PEDOLOGY SCOPING REPORT FOR ELANDSFONTEIN COLLIERY

Emalahleni, Mpumalanga

November 2019

CLIENT

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany

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1 Introduction

The Biodiversity Company (TBC) was appointed to conduct a pedology scoping assessment comprising desktop information and also a high-level impact identification and assessment for the Environmental Impact Assessment (EIA) for Elandsfontein colliery. The applicant plans to consolidate two mining right areas into a single mining right.

2 Document Structure

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

ENVIRONMENTAL REGULATION	DESCRIPTION	SECTION IN REPORT
NEMA EIA REGULATIONS 2014 (AS AMENDED)		
Appendix 6 (1)(a):	Details of – (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 3 and Appendix B
Appendix 6 (1)(b):	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
Appendix 6 (1)(c):	an indication of the scope of, and the purpose for which, the report was prepared;	Section 4
Appendix 6 (1)(ca):	an indication of the quality and age of base data used for the specialist report;	Section 8
Appendix 6 (1)(cb):	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 9
Appendix 6 (1)(d):	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
Appendix 6 (1)(e):	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 11
Appendix 6(1)(f):	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	N/A
Appendix 6(1)(g):	an identification of any areas to be avoided, including buffers;	N/A
Appendix 6(1)(h):	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 0
Appendix 6(1)(i):	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 0
Appendix 6(1)(j):	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 9
Appendix 6(1)(k):	any mitigation measures for inclusion in the EMPr;	Section 9
Appendix 6(1)(l):	any conditions for inclusion in the environmental authorisation;	N/A
Appendix 6(1)(m):	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
Appendix 6(1)(n):	a reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and	N/A

	(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
Appendix 6(1)(o):	a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
Appendix 6(1)(p):	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
Appendix 6(1)(q):	any other information requested by the competent authority.	N/A

3 Specialist Details

REPORT NAME	**PEDOLOGY SCOPING REPORT FOR ELANDSFONTEIN**
SUBMITTED TO	EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
THE CLIENT	jgeo
REPORT WRITER	**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..
REPORT 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. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
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.

4 Terms of Reference

The soil specific scope required is as follows:

- A soils study will be conducted 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;
- 20 soil samples will be taken from the opencast and underground areas to be sent away for chemical analyses. The results will serve as reference for rehabilitation purposes;
- The findings from the study will be used to determine the existing land capability and current land use of the entire surface area of the relevant portions of the study area;
- Soil sampling during the field work was based on a grid of 150 x 150 m for the areas where opencast mining will occur, while a grid of 300 x 300 m was required for the remaining surface areas;
- 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.

5 Project Description

The Elandsfontein Colliery is located in the Witbank Coal Field on the farm Elandsfontein 309 JS. The property is approximately 16 km west of the town of Witbank in the Mpumalanga Province, South Africa. The centre point of the site is 25°53'05.01"S and 29°05'36.57"E. The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated Environmental Management Programme (EMPr). In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e. new opencast & underground areas within the consolidated mining right boundary) (GSW, 2019). The area surrounding the project area consists predominantly of mining activities, secondary roads and agricultural areas.

The various land-use activities within, and adjacent to the project area have impacted upon the associated ecosystems according to available desktop information. A locality map of the project area is shown in Figure 1.

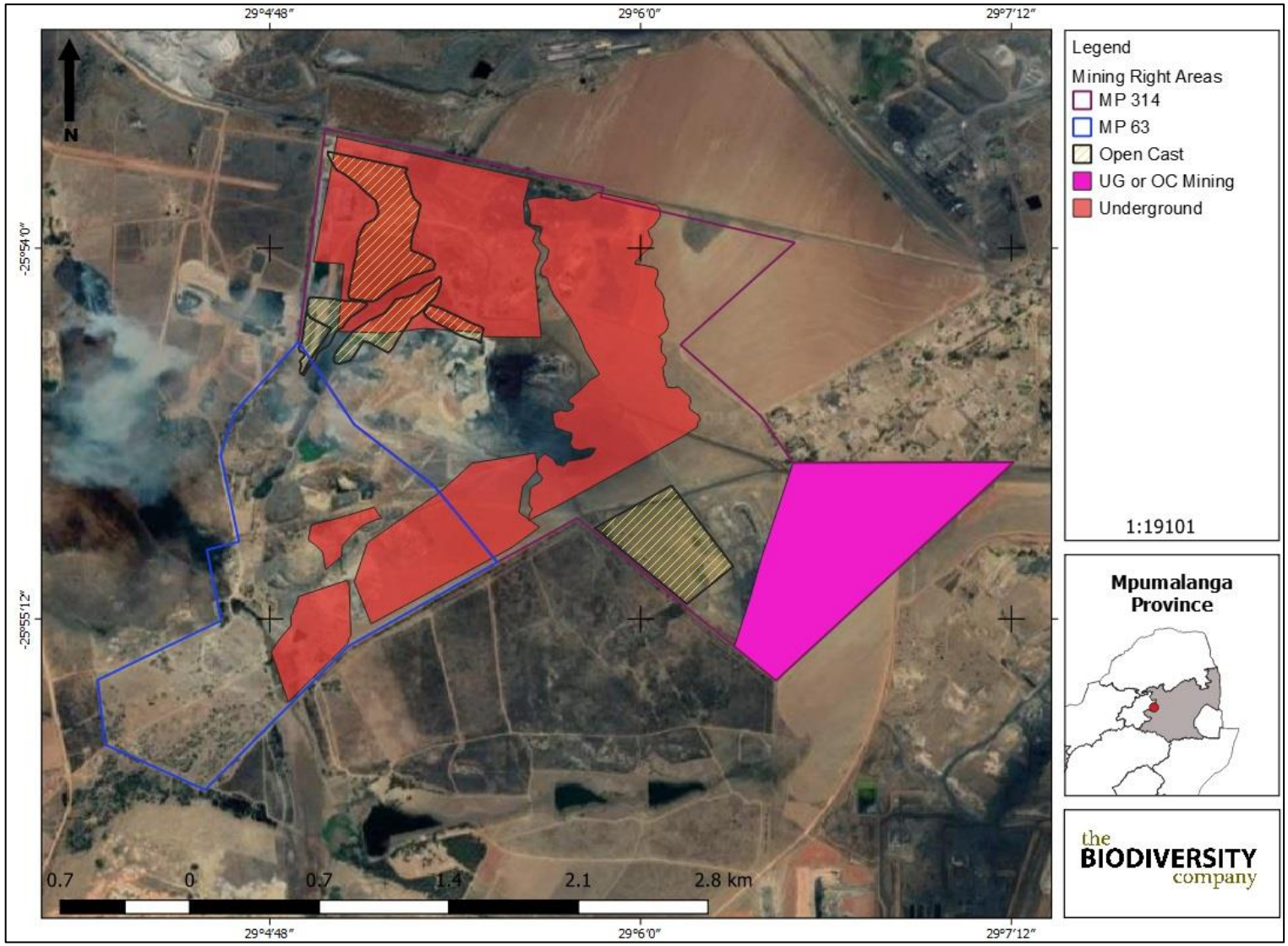

Figure 1: The proposed Elandsfontein project area

6 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);
- National Environmental Management Act (Act 107 of 1998); and
- National Water Act (Act 36 of 1998).

7 Limitations

The following limitations should be noted for the study:

- This assessment represents the Scoping Phase of the project only;
- A detailed pedology baseline and impact assessment report will be submitted for the Environmental Impact Assessment (EIA) phase of the project;
- The impact assessment has only been conducted for the proposed opencast and underground mining areas; and
- A field survey still needs to be conducted to advise on the viability of the alternatives.

8 Receiving Environment

8.1 Vegetation Types

The MRA is located within two vegetation types, including the Rand Highveld Grassland (Gm 11) Eastern Highveld Grassland (Gm 12). The distribution of the Rand Highveld Grassland ranges between the North-West, Gauteng, Free State and Mpumalanga provinces. This vegetation type can be found between rocky ridges specifically between Witbank and Pretoria. The Rand Highveld

Grassland extends into these ridges in the Stoffberg area as well as west of Krugersdorp stretching all the way to Potchefstroom. The preferred altitude for this vegetation type is between 1300m and 1635m above sea level (Mucina & Rutherford, 2006).

Grass species commonly found in these regions include the genera *Themeda. Eragrostis, Elionurus* and *Heteropogon*. The diversity of herbs is high in these regions with rocky ridges and hills being colonized by sparse woodlands accompanied by a rich suite of shrubs with the genus *Rhus* making up the bulk thereof (Mucina & Rutherford, 2006). The sparse woodlands in this vegetation type includes species like *Protea caffra* subsp., *Caffra, Acacia caffra, P. Welwitschii* etc.

The project area falls within the Eastern Highveld Grassland (Gm 12) vegetation type. This vegetation type is located in the Gauteng and Mpumalanga province within the plains between Belfast and Johannesburg. This vegetation type also extends to Bethal, the western areas of Piet Retief and Ermelo. The altitude in which this vegetation type occurs ranges between 1 520 meters above sea level to 1 780 meters above sea level (Mucina & Rutherford, 2006).

The vegetation of this vegetation type is characterised by short and dense grasslands that occur in moderately undulating plains which include low hills and pan depressions (Mucina & Rutherford, 2006). Small scattered rocky outcrops are common in this area with wiry, sour grasses accompanied by some woody species which include *Celtis africana, Parinari capensis, Protea caffra* etc.

The conservation status of the Gm 12 vegetation type is endangered with a target percentage of 24. Half of the area is already transformed into agriculture, mining, urban etc. with a handful of conservation areas still up and running. These include Holkranse, Nooitgedacht Dam and Morgenstond (just to name a few) (Mucina & Rutherford, 2006).

8.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Bb 13 and the Ba 5 land types. Figure 2 illustrates the respective terrain units relevant to the Bb 13 land type with the expected soils illustrated in Table 2. Figure 3 illustrates the respective terrain units relevant to the Ba 5 land type with the expected soils illustrated in Table 3.

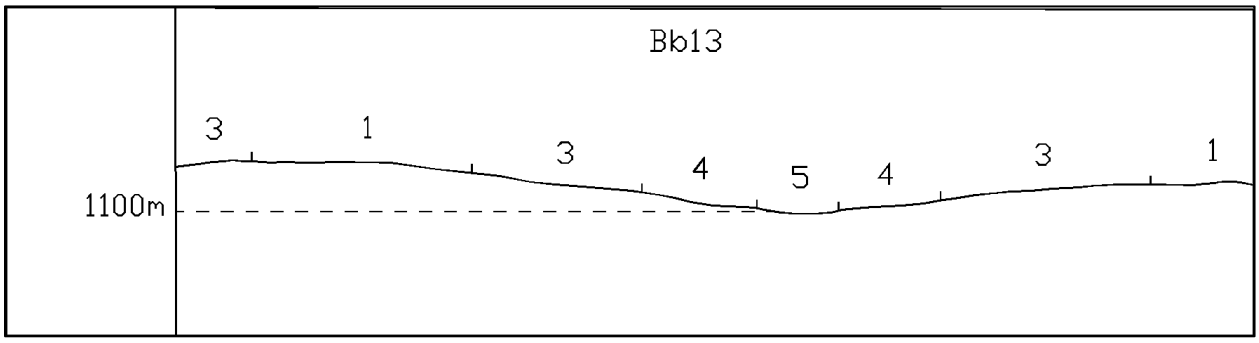

Figure 2: Illustration of land type Bb 13 terrain units (Land Type Survey Staff, 1972 - 2006)

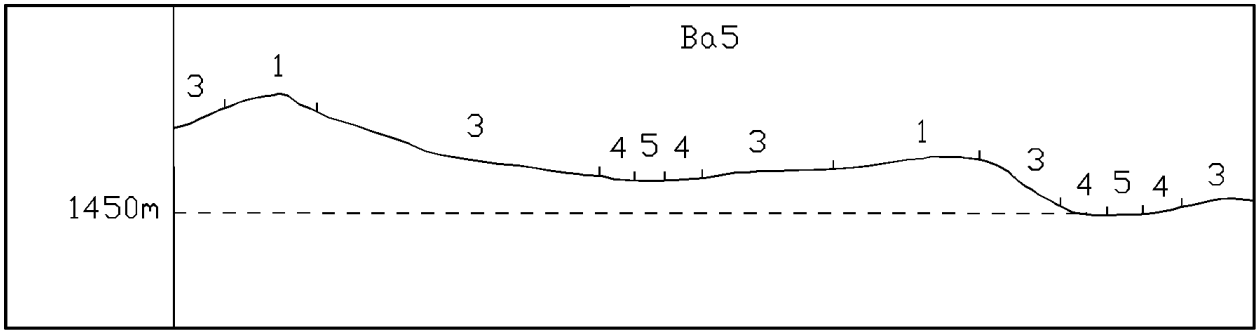

Figure 3: Illustration of land type Ba 5 terrain units (Land Type Survey Staff, 1972 - 2006)

Table 2: Soils expected at the respective terrain units within the Bb 13 land type (Land Type Survey Staff, 1972 - 2006)

Terrain units							
1 (40%)		**3 (45%)**		**4 (10%)**		**5 (5%)**	
Clovelly	45	Avalon	35	Avalon	30	Katspruit	40
Glencoe	25	Clovelly	35	Longlands	25	Kroonstad	30
Hutton	15	Hutton	10	Kroonstad	15	Fernwood	20
Avalon	15	Glencoe	10	Glencoe	10	Longlands	10
		Longlands	5	Wasbank	10		
		Kroonstad	5	Fernwood	10		

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

Terrain units							
1 (20%)		**3 (60%)**		**4 (15%)**		**5 (5%)**	
Hutton	60	Hutton	40	Hutton	25	Rensburg	50
Glenrosa	20	Avalon	15	Avalon	15	Katspruit	30
Clovelly	10	Glencoe	10	Longlands	15	Swartland	20
		Glenrosa	10	Kroonstad	10		
		Clovelly	5	Bonheim	10		
		Longlands	5	Clovelly	10		
		Swartland	5	Swartland	5		
		Wasbank	5	Glencoe	5		
		Mispah	5	Wasbank	5		

The geology of this vegetation type is characterised by the Pretoria group and the Witwatersrand Subgroup's quartzite ridges as well as the Rooiberg Group's Selons River Formation which is from the Transvaal Supergroup. The parent geology from this vegetation type supports shallow soils like Glenrosa and Mispah which typically forms on slopes and ridges where topsoil is likely to wash off (Mucina & Rutherford, 2006).

8.3 Climate

The climate for the Rand Highveld Grassland is characterised by a summer rainfall with a mean annual precipitation of 654mm which is slightly lower in the western parts of this vegetation type see (Figure 4). These areas are known to have warm-temperate conditions with dry winters. The likelihood of frost however is greater in the western parts with the incidence of frost ranging from 30 to 40 days compared to the east which has a frost incidence of 10 to 35 days (Mucina & Rutherford, 2006). This vegetation type is also classified as endangered even though very little conservation has been done for this vegetation type.

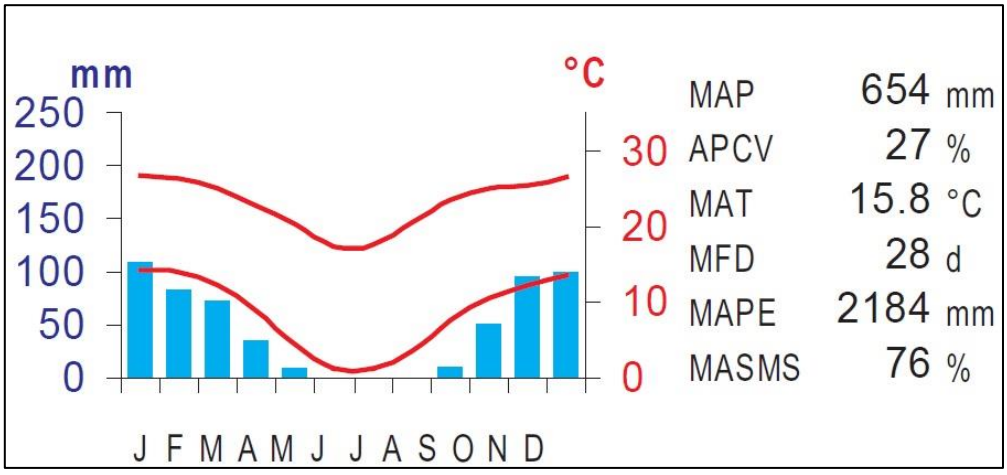

Figure 4: Climate for the Rand Highveld Grassland (Mucina & Rutherford, 2006)

8.4 Digital Elevation Model

The elevation of the project area (in Meters Above Sea Level (MASL)) is illustrated in Figure 5. The elevation of the MRAs range between 1 471 MASL to 1 571 MASL, ultimately indicating a difference of 100 m (vertically) between the valley bottom and the crest.

8.5 Slope Percentage

The slope percentage of the project area is illustrated in Figure 6. The slope percentage ranges between 0 and 3 with the majority of the MRA characterised by a slope percentage between 0 and 1, which indicates a gentle slope.

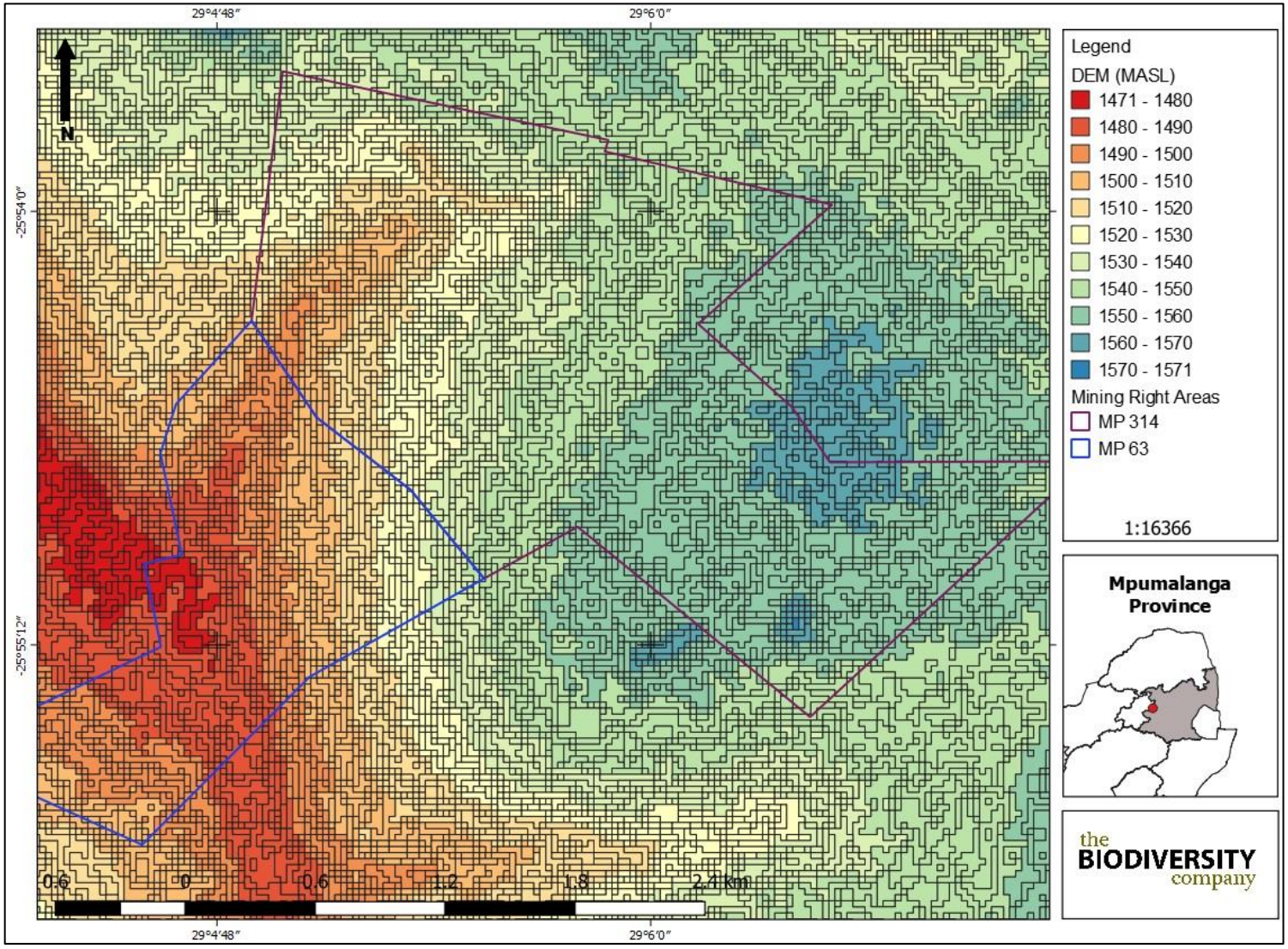

Figure 5: Digital elevation model for the relevant Mining Right Areas

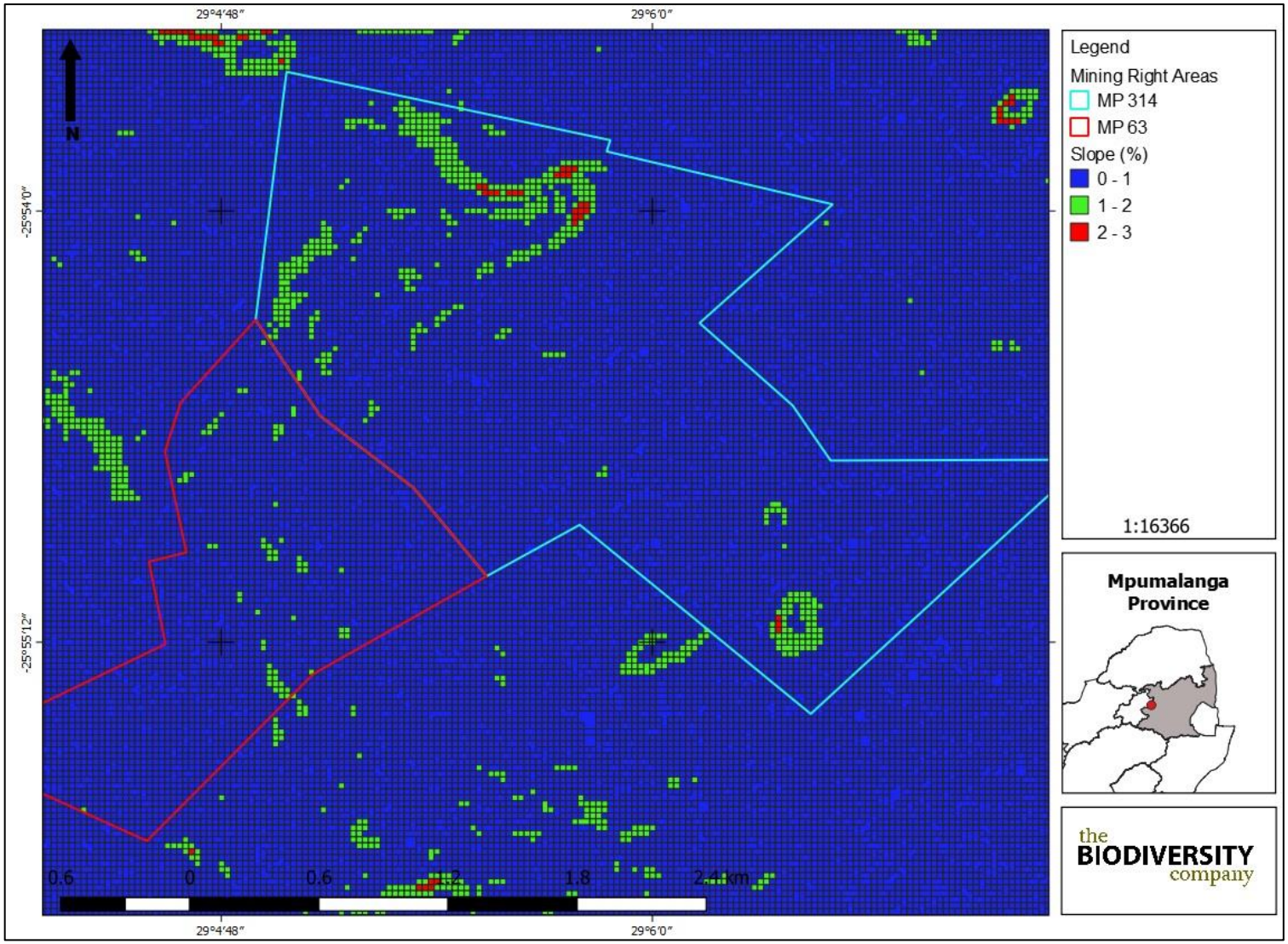

Figure 6: Slope percentage of the project area

9 Impact Assessment

The summarised impact assessment is a prediction of the risks/impacts that will be associated with the mining phases associated with the proposed opencast and underground mining areas. A full impact assessment will be completed once the final fieldwork assessment has been conducted. The risk assessment ranges from high to low for the anticipated risks and activities associated with the project. One main impact has been taken into consideration for the proposed activities, namely “Loss of Land Capability”.

It is worth noting that the subsidence investigation report (Geomech Consulting, 2019) indicated various areas characterised by a “High” risk of subsidence, with various other areas characterised by “Moderate” risks (see Figure 7).

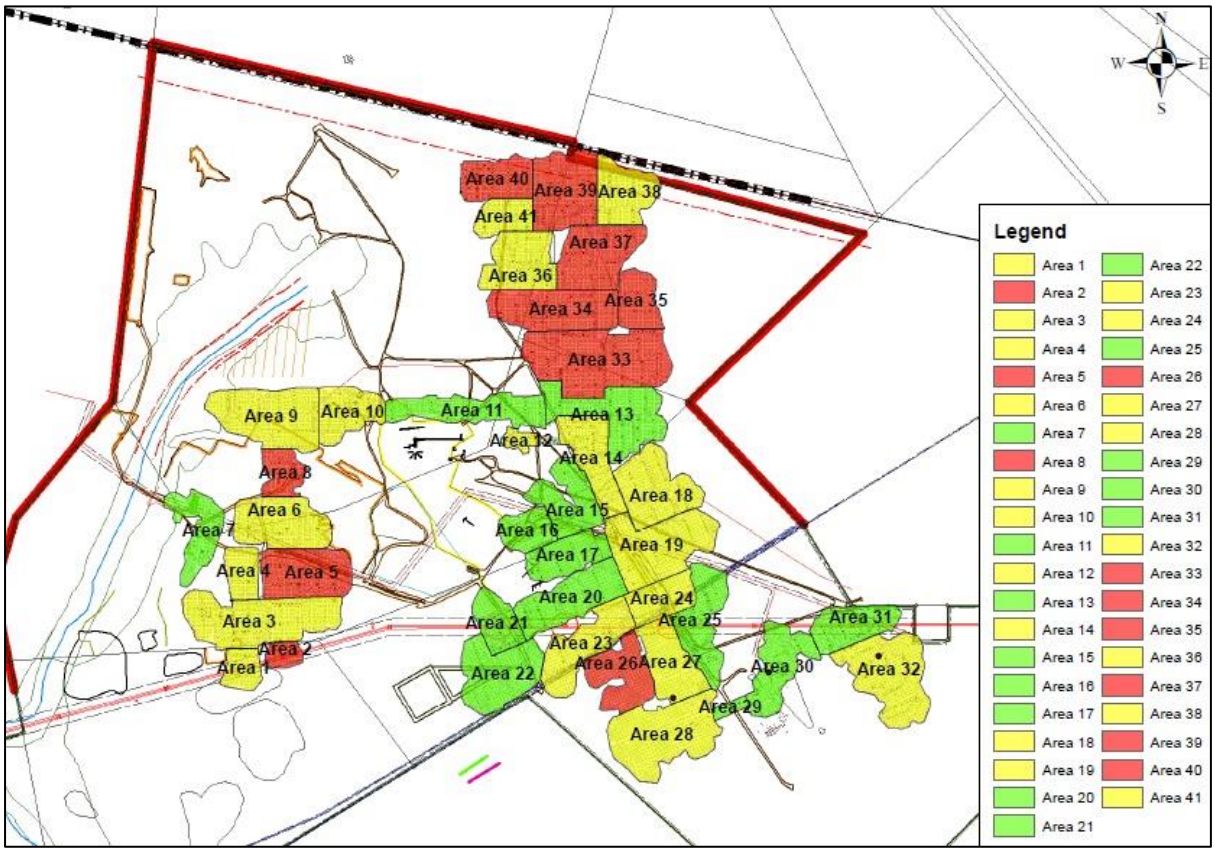

Figure 7: Subsidence risk level

9.1 Planning Phase

Opencast and Underground Mining

The final significance rating has been determined to be “Low” given the duration of planning activities, the lower magnitude of impacts and the fact that roads already are in existence throughout the project area, which will be utilised during the planning phase.

9.1.1 Mitigation

No mitigation measures are required for this phase, given the fact that the pre- and post-mitigation environmental risks are expected to be the same (“Low”).

9.1.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of degraded soil resources as a result of mining activities.

9.1.3 Irreplaceable Loss

The planning phase of the relevant activities are not expected to result in irreplaceable loss of soil resources.

9.2 Construction Phase

Opencast Mining

The final significance rating for the construction of the opencast mine and associated infrastructure has been determined to be associated with a “Moderate” final significance score. This includes blasting activities, construction of associated infrastructure and stripping of topsoil.

Underground Mining

The final significance rating for the construction of the underground mine and associated infrastructure has been determined to be associated with a “Low” final significance score. This includes blasting activities, construction of associated infrastructure and stripping of topsoil.

9.2.1 Mitigation

The following mitigation measures are prescribed to ensure the final significance rating mentioned above is reached;

- If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;
- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- Only the designated access routes are to be used to reduce any unnecessary compaction;
- Compacted areas are to be ripped to loosen the soil structure;
- The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks;
- Topsoil stockpiles are to be kept to a maximum height of 4 m;
- Topsoil is to be stripped when the soil is dry, as to reduce compaction;
- The subsoil approximately 0.3 – 0.8 m thick will then be stripped and stockpiled separately;
- The handling of the stripped topsoil will be minimised to ensure the soil’s structure does not deteriorate significantly;

- Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles;
- The stockpiles will be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.
- Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks;
- If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities;
- All vehicles are to be serviced in a correctly bunded area or at an off-site location;
- Subsidence monitoring must occur quarterly with any signs of subsidence reported;
- Leaking vehicles will have drip trays place under them where the leak is occurring;
- Pipelines must be maintained; and
- If there are leaks the pipelines must be repaired immediately.

9.2.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of degraded soil resources as a result of mining activities.

9.2.3 Irreplaceable Loss

The construction phase of the relevant activities may result in irreplaceable loss of soil resources.

9.3 Operational Phase

Opencast Mining

The final significance rating for the operations of the opencast mine and associated infrastructure has been determined to be associated with a “High” final significance score. This includes blasting activities, traffic of heavy machinery, erosion etc, degradation of stockpiles etc.

Underground Mining

The final significance rating for the operations of the underground mine and associated infrastructure has been determined to be associated with a “Moderate” final significance score. This includes blasting activities, traffic of heavy machinery, erosion etc, degradation of stockpiles etc.

9.3.1 Mitigation

The following mitigation measures are prescribed to ensure the final significance rating mentioned above is reached;

- If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;

- If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion;
- Only the designated access routes are to be used to reduce any unnecessary compaction;
- Compacted areas are to be ripped to loosen the soil structure;
- The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks;
- Topsoil stockpiles are to be kept to a maximum height of 4 m;
- Topsoil is to be stripped when the soil is dry, as to reduce compaction;
- The subsoil approximately 0.3 – 0.8 m thick will then be stripped and stockpiled separately;
- The handling of the stripped topsoil will be minimised to ensure the soil's structure does not deteriorate significantly;
- Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles;
- The stockpiles will be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.
- Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks;
- If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities;
- All vehicles are to be serviced in a correctly bunded area or at an off-site location;
- Subsidence monitoring must occur quarterly with any signs of subsidence reported;
- Leaking vehicles will have drip trays place under them where the leak is occurring;
- Pipelines must be maintained; and
- If there are leaks the pipelines must be repaired immediately.

9.3.2 Cumulative Impact

The cumulative impact rating has been scored "High" given the extent of degraded soil resources as a result of mining activities.

9.3.3 Irreplaceable Loss

The operational phase of the relevant activities may result in irreplaceable loss of soil resources.

9.4 Decommissioning Phase

Opencast and Underground Mining

The final significance rating has been determined to be “Low” given the duration of decommissioning activities and the low magnitude expected for the proposed activities.

9.4.1 Mitigation

No mitigation measures are required for this phase, given the fact that the pre- and post-mitigation environmental risks are expected to be the same (“Low”). All degraded areas must be investigated during the rehabilitation phase and tended to accordingly.

9.4.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of degraded soil resources as a result of mining activities.

9.4.3 Irreplaceable Loss

The decommissioning phase of the relevant activities are not expected to result in irreplaceable loss of soil resources.

9.5 Rehabilitation and Closure Phase

Opencast and Underground Mining

The final significance rating has been determined to be “Low” given fact that the rehabilitation phase will be focussed on rehabilitating degraded areas, which could result in an improvement of environmental conditions.

9.5.1 Mitigation

No mitigation measures are required for this phase, given the fact that the pre- and post-mitigation environmental risks are expected to be the same (“Low”).

9.5.2 Cumulative Impact

The cumulative impact rating has been scored “High” given the extent of degraded soil resources as a result of mining activities.

9.5.3 Irreplaceable Loss

The rehabilitation and closure phase of the relevant activities are not expected to result in irreplaceable loss of soil resources.

10 Conclusion

It is apparent from the scoping phase that the project area is characterised by freely drained soils, predominantly Clovelly, Glencoe and Hutton soils. The project area also is characterised by a gentle slope (between 0 and 1%) with a large portion already disturbed by means of mining activities. Various areas within the MRAs have been determined to have “Moderate” and “High” subsidence risks, which indicates the potential of land capability being lost due to subsidence.

“Low” to “High” final significance ratings have been calculated for the opencast and underground mining activities, with both activities being characterised by “Low” final significance ratings during the planning, decommissioning and rehabilitation phase.

11 Terms of Reference of Final Study

11.1 Field Survey

The site will be traversed by vehicle and on foot. A soil auger will be used to determine the soil form/family and depth. The soil was 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, 1991). Landscape features such as existing open trenches were also helpful in determining soil types and depth.

11.2 Agricultural Potential Assessment

Land capability and agricultural potential is 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 (Smith, 2006)

Land capability is divided into eight classes and these may be divided into three capability groups. Table 4 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 4: 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	VI C	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.

Table 5: 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: 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

11.3 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.

12 References

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13 Appendices

Appendix A: Specialist declarations

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

Wetland Ecologist

The Biodiversity Company

November 2019

Appendix B: Specialist CV

Ivan John Baker

Masters in Environmental Science and Hydropedology

Cell: +27 79 898 4056

Email: ivan@thebiodiversitycompany.com

Identity Number: 9401105251087

Date of birth: 10 January 1994

Profile Summary

Working experience throughout Southern Africa

Working experience in West-Africa

Specialist experience with mining, construction and agriculture.

Specialist expertise include hydropedology, pedology, land contamination, agricultural potential, land rehabilitation, rehabilitation management and wetlands resources.

Experience hydropedological modelling (HYDRUS model)

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Farming, Land contamination, Sustainability and Conservation.

Key Experience

- Environmental Impact Assessments (EIA)
- Environmental Management Programmes (EMP)
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Soil-and rock classification
- Level 1, 2 and 3 hydropedology assessments
- Agriculture potential assessments
- Land contamination assessments
- Modulation of surface- and subsurface flows (HYDRUS model)

Countries worked in

South Africa	Mozambique
Swaziland	Zimbabwe
Guinea	

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- MSc (North-West University of Potchefstroom) – Hydropedology
- BSc Honours (North-West University of Potchefstroom) – Environmental geology- Pedology and rehabilitation
- BSc Environmental sciences
- Pr Sci Nat candidateship

SELECTED PROJECT EXPERIENCE

Project Name: Environmental impact assessment for the construction of Road DR08606 leading to Mlamli Hospital, Sterkspruit

Client: EIMS

Personal position / role on project: Wetland ecologist

Location: Sterkspruit, Eastern Cape Province, South Africa

Main project features: To conduct a wetland assessment, as a component of the environmental authorisation process and Water Use Licence Application (WULA) for the construction of Road DR08606 leading to Mlamli Hospital

Project Name: Biodiversity Baseline & Impact Assessment Report for the proposed Nondvo Dam Project

Client: WSP

Personal position / role on project: Wetland ecologist

Location: Mbabane, Swaziland

Main project features: To conduct various assessments according to IFC standards in regard to delineation of wetlands and assessing ecosystem services.

Project Name: Agricultural Potential Assessment - Proposed Kalabasfontein Coal Mining Project Extension

Client: Nemai EIMS.

Personal position / role on project: Project Manager and Soil Specialist.

Location: Bethal, Mpumalanga, South Africa

Main project features: To conduct a soil assessment to identify any sensitive resources that might be affected by the proposed mining activities and associated infrastructure as part of an environmental impact assessment.

Project Name: Soil assessment for the closure of the St Helena Shaft, Harmony

Client: EIMS

Personal position / role on project: Soil specialist

Location: Welkom, Free State, South Africa

Main project features: To conduct a thorough soil and fertility assessment to recommend relevant mitigation and rehabilitation measures to finalise closure at the relevant mine

Project Name: Wetland Functionality Assessment for the Environmental, Health and Socio-Economic Baseline Studies for Block 2 at Siguiri Gold Mine

Client: SRK Consulting

Personal position / role on project: Wetland ecologist

Location: Siguiri, Guinea, West-Africa

Main project features: To conduct various assessments according to IUCN standards in regard to delineation of wetlands and assessing ecosystem services.

Project Name: Level 3 Hydropedological Assessment for the Sara Buffels Mining Project

Client: Alegna Environmental Consulting

Personal position / role on project: Hydropedologist

Location: Ermelo, Mpumalanga, South-Africa

Main project features: To conduct various assessments to determine the hillslope hydrology and to acquire information relevant to the vadose zone's hydraulic properties to quantify sub-surface flows by means of modelling.

Project Name: Level 3 Hydropedological Assessment for the Buffalo Coal Mining Project

Client: Agreenco

Personal position / role on project: Hydropedologist

Location: Dundee, KwaZulu-Natal, South-Africa

Main project features: To conduct various assessments to determine the hillslope hydrology and to acquire information relevant to the vadose zone's hydraulic properties to quantify sub-surface flows by means of modelling

Project Name: Biodiversity Baseline & Impact Assessment for the proposed Tetereane 15MW Solar PV Plant

Client: WSP

Personal position / role on project: Ecosystem Services Specialist

Location: Cuamba, Mozambique, Southern-Africa

Main project features: To conduct various assessments according to IUCN standards in regard to ecosystem services

Project Name: Land contamination assessment for the proposed Fleurhof Development

Client: Geo Soil and Water

Personal position / role on project: Soil Specialist

Location: Fleurhof, South Africa

Main project features: To conduct assessments relevant to the determination of land contamination, including recommendations, mitigations and risk assessments.

OVERVIEW

An overview of the specialist technical expertise include the following:

- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for wetland systems.
- Soil classification and agricultural assessments.
- Stripping and stockpiling guidelines.
- Soil rehabilitation plans.
- Soil and stockpile monitoring plans.
- Hydro pedological assessments.

TRAINING

Some of the more pertinent training undergone includes the following:

- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2018; and
- Workshop on digital soil mapping.

EMPLOYMENT EXPERIENCE

Internship at SRK consulting (January 2017-August 2017)

- **Field assistant** for SRK consulting during 2017 included the sampling of surface and groundwater as well as on site tests, the accumulation of various different data sets from field loggers, presenting and arranging the relevant data and ultimately using it for my own personal post-graduate studies.

Internship at The Biodiversity Company (August 2017-December 2017)

Employed as an intern (wetland and soil scientist) during the last few months of 2017. During this period, I was part of a variety of soil- and wetland projects, both as report writer and/or field assistant.

CURRENT EMPLOYMENT: The Biodiversity Company (January 2018 – Present)

- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.

ACADEMIC QUALIFICATIONS

North-West University of Potchefstroom (2018): MAGISTER SCIENTIAE (MSc) - Hydropedology:

Title: *Characterisation of vadose zone processes in a tailings facility*

North-West University of Potchefstroom (2016): BACCALAUREUS SCIENTIAE HONORIBUS (Hons) – Environmental Geology- Pedology and rehabilitation

North-West University of Potchefstroom (2015): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Geology and Geography