

AGRICULTURE

IMPACT OF MINING ON AGRICULTURE: 2 SEAM COAL MINE

Mpumalanga Province

Compiled for

ELEMENTAL SUSTAINABILITY

Compiled by

Dr Andries Gouws

Index

August 2022

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.



1 August 2022

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SUMMARY

Index was appointment by Elemental Sustainability to do an agricultural impact assessment of mining land of 2 Seam Coal Mine in the Mpumalanga Province. This is an existing mine that intends to mine additional land, and, hence, requires authorisation.

The total area assessed was 54 ha.

The only cultivated portion of land that has not been affected by mining is in the far north western part of the survey site. This was classified as Clovelly soil. The rest of the surveyed land consists of shallow derelict land and rehabilitated opencast mined land. The veld's grazing capacity is estimated by the Department as 5 ha per LSU. It is our opinion that due to mining activities that the land is not suitable for grazing purposes.

According to the screening tool, the site has medium sensitivity. There are isolated pockets within the proposed additional opencast mining area that is indicated as high sensitivity. These have recently been mined and as such, are not sensitive. Per implication, the site investigated is low sensitive land.

Specialist site analyses

A detailed agricultural assessment found that the sensitivity is low or medium and has no high sensitivity areas, as found with the tool. The screening tool did not consider watercourses, infrastructure or mined land.

Having taken these into consideration makes the site low sensitivity to farming.

- *There will be no loss of high potential land. No impact and no mitigation required.*
- *No grazing land will be lost. The only portion suitable for grazing is the rehabilitated land. The balance is under mining infrastructure or vacant.*
- *Loss of crop production. There will be a loss of 1,2 ha of cultivated land. The impact is negligible and no mitigation is required.*
- *Loss of animal production. The land is fragmented and not used for animal grazing. Hence, there will be no loss of animal production or income.*
- *No farming infrastructure will be lost. No impact.*

Recommendation

Therefore, no reason could be found not to allow the development.

It is our recommendation that the project be allowed to be implemented.

1 BACKGROUND

Index was appointment by Elemental Sustainability to do an agricultural impact assessment of mining land of 2 Seam Coal Mine in the Mpumalanga Province. This is an existing mine that will mine additional land, and, hence, require authorisation.

The location is indicated in Figure 1.

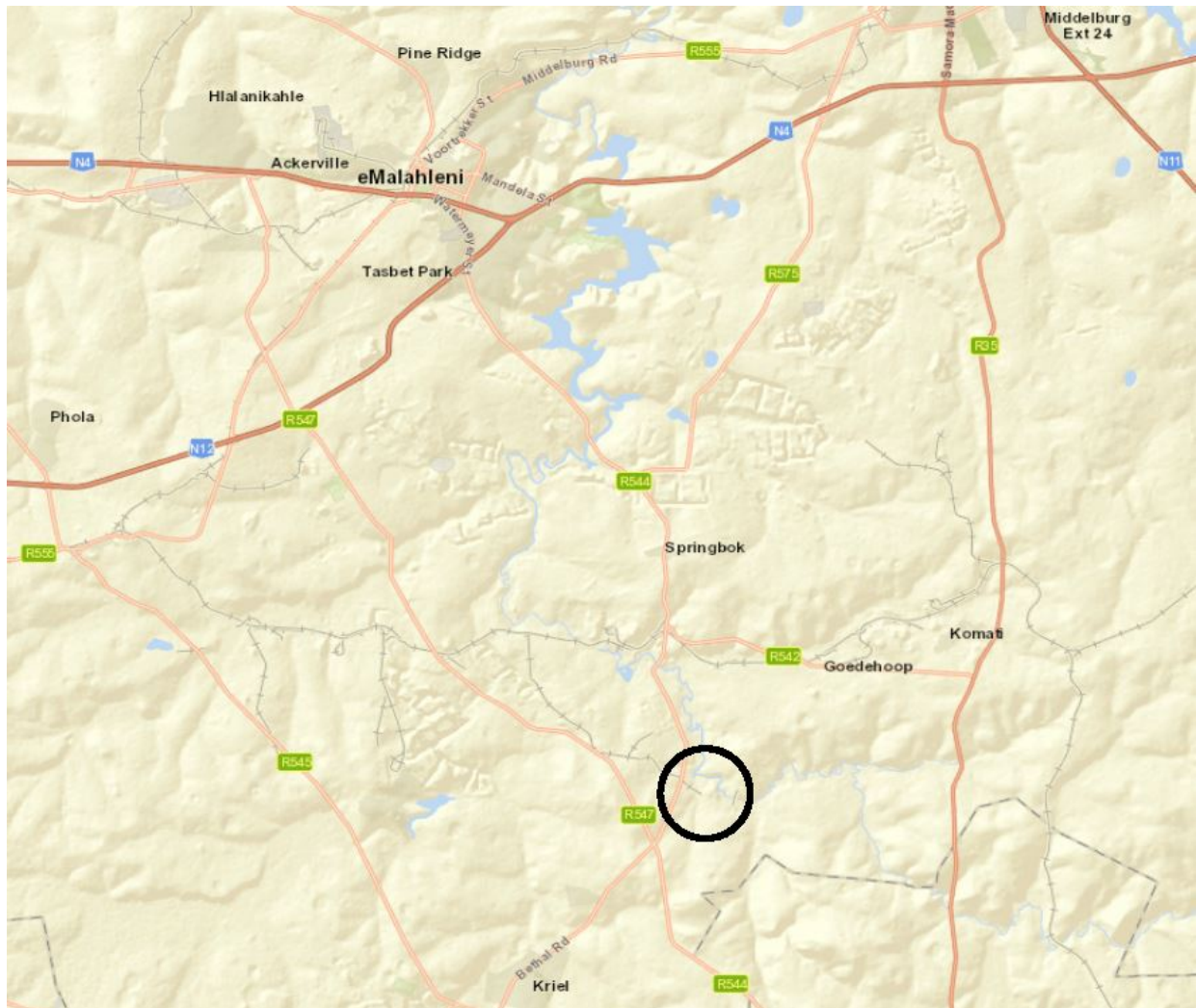


Figure 1. Locality of 2 Seams Coal mine

Five areas will be assessed (see Figure 2).

- Contractor's yard: 3.5 ha
- Opencast Mine: 11 ha
- Coal Wash Plant: 1.25 ha
- 2 PCD: 2 ha
- Tailings Facility: 37 ha

The total area assessed was 54 ha.

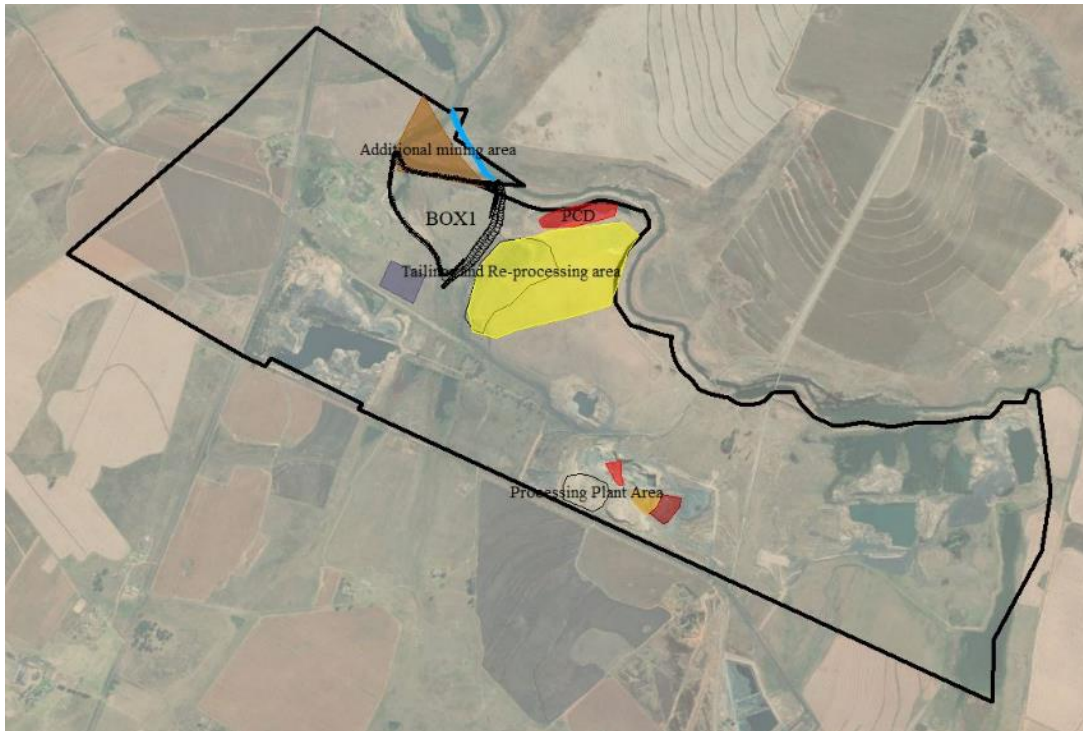


Figure 2. Areas to be evaluated and proposed use

2 METHODS AND PROCEDURES FOR THE SURVEY

Site sensitivity verification

The current use of the land and the environmental sensitivity of the site are available in the screening tool¹, and were used in assessing the site's sensitivity.

- The site sensitivity verification was done through analyses on recent satellite imagery, followed by a site inspection;
- The outcome of the site sensitivity verification is described in this report.

The report will compare the current land use to the environmental sensitivity as identified by the screening tool, including information on new developments or infrastructure, the change in vegetation cover or status etc.; It will further indicate, according to the requirements of the Environmental Impact Assessment Regulations, the differences between the screening tool and the actual status as found by the site visit.

Site evaluation process

The results of this study followed a site visit to 2 Seam Mine on 27 July 2022. Google and Bing images were used as backdrop and the present land uses digitised. The dominant soil types were identified from which a generalised soil map was prepared.

Vegetation was simultaneously logged to determine veld condition. Grazing capacity of the natural veld is as indicated by DALRRD and then adapted to present veld conditions.

The land capability classification is done according to the guidelines published on the AGIS website of the NDA (Department of Agriculture, 2019).

Climate data was obtained from SA Weather and other on-line sources available on the internet.

¹ <https://screening.environment.gov.za/screeningtool>.

3 SITE EVALUATION

3.1 Present land uses

Site land uses

The mining right land is mostly under mining activities. There are small portions that are vacant and used for farming. Approximately 1,2 hectares is planted to summer grains.

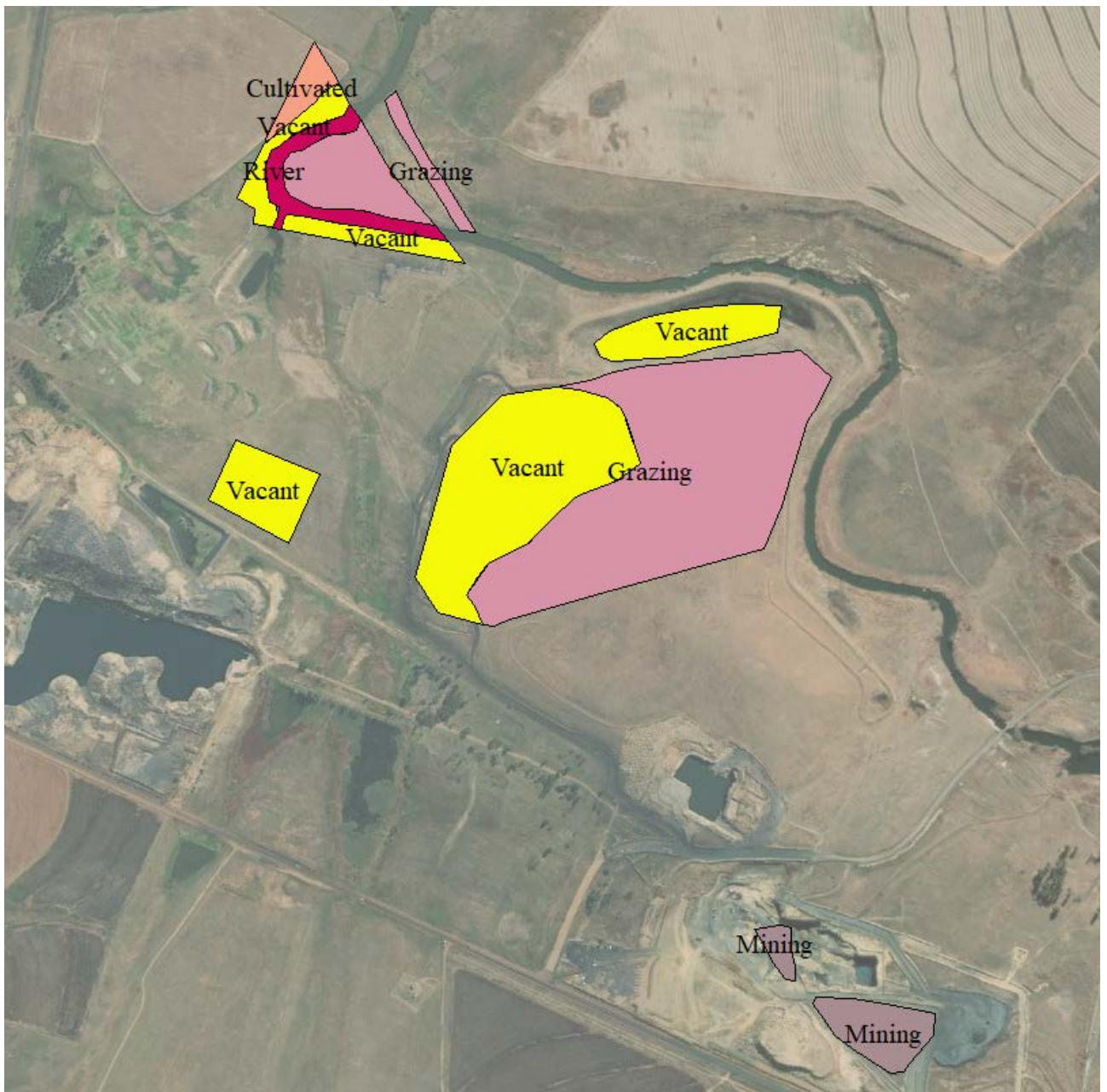


Figure 3. Present land uses

Regional land uses

General uses within 5km of the site include mining, grazing and cultivated land.

The regional land uses are indicated in Figure 4. The area in green is mining land, grey is cultivated and that in rose is vacant or used as grazing.

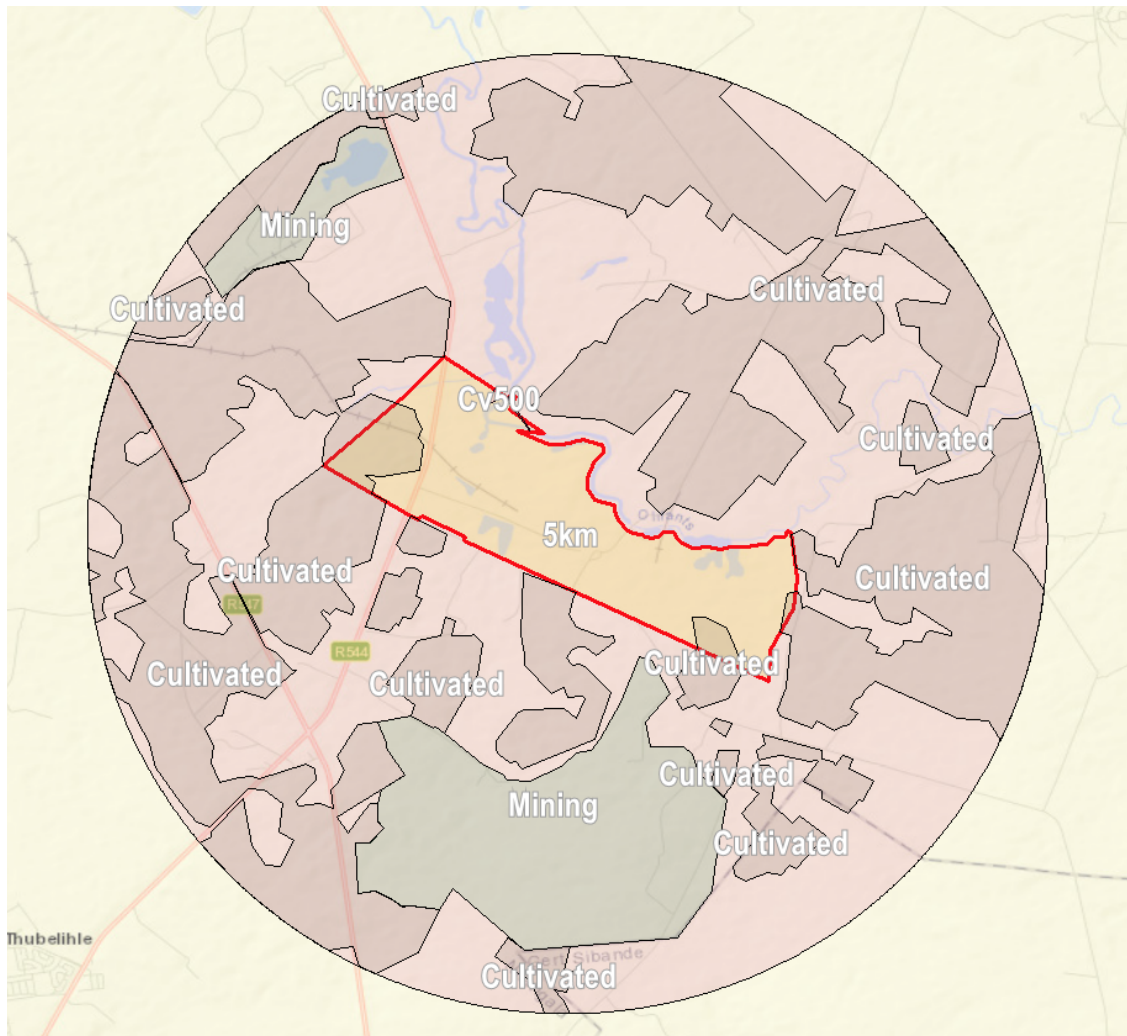


Figure 4. Regional land uses

3.2 Climate

The region is suitable for rainfed agriculture.

3.3 Soil

The land has been used for mining for some time. The only portion that has not been affected by mining is in the far north western part of the survey site. This was classified as Clovelly soils. The rest of the surveyed land consists of shallow derelict land and rehabilitated mined land.

The soil map and description of the dominant soils are provided in Figure 5.

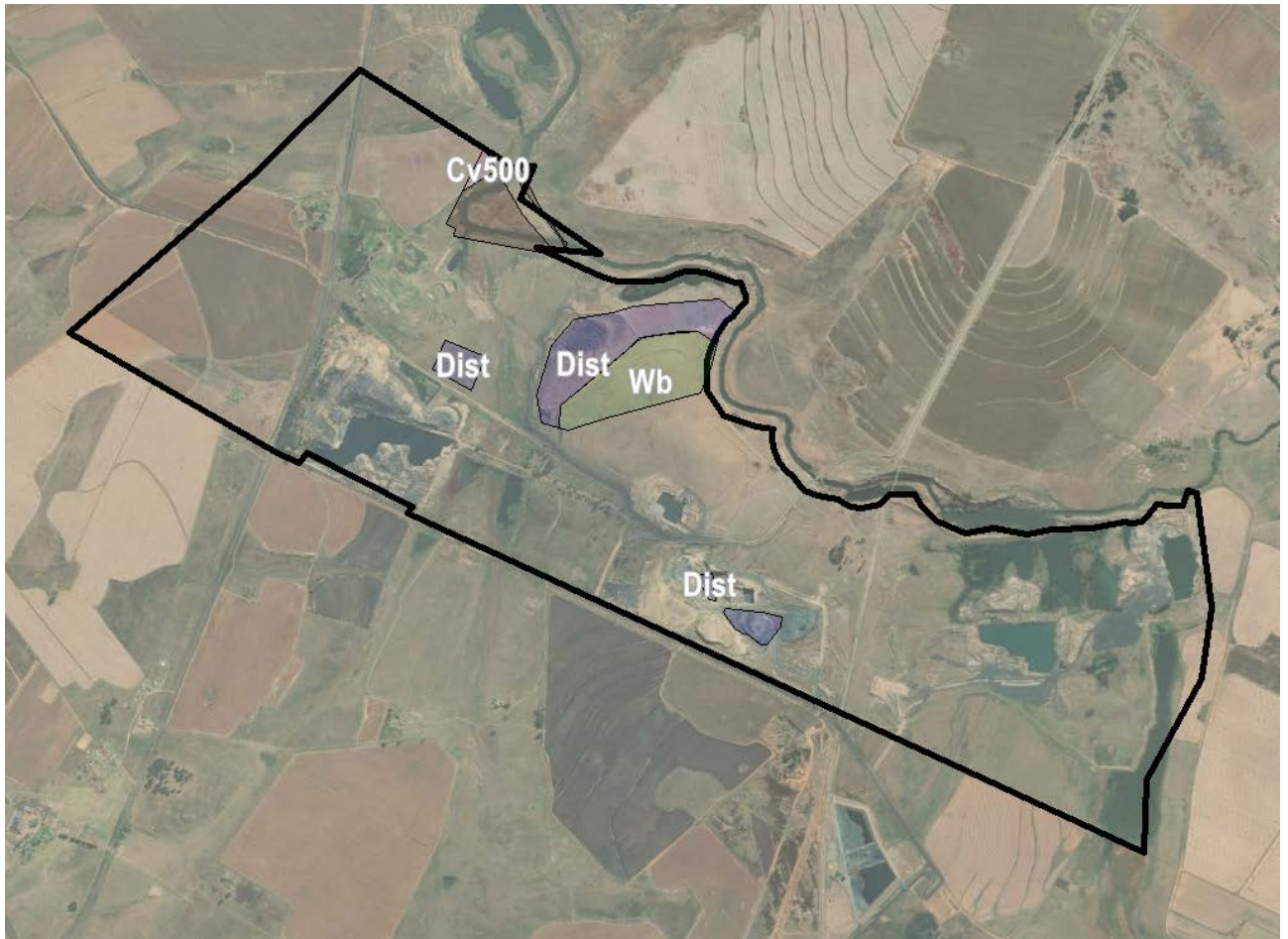


Figure 5. Soil types on the development areas

Table 1. Soil descriptions

Map unit	Description
Cv800	Sandy soil with a clay content of 18 - 28%. The soil depth that is normally more than 600 mm. The topsoil is light brown with a grain structure. The topsoil is free of stones or nodules. The subsoil is yellowish brown coarse sandy loam with poorly developed blocky or grain structure. The deeper subsoil can be ferricrete or have hard ferricrete nodules. The dominant soil forms identified are Clovelly and Glencoe.
Wb	Rehabilitated land that is still in process of development. The soil type is Witbank.
Wetland	Moderately deep and shallow black and dark grey clay soils and waterlogged areas. These soils have strongly developed expansive properties with prismatic structures. The subsoil is gleyed. This soil should not be cultivated but be left as natural grazing.
Dist	This unit is disturbed land where mining is taking place.

3.4 Vegetation

Veld condition is moderate to poor. It is currently in its pioneer state.

The veld's grazing capacity is estimated by the Department as 5 ha per LSU. It is our opinion that due to mining activities that the land is not suitable for grazing purposes.

3.5 Water

There is no water abstracted for irrigation purposes. The Klein Olifants River forms the Northern boundary.

4 PROPOSED DEVELOPMENT

The areas are proposed to extend the mining activities.

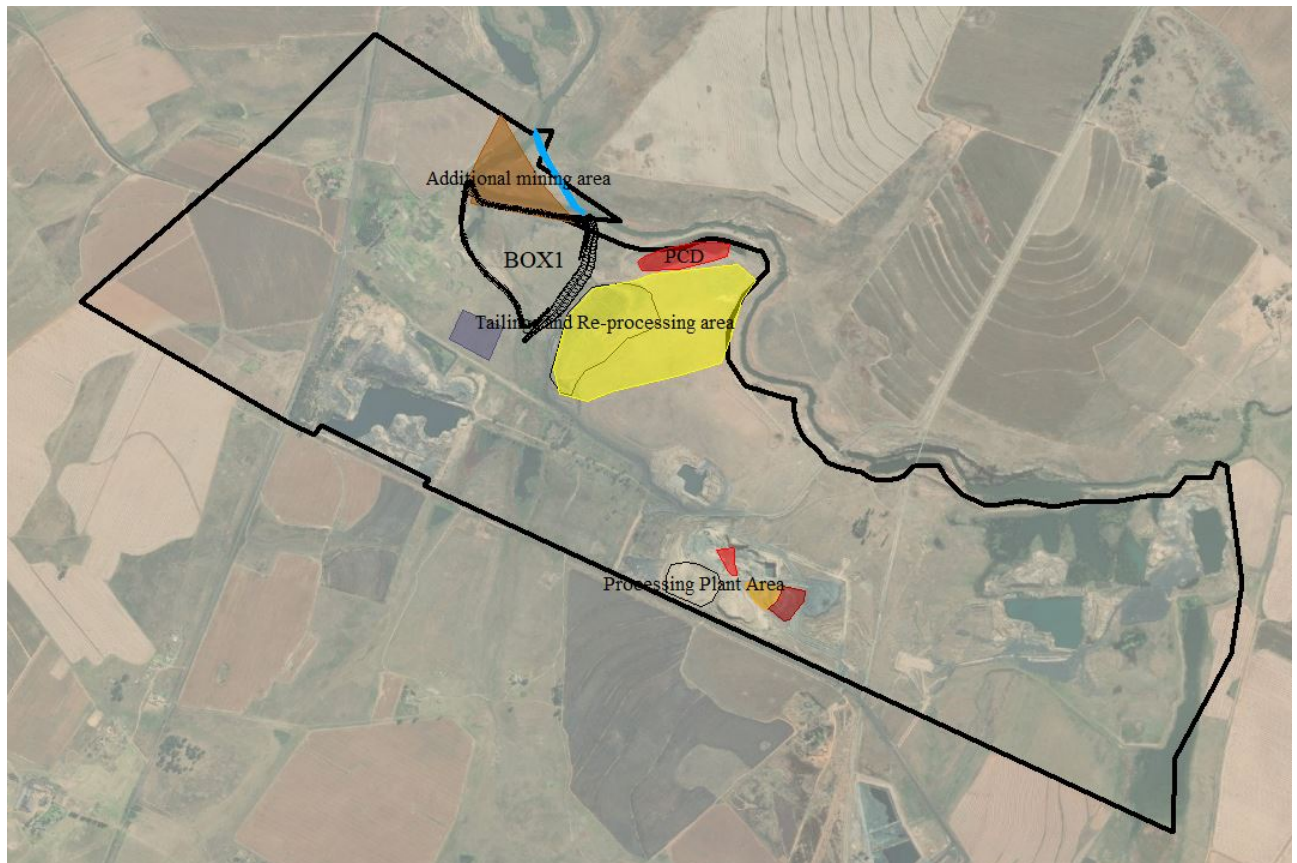


Figure 6. Site layout

5 SENSITIVITY ANALYSES

5.1 Ecological sensitivity – screening tool

Background

The Department of Environmental Affairs published Notice 320 in 2020 that describes the minimum criteria when applying for environmental authorisation.

This protocol provides the criteria for the assessment and reporting of impacts on agricultural resources for activities requiring environmental authorisation. The assessments requirements of this protocol are according to the level of environmental sensitivity as indicated by the national web-based environmental screening tool for agricultural resources. It is based on the most recent land capability evaluation as provided by DALRRD.

An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of “very high” or “high” sensitivity for agricultural resources must submit an Agricultural Agro-Ecosystem Specialist Assessment unless:

- the application is for a linear activity for which impacts on the agricultural resource are temporary and the land in the opinion of the soil scientist or agricultural specialist, based on the mitigation and remedial measures, can be returned to the current land capability within two years of the completion of the construction phase;
- the impact on agricultural resources is for an electricity pylon; or
- information gathered from the site sensitivity verification *differs from the designation*.

According to the screening tool, the site has *medium sensitivity*. There are isolated pockets within the proposed additional mining area that are indicated as *high sensitivity*. These have recently been mined and as such, are not sensitive in terms of agriculture.



Figure 7. Results of the Screening tool

5.2 Specialist site analyses

According to the guidelines of the protocol, for the assessment and minimum report content for EIA impacts on agricultural resources, the following applies:

A detailed assessment found that the sensitivity is low or medium which is a variation to the findings of the screening tool.. Provision 1.1.3 in the Protocol applies, which requires the specialist to submit an *Agricultural Compliance Statement*. This statement is provided in Section 5.3.

The following will evaluate the land proposed for the development.

Land use capability

The soil on the property is arable but no water is available for irrigation (*Department of Agriculture, 2019*). Land capability classes are interpretive groupings of land with similar potential and limitations or similar hazards.

The classic eight-class land capability system (Klingebiel & Montgomery, 1961) was adapted for use by the South African Department of Agriculture in their Agriculture Geographic Information System (AGIS).

Land capability is classified according to guidelines published by the National Department of Agriculture 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. At the same time, it indicates the permanent limitations associated with the different land-use classes (refer to Table 3).

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

Note: the shaded area indicates the suitable land use.

Findings

The following were found:

- Medium capability cropping land (Class iii) occurs in the northern western portion of the land. The size is approximately 1,2 ha.
- The balance is low capability (Classes iv and lower).
- The land capability was then used as input to determine agricultural sensitivity.

Conclusions

The screening tool did not consider watercourses, infrastructure, excavations and mines land.

Having taken these into consideration makes the site *low sensitive* to farming.

5.3 Specialist declaration

Agricultural compliance statement

- SACNASP registration of specialist and a curriculum vita – Refer to Paragraph 9.2;
- A signed statement of independence by the specialist – Refer to Paragraph 1;
- The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment. The main criteria for farming potential are soils, climate and water availability. These are not bound to seasons;
- For the description of the methodology used to undertake the on-site assessment: Refer to Paragraph 2;
- The proposed development includes the sites indicated in Figure 6;
- The site falls in a mining area. There are various mines in close proximity of the site;
- Confirm that the site is of *low* or *medium* sensitivity for agriculture. Refer to Section 5. The site used to place the infrastructure has *low* or *medium* sensitivity. The proposed development will, therefore have negligible impact on the agricultural production capability Refer to Sections 3.4 and 5.2.
- A map showing the proposed development footprint (including supporting infrastructure) overlaid on the agricultural sensitivity map is provided in Section 5;
- Confirmation that all reasonable measures have been taken through micro placement to avoid or minimise fragmentation and disturbance of agricultural activities. Only small isolated pockets will be developed. The only land that is still used for farming purposes is the cultivated land in the north western part of the site. The size is 1,2 hectares, which is so small that it will not influence the adjacent land;
- A statement from the soil scientist or agricultural specialist on the acceptability of the proposed development and a recommendation on the approval of the proposed development: The site is not located on any high potential land. The site survey also found that the grazing land is fragmented portions that is and vacant because it falls into the larger mining land. Therefore, no reason can be found not to allow the development. It is our recommendation that the project be approved for implemented;
- There are no conditions to which the statement is subjected;
- No gaps in knowledge or data were found that would influence the findings or recommendations.

6 CONCLUSIONS AND RECOMMENDATIONS

The screening tool indicates very small portions of *high sensitivity* land. This is now mined.

A detailed assessment found that the sensitivity is low and that there is no medium or high sensitivity land as indicated by the tool.

The screening tool did not consider watercourses, infrastructure or mined land. Having taken these into consideration makes the site low sensitive to farming.

- There will be no loss of high potential land. No impact and no mitigation is required.
- No grazing land will be lost. The only portion suitable for grazing is the rehabilitated land. The balance is under mining infrastructure and vacant.
- Loss of crop production. There will be a loss of 1,2 ha of cultivated land. The impact is negligible and no mitigation is required.
- Loss of animal production. The land is fragmented and not used for animal grazing. Hence, there will be no loss of animal production or income.

- No farming infrastructure will be lost. No impact.

Recommendation

- The development is not located on any high potential land.
- The site survey also found that the grazing land is too small or inaccessible.

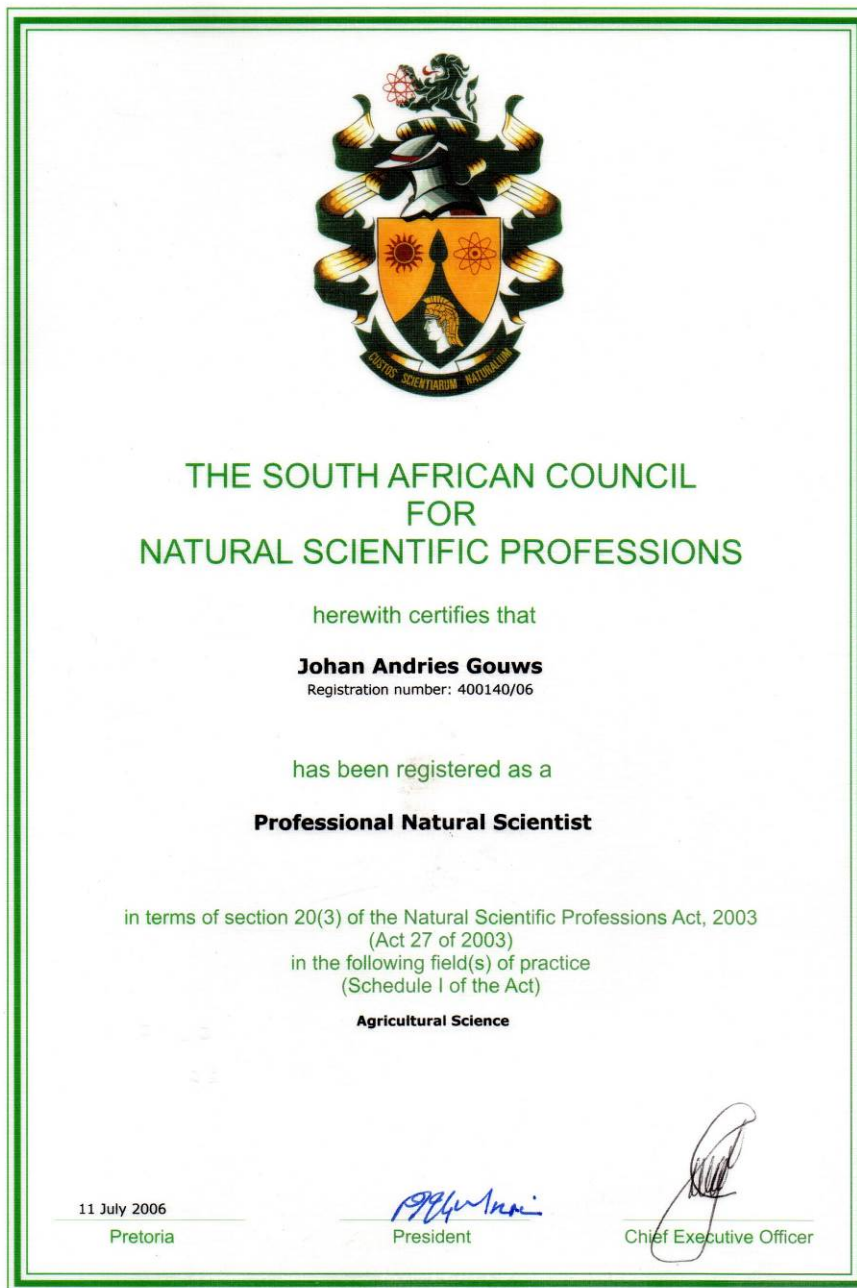
Therefore, no reason can be found not to allow the development. It is our recommendation that the project be allowed to be implemented.

7 ADDENDA

7.1 Sources of information

- a) Criteria for high potential agricultural land in South Africa, Department of Agriculture, Directorate Land Use and Soil Management, 2002.
- b) Grondklassifikasie Werkgroep, 1991. Grondklassifikasie, 'n Taksonomiese sisteem vir Suid Afrika, Departement van Landbou-ontwikkeling, Pretoria.
- c) Department of Agriculture. Grazing capacity. Development of Agricultural Land Framework Bill , 2016
- d) WRC, 2003 South African Atlas of Agrohydrology and Climatology, Water Research Commission
- e) CROPWAT 8.0 has been developed by Joss Swennenhuis for the Water Resources Development and Management Service of FAO.

7.2 SACNASP certificate



7.3 Photos



