



SOIL AND AGRICULTURAL COMPLIANCE STATEMENT FOR THE PROPOSED TETRA4 PRODUCTION RIGHT EXTENSION PROJECT

**Matjhabeng and Masilonyana Local Municipalities,
Free State Province, South Africa**

6/3/2024

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax : +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com




Report Name	SOIL AND AGRICULTURAL COMPLIANCE STATEMENT FOR THE PROPOSED TETRA4 PRODUCTION RIGHT EXTENSION PROJECT	
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Fieldwork & Report Writer	Masilabela Seepamore (SACNASP 113907)	
Reviewer	Andrew Husted (SACNASP 400213/11)	
Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. We have no conflicting interests in the undertaking of this activity and have no interest in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time, and budget) based on the principals of science.</p>	

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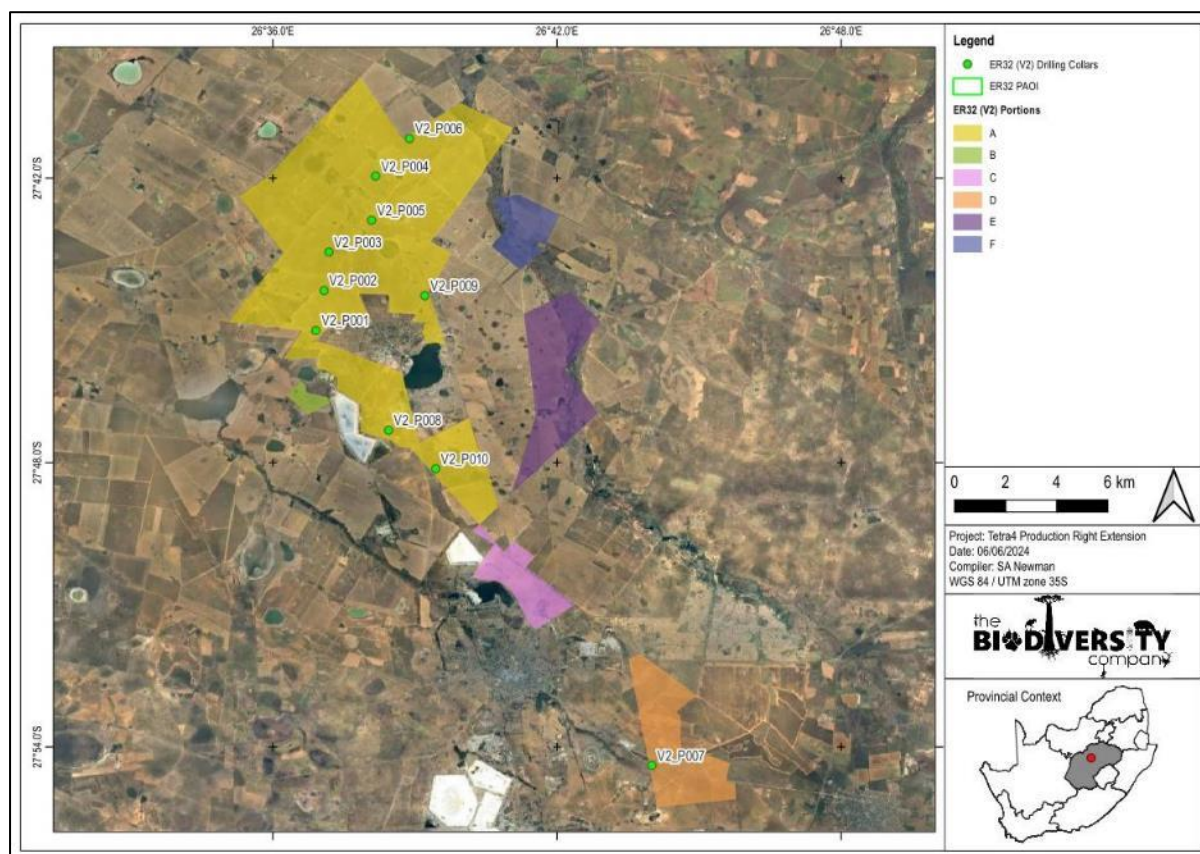


Figure 1-2 The proposed ER32 Drilling Collars

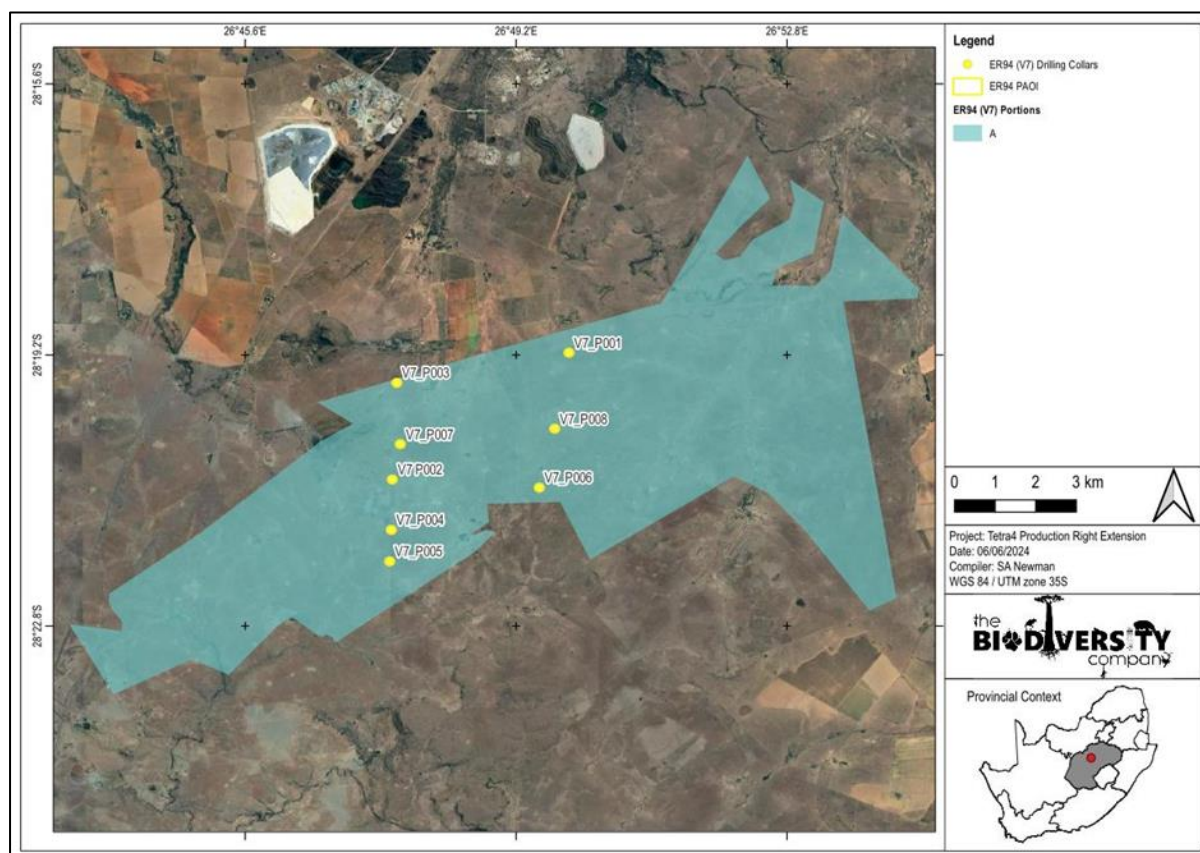


Figure 1-3 The proposed ER94 Drilling Collars

This report aims to present and discuss the findings from the soil resources identified within the 50 m buffered area. The report will also identify the soil suitability and land potential of these soils, the land uses within the assessment area and the risks associated with the proposed project.

This report should be interpreted after taking into consideration the findings and recommendations provided by the specialist (Section 4 of this report). Further, this report should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the soil resources of the proposed project.

1.2 Project Description

Tetra4 is the operator and holder of existing Exploration Rights (ERs) and a Production Right (PR), in the Matjhabeng and Masilonyana Local Municipalities, in terms of the Mineral and Petroleum Resources Development Act (No. 28 of 2002 - MPRDA). In 2012, a Production Right (Ref: 12/4/1/07/2/2) was granted which spans approximately 187 000 hectares for the development of natural gas (Helium and Methane) production operations around the town of Virginia in the Free State Province. Within the approval of the Production Right, the 2010 Environmental Management Programme (EMPr) was approved which is applicable to a large portion of the Production Right area.

The activities in the Production Right include:

- Continued exploration activities;
- Drilling and establishment of further production wells throughout the entire production area (260 production wells);
- Installation of intra-field pipelines throughout the entire production area (~500km);
- Installation of boosters and main compressors; and
- Central gas processing plant (not approved in the original EIA and approved EMPr).

On 21 September 2017, the Department of Mineral Resources and Energy (DMRE) issued an integrated environmental authorisation ("Cluster 1 EA") (reference: 12/04/07) to Tetra4 in terms of the NEMA. The Cluster 1 EA (as amended by Cluster 1 EA amendments dated 26 August 2019 and 1 September 2020) authorises the development of "Cluster 1" of the Project. In this EA approval, various new wells and pipelines, booster and compressor stations, a Helium and LNG Facility and associated infrastructure was approved which comprises the first gas field for development within the approved Production Right area. The Cluster 1 EA also authorises certain waste management activities as per the List of Waste Management Activities (Government Notice 921, as amended) published under the National Environmental Management: Waste Act 59 of 2008 (NEMWA).

On 13 July 2023, the Department of Mineral Resources and Energy (DMRE) issued an integrated environmental authorisation ("Cluster 2 EA") (reference: 12/04/007) to Tetra4 in terms of the NEMA. The Cluster 2 EA authorises the development of "Cluster 2" of the Project. The Cluster 2 EA authorised up to 300 new production wells, gas transmission pipelines and associated infrastructure, 3 compressor stations and an additional new combined Liquid Natural Gas (LNG) and Liquid Helium (LHe) plant ("LNG/LHe Plant") and associated infrastructure, as well as powerlines as part of the Cluster 2 expansion of the Project in order to meet the future production requirements. The Cluster 2 EA also authorises certain waste management activities as per the List of Waste Management Activities (Government Notice 921, as amended) published under the National Environmental Management: Waste Act 59 of 2008 (NEMWA).

Tetra4 was granted two Exploration Rights (ER32 and ER94) in 2015/2016 which span combined area of approximately 18 700 hectares for the development of natural gas (Helium and Methane) exploration operations near the towns of Theunissen / Winburg and Odendaalsrus / Allanridge in the Free State Province. Further to the above project history and resource tenure background, Tetra4 now wishes to consolidate the two ERs into the greater PR area. The consolidation of the ERs into the PR area will include the drilling of up to 18 exploration wells. This consolidation will incorporate ~78 farm portions

near the towns of Theunissen and Winburg in the south of the PR area and Odendaalsrus and Allanridge in the north of the PR area (comprising the Exploration Rights) into the Production Right. The ER32 located north of the Production Right is approximately 7.2 km Northwest of Welkom and the ER94 to the south of the Production Right is approximately 19.2 km South of Virginia. An MPRDA Section 102 application shall be lodged to consolidate ER 32 and ER 94 (with associated exploration activities) into the Production Right and this process will also require an Environmental Authorisation application in terms of the National Environmental Management Act (Act 107 of 1998).

1.3 Scope of Work

In addition to the requirements stipulated in GNR 320, the following Terms of Reference apply to the Agricultural Compliance Statement:

- Ensure a thorough assessment, which includes both the desktop assessment of databases and aerial photography; a description of the on-site verification of the agricultural potential of the area; and the soil forms present in the development area;
- Identify and assess potential impacts on both agricultural potential and soil resulting from the proposed project;
- Identify and describe potential cumulative soil, agricultural potential and land capability impacts resulting from the proposed project in relation to proposed and existing developments in the surrounding area; and
- Recommend mitigation, management, and monitoring measures, to minimise impacts and/or optimise benefits associated with the proposed project.

1.4 Assumptions and Limitations

The following aspects were considered as limitations;

- Only the slopes affected by the proposed development have been assessed;
- It has been assumed that the extent of the development area provided by the responsible party is accurate;
- The GPS used for ground truthing is accurate to within five meters. Therefore, the soil and the observation site's delineation plotted digitally may be offset by up to five meters to either side; and
- No heavy metals have been assessed nor fertility been analysed for the relevant classified soils.

1.5 Key Legislative Requirements

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GNR 320). This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (NEMA).

The above mentioned are supported by additional legislation that aims to manage the impact of development on the environment and the natural resource base of the country. Related legislation to this effect includes:

- Conservation of Agricultural Resources Act (Act 43 of 1983);

- Environment Conservation Act (Act 73 of 1989);
- National Environmental Management Act (Act 107 of 1998); and
- National Water Act (Act 36 of 1998).

1.6 Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on soil and agricultural assessment as per the Government Notice 320 published in terms of NEMA, dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" – the following has been assumed:

- 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:
 - "Low sensitivity" for agriculture, must submit an Agricultural Compliance Statement.

An Agricultural Compliance Statement must contain the information as presented in Table 1-1 below.

Table 1-1 *Agricultural Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report*

Information to be Included (as per GN 320, 20 March 2020)	Report Section
details and relevant expertise as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the statement including a curriculum vitae	Page i, Appendix C
a signed statement of independence by the specialist	Appendix B
a map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool	Section 3.3 or Figure 3-12 and Figure 3-13
confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities	Section 4
a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development	Section 4.2
any conditions to which this statement is subjected	Section 4.3
where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMP	Section 4.1
a description of the assumptions made and any uncertainties or gaps in knowledge or data	Section 1.5

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

2 Fieldwork

Field assessment for the proposed project area was conducted on the 4th to the 5th of June 2024, to determine the soil forms and current land uses within the assessed area (Figure 2-1).

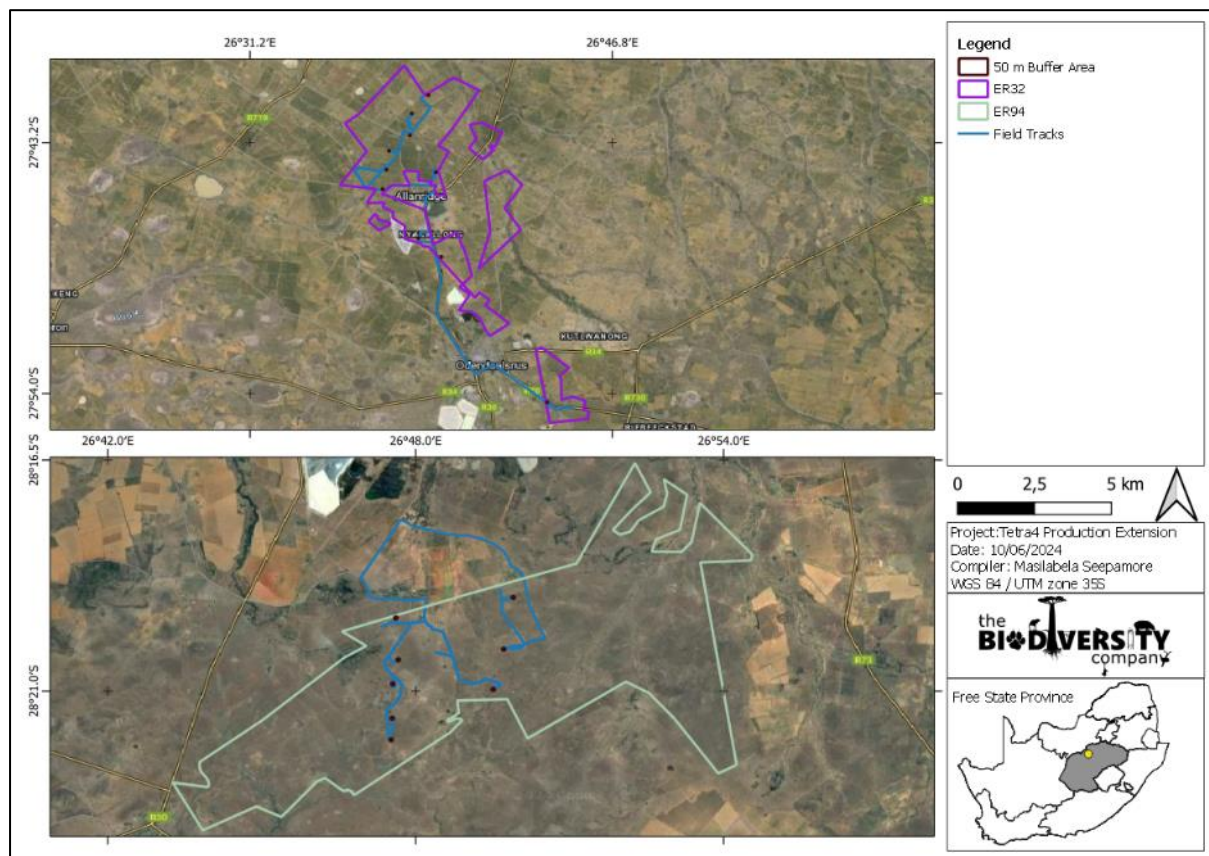


Figure 2-1 Map illustrating the field tracks of the field survey

3 Results and Discussion

3.1 Desktop Information

3.1.1 Climate

The project area falls within the Central Free State Grassland, Vaal-Vet Sandy Grassland and Western Free State Grassland vegetation. It is characterised with a summer rainfall and high occurrence of frosty in winter months (43 days on average). The overall mean average precipitation (MAP) of the proposed project area is approximately 560 mm (Mucina & Rutherford, 2006; Figure 3-1).

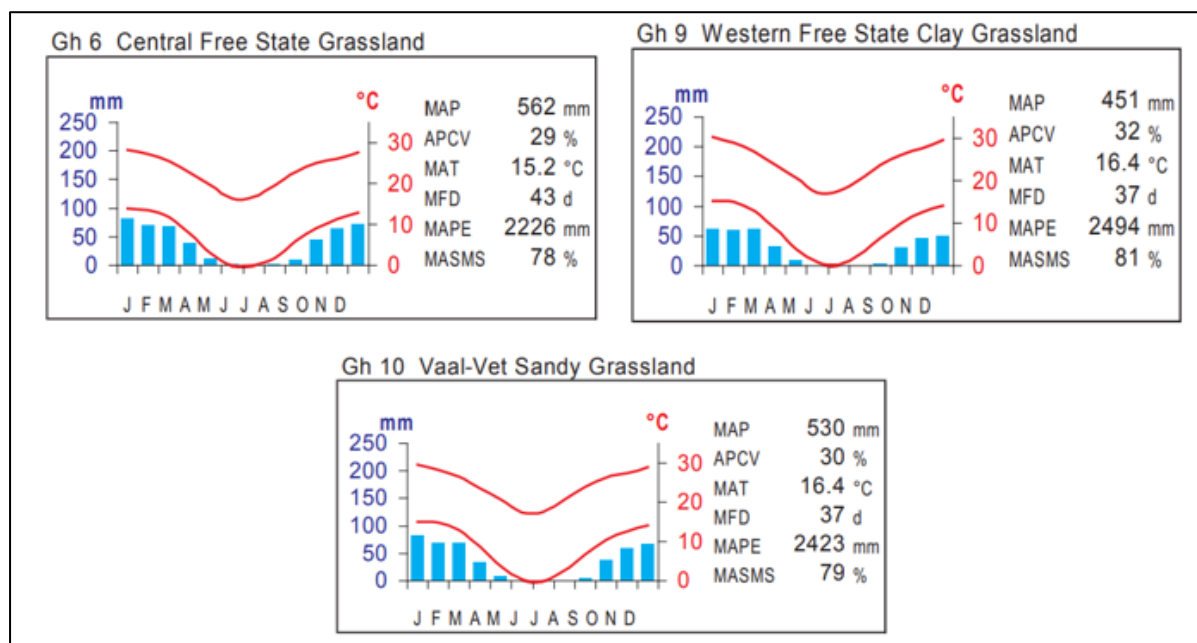


Figure 3-1 Summarised climate for the region (Mucina & Rutherford, 2006)

3.1.2 Geology & Soils

The geology of the area includes deposits, sedimentary, and Aeolian and Colluvial of sandstone, mudstone and shale of various formation mainly, Volksrust Formation of the Ecca Group, and Adelaide Subgroup (Beaufort Group, Karro Subgroup). The geology supports numerous soils ranging from dry clayey, duplex soils typical of the land types Da, Db, Dc and Fc, Vertic, Melanic and red soils of the Dc land type, and lastly the Avalon, Westleigh and Clovelly soils found in the Bd, Bc, Ae and Ba land types.

According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment area to be focused on mainly falls within the Ae 40, Bd 18, Dc 9, Dc 12 and Ea 41 land types (Figure 3-2). The Ae 40 land type mainly consists of Hutton, Mispah, Katspruit and Rensburg soil forms according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Bd 18 land type mainly consists of Avalon, Oakleaf and Dundee Rensburg soil forms according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Dc 9 land type mainly consists of Hutton, Swartland, Katspruit and Willowbrook soil forms according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Dc 12 land type mainly consists of Mispah, Swartland, Bonheim, Oakleaf soil form and the occurrence of rocky areas, according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Ea 41 land type consists mainly of Mispah, Glenrosa, Bonheim soil forms and the occurrence of rocky areas, according to the Soil classification working group (1991), with the occurrence of other soils within the landscape.

In addition, the Ae 40 land type is also characterised by red-yellow, freely drained soils; red, high base status greater than 300 mm deep (no dunes). The Bd 18 land type is also characterised by plinthic catena: upland and margaritic soils rare; eutrophic; red soils not widespread. The Dc land types is also characterised by prisma-cutanic and/or pedocutanic diagnostic horizons dominant; in addition, one or more of: vertic, melanic, red structured diagnostic horizons. The Ea 41 land type is also characterised by one or more of: vertic, melanic, red structured diagnostic horizons; undifferentiated. The land terrain units for the featured land type are illustrated in the below tables and figures.

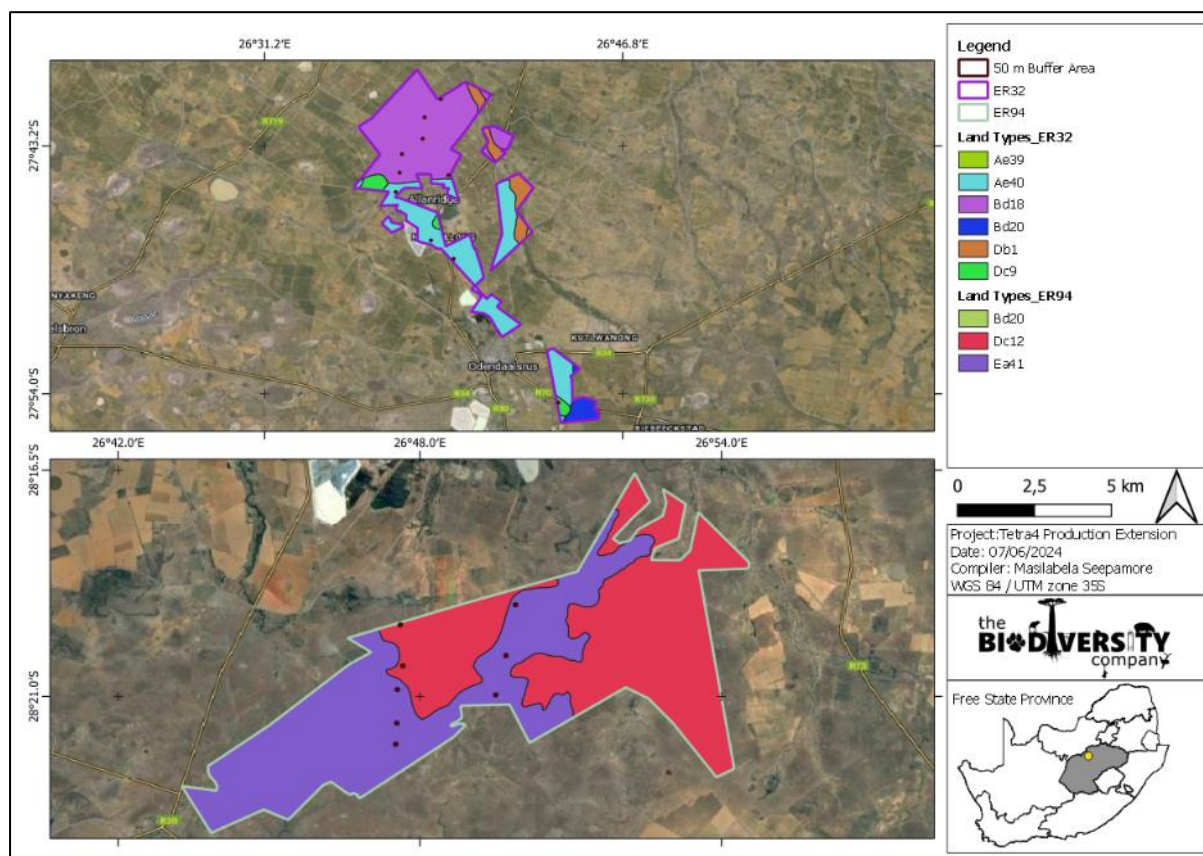


Figure 3-2 Land type associated with the proposed project area

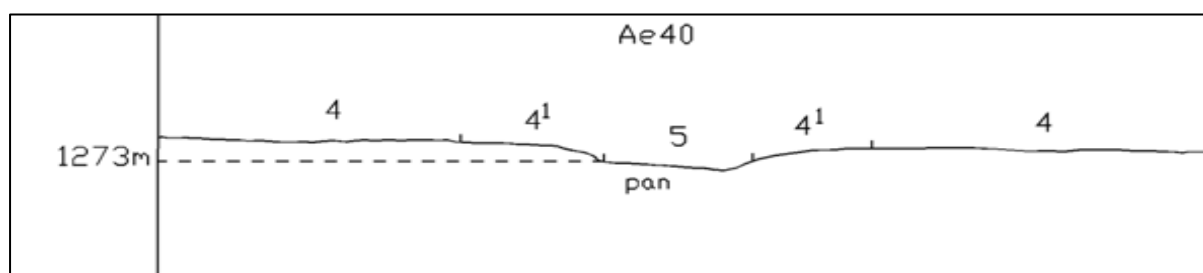


Figure 3-3 Illustration of land types of Ae 40 terrain units (Land Type Survey Staff, 1972 – 2006)

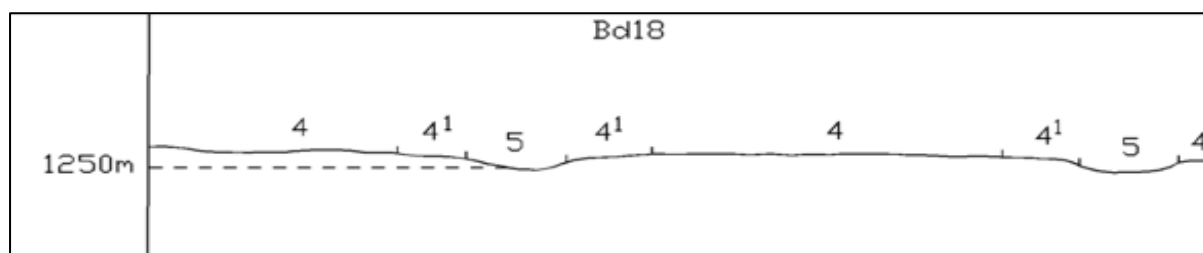


Figure 3-4 Illustration of land types of Ae Bd 18 terrain units (Land Type Survey Staff, 1972 – 2006)

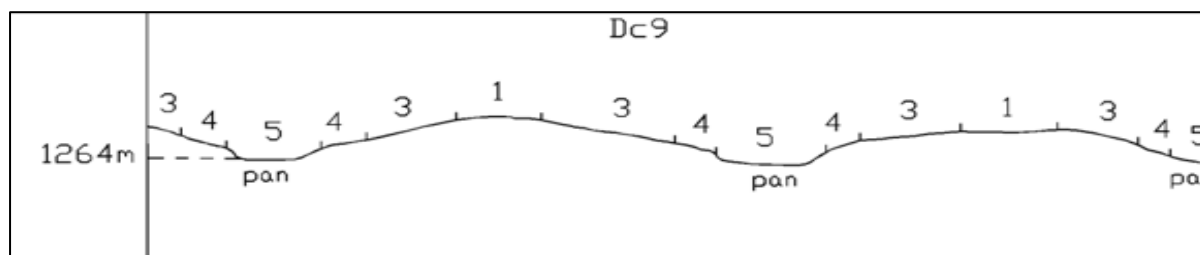


Figure 3-5 Illustration of land types of Dc 9 terrain units (Land Type Survey Staff, 1972 – 2006)

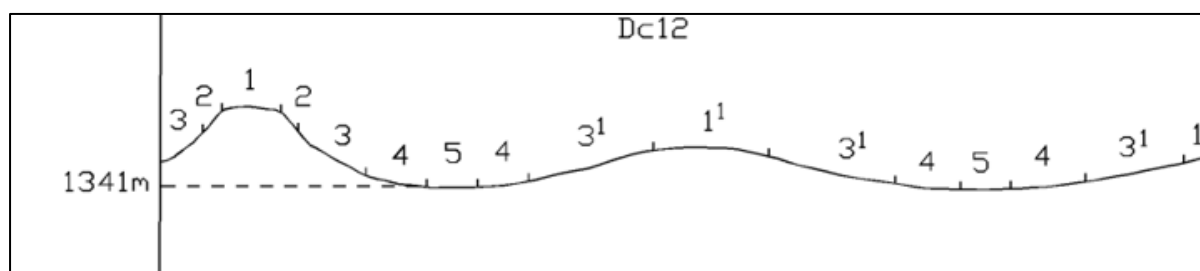


Figure 3-6 Illustration of land types of Dc 12 terrain units (Land Type Survey Staff, 1972 – 2006)

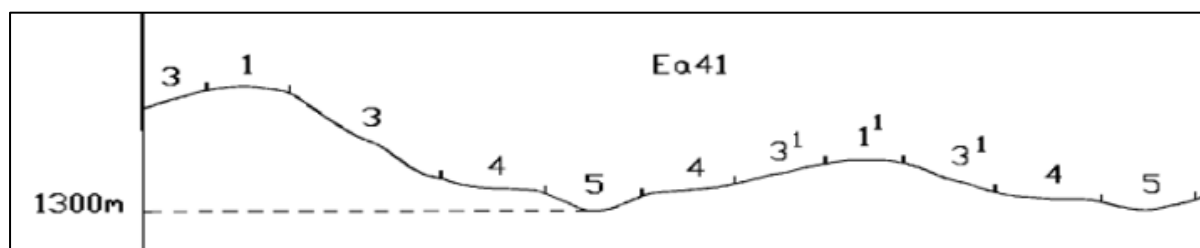


Figure 3-7 Illustration of land types of Ea 41 terrain units (Land Type Survey Staff, 1972 – 2006)

Table 3-1 Soils expected at the respective terrain units within the Ae 40 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units					
4 (92%)		4 (1) (4%)		5 (4%)	
Hutton	89%	Mispah	50%	Katspruit, Rensburg	75%
Clovelly	6%	Swartland	25%	Swartland	25%
Bainsvlei	2%	Oakleaf	25%		
Avalon	3%				

Table 3-2 Soils expected at the respective terrain units within the Bd 18 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units					
4 (84%)		4 (1) (12%)		5 (4%)	
Avalon	72%	Oakleaf	42%	Dundee	75%
Hutton	10%	Sterkspruit	29%	Sterkspruit	13%
Clovelly	8%	Valsrivier	29%	Valsrivier	12%
Westleigh	4%				

Longlands, Kroonstad	2%				
Glenrosa	2%				
Mispah	1%				
Bare Rocks	1%				

Table 3-3 Soils expected at the respective terrain units within the Dc 9 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units							
1 (10%)		3 (27%)		4 (41%)		5 (22%)	
Hutton	100%	Hutton	88%	Swartland	28%	Katspruit, Willowbrook	91%
		Clovelly	11%	Valsrivier	24%	Valsrivier	5%
		Oakleaf	1%	Oakleaf	23%	Arcadia	2%
				Sterkspruit	17%		
				Arcadia	4%		
				Estcourt	3%		
				Mispah	1%		

Table 3-4 Soils expected at the respective terrain units within the Dc 12 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units													
1 (3%)		3 (1) (20%)		2 (1%)		3 (6%)		3 (1) (38%)		4 (24%)		5 (8)	
Bare Rocks	33%	Mispah	37%	Bare Rocks	60%	Bare Rocks	33%	Swartland	34%	Bonheim	29%	Oakleaf	41%
Mayo	23%	Swartland	19%	Mispah	30%	Mayo	25%	Mispah	18%	Swartland	27%	Katspruit	27%
Mispah	21%	Glenrosa	13%	Glenrosa	10%	Swartland	17%	Bonheim	14%	Valsrivier	15%	Stream Beds	13%
Glenrosa	13%	Westleigh	12%			Mispah	17%	Valsrivier	9%	Arcadia	15%	Valsrivier	6%
Swartland	10%	Mayo	6%			Glenrosa	8%	Glenrosa	7%	Mispah	4%	Bonheim	5%
		Bonheim	5%					Arcadia	7%	Sterkspruit	4%	Arcadia	4%
		Bare Rocks	3%					Westleigh	5%	Mayo	3%	Mayo	4%
		Valsrivier	3%					Mayo	3%	Glenrosa	2%		
		Hutton	2%					Sterkspruit	2%	Bare Rocks	1%		
								Bare Rocks	1%				

Table 3-5 Soils expected at the respective terrain units within the Ea 41 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units											
1 (16%)		1 (1) (5%)		3 (40%)		3 (1) (15%)		4 (15%)		5 (9%)	
Bare Rocks	70%	Mispah, Glenrosa	45%	Bare Rocks	65%	Bonheim	57%	Bonheim	85%	Bonheim	50%
Hutton	20%	Milkwood	35%	Hutton	20%	Milkwood	25%	Mispah, Glenrosa	5%	Dundee, Oakleaf	25%

Milkwood, Shortlands	10%	Hutton	5%	Milkwood, Shortlands	15%	Arcadia	10%	Mayo	4%	Milkwood	10%
		Arcadia	5%			Mispah, Glenrosa	5%	Milkwood	3%	Stram Beds	10%
						Hutton	2%	Arcadia	2%	Arcadia	5%
						Mayo	1%	Hutton	1%		

3.2 Baseline Findings

The nine representative soil forms that were identified within the 50 m buffer area include the Ermelo, Pinedene, Tukulu, Swartland, Glen, Arcadia, Glenrosa, Mispah and Witbank soil forms. The assessment area is dominated by yellow brown apedal soils, with a gleyic subsoil. The other identified soil forms are duplex in nature, characterised by an increase in clay content of the sub-soil horizon, shallow soils and lastly soils that contains transported anthropogenic material.

The most sensitive soil forms identified within the project area with high potential for crop production includes the Ermelo and Pinedene forms. The Ermelo soil form consists of an orthic topsoil horizon on top of a thick yellow brown apedal horizon below. The Pinedene soil form consists of an orthic topsoil horizon on top of a yellow brown apedal horizon underlain with a gleyic horizon below. These soils are characterised with high suitability for crop production due to their good fertility that result from moderate retention of nutrients and water. Furthermore, a deep gleyic horizon ensure moisture storage away from evaporation that will aid crop production under water stress conditions, which are common under rainfed crop production.

Other less to moderate sensitive soil forms identified within the proposed project area include, Tukulu, Swartland, Glen and Arcadia forms. The Tukulu soil form consists of an orthic topsoil horizon on top of a neocutanic horizon underlain with a gleyic horizon below. The Swartland soil form an orthic topsoil horizon on top a pedocutanic horizon underlain with a lithic horizon below. The Glen soil form consists of a vertic topsoil horizon on top a thick pedocutanic horizon below. The Arcadia soil form consists of a vertic topsoil horizon on top of a lithic horizon below. These soils have moderate to low crop production potential due their limited water, aeration and root penetration due to increase clay content of the subsoil horizons.

The less sensitive soil forms identified within the proposed project area include, Glenrosa, Mispah and Witbank soils. The Glenrosa consists of an orthic topsoil horizon on top of a lithic horizon below. The Mispah soil form consists of an orthic topsoil horizon on top of a hard rock substratum horizon below. The Witbank soil form is a transported Technosols consisting of transported anthropogenic covering undisturbed natural soil. These soils have a low suitability for crop production due to their limited soil profile which restrict their total profile water storage capability and the anthropogenic material contains various elements at high concentrations that can be toxic for most important agronomic crops (Figure 3-8). All the identified soil horizons within the proposed project area, as well as the current land uses are illustrated in Figure 3-9 and Figure 3-10.

The land capability classes of the above-mentioned soils have been determined to be class “II”, “IV”, “VI” and “VIII”, according to Smith (2006). The land capability class “II” is characterised by slight limitations and high arable potential, which is suitable for annual cropping with special tillage or ley (25%). The land capability class “IV” is characterised by severe limitations with low arable potential and has a high erosion hazard, which is suitable for long-term leys (75%). The land capability class “VII” is characterised by very severe limitations and suitable as for natural veld and afforestation. The land capability class “VIII” is characterised by extreme severe limitations and is not suitable grazing or afforestation. A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. By using the determined land capability classes and the determined climate capability, land potential “L5”, “L6”, “L7” and “L8” were calculated. According to Smith (2006), the “L5” land potential level is characterised by restricted potential with regular and/or severe limitations due to soil, slope, temperatures or rainfall. The

land potential level “L6” is characterised by very restricted potential with regular and/or severe limitations due to soil, slope, temperatures or rainfall. The “L7” land potential level is characterised by low potential with severe limitations due to soil, slope, temperatures, or rainfall and the “L8” land potential level is characterised by very low potential with very severe limitations due to soil, slope, temperatures or rainfall. Therefore, the proposed project area coincides with arable and non-arable areas.

The following land potential levels have been determined;

- Land potential level 5 (this land potential level is characterised by restricted potential. Regular and/or severe limitations due to soil, slope, temperatures, or rainfall) and;
- Land potential level 6 (this land potential level is characterised by very restricted potential. Regular and/or severe limitations due to soil, slope, temperatures, or rainfall) and;
- Land potential level 7 (this land potential level is characterised by low potential. Severe limitations due to soil, slope, temperatures, or rainfall) and;
- Land potential 8 (this land potential level is characterised by very low potential. Very severe limitations due to soil, slope, temperatures or rainfall).

Land potential levels of the proposed area are illustrated in Figure 3-11.

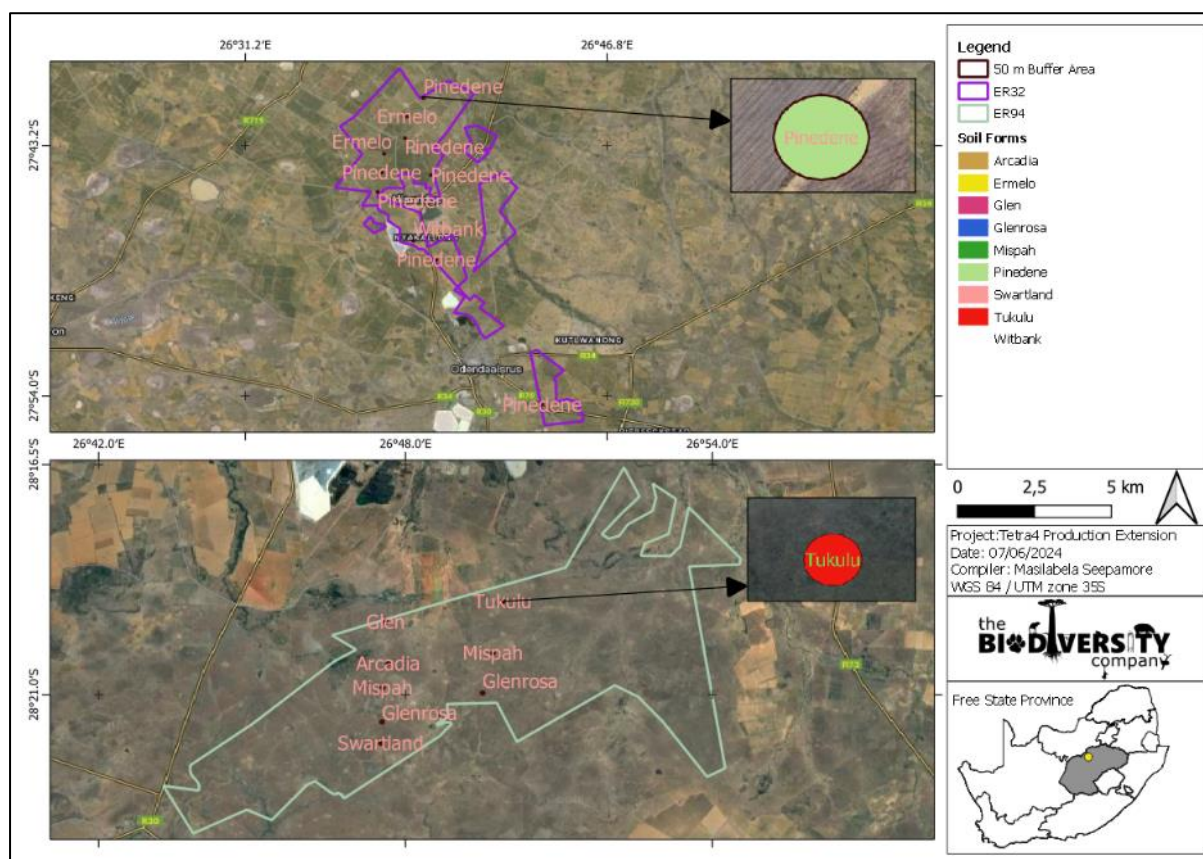


Figure 3-8 Soil forms found within the proposed project area



Figure 3-9 Diagnostic soil horizons identified on-site: A) Glen soil form; B) Glenrosa soil form; (C) gleyic subsoil horizon found in Pinedene soil form; D) yellow-brown subsoil horizon found in the Ermelo and Pinedene soil forms; E) Swartland soil form ;and F) Witbank soil form.

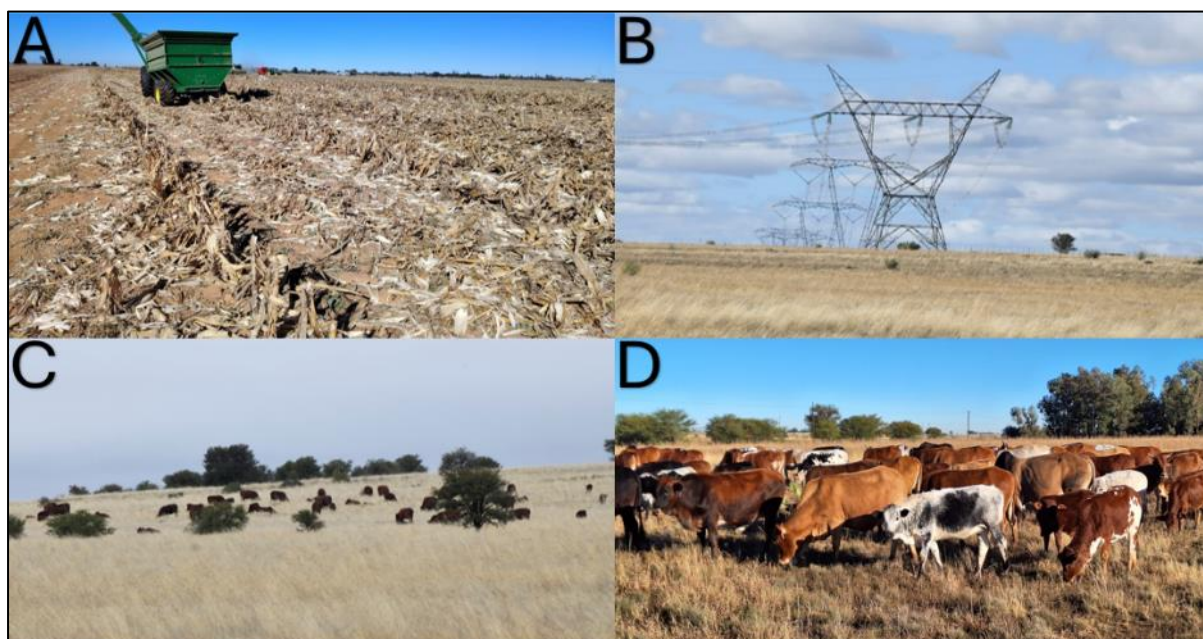


Figure 3-10 Different land uses found within the proposed project area; A) Active maize field; B) Eskom powerline; C and D) livestock with the dominant vegetation.

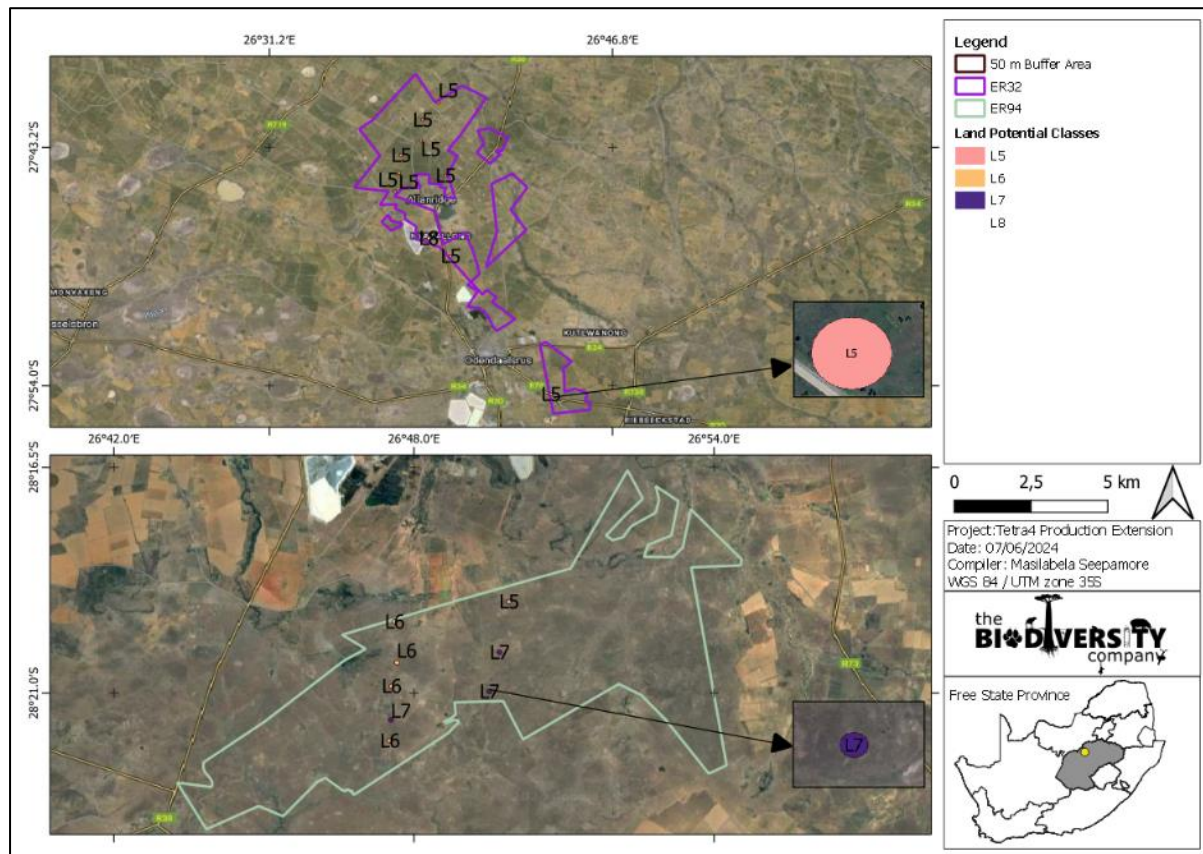


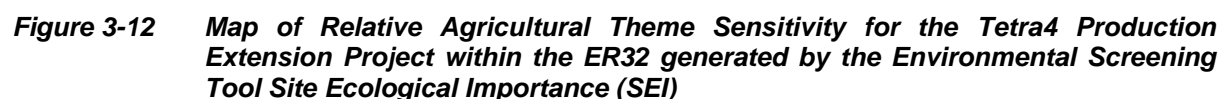
Figure 3-11 Land Potential of the proposed project area

3.3 Sensitivity Verification

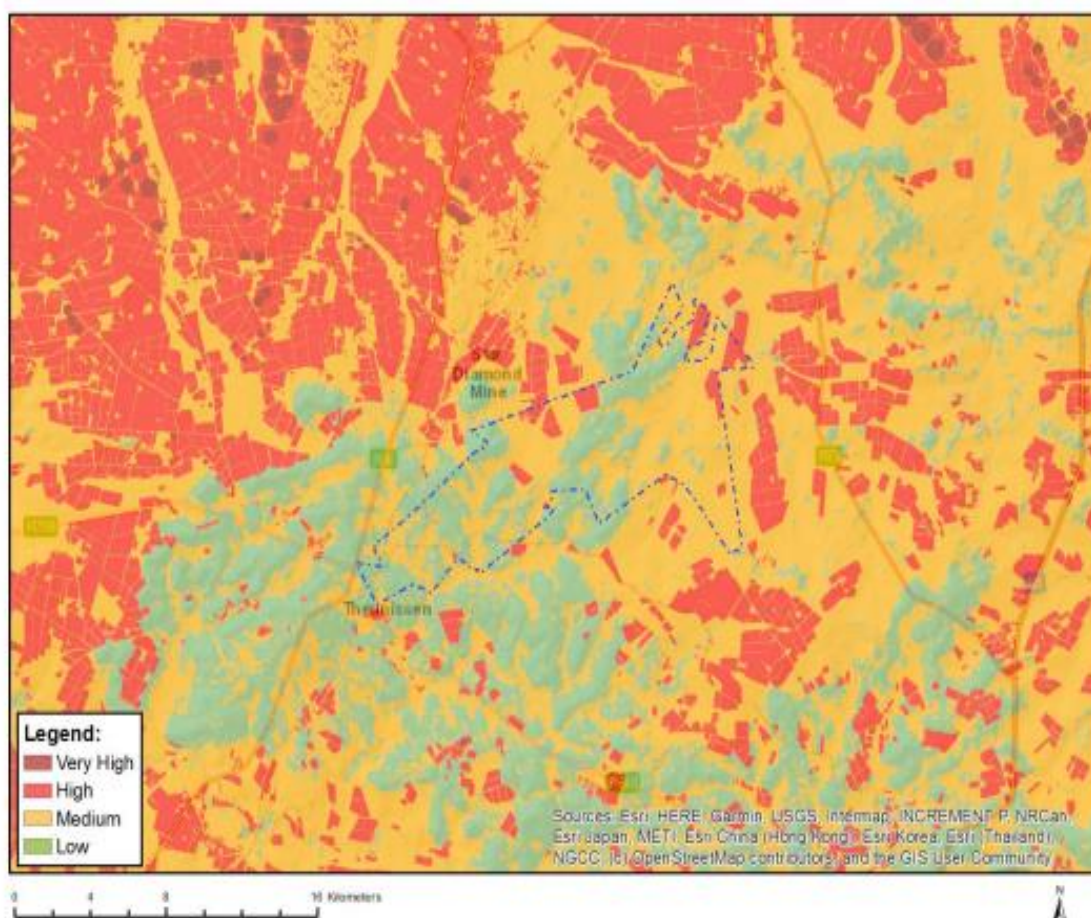
3.3.1 Screening Report – Tetra4 Production Extension Project

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Agriculture Theme Sensitivity indicates that the proposed project area falls within the 'Low to High' agricultural sensitivity (Figure 3-12 and Figure 3-13).



MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Annual Crop Cultivation / Planted Pastures Rotation; Land capability; 01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
High	Annual Crop Cultivation / Planted Pastures Rotation; Land capability; 06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Old Fields; Land capability; 06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Old Fields; Land capability; 01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Low	Land capability; 01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability; 06. Low-Moderate/07. Low-Moderate/08. Moderate

Figure 3-13 Map of Relative Agricultural Theme Sensitivity for the Tetra4 Production Extension Project within the ER94 generated by the Environmental Screening Tool Site Ecological Importance (SEI)

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which ten potential land capability classes are located within the assessment area, including;

- Land Capability 1 to 5 (Very Low to Low-Very Low Sensitivity);
- Land Capability 6 to 8 (Low to Moderate Sensitivity); and
- Land Capability 9 to 10 (Moderate to High Sensitivity).

The land capability dataset (DAFF, 2017) indicates that the proposed project area predominately falls within the “Moderate High”, with other areas having a “Moderate Low to Moderate” and some isolated areas with “Very Low to Low” sensitivities within the ER32 portion. The ER94 portion, predominately falls within the “Moderate Low to Moderate” and with other areas having “Very-Low to Low” sensitivities (see Figure 3-14). Furthermore, highly sensitive field crop boundaries were also identified within the proposed project area by the use of the agricultural theme tool (DFFE, 2024; Figure 3-15). Following the site verification, active crop fields under rainfed conditions were identified in the ER32 portion in the following drilling collars (V2_P001, V2_P002, V2_P003, V2_P004, V2_P005, V2_P006, V2_P009 and V2_P010). Therefore, consent from landowners is needed before exploration/development can occur on active crop fields.

The baseline soil findings, current land uses and the calculated land potential concur with the agricultural theme in areas associated with sensitivities ranging from Very Low to Low and Moderate Low to Moderate. They further dispute the agricultural theme tool on all areas associated with “Moderate to High” sensitivities and areas demarcated as highly sensitive for field crop boundaries. In addition, only commercial rainfed agriculture was confirmed within the proposed project area. Consent is needed from the landowners to explore the active crop fields. It is worth noting that the proposed drilling collars will only be installed for a short period of time, during the fallow period and will have a negligible impact on soil and agricultural productivity of the area. No irrigation infrastructure such as centre pivots or drip irrigation was identified within the proposed project area.

As a result, based on the verified baseline findings, the proposed Tetra4 drilling will have a negligible impact on the soil resources. Furthermore, the land capability and land potential of the resources in the assessment area are both reclassified with an overall “Low” sensitivity with “Medium” sensitivity on active crop fields under rainfed conditions (Figure 3-16).

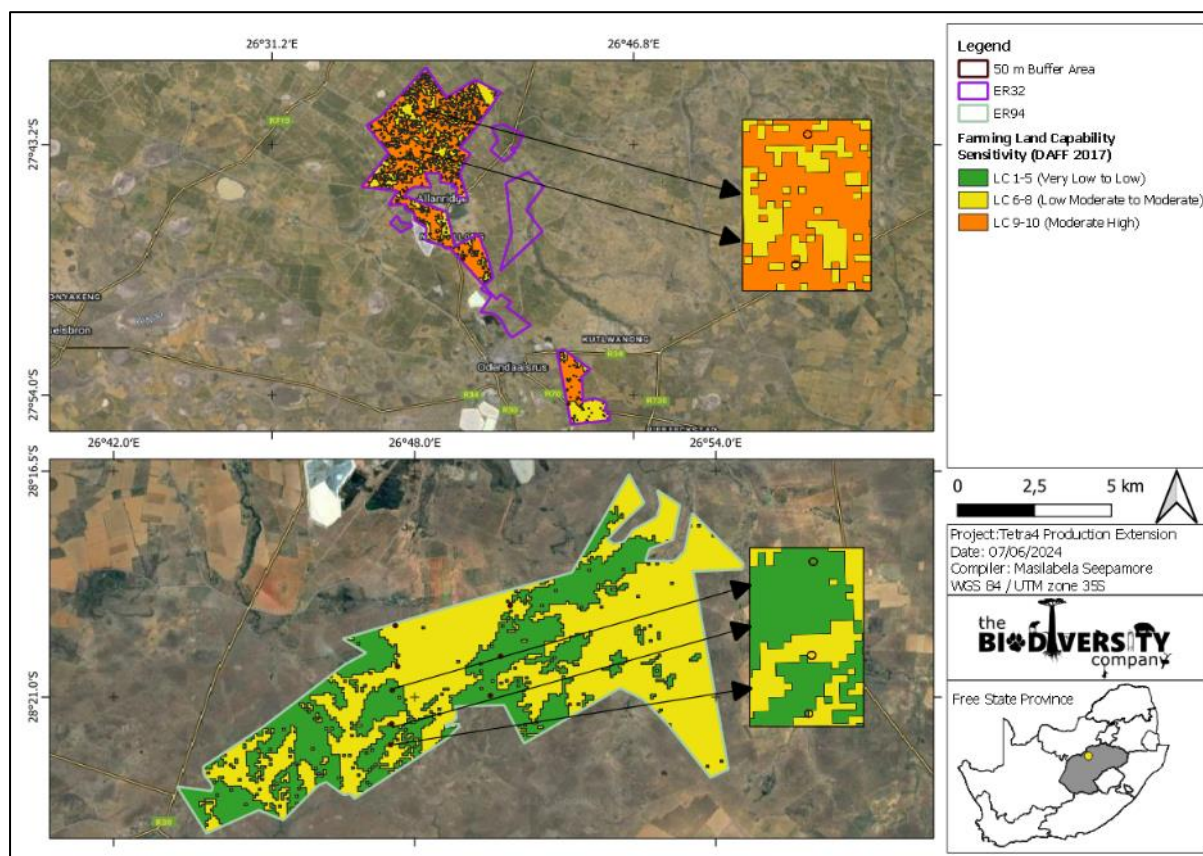


Figure 3-14 Land Capability Sensitivity (DAFF, 2017)

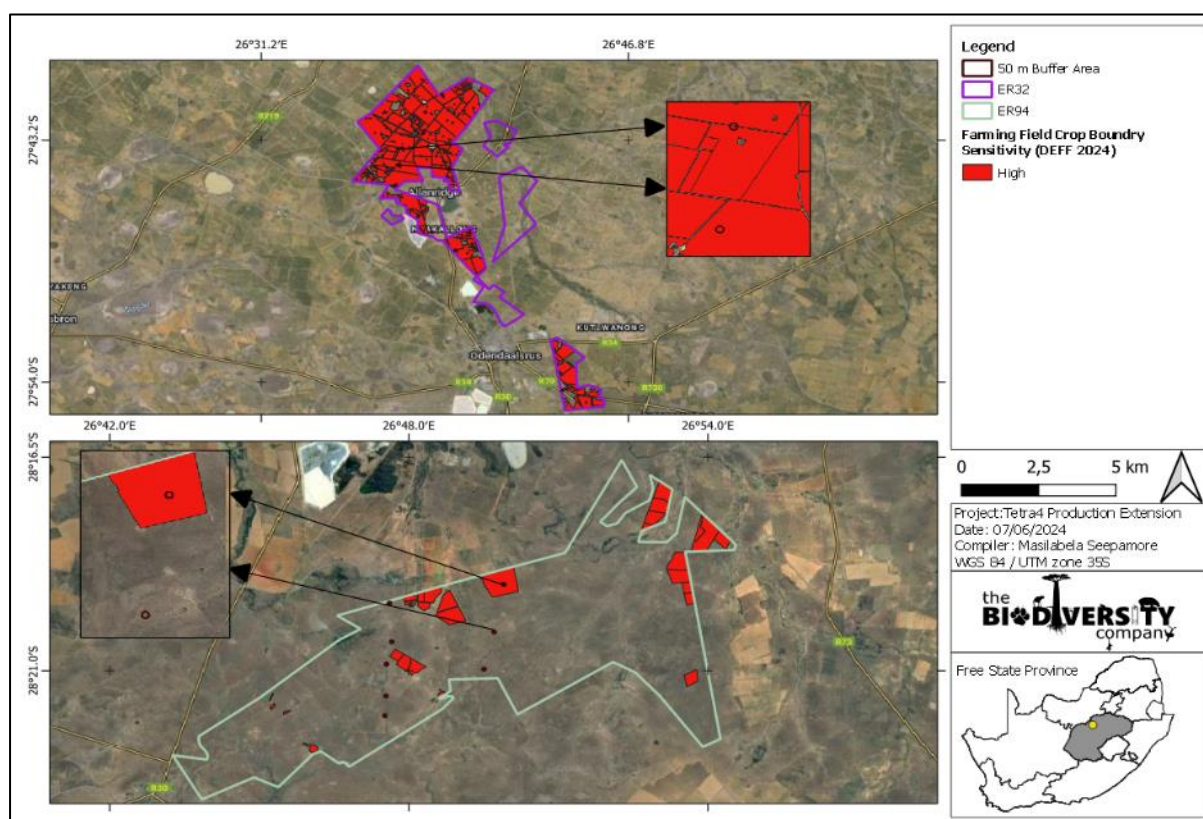


Figure 3-15 Field Crop Boundary Sensitivity (DFFE 2024)

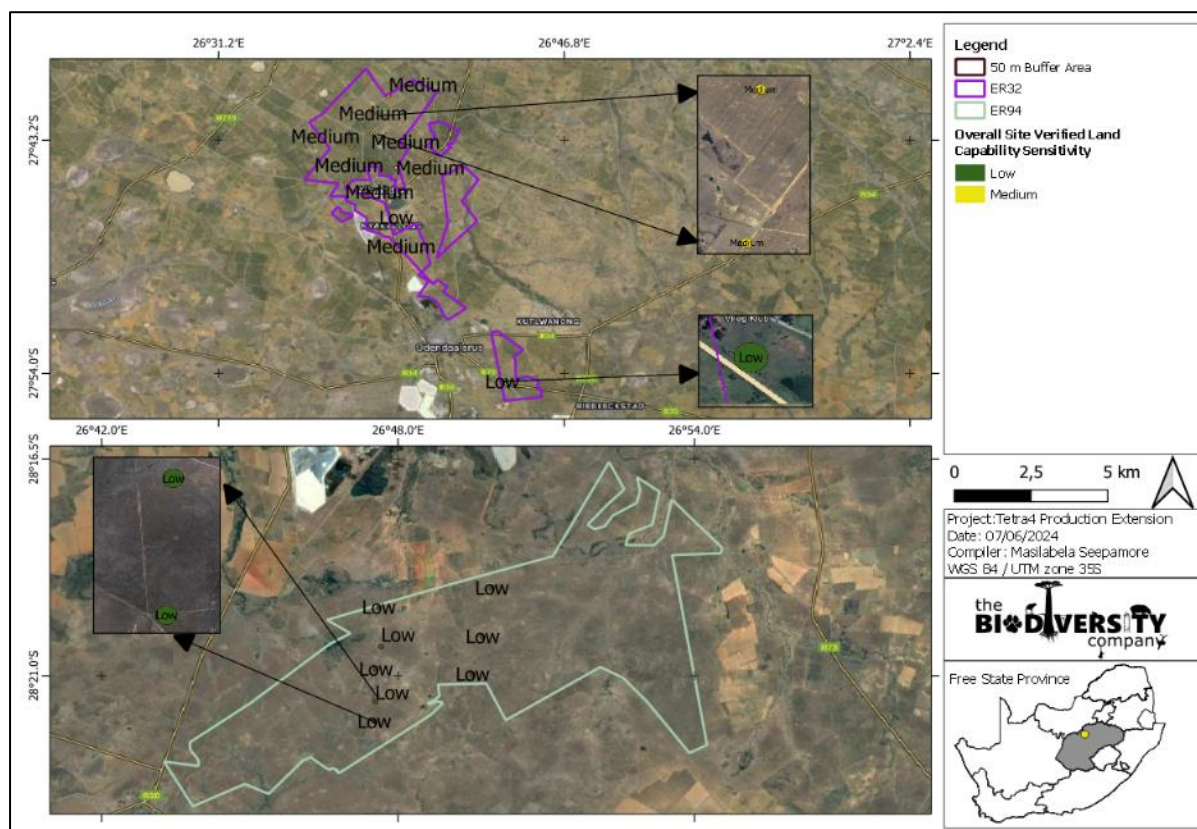


Figure 3-16 Overall site verified land capability sensitivity of the project area

Considering the soil properties, agricultural potential as well as the current land use of the proposed Tetra4 drilling area, the area has a “Low” agricultural sensitivity and “Medium” sensitivity on active crop fields. Based on the confirmed sensitivities, the overall sensitivity of the proposed project area is also categorized as “Medium” sensitivity for the proposed drilling collar sites. The allocated sensitivities for the theme are either disputed or validated in Table 3-6 below.

Table 3-6 Summary of the screening tool vs specialist assigned sensitivities

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Agricultural Theme	High	Medium	Disputed – Land capability Moderate. The presence of Moderate-High soils such as Ermelo and Pinedene, the presence of active crop fields under rainfed condition but the proposed drilling collars will have a negligible impact on the soil and agricultural potential of the project area.
	Medium	Low	Disputed – Land capability Very Low to Low. Presence of restrictive sensitivity soils including Mispah and Glenrosa forms.
	Low	Low	Validated – Land capability Very Low to Low. Presence of restrictive sensitive soils including Mispah and Glenrosa soil forms.

4 Conclusion

The representative soil forms including Ermelo, Pinedene, Tukulu, Swartland, Glen, Arcadia, Glenrosa, Mispah and Witbank, found in the proposed project area are characterised by land potential levels of “L5”, “L6”, “L7” and “L8” and ultimately a “Low” sensitivity. Furthermore, active crop fields under rainfed condition were identified within the proposed project area. Therefore, it can be concluded that the proposed project area has an overall “Medium” sensitivity on the proposed drilling collar sites.

The land capability sensitivity (DAFF, 2017) is dominated by land capabilities with “Very Low to Low”, with other areas associated with “Low-Moderate to Moderate” and “Moderate to High” sensitivities. The verified baseline findings, current land uses and the calculated land potential level disputed the agricultural theme in areas associated with “Moderate to High” sensitivity due to the insignificant impact of the proposed drilling collars on soil and agricultural potential of the project area.

It is the specialist’s opinion that the proposed Tetra4 drilling production extension project will have an overall low to medium residual impact on the agricultural production ability of the land. That being the case, the proposed project and associate infrastructure may be favourably considered for development.

4.1 Management Measures

An impact assessment is not required to be included in the Agricultural compliance statement, but where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr must be provided. The following measures are provided:

- Vegetation clearance must be restricted to areas authorised for development;
- Land clearing and preparation may only be undertaken immediately prior to construction activities and within authorised areas;
- A stormwater management plan must be developed and implemented for the project; and
- If soil erosion is detected, the area must be stabilised using geo-textiles and facilitated re-vegetation.

After assessing the updated infrastructure layout (Tetra4 Production Extension-Gas Exploration Phase), it can be concluded that all agricultural sensitive areas will not be impacted as the phase will only be for a short period. This will preserve all high potential cropping areas as highlighted in the initial report by TBC (2022- Cluster 2). Therefore, the updated layout can be considered acceptable for the natural gas exploration phase. All the recommendations and mitigations are still applicable for the proposed layout updates as in the initial report and within the EMP 1473 (2023).

4.2 Specialist Statement

The proposed Tetra4 drilling Production Extension area will have an overall low to moderate residual impact on the agricultural production capability of the area. The proposed development can be favourably considered for authorisation. The following serves to substantiate this statement:

- The site verified land capability of the proposed project area is found to be to range from low to medium;
- The agricultural potential of the area ranges from low to medium;
- Consent must be obtained from landowners for the development of any actively cultivated lands; and

- The overall agricultural sensitivity for the Tetra4 drilling production extension ranges from low to medium.

4.3 Statement Conditions

The conclusion of this assessment on the acceptability of the proposed project and the recommendation for its approval is not subject to any conditions.

5 References

Department of Agriculture, Forestry and Fisheries, 2017. *National land capability evaluation raster data: Land capability data layer*, 2017. Pretoria.

Environmental Management Programme. 2023. TETRA4 PRODUCTION RIGHTS: PRODUCTION RIGHT REFERENCE:12/4/1/07/2/2, 2023. Johannesburg.

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Mucina, L., & Rutherford, M. C. 2006. The Vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. Pretoria: National Biodiversity Institute.

Smith, B. 2006. The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA.

Soil Classification Working Group. 1991. Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

Soil Classification Working Group. 2018. Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

6 Appendix Items

6.1 Appendix A: Methodology

6.1.1 Desktop Assessment

As part of the desktop assessment, baseline soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types. In addition, a Digital Elevation Model (DEM) as well as the slope percentage of the area was calculated by means of the NASA Shuttle Radar Topography Mission Global 1 arc second digital elevation data by means of QGIS and SAGA software.

6.1.2 Field Survey

The site was traversed on foot. A soil auger was used to determine the soil form/family and depth. The soil was hand augured to the first restricting layer or 1.2 m. Soil survey positions were recorded as waypoints using a handheld GPS. Soils were identified to the soil family level as per the "Soil Classification: A Taxonomic System for South Africa" (Soil Classification Working Group, 2018). Landscape features such as existing open trenches were also helpful in determining soil types and depth.

6.1.3 Land Capability

Land capability and agricultural potential will be determined by a combination of soil, terrain, and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

Land capability is divided into eight classes, and these may be divided into three capability groups. Table 6-1 shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use increases from class I to class VIII (Smith, 2006).

Table 6-1 Land capability class and intensity of use (Smith, 2006)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W - Wildlife		MG - Moderate Grazing			MC - Moderate Cultivation					
F - Forestry		IG - Intensive Grazing			IC - Intensive Cultivation					
LG - Light Grazing		LC - Light Cultivation			VIC - Very Intensive Cultivation					

The land potential classes are determined by combining the land capability results and the climate capability of a region as shown in the table below. The final land potential results are then described in the subsequent table.

Table 6-2 The combination table for land potential classification

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5
III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 6-3 The Land Potential Classes

Land potential	Description of land potential class
L1	Very high potential: No limitations. Appropriate contour protection must be implemented and inspected.
L2	High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures, or rainfall. Appropriate contour protection must be implemented and inspected.
L3	Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures, or rainfall. Appropriate contour protection must be implemented and inspected.
L4	Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures, or rainfall. Appropriate permission is required before ploughing virgin land.
L5	Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures, or rainfall.
L6	Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures, or rainfall. Non-arable
L7	Low potential: Severe limitations due to soil, slope, temperatures, or rainfall. Non-arable
L8	Very low potential: Very severe limitations due to soil, slope, temperatures, or rainfall. Non-arable

The land capability of the proposed footprint will be compared to the National Land Capability which was refined in 2014- 2016. The National Land Capability methodology is based on a spatial evaluation modelling approach and a raster spatial data layer consisting of fifteen (15) land capability evaluation values (Table 6-4), usable on a scale of 1:50 000 – 1:100 000 (DAFF, 2017). The previous system is based on a classification approach, with 8 classes (Table 6-1). Land capability and land potential will also be determined in consideration of the screening tool to ultimately establish the accuracy of the land capability sensitivity from (DAFF, 2017).

Table 6-4 National Land Capability Values (DAFF,2017)

Land Capability Evaluation Value	Land Capability Description
1	Very low
2	
3	Very Low to Low
4	
5	Low
6	Low to Moderate
7	
8	Moderate

9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

6.2 Appendix B Specialist declarations

DECLARATION

I, Matthew Mamera, declare that:

- I act as the independent specialist in this application;
- I will perform 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;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of Section 24F of the Act.



Dr Matthew Mamera

Soil Scientist

The Biodiversity Company

June 2024

DECLARATION

I, Masilabela Seepamore, declare that:

- I act as the independent specialist in this application;
- I will perform 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;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of Section 24F of the Act.



Masilabela Seepamore

Soil Scientist

The Biodiversity Company

June 2024

6.3 Appendix C Curriculum vitae

Matthew Mamera

PhD Soil Science (*Cand Nat Sci*)

Cell: +27 785 772 668

Email: matthew@thebiodiversitycompany.com

Identity Number: 8810315983183

Date of birth: 31 October 1988



Profile Summary	Key Experience	Nationality
Working experience throughout South Africa	<ul style="list-style-type: none"> Environmental Impact Assessments (EIA) 	South African Permanent Residence
Specialist experience with pedology and agriculture.	<ul style="list-style-type: none"> Environmental Management Programmes (EMP) 	Languages
Specialist expertise include hydropedology, pedology, land contamination, agricultural potential, land rehabilitation, rehabilitation management and wetlands resources.	<ul style="list-style-type: none"> Wetland delineations Rehabilitation Plans 	English – Proficient
Experience hydropedological modelling	<ul style="list-style-type: none"> Soil taxonomic classification (SA forms and WRB groups) Soil Hydropedology assessments Agriculture potential assessments Land contamination assessments 	Ndebele, Xhosa, Shona – Proficient
Areas of Interest	Country Experience	Qualifications
Mining, Farming, Soil and Water quality contamination, Soil Sanitation management, Soil Carbon, Sustainability and Conservation.	<p>South Africa: All Provinces</p> <p>Zambia - Kitwe and Mufulira</p> <p>Angola- Zenza – Cacuso;</p> <p>Luena - Saurimo</p>	<ul style="list-style-type: none"> PhD (University of the Free States)- Soil Science (Hydropedology, Sanitation and Water quality management) MSc (University of Fort Hare) – Soil Science (Hydropedology, Sanitation and Water quality management) BSc Honours <i>Cum laude</i> (University of Fort Hare) – Soil Science (Hydropedology, wetlands delineation and rehabilitation) BSc Agricultural Soil Science Cand Nat Sci 116356 SSSSA- SSSSA 201

Masilabela Klaas Seepamore

MSc Soil Science (Cand Nat Sci)

Cell: +27 788151878

Email: masilabela@thebiodiversitycompany.com

Identity Number: 8806085781088

Date of birth: 08 June 1988



Profile Summary

Working experience in South Africa

Specialist experience with soil science, agronomy and agrometeorology.

Specialist expertise include production agronomy, pedology, fertilizer recommendation, trial management, data analysis and crop modelling.

Areas of Interest

Farming, resource use efficiency production agronomy, soil classification, soil and crop research, climate change adaptation and mitigation strategies,

Key Experience

- Land suitability studies and report writing
- Soil taxonomic classification SA forms
- Fertilizer recommendation
- Crop research
- Data analysis
- Farm visit
- Technology transfer

Country Experience

South Africa

Nationality

South African

Languages

English – Proficient

Setswana, Sesotho – Proficient

Qualifications

- BASOS-FACTS Course (FERTASA)
- MSc Agriculture *Cum laude* (University of the Free State) – Soil Science (soil science, agronomy, and production agronomy)
- BSc Agriculture Honours (University of the Free State) – Soil Science (soil science, agronomy, crop nutrition)
- BSc Agricultural Agronomy and Soil Science
- Cand Nat Sci 113907