Pedology Baseline and Impact Assessment for the proposed Becrux Solar Photovoltaic Facility

Secunda, Mpumalanga

November 2021

CLIENT

savannah environmental

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Declaration

I, Ivan Baker 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 71 and is punishable in terms of Section 24F of the Act.

Ivan Baker

Soil Specialist

The Biodiversity Company

November 2021

1 Introduction

Becrux Solar PV Project One (Pty) Ltd is proposing the development of a Solar Photovoltaic (PV) Energy Facility and associated infrastructure on Portion 6 of the Farm Goedehoop No. 290, located ~7km south-east of Secunda and 15 km east of Embalenhle. The project site falls within jurisdiction of the Govan Mbeki Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province.

The Solar PV Facility will have a contracted capacity of up to 19.99MW_{ac} and will use bi-facial panels with single axis tracking or fix tilt mounting structures to harness the solar resource on the project site. The purpose of the facility will be to generate electricity for exclusive use by Sasol's Secunda (coal-to-liquids) CTL Plant. The construction of the PV Facility aims to reduce Sasol's dependence on direct supply from Eskom's national grid for operation purposes and demonstrate Sasol's move towards a greener future through procurement of renewable energy from Independent Power Producers (IPPs).

To evacuate the generated power to Sasol's Secunda CTL Plant, a 11kV overhead power line will be established to connect the 11kV E-house containerized substation (with a development footprint of 32 m^2) to the existing Goedehoop Substation. The overhead power line will run ~400 m from the Solar PV Facility to the Goedehoop Substation. One 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of the overhead power line. The assessment of a wider grid connection corridor allows for the avoidance of sensitive environmental features that may be present within the project site, and to ensure the suitable placement of the power line within the identified corridor. A development area of ~26.64 ha and a development footprint of ~19.95 ha have been identified within the preferred project site (~433 ha) by Becrux Solar PV Project One (Pty) Ltd for the development of the Becrux Solar PV Energy Facility. Infrastructure associated with the facility will include the following:

A development area of ~26.64 ha and a development footprint of ~19.95 ha have been identified within the preferred project site (~433 ha) by Becrux Solar PV Project One (Pty) Ltd for the development of the Becrux Solar PV Energy Facility. Infrastructure associated with the facility will include the following:

- Solar PV array comprising PV modules and mounting structures;
- Inverters and transformers;
- Cabling between the panels;
- E-house containerized substation;
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation;
- Laydown area;
- Access gravel road (existing) and internal gravel roads; and
- Security booth, O&M building, workshop, storage area and site office.

The Biodiversity Company was commissioned to conduct a pedology baseline and impact assessment in support of the Environmental Authorisation application process for the proposed activities associated with the Becrux Solar Photovoltaic (PV) Facility. One pedology site visit was conducted on the 2nd of November 2021.

The approach of this study has taken cognisance of the recently published Government Notice 320 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 National Web based Environmental Screening Tool has characterised the agricultural theme sensitivity for the project area as "high sensitivity".

The purpose of these specialist studies is to provide relevant input into the Environmental Authorisation application process for the proposed activities associated with the solar PV facility. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the viability of the proposed project from a soils and agricultural potential perspective.

1.1 Specialist Details

Report Name	**Pedology Baseline and Impact Assessment for the proposed Becrux Solar PV Facility**
Reference	**Becrux Solar PV Facility**
Submitted to	savannah environmental
Report Writer and Site Assessment	**Ivan Baker** Ivan Baker is Cand. Sci Nat registered (119315) in environmental science and geological science. Ivan is a wetland and ecosystem service specialist, a hydropedologist and pedologist that has completed numerous specialist studies ranging from basic assessments to EIAs. Ivan has carried out various international studies following FC standards. Ivan completed training in Tools for Wetland Assessments with a certificate of competence and completed his MSc in environmental science and hydropedology at the North-West University of Potchefstroom.
Reviewer	**Andrew Husted** Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field.
Declaration	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, 2017. We have no conflicting interests in the undertaking of this activity and have no interests 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.

2 Scope of Work

The Terms of Reference (ToR) for this study include the following:

- Conducting a pedology assessment which includes a description of the physical properties which characterise the soil within the proposed area of development of the relevant portions of the property;
- The findings from the study were used to determine the existing land capability and current land use of the entire surface area of the relevant portions of the project area;
- The soil classification was done according to the Taxonomic Soil Classification System for South Africa, 1991. The following attributes must be included at each observation:
  - Soil form and family (Taxonomic Soil Classification System for South Africa, 1991);
  - Soil depth;
  - Estimated soil texture;
  - Soil structure, coarse fragments, calcareousness;
  - Buffer capacities;
  - Underlying material;
  - Current land use; and
  - Land capability.

3 Key Legislative Requirements

Currently, various pieces of legislation and related policies exist that guide and direct the land user in terms of land use planning both on a national and provincial level. This legislation includes, but is not limited to:

- The Constitution of the Republic of South Africa (Act 108 of 1996);
- Sub-division of Agricultural Land Act (Act 70 of 1970);
- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000); and
- Spatial Planning and Land Use Management Act, 16 of 2013 (not yet implemented).

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); and
- National Environmental Management Act (Act 107 of 1998).

3.1 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place, an Environmental Authorisation application process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Scoping & Environmental Impact Assessment (S&EIA) process depending on the scale of the impact.

4 Literature Review

4.1 Land Capability

According to Smith (2006), the capability of land concerns the wise use of land to ensure economical production on a sustained basis, under specific uses and treatments. The object of land classification is the grouping of different land capabilities, to indicate the safest option for use, to indicate permanent hazards and management requirements. These land capability classes decrease in capability from I to VIII and increase in risk from I to VIII. DAFF (2017) further defines land capability as "*the most intensive long-term use of land for purposes of rainfed farming, determined by the interaction of* ***climate, soil*** *and* ***terrain****.*

DAFF (2017) has further modelled the land capability on a rough scale for the entire of South Africa and has divided these results into 15 classes (see Table 4-1). Terrain, climate and soil capability were used as the building blocks for this exercise to ensure a national land capability data set.

Table 4-1 Land Capability (DAFF, 2017)

Land Capability Class (DAFF, 2017)	Description of Capability
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	

It is worth noting that this nation-wide data set has some constraints of its own. According to DAFF (2017), inaccuracies and the level of detail of these datasets are of concern. Additionally, the scales used to model these datasets are large (1:50 000 to 1:100 000) and are not suitable for farm level planning. Furthermore, it is mentioned by DAFF (2017) that these datasets should not replace any site-based assessments given the accuracies perceived.

5 Methodology

5.1 Desktop Assessment

The elevation and slope percentage of the project area will be determined by means of SAGA software, which will be used to determine the agricultural potential of the site.

5.2 Field Survey

The site will be traversed by vehicle and on foot. A soil auger has been used to determine the soil form/family and depth. The soil will be hand augured to the first restricting layer or 1.5 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.

5.3 Agricultural Potential Assessment

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 5-1 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 5-1 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 Table 5-2. The final land potential results are then described in Table 5-2.

Table 5-2 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 5-3 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

5.4 Current Land Use

Land use was identified using aerial imagery and then ground-truthed while out in the field. The possible land use categories are:

- Mining;
- Bare areas;
- Agriculture crops;
- Natural veld;
- Grazing lands;
- Forest;
- Plantation;
- Urban;
- Built-up;
- Waterbodies; and
- Wetlands.

5.5 Erosion Potential

Erosion has been calculated by means of the (Smith, 2006) methodology. The steps in calculating the Fb1 ratings relevant to erosion potential are illustrated in Table 5-4 with the final erosion classes illustrated in Table 5-5.

Table 5-4 Fb ratings relevant to the calculating of erosion potential (Smith, 2006)

Step 1- Initial value, texture of topsoil horizon				
Light (0-15% clay)		Medium (15-35% clay)		Heavy (>35% clay)
Fine sand	Medium/coarse sand	Fine Sand	Medium/coarse sand	All sands
3.5	4.0	4.5	5.0	6.0
Step 2- Adjustment value (permeability of subsoil)				
Slightly restricted	Moderately restricted	Heavily restricted		
-0.5	-1.0	-2.0		
Step 3- Degree of leaching (excluding bottomlands)				
Dystrophic soils, medium and heavy textures	Mesotrophic soils	Eutrophic or calcareous soils, medium and heavy textures		
+0.5	0	-0.5		
Step 4- Organic Matter				
Organic topsoil	Humic Topsoil			
+0.5	+0.5			
Step 5- Topsoil limitations				
Surface crusting	Excessive sand/high swell-shrink/self-mulching			
-0.5	-0.5			
Step 6- Effective soil depth				
Very shallow (<250 mm)	Shallow (250-500 mm)			
-1.0	-0.5			

Table 5-5 Final erosion potential class

Erodibility	Fb Rating (from calculation)
Very Low	>6.0
Low	5.0 - 5.5
Moderate	3.5 – 4.5
High	2.5 – 3.0
Very High	<3.0

5.6 Impact Assessment Methodology

Direct, indirect and cumulative impacts will be assessed using the following criteria;

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected;

[1] The soil erodibility index

- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high);
- The duration, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes;
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures);
- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high;
- the status, which will be described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

S=(E+D+M)P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated); and
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of Cumulative Impacts

As per DFFE's requirements, specialists are required to assess the cumulative impacts. In this regard, please refer to the methodology below that will need to be used for the assessment of Cumulative Impacts.

"Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed development will result in:

- Unacceptable risk;
- Unacceptable loss;
- Complete or whole-scale changes to the environment or sense of place; and
- Unacceptable increase in impact.

The specialist is required to conclude if the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area.

6 Assumptions and Limitations

The following aspects were considered as limitations:

- No detailed layout has been provided. The main objective will therefore be to recommend no-go areas and relevant recommendations to ensure the successful operation of the proposed activities whilst conserving sensitive receptors; and
- The GPS used for delineations is accurate to within five meters. Therefore, the soil delineation plotted digitally may be offset by at least five meters to either side.

7 Results and Discussion

7.1 Desktop Results

The project area is located approximately 6 km south-west of Secunda and 5 km east of SASOL Industrial Area, Mpumalanga (see below). The surrounding land-use predominantly includes agriculture, industrial areas and regional roads.

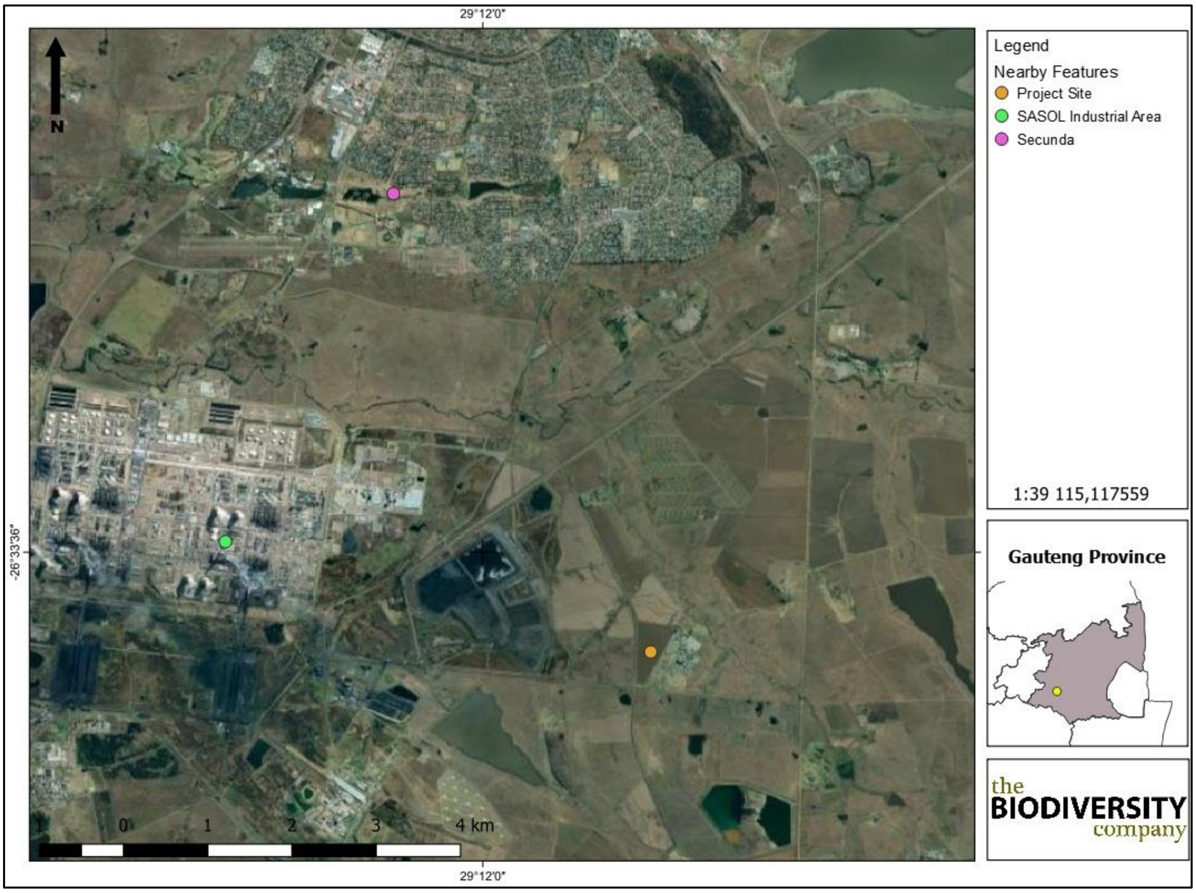

Figure 7-1 Locality of proposed development

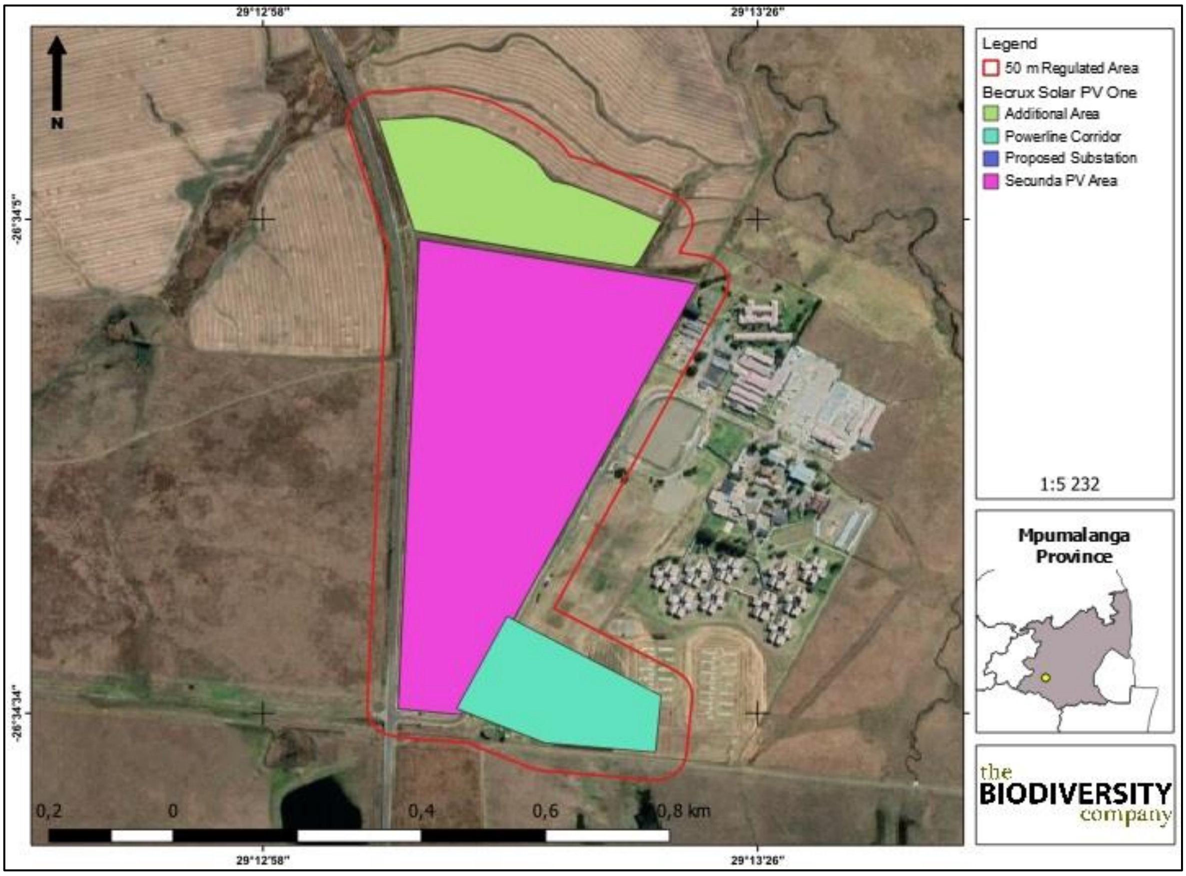

Figure 7-2 Proposed layout

7.1.1 Vegetation Types

The project area is located within the Soweto Highveld Grassland (GM 8) vegetation type. The distribution of the Soweto Highveld Grassland (GM 8) vegetation type is restricted to Gauteng and Mpumalanga with small portions of this vegetation type occurring in the North-West and Free State provinces. This vegetation type is roughly delineated by the Vaal River, Perdekop in the south-east and the N17 between Johannesburg and Ermelo. The GM 8 vegetation type extends further westward as far as Randfontein and includes parts of Soweto. The GM 8 vegetation type surrounds parts to the south as well, including Vanderbijlpark, Vereeniging and Sasolburg, which are located in the northern most parts of the Free State (Mucina & Rutherford. 2006).

The vegetation within the GM 8 region is dominated by short to medium-high, dense, tufted grassland which mostly includes *Themeda triandra* within gently to moderately undulating landscapes on the Highveld plateau. Other grass species which occur to a lesser extent include *Eragrostis recemosa*, *Elionurus muticus*, *Tristachya leucothrix* and *Heteropogon contortus* (Mucina & Rutherford, 2006).

The conservation status of the GM 8 vegetation type is endangered with a target percentage of 24. Half of the area is already transformed into agriculture, mining, urban build-up etc. with a handful of conservation areas still up and running. These include Waldrift, Suikerbosrand and Rolfe's Pan Nature Reserve (just to name a few).

7.1.2 Soils and Geology

The geology of this area is characterised by the Madzaringwe Formation shale, mudstone and sandstone from the Karoo Supergroup or the Karoo Suite dolerites which feature prominently in this area. To the west, the rocks of Ventersdorp, Old Transvaal and Witwatersrand Supergroups are significant with the south being characterised by the Volksrust Formation from the Karoo Supergroup. Deep soils occur in this area and is typically labelled by Ea, Ba and Bb land types (Mucina and Rutherford, 2006).

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Ea 17 land type. The Ea land type consists of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated. The Ea 17 land type terrain units and expected soil forms are illustrated in Figure 7-3 and Table 7-1 respectively.

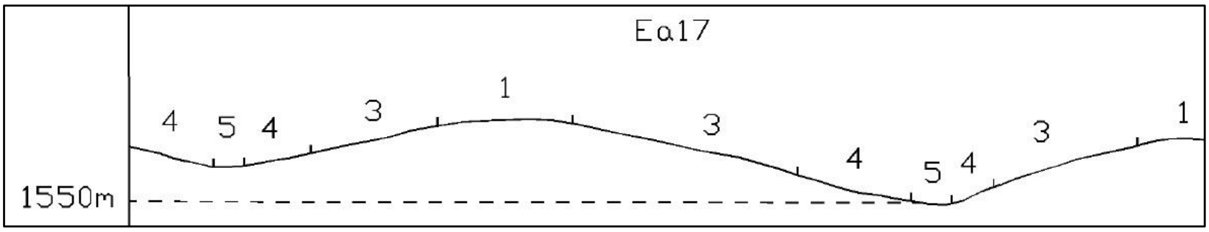

Figure 7-3 Illustration of land type Ea 17 terrain unit (Land Type Survey Staff, 1972 - 2006)

Table 7-1 Soils expected at the respective terrain units within the Ea 17 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units							
1 (30%)		**3 (50%)**		**4 (15%)**		**5 (5%)**	
Arcadia	40	Arcadia	70	Arcadia	50	Rensburg	70
Mayo	15	Rensburg	15	Rensburg	30	Stream Beds	20
Valsrivier	15	Valsrivier	5	Bonheim 5	10	Arcadia	10
Swartland	10	Swartland	5				
Avalon	5	Bonheim	5				
Westleigh	5						
Glenrosa	5						
Rock	2						

7.1.3 Climate

The mean annual precipitation for this region reaches approximately 662mm and is characterised by summer rainfall (Mucina & Rutherford, 2006). This area is characterised by high and low extreme temperatures during the summer and winter, respectively, with frost frequently occurring (see Figure 7-4).

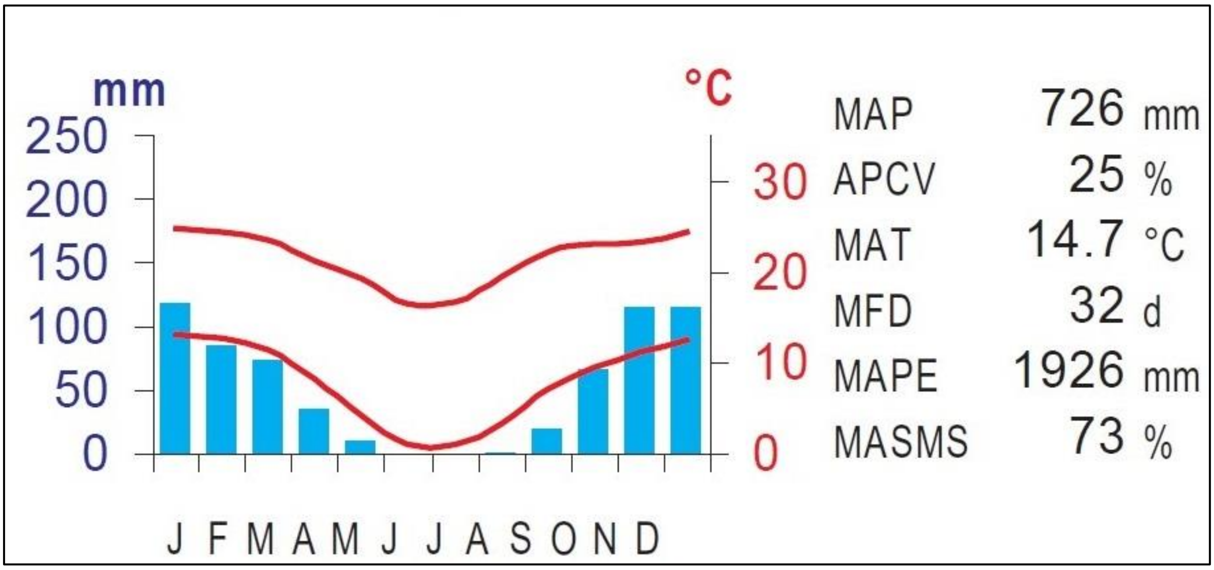

Figure 7-4 Climate diagram for the region (Mucina & Rutherford, 2006)

7.1.4 Terrain

The terrain of the 50 m regulated area has been analysed to determine different terrain units within the area.

7.1.4.1 Digital Elevation Model

A Digital Elevation Model (DEM) has been created to identify lower laying regions as well as potential convex topographical features which could point towards hydromorphic soils. The 50 m regulated area ranges from 1 604 to 1 635 Metres Above Sea Level (MASL). The lower laying areas (generally represented in dark blue) represent areas that will have the highest potential to be characterised as hydromorphic soils (see Figure 7-5).

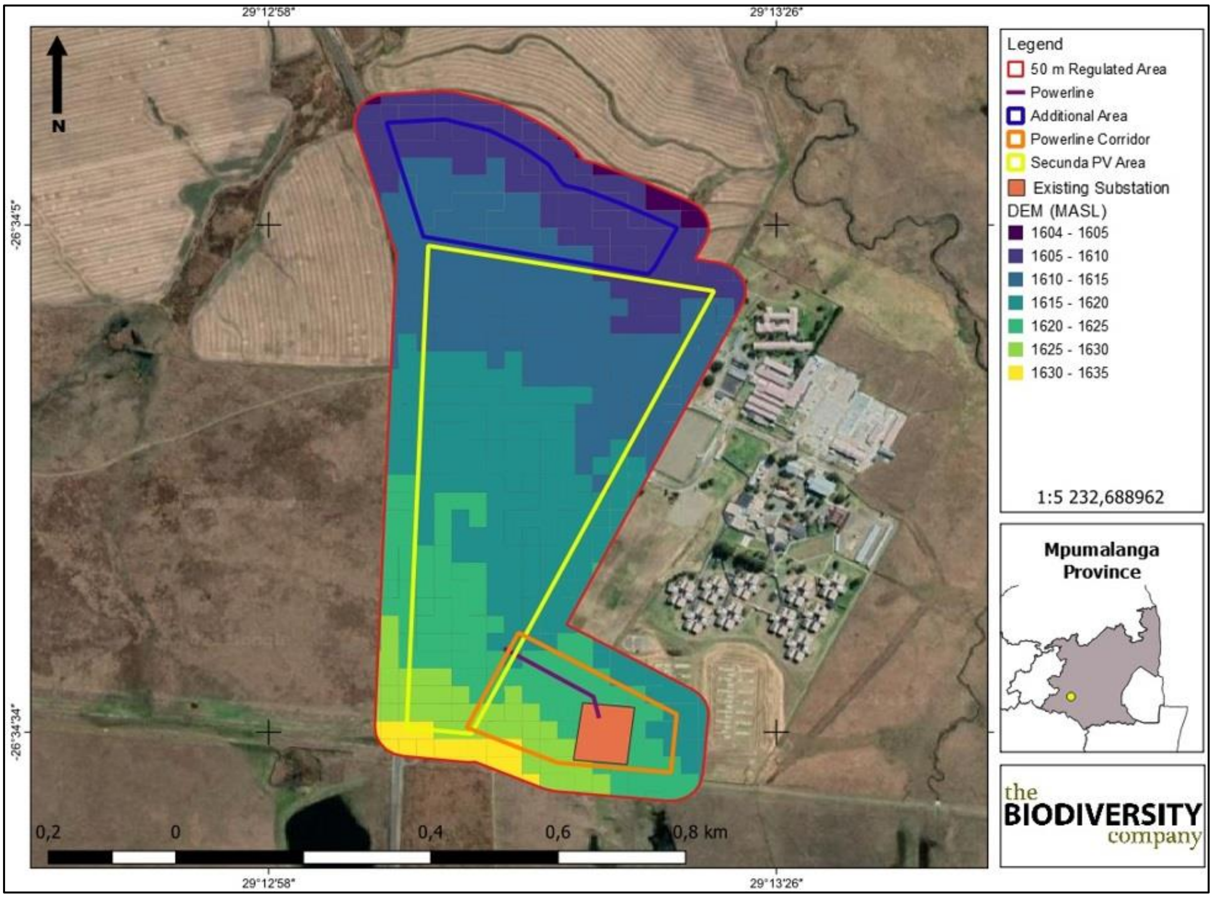

Figure 7-5 Digital Elevation Model of the 50 m regulated area

7.1.4.2 Slope Percentage

The slope percentage of the 50 m regulated area is illustrated in Figure 7-6. The slope percentage ranges from 0 to 13%, with the majority of the 50 m regulated area being characterised by a gentler slope (between 0 and 5%). Slopes are regarded as one of the most important parameters in soil classification and formation.

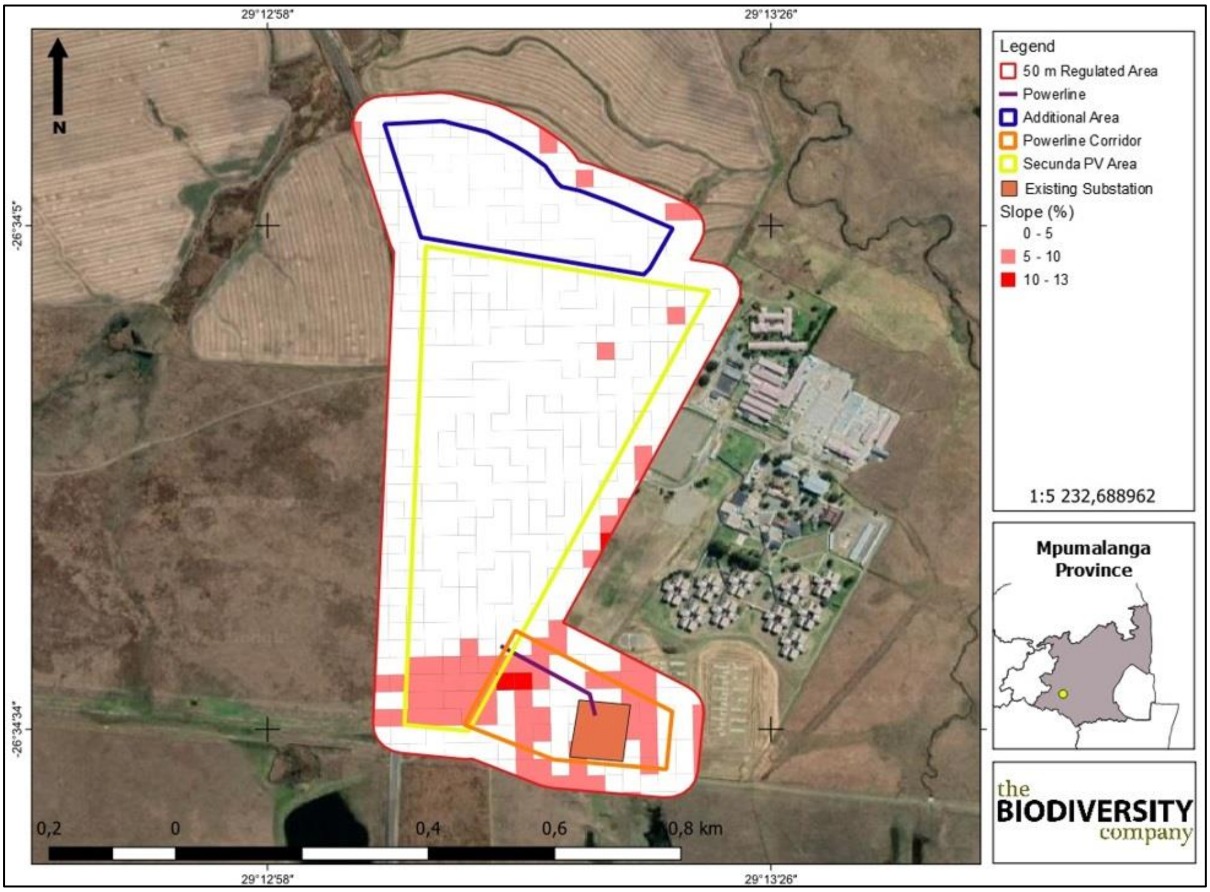

Figure 7-6 Slope percentage of the 50 m regulated area

7.2 Baseline Findings

7.2.1 Description of Soil Profiles and Diagnostic Horizons

Soil profiles were studied up to a depth of 1.2 m to identify specific diagnostic horizons which are vital in the soil classification process as well as determining the agricultural potential and land capability. The following diagnostic horizons were identified during the site assessment (also see Figure 7-7):

- Gley horizon;
- Lithocutanic horizon;
- Vertic topsoil; and
- Melanic topsoil.

7.2.1.1 Gley Horizon

Gley horizons that are well developed and have homogenous dark to light grey colours with smooth transitions. Stagnant and reduced water over long periods is the main factor responsible for the formation of a Gley horizon and could be characterised by green or blue tinges due to the presence of a mineral called Fougerite which includes sulphate and carbonate complexes. Even though grey colours are dominant, yellow and/or red striations can be noticed throughout a Gley horizon. The structure of a Gley horizon mostly is characterised as strong pedal, with low hydraulic conductivities and a clay texture, although sandy Gley horizons are known to occur. The Gley soil form commonly occurs at the toe of hillslopes (or benches) where lateral water input (sub-surface) is dominant and the underlaying geology is characterised by a low hydraulic conductivity. The Gley horizon usually is second in diagnostic sequence in shallow profiles yet is known to be lower down in sequence and at greater depths (Soil Classification Working Group, 2018).

7.2.1.2 Lithocutanic Horizon

For the Lithocutanic horizon, i*n situ* weathering of rock underneath a topsoil results in a well-mixed soil-rock layer. The colour, structure and consistency of this material must be directly related to the parent material of the weathered rock. The Lithocutanic horizon is usually followed by a massive rock layer at shallow depths. Hard rock, permeable rock and horizontally layered shale usually is not associated with the weathering processes involved with the formation of this diagnostic horizon.

7.2.1.3 Vertic Topsoil

Vertic topsoils have high clay content with smectic clay particles being dominant (Soil Classification Working Group, 2018). The smectic clays have swell and shrink properties during wet and dry periods respectively. Peds will be shiny, well-developed, with a highly plastic consistency during wet periods as a result of the dominance of smectic clays. During shrinking periods, cracks form on the surface and rarely occur in shallow vertic clays.

7.2.1.4 Melanic Topsoil

A Melanic topsoil is characterised by dark colours and well-structured blocky peds which is common in young landscapes. The parent geology of this soil horizon is intermediate or basic and can be very similar to Vertic clay due to a high clay percentage. Melanic clays distinctly have a high percentage of mica-like vermiculite and coalite clays rather than swelling smectic clays.

Figure 7-7 Soils identified during the site assessment. A) Melanic topsoil. B) Gley topsoil. C) Transition from Vertic topsoil to gley horizon. D) Vertic topsoil with signs of wetness (unconsolidated material with signs of wetness)

7.2.2 Description of Soil Forms and Soil Families

During the site assessment, five soil forms were identified. These soil forms have been delineated and are illustrated in Figure 7-8 and is described in Table 7-2 according to depth, clay percentage, indications of surface crusting, signs of wetness and percentage rock. The soil forms are followed by the soil family and in brackets the maximum clay percentage of the topsoil. Soil family characteristics are described in Table 7-3.

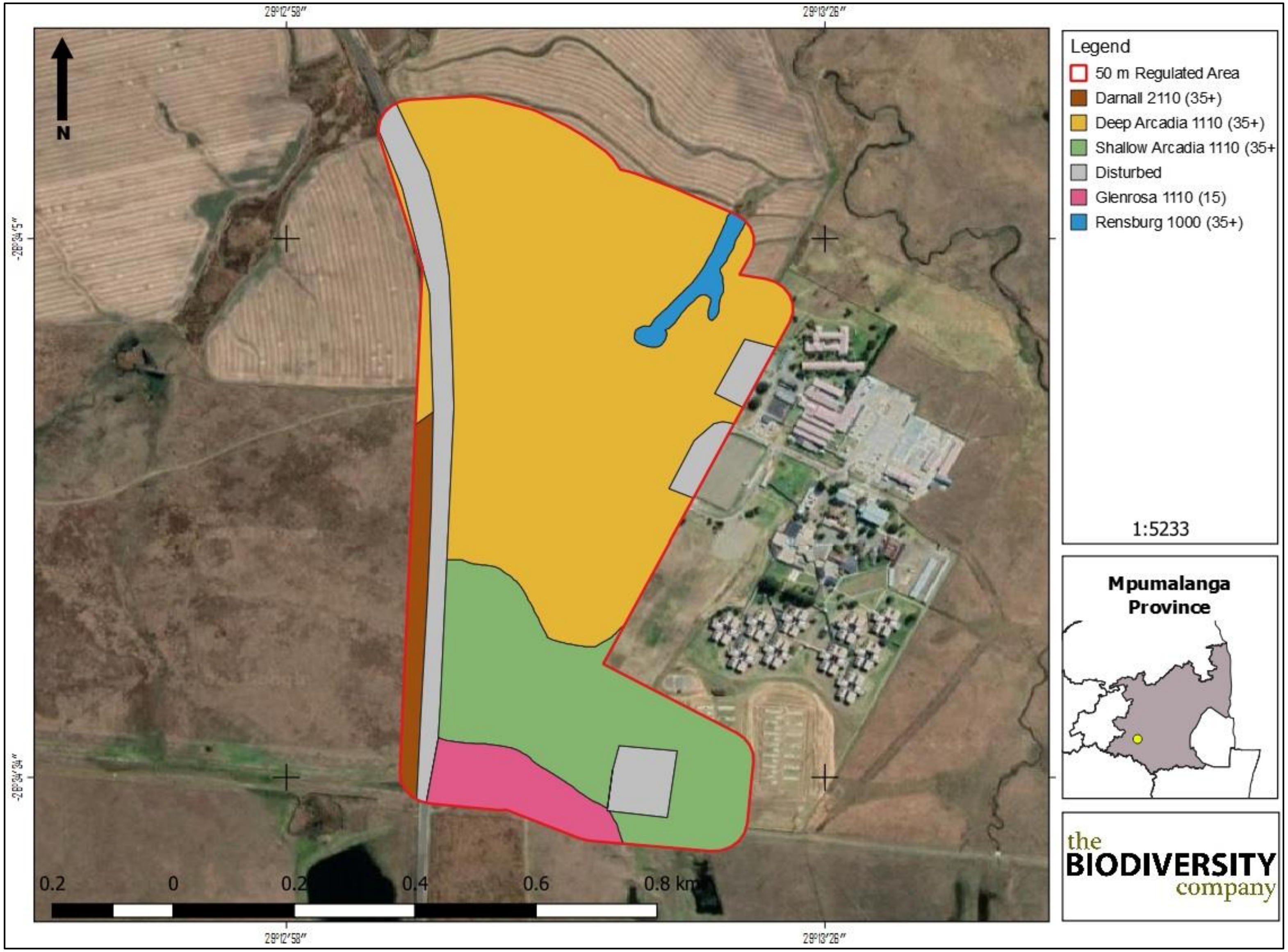

Figure 7-8 Soil delineations within the 50m regulated area

Table 7-2 Summary of soils identified within the project area

	Topsoil					Subsoil A				Subsoil B			
	Depth (mm)	**Clay (%)**	**Signs of wetness**	**Rock %**	**Surface crusting**	**Depth (mm)**	**Clay (%)**	**Signs of wetness**	**Rock %**	**Depth (mm)**	**Clay (%)**	**Signs of wetness**	**Rock %**
Glenrosa 1110 (15)	0-300	0-15	None	2-10	Slight	N/A				N/A			
Deep Arcadia 1110 (>35)	0-1 200	>35	None	0	None	N/A				N/A			
Shallow Arcadia 1110 (>35)	0-400	>35	None	0	None	N/A				N/A			
Darnall 2110 (>35)	0-400	>35	None	0	None	400 to 800/1 200	15-35	None	0	N/A			
Rensburg 1000 (>35)	0-1 100	>35	None	0	Slight	>1100	15-35	None	0	N/A			

Table 7-3 Description of soil family characteristics

Soil Form/Family	Topsoil Colour	Pedocutanic Vertic Properties	Occurrence of Lime	Base Status	Textural Contrast	Extent of Rock Weathering
Glenrosa 1110 (15)	Dark Topsoil	N/A	Lime Absent	N/A	N/A	Saprolithic
Deep Arcadia 1110 (>35)	Dark Topsoil	N/A	Lime Absent	N/A	N/A	Saprolithic
Shallow Arcadia 1110 (>35)	Dark Topsoil	N/A	Lime Absent	N/A	N/A	Saprolithic
Darnall 2110 (>35)	N/A	Vertic Properties Present	Lime Absent	N/A	N/A	Saprolithic below pedocutanic
Rensburg 1000 (>35)	N/A	N/A	Lime Absent	N/A	N/A	N/A

7.2.3 Agricultural Potential

Agricultural potential is determined by a combination of soil, terrain and climate features. Land capability classes reflect the most intensive long-term use of land under rain-fed conditions.

The land capability is determined by the physical features of the landscape, including the soils present. The land potential or agricultural potential is determined by combining the land capability results and the climate capability for the region.

7.2.3.1 Climatic Capability

The climatic capability has been determined by means of the Smith (2006) methodology, of which the first step includes determining the climatic capability of the region by means of the Mean Annual Precipitation (MAP) and annual Class A pan (potential evaporation) (see Table 7-4).

Table 7-4 Climatic capability (step 1) (Scotney et al., 1987)

Central Sandy Bushveld region				
Climatic Capability Class	**Limitation Rating**	**Description**	**MAP: Class A pan Class**	**Applicability to site**
C1	None to Slight	Local climate is favourable for good yields for a wide range of adapted crops throughout the year.	0.75-1.00	-
C2	Slight	Local climate is favourable for a wide range of adapted crops and a year-round growing season. Moisture stress and lower temperature increase risk and decrease yields relative to C1.	0.50-0.75	-
C3	Slight to Moderate	Slightly restricted growing season due to the occurrence of low temperatures and frost. Good yield potential for a moderate range of adapted crops.	0.47-0.50	-
C4	Moderate	Moderately restricted growing season due to the occurrence of low temperatures and severe frost. Good yield potential for a moderate range of adapted crops but planting date options more limited than C3.	0.44-0.47	-
C5	Moderate to Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops at risk of some yield loss.	0.41-0.44	-
C6	Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Limited suitable crops that frequently experience yield loss.	0.38-0.41	-
C7	Severe to Very Severe	Severely restricted choice of crops due to heat and moisture stress.	0.34-0.38	✔
C8	Very Severe	Very severely restricted choice of crops due to heat and moisture stress. Suitable crops at high risk of yield loss.	0.30-0.34	-

According to Smith (2006), the climatic capability of a region is only refined past the first step if the climatic capability is determined to be between climatic capability 1 and 6. Given the fact that the climatic capability has been determined to be “C7” for the project area, no further steps will be taken to refine the climate capability.

7.2.4 Land Capability

The land capability was determined by using the guidelines described in “The farming handbook” (Smith, 2006). The delineated soil forms were clipped into the three different slope classes (0-3%, 3-7% and 7-12%) to determine the land capability of each soil form. The delineated soil forms were then grouped together in six different land capability classes (land capability 1, 2, 3, 4, V and 6). As per example, the deep Arcadia soil form will classify as a Land Capability (LC) 2 within the first slope class (0-3%) and a LC3 within the second (3-7) and third (7-12%) slope classes (see Table 7-5).

It is however worth noting, that even though the slope percentage of an area plays a considerable role in the formation and morphology of soil forms, the slope class is not the only parameter used to determine land capability. All parameters listed in Table 7-3 are also used to calculate land capability together with slope percentage. Key parameters used to determine the land capability include topsoil texture, depth and the permeability class of a soil form. The land capabilities for the project area are described in Table 7-6 and illustrated in Figure 7-10.

Table 7-5 Land capability calculations as per the slope classes relevant to the project area for the Avalon soil form

Soil Form	Slope Class	Calculated Land Capability
Deep Arcadia	0-3%	LC2
	3-7%	LC3
	7-12%	LC3

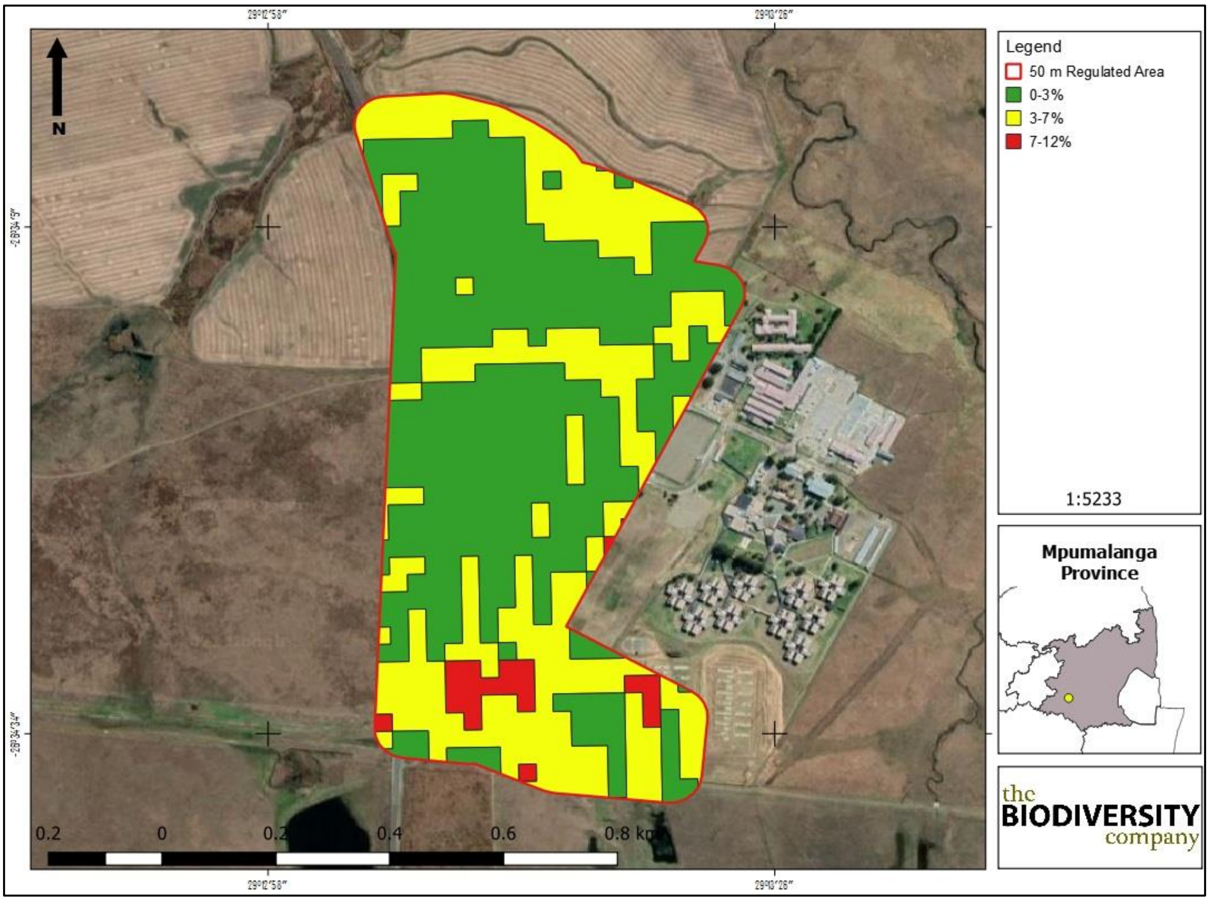

Figure 7-9 Three slope classes relevant to the land capability calculation methodology

Table 7-6 Land capability for the soils within the project area

Land Capability Class	Definition of Class	Conservation Need	Use-Suitability	Percentage of Land Capability within Project Area	Land Capability Group	Sensitivity
1	None to Slight	Local climate is favourable for good yields for a wide range of adapted crops throughout the year		1.9	Arable	Very High
2	Slight	Local climate is favourable for a wide range of adapted crops and a year-round growing season. Moisture stress and lower temperatures increase risk and decreases yields		42.2	Arable	High
3	Moderate limitations. Some erosion hazard	Special conservation practice and tillage methods	Rotation crops and ley (50%)	19.2	Arable	High
4	Severe limitations. Low arable potential.	Intensive conservation practice	Long term leys (75%)	19.8	Arable	Moderate
V	Water course and land with wetness limitations	Protection and control of water table	Improved pastures, suitable for wildlife	4.6	Grazing	Low
6	Limitations preclude cultivation. Suitable for perennial vegetation	Protection measures for establishment, e.g. sod-seeding	Veld, pastures and afforestation	1.4	Grazing	Low

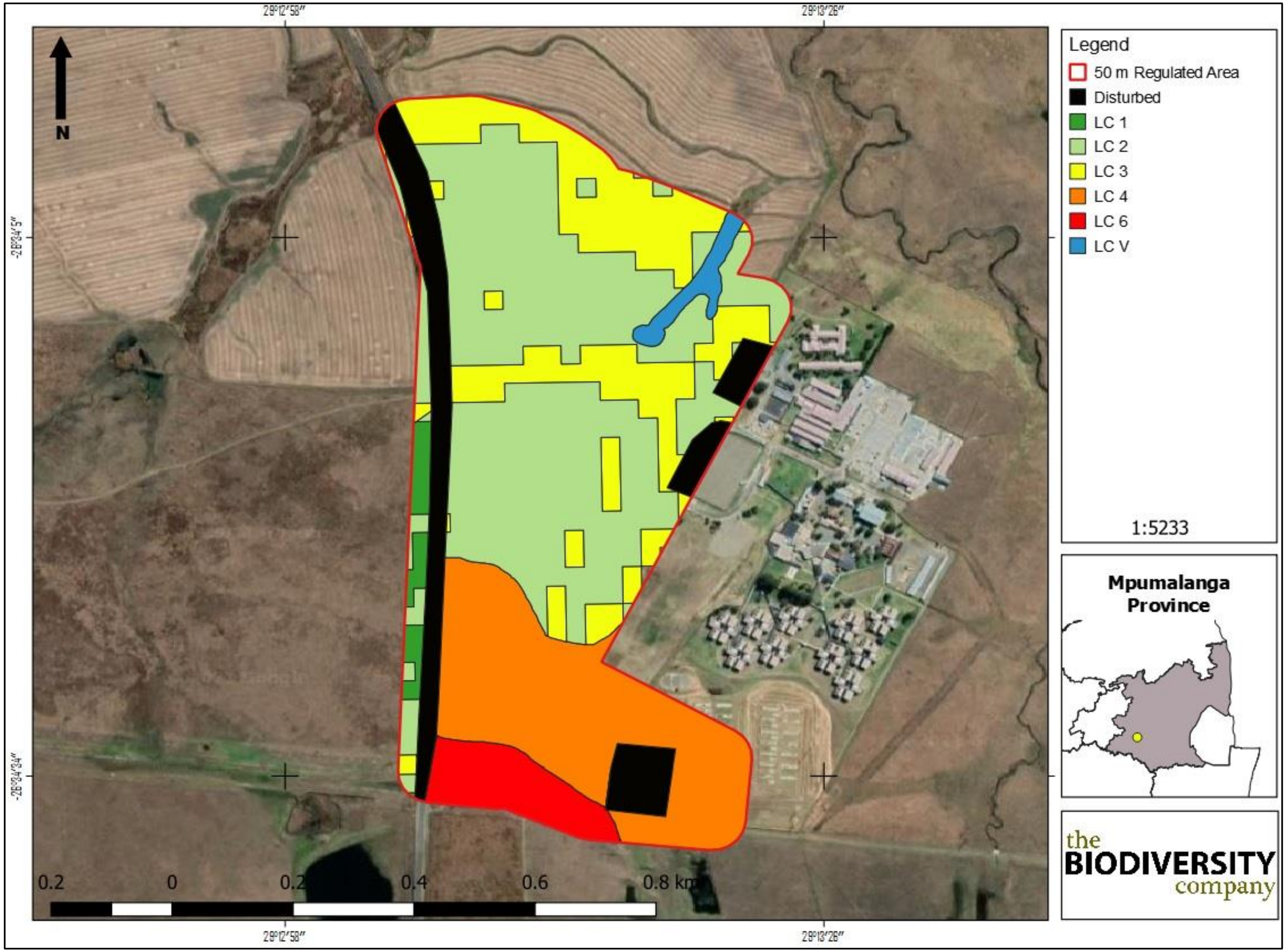

Figure 7-10   Land capability classes for the project area

7.2.5 Land Potential

The methodology in regard to the calculations of the relevant land potential levels are illustrated in Table 7-7 and Table 7-8. From the six land capability classes, four land potential levels have been determined by means of the Guy and Smith (1998) methodology. Land capability 1 and 2 have been reduced to a land potential level L4 due to climatic limitations. Land capability classes 3 and 4 have been calculated to be land potential "L5" with the land capability 6 areas being associated with L6 conditions. The land capability V has been allocated a land potential "Vlei" considering its hydromorphic characteristics.

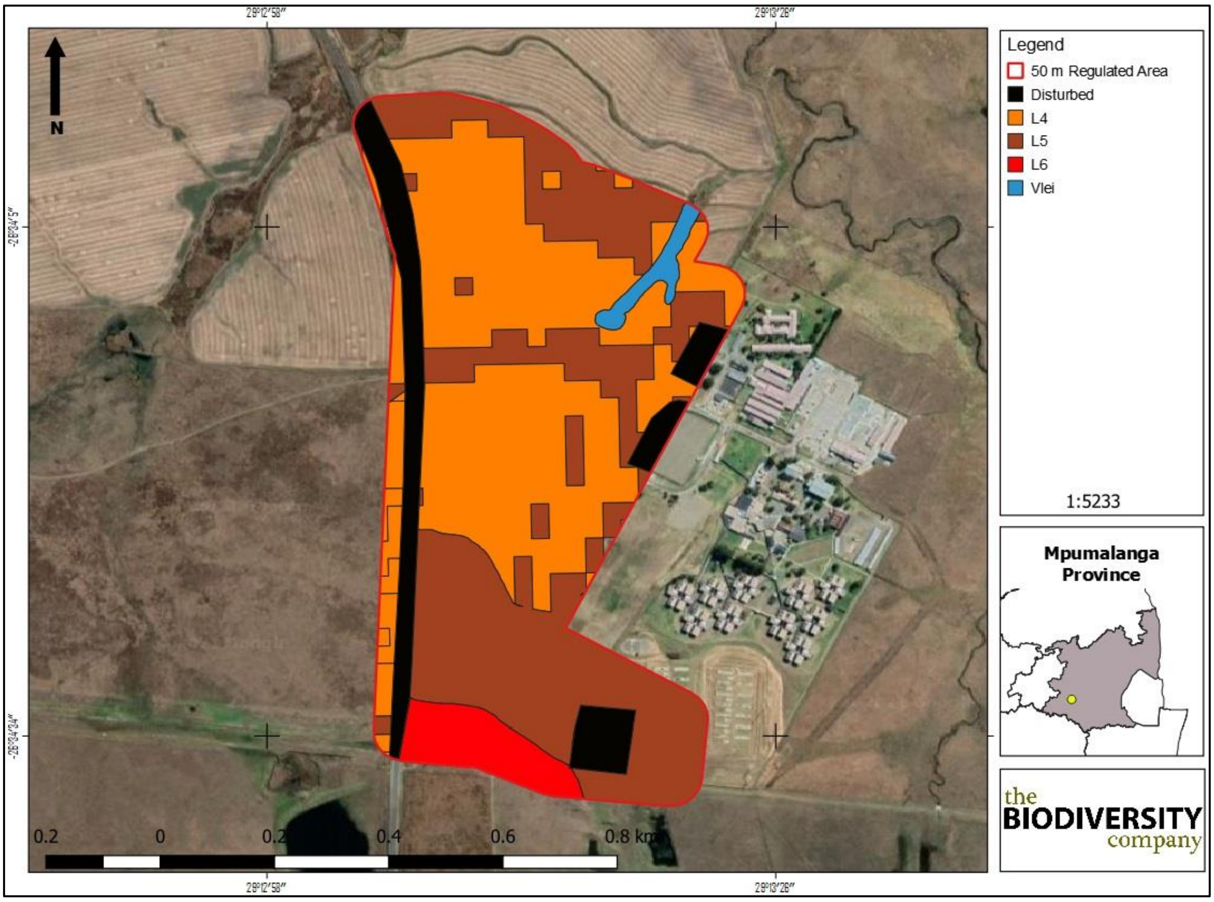

Figure 7-11 Land potential of the 50 m regulated area

Table 7-7 Land potential from climate capability vs land capability (Guy and Smith, 1998)

Land Capability Class	Climatic Capability Class							
	C1	C2	C3	C4	C5	C6	C7	C8
LC1	L1	L1	L2	L2	L3	L3	**L4***	L4
LC2	L1	L2	L2	L3	L3	L4	**L4***	L5
LC3	L2	L2	L2	L2	L4	L4	**L5***	L6
LC4	L2	L3	L3	L4	L4	L5	**L5***	L6
LC5	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	**Vlei***	Vlei
LC6	L4	L4	L5	L5	L5	L6	**L6***	L7

LC7	L5	L5	L6	L6	L7	L7	L7	L8
LC8	L6	L6	L7	L7	L8	L8	L8	L8

*Land potential level applicable to climatic and land capability

Table 7-8 Land potential for the soils within the project area (Guy and Smith, 1998)

Land Potential	Percentage	Description of Land Potential Class	Sensitivity
4	44.1	**Moderate potential.** Moderately regular and/or severe to moderate limitations due to slope, soil, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.	Moderate
5	39	**Restricted potential.** Regular and/or severe to moderate limitations due to soil, temperatures, slope o0r rainfall.	Moderate
6	1.4	**Very restricted potential.** Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable.	Low
Vlei	4.6	Wetland (grazing and wildlife)	Low

7.2.6 Land Use

Five different land uses have been identified within the proposed project area, namely “Crops”, “Disturbed”, “Built-Up”, “Grassland” and “Wetlands” (Figure 7-12).

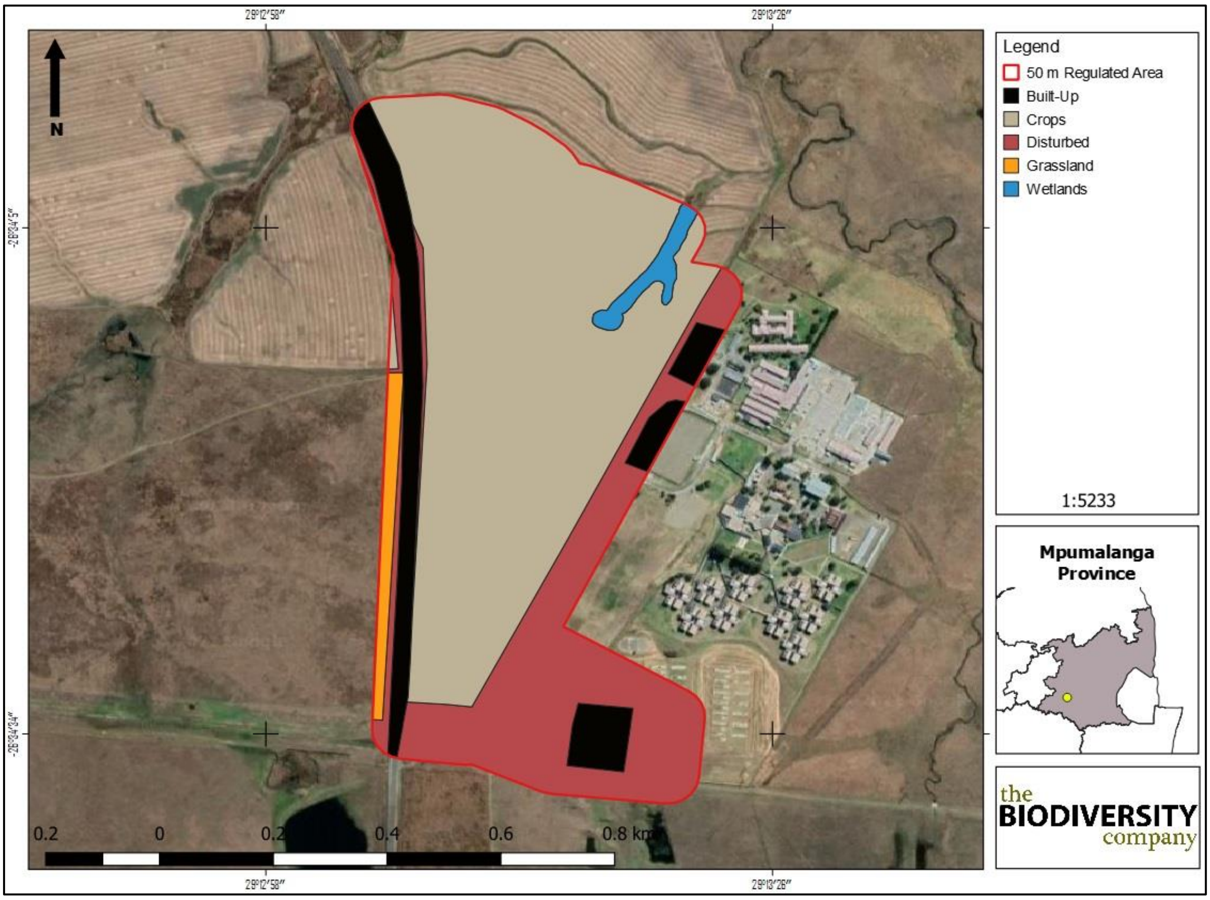

Figure 7-12 Different land uses within the proposed project area

7.2.7 Erosion Potential

The erosion potential of the identified soil forms has been calculated by means of the (Smith, 2006) methodology. In some cases, none of the parameters are applicable, in which case the step was skipped.

7.2.7.1 Deep Arcadia and Rensburg

Table 7-9 illustrates the values relevant to the erosion potential of the deep Arcadia soil form. The final erosion potential score has been calculated at 3.5, which indicates a “Moderate” potential for erosion.

Table 7-9 Erosion potential calculation for the deep Arcadia soil forms

Step 1- Initial Value, Texture of Topsoil				
Light (0-15% Clay)		**Medium (15-35% Clay)**		**Heavy (>35% Clay)**
3.5	4.0	4.5	5.0	**6.0**
Step 2- Adjustment Value (Permeability of Subsoil)				
Slightly Restricted		**Moderately Restricted**		**Heavily Restricted**
-0.5		-1.0		**-2.0**
Step 3- Degree of Leaching (Excluding Bottomlands)				
Dystrophic Soils, Medium and Heavy Textures		**Mesotrophic Soils**		**Eutrophic or Calcareous Soils, Medium and Heavy Textures**
+0.5		**0**		-0.5
Step 4- Organic Matter				
Organic Topsoil			**Humic Topsoil**	
+0.5			+0.5	
Step 5- Topsoil Limitations				
Surface Crusting			**Excessive Sand/High Shrink/Self-Mulching**	
-0.5			**-0.5**	
Step 6- Effective Soil Depth				
Very Shallow (<250 mm)			**Shallow (<250-500 mm)**	
-1.0			-0.5	

7.2.7.2 Shallow Arcadia

Table 7-9 illustrates the values relevant to the erosion potential of the shallow Arcadia soil form. The final erosion potential score has been calculated at 3.0, which indicates a “Moderate” potential for erosion.

Table 7-10 Erosion potential calculation for the shallow Arcadia soil forms

Step 1- Initial Value, Texture of Topsoil				
Light (0-15% Clay)		**Medium (15-35% Clay)**		**Heavy (>35% Clay)**
3.5	4.0	4.5	5.0	**6.0**
Step 2- Adjustment Value (Permeability of Subsoil)				

Slightly Restricted	Moderately Restricted	Heavily Restricted
-0.5	-1.0	**-2.0**
	Step 3- Degree of Leaching (Excluding Bottomlands)	
Dystrophic Soils, Medium and Heavy Textures	**Mesotrophic Soils**	**Eutrophic or Calcareous Soils, Medium and Heavy Textures**
+0.5	**0**	-0.5
	Step 4- Organic Matter	
Organic Topsoil		**Humic Topsoil**
+0.5		+0.5
	Step 5- Topsoil Limitations	
Surface Crusting		**Excessive Sand/High Shrink/Self-Mulching**
-0.5		**-0.5**
	Step 6- Effective Soil Depth	
Very Shallow (<250 mm)		**Shallow (<250-500 mm)**
-1.0		**-0.5**

7.2.7.3 Glenrosa

Table 7-11 illustrates the values relevant to the erosion potential of the Glenrosa soil forms. The final erosion potential score has been calculated at 2.5, which indicates a "Very High" potential for erosion.

Table 7-11 Erosion potential calculation for the Glenrosa soil forms

		Step 1- Initial Value, Texture of Topsoil		
Light (0-15% Clay)		**Medium (15-35% Clay)**		**Heavy (>35% Clay)**
3.5	**4.0**	4.5	5.0	6.0

	Step 2- Adjustment Value (Permeability of Subsoil)	
Slightly Restricted	**Moderately Restricted**	**Heavily Restricted**
-0.5	-1.0	-2.0
	Step 3- Degree of Leaching (Excluding Bottomlands)	
Dystrophic Soils, Medium and Heavy Textures	**Mesotrophic Soils**	**Eutrophic or Calcareous Soils, Medium and Heavy Textures**
+0.5	0	**-0.5**
	Step 4- Organic Matter	
Organic Topsoil		**Humic Topsoil**
+0.5		+0.5
	Step 5- Topsoil Limitations	
Surface Crusting		**Excessive Sand/High Shrink/Self-Mulching**
-0.5		-0.5
	Step 6- Effective Soil Depth	
Very Shallow (<250 mm)		**Shallow (<250-500 mm)**
-1.0		-0.5

7.2.7.4 Darnall

Table 7-9 illustrates the values relevant to the erosion potential of the Darnall soil form. The final erosion potential score has been calculated at 5.0, which indicates a “Low” potential for erosion.

Table 7-12 Erosion potential calculation for the Darnall soil form

Step 1- Initial Value, Texture of Topsoil				
Light (0-15% Clay)		**Medium (15-35% Clay)**		**Heavy (>35% Clay)**
3.5	4.0	4.5	5.0	**6.0**
Step 2- Adjustment Value (Permeability of Subsoil)				
Slightly Restricted		**Moderately Restricted**		**Heavily Restricted**
-0.5		-1.0		-2.0
Step 3- Degree of Leaching (Excluding Bottomlands)				
Dystrophic Soils, Medium and Heavy Textures		**Mesotrophic Soils**		**Eutrophic or Calcareous Soils, Medium and Heavy Textures**
+0.5		**0**		-0.5
Step 4- Organic Matter				
Organic Topsoil			**Humic Topsoil**	
+0.5			+0.5	
Step 5- Topsoil Limitations				
Surface Crusting			**Excessive Sand/High Shrink/Self-Mulching**	
-0.5			**-0.5**	
Step 6- Effective Soil Depth				
Very Shallow (<250 mm)			**Shallow (<250-500 mm)**	
-1.0			-0.5	

8 Sensitivity Verification

8.1 Land Capability Sensitivity

According to DAFF (2017), two classes of land capability sensitivity are located within the project area, namely “Moderate” and “High” (see Figure 8-1). It is worth noting that the “High” ranked sensitivity has been ground truthed and has been classified as having a very low potential. As for the crop boundary sensitivity (DFFE, 2021), various areas classified as having “High” sensitivity were identified within the 50 m regulated area. It is worth noting that these areas are indicative of sensitive agricultural land uses rather than potential.

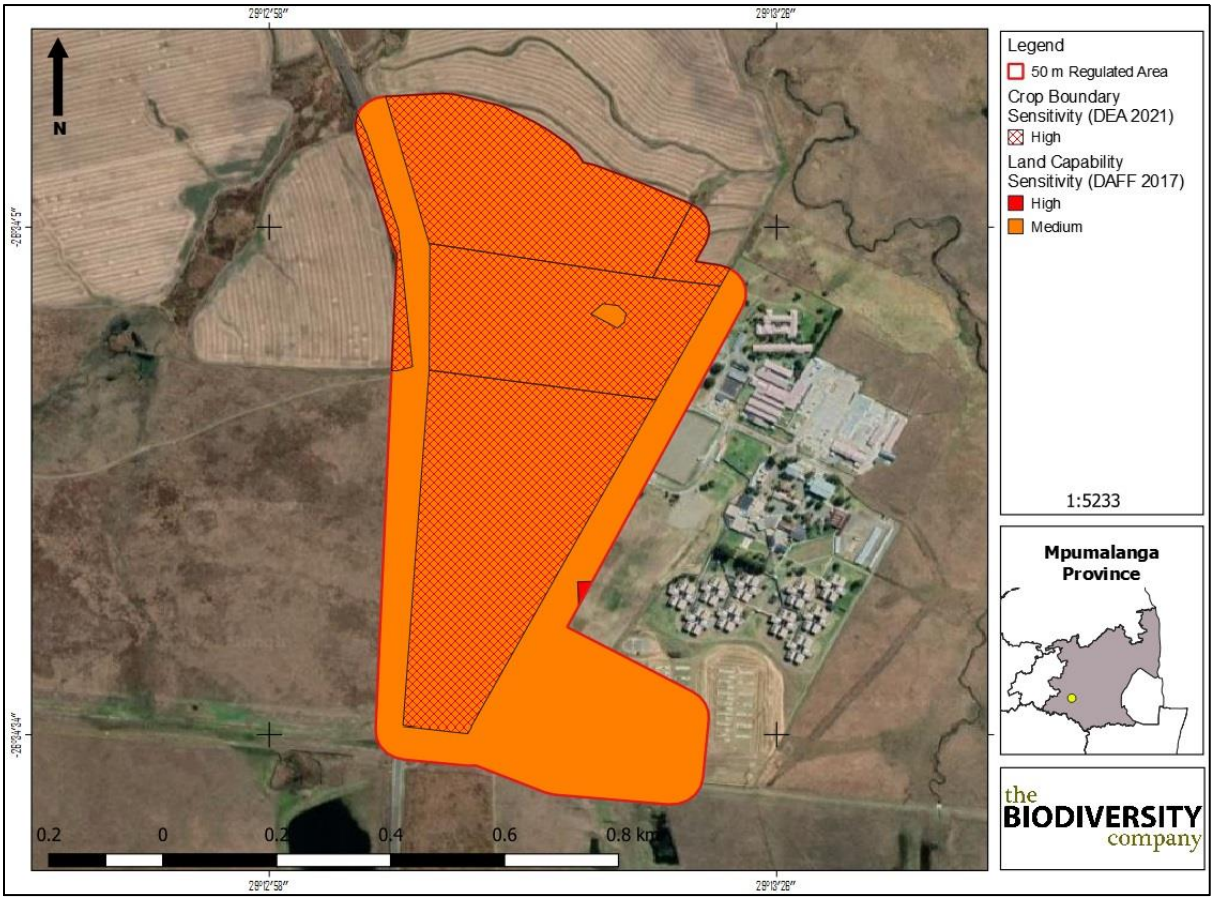

Figure 8-1 Land capability and crop boundary sensitivity

9 Impact Assessment

The impact assessment will consider the calculated sensitivities associated with the soil resources expected to be impacted upon by the relevant components. All proposed activities are expected to be long term (> 15 years) and have been considered "permanent" on this basis, which renders the decommissioning phase irrelevant. The proposed PV area will be assessed separately from the proposed powerline considering the difference in intensity as well as the sensitivity of impacts upon soil resources. This impact assessment will purely focus on the impacts expected towards natural resources (in specific, the soil and associated land capability). Social consideration needs to be taken in regard to compensation towards the landowner that currently utilises the crop fields.

9.1 Proposed PV Area

Construction Phase

During the construction phase, heavy vehicles (trucks) will be used to transport PV structures throughout the footprint area with reliance on manual labour for finer refinement. No vegetation is located within this area due to the dominance of crop fields. Potential erosion is possible during the construction phase, although limited due to the clay nature of the soil in the footprint area. The potential for contamination of soil resources from heavy vehicle oil leaks, which needs to be monitored by the ECO.

It is evident from the impact calculations in Table 9-1 that in a pre-mitigation state, moderate impacts are expected. The main mitigation objective would be to limit the area to be impacted upon by means of concrete pylons where possible, but rather installing pylons directly into the soil surface. In the event that this recommendation be adhered to, lower impacts are foreseen which ultimately results in a post-mitigation significance rating of "Low". It has been communicated to the specialist that this recommendation might not be feasible depending on the Geotech findings, therefore, a "Medium" post-mitigation significance rating will be relevant until more details surrounding the proposed foundations are made available.

Table 9-1 Impact assessment related to the loss of land capability during the construction phase of the proposed PV facility

Nature:* *Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Medium (30)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
***Mitigation:* See Section 10**		

Residual Impacts:	
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.	

Operational Phase

During the operational phase, limited impacts are foreseen. Vegetation cover will naturally re-establish in the area after cultivation practices cease. Maintenance of vegetation, as well as the occasional maintenance of PV structures will have to be carried out throughout the life of the project. It is expected that these maintenance practices can be undertaken by means of manual labour. Overland flow dynamics are expected to improve due to the change in land use from baron crop fields to a PV area predominantly being covered in basal cover.

Foundations will be concreted, which results in the post-mitigation ratings not changing from “Medium”.

Table 9-2 Impact assessment related to the loss of land capability during the operational phase of the proposed PV facility

Nature:* *Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
***Mitigation:* See Section 10**		
Residual Impacts:		
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

9.2 Proposed Powerline

Construction Phase

During the construction phase, heavy vehicles (trucks) will be used to transport powerline structures throughout the powerline corridor with reliance on manual labour for finer refinement. During this phase, impacts are expected towards low sensitivity soil resources in the form of excavations and installations of powerline pylons.

It is evident from the impact calculations in Table 9-1 that limited impacts are expected considering the low sensitivity of soil resources in the area, and the extent of the footprint associated with the placement of the proposed power line (< 1km in length). The proposed activities are therefore not expected to reduce the land capability of this area any further.

Table 9-3 Impact assessment related to the loss of land capability during the construction phase of the proposed powerline

Nature: *Loss of land capability*		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
***Mitigation:* See Section 10**		
Residual Impacts:		
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

Operational Phase

The only impacts expected towards the land capability of the area during the operation of the powerline includes potential erosion at the base of the powerline pylons. These impacts, together with the low sensitivity of the area, are expected to be minor. The pre-and post-mitigation significance ratings have been calculated to be "Low".

Table 9-4 Impact assessment related to the loss of land capability during the operational phase of the proposed powerline

Nature: *Loss of land capability*		
	Without mitigation	**With mitigation**
Extent	Very Low (1)	Very Low (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
***Mitigation:* See Section 10**		
Residual Impacts:		
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

9.3 Cumulative Impacts

Cumulative impacts within the proposed PV area and its surroundings have been determined to be low. Soil resources in the area have been impacted upon by means of built-up areas, yet, not to such an extent that the larger integrity of soil resources within the area are at stake.

Table 9-5 Impact assessment related cumulative impacts

Nature:* *Loss of land capability		
	Cumulative impact of the project and other projects in the area	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (18)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
***Mitigation:* See Section 10**		

10 Specialist Management Plan

Table 10-1 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators. The mitigations within this section have been taken into consideration during the impact assessment in cases where the post-mitigation environmental risk is lower than that of the pre-mitigation environmental risk. Additionally, the implementation of these strategies will improve the possibility of restoring degraded soil resources, which are likely to be impacted upon during the operational phase especially.

Table 10-1 Mitigation measures, including requirements for timeframes, roles and responsibilities

Action plan				
Phase	**Management action**	**Timeframe for implementation**	**Responsible party for implementation**	**Responsible party for monitoring/audit/review**
Planning phase	Investigate the possibility of avoiding large concrete areas	At least 6 months prior to the implementation of soil stripping or any other disturbances	Developer	Developer's Environmental Officer (dEO)
	Develop and implement a rehabilitation management and monitoring plan	At least 2 months prior to the implementation of soil stripping	Developer Specialist	dEO
Construction	Demarcate all access routes	This activity should be finished at least two weeks prior to any construction activities	Developer Contractor	Environmental Control Officer (ECO)
	Vegetate all stockpiles after stripping/removing soils	During construction phase	Contractor	ECO
	Storage of potential contaminants in bunded areas	During construction phase	Contractor	ECO
	All contractors must have spill kits available and be	During construction phase	Contractor	ECO

	trained in the correct use thereof. All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".	During construction phase	Contractor	ECO
	No cleaning or servicing of vehicles, machines and equipment in water resources.	During construction phase	Contractor	ECO
	Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.	During construction phase	Contractor	ECO
Operation	Continuously monitor erosion on site	During the timeframe assigned for the life of the PV plant	Operator	dEO
	Monitor compaction on site	During the timeframe assigned for the life of the PV plant	Operator	dEO

11 Conclusion and Impact Statement

11.1 Baseline Findings

Various soil forms have been identified which have been divided into six main land capability classes according to depth, texture, hydromorphic properties etc. (namely land capability class I, II, III, IV, V and VI). These land capability classes range from a "Low" to a "High" sensitivity, which concurs with the findings from the DEA screening tool. From these four classes as well as the poor climatic capability of "C7", four land potential levels were calculated, namely land potential 3, 5, 6 and "vlei". Therefore, the overall land potential is "Moderate" to "Low".

11.2 Specialist Findings

Considering the low post-mitigation significance ratings for all the aspects and phases, it is the specialist's opinion that no significant impacts towards the land capability resources are foreseen. Thus, the proposed development should be considered favourably by the relevant Competent Authority. It is however worth noting that crop fields within the proposed PV area are currently in use by the landowner.

12 References

Camp, K. (1995). The Bioresource Units of KwaZulu-Natal. Pietermaritzburg: Department of Agriculture, Environmental Affairs & Rural Development.

Land Type Survey Staff. (1972 - 2006). Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.

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.