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Agricultural Compliance Statement for the proposed Gunstfontein Battery Energy Storage System

Submitted by TerraAfrica Consult cc

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3 September 2020

Declaration of the Specialist

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Declaration of Independence

I, Mariné Pienaar, hereby declare that TerraAfrica Consult, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

I further declare that I was responsible for collecting data and compiling this report. All assumptions, assessments and recommendations are made in good faith and are considered to be correct to the best of my knowledge and the information available at this stage.

TerraAfrica Consult cc represented by M Pienaar
September 2020

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1. Introduction

TerraAfrica Consult cc was appointed by Savannah Environmental (Pty) Ltd to conduct the agricultural compliance assessment as part of the Basic Assessment (BAR) process for the proposed Gunstfontein Battery Energy Storage System (BESS). The project applicant is Gunstfontein Wind Farm (Pty) Ltd. The Gunstfontein BESS will be located on the Remaining Extent of Farm Gunstfontein 131 that are part of the Karoo Hoogland Local Municipality and within the Namakwa District Municipality. The nearest towns to the proposed project are Sutherland in the north and Matjiesfontein to the south (Figure 1).

This project will form part of the Gunstfontein Wind Farm for which Environmental Authorisation was already granted (DEA Ref No: 14/12/16/3/3/2/826). The Gunstfontein BESS will be approximately 3 to 4 ha in extent and will be located in close proximity to the facility substation. The BESS will be connected to the substation either by an overhead grid connection or alternatively via below-ground grid connection. This connection is anticipated to have voltage of 33 kV or less.

For the purpose of the assessment, a buffered area of 500m around the facility substation was selected. This area is from here onwards referred to as the “project assessment zone”. A preliminary infrastructure layout plan was provided although it is understood that the infrastructure may be positioned differently within the assessment zone once the project commences.

2. Purpose and objectives of the compliance statement

The overarching purpose of the Agricultural Compliance Statement that will be included in the Basic Assessment Report, is to ensure that the sensitivity of the site from the perspective of agricultural production to the proposed construction of a battery energy storage system, is sufficiently considered. Also, that the information provided in this report, enables the Competent Authority to come to a sound conclusion on the impact of the proposed project on the food production potential of the study area and development area, and that therefore the location provided is not final and that the BESS may be sited anywhere within the 500m project assessment zone.

To meet this objective, site sensitivity verification must be conducted of which the results must meet the following objectives:

- It must confirm or dispute the current land use and the environmental sensitivity as was indicated by the National Environmental Screening Tool. **Please refer to Section 9.3 for confirmation of the screening tool report.**
- It must contain proof in the form of photographs of the current land use and environmental sensitivity pertaining to the study field. **Please refer to Chapter 9 for detail and proof of current land use.**
- All data and conclusions are submitted together with the Basic Assessment Report (prepared in accordance with the NEMA regulations) for the proposed Gunstfontein

BESS. **This report will be submitted as part of the Basic Assessment being conducted for environmental authorisation by Savannah Environmental.**

According to GN320, the agricultural compliance statement that is submitted must meet the following requirements:

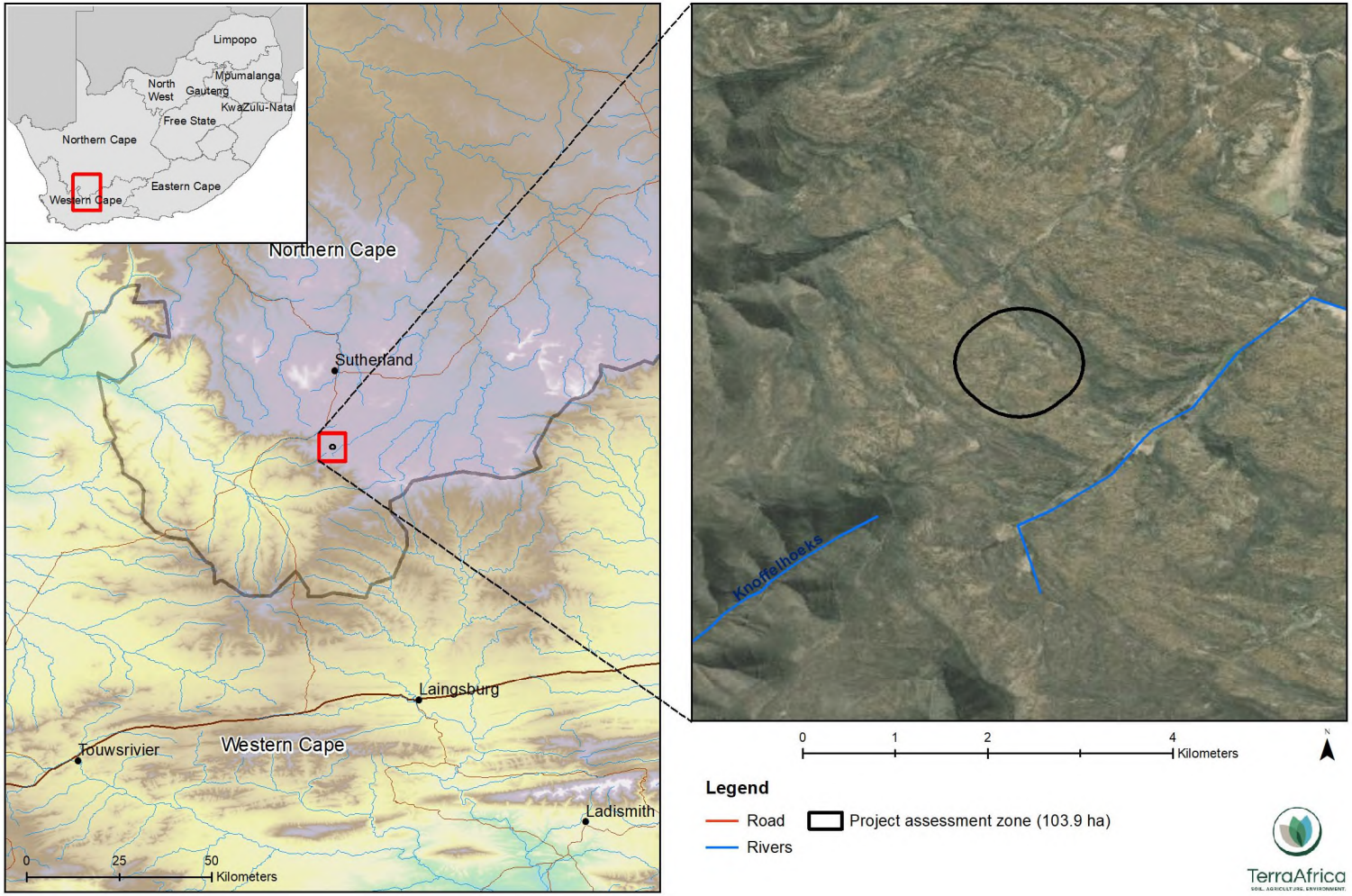


Figure 1: Locality map of the proposed Gunstfontein BESS project assessment zone

- It must be applicable to the preferred site and the proposed development footprint.
- It has to confirm that the site is of “low” or “medium” sensitivity for agriculture.
- It has to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

The following checklist is supplied as per the requirements of GNR 320, detailing where in the report the various requirements have been addressed:

GNR 320 requirements of an Agricultural Compliance Statement (Low to Medium Sensitivity)	Reference in this report
3.1. The compliance statement must be prepared by a soil scientist or agricultural specialist registered with the SACNASP.	Page 2
3.2. The compliance statement must: 3.2.1. be applicable to the preferred site and proposed development footprint;	Page 6
3.2.2. confirm that the site is of "low" or "medium" sensitivity for agriculture; and	Section 9.3
3.2.3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.	Section 12
3.3. The compliance statement must contain, as a minimum, the following information: 3.3.1. contact details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vitae;	Page 2
3.3.2. a signed statement of independence;	Page 2
3.3.3. a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	Figure 2
3.3.4. confirmation from the specialist that all reasonable measures have been taken through micro- siting to avoid or minimise fragmentation and disturbance of agricultural activities;	Section 12
3.3.5. a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development;	Section 12
3.3.6. any conditions to which the statement is subjected;	Section 10
3.3.7. in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	N/A – not a linear activity
3.3.8. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr; and	Section 10
3.3.9. a description of the assumptions made as well as any uncertainties or gaps in knowledge or data.	Section 7
3.4. A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	This report forms part of the BA process

	reports for authorisation

3. Terms of Reference

In addition to the requirements stipulated in GN320, the following Terms of Reference as stipulated by Savannah Environmental (Pty) Ltd applies to the Agricultural Compliance Statement:

- To ensure a thorough assessment, that includes both the desktop assessment of databases and aerial photography as well as on-site verification of the agricultural potential of the area to be affected by the Gunstfontein BESS.
- Identify and assess potential impacts on both agricultural potential as well as soil, resulting from the proposed project.
- Identify and describe potential cumulative soil, agricultural potential and land capability impacts resulting from the proposed development in relation to proposed and existing developments in the surrounding area.
- Recommend mitigation, management and monitoring measures to minimise impacts and/or optimise benefits associated with the proposed project.

4. Agricultural Sensitivity

The combined Agricultural Sensitivity of the Gunstfontein BESS project assessment zone was determined by using the National Environmental Screening Tool (www.screening.environment.gov.za). The Agricultural Theme of the screening tool considers a combination of the national land capability raster data as well as the field crop boundaries as compiled by Department of Agricultural, Forestry and Fisheries (DAFF) (DAFF 2017, DAFF 2019).

The screening report was generated by Savannah Environmental (Pty) Ltd on 12 June 2020. The requirements of GN320 stipulates that a 50m buffered development envelope must be assessed with the screening tool. The 500m project assessment zone that was used is therefore more than sufficient exceeds the requirement of a 50m buffer zone around the proposed areas of impact.

The results provided by the screening tool indicated that the site has Medium to Low sensitivity to the proposed development (Figure 2).

5. Environmental legislation and soil management guidelines applicable to study

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GN320). This Notice provides the procedures and minimum criteria for reporting

in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (from here onwards referred to as NEMA). It replaces the previous requirements of Appendix 6 of the Environmental Impact Assessment Regulations of NEMA.

Since the results of the environmental screening report indicated that the area has Medium to Low sensitivity with regards to the combined agricultural theme, an Agricultural Compliance Statement is required as part of the Basic Assessment process. In addition to the specific requirements of GN320 for this study, the following South African legislation is also considered applicable to the interpretation of the data and conclusions made with regards to environmental sensitivity and the conservation of soil resources of the project area:

- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. This Act requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- Section 3(a) of the Subdivision of Agricultural Land Act 70 of 1970 states that agricultural land must not be subdivided. Although the Great Karoo BESS Basic Assessment is not for the purpose of a subdivision of agricultural land, it will change the current land use from extensive livestock production to that of infrastructure associated with renewable energy generation.
- In addition to this, the National Water Act (Act 36 of 1998) deals with the protection of water resources (i.e. wetlands and rivers).

6. Methodology

The different steps that were followed to gather the information used for the compilation of this report, is outlined below. The methodology is in alignment with the requirements of GN320.

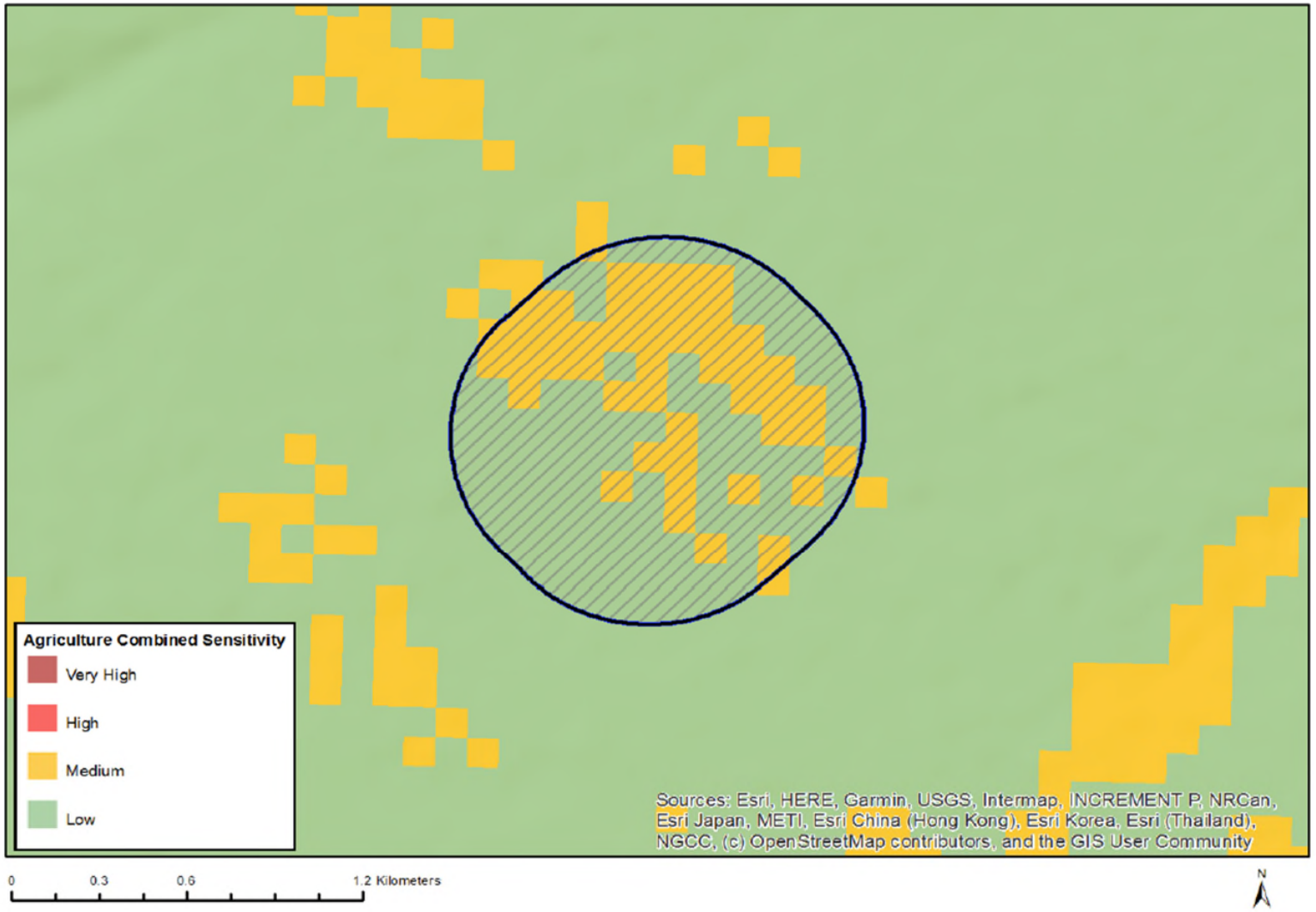


Figure 2 Agricultural Combined Sensitivity of the Gunstfontein project assessment zone (generated by Savannah Environmental, 12 June 2020)

6.1 Desktop analysis of satellite imagery

The most recent aerial photography of the area available from Google Earth was obtained. The satellite imagery was analysed to determine areas of existing impact and land uses within the grid connection corridor as well as the larger landscape. It was also scanned for any areas where crop production and farming infrastructure may be present.

6.2 Site assessment

The project assessment zone was visited by Simon Todd of 3Foxes Biodiversity Solutions on 6 August 2020. During the site visit, photographic evidence was collected on the typical soil characteristics of the project assessment zone. The photos together with other relevant information on the land use of the area, was used towards on-site verification of the available data sets and existing reports that was used for baseline characterisation.

6.3 Analysis of all other relevant available information

To ensure a comprehensive analysis of the proposed development area, the following data was also analysed:

- The National Land Capability Evaluation Raster Data Layer was obtained from the DAFF to determine the land capability classes of the project assessment zone according to this system. The data was developed using a spatial evaluation modelling approach (DAFF, 2017).
- The long-term grazing capacity for South Africa 2018 was analysed for the area and surrounding area of the project assessment zone. This data set includes incorporation of the RSA grazing capacity map of 1993, the Vegetation type of SA 2006 (as published by Mucina L. & Rutherford M.C.), the Land Types of South Africa data set as well as the KZN Bioresource classification data. The values indicated for the different areas represent long term grazing capacity with the understanding that the veld is in a relatively good condition.
- The Northern Cape Field Boundaries (November 2019) was analysed to determine whether the proposed project assessment zone falls within the boundaries of any crop production areas. The crop production areas may include rainfed annual crops, non-pivot and pivot irrigated annual crops, horticulture, viticulture, old fields, small holdings and subsistence farming.
- Land type data for the project assessment zone was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 – 2006). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units.

6.4 Impact assessment methodology

Following the methodology prescribed by Savannah Environmental (Pty) Ltd., the direct, indirect and cumulative impacts associated with the project have been assessed in terms of 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.

- 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; and
- 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.
- 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),

- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

7. Study gaps, limitations and assumptions

- It is assumed that the photographic evidence provided by the ecology specialist as well as the existing reports for the Gunstfontein Wind Farm, provides sufficient evidence of the baseline soil and agricultural properties of the project assessment zone.
- It is assumed that the exact layout and location of the project infrastructure may change but that it will remain within the project assessment zone.
- It is further assumed that the infrastructure components will remain as indicated and that the activities for the construction and operation of the infrastructure are limited to that typical for a project of this nature.
- No other uncertainties and gaps have been identified that may affect the conclusions made in this report.

8. Results of desktop analysis

8.1 Land capability

The Gunstfontein BESS project assessment zone as well as the area around it includes seven different land capability classes according to the land capability data (DAFF, 2017). Within the project assessment zone, approximately four of these land capability classes are present The position of the different land capability classes in the landscape are depicted in

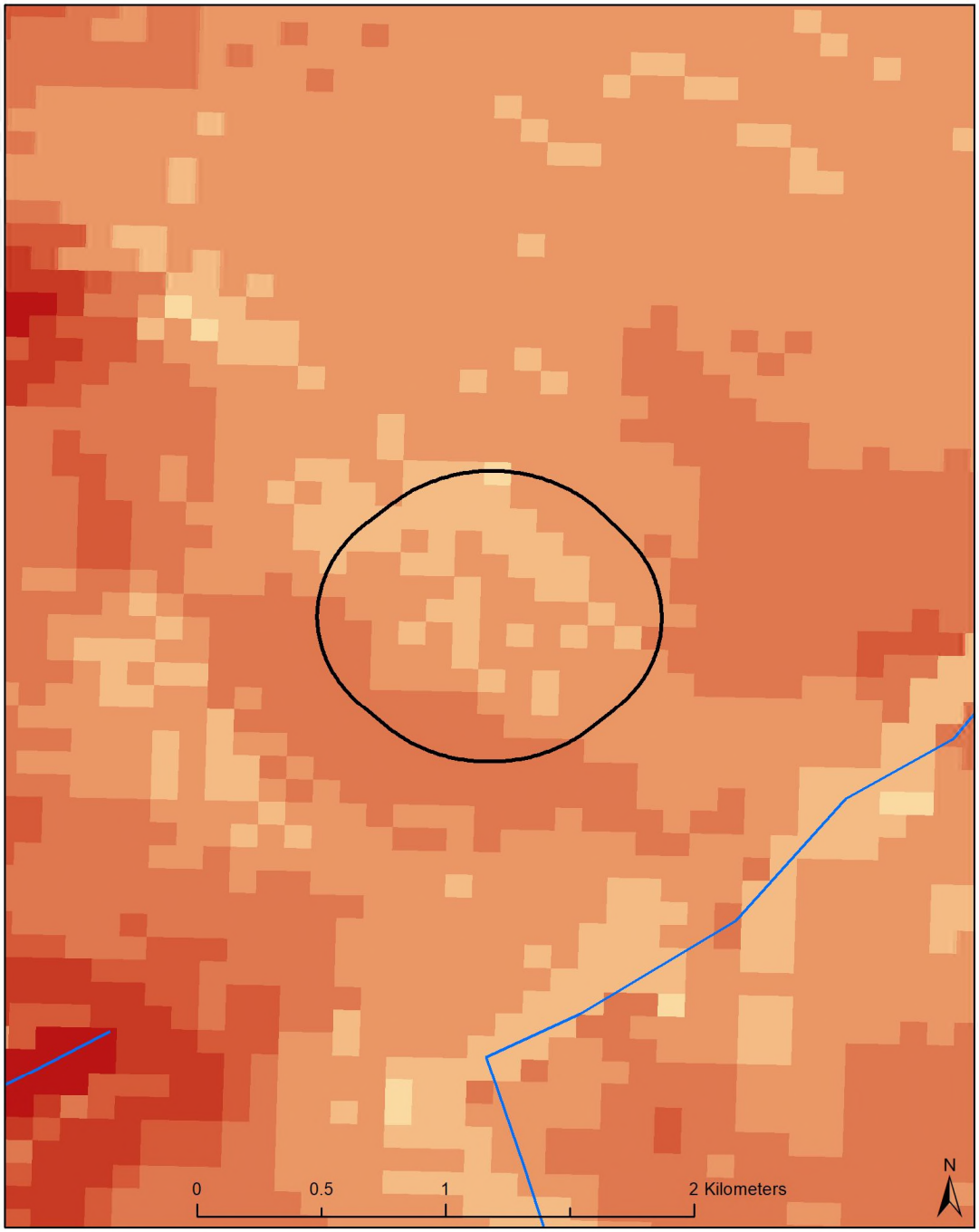
Figure 3.

Low-Very Low (Class 04) land capability is present in a diagonal strip along the southwestern boundary. Bordering on this, land with Low (Class 05) and Low-Moderate (Class 06) land capability is present in the largest part of the middle of the project assessment zone. A small area with Low-Moderate (Class 07) land capability is present along the middle of the northern boundary of the assessment zone.

8.2 Field crop boundaries

The position of field crops around the proposed Gunstfontein BESS project assessment zone is illustrated in

Figure 4. There are no field crop boundaries within this area. The nearest field crops are approximately 3km away to the northeast of the project area. According to the data set, these fields consist of a small block of horticultural crops and another one of either planted pastures or rainfed crop production (DAFF, 2019). More field crop boundaries are present further away (approximately 9km northeast as well as 9km southwest) from the project assessment zone. Small isolated areas with crop fields are also present further north of the site, in closer proximity to Sutherland. The crop field boundaries outside of the project assessment zone are clustered together and likely represent valleys with deeper and more fertile soil where crops can be produced.



Legend

Land capability (DAFF)

- 01. Very low
- 02. Very low
- 03. Low-Very low
- 04. Low-Very low
- 05. Low
- 06. Low-Moderate
- 07. Low-Moderate

- Project assessment zone (103.9 ha)
- Rivers

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Figure 3 Land capability classification of the Gunstfontein BESS project assessment zone and surrounding area (data source: DAFF, 2017)

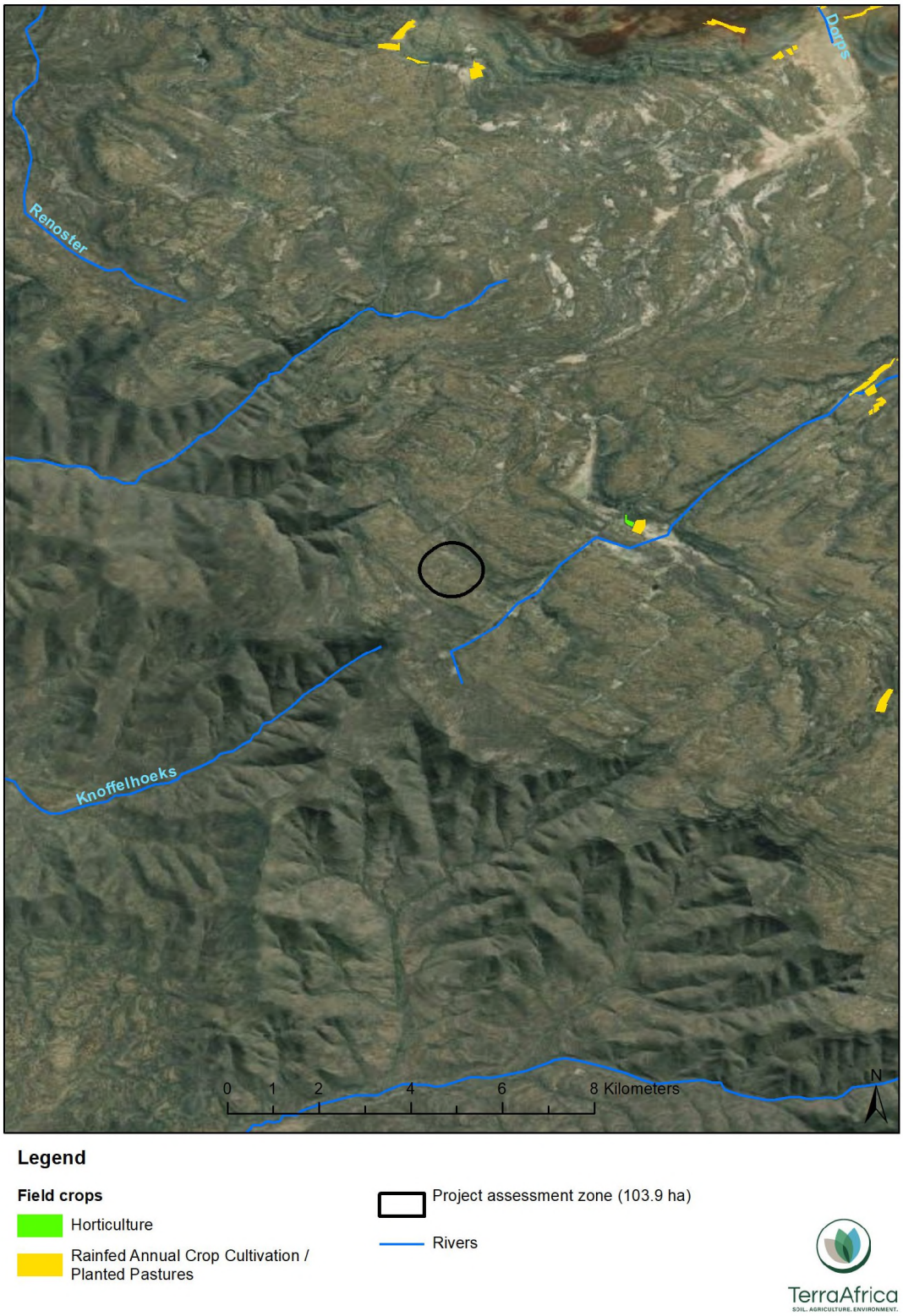

Figure 4 Location of field crop boundaries in the larger area around the proposed Gunstfontein BESS project assessment zone (data source: DAFF, 2019)

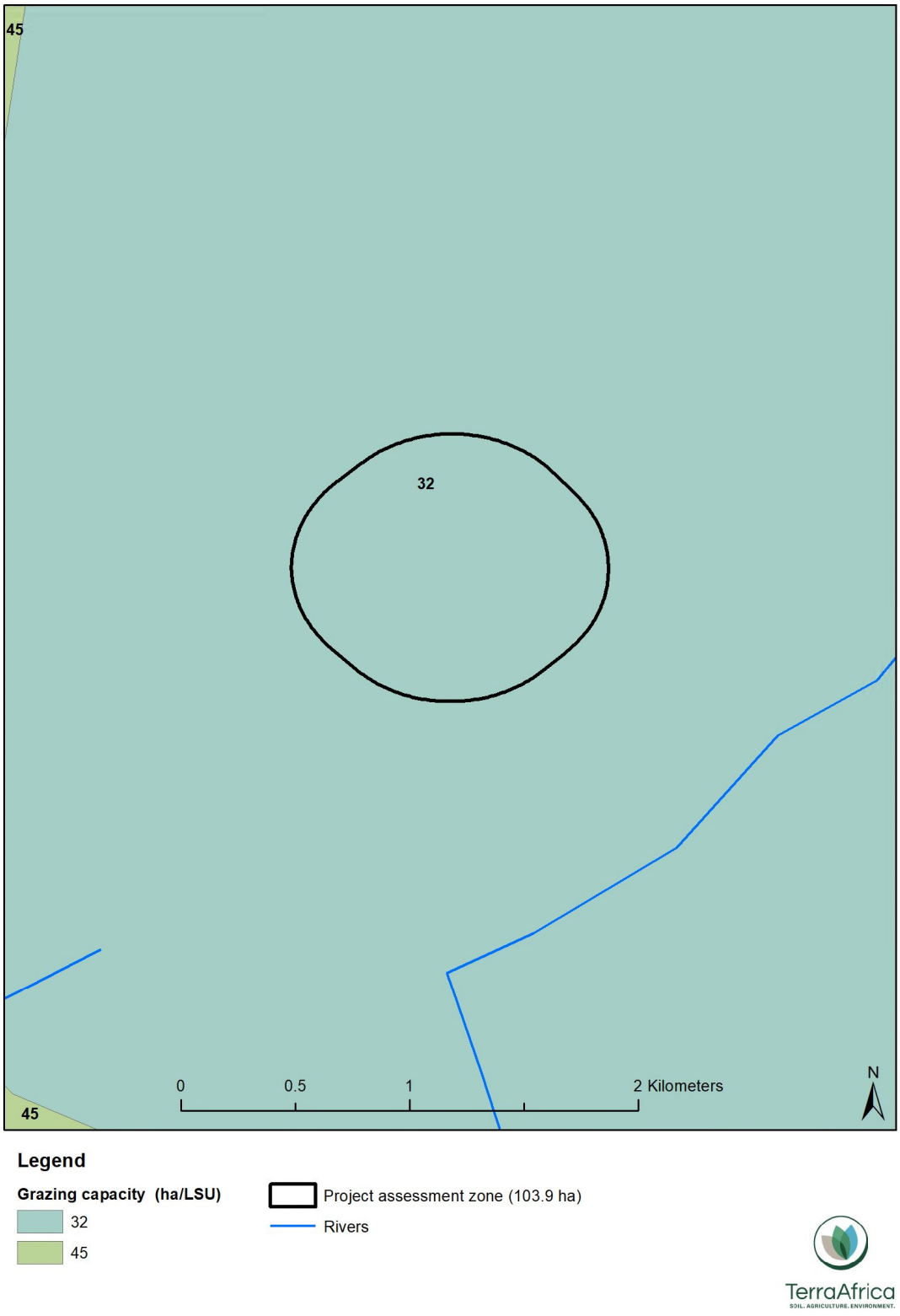

Figure 5 Grazing capacity of the proposed Gunstfontein BESS project assessment zone grid as well as the surrounding area (data source: DAFF, 2018)

8.3 Grazing capacity

The ideal grazing capacity of a specified area is an indication of the long-term production potential of the vegetation layer growing there to maintain an animal with an average weight of 450 kg (defined as 1 Large Stock Unit (LSU)) with an average feed intake of 10 kg dry mass per day over the period of approximately a year. This definition includes the condition that this feed consumption should also prevent the degradation of the soil and the vegetation. The grazing capacity is therefore expressed in a number of hectares per LSU (ha/LSU) (South Africa, 2018). This unit used for large animals such as cattle can be converted to small animal units or small stock units (SSU). The conversion factor is 4 small stock units that equates one large stock unit. Small stock units are more applicable in areas where sheep and goat farming is a more sustainably type of livestock farming.

Following the metadata layer obtained from DAFF, the grazing capacity of the entire project assessment zone, is 32ha/LSU (
Figure **5**). This can be converted to approximately 8 ha/SSU, depending on the veld quality of the specific area. The project footprint of 3 to 4 ha will therefore result in the loss of grazing veld of less than 1 head of sheep or goat (small stock unit). Although it is unlikely that cattle farming is present in the area, the area that will be affected provides an eighth (8^{th}) of the feed requirements of one head of cattle.

8.4 Land types

The proposed Gunstfontein BESS project assessment zone consist of three different land types. These land types are Fc254 (western part of the assessment zone), Fc256 and Db6 (a smallish section in the northern part of the assessment zone) (Figure 7). The terrain units, slope and soil forms within each land type is described below.

Land Type Fc254

According to the Land Type Fc254 data sheet, approximately 25440ha of land in South Africa consist of this land type. This area has very limited agricultural potential and only around 0.12% of land within this land type, is considered suitable for arable agriculture. The most prevalent terrain unit within this area, is the toe-slope positions (approximately 60% of the land type area's surface). These areas have slight slope (between 1 and 5%) and consist of a mixture of shallow, rocky Mispah and Glenrosa soils as well as solid rock. Approximately 15% of the toe-slopes as well as 65% of the small depressions (Terrain unit 5) consist of deeper profiles of the Oakleaf form (between 0.3m and deeper than 1.2m). Small area of this land type may consist of soil of the Swartland and Dundee forms.

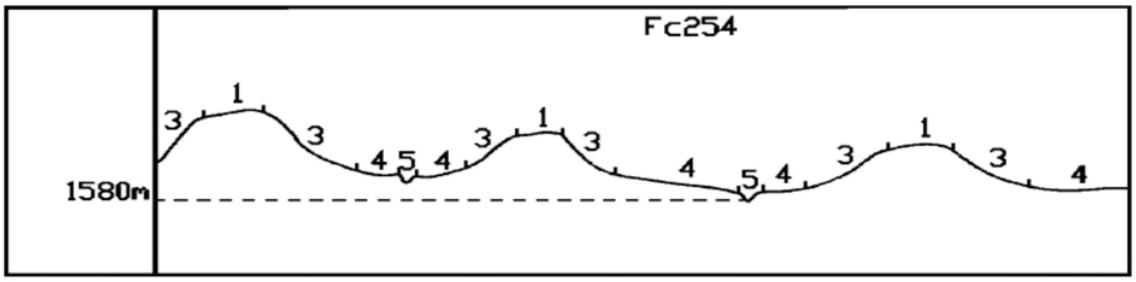

Figure 6 Terrain form sketch of Land Type Fc254

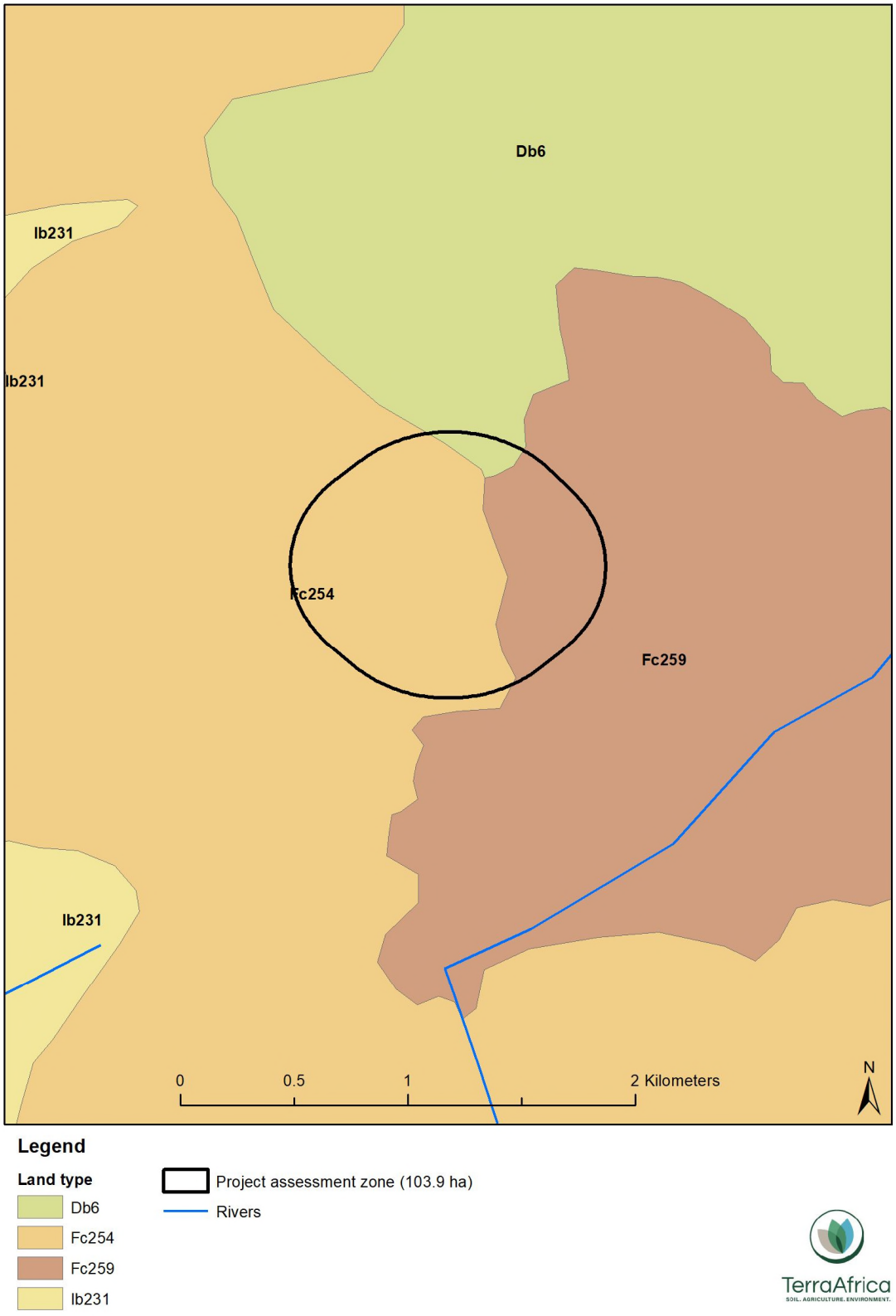

Figure 7 Land type classification of the proposed Gunstfontein BESS project assessment zone and the surrounding area

Land Type Fc259

Land Type Ib228 consists of four different terrain units (Figure 8). Approximately 69% of the total land type area occupied by foot-slopes (Terrain unit 4) with slight slope (2 to 5%). The soil forms of this terrain unit are a combination of rock and shallow Mispah and Glenrosa profiles. The crest (Terrain unit 1) and mid-slopes (Terrain unit 3) also consist of the same combination of shallow soils. Deeper soil profiles of the Oakleaf and Dundee forms may be found in small depressions in this area (Terrain unit 5). Land Type Ib228 are not considered suitable for arable agriculture. The land type data sheet indicate that of the estimated total area of 3922ha occupied by this land type in South Africa, none of this area have suitability for arable crop production.

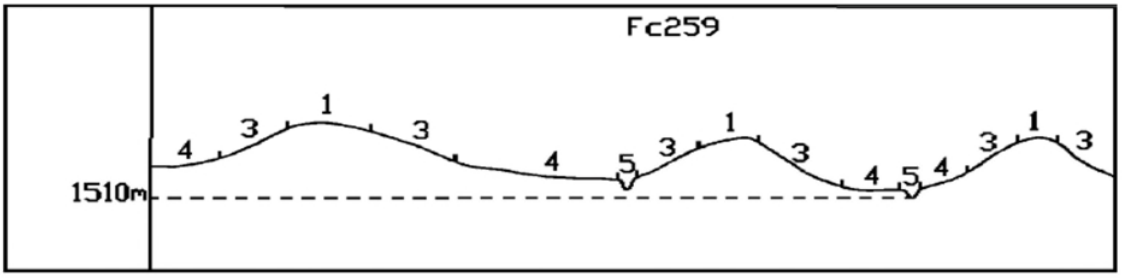

Figure 8: Terrain form sketch of Land Type Fc259

Land Type Db6

Around 7215ha of land in the country consist of Land Type Db6 and of this area, only 25ha is considered suitable for arable agriculture. This land type consists of only two terrain units i.e. flat to slightly sloped toe-slopes (Terrain unit 4) where slope ranges between 0 and 2% as well as small depressions in the landscape (Terrain unit 5) (Figure 9). Both the toe-slopes and small depressions consist largely of shallow soil profiles with moderate to strong structured soil (Swartland form). Other soil forms within this land type include that of the Mispah, Glenrosa and Oakleaf forms as well as around 10% solid rock.

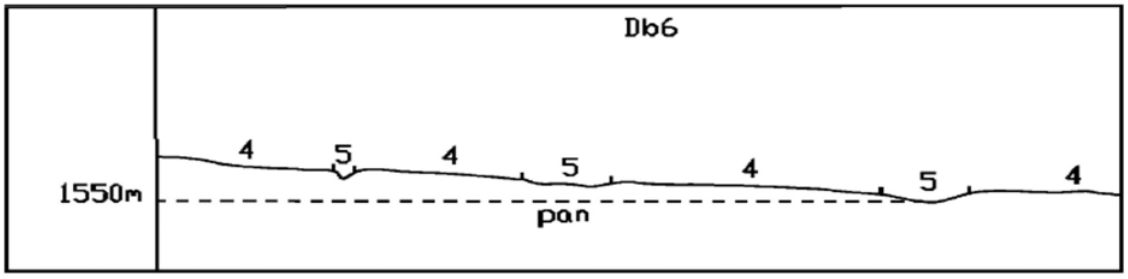

Figure 9: Terrain form sketch of Land Type Db6

9. Results of on-site inspection

9.1 Soil forms

According to the land type data, the most likely soil forms that are present within the project assessment zone is the Mispah and Glenrosa soils as well as solid rock. Within this area, toe-slopes and depressions in the landscape will likely consist of soil of the Oakleaf, Swartland and Dundee forms. Since the land type data sheets were compiled, the South African Soil Classification System was updated to provide for the wider range of soil forms that have been identified since the publication of the soil system classification guidelines in 1991. Following the new classification system (Soil Classification Working Group, 2018), the main soil forms identified in the area, is that of the Mispah, Glenrosa, Bethesda, Tubatse, Swartland, Spioenberg and Dundee forms.

Figure 10 Photographic evidence of a shallow Bethesda form identified on site (the neocutanic subsoil horizon is limited in depth by fractured rock)

Within the project assessment zone, shallow profiles of the Bethesda profile identified has an effective soil depth of around 0.3m and is limited in depth by fractured rock (Figure 10).

Soil of the Spioenberg form was identified in the northern part of the project assessment zone. The Spioenberg form consist of orthic topsoil underlain by a pedocutanic horizon that reaches to a depth of 0.5m (Figure 11). The pedocutanic horizon has moderate to strong blocky structure. The effective depth of the pedocutanic horizon is limited by fractured rock. The orthic topsoil has bleached colours while the subsoil horizon is brown with vertic colours and non-calcareous.

Figure 11 Photographic evidence of the Spioenberg profile present within the project assessment zone

9.2 Land use and agricultural activities

The current land use on all the land parcels assessed, is a combination of natural veld that support local biodiversity and small stock farming. The natural vegetation consist of small shrubs and veld grass between the shrubs and forbs are sparse, especially during times of drought (Figure 12 and Figure 13).

Figure 12 Sparse vegetation consisting of small shrubs and forbs with the sandy topsoil surface of the Dundee profiles visible

Figure 13 Fractured rock visible on the surface of the shallow Mispah and Glenrosa profiles in the toe-slope positions of Land Type Fc254

In confirmation of the field crop data layer for the Northern Cape (DAFF, 2019), the project assessment zone has no rainfed or irrigated crop fields. No special horticultural structures such as tunnels or greenhouses are present within this area.

9.3 Sensitivity analysis

Following the consideration of all the desktop and gathered baseline data above, the area is considered to have Low Sensitivity to the proposed development. The soil forms observed within the project assessment zone confirmed the details of the land type analysis that indicates very low suitability of these areas for arable crop production. The dominant soil forms identified in Gunstfontein BESS project assessment zone are solid rock, Mispah and shallow Bethesda profiles. Further to the low soil suitability, the arid climate (accompanied by long drought spells) from time to time, makes these areas not suitable for rainfed agriculture. The anticipated impacts of the proposed project on the soil properties and land productivity, are discussed in Section 10 below.

10. Impact assessment

10.1 Project description

The proposed Gunstfontein BESS and supporting infrastructure will affect approximately 3 to 4 ha of land. Apart from the battery facility to be constructed in close proximity to the facility substation, the following infrastructure will also be part of the footprint:

- An access road to the BESS
- Fence line constructed around the BESS
- Laydown area for construction materials
- Parking area for construction vehicles
- Cabling for the grid connection

10.2 Impact significance rating

The impacts of the proposed Gunstfontein BESS project on soil and agricultural productivity, will mainly occur during the construction phase. Below follows a rating of the significance of each of the impacts.

10.2.1. Impact: Reduction of land with natural vegetation for livestock grazing

Earth-moving equipment will be used to clear the vegetation all along the area where the BESS will be constructed. In areas where obstacles such as rock outcrops are present, earth-moving equipment will be used to prepare the surface for the delivery of the construction materials.

Nature: The availability of grazing land for livestock farming will be reduced during the construction phase. It is anticipated that the significance impact will remain the same as the BESS area will likely be fenced-off for security purposes.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short duration - 2-5 years (2)	Short duration - 2-5 years (2)
Magnitude	Low (4)	Low (4)
Probability	Definite (4)	Definite (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: • Vegetation clearance must be restricted to areas where infrastructure is constructed. • Removal of obstacles to allow for access of construction vehicles must be kept to only where essential. • Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area. • No boundary fence must be opened without the landowners' permission. • All left-over construction material must be removed from site once construction on a land portion is completed. • No open fires made by the construction teams are allowable during the construction phase.		
Residual Impacts: The residual impact from the construction and operation of the Gunstfontein BESS is considered low.		
Cumulative Impacts: Any additional infrastructure that will be constructed to strengthen and support the operation of the Gunstfontein Wind Energy Facility, will result in additional areas where grazing veld will be disturbed.		

10.2.2 Impact: Soil erosion

All areas where vegetation is removed from the soil surface in preparation for the BESS construction, will result in exposed soil surfaces that will be prone to erosion. Both wind and water erosion are a risk and even though the project area is in the arid climate, the intensity of single rainstorm may result in soil particles being transported away. Once the soil particles are removed, vegetation will have difficulty establishing itself on the rock and lithic material in the area.

Nature: The clearing and levelling of a limited area of land (3 to 4 ha) within the proposed project assessment zone will increase the risk of soil erosion in the area. It is anticipated that the risk will naturally reduce as grass and lower shrubs re-establishes in the areas around the new infrastructure once the construction has wrapped up and the operational phase continues.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A

Mitigation:

- Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint;
- Unnecessary land clearance must be avoided;
- Level any remaining soil removed from excavation pits that remained on the surface instead of allowing small stockpiles of soil to remain on the surface.
- Where possible, conduct the construction activities outside of the rainy season.

Residual Impacts:

The residual impact from the construction and operation of the proposed Gunstfontein BESS on the susceptibility to erosion is considered low.

Cumulative Impacts:

Any additional infrastructure that will be constructed to strengthen and support the operation of the Gunstfontein Wind Energy Facility, will result in additional areas where exposed to soil erosion through wind and water movement.

10.2.3 Impact: Soil pollution

During the construction phase, construction workers will access the land for the preparation of the terrain and the construction of BESS infrastructure. Both potential spills and leaks from construction vehicles and equipment as well as waste generation on site, can result in soil pollution.

Nature: The following construction activities can result in the chemical pollution of the soil:

1. Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation.
2. Spills from vehicles transporting workers, equipment, and construction material to and from the construction site.
3. The accidental spills from temporary chemical toilets used by construction workers.
4. The generation of domestic waste by construction workers.

5. Spills from fuel storage tanks during construction.
6. Pollution from concrete mixing.
7. Any construction material remaining within the construction area once construction is completed.

During the operational phase of the power line, maintenance and repairs can result in waste generation within the servitude area.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Low (4)	Improbable (2)
Significance	**Medium (36)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A

Mitigation:

- Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;
- Any waste generated during construction, must be stored into designated containers and removed from the site by the construction teams.
- Any left-over construction materials must be removed from site.

Residual Impacts:

The residual impact from the construction and operation of the proposed project will be low to negligible.

Cumulative Impacts:

Any additional infrastructure that will be constructed to strengthen and support the operation of the Gunstfontein Wind Energy Facility and where waste is not removed to designated waste sites, will increase the cumulative impacts associated with soil pollution in the area.

11. 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[1].

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
- Unacceptable increase in impact

[1] Unless otherwise stated, all definitions are from the EIA Regulations 2014 (GNR 326).

Table 1 Assessment of cumulative impact of decrease in areas available for livestock farming

Nature: Decrease in areas with suitable land capability for livestock farming.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Short duration - 2-5 years (2)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly likely (4)	Highly likely (4)
Significance	**Low (28)**	Medium (40)
Status (positive/negative)	Negative	Negative
Reversibility	High	Low
Loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	No
Confidence in findings: High.		
Mitigation: The only mitigation measure for this impact is to keep the footprints of all renewable energy facilities as small as possible and to manage the soil quality by avoiding far-reaching soil degradation such as erosion.		

Table 2 Assessment of cumulative impact of areas susceptible to soil erosion

Nature: Increase in areas susceptible to soil erosion		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Medium (33)**
Status (positive/negative)	Negative	Negative
Reversibility	Low	Low
Loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	No
Confidence in findings: High.		
Mitigation: Each of the projects should adhere to the highest standards for soil erosion prevention and management as defined in Section 10.2.2 above.		

Table 3 Assessment of cumulative impact of increased risk of soil pollution

Nature: Increase in areas susceptible to soil pollution

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Medium (30)**
Status (positive/negative)	Negative	Negative
Reversibility	Low	Low
Loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	No
Confidence in findings: High.		
Mitigation: Each of the projects should adhere to the highest standards for soil pollution prevention and management as defined in Section 10.2.3 above.		

12. Acceptability statement

Following the data analysis and impact assessment above, the proposed Gunstfontein BESS is considered an acceptable development within the area of the project assessment zone that was assessed for the purpose of compiling the Agricultural Compliance Report.

The project assessment zone consists largely of shallow rocky soil where soil depths and low land capability classes. The land capability classes range between Low-Very-Low (Class 04) and Low-Moderate (Class 07). The long-term grazing capacity of 32 ha/LSU indicates that large portions of land are required for long-term sustainable livestock farming. The vegetation and climatic conditions of the project assessment zone makes this area more suitable for small stock farming (sheep and goats) than cattle farming.

It is anticipated that the construction phase will have impacts that range from medium to low and that through the consistent implementation of the recommendation mitigation measures, these impacts can all be reduced to low. Impacts during the operational phase are associated with maintenance of the infrastructure as well as possible repairs that may be required in the case of equipment failure.

Considering the BESS infrastructure will be placed in close proximity to each other, and as close as possible to the onsite, connecting substation, I confirm that all reasonable measures have been taken to avoid or minimize fragmentation and disturbance of agricultural activities, provided that the mitigation measures provided in this report are implemented.

It is my professional opinion that this application be considered favourably, permitting that the mitigation measures are followed to prevent soil erosion and soil pollution and to minimise impacts on the veld quality of the farm portions that will be affected. The project infrastructure

should also remain within the 500m project assessment zone but placement thereof anywhere in the assessment zone has been assessed in this report and does not alter any impacts, mitigations or ratings provided, and regardless of precise location within the 500m project assessment zone, is thus regarded as acceptable from an agricultural impact perspective.

13. Reference list

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South Africa (Republic), 2018. *Long-term grazing capacity for South Africa*: Data layer. Government Gazette Vol. 638, No. 41870. 31 August 2018. Regulation 10 of the Conservation of Agricultural Resources Act (CARA): Act 43 of 1983. Pretoria. Government Printing Works.

The Soil Classification Working Group, 2018. *Soil Classification – Taxonomic System for South Africa.* Dept. of Agric., Pretoria.

Van der Waals, J.H., 2012. Soil, Land Use, Land Capability and Agricultural Potential Survey: Proposed Hidden Valley Wind Energy Facility in the Northern Cape Province.

APPENDIX 1 - CURRICULUM VITAE OF SPECIALIST

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EXPERTISE

Soil Quality Assessment

Soil Policy and Guidelines

Agricultural Agro-Ecosystem Assessment

Sustainable Agriculture

Data Consolidation

Land Use Planning

Soil Pollution

Hydropedology

EDUCATION

MASTER'S DEGREE
Environmental Science
University of Witwatersrand
2010 – 2018

BACHELOR'S DEGREE
Agricultural Science
University of Pretoria
2001 – 2004

PROFESSIONAL PROFILE

I contribute specialist knowledge on agriculture and soil management to ensure long-term sustainability of projects in Africa. For the past thirteen years, it has been my calling and I have consulted on more than 200 projects. My clients include environmental and engineering companies, mining houses, and project developers. I enjoy the multi-disciplinary nature of the projects that I work on and I am fascinated by the evolving nature of my field of practice. The next section provide examples of the range of projects completed. A comprehensive project list is available on request.

PROJECT EXPERIENCE

Global Assessment on Soil Pollution

Food and Agricultural Organisation (FAO) of the United Nations (UN)

Author of the regional assessment of Soil in Sub-Saharan Africa. The report is due for release in February 2021. The different sections included:

- Analysis of soil and soil-related policies and guidelines for each of the 48 regional countries
- Description of the major sources of soil pollution in the region
- The extent of soil pollution in the region and as well as the nature and extent of soil monitoring
- Case study discussions of the impacts of soil pollution on human and environmental health in the region
- Recommendations and guidelines for policy development and capacitation to address soil pollution in Sub-Saharan Africa

Data Consolidation and Amendment

Range of projects: Mining Projects, Renewal Energy

These projects included developments where previous agricultural and soil studies are available that are not aligned with the current legal and international best practice requirements such as the IFC Principles. Other projects are expansion projects or changes in the project infrastructure layout. Tasks on such projects include the incorporation of all relevant data, site verification, updated baseline reporting and alignment of management and monitoring measures.

Project examples:

- Northam Platinum's Booysendal Mine, South Africa
- Musonoi Mine, Kolwezi District, Democratic Republic of Congo
- Polihali Reservoir and Associated Infrastructure, Lesotho
- Kaiha 2 Hydropower Project, Liberia
- Aquarius Platinum's Kroondal and Marikana Mines

PROFESSIONAL MEMBERSHIP

South African Council for Natural Scientific Professions (SACNASP)

Soil Science Society of South Africa (SSSSA)

Soil Science Society of America (SSSA)

Network for Industrially Contaminated Land in Africa (NICOLA)

LANGUAGES

English (Fluent)

Afrikaans (Native)

French (Basic)

PRESENTATIONS

There is spinach in my fish pond
TEDx Talk
Available on YouTube

♦

Soil and the Extractive Industries
Session organiser and presenter
Global Soil Week, Berlin (2015)

♦

How to dismantle an atomic bomb
Conference presentation (2014)
Environmental Law Association (SA)

PROJECT EXPERIENCE (Continued)

Agricultural Agro-Ecosystem Assessments

Range of projects: Renewable Energy, Industrial and Residential Developments, Mining, Linear Developments (railways and power lines)

The assessments were conducted as part of the Environmental and Social Impact Assessment processes. The assessment process includes the assessment of soil physical and chemical properties as well as other natural resources that contributes to the land capability of the area.

Project examples:

- Mocuba Solar PV Development, Mozambique
- Italthai Railway between Tete and Quelimane, Mozambique
- Lichtenburg PV Solar Developments, South Africa
- Manica Gold Mine Project, Mozambique
- Khunab Solar PV Developments near Upington, South Africa
- Bomi Hills and Mano River Mines, Liberia
- King City near Sekondi-Takoradi and Appolonia City near Accra, Ghana
- Limpopo-Lipadi Game Reserve, Botswana
- Namoya Gold Mine, Democratic Republic of Congo

Sustainable Agriculture

Range of projects: Policy Development for Financial Institutions, Mine Closure Planning, Agricultural Project and Business Development Planning

Each of the projects completed had a unique scope of works and the methodology was designed to answer the questions. While global indicators of sustainable agriculture are considered, the unique challenges to viable food production in Africa, especially climate change and a lack of infrastructure, in these analyses.

Project examples:

- Measurement of sustainability of agricultural practices of South African farmers – survey design and pilot testing for the LandBank of South Africa
- Analysis of the viability of avocado and mango large-scale farming developments in Angola for McKinsey & Company
- Closure options analysis for the Tshipi Borwa Mine to increase agricultural productivity in the area, consultation to SLR Consulting
- Analysis of risks and opportunities for farm feeds and supplement suppliers of the Southern African livestock and dairy farming industries
- Sustainable agricultural options development for mine closure planning of the Camutue Diamond Mine, Angola

PROFESSIONAL DEVELOPMENT

Contaminated Land Management 101Training
Network for Industrially Contaminated Land in Africa
2020

Intensive Agriculture in Arid & Semi-Arid Environments
CINADCO/MASHAV R&D Course, Israel
2015

World Soils and their Assessment Course
ISRIC – World Soil Information Centre, Netherlands
2015

Wetland Rehabilitation Course
University of Pretoria
2010

Course in Advanced Modelling of Water Flow and Solute Transport in the Vadose Zone with Hydrus
University of Kwazulu-Natal
2010

Environmental Law for Environmental Managers
North-West University Centre for Environmental Management
2009

PROJECT EXPERIENCE (Continued)

Soil Quality Assessments
Range of projects: Rehabilitated Land Audits, Mine Closure Applications, Mineral and Ore Processing Facilities, Human Resettlement Plans

The soil quality assessments included physical and chemical analysis of soil quality parameters to determine the success of land rehabilitation towards productive landscapes. The assessments are also used to understand the suitability for areas for Human Resettlement Plans

Project examples:

- Closure Planning for Yoctolux Colliery
- Soil and vegetation monitoring at Kingston Vale Waste Facility
- Exxaro Belfast Resettlement Action Plan Soil Assessment
- Soil Quality Monitoring of Wastewater Irrigated Areas around Matimba Power Station
- Keaton Vanggatfontein Colliery Bi-Annual Soil Quality Monitoring

REFERENCES

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