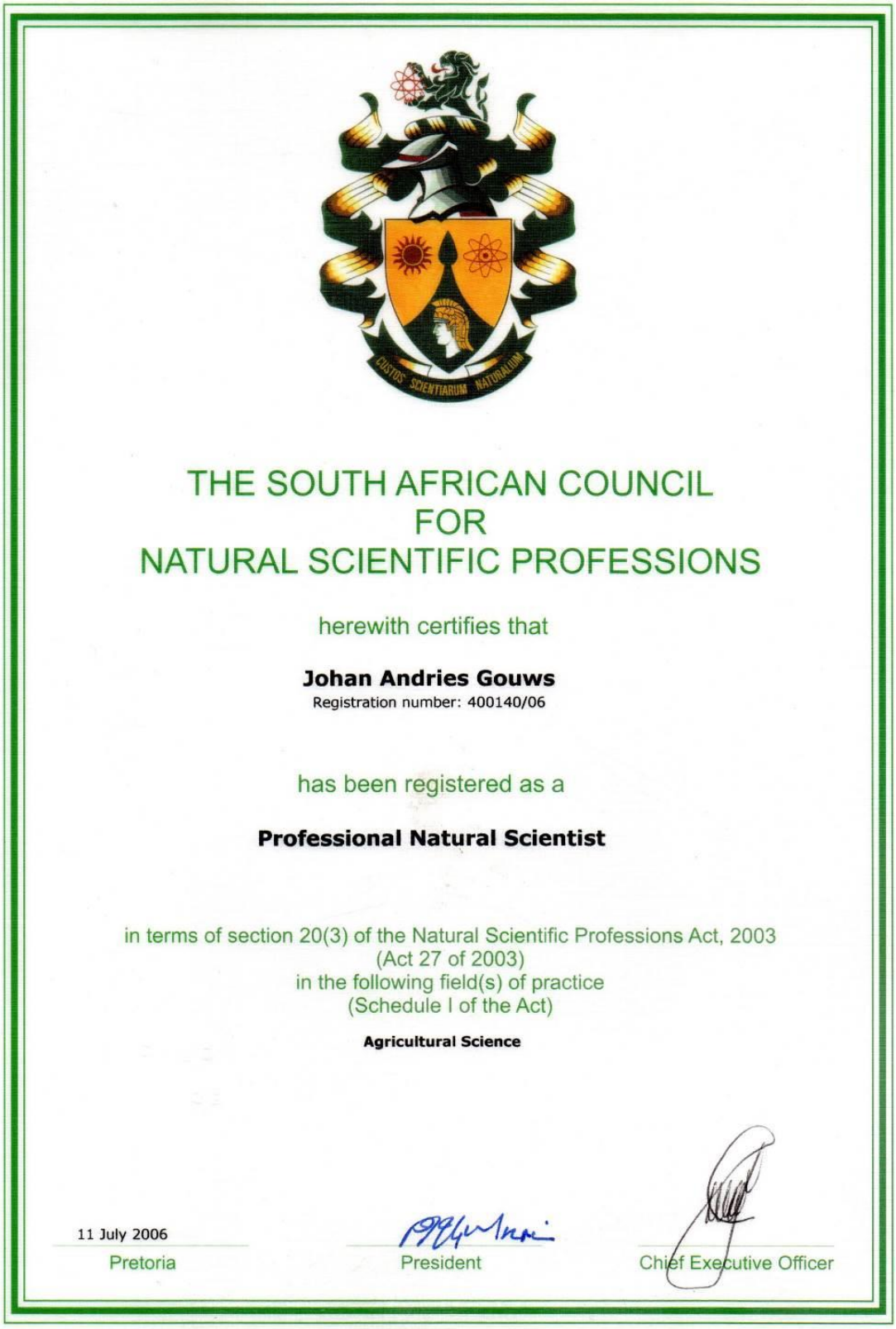
2. EMPLOYMENT RECORD		
Employer's Company Name:	**Period of service and length:**	**Position with the Enterprise:**
Integrated Development Expertise (INDEX)	Since 1993	Managing Director
Barari Forest Management (seconded)	2008 - 2016	Chief Technology Officer
South African Development Trust (STK)	1984 - 1993	Senior agriculturist, agronomy and planning
Eastern Transvaal Cooperative	1979 - 1981	Soil scientist

3. EDUCATION		
Institution	**Length of education**	**Degree/Diploma obtained:**
University of Pretoria, South Africa	1975 - 1979	BSc. Agriculture
University of Bloemfontein	1986 - 1987	BSc. Honours, Agriculture
Potchefstroom Collage for Agriculture	1981	Diploma: Stereoscopic aerial photo interpretation of natural resources for farm planning
University of South Africa	1992	Diploma: Financial management
University of Trinity	2007	PhD: Integrated agricultural development

6. SPECIALIST STUDIES ON AGRICULTURAL POTENTIAL (selected)		
Year:	**Project Name:**	**Name of Client:**
2018	Impact of mining development on agriculture in north-eastern Ekurhuleni	Boston Associates
2018	Agricultural potential study of Portion 21 (portion of portion 1) of the farm Koppieskraal 1157-IR	Adv. Johan du Plessis
2016	Promoting Intensive Agriculture in Ekurhuleni	Ekurhuleni Metro
2013	MSOBO COAL – HARWAR; economic study for the farming enterprises that will be affected by the proposed coal mine. Discussion of the natural resources that influences agricultural potential; Farming and the potential for different enterprises; Indicate the potential income from main enterprises and Indicate the financial impact of the development on the farmers.	DEMACON
2014	Agricultural Impact Assessment for a Proposed Pipeline Between Brandkop 1504 And Leeu Kop (105), Located South-East Of Bloemfontein	Nemai Consulting

J A Gouws

SACNASP registration of the author.



THE SOUTH AFRICAN COUNCIL
FOR
NATURAL SCIENTIFIC PROFESSIONS

herewith certifies that

Johan Andries Gouws
Registration number: 400140/06

has been registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice
(Schedule I of the Act)

Agricultural Science

11 July 2006
Pretoria

President

Chief Executive Officer