



SCIENTIFIC TERRESTRIAL SERVICES

Reg No. 2005/122/329/23
VAT Reg No. 4150274472
PO Box 751779
Gardenview
2047
Tel: 011 616 7893
Fax: 086 724 3132
Email: admin@sasenvgroup.co.za
www.sasenvironmental.co.za

**BIODIVERSITY SCOPING REPORT AS PART OF THE
ENVIRONMENTAL IMPACT ASSESSMENT AND
AUTHORISATION PROCESS FOR THE PROPOSED
THERMAL DUAL FUEL FACILITY TO FORM PART OF A
HYBRID GENERATION FACILITY TOGETHER WITH THE
HYPERION 1 & 2 SOLAR PV FACILITIES, NEAR KATHU,
NORTHERN CAPE PROVINCE**

Prepared for

Red Rocket South Africa (Pty) Ltd.

October 2020

Prepared by:	Scientific Terrestrial Services CC
Report author:	S.L. Daniels
Report reviewers:	C. Hooton N. Cloete (Pr. Sci. Nat)
Report reference:	STS 200056



EXECUTIVE SUMMARY

Scientific Terrestrial Services (STS) was appointed to conduct a desktop terrestrial biodiversity scoping assessment as part of the Environmental Impact and Authorisation process for the proposed thermal dual fuel facility to form part of a hybrid generation facility together with the Hyperion 1 & 2 solar PV facilities, located near the town of Kathu, Northern Cape Province, henceforth referred to as the “study area”.

During the desktop analysis, it was established that the study area has a very high terrestrial sensitivity according to the National Web-based Environmental Screening Tool (2020). This high sensitivity is likely triggered by the presence of an Ecological Support Area (ESA). The field assessment will verify desktop sensitive habitat, where a sensitivity map and potential development areas will be identified.

During the desktop analysis, several plant species, that are protected under Schedule 2 (Protected Species) of the Northern Cape Nature Conservation Act (Act No. 9 of 2009), were identified as having the potential to be located within the study area. As these species are provincially important, should they be present within the study area, they will require rescuing and relocation to a similar habitat near the study area before any construction commences. Thus, a field assessment would be required to establish whether suitable habitat exists to support these species.

Several faunal SCC, as identified by the Threatened or Protected Species list of NEMBA (2007), have potential distribution ranges that encompass the study site. A field investigation would be required to determine the habitat suitability of these species prior to commencement of any development activities.

Following the desktop analysis of the biodiversity within the study area, it is determined that a full biodiversity assessment will need to be undertaken to determine the sensitivity and the potential impacts to the study areas should the proposed development receive Environmental



TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
TABLE OF CONTENTS	ii
LIST OF FIGURES	iii
LIST OF TABLES	iii
LIST OF ACRONYMS	iv
GLOSSARY OF TERMS	v
1 INTRODUCTION	1
1.1 Project Scope.....	6
1.2 Assumptions and Limitations	6
1.3 Legislative Requirements	6
2 ASSESSMENT APPROACH	7
2.1 Desktop Study.....	7
2.2 General Approach.....	8
3 RESULTS OF THE DESKTOP ANALYSIS	8
3.1 Conservation Characteristics of the study area based on National and Provincial Datasets.....	8
4 POTENTIAL IMPACTS AND PROPOSED MANAGEMENT MEASURES	16
4.1 Description of Potential Impacts Associated with the Proposed PV SEF Facility and associated infrastructure.....	16
4.2 Preliminary Management Measures	18
5 A PLAN OF STUDY FOR EIA PHASE	20
6 CONCLUSION.....	21
REFERENCES	23
APPENDIX A - Legislative Requirements and Indemnity	24
APPENDIX B - Floral Method of Assessment during EIA phase.....	28
APPENDIX C - Faunal Method of Assessment during EIA phase.....	31
APPENDIX D - Impact Assessment Methodology.....	34
APPENDIX E - Vegetation Types.....	38
APPENDIX F - Floral SCC	39
APPENDIX G - Faunal SCC.....	45
APPENDIX H - Specialist information.....	46



LIST OF FIGURES

Figure 1:	Digital satellite image depicting the study area in relation to the surrounding areas.	3
Figure 2:	Location of the study area depicted on a 1:50 000 topographical map in relation to the surrounding area.	4
Figure 3:	The proposed infrastructure layout within the study area.	5
Figure 4:	The remaining extent of the Endangered Egoli Granite Grassland, according to the National Biodiversity Assessment (NBA, 2018).	11
Figure 5:	Protected areas within a 5 km and 10 km radius of the study area, according to SAPAD (Q4, 2019), SACAD (Q4, 2019) and NPAES (2009).	12
Figure 6:	Northern Cape Critical Biodiversity areas associated with the study area and the associated infrastructure.	13
Figure 7:	Centres of endemism of the Northern Cape Province: the study area indicated by the yellow circle (NPSDF, 2012).	14
Figure 8:	Development corridors of the Northern Cape Province: the study area is indicated by the yellow circle (NPSDF, 2012).	15

LIST OF TABLES

Table 1:	Summary of the terrestrial conservation characteristics for the study area (Quarter Degree Square (QDS) 2723CA).	9
Table 2:	Potential impacts associated with the proposed development within the study area.	16



LIST OF ACRONYMS

AIP	Alien Invasive Plant
BGIS	Biodiversity Geographic Information Systems
CARA	Conservation of Agricultural Resource Act
CBA	Critical Biodiversity Area
CR	Critically Endangered
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
GIS	Geographic Information System
GPS	Global Positioning System
Ha	Hectares
IBA	Important Bird Area
IEM	Integrated Environmental Management
IUCN	International Union for the Conservation of Nature
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential for Evaporation
MASMS	Mean Annual Soil Moisture Stress
MAT	Mean Annual Temperature
MFD	Mean Frost Days
NBA	National Biodiversity Assessment (2011)
NCNCA	Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
NCPSDF	Northern Cape Provincial Spatial Development Framework
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
PES	Present Ecological State
POC	Probability of Occurrence
QDS	Quarter Degree Square (1:50,000 topographical mapping references)
RDL	Red Data List
SABAP 2	Southern African Bird Atlas 2
SACAD	South Africa Conservation Areas Database
SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Area Database
SCC	Species of Conservation Concern
STS	Scientific Terrestrial Services CC
TOPS	Threatened or Protected Species
TSP	Threatened Species Programme
VU	Vulnerable
WRD	Waste Rock Dump



GLOSSARY OF TERMS

Most definitions are based on terms and concepts elaborated by Richardson et al. (2011), Hui and Richardson (2017) and Wilson et al. (2017), with consideration to their applicability in the South African context, especially South African legislation [notably the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004), and the associated Alien and Invasive Species (A&I) Regulations, 2014].

Alien species (syn. exotic species; non-native species)	A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers.
Biological diversity or Biodiversity (as per the definition in NEMBA)	The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species, and of ecosystems.
Biome - as per Mucina and Rutherford (2006); after Low and Rebelo (1998).	A broad ecological spatial unit representing major life zones of large natural areas – defined mainly by vegetation structure, climate, and major large-scale disturbance factors (such as fires).
Bioregion (as per the definition in NEMBA)	A geographic region which has in terms of section 40(1) been determined as a bioregion for the purposes of this Act;
Bush encroachment	The increase in density of (usually native) woody plants so that the natural equilibrium of the woody plant layer (trees and shrubs) and herbaceous (grass and forb) layer densities is shifted in favour of trees and shrubs.
CBA (Critical Biodiversity Area)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation, and ridges.
Corridor	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Disturbance	A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions.
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region".
Endangered	Organisms in danger of extinction if causal factors continue to operate.
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g. southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range.
ESA (Ecological Support Area)	An ESA provides connectivity and important ecological processes between CBAs and is therefore important in terms of habitat conservation.
Habitat (as per the definition in NEMBA)	A place where a species or ecological community naturally occurs.
IBA (Important Bird and Biodiversity Area)	The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations.
Indigenous vegetation (as per the definition in NEMA)	Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Integrity (ecological)	The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes.
Invasive species	Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances.
Listed alien species	All alien species that are regulated in South Africa under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004), Alien and Invasive Species (A&I) Regulations, 2016.
Least Threatened	Least threatened ecosystems are still largely intact.



<p>Native species (syn. indigenous species)</p>	<p>Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have expanded their range as a result of human modification of the environment that does not directly impact dispersal (e.g. species are still native if they increase their range as a result of watered gardens, but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions).</p>
<p>RDL (Red Data listed) species</p>	<p>According to the Red List of South African plants (http://redlist.sanbi.org/) and the International Union for Conservation of Nature (IUCN), organisms that fall into the Extinct in the Wild (EW), critically endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.</p>
<p>SCC (Species of Conservation Concern)</p>	<p>The term SCC in the context of this report refers to all RDL (Red Data) and IUCN (International Union for the Conservation of Nature) listed threatened species as well as protected species of relevance to the project.</p> <p>Specifically related to flora: A list of floral SCC for the Northern Cape is available under Schedule 2 of the Northern Cape Nature Conservation Act (Act No. 9 of 2009), comprising SANBI Red Data Listed species. Additional datasets and sources that were also taken into consideration included:</p> <ul style="list-style-type: none"> - The Botanical Database of Southern Africa (BODATSA) to obtain plant names and floristic details (http://posa.sanbi.org/); and - The List of Protected Tree Species (GN 809 of 2014) under the National Forest Act (Act 84 of 1998). <p>Specifically related to fauna: A list of faunal SCC as identified by the Threatened or Protected Species list (2007) is available for the Northern Cape. Additional datasets and sources that were also taken into consideration included:</p> <ul style="list-style-type: none"> - The National Environmental Management: Biodiversity Act (Act No.10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) list (NEMBA, Notice 389 of 2013); - The International Union for Conservation of Nature (IUCN) Red List of Threatened Species; and - The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland; - The Atlas and Red List of the Reptiles of South Africa, Lesotho, and Swaziland.



1 INTRODUCTION

Scientific Terrestrial Services (STS) was appointed to conduct a biodiversity assessment as part of the Environmental Impact and Environmental Authorisation (EIA) process for the proposed thermal dual fuel facility to form part of a hybrid generation facility together with the Hyperion 1 & 2 solar PV facilities, near the town of Kathu, Northern Cape Province, henceforth referred to as the “study area”. This report includes a desktop screening assessment as part of the Scoping Phase of the Environmental Impact Assessment (EIA) process.

The study area is in the Gamagara Metropolitan Municipality which is an administrative area of the John Taolo Gaetse District Municipality. The study area (which consists of a focus area and associated infrastructure) is situated approximately 15 km north of the town of Kathu, 11 km northeast of the Sishen Airport, and approximately 5 km northwest of the N14 national route. The location and extent are indicated in Figures 1 and 2.

The proposed development will encompass a focus area and associated infrastructure. Development of the following infrastructure is proposed (Figure 3):

- Bellmouth;
- Thermal generating facility;
- Laydown area;
- Energy storage;
- Administration building;
- On-site substation and cabling;
- A 300 m corridor was utilised along the proposed route of the access road as the exact location of the road has yet to be determined;
- The authorised Hyperion 1 & 2 PV SEF site and internal access roads;
- Gas turbines or reciprocating Engines;
- Truck entrance and parking facility;
- Regasification plant and fuel preparation plant;
- Dry cooling system for operating oils/chemicals;
- Fuel storage facility;
- Water demineralisation plant;
- O&M building; and
- Fencing.
- Warehouses and workshops.



The purpose of this report is to identify and describe the terrestrial ecology of the study area making use of provincial and national desktop datasets. This report, after consideration and the description of the ecological integrity of the study area, must guide the Environmental Assessment Practitioner (EAP), regulatory authorities and developing proponent, by means of the presentation of results and recommendations, as to the ecological viability of the proposed development activities.



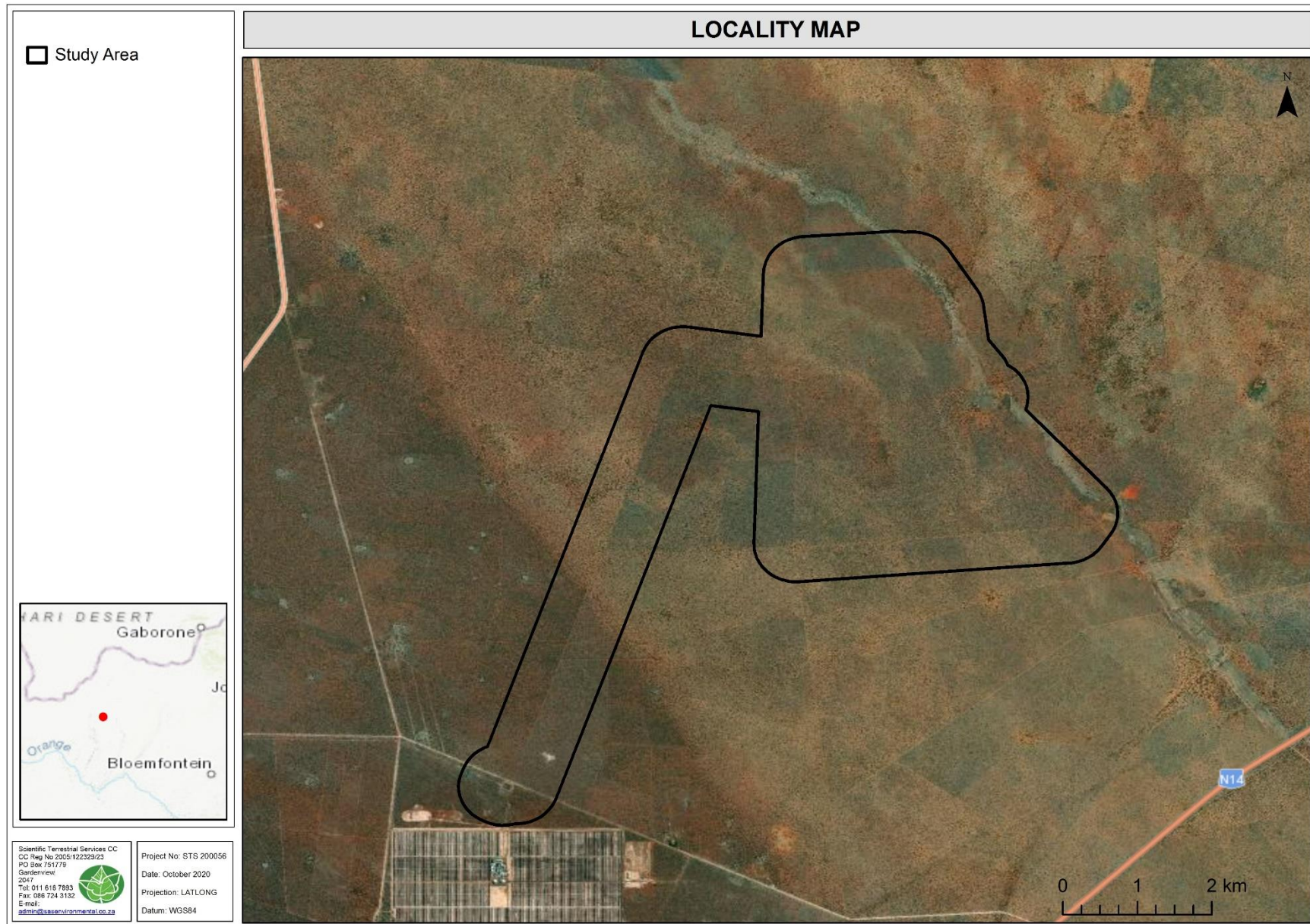


Figure 1: Digital satellite image depicting the study area in relation to the surrounding areas.



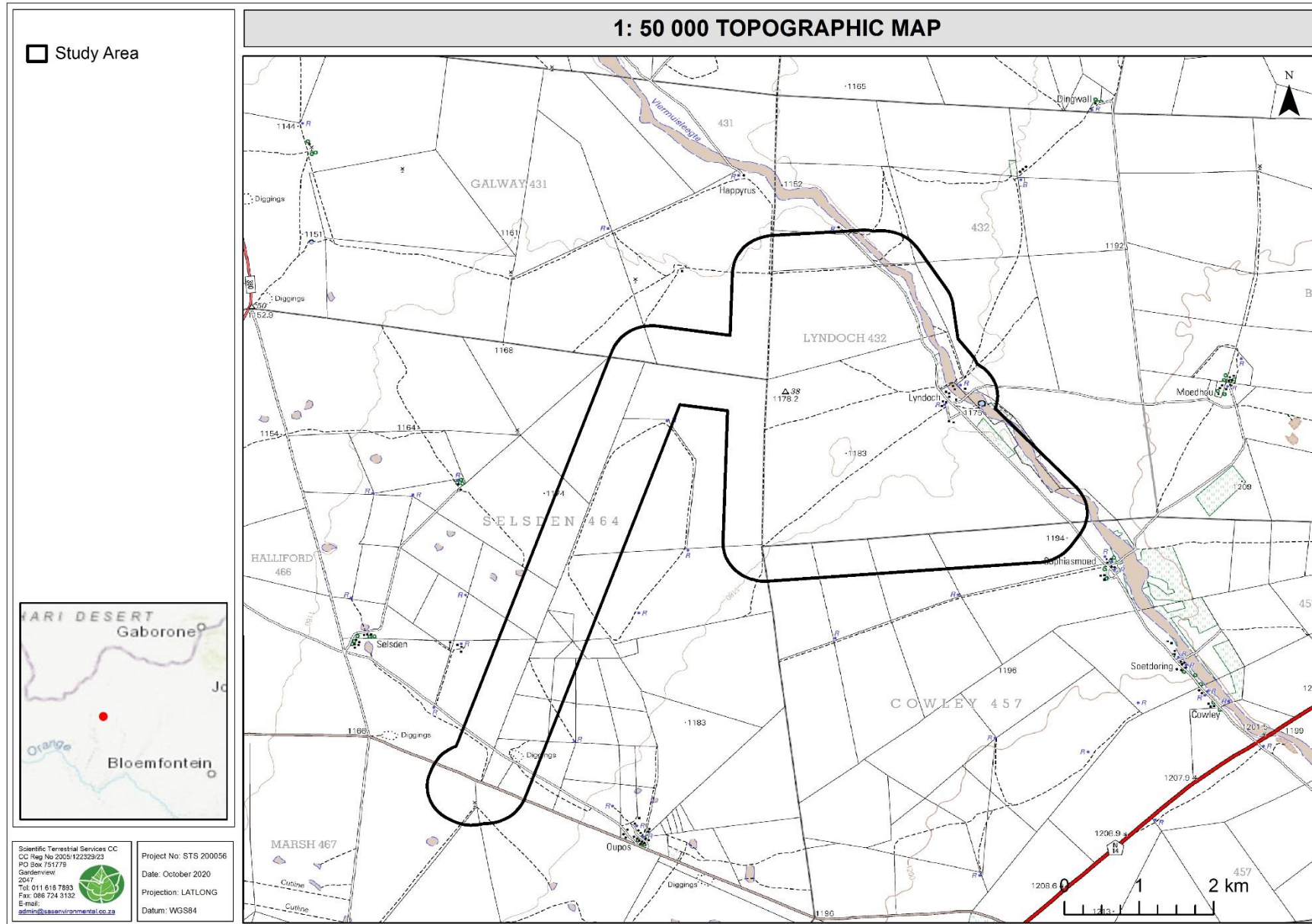


Figure 2: Location of the study area depicted on a 1:50 000 topographical map in relation to the surrounding area.



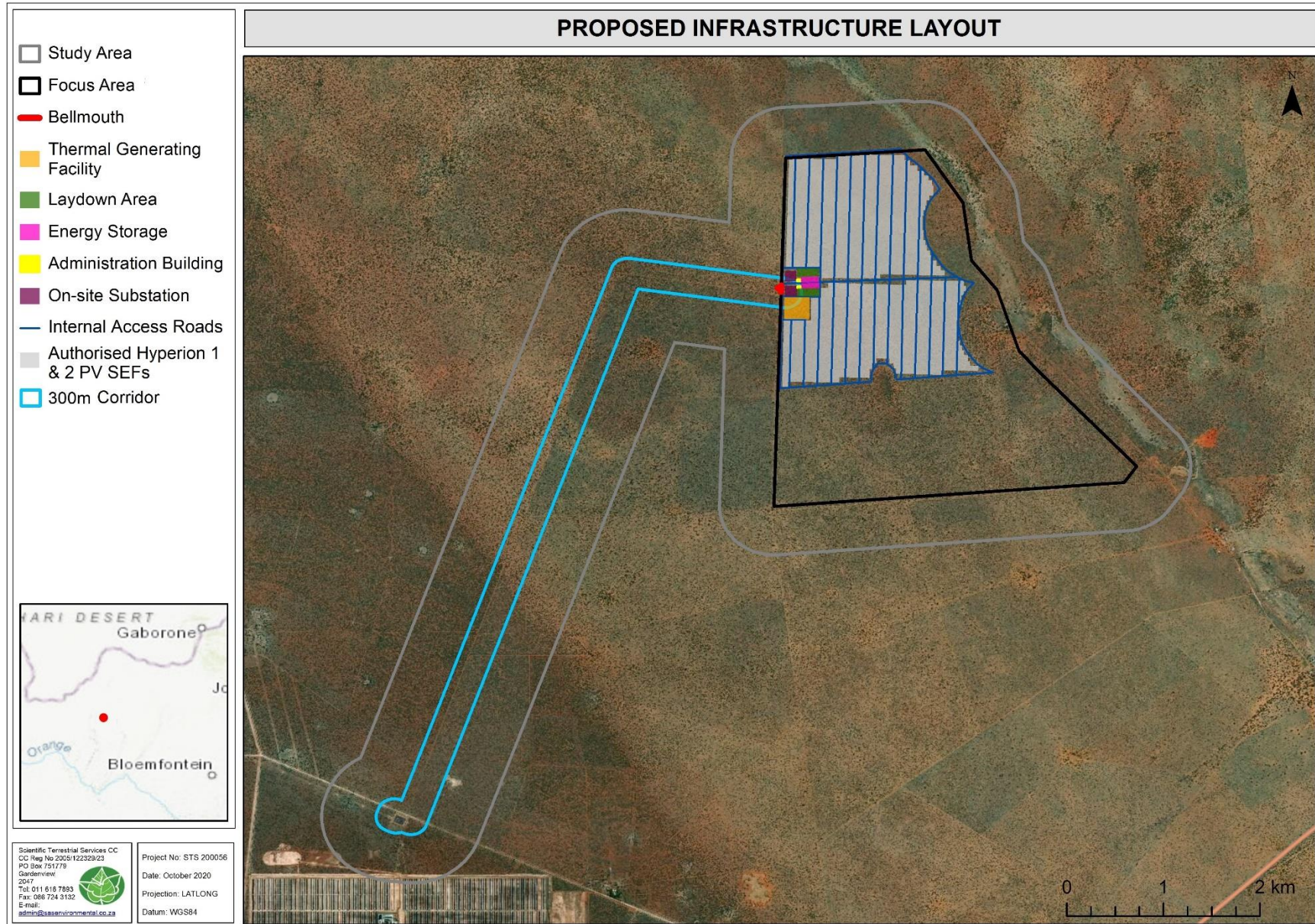


Figure 3: The proposed infrastructure layout within the study area.



1.1 Project Scope

Specific outcomes in terms of the Scoping Phase report are as follows:

- Compile a desktop assessment with all relevant information as presented by SANBI's Biodiversity Geographic Information Systems (BGIS) website (<http://bgis.sanbi.org>), including the National Threatened Ecosystem Database (2011), the Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009); and the Northern Cape Provincial Spatial Development Framework.
- Compile a report presenting the results and findings of the scoping assessment; as well as identify potential impacts associated with the proposed development; and
- Present the plan of study for the EIA phase of the project including the methods of assessment to be used.

1.2 Assumptions and Limitations

The following assumptions and limitations apply to this report:

- The terrestrial ecological desktop assessment is confined to the study area and did not include the neighbouring and adjacent properties, although the sensitivity of surrounding areas is included on the respective maps;
- This scoping phase study was undertaken as a desktop assessment only, and as such, the information gathered must be considered with caution, as inaccuracies and data capturing errors are often present within these databases. Since this information forms part of the scoping phase, this desktop assessment is considered to provide adequate information for informed decision making and to inform the Plan of Study for the EIA phase; and
- To comply with the Northern Cape Department of Environment and Nature Conservation requirements, a site visit has been scheduled in the summer. Findings of the site assessment, as well as an impact assessment, will be included as part of the EIA phase report.

1.3 Legislative Requirements

The following legislative requirements were considered during the assessment:

- The Constitution of the Republic of South Africa, 1996¹;

¹ Since 1996, the Constitution has been amended by seventeen amendments acts. The Constitution is formally entitled the 'Constitution of the Republic of South Africa, 1996'. It was previously also numbered as if it were an Act of Parliament – Act No. 108 of 1996 – but since the passage of the Citation of Constitutional Laws Act, neither it nor the acts amending it are allocated act numbers



- National Environmental Management Act, 1998, (Act 107 of 1998) (NEMA);
- National Environmental Management: Biodiversity Act, 2004, (Act 10 of 2004) (NEMBA);
- Conservation of Agricultural Resources Act, 1983, (Act 43 of 1983) (CARA);
- Government Notice R598 Alien and Invasive Species Regulations as published in the Government Gazette 37885 dated 1 August 2014 as it relates to the National Environmental Management Biodiversity Act, 1998 (Act 107 of 1998);
- Government Notice 536 List of Protected Tree Species as published in the Government Gazette 41887 dated 7 October 2018 as it relates to the National Forest Act, 1998 (Act No. 84 of 1998);
- The National Forest Act, 1998, (Act 84 of 1998, as amended in October 2011) (NFA);
- The Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) (NCNCA); and
- The Northern Cape Provincial Spatial Development Framework (NCPSDF) as developed 2011 to meet the requirements of the Northern Cape Planning and Development Act, 1998 (Act 7 of 1998) and the Municipal Systems Act, 2000 (Act 32 of 2000).

The details of each of the above, as they pertain to this study, are provided in Appendix B of this report.

2 ASSESSMENT APPROACH

2.1 Desktop Study

A desktop assessment was compiled with all relevant information as presented by the SANBI's Biodiversity GIS website (<http://bgis.sanbi.org>). Relevant databases and documentation that were considered during the assessment of the study area included:

- NPAES Focus Areas for Protected Area Expansion, 2009:
 - Formally and Informally Protected Areas;
- South Africa Conservation Area Database, Quarter 4, 2019;
- South Africa Protected Area Database, Quarter 4, 2019;
- Mucina and Rutherford, 2012 & 2018 (beta version):
 - Biomes;
 - Bioregions; and
 - Vegetation Type(s).
- National Biodiversity Assessment, 2018;
- The National Web-based Screening Tool, 2020;



- Important Bird and Biodiversity Areas (IBAs), 2015, in conjunction with the South African Bird Atlas Project (SABAP2);
- Northern Cape Critical Biodiversity Areas (2016); and
- The Northern Cape Provincial Spatial Development Framework (2000)

2.2 General Approach

To accurately determine the PES of the focus area and capture comprehensive data with respect to faunal and floral taxa, the following methodology was used:

- Maps and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites; and
- Relevant databases considered during the assessment of the study area included the South African National Biodiversity Institute (SANBI) Threatened Species Programme (TSP), the Northern Cape Critical Biodiversity Areas (2016), The Northern Cape Provincial Spatial Development Framework (2000), Mucina and Rutherford (2012), National Biodiversity Assessment (2011), Important Bird Areas in conjunction with the South African Bird Atlas Project (SABAP 2) (2015), International Union for Conservation of Nature (IUCN), and Pretoria National Herbarium Computer Information Systems (PRECIS).

3 RESULTS OF THE DESKTOP ANALYSIS

3.1 Conservation Characteristics of the study area based on National and Provincial Datasets

The following table contains data accessed as part of the desktop assessment. It is important to note that although all data sources used provide useful and often verifiable, high-quality data, the various databases do not always provide an entirely accurate indication of the study area's actual biodiversity characteristics.



Table 1: Summary of the terrestrial conservation characteristics for the study area (Quarter Degree Square (QDS) 2723CA).

CONSERVATION DETAILS PERTAINING TO THE AREA OF INTEREST (VARIOUS DATABASES)		DETAILS OF THE AREA OF INTEREST IN TERMS OF MUCINA & RUTHERFORD (2006, 2018, 2012)				
<p>NATIONAL BIODIVERSITY ASSESSMENT (NBA): Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the National Environmental Management: Protected Areas Act, 2003 (act no. 57 of 2003) (NEMPAA), and compared with the biodiversity target for that ecosystem type. the ecosystem protection level status is assigned using the following criteria:</p> <ul style="list-style-type: none"> I. if an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either a or b, it is classified as well protected, II. when less than 100% of the biodiversity target is met in formal a or b protected areas it is classified it as moderately protected, III. if less than 50% of the biodiversity target is met, it is classified it as poorly protected, and IV. if less than 5% it is hardly protected. 		Biome	The study area is situated within the Savanna Biome .			
		Bioregion	The study area is located within the Eastern Kalahari Bushveld Bioregion .			
		Vegetation Type	The study area is situated within the Kathu Bushveld .			
		Climate	Summer and autumn rainfall with very dry winters.			
			MAP* (mm)	MAT* (°C)	MFD* (Days)	MAPE* (mm)
		300	18.5	27	2 883	85
		Altitude (m)	960 –1 300			
<p>NBA (2018):</p> <ul style="list-style-type: none"> 1) Ecosystem Threat Status 2) Ecosystem Protection Level 	<p><u>NBA 2018 dataset (Figure 4):</u> The study area falls within the Kathu Bushveld which is considered a Least Concern ecosystem and is currently Poorly Protected.</p>	Distribution	Northern Cape Province: Plains from Kathu and Dibeng in the south, through Hotazel, vicinity of Frylinckspan to the Botswana border roughly between Van Zylsrus and McCarthysrus.			
		Conservation	Least threatened. Target 16%. None conserved in statutory conservation areas. More than 1% already transformed, including the iron ore mining locality at Sishen, one of the biggest open-cast mines in the world. Erosion is very low.			
<p>National Threatened Ecosystems (2011) Figure 4</p>	<p>The study area falls within an ecosystem that is currently considered to be Least Concern. Least Concern (LC) ecosystems have not experienced a significant loss of natural habitat or deterioration in condition.</p> <p>For Environmental Impact Assessments (EIAs), the 2011 National list of Threatened Ecosystems remains the trigger for a Basic Assessment in terms of Listing Notice 3 of the EIA Regulations published under the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA).</p>	Geology & Soils	Aeolian red sand and surface calcrete, deep (>1.2 m) sandy soils of Hutton and Clovelly soil forms. Land types mainly Ah and Ae, with some Ag.			
		Vegetation & landscape features	Medium-tall tree layer with <i>Acacia erioloba</i> in places, but mostly open and including <i>Boscia albitrunca</i> as the prominent trees. Shrub layer generally most important with, for example, <i>A. mellifera</i> , <i>Diospyros lycioides</i> and <i>Lycium hirsutum</i> . Grass layer is variable in cover.			
IBA (2015)	The study area does not fall within a 10km radius an Important Bird Area.					



<p>SAPAD (2019, Q3); SACAD (2019, Q3); NPAES (2009). Figure 5</p>	<p>The South African Protected Areas Database (SAPAD, 2019), the South African Conservation Areas Database (SACAD, 2019), and the National Protected Areas Expansion Strategy (NPAES, 2009) indicates that the Khathu Forest Nature falls within a 10km zone from the study area.</p>	
<p>NORTHERN CAPE CRITICAL BIODIVERSITY AREAS (2016) (FIGURE 6)</p>		<p>NORTHERN CAPE PROVINCIAL SPATIAL DEVELOPMENT FRAMEWORK (NCPSDF, 2019) (FIGURE 7 & 8)</p>
<p>According to the Northern Cape Critical Biodiversity Areas (2016) database, most of the study area falls within areas categorised as Other Natural Areas. However, the southern portion of the 300 m corridor as well as the north-eastern parts of the authorised Hyperion 1 & 2 PV SEF site and the focus area fall within an Ecological Support Area.</p>	<p>The NCPSDF is to function as an innovate strategy that will apply sustainability principles to all forms of land use management throughout the Northern Cape as well as to facilitate practical results, as it relates to the eradication of poverty and inequality and the protection of the integrity of the environment.</p> <p>The study area is located within the Griqualand West Centre (GWC) of plant endemism (Figure 6). This semi-arid region is broadly described as Savanna, forming part of the Eastern Kalahari Bushveld Bioregion. Studies investigating the endemism of the centre report at least 23 plant species that have restricted distributions (Frisby <i>et al.</i> 2019).</p> <p>The study area also falls within the Gamagara corridor (Figure 7). The Gamagara Corridor comprises the mining belt of the John Taolo Gaetsewe and Siyanda districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese.</p>	
<p>NATIONAL WEB BASED ENVIRONMMETAL SCREENING TOOL (2020)</p>		
<p>The screening tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. this assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas</p>	<p>Terrestrial Biodiversity Theme</p>	<p>For the terrestrial biodiversity theme, the study area is considered to have a very high sensitivity. The triggered sensitivity features include an Ecological Support Areas (ESA).</p>
	<p>Plant Species Theme</p>	<p>For the plant species theme, the entire study area is considered to have a low sensitivity.</p>
	<p>Animal Species Theme</p>	<p>For the animal species theme, the entire study area is considered to have a medium sensitivity. The triggered sensitivity is due to the presence of <i>Sagittarius serpentarius</i> (Secretary bird).</p>
<p>STRATEGIC WATER SOURCE AREAS FOR SURFACE WATER (2017)</p>		
<p>Surface Water SWSAS are defined as areas of land that supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size. they include transboundary areas that extend into Lesotho and Swaziland. the sub-national water source areas (WSAS) are not nationally strategic as defined in the report but were included to provide a complete coverage.</p>	<p>Name & Criteria</p>	<p>The study area is not within 10 km of a Strategic Water Source Area.</p>

CBA = Critical Biodiversity Area, ESA = Ecological Support Area, IBA = Important Bird and Biodiversity Area, MAP = Mean Annual Precipitation, MAT = Mean Annual Temperature, MFD = Mean Frost Days, MAPE = Mean Annual Potential for Evaporation, MASMS = Mean Annual Soil Moisture Stress, NBA = National Biodiversity Assessment, NPAES = National Protected Areas Expansion Strategy, SACAD = South African Conservation Areas Database, SAPAD = South African Protected Areas Database.



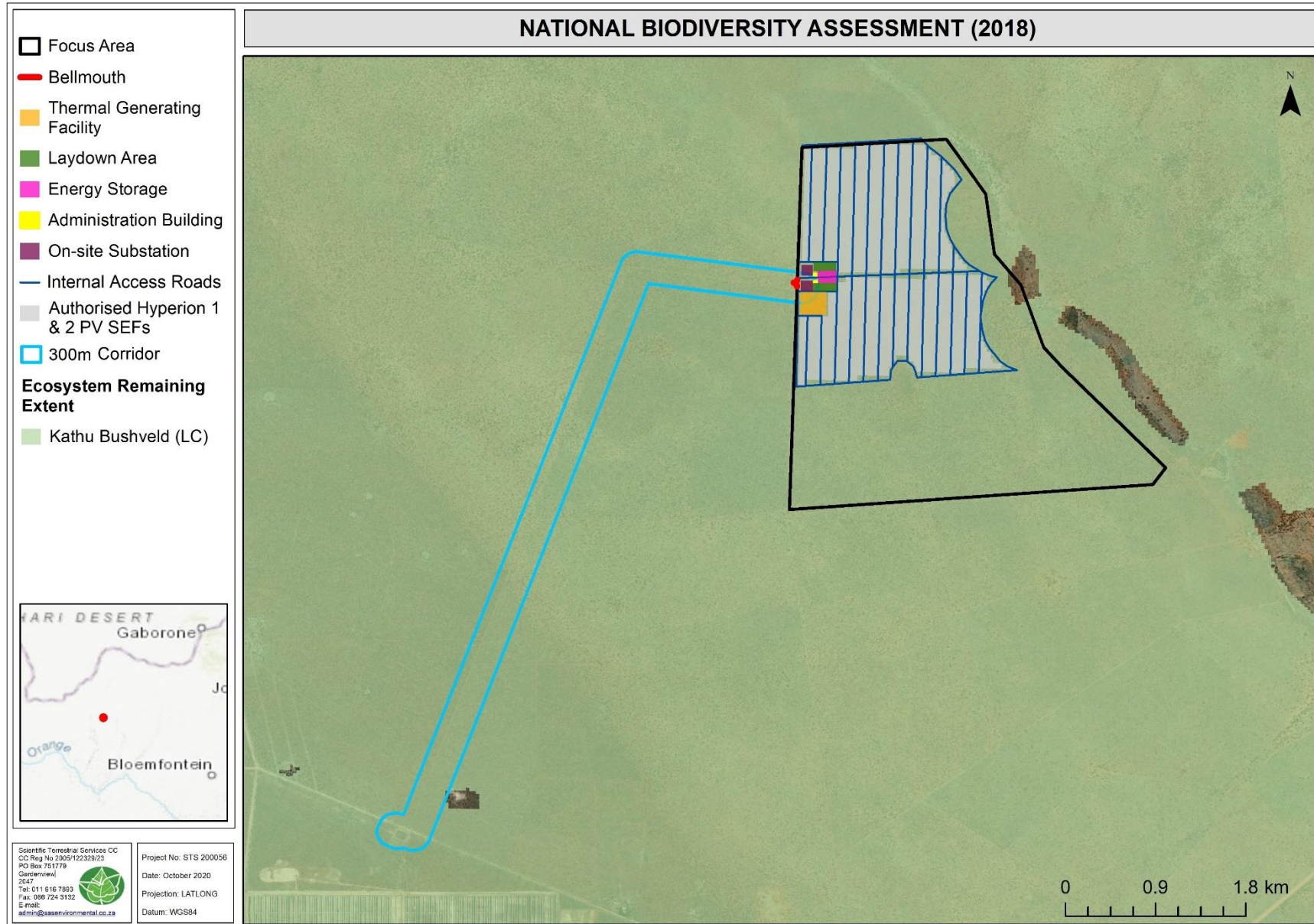


Figure 4: The remaining extent of the Endangered Egoli Granite Grassland, according to the National Biodiversity Assessment (NBA, 2018).



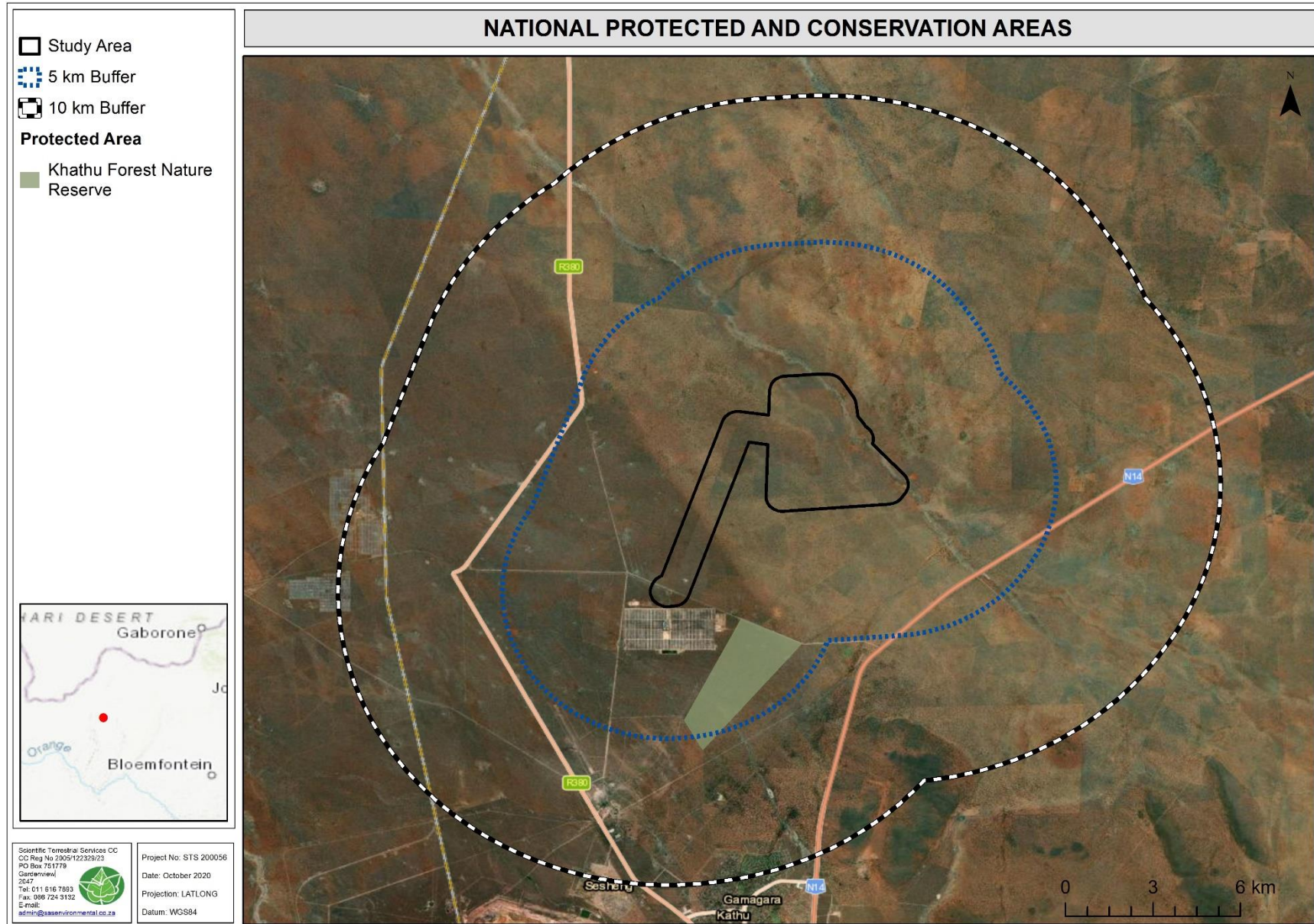


Figure 5: Protected areas within a 5 km and 10 km radius of the study area, according to SAPAD (Q4, 2019), SACAD (Q4, 2019) and NPAES (2009).



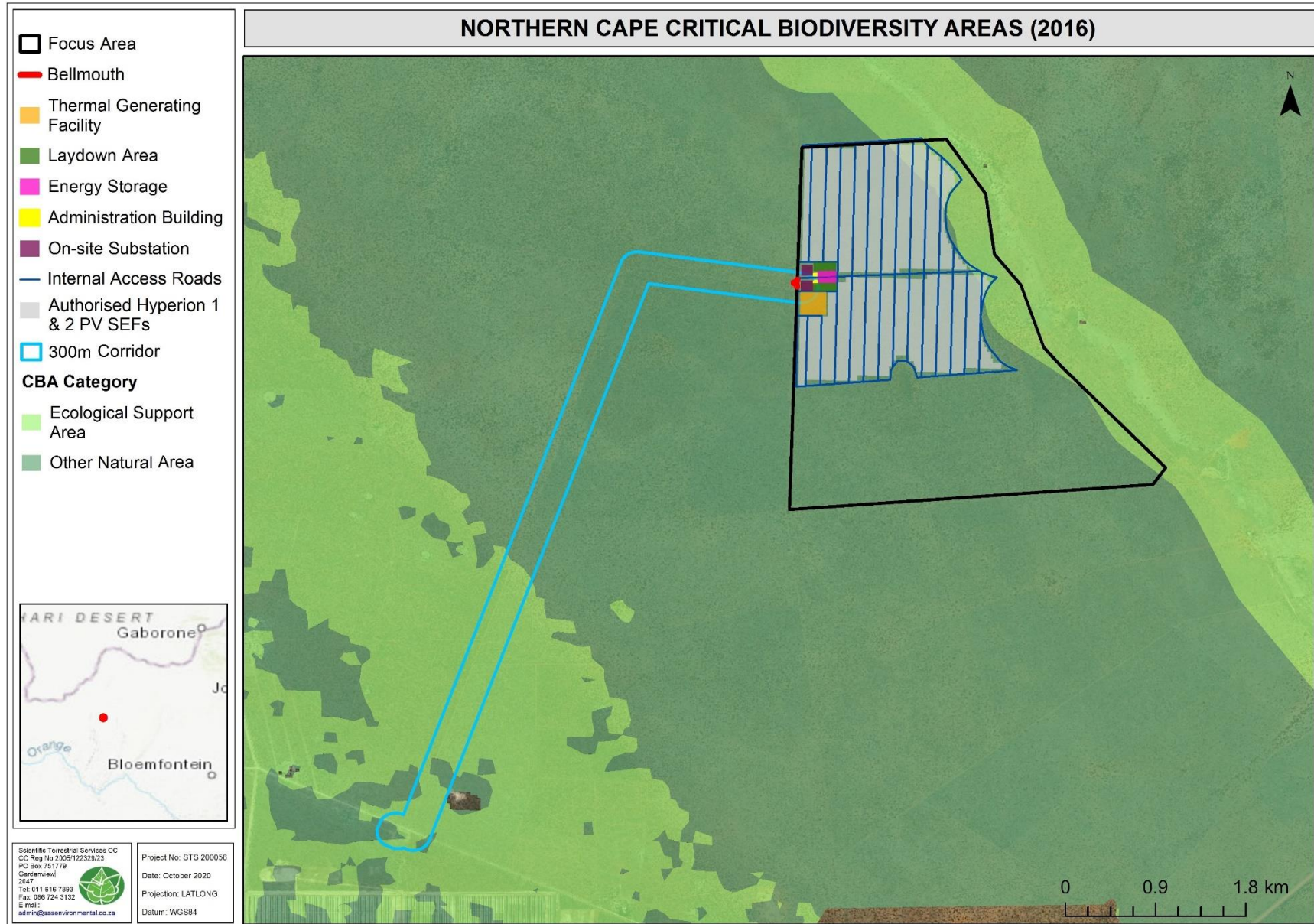


Figure 6: Northern Cape Critical Biodiversity areas associated with the study area and the associated infrastructure.



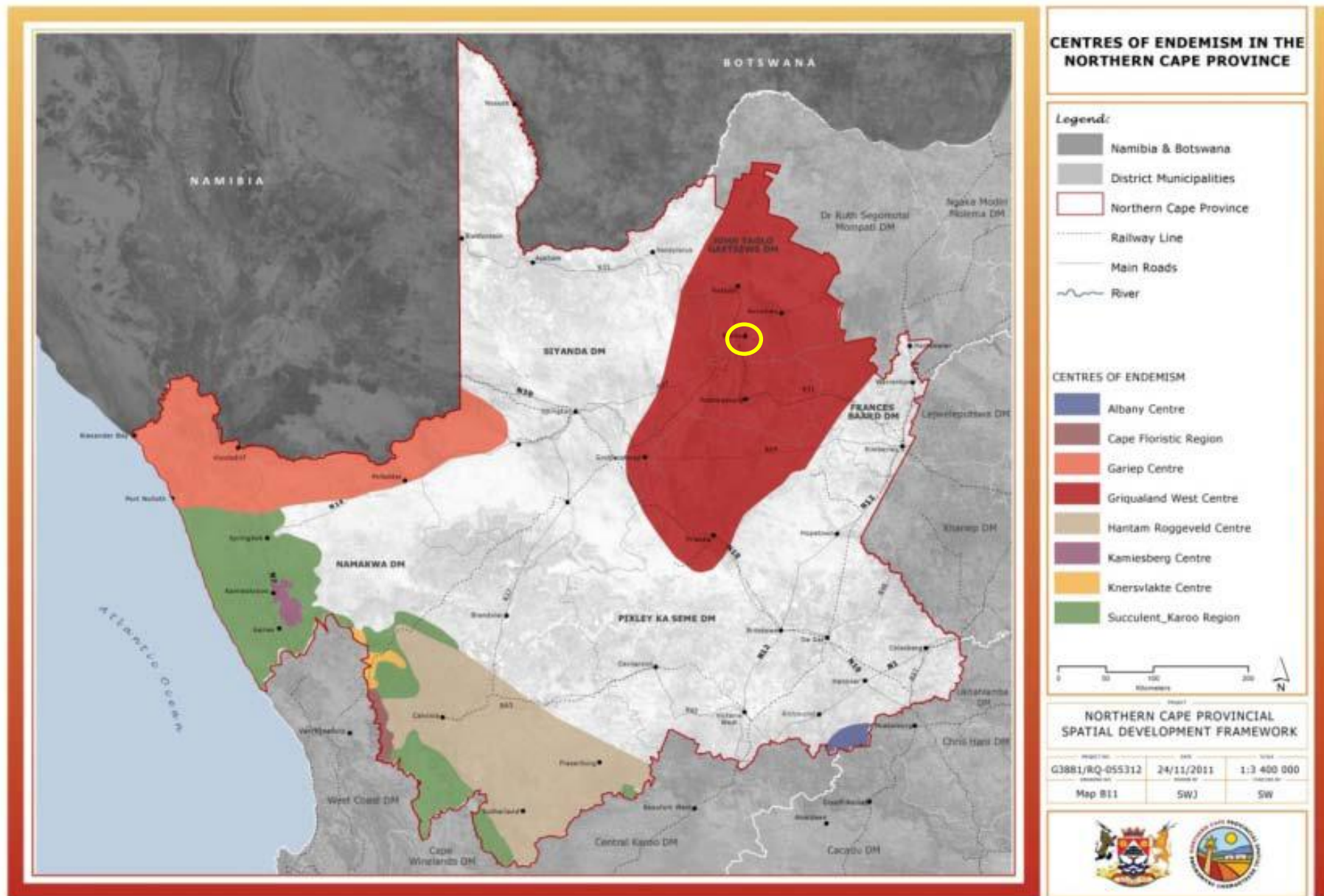


Figure 7: Centres of endemism of the Northern Cape Province: the study area indicated by the yellow circle (NPSDF, 2012).



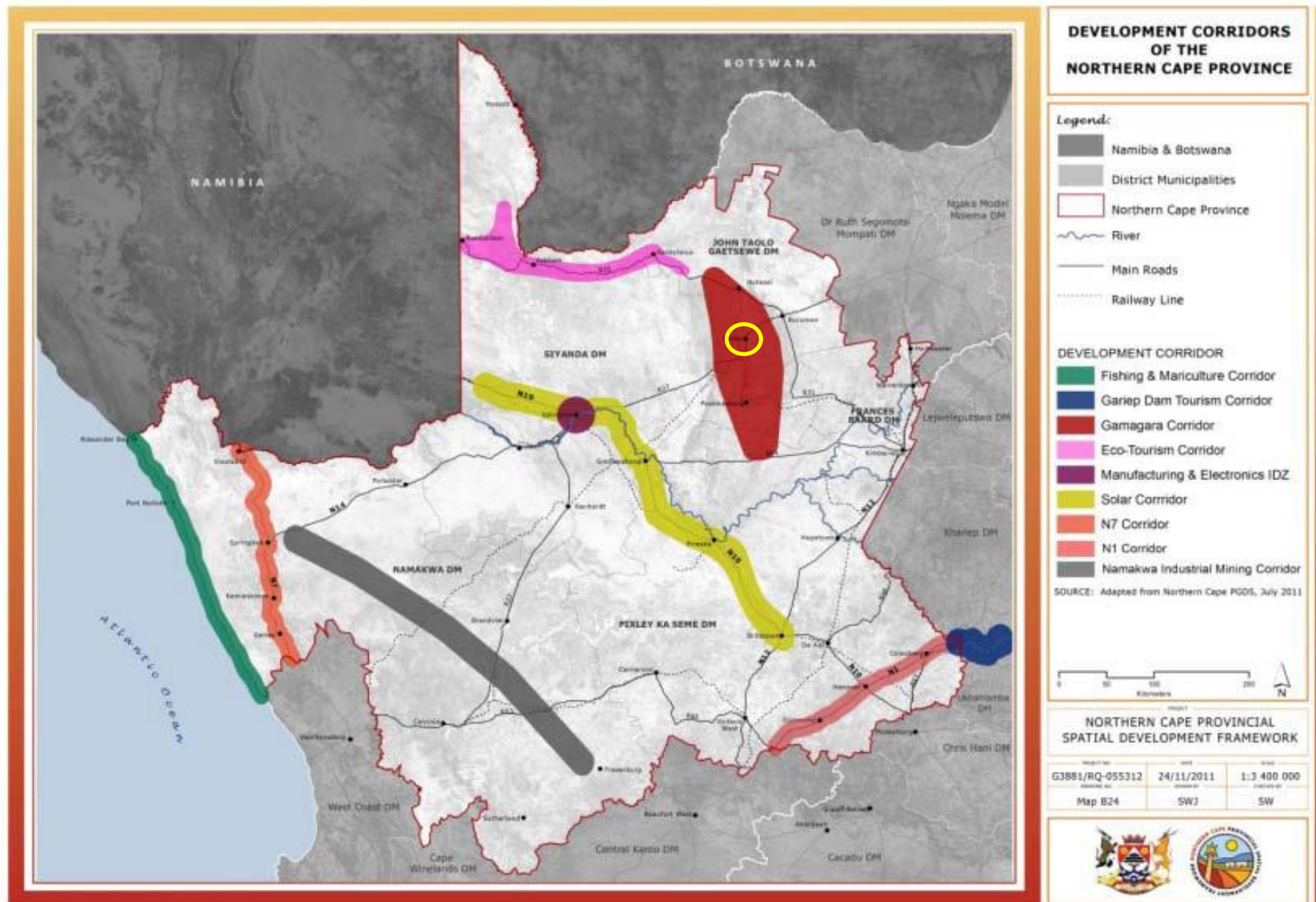


Figure 8: Development corridors of the Northern Cape Province: the study area is indicated by the yellow circle (NPSDF, 2012).



4 POTENTIAL IMPACTS AND PROPOSED MANAGEMENT MEASURES

4.1 Description of Potential Impacts Associated with the Proposed PV SEF Facility and associated infrastructure

This section of the scoping report aims to provide a summary of the most likely impacts that the proposed development may have on the surrounding natural area. Table 2 below provides the potential impacts the proposed infrastructure development may have on the habitat within the development area, as well as the nature and extent of the impact. Desktop data (as presented in this report) was utilised to determine the preliminary impact significance of the proposed development on the habitat, which will be further refined and assessed during the EIA Phase of this project.

Table 2: Potential impacts associated with the proposed development within the study area.

Impacts			
Several potential risks to the receiving environment by the proposed infrastructure development have been identified and are presented below. According to the National web based environmental screening tool (2020), the terrestrial biodiversity theme for the study area is considered to have a very high sensitivity. The triggered sensitivity features include an Ecological Support Areas (ESA). The Plant Species Theme was identified to be of low sensitivity whereas the Animal Species Theme was identified as having a medium sensitivity, which is triggered by the presence of <i>Sagittarius serpentarius</i> which is considered vulnerable.			
Issue	Nature of Impact	Extent of Impact	No-go Areas
Habitat fragmentation	Vegetation clearing and construction activities will lead to habitat destruction, disturbance and fragmentation within the footprint area and will likely lead to the loss of floral and faunal communities, consequently impacting on the terrestrial biodiversity within the study area	Local	None identified at this stage
Loss of floral and faunal communities	Potential indiscriminate fires by construction personnel may lead to uncontrolled / run-away fires, impacting on floral and faunal communities of the study area and surrounds	Local	
Alteration, degradation, loss, or destruction of faunal and floral habitat	Vehicles may impact the habitat during construction, operation, and rehabilitation, resulting in a loss of habitat. Vehicular movement and construction activities could additionally cause increased erosion, leading to poor growth and establishing conditions for floral species and, consequently, providing sub-optimal living conditions for faunal species; Dumping of construction and operational waste materials in the surrounding habitat will result in floral and faunal habitat changes, which is likely to push faunal species out of their current home ranges, resulting in an increased competition for space and resources within the study area and in the surrounding area;	Local	



	<p>Earthworks may lead to increased runoff and erosion resulting in a further loss of faunal and floral habitat; and</p> <p>Risk of discharge of contaminated water from construction related operations may pollute the receiving environment leading to altered floral and faunal habitat</p>		
Loss of protected and/or SCC plant species	<p>Several floral species that are protected under Schedule 2 (Protected Species) of the Northern Cape Nature Conservation Act (Act No. 9 of 2009) have the potential to be found within the study area. A full list of species can be viewed in Table F1 (Appendix F). A field investigation will be necessary to determine the presence of suitable habitat for the above-mentioned species. Increased personnel on site may result in an increased risk of harvesting/overutilisation of species of conservation concern (SCC) species. Moreover, increased personnel within the study area inherently brings an increased risk of poaching activities, threatening the current floral populations.</p>	Local	
Loss of protected and/or SCC faunal species	<p>Several faunal SCC as identified by the Threatened or Protected Species list (2007) have the potential to be located within the study area. A field investigation will be necessary to determine the presence of suitable habitat for the species as presented in Table G1 (Appendix G). Increased personnel on site may result in an increased risk of harvesting/overutilisation of species of conservation concern (SCC) species. Moreover, increased personnel within the study area inherently brings an increased risk of poaching activities, threatening the current faunal populations</p>	Local	
Loss of a poorly protected ecosystem	<p>According to the National Biodiversity Assessment (2011), the entire study area falls within the Kathu Bushveld which is of least concern and is a poorly protected ecosystem.</p>	Regional	
Loss of ESA areas	<p>The Northern Cape Critical Biodiversity Areas (2016) database has indicated that most of the study area falls within areas categorised as other natural areas. However, the southern portion of the 300 m corridor along which the access road will be aligned as well as the north-eastern parts of the Hyperion 1 & 2 PV SEF sites and the focus area fall within an ecological support area (ESA). ESAs are important as they maintain the ecological processes on which Critical Biodiversity Areas and Protected Areas depend;</p>	Regional	
Loss of areas within a centre of plant endemism	<p>According to the Northern Cape Province Spatial Development Framework (NCPSDF), the study area is located within the Griqualand West Centre (GWC) of plant endemism. This semi-arid region is broadly described as Savanna, forming part of the Eastern Kalahari Bushveld Bioregion. Studies investigating the endemism of the centre report at least 23 plant species that have restricted distributions (Frisby <i>et al.</i> 2019);</p>	Regional	



Loss of a developmental corridor	the NCPSDF indicates that the study area also falls within the Gamagara corridor. The Gamagara Corridor comprises the mining belt of the John Taolo Gaetsewe and Siyanda districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese	Local	
Lack of maintenance activities	Failure to implement an alien floral control plan will result in a high risk of increased loss of biodiversity within the study area; and the ineffective removal of alien invader species, and rehabilitation of exposed areas could lead to re-establishment of invasive species, impacting on floral community rehabilitation efforts.	Local	
Soil and water contamination	Untreated wastewater and other effluents from the construction activities may contaminate water resources in the project site; and disposal of hazardous and non-hazardous waste may potentially cause groundwater pollution and deteriorate habitat quality on adjacent areas.	Local/Regional	
Description of the expected significance of the impact			
Impacts on ecological resources are likely to occur at the extent of the study area and the broader area. A field investigation will be necessary to determine the presence of suitable habitat for the faunal and floral species that are potentially located within the study area.			
Gaps in knowledge & recommendations for further study			
As the study area has only been assessed using desktop analysis, the exact ecological state of the area could not be described. Thus, a gap in the knowledge of the condition of the habitat exists, and it is anticipated that these gaps will be sufficiently addressed during a site investigation as part of the EIA Phase of this project. Several Red Listed/Protected flora and fauna species potentially occur within the study area. Thus, detailed fauna and flora field investigations must be conducted during the EIA phase to identify any Red Listed/Protected fauna and flora species within the study area.			

Please note that the above list is not exhaustive. Additional impacts will need to be identified during a detailed impact assessment.

4.2 Preliminary Management Measures

The implementation of mitigation measures is important to manage the overall risk to floral and faunal diversity, habitat, and SCC. The list below highlights the key integrated mitigation measures that are applicable to the focus area in order to suitably manage and mitigate the ecological impacts, both faunal and floral, that are associated with the proposed developmental activities.

Mitigation Measures

- Several Protected plant taxa that are protected under Schedule 2 (Protected Species) of the Northern Cape Nature Conservation Act (Act No. 9 of 2009) have the potential to be found within the study area. Furthermore, several faunal SCC as identified by the Threatened or Protected Species list (2007) also have the potential to be located within the study area. As such, prior to any vegetation clearing activities taking place, an extensive assessment for floral and faunal SCC is to be undertaken within the



proposed footprint areas. Individuals or communities of the species (as mentioned above) that are identified within the study area, and will be disturbed by construction/operational activities, must be relocated to suitable, similar habitat in close proximity to where they were removed from, but outside the disturbance footprint after obtaining the relevant permits from the Northern Cape Department of Environment and Nature Conservation;

- The construction and operational footprints must be kept as small as possible in order to minimise the impact on the surrounding environment;
- Where site clearing is necessary, it should take place in a phased manner to allow for faunal species present to move out of the footprint area;
- No trapping, collecting or hunting of faunal species must be allowed during any phases of the proposed infrastructure development;
- No collection/ harvesting of floral medicinal plants or SCC is to take place;
- Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed;
- Appropriate sanitary facilities must be provided during the construction phase, and all waste must be removed to an appropriate waste facility;
- All soils compacted because of construction activities should be ripped and reprofiled to natural levels and revegetated with indigenous vegetation. Particular attention should be paid to alien and invasive plant control within these areas;
- No dumping of waste should take place within any sensitive habitat or areas designated as “open space”. If any spills occur, they should be immediately cleaned up, and be disposed of at a registered waste facility;
- Upon completion of the development, it is highly recommended that bare areas be rehabilitated, and that indigenous floral species are reintroduced, especially within the surrounding areas; and
- Establishment of reintroduced vegetation must be monitored during the rehabilitation phase.

Vehicle access

- Vehicles should be restricted from travelling in sensitive environments; and
- In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised near the surface area to prevent ingress of hydrocarbons into topsoil.



Soils

- Limit the footprint area of the construction activity to what is essential in order to minimise environmental damage;
- Edge effects of activities including erosion and alien and invasive plant control need to be strictly managed in sensitive areas; and
- It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.

Rehabilitation

- Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan compiled by a suitable specialist. This rehabilitation plan should consider all development phases of the infrastructure development indicating rehabilitation actions to be undertaken during and once construction has been completed, and ongoing rehabilitation during the operational phase;
- Any natural areas beyond the development footprint that have been affected by related construction activities, must be rehabilitated using indigenous species. All rehabilitated areas should be rehabilitated to a point where natural processes will allow the pre-development ecological functioning and biodiversity of the area to be re-instated; and
- All areas of disturbed and compacted soils need to be ripped and reprofiled.

5 A PLAN OF STUDY FOR EIA PHASE

Specific outcomes in terms of the EIA phase report are presented in the points below:

- To identify and consider all sensitive landscapes including rocky ridges, wetlands and/or any other special features;
- The terrestrial ecological assessment will focus on:
 - Conducting a Species of Conservation Concern (SCC) assessment, including potential for species to occur within the focus area;
 - Providing floral and faunal inventories of species that were encountered on site;
 - Describing the spatial significance of the proposed development with regards to surrounding natural areas;
 - Describing floral habitats, communities and ecological state of the proposed development layout as is determined on site;
 - Identifying dominant floral and faunal species for each habitat type;



- Focus will be given to identifying areas of severe alien and invader encroachment and listing Category 1, 2 and 3 species in terms of GN No. 864 Alien and Invasive Species List, 2016: National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA);
 - Specific focus will also be given to establishing the presence of RDL and protected fauna and flora as listed within the IUCN List, relevant protected species listed under Schedule 2 (Protected Species) of the Northern Cape Nature Conservation Act (Act No. 9 of 2009), the National Forest Act, and the TOPS list of NEMBA.
- The reports produced will include a detailed impact assessment of all identified significant risks, including cumulative impacts on ecological assemblages in the region; and
- Recommendations on the management and mitigation measures (including opportunities and constraints) with regards to the construction and operation of the proposed activities, will be provided to manage and mitigate impacts on the terrestrial ecology of the area.

Please refer to Appendices C for the method of assessment.

6 CONCLUSION

Scientific Terrestrial Services (STS) was appointed to conduct a biodiversity assessment as part of the Environmental Impact and Environmental Authorisation (EA) process for the proposed thermal dual fuel facility to form part of a hybrid generation facility together with the Hyperion 1 & 2 solar PV facilities, located near the town of Kuruman, Northern Cape Province, henceforth referred to as the “study area”. This report provides the desktop results for the scoping phase of the project.

Based on the preliminary desktop assessment, the study area falls within an ecosystem of least concern, namely the Kathu Bushveld. The proposed study area is not located within a protected area, however, is situated within a 10 km radius of the Kathu Forest Nature Reserve. According to the Northern Cape Critical Biodiversity Areas (2016) database, the study area does not fall within any Critical Biodiversity Areas (CBAs). However, most of the study area falls within an area categorised as Other Natural Areas, although small sections (in both the northeast and the southwest) of the study area fall within Ecological Support Areas (ESAs). ESAs are required to be maintained in an ecologically functional state to support Critical Biodiversity Areas and/or Protected Areas. ESAs maintain the ecological processes on which Critical Biodiversity Areas and Protected Areas depend. According to the Northern Cape Province Spatial Development Framework (NCPSDF), the study area is located within the



Griqualand West Centre (GWC) of plant endemism. This semi-arid region is broadly described as Savanna, forming part of the Eastern Kalahari Bushveld Bioregion. Studies investigating the endemism of the centre report at least 23 plant species that have restricted distributions (Frisby *et al.* 2019). Furthermore, the NCPSTDF indicates that the study area also falls within the Gamagara corridor. The Gamagara Corridor comprises the mining belt of the John Taolo Gaetsewe and Siyanda districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese. According to the National web based environmental screening tool (2020), the terrestrial biodiversity theme for the study area is considered to have a very high sensitivity. The triggered sensitivity features include an Ecological Support Areas (ESA). The Plant Species Theme was identified to be of low sensitivity whereas the Animal Species Theme was identified as having a medium sensitivity, which is triggered by the presence of *Sagittarius serpentarius* (Secretary Bird) which is considered vulnerable. Furthermore, due to the potential occurrence of floral and faunal species of conservation concern (SCC) as listed for the province, permits will be required to move or destroy these species if they are identified on site.

Following the desktop analysis of the biodiversity within the study area, it is determined that a full biodiversity assessment will need to be undertaken to determine the sensitivity and the potential impacts to the study areas should the proposed development receive Environmental Authorisation. It is the opinion of the ecologists that this study provides the relevant information required in order to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the study area will be made in support of the principle of sustainable development.



REFERENCES

- Conservation of Agricultural Resources Act (CARA) 43 of 1983.
- Frisby, A.W., Siebert, S.J., Struwig, M. and Cilliers, D.P., 2019. Plant endemism in Griqualand West, South Africa. *South African Journal of Botany*, 124, pp.127-137.
- IBA: Marnewick MD, Retief EF, Theron NT, Wright DR, Anderson TA. (2015). Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa. Online available: <http://bgis.sanbi.org/IBA/project.asp>
- Mucina, L. & Rutherford, M.C. (Eds). (2012). *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria, RSA.
- National Environmental Management Act (NEMA) 107 of 1998
- NBA: Driver A., Sink, K.J., Nel, J.N., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. National Biodiversity Assessment (2011): An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria. Online available: <http://bgis.sanbi.org/NBA/project.asp>
- NPAES: DEA and SANBI. (2009). *National Protected Areas Expansion Strategy Resource Document*. Online available: <http://bgis.sanbi.org/protectedareas/NPAESinfo.asp>
- NPAES: DEA and SANBI. (2009). *National Protected Areas Expansion Strategy Resource Document*. Online available: <http://bgis.sanbi.org/protectedareas/NPAESinfo.asp>
- SABAP2, 2014. *The South Africa Bird Atlas Project 2 database*.
- SACAD: Department of Environmental Affairs. (2017). *South Africa Conservation Areas Database (SACAD_OR_2018_Q1)*. Online available: [<http://egis.environment.gov.za>]
- SANBI (2009). PRECIS Information Database. The South African National Biodiversity Institute is thanked for the use of data from the National Herbarium, Pretoria (PRE) Computerised Information System (PRECIS). Online available: http://posa.sanbi.org/intro_precis.php
- SANBI BGIS (2018). The South African National Biodiversity Institute - Biodiversity GIS (BGIS) [online]. URL: <http://bgis.sanbi.org> as retrieved in 2018
- SAPAD: Department of Environmental Affairs. (2017). *South Africa Protected Areas Database (SAPAD_OR_2018_Q1)*. Online available: [<http://egis.environment.gov.za>]
- Threatened Ecosystems: National Environmental Management Biodiversity Act: National list of ecosystems that are threatened and in need of protection (G 34809, GoN 1002). 2011. Department of Environmental Affairs. Online available: <http://bgis.sanbi.org/ecosystems/project.asp>



APPENDIX A - Legislative Requirements and Indemnity

The Constitution of the Republic of South Africa, 1996

The environment and the health and well-being of people are safeguarded under the Constitution of the Republic of South Africa, 1996 by way of section 24. Section 24(a) guarantees a right to an environment that is not harmful to human health or well-being and to environmental protection for the benefit of present and future generations. Section 24(b) directs the state to take reasonable legislative and other measures to prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources (including water and mineral resources) while promoting justifiable economic and social development. Section 27 guarantees every person the right of access to sufficient water, and the state is obliged to take reasonable legislative and other measures within its available resources to achieve the progressive realisation of this right. Section 27 is defined as a socio-economic right and not an environmental right. However, read with section 24 it requires of the state to ensure that water is conserved and protected and that sufficient access to the resource is provided. Water regulation in South Africa places a great emphasis on protecting the resource and on providing access to water for everyone.

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (GN R326 as amended in 2017 and well as listing notices 1, 2 and 3 (GN R327, R325 and R324 of 2017), state that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the Environmental Impact Assessment process depending on the nature of the activity and scale of the impact.

The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)

The objectives of this act are (within the framework of NEMA) to provide for:

- The management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of the surrounding areas are not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of the benefits arising from indigenous biological resources.

Furthermore, a person may not carry out a restricted activity involving either:

- a) A specimen of a listed threatened or protected species;
- b) Specimens of an alien species; or
- c) A specimen of a listed invasive species without a permit.

The National Forest Act, 1998 (act 10 of 1998), as amended in October 2011 (NFA)

According to the department of Department of Environment, Forestry and Fisheries (DEFF) (previously the Department of Agriculture, Forestry and Fisheries (DAFF)) ©2019 website (<https://www.daff.gov.za/daffweb3/>):



“In terms of the National Forests Act of 1998 certain tree species (types of trees) can be identified and declared as protected. The Department of Water Affairs and Forestry followed an objective, scientific and participative process to arrive at the new list of protected tree species, enacted in 2004. All trees occurring in natural forests are also protected in terms of the Act. Protective actions take place within the framework of the Act as well as national policy and guidelines. Trees are protected for a variety of reasons, and some species require strict protection while others require control over harvesting and utilization.”

Applicable sections of the NFA pertaining to the proposed project include the below:

Section 12:

Declaration of trees as protected

- 1) The Minister may declare-
 - a. particular tree,
 - b. a particular group of trees,
 - c. a particular woodland; or
 - d. trees belonging to a particular species,
 to be a protected tree, group of trees, woodland or species.
- 2) The Minister may make such a declaration only if he or she is of the opinion that the tree, group of trees, woodland or species is not already adequately protected in terms of other legislation.
- 3) In exercising a discretion in terms of this section, the Minister must consider the principles set out in section 3(3) of the NFA.

Section 15(1):

No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence granted by the Minister or in terms of an exemption from the provisions of this subsection published by the Minister in the Gazette.

Contravention of this declaration is regarded as a first category offence that may result in a person who is found guilty of being sentenced to a fine or imprisonment for a period up to three years, or both a fine and imprisonment.

Government Notice 598 Alien and Invasive Species Regulations (2014), including the Government Notice 864 Alien Invasive Species List as published in the Government Gazette 40166 of 2016, as it relates to the National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004)

NEMBA is administered by the Department of Environmental Affairs and aims to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA. In terms of alien and invasive species. This act in terms of alien and invasive species aims to:

- Prevent the unauthorized introduction and spread of alien and invasive species to ecosystems and habitats where they do not naturally occur,
- Manage and control alien and invasive species, to prevent or minimize harm to the environment and biodiversity; and
- Eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Alien species are defined, in terms of the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004) as:

- (a) A species that is not an indigenous species; or
- (b) An indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.

Categories according to NEMBA (Alien and Invasive Species Regulations, 2017):

- **Category 1a:** Invasive species that require compulsory control;
- **Category 1b:** Invasive species that require control by means of an invasive species management programme;



- **Category 2:** Commercially used plants that may be grown in demarcated areas, provided that there is a permit and that steps are taken to prevent their spread; and
- **Category 3:** Ornamentally used plants that may no longer be planted.

The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)

Removal of the alien and weed species encountered in the application area must take place in order to comply with existing legislation (amendments to the regulations under the CARA, 1983 and Section 28 of the NEMA, 1998). Removal of species should take place throughout the construction and operation, phases.

GDARD Requirements for Biodiversity Assessments Version 3 (GDARD, 2014b).

The biodiversity assessment must comply with the minimum requirements as stipulated by GDARD Version 3 of 2014 and must contain the following information:

- A location and description of the application site and proposed activities;
- Photographic record and description of the site characteristics and inventories of the faunal and floral species observed on site, with special mention to Red Listed species;
- Sensitivity map displaying all sensitive areas and associated buffers as listed in the Sensitivity Mapping Rules for Biodiversity Assessments section of GDARD V3 (2014); and
- A list of recommendations and mitigation measures to reduce the potential environmental impacts that the proposed development might have on the terrestrial ecology associated with the site.

Northern Cape Provincial Spatial Development Framework (NCPSDF, 2019)

The Northern Cape Provincial Spatial Development Framework (NCPSDF) was developed in 2011 to meet the requirements of the Northern Cape Planning and Development Act, 1998 (Act 7 of 1998) and the Municipal Systems Act, 2000 (Act 32 of 2000).

The Northern Cape Nature Conservation Act (NCNCA, Act No 9 of 2009)

The purpose of this Act is to provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act; to provide for the issuing of permits and other authorisations; and to provide for matters connected therewith.

Restricted activities involving specially protected plants:

49(1) No person may, without a permit –

- (a) Pick;
- (b) Import;
- (c) Export;
- (d) Transport;
- (e) Possess;
- (f) Cultivate; or
- (g) Trade in,

A specimen of a specially protected plant

Restricted activities involving protected plants

50 (1) Subject to the provision of section 52, no person may, without a permit –

- (a) Pick;
- (b) Import;
- (c) Export;
- (d) Transport;
- (e) Cultivate; or
- (f) Trade in,

A specimen of a protected plant.



Indemnity and Terms of use of this Report

The findings, results, observations, conclusions, and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and STS CC and its staff reserve the right to modify aspects of the report including the recommendations if, and when, new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

Although STS CC exercises due care and diligence in rendering services and preparing documents, STS CC accepts no liability and the client, by receiving this document, indemnifies STS CC and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from, or in connection with, services rendered, directly or indirectly by STS CC and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.



APPENDIX B - Floral Method of Assessment during EIA phase

Floral Species of Conservational Concern Assessment

Prior to the site visit, a record of floral SCC and their habitat requirements was developed for the study area, which includes consulting the National Web-based Environmental Screening Tool. Because not all SCC have been included in the Screening Tool layers (e.g. NT and DD taxa), it remains important for the specialist to be on the lookout for additional SCC. For this study, two primary sources were consulted and are described below.

The National Web-Based Environmental Screening Tool

The Screening Tool was accessed to obtain a list of potentially occurring species of conservation concern for the study area. Each of the themes in the Screening Tool consists of theme-specific spatial datasets which have been assigned a sensitivity level namely, “*low*”, “*medium*”, “*high*” and “*very high*” sensitivity. The four levels of sensitivity are derived and identified in different ways, e.g. for **confirmed** areas of occupied habitat for SCC a Very High and High Sensitivity is assigned and for areas of suitable habitat where SCC may occur based on spatial models only, a Medium Sensitivity is assigned. The different sensitivity ratings pertaining to the Plant [and Animal] Protocols are described below²:

- **Very High:** Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km² are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) D criteria of the IUCN or species listed as Critically/ Extremely Rare under South Africa’s National Red List Criteria. For each species reliant on a Critical Habitat, all remaining suitable habitat has been manually mapped at a fine scale.
- **High:** Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2000) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat.
- **Medium:** Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
- **Low:** Areas where no SCC are known or expected to occur.

BRAHMS Online Website

The Botanical Database of Southern Africa (BODATSA) is accessed to obtain plant names and floristic details (<http://posa.sanbi.org/>) for species of conservation concern within a selected boundary;

- This website provides access to South African plant names (taxa), specimens (herbarium sheets) and observations of plants made in the field (botanical records). Data is obtained from

² More details on the use of the Screening Tool for Species of Conservation Concern can be found in the below resources:

- South African National Biodiversity Institute (SANBI). 2020. Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.0.
- The National Web based Environmental Screening Tool website:
<https://screening.environment.gov.za/screeningtool/#/pages/welcome>



the Botanical Database of Southern Africa (BODATSA), which contains records from the National Herbarium in Pretoria (PRE), the Compton Herbarium in Cape Town (NBG & SAM) and the KwaZulu-Natal Herbarium in Durban (NH).

- Information on habitat requirements etc. is obtained from the SANBI Red List of South African Plants website (<http://redlist.sanbi.org/>).
- Typically, data is extracted for the Quarter Degree Square (QDS) in which the study area is situated but where it is deemed appropriate, a larger area can be included.

Throughout the floral assessment, special attention was paid to the identification of any of these SCC as well as the identification of suitable habitat that could potentially support these species.

The Probability of Occurrence (POC) for each floral SCC is described:

- **“Confirmed”**: if observed during the survey;
- **“High”**: if within the species’ known distribution range and suitable habitat is available;
- **“Medium”**: if either within the known distribution range of the species or if suitable habitat is present; or
- **“Low”**: if the habitat is not suitable and falls outside the distribution range of the species.

The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

Vegetation Surveys

When planning the timing of a floristic survey, it is important to remember that the primary objective is not an exhaustive species list but rather to ensure that sufficient data are collected to describe all the vegetation communities present in the area of interest, to optimise the detection of SCC and to assess habitat suitability for other potentially occurring SCC (SANBI, 2020).

The vegetation survey incorporates the subjective (or stratified) sampling method. Subjective sampling is a sampling technique in which the specialist relies on his or her own professional experience when choosing sample sites within the study area. This allows representative recordings of floral communities and optimal detection of SCC. Subjective sampling is used to consider different areas (or habitat units) which are identified within the main body of a habitat/study area.

One of the problems with random sampling, another popular sampling method, is that random samples may not cover all areas of a study area equally and thus increase the potential to miss floral SCC. Random sampling methods also tend to require more time in the field to locate the amount of SCC that can be detected using subjective sampling methods - In the context of an EIA where time constraints are often restrictive, priority needs to be given to collecting data in the shortest time possible without compromising the efficiency of locating SCC (SANBI, 2020).

Floral Habitat Sensitivity

The floral habitat sensitivity of each habitat unit was determined by calculating the mean of five different parameters which influence floral communities and provide an indication of the overall floristic ecological integrity, importance, and sensitivity of the habitat unit. Each of the following parameters are subjectively rated on a scale of 1 to 5 (1 = lowest and 5 = highest):

- **Floral SCC**: The confirmed presence or potential for floral SCC or any other significant species, such as endemics, to occur within the habitat unit;
- **Unique Landscapes**: The presence of unique landscapes or the presence of an ecologically intact habitat unit in a transformed region;
- **Conservation Status**: The conservation status of the ecosystem or vegetation type in which the habitat unit is situated based on local, regional and national databases. Whether the habitat is representative of a Critical Biodiversity Area or forms part of an Ecological Support Area is also taken into consideration;
- **Floral Diversity**: The recorded floral diversity compared to a suitable reference condition such as surrounding natural areas or available floristic databases; and
- **Habitat Integrity**: The degree to which the habitat unit is transformed based on observed disturbances which may affect habitat integrity.



Each of these values contribute equally to the mean score, which determines the floral habitat sensitivity class in which each habitat unit falls. A conservation and land-use objective is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilization of the habitat unit in question. To present the results use is made of spider diagrams to depict the significance of each aspect of floral ecology for each vegetation type. The different classes and land-use objectives are presented in the table below:

Table A1: Floral habitat sensitivity rankings and associated land-use objectives.

Score	Rating significance	Conservation objective
1 < 1.5	Low	Optimise development potential.
≥1.5 <2.5	Moderately low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.
≥2.5 <3.5	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimizing development potential.
≥3.5 <4.5	Moderately high	Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.
≥4.5 ≤5.0	High	Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.



APPENDIX C - Faunal Method of Assessment during EIA phase

It is important to note that due to the nature and habits of fauna, varied stages of life cycles, seasonal and temporal fluctuations along with other external factors, it is unlikely that all faunal species will have been recorded during the site assessment. The presence of human habitation nearby the study area and the associated anthropogenic activities may have an impact on faunal behaviour and in turn the rate of observations.

Mammals

Mammal species were recorded during the field assessment with the use of visual identification, spoor, call and dung. Specific attention was paid to mammal SCC as listed by the IUCN, 2015.

Avifauna

The Southern African Bird Atlas Project 2 database (<http://sabap2.adu.org.za/>) was compared with the recent field survey of avifaunal species identified on the study area. Field surveys were undertaken utilising visual observation and bird call identification techniques in order to accurately identify avifaunal species. Specific attention was given to avifaunal SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Reptiles

During the field assessment, suitable applicable habitat areas (rocky outcrops and fallen dead trees) were inspected for the presence of reptiles, and any individuals encountered were identified. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which reptile species are likely to occur on the study area. Specific attention was given to reptile SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Amphibians

Identifying amphibian species is done using direct visual identification along with call identification technique. Amphibian species flourish in and around wetland, riparian and moist grassland areas. It is unlikely that all amphibian species will have been recorded during the site assessment, due to their cryptic nature and habits, varied stages of life cycles and seasonal and temporal fluctuations within the environment. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which amphibian species are likely to occur within the study area as well as the surrounding area. Specific attention was given to amphibian SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Invertebrates

Whilst conducting transects through the study area, all insect species visually observed were identified, and where possible photographs taken.

It must be noted however that due to the cryptic nature and habits of insects, varied stages of life cycles and seasonal and temporal fluctuations within the environment, it is unlikely that all insect species will have been recorded during the site assessment period. Nevertheless, the data gathered during the assessment along with the habitat analysis provided an accurate indication of which species are likely to occur in the study area at the time of survey. Specific attention was given to insect SCC listed on a regional and national level, as well as those identified by the International Union for the Conservation of Nature (IUCN).

Arachnids

Suitable applicable habitat areas (rocky outcrops, sandy areas and fallen dead trees) where spiders and scorpions are likely to reside were searched. Rocks were overturned and inspected for signs of



these species. Specific attention was paid to searching for Mygalomorphae arachnids (Trapdoor and Baboon spiders) as well as potential SCC species within the study area.

Faunal Species of Conservational Concern Assessment

The Probability of Occurrence (POC) for each faunal SCC was determined using the following four parameters:

- Species distribution;
- Habitat availability;
- Food availability; and
- Habitat disturbance.

The accuracy of the calculation is based on the available knowledge about the species in question. Therefore, it is important that the literature available is also considered during the calculation. Each factor contributes an equal value to the calculation.

Scoring Guideline				
Habitat availability				
No Habitat	Very low	Low	Moderate	High
1	2	3	4	5
Food availability				
No food available	Very low	Low	Moderate	High
1	2	3	4	5
Habitat disturbance				
Very High	High	Moderate	Low	Very Low
1	2	3	4	5
Distribution/Range				
Not Recorded		Historically Recorded		Recently Recorded
1		3		5
[Habitat availability + Food availability + Habitat disturbance + Distribution/Range] / 20 x 100 = POC%				

Faunal Habitat Sensitivity

The sensitivity of the study area for each faunal class (i.e. mammals, birds, reptiles, amphibians and invertebrates) was determined by calculating the mean of five different parameters which influence each faunal class and provide an indication of the overall faunal ecological integrity, importance and sensitivity of the study area for each class. Each of the following parameters are subjectively rated on a scale of 1 to 5 (1 = lowest and 5 = highest):

- **Faunal SCC:** The confirmed presence or potential for faunal SCC or any other significant species, such as endemics, to occur within the habitat unit;
- **Habitat Availability:** The presence of suitable habitat for each class;
- **Food Availability:** The availability of food within the study area for each faunal class;
- **Faunal Diversity:** The recorded faunal diversity compared to a suitable reference condition such as surrounding natural areas or available faunal databases; and
- **Habitat Integrity:** The degree to which the habitat is transformed based on observed disturbances which may affect habitat integrity.

Each of these values contributes equally to the mean score, which determines the suitability and sensitivity of the study area for each faunal class. A conservation and land-use objective is also assigned to each sensitivity class which aims to guide the responsible and sustainable utilisation of the study area in relation to each faunal class. The different classes and land-use objectives are presented in the table below:



Table C1: Faunal habitat sensitivity rankings and associated land-use objectives.

Score	Rating significance	Conservation objective
1.0 < 1.5	Low	Optimise development potential.
≥1.5 <2.5	Moderately low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.
≥2.5 <3.5	Intermediate	Preserve and enhance biodiversity of the habitat unit and surrounds while optimising development potential.
≥3.5 <4.5	Moderately high	Preserve and enhance the biodiversity of the habitat unit, limit development and disturbance.
≥4.5 ≤ 5.0	High	Preserve and enhance the biodiversity of the habitat unit, no-go alternative must be considered.



APPENDIX D - Impact Assessment Methodology

In order for the Environmental Assessment Practitioner (EAP) to allow for sufficient consideration of all environmental impacts, impacts were assessed using a common, defensible method of assessing significance that will enable comparisons to be made between risks/impacts and will enable authorities, stakeholders and the client to understand the process and rationale upon which risks/impacts have been assessed. The method to be used for assessing risks/impacts is outlined in the sections below.

The first stage of risk/impact assessment is the identification of environmental activities, aspects and impacts. This is supported by the identification of receptors and resources, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. The definitions used in the impact assessment are presented below.

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or infrastructure that is possessed by an organisation.
- An **environmental aspect** is an 'element of an organizations activities, products and services which can interact with the environment'³. The interaction of an aspect with the environment may result in an impact.
- **Environmental risks/impacts** are the consequences of these aspects on environmental resources or receptors of value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. In the case where the impact is on human health or wellbeing, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
- **Receptors** can comprise, but are not limited to, people or human-made systems, such as residents, communities, and social infrastructure, as well as components of the biophysical environment such as wetlands, flora, and riverine systems.
- **Resources** include components of the biophysical environment.
- **Frequency of activity** refers to how often the proposed activity will take place.
- **Frequency of impact** refers to the frequency with which a stressor (aspect) will impact on the receptor.
- **Severity** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
- **Spatial extent** refers to the geographical scale of the impact.
- **Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

The significance of the impact is then assessed by rating each variable numerically according to the defined criteria. Refer to Table 3. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance-rating matrix and are used to determine whether mitigation is necessary⁴.

The assessment of significance is undertaken twice. Initial, significance is based on only natural and existing mitigation measures (including built-in engineering designs). The subsequent assessment considers the recommended management measures required to mitigate the impacts. Measures such as demolishing infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

The model outcome of the impacts was then assessed in terms of impact certainty and consideration of available information. The Precautionary Principle is applied in line with South Africa's National Environmental Management Act 1998 (Act No. 107 of 1998) in instances of uncertainty or lack of

³ The definition has been aligned with that used in the ISO 14001 Standard.

⁴ Some risks/impacts that have low significance will however still require mitigation.



information, by increasing assigned ratings or adjusting final model outcomes. In certain instances where a variable or outcome requires rational adjustment due to model limitations, the model outcomes have been adjusted.

Table D1: Criteria for assessing significance of impacts

LIKELIHOOD DESCRIPTORS

Probability of impact	RATING
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
Sensitivity of receiving environment	RATING
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/ /important	3
Ecology highly sensitive /important	4
Ecology critically sensitive /important	5

CONSEQUENCE DESCRIPTORS

Severity of impact	RATING
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Spatial scope of impact	RATING
Activity specific/ < 5 ha impacted / Linear developments affected < 100m	1
Development specific/ within the site boundary / < 100ha impacted / Linear developments affected < 100m	2
Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear developments affected < 1000m	3
Regional within 5 km of the site boundary / < 2000ha impacted / Linear developments affected < 3000m	4
Entire habitat unit / Entire system/ > 2000ha impacted / Linear developments affected > 3000m	5
Duration of impact	RATING
One day to one month	1
One month to one year	2
One year to five years	3
Life of operation or less than 20 years	4
Permanent	5



Table D2: Significance Rating Matrix.

		CONSEQUENCE (Severity + Spatial Scope + Duration)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LIKELIHOOD (Frequency of activity + Frequency of impact)	1	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	2	4	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	3	6	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	4	8	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	5	10	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	6	12	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	7	14	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	8	16	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	9	18	20	30	40	50	60	70	80	90	100	110	120	130	140	150
	10	20														

Table D3: Positive/Negative Mitigation Ratings.

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very high	126-150	Critically consider the viability of proposed projects Improve current management of existing projects significantly and immediately	Maintain current management
High	101-125	Comprehensively consider the viability of proposed projects Improve current management of existing projects significantly	Maintain current management
Medium-high	76-100	Consider the viability of proposed projects Improve current management of existing projects	Maintain current management
Medium-low	51-75	Actively seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Low	26-50	Where deemed necessary seek mechanisms to minimise impacts in line with the mitigation hierarchy	Maintain current management and/or proposed project criteria and strive for continuous improvement
Very low	1-25	Maintain current management and/or proposed project criteria and strive for continuous improvement	Maintain current management and/or proposed project criteria and strive for continuous improvement

The following points were considered when undertaking the assessment:

- Risks and impacts were analysed in the context of the *project's area of influence* encompassing:
 - Primary project site and related facilities that the client and its contractors develops or controls;
 - Areas potentially impacted by cumulative impacts for any existing project or condition and other project-related developments; and
 - Areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.
- Risks/Impacts were assessed for all stages of the project cycle including:
 - Pre-construction;
 - Construction; and
 - Operation.
 - If applicable, transboundary, or global effects were assessed.
 - Individuals or groups who may be differentially or disproportionately affected by the project because of their *disadvantaged* or *vulnerable* status were assessed.
 - Particular attention was paid to describing any residual impacts that will occur after rehabilitation.



Mitigation measure development

The following points present the key concepts considered in the development of mitigation measures for the proposed development.

- *Mitigation and performance improvement measures* and actions that address the risks and impacts⁵ are identified and described in as much detail as possible.
- Measures and actions to address negative impacts will favour avoidance and prevention over minimisation, mitigation, or compensation.
- Desired outcomes are defined, and have been developed in such a way as to be *measurable events with performance indicators, targets and acceptable criteria* that can be tracked over *defined periods*, with estimates of the *resources* (including human resource and training requirements) *and responsibilities for implementation*.

Recommendations

Recommendations were developed to address and mitigate impacts associated with the proposed development. These recommendations also include general management measures which apply to the proposed development. Mitigation measures have been developed to address issues in all phases throughout the life of the operation from planning, through to construction and operation.

⁵ Mitigation measures should address both positive and negative impacts



APPENDIX E - Vegetation Types

Kathu Bushveld (SVk 12)



Figure E1: SVk 12 Kathu Bushveld: Open savanna dominated by *Vachellia erioloba*, *Senegalia mellifera* and *Grewia Flava* with low cover of *Stipagrostis ciliata* against the red sand east of Oupos, in the Kuruman District north of Kathu. Image by M.C. Rutherford.

Remarks: One of the most strikingly dominant areas of tall *V. erioloba* is centred on the town of Kathu, which was built around many of these trees.

Table E1: Floristic species of *The Kathu Bushveld* (Mucina & Rutherford, 2012).

Plant Community	Species
Dominant and typical floristic species	
Woody Layer	
Trees	Small Tree: <i>Senegalia erubescens</i> (d), <i>Boscia albitrunca</i> (d), <i>Terminalia sericea</i> . Tall Tree: <i>Vachellia erioloba</i>
Shrubs	Tall Shrub: <i>Diospyros lycioides</i> subsp. <i>lycioides</i> (d), <i>Dichrostachys cinerea</i> , <i>Grewia flava</i> , <i>Gymnosporia buxifolia</i> , <i>Rhigozum brevispinosum</i> . Low Shrubs: <i>Aptosimum decumbens</i> , <i>Grewia retinervis</i> , <i>Nolletia arenosa</i> , <i>Sida cordifolia</i> , <i>Tragia dioica</i> . Succulent Shrub: <i>Kalanchoe rotundifolia</i> , <i>Talinum cafrum</i> .
Forb layer	
Herbs	<i>Acrotome inflata</i> , <i>Erlangea misera</i> , <i>Gisekia africana</i> , <i>Heliotropium ciliatum</i> , <i>Hermbstaedtia fleckii</i> , <i>H. odorata</i> , <i>Limeum fenestratum</i> , <i>L. viscosum</i> , <i>Lotononis platycarpa</i> , <i>Senna italica</i> subsp. <i>arachoides</i> , <i>Tribulus terrestris</i> .
Gramminoid layer	
Graminoids	<i>Aristida meridionalis</i> (d), <i>Brachiaria nigropedata</i> (d), <i>Centropodia glauca</i> (d), <i>Eragrostis lehmanniana</i> (d), <i>Schmidtia pappophoroides</i> (d), <i>Stipagrostis ciliata</i> (d), <i>Aristida congesta</i> , <i>Eragrostis biflora</i> , <i>E. chloromelas</i> , <i>E. heteromera</i> , <i>E. pallens</i> , <i>Melinis repens</i> , <i>Schmidtia kalahariensis</i> , <i>Stipagrostis uniplumis</i> , <i>Tragus berteronianus</i> .

*(d) is for dominant



APPENDIX F - Floral SCC

South Africa uses the internationally endorsed [IUCN Red List Categories and Criteria](#) in the Red List of South African plants. This scientific system is designed to measure species' risk of extinction. The purpose of this system is to highlight those species that are most urgently in need of conservation action. Due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. Because the Red List of South African plants is used widely in South African conservation practices such as systematic conservation planning or protected area expansion, we use an amended system of categories designed to highlight those species that are at low risk of extinction but of conservation concern.

Definitions of the national Red List categories

Categories marked with ^N are non-IUCN, national Red List categories for species not in danger of extinction but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

- **Extinct (EX)** A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.
- **Extinct in the Wild (EW)** A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
- **Regionally Extinct (RE)** A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
- **Critically Endangered, Possibly Extinct (CR PE)** Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.
- **Critically Endangered (CR)** A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
- **Endangered (EN)** A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
- **Vulnerable (VU)** A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
- **Near Threatened (NT)** A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future.
- ^N**Critically Rare** A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
- ^N**Rare** A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows:
 - Restricted range: Extent of Occurrence (EOO) <500 km², OR
 - Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy (AOO), typically smaller than 20 km², OR
 - Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR
 - Small global population: Less than 10 000 mature individuals.
- **Least Concern** A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.



- **Data Deficient - Insufficient Information (DDD)** A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
- **Data Deficient - Taxonomically Problematic (DDT)** A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
- **Not Evaluated (NE)** A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in Plants of southern Africa: an online checklist are species that do not qualify for national listing because they are naturalized exotics, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.

Table F1: Floral SCC expected to occur within the QDS 2723CA in which the study area is located. Additional information on species threat status as defined in The Red List of South African Plants (<http://redlist.sanbi.org/index.php>) is presented. Species presented below are protected under the Northern Cape Nature Conservation Act (Act No. 9 of 2009).

Species	Habitat and distribution details	IUCN
Schedule 2 Protected Species		
FAMILY AIZOACEAE (MESEMBRYANTHEMACEAE) - All species except those listed as Schedule		
<i>Chasmatophyllum musculinum</i>	Succulent Provincial distribution: Eastern Cape, Free State, Gauteng, Mpumalanga, Northern Cape, North West, Western Cape Major habitats: Terrestrial Description: Wide, but sparse distribution within the southern African interior. Habitat can range from rocky areas to deeper soils (Smith et al. 1998).	LC
<i>Ebracteola wilmaniae</i>	Succulent Range: Widespread across the Northern Cape and North West Province, from Zeerust to Prieska. Major habitats: Grassland, Savanna. Description: Lithosols in chert or dolomite outcrops in grassland.	LC
<i>Lithops aucampiae</i> subsp. <i>aucampiae</i> var. <i>aucampiae</i>	Succulent Range: Northern Cape. Kimberly to Upington. Major habitats: Savanna. Description: Red quartzite..	LC
<i>Galenia collina</i>	Dwarf shrub Provincial distribution: Northern Cape, Western Cape. Major habitats: Terrestrial. Description: None provided.	LC
<i>Galenia prostrata</i>	Dwarf shrub Provincial distribution: Eastern Cape, Free State, Northern Cape, North West. Major habitats: Terrestrial. Description: None provided. Population trend: Stable.	LC
<i>Nananthus aloides</i>	Succulent Range: Northern Cape, North West. Major habitats: Terrestrial. Description: Widespread in the climatically severe southern African interior. It grows mostly at the edge of pans in finely decomposed limestone, the plants often sunken into the ground, or among stones (The encyclopaedia of succulents). Population trend: None provided.	LC
<i>Plinthus cryptocarpus</i>	Dwarf shrub Range: Northern Cape Major habitats: Terrestrial. Description: None provided. Population trend: None provided.	LC
<i>Prepodesma orpenii</i>	Succulent Range: Northern Cape. Major habitats: Terrestrial.	LC



Species	Habitat and distribution details	IUCN
	Description: Arid subtropics. It grows in dry plane lands on barren loamy shales or in crevices between quartzitic limestone stones (The encyclopaedia of succulents). Population trend: Stable.	
<i>Ruschia griquensis</i>	Succulent; shrub Range: Free State, Northern Cape. Major habitats: Terrestrial Description: The plant sprawls on exposed, stony ground. Population trend: Stable.	LC
<i>Tetragonia arbuscula</i>	Succulent; dwarf shrub Range: Eastern Cape, Free State, Northern Cape, Western Cape. Major habitats: Terrestrial. Description: Not provided. Population trend: Not provided.	LC
<i>Tetragonia calycina</i>	Succulent; dwarf shrub Range: Eastern Cape, Free State, Northern Cape, Western Cape. Major habitats: Terrestrial. Description: Not provided. Population trend: Not provided.	LC
Schedule 2 Protected Species		
FAMILY APOCYNACEAE - All species except those listed as Schedule		
<i>Brachystelma circinatum</i>	Succulent; geophyte Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Western Cape. Major habitats: Terrestrial. Description: Grows in various stony places and has adapted to different environmental factors (The encyclopaedia of succulents). Population trend: Not provided.	LC
<i>Cynanchum orangeanum</i>	Herb Range: Eastern Cape, Free State, Northern Cape, North West. Major habitats: Terrestrial. Population trend: Not provided.	LC
<i>Fockea angustifolia</i>	Succulent; climber Range: Free State, KwaZulu-Natal, Limpopo, Northern Cape, North West Major habitats: Terrestrial. Description: Occurs in dry areas on stony hillsides on granite or limestone (Pooley, 2005).	LC
<i>Gomphocarpus fruticosus</i>	Herb; shrub Range: Widespread across South Africa, extending northwards to Angola, Zambia and Mozambique. Major habitats: Albany Thicket, Desert, Fynbos, Grassland, Indian Ocean Coastal Belt, Nama Karoo, Savanna, Succulent Karoo. Description: Dry sandy soils in open or disturbed places, often on riverbanks.	LC
<i>Gomphocarpus tomentosus</i>	Herb; shrub Range: Widespread across the central and north-eastern interior of South Africa, extending northwards within southern Africa to southern Angola, Zimbabwe and southern Mozambique. Major habitats: Grassland, Nama Karoo, Savanna. Description: Sandy open or disturbed areas.	LC
<i>Huernia barbata</i> subsp. <i>ingeae</i>	Succulent Range: Northern Cape. Major habitats: Terrestrial. Description: Not provided.	LC
<i>Microloma armatum</i>	Dwarf shrub; shrub Range: Widespread, but sparsely distributed across southern Namibia and the Northern Cape Province, South Africa, extending as far south as Karooport east of Ceres in the Western Cape. Major habitats: Nama Karoo, Savanna, Succulent Karoo. Description: Arid shrubland and thornveld. Sometimes restricted to rock formations.	LC
<i>Pachypodium succulentum</i>	Succulent; shrub Range: Eastern Cape, Northern Cape, Western Cape. Major habitats: Terrestrial. Description: It occurs in rocky grassland, koppies, steep hills and succulent scrub vegetation in the Western, Eastern and Northern Cape and western Free State, at altitudes up to 1 400 m (SANBI PlantZAfrica).	LC



Species	Habitat and distribution details	IUCN
	**This species is listed on Appendix II of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora).	
Schedule 2 Protected Species		
FAMILY ASPHODELACEAE - All species except those listed as Schedule 1, and the species <i>Aloe ferox</i>		
<i>Aloidendron dichotomum</i>	Range: From Nieuwoudtville east to Olifantsfontein and northwards to the Brandberg in Namibia. Major habitats: Terrestrial. Description: On north-facing rocky slopes (particularly dolomite) in the south of its range. Any slopes and sandy flats in the central and northern parts of range. Population trend: Decreasing.	VU
<i>Bulbine abyssinica</i>	Succulent; geophyte; herb Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape. Major habitats: Terrestrial. Description: It favours rocky grassland and shallow soil overlying rock but can also be found in woodland and along seepage areas.	LC
<i>Trachyandra saltii</i>	Succulent; geophyte Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West. Major habitats: Terrestrial. Description: In rocky montane grassland, margins of forest and vleis and open woodland, often on stony or sandy soils, including Kalahari sand.	LC
Schedule 2 Protected Species		
FAMILY CAPPARACEAE - <i>Boscia</i> spp., i.e. Shepherd's trees, all species		
<i>Boscia albitrunca</i>	Shrub; tree Range: Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West. Major habitats: Terrestrial. Description: This species is found in the drier parts of southern Africa, in areas of low rainfall.	LC
Schedule 2 Protected Species		
FAMILY CELASTRACEAE - <i>Gymnosporia</i> spp. All species		
<i>Gymnosporia buxifolia</i>	Shrub; tree Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape. Major habitats: Terrestrial. Description: Its natural habitat is in grasslands, fynbos, Nama-karoo, forests, thickets and savanna-bushveld. It occurs on hillsides, dry slopes of valleys, sometimes in riverbeds, often on termite mounds and it is often found as undergrowth to taller trees.	LC
Schedule 2 Protected Species		
FAMILY CRASSULACEAE - All species except those listed in Schedule 1		
<i>Crassula corallina</i>	Succulent; herb Range: Northern Cape (Subsp. <i>corallina</i> , also occurs in the Eastern Cape, Free State, North West, Western Cape). Major habitats: Terrestrial. Description: It grows in quartzite outcrops in desert-like habitat and dry floodplain (The encyclopaedia of succulents).	LC
<i>Crassula muscosa</i>	Succulent; herb Range: This species is widespread across Namaqualand, Bushmanland and the Karoo, extending to the coastal lowlands of the Western Cape and the western half of the Eastern Cape. It also occurs in Namibia. Major habitats: Terrestrial, including Postmasburg Thornveld. Description: Occurs sheltered under shrubs or in rocky places in karroid shrubland, valley bushveld and fynbos.	NE
<i>Kalanchoe rotundifolia</i>	Succulent; dwarf shrub Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West. Major habitats: Terrestrial. Description: A very common plant found growing as a pioneer plant usually in shade or half-shade, single or in large communities under trees or shrubs in bushland, woodland, open and secondary forests, savanna, open veld; sandy, limestone, brackish or rocky soils or on rocks, either in dry or wet habitats, sometimes in salt marshes.	LC
Schedule 2 Protected Species		
FAMILY EUPHORBIACEAE - <i>Euphorbia</i> spp. All species		



Species	Habitat and distribution details	IUCN
<i>Euphorbia crassipes</i> or potentially <i>Euphorbia fusca</i> The separation of these two species as distinct is not universally accepted.	Dwarf succulent Range: Northern Cape. Major habitats: Namibia to Kliprand, Pofadder, Prieska and Kimberley. Description: Gravelly flats.	LC
<i>Euphorbia davyi</i>	Dwarf, spineless succulent shrub Range: Gauteng, Limpopo, North West. Major habitats: Terrestrial. Description: Rocky outcrops in grassland.	LC
<i>Euphorbia duseimata</i>	Succulent; dwarf shrub Range: Free State, Northern Cape, North West. Major habitats: Terrestrial. Description: Sandy or turfy soils, Kalahari Thornveld and Bushveld.	LC
<i>Euphorbia gariepina</i>	Succulent Range: Northern Cape and Namibia. From the Orange River to 160 km north of Windhoek. Major habitats: Terrestrial. Description: Sandy, gravelly soils.	LC
<i>Euphorbia wilmaniae</i>	Spineless dwarf succulent Range: Northern Cape. Griqualand West Centre endemic species. Major habitats: Terrestrial. Description: Among boulders and rocks, often concealed in the crevices of the rocks.	LC
Schedule 2 Protected Species		
FAMILY HYACINTHACEAE - <i>Eucomis</i> spp. Pineapple flower, all species		
<i>Eucomis autumnalis</i>	Geophyte Range: South Africa, Swaziland, Lesotho, Botswana, Zimbabwe and Malawi. Major habitats: Grassland Description: Damp, open grassland and sheltered places from the coast to 2450 m.	NE
Schedule 2 Protected Species		
FAMILY IRIDACEAE - All species except those listed in Schedule 1		
<i>Babiana bainesii</i>	Geophyte; herb Range: Limpopo, Northern Cape, North West. Major habitats: Terrestrial. Description: Grassland, usually among small rocks.	LC
<i>Babiana hypogaea</i>	Geophyte; herb Range: Free State, Northern Cape, North West. Major habitats: Terrestrial. Description: Red sand plains. Usually in Kalahari Sand or stony laterite in open woodland or grassland.	LC
<i>Duthieastrum linifolium</i>	Geophyte; herb Range: Free State, Northern Cape, North West. Major habitats: Terrestrial. Description: None provided	LC
<i>Freesia andersoniae</i>	Geophyte; herb Range: Eastern Cape, Free State, Northern Cape, North West. Widespread across the central interior of South Africa. Major habitats: Grassland, Nama Karoo, Savanna. Description: Wedged among rocks on lower slopes of dolerite and dolomite outcrops.	LC
<i>Gladiolus orchidiflorus</i>	Geophyte; herb Range: Free State, Northern Cape, Western Cape. Major habitats: Terrestrial. Description: Found on clay and sandstone soils from Namibia to Cape Flats and also to Free State and flowers in the spring.	LC
<i>Moraea polystachya</i>	Geophyte; herb Range: Eastern Cape, North West, Western Cape. Major habitats: Terrestrial. Description: The habitat is well-drained flats and slight slopes, with collectors often referring to the presence of calcrete deposits.	LC
Schedule 2 Protected Species		
FAMILY MELIACEAE - <i>Nymania capensis</i> (Thunb.) (Lindb.) Chinese Lantern		
<i>Nymania capensis</i>	Tree; shrub Range: Eastern Cape, Northern Cape, Western Cape. Major habitats: Description: It favours hot, dry, rocky habitats, but also occurs near dry, sandy rivers.	LC



Species	Habitat and distribution details	IUCN
Schedule 2 Protected Species		
FAMILY OLEACEAE - <i>Olea europaea</i> subsp. <i>africana</i> (Mill.) (P.S. Green) Wild olive		
<i>Olea europaea</i> subsp. <i>africana</i>	Tree Range: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, Western Cape Major habitats: Terrestrial. Description: This tree is found in a variety of habitats, often near water, e.g. on rocky hillsides, on stream banks and in woodland (where it can reach 12 m) (SANBI PlantZAfrica).	
Schedule 2 Protected Species		
FAMILY OXALIDACEAE - <i>Oxalis</i> spp. Sorrel, all species except those species listed in Schedule 1		
<i>Oxalis lawsonii</i>	Geophyte Range: Free State, Northern Cape, North West. Major habitats: Terrestrial.	LC
Schedule 2 Protected Species		
FAMILY SCROPHULARIACEAE - <i>Jamesbrittenia</i> spp. All species		
<i>Jamesbrittenia atropurpurea</i>	Shrub; dwarf shrub Range: Eastern Cape, Free State, Gauteng, Northern Cape, North West, Western Cape. Major habitats: Terrestrial. Description: This species grows in clay or loam flats, slopes and ridges among scrub.	LC
<i>Jamesbrittenia tysonii</i>	Dwarf shrub Range: Eastern Cape, Northern Cape. Major habitats: Terrestrial. Description: It grows on slopes, along seasonal watercourses among scrub adapted to semi-arid terrain; also, on degraded land (Operation Wildflower).	LC
<i>Manulea burchellii</i>	Herb Range: Northern Cape. Major habitats: Terrestrial. Description: None provided	LC

CR PE = Critically Endangered (Possibly Extinct); EN= Endangered; EW = Extinct in the Wild; NT = Near Threatened; VU= Vulnerable; P= Protected LC = Least Concern; POC = Probability of Occurrence.

Table F2: The TOPS plant list for floral species within the Northern Cape.

Family	Scientific Name	Region	Threat Status
Aizoaceae	<i>Cheiridopsis peculiaris</i>	NC	CR
	<i>Conophytum herreanthus</i> subsp. <i>Herreanthus</i>	NC	CR (now Extinct in the Wild)
	<i>Lithops dorotheae</i>	NC	EN
	<i>Sceletium tortuosum</i>	EC, NC, WC	P (LC)
Amaryllidaceae	<i>Brunsvigia josephinae</i>	EC, NC, WC	VU
	<i>Haemanthus graniticus</i>	NC	EN
Asphodelaceae	<i>Aloe krapohlina</i>	NC	P
Hyacinthaceae	<i>Drimia sanguinea</i>	FS, GP, LP, MP, NW, NC	P (NT)
Pedaliaceae	<i>Harpagophytum procumbens</i>	FS, LP, NC, NW	P (LC)

CR PE = Critically Endangered (Possibly Extinct); EN= Endangered; EW = Extinct in the Wild; NT = Near Threatened; VU= Vulnerable; P= Protected LC = Least Concern; POC = Probability of Occurrence.



APPENDIX G - Faunal SCC

The tables below list the faunal Species of Conservation Concern for the study area:

Table G1: TOPS list of faunal species (2015) expected to occur within the Northern Cape.

Scientific Name	Common Name	Threat Status
<i>Homopus signatus</i>	Speckled tortoise	VU
<i>Pachydactylus goodi</i>	Good's Gecko	VU
<i>Cordylus macropholis</i>	Large-scaled Lizard	P
<i>Cordylus imkeae</i>	Rooiberg Girdled Lizard	P
<i>Opisthophthalmus ater</i>	Steinkopf Burrowing Scorpion	CR
<i>Acinonyx jubatus</i>	Cheetah	VU
<i>Manis temminckii</i>	Pangolin	VU
<i>Ceratotherium simum</i>	Southern White Rhinoceros	P
<i>Crocuta</i>	Spotted Hyaena	P
<i>Felis nigripes</i>	Black-footed Cat	P
<i>Hyaena brunnea</i>	Brown Hyaena	NT
<i>Neophron percnopterus</i>	Egyptian Vulture	CR
<i>Aquila rapax</i>	Tawny Eagle	EN
<i>Torgos tracheliotus</i>	Lappet-faced Vulture	EN
<i>Gyps africanus</i>	White-backed Vulture	CR
<i>Gyps coprotheres</i>	Cape Vulture	EN
<i>Neotis ludwigii</i>	Ludwig's Bustard	EN
<i>Polemaetus bellicosus</i>	Martial Eagle	EN
<i>Terathopius ecaudatus</i>	Bateleur	EN
<i>Anthropoides paradiseus</i>	Blue Crane	P
<i>Ardeotis kori</i>	Kori Bustard	P
<i>Orycteropus afer</i>	Aardvark	P

CR= Critically Endangered, EN=Endangered, NT=Near Threatened, VU=Vulnerable, P=Protected



APPENDIX H - Specialist information

DETAILS, EXPERTISE AND CURRICULUM VITAE OF SPECIALISTS

1. (a) (i) Details of the specialist who prepared the report

Samantha-Leigh Daniels	PhD Candidate (Plant Science) (University of Pretoria)
Chris Hooton	BTech Nature Conservation (Tshwane University of Technology)
Nelanie Cloete	MSc (Environmental Management) (University of Johannesburg)

1. (a). (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

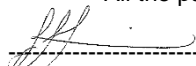
Company of Specialist:	Scientific Terrestrial Services		
Name / Contact person:	Nelanie Cloete		
Postal address:	PO. Box 751779, Gardenview		
Postal code:	2047	Cell:	084 311 4878
Telephone:	011 616 7893	Fax:	011 615 6240/ 086 724 3132
E-mail:	Nelanie@sasenvgroup.co.za		
Qualifications	MSc Environmental Management (University of Johannesburg) MSc Botany (University of Johannesburg) BSc (Hons) Botany (University of Johannesburg) BSc (Botany and Zoology) (Rand Afrikaans University)		
Registration / Associations	Professional member of the South African Council for Natural Scientific Professions (SACNASP) Member of the South African Association of Botanists (SAAB) Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group Member of the Grassland Society of South Africa (GSSA)		



1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, Samantha-Leigh Daniels, 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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



Signature of the Specialist

I, Christopher Hooton, declare that -

- I act as the **independent specialist (reviewer)** 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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



Signature of the Specialist

I, Nelanie Cloete, declare that -

- I act as the **independent specialist (reviewer)** 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have not, 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



Signature of the Specialist





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF SAMANTHA-LEIGH DANIELS

PERSONAL DETAILS

Position in Company	Contract Ecologist
Joined SAS Environmental Group of Companies	2020

EDUCATION

Qualifications

PhD (Plant Science) (University of Pretoria)	Present
MSc (Plant Science) (University of Pretoria)	2017
BSc (Hons) Zoology & Entomology (University of Pretoria)	2014
BSC Zoology & Entomology (University of Pretoria)	2013

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, KwaZulu-Natal

KEY SPECIALIST DISCIPLINES

Experience

- Desktop Delineations
- Invertebrate and plant surveys along the Sani Pass as part of an ongoing research project
- Bush encroachment surveys within Mpumalanga
- Grassland Surveys at Rietvlei Nature Reserve

Training

- Plant species identification
- Herbarium usage and protocols





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF CHRISTOPHER HOOTON

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Biodiversity Specialist
Joined SAS Environmental Group of Companies	2013

EDUCATION

Qualifications

BTech Nature Conservation (Tshwane University of Technology)	2013
National Diploma Nature Conservation (Tshwane University of Technology)	2008

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Eastern Cape, Western Cape, Northern Cape, Free State
Africa - Zimbabwe, Sierra Leone

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Faunal Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning





SAS ENVIRONMENTAL GROUP OF COMPANIES – SPECIALIST CONSULTANT INFORMATION

CURRICULUM VITAE OF NELANIE CLOETE

PERSONAL DETAILS

Position in Company	Senior Scientist, Member Botanical Science and Terrestrial Ecology
Joined SAS Environmental Group of Companies	2011

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Professional member of the South African Council for Natural Scientific Professions (SACNASP – Reg No. 400503/14)
 Member of the South African Association of Botanists (SAAB)
 Member of the International Affiliation for Impact Assessments (IAIAsa) South Africa group
 Member of the Grassland Society of South Africa (GSSA)
 Member of the Botanical Society of South Africa (BotSoc)
 Member of the Gauteng Wetland Forum (GWF)

EDUCATION

Qualifications

MSc Environmental Management (University of Johannesburg)	2013
MSc Botany (University of Johannesburg)	2007
BSc (Hons) Botany (University of Johannesburg)	2005
BSc (Botany and Zoology) (Rand Afrikaans University)	2004

Short Courses

Certificate – Department of Environmental Science in Legal context of Environmental Management, Compliance and Enforcement (UNISA)	2009
Introduction to Project Management - Online course by the University of Adelaide	2016
Integrated Water Resource Management, the National Water Act, and Water Use Authorisations, focusing on WULAs and IWWMPs	2017

AREAS OF WORK EXPERIENCE

South Africa – Gauteng, Mpumalanga, North West, Limpopo, KwaZulu-Natal, Northern Cape, Eastern Cape, Free State
Africa - Democratic Republic of the Congo (DRC)

KEY SPECIALIST DISCIPLINES

Biodiversity Assessments

- Floral Assessments
- Biodiversity Actions Plan (BAP)
- Biodiversity Management Plan (BMP)
- Alien and Invasive Control Plan (AICP)
- Ecological Scan
- Terrestrial Monitoring
- Protected Tree and Floral Marking and Reporting
- Biodiversity Offset Plan

Freshwater Assessments

- Desktop Freshwater Delineation
- Freshwater Verification Assessment
- Freshwater (wetland / riparian) Delineation and Assessment
- Freshwater Eco Service and Status Determination
- Rehabilitation Assessment / Planning
- Plant species and Landscape Plan

Legislative Requirements, Processes and Assessments

- Water Use Applications (Water Use Licence Applications / General Authorisations)
- Environmental and Water Use Audits
- Freshwater Resource Management and Monitoring as part of EMPR and WUL condition

