BOSCHENDAL TENTED CAMP S24G

ECOLOGICAL REPORT

Prepared for:

FE 5 (PTY) Ltd
Tented Camp S24G
Pniel Street
Groot, Franschhoek
7680

Prepared by:

Biodiversity Africa

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Cape Town, Western Cape



September 2021

Details of Company

Biodiversity Africa	Biodiversity Africa is situated in Cape Town and specialises in terrestrial botanical and faunal impact assessments.
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Authors

Tarryn Martin (Botanical Specialist) (*Pri. Sci. Nat* 008745)

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon, Swaziland and Malawi. The majority of these projects required lender finance and consequently met both in-country and lender requirements.

Tarryn has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C3 and C4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa.

Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

Amber Jackson (Faunal Specialist) (*Cand. Nat. Sci)*

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African

environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. She was awarded the Denzil and Dorethy Carr Prize for her plant collection in 2006. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets.

Declaration of Independence

Tarryn Martin (Botanical Specialist)

- I, Tarryn Martin, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;
- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

…….. ……

SIGNED DATE

Amber Jackson (Faunal Specialist)

- I, Amber Jackson, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;
- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
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- 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 report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

…….. ……

SIGNED DATE

Non-Technical Summary

Introduction

A tented camp has been developed on the upper slopes of the Boschendal Estate, distanced from the main upmarket tourist accommodation nodes to provide a low impact, less formal accommodation offering.

The tented camp was constructed within an area of natural vegetation without the required Environmental Authorisation. As such, an S24G application has been submitted to the authorities for the infrastructure that has been built.

Approach

A desktop assessment was undertaken prior to the site visit to determine the vegetation types present, identify species of conservation concern that might occur on site and identify the threat and conservation status of the project site.

Following this, a field survey was conducted during the late flowering season on the 10 September 2021. The purpose of the survey was to assess the site-specific ecological state of the project area by recording the species present (both indigenous and alien invasive species), identifying sensitive ecosystems such as rocky outcrops, riparian areas or areas with species of conservation concern, and identifying the current landuse of the site.
The findings from this site visit were supplemented with data from a previous baseline assessment and constraints study undertaken by Helme (2019).

Vegetation and Floristics

The project site occurs within the Fynbos Biome which occupies most of the Cape Fold Belt as well as the lowlands that occur between the mountains and the Atlantic Ocean in the west and south. According to the National Vegetation Map (2018) the project site occurs within Boland Granite Fynbos which is listed as as endangered with a conservation target of 30%. Originally this vegetation type covered an estimated 524 ha but at least half has been transformed for vineyards, olive groves and plantations. Despite this, the NBA (2018) lists this vegetation type as well protected.

The field survey confirmed that a patch of Boland Granite Fynbos occurs within the tented camp footprint. The north-western portion of this patch (where tents 4, 6 and 7 are located) is characterised as near intact with species such as *Cliffortia ruscifolia, Hermannia hyssopifolia, Leucadendron salicifolium, Osteospermum moniliferum, Searsia angustifolia* and *Dicerothamnus rhinocerotis* present. The eastern portion of this patch is more degraded and has a higher number of alien invasive species. On the eastern edge of this patch is a stand of large pine trees.

There are also a large number of alien/weedy species within impacted patch of Boland Granite Fynbos, specifically the degraded patch. These include species such as *Acacia longifolia, Pinus cf. pinaster, Verbena bonariensis, Echium plantagineum, Phytolacca octandra, Solanum mauritanium and Pittosporum undulatum.*

One species of conservation concern (*Hermannia rugosa* listed as VU) was confirmed to occur within the impacted project area and one species (*Protea burchelli* listed as VU) was recorded immediately to the west of the site and is therefore likely to occur within the site.

Fauna

The Boschendal Tented Camp site intersects the distribution range of 19 amphibian species of which 12 are endemic and four are Near-Threatened. The only amphibian that may have occurred on site during the time of development is the Cape Rain Frog (*Breviceps gibbosus*) previously listed as vulnerable but recently been updated to near-threatened. This species favours Renosterveld fynbos heathland and is also found in disturbed habitats in burrows in well-drained soil. It is unclear what means was used to clear vegetation and soil i.e. machinery or by hand, and what was done if this species was found on site. However, it appears as though vegetation clearing was kept to a minimum for the development and only a small portion (15%) of the impacted Boland Granite Fynbos patch was affected.

The Western Cape Province hosts 155 reptile species of which 22 are endemic and 21 are either threatened of near-threatened. Approximately 53 of these reptile species have a distribution range that includes the Boschendal tented camp area.

Reptiles that inhabited the site immediately prior to construction of the tented camp likely would have moved out of the area due to the disturbance. The tented camp would create minimal and intermittent operational disturbance to reptiles and the remaining habitat likely hosts reptiles that have either returned to the area, or are new inhabitants.

The Western Cape hosts approximately 172 mammal species of which 24 are threatened and 13 are near threatened. One vulnerable, six near threatened, three endemic and five near endemic mammal species have a distribution which includes the tented camp area. However, no zebra occur at the tented camp area. No antelope and feline species were expected to use the tented camp area permanently and only if utilised would be for intermittent foraging and/or cover. Small mammals, namely rodents, golden moles and hares are expected to use the area. These would have been disturbed during construction but would have returned once construction ceased. Evidence of moles (mole mounds) and hares (foraging) was observed along the roads in and around the tented camp.

The western Cape hosts 608 bird species (including offshore water birds) and the South African Bird Atlas Project records state 124 species have been recorded in the same pentad as the tented camp area. A previous study by CES (2019) recorded 62 bird species on the Boschendal estate including the Cape Sugarbird specific to the Fynbos vegetation near the tented camp. The western cape hosts 28 threatened and 19 near threatened bird species of which 10 threatened and 13 near-threatened birds have a distribution which includes the tented camp area.

The Black Harrier, Cape Rockjumper and Ground Woodpecker were recorded in the pentad on SABAP2 in 2019 and the study by CES (2019) recorded the Forest Buzzard and Blue Crane. The larger bird species (vultures, eagles) and waterbirds would not have been negatively influenced by the habitat removed for the tented camp.

Site Ecological Index

The Site Ecological Importance (SEI) was assessed for each vegetation type identified for the project site.

Although the near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos has a high sensitivity due to its status of Endangered, the SEI specific to this project infrastructure, which has a small footprint and is of low impact, is rated as medium. However, if additional clearing occurs within this patch of vegetation, this score is likely to increase to high.

The intact patch of Boland Granite Fynbos to the west of the impacted site has an overall SEI of high.

The agricultural land surrounding the near-intact and degraded Boland Granite Fynbos is classified as transformed and has an overall SEI of very low.

Conclusions

Based on the data available in the NBA, it is estimated that approximately 299ha of natural vegetation remain within the Province. The patch of impacted Boland Granite Fynbos that the tented camp occurs within is 1.6ha or 0.54% of the total extent of remaining natural habitat within the Province. The total area of Boland Granite Fynbos impacted by the infrastructure associated with the tented camp (tent platforms, access roads, paths) is approximately 0.24ha or 0.08% of the total remaining extent of this vegetation type.

Impacts associated with this infrastructure were typically of moderate significance prior to mitigation with all but one being reduced to low sensitivity after mitigation measures are implemented.

Recommendations

It is recommended that the following conditions are included in the Final EMPr as well as the conditions of the Environmental Authorisation (EA), if granted:

- No further construction activities may occur until Environmental authorisation has been received and the required permits are in place;
- No further clearing within the impacted Boland Granite Fynbos patch may occur for additional roads or tents;
- No infrastructure must be placed in areas of high sensitivity.
- If any SCC are to be impacted, these must be relocated to nearest appropriate habitat;
- It is recommended that the 1.6ha patch that the project infrastructure is located within is restored to represent natural Boland Granite Fynbos and as such a restoration plan for the site should form part of the EMPr. This includes removal of aliens and re-introduction of representative species;
- Similarly, alien species should be removed from the area to the west of the impacted patch to ensure that these do not spread downhill and back into the area around the tented camp.
- Alien invasive plant clearing should be undertaken in line with an Alien Vegetation Management plan, which should be compiled as part of the EMPr and implemented with immediate effect;

- Only indigenous plant species typical of the local vegetation and approved by a botanist should be used for rehabilitation purposes.
- The impacted Boland Granite Fynbos vegetation patch is not pristine and has been subjected to edge effects and likely infestation of alien plant species for several years. Although further loss of an endangered vegetation type, even if degraded, should be avoided, the impact associated with the tented camp has generally been moderate to low given the small footprint of the project and the limited disturbance of soil, the considered clearing of the site by the contractors (which appears to have been limited to the infrastructure footprint) and the current condition of the vegetation on site.
- If the remaining patch of this vegetation is managed appropriately through the removal of alien invasive plant species and the restoration of the remaining patch (not impacted by the access roads and tent platforms) to its natural state this will improve diversity within the site and contribute towards the conservation of the remaining portion of this vegetation type within the impacted area. The specialist therefore recommends that impacted areas within this patch that are not required for the operation of the tented camp are restored using locally indigenous species representative of Boland Granite Fynbos.
- Further to this, once the tent platforms within the areas of indigenous vegetation have been decommissioned, the sites must be restored back to Boland Granite Fynbos using only locally indigenous species representative of the site.
- Based on the SEI and the identified impacts, the specialist has determined that these are acceptable provided the mitigation recommendations are implemented.

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Glossary of Terms

Alien Invasive Species refers to an exotic species that can spread rapidly and displace native species causing damage to the environment

Biodiversity is the term that is used to describe the variety of life on Earth and is defined as "*the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems*" (Secretariat of the Convention on Biological Diversity, 2005).

Habitat Fragmentation occurs when large expanses of habitat are transformed into smaller patches of discontinuous habitat units isolated from each other by transformed habitats such as farmland.

Key Biodiversity Area are globally recognised sites that contain significant concentrations of biodiversity.

Natural Habitat refers to habitats composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity has not essentially modified an area's primary ecological function and species composition.

Protected Area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values**.** *(IUCN Definition 2008)*

Acronyms

CBA	Critical Biodiversity Area
CR	Critically Endangered
CCR	Core Cape Subregion
ECO	Environmental Control Officer
EDGE	Evolutionarily Distinct and Globally Endangered
EN	Endangered
EIA	Environmental Impact Assessment
EOO	Extent of Occupancy
GBIF	Global Biodiversity Information Facility
GCFR	Greater Cape Floristic Region
GIS	Geographical Information System
IBA	Important Birding Areas
IUCN	International Union for Conservation of Nature
KBA	Key Birding Areas
LC	Least Concern
NBSAP	National Biodiversity and Strategy Action Plan
NEMBA	National Environmental Management Biodiversity Act
PNCO	Provincial Nature Conservation Ordinance
SCC	Species of Conservation Concern
QDS	Quarter Degree Square
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
TOPS	Threatened and Protected Species
VU	Vulnerable

Specialist Check List

The contents of this specialist report complies with the legislated requirements as described in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320			SECTION OF REPORT
3.1	The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2-4 Appendix 6
	3.1.2	A signed statement of independence by the specialist;	Page 3-4
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 2.3
	3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 1.3
	3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 8.2
	3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 7
	3.1.8	Any direct, indirect and cumulative impacts of the proposed development;	Chapter 7
	3.1.9	The degree to which the impacts and risks can be mitigated;	Chapter 7
	3.1.10	The degree to which the impacts and risks can be reversed;	
	3.1.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	
	3.1.12	Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8.2
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
	3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Section 8.3
	3.1.15	Any conditions to which this statement is subjected.	Section 8.2
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.		✓
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

1. INTRODUCTION

1.1. Project Location and Description

Boschendal Estate is situated in the Dwars River Valley north east of Stellenbosch, on either side of the town of Pniel. A large section of the property has been transformed and is used for agriculture which is currently under vineyards and orchards while the remaining portion is managed as a conservation area (Helme, 2019).

A tented camp has been developed on Portion 5 of Farm 1685 by FE5 Pty Ltd on the upper slopes of the Boschendal Estate, distanced from the main upmarket tourist accommodation nodes to provide a low impact, less formal accommodation offering (Figure 1.1).

The tented camp was constructed within an area of natural vegetation without the required Environmental Authorisation. As such, an S24G application has been submitted to the authorities for the infrastructure that has been built.

The tented camp is comprised of the following:

- Seven tents for accommodation of two people each serviced with their own bathrooms and limited self-catering facilities. The tents accommodate a maximum of 14 people on the site in total at any one time. Tents are located on decks of approximately 78 to 83m² each.
- A large mess tent where guests staying on site can congregate as a group if necessary. The tent deck is approximately 246m² in extent.
- A guest support tent with a communal kitchen facility and toilets. The tent deck is approximately 125m² in extent.
- A staff office tent. This is necessary to ensure at least one staff member can be available onsite while guests are staying. It has space for an office and storage. The tent deck is approximately 43m² in extent.

The tented accommodation units are tucked into a patch of indigenous vegetation so as to provide a combination of privacy and views of the Berg River Valley below. The communal / operations related tents are located at a lower level, within the open fallow lands close to the dam (Figure 1.2).

A generator and a transformer are located downslope and north of the staff office tent. The sewage treatment infrastructure is downslope and along the northern edge of the camp. Fire hydrants are located around the periphery of the camp. A reservoir above the site supplies water to the camp.

A gravel road that circulates around the site provides access to the respective units, and the communal / operations tents. Seven parking bays for the guests are provided on the upslope side of the accommodation, with the intention of limiting vehicular movement around the site. The parking is tucked informally off an existing road in groups of 2 and 3 bays.

Figure 1.1: Locality map showing the project site in relation to Pniel and Stellenbosch

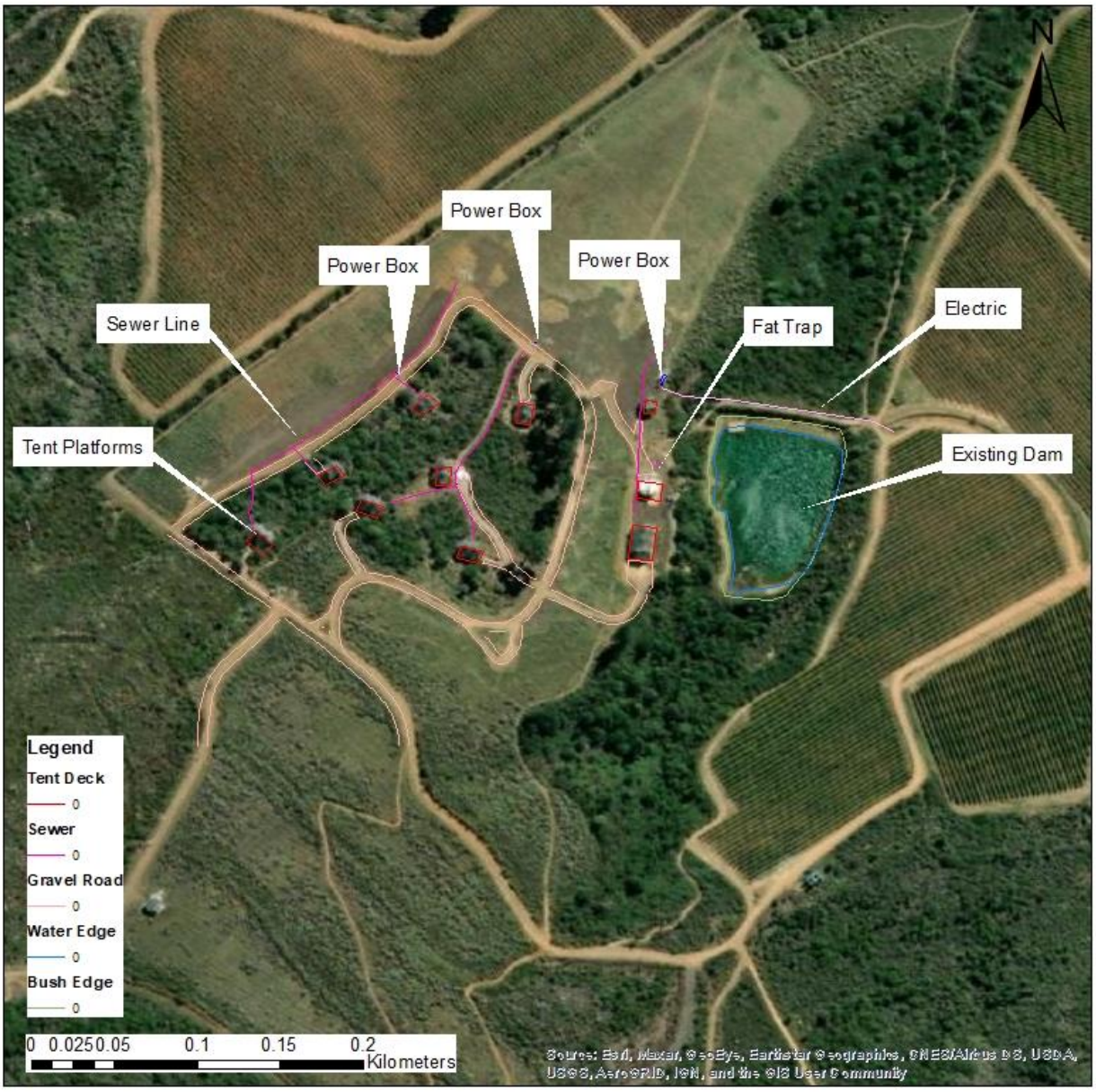

Figure 1.2: Infrastructure Map

1.2. Objectives

The objectives of the ecological assessment are as follows:

- Undertake a desktop assessment of the site to determine its sensitivity and species of conservation concern (SCC) that could be present within the site.
- Undertake a field survey, to record the following information:
    - Species present
    - Identification of species that are either protected (TOPS and PNCO) or considered threatened (CR, EN, VU) on the South African Red Data List

    - Assess the level of degradation/ecological status of the site (i.e. intact, near natural, transformed)
- Assess the sensitivity of each site using the sensitivity analysis outlined in the Species Guideline Document (2020)
- For areas of moderate and high sensitivity, assess the impact that the construction of the tented camp has had on the plant and faunal species.
- Where necessary, provide mitigation measures to reduce the impact of the infrastructure on the environment.
- Provide a specialist statement/opinion

1.3. Limitations and Assumptions

This report is based on current available information and, as a result, the following limitations and assumptions are implicit:

- The report is based on a project description received from the client.
- Species of Conservation Concern (SCC) are difficult to find and may be difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional SCCs are present.
- Sampling could only be carried out at one stage in the annual or seasonal cycle. The survey was conducted in late spring when most plants were flowering. Some early flowering species, specifically geophytes may have gone undetected. However, the time available in the field, and information gathered during the survey was sufficient to provide enough information to determine the status of the affected area.

2. METHODOLOGY

2.1. Project Area

The “project area” or “impacted project site” is defined as the area that has been directly impacted by project infrastructure. This includes the patch of Boland Granite Fynbos where the seven tent platforms are located as well as the old agricultural land in which the Mess Tent (platform 8), Guest Support Tent (platform 9), Staff Office Tent (platform 10), electrical boxes and roads are located.

The “impacted patch of Boland Granite Fynbos” refers to the 1.6 ha patch of Boland Granite Fynbos that the seven accommodation tents are located in.

The project area of influence refers to the broader area around the project area that may be indirectly impacted by project activities.

2.2. Desktop Assessment

A desktop assessment was undertaken prior to the site visit to determine the vegetation types present, identify species of conservation concern that might occur on site and identify the threat and conservation status of the project site. Key resources were consulted including:

- The DFFE screening report for the site
- The South African Vegetation Map (Mucina and Rutherford, 2018);
- The Western Cape Biodiversity Spatial Plan (2017);
- The National Environmental Management: Biodiversity Act (NEMBA), 2004: List of Threatened Ecosystems (2011);
- National Biodiversity Management: Biodiversity Act (NEMBA) List of Threatened or Protected Species;
- The National Biodiversity Assessment (SANBI, 2018);
- The Plants of Southern Africa (POSA) database; and
- iNaturalist

A species list was compiled for the site and the likelihood of occurrence assessed for species listed as critically endangered, endangered and vulnerable (Section 4.3 and Appendix 1).

The known diversity of the vertebrate fauna in the project area was determined by a literature review. Species known from the region, or from adjacent regions whose preferred habitat(s) were known to occur within the study area, were also included. Literature sources included:

- Amphibians –Du Preez & Carruthers (2017), FrogMap (ADU, 2021)
- Reptiles – Branch (1998), ReptileMap (ADU, 2021),
- Birds – Chittenden (2009), SABAP2
- Mammals – Stuart & Stuart (2014), MammalMap (ADU, 2021).

To establish which of those species identified in the literature review are Species of Conservation Concern (SCC), the following sources were consulted:

- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al*., 2014)
- Atlas and Red List of Frogs of South Africa, Lesotho and Swaziland (Minter *et al*., 2004)
- Red Data book of Birds of South Africa, Lesotho and Swaziland (Taylor et al., 2015)
- Red List of Mammals of South Africa, Swaziland and Lesotho.
- CITES Appendix I and II

2.3. Field Survey

A field survey was undertaken during the late flowering season on the 10 September 2021. The purpose of the survey was to assess the site-specific ecological state of the project area by recording the species present (both indigenous and alien invasive species), identifying sensitive ecosystems such as rocky outcrops, riparian areas or areas with species of conservation concern, and identifying the current landuse of the site.

The findings from this site visit were supplemented with data from a previous baseline assessment and constraints study undertaken by Helme (2019).

The project site was walked and sample plots were analysed by determining the dominant species in each plot, as well as any alien invasive species and potential SCC occurring within the plots. Each sample plot was sampled until no new species were recorded. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

Additionally, since the project site has already been disturbed with the construction of infrastructure, the surrounding vegetation was also sampled to gain an understanding of what might have been present previously. This was supplemented by analysing historical imagery to determine how the site has changed over time.

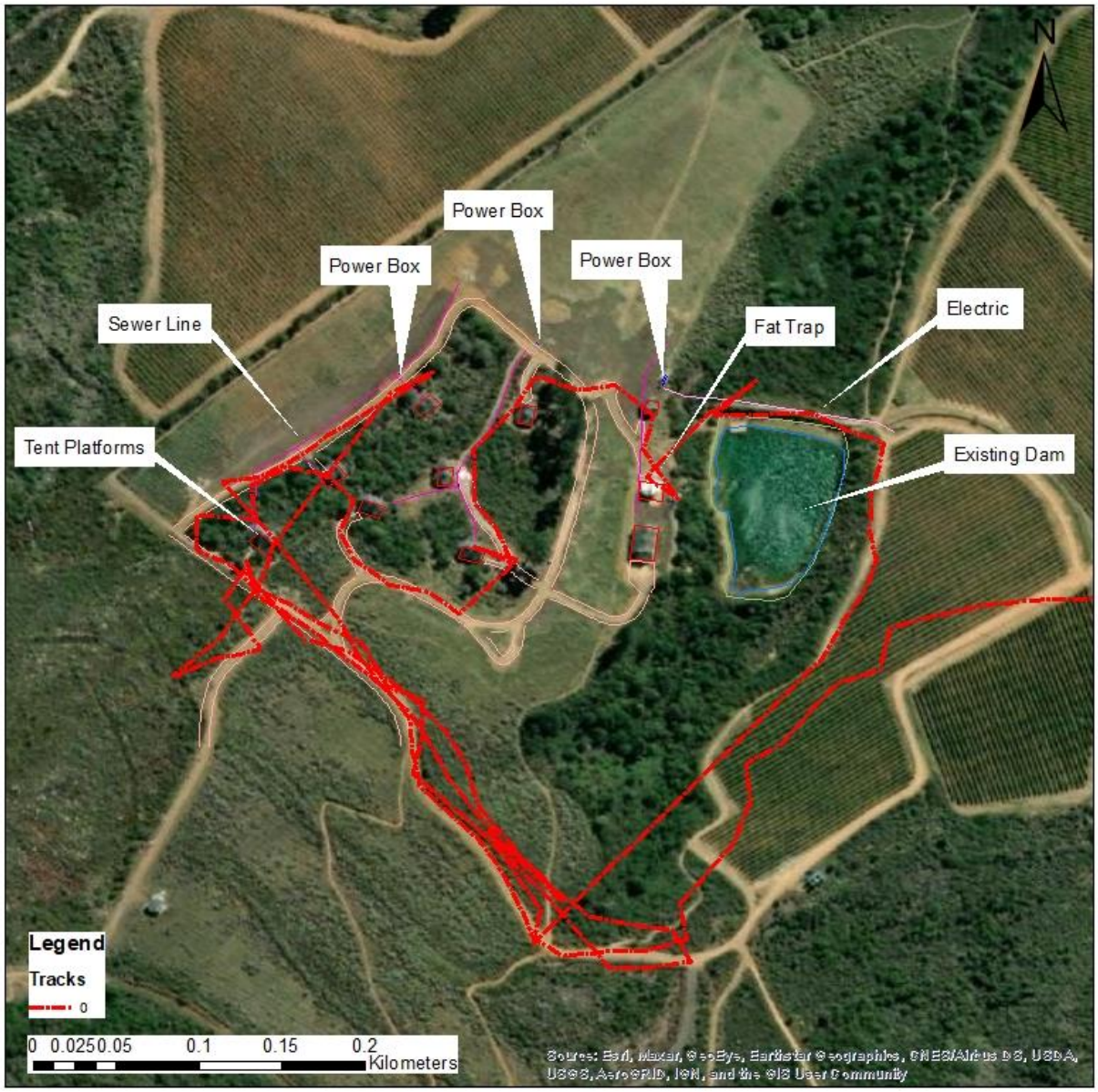

Figure 2.1: Map showing sample tracks within and adjacent to the project site.

2.4. Site Sensitivity Assessment

The Species Environmental Assessment guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the species of conservation concern in the project area were assessed based on their conservation importance, functional integrity and receptor resilience (Table 2.1). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 2-1: Criteria for establishing Site Ecological importance and description of criteria

Criteria	Description
Conservation Importance (CI)	*The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*
Functional Integrity (FI)	*A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.*
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	*The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.*
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

2.5. Description of impact analysis methodology used

2.5.1. Definitions of or criteria for environmental impact parameters

The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

The following variables were considered when assessing each impact:

- Extent (spatial scale)
- Duration
- Intensity (severity)
- Probability of occurrence
- Status of the impact i.e. whether it is positive or negative

The tables used to determine each variable for each impact have been included in Appendix 3.

3. BIOPHYSICAL DESCRIPTION

3.1. Climate

The project site is situated in the south-western part of the Core Cape Subregion (CCR) which experiences a strictly Mediterranean climate with rainfall occurring primarily in the winter months (Manning and Goldblatt, 2012). Pniel, the closest town to the project site, experiences its highest rainfall from May to September (worldweatheronline, 2021) while summers are typically warm and dry. January and February are the hottest months with average temperatures of 27°C while July and August are the coolest months with minimum average temperatures of 7°C. The steep slopes of the mountain ranges such as the Drakenstein and Simonsberg that occur within close proximity to the project site provide greater climatic variation resulting in a higher diversity of habitats and therefore species diversity (Manning and Goldblatt, 2012).

3.2. Topography

The project site is situated on the eastern slopes of the Simonsberg Mountain Range. The site is gently sloping towards the northeast with the elevation changing from 385 masl in the west to 355 masl in the east.

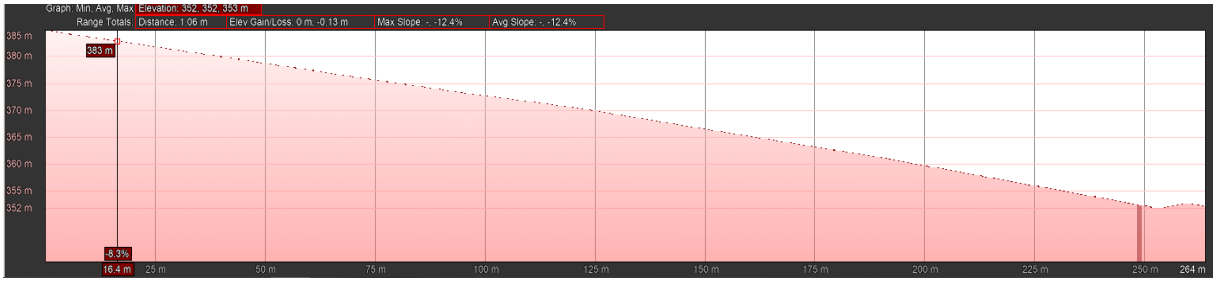

Figure 3.1: Elevation profile showing the change in slope from west to east

3.3. Geology and Soils

The project site is located within the Cape Granite Suite which is comprised of porphyritic, medium or fine grained granite and granodiorite (a coarse-grained plutonic rock containing quartz and plagioclase). It is also comprised of subordinate syenite (a coarse-grained grey igneous rock), gabbro (a dark, coarse-grained plutonic rock of crystalline texture), diorite (a speckled, coarse-grained igneous rock) and quartz porphyry (a type of igneous rock containing large quartz crystals) (CapeFarmMapper, 2021).

The underlying geology gives rise to apedal, freely drained red-yellow soils. Clay content varies between 15 and 35% with soil depths >750mm.

4. VEGETATION AND FLORISTICS

The project site occurs within the Fynbos Biome which occupies most of the Cape Fold Belt as well as the lowlands that occur between the mountains and the Atlantic Ocean in the west and south (Rebelo *et. al*. 2006). In the south it occurs between the mountains and the Indian Ocean. The project falls within the Core Cape Subregion (CCR) of the Greater Cape Floristic Region (GCFR) (Manning and Goldblatt, 2012). The CCR is unique in that within 90 760km^2 (less than 4% of the southern African Continent), there are 9,383 species of vascular plants, of which 9,251 are flowering species, and over 68% are endemic (i.e. don't occur anywhere else in the world). This region is floristically rich and comprises over 46% of the estimated 20% vascular plant species recorded from southern Africa.

According to the National Vegetation Map (2018), which was compiled to provide a greater level of detail for floristically based vegetation units in South Africa, the project site occurs within Boland Granite Fynbos (Figure 4.1).

4.1. Boland Granite Fynbos

Boland Granite Fynbos occurs in the Western Cape Province on the upper slopes of Paardeberg and Paarl Mountain as well as the lower slopes of the mountains spanning the Groenberg and Hawequasberge, Pniel, Franschhoek, Stellenbosch and Helderberg Municipality as well as in the Du Toitskloof and Wemmershoek Valleys.

This vegetation type occurs on moderately undulating hills and is characterised by fairly dense 1-2m tall shrubland comprised of scrub, asteraceous and proteoid fynbos with restioid and ericaceous fynbos dominating in wetter areas.

This vegetation type is listed as endangered with a conservation target of 30%. Originally this vegetation type covered an estimated 524 ha but at least half has been transformed for vineyards, olive groves and plantations. Despite this, the NBA (2018) lists this vegetation type as well protected.

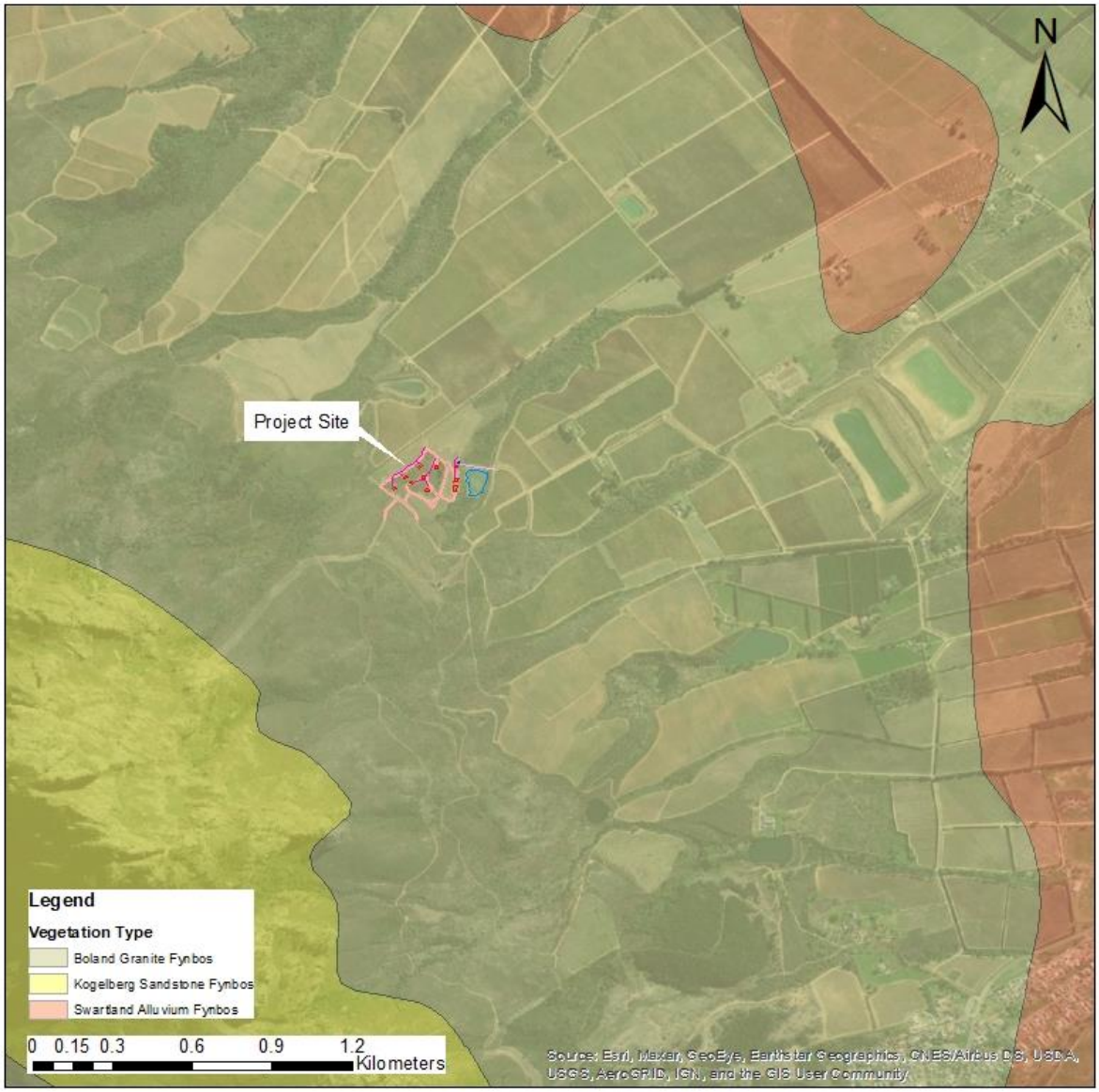

Figure 4.1: National Vegetation Map showing the project area as occurring within Boland Granite Fynbos

4.2. Vegetation types recorded on site

The vegetation within the project area of influence is comprised of

- Intact Boland Granite Fynbos to the west,
- Riparian vegetation to the east, and
- Transformed land (roads and agricultural land) to the north and south (Figure 4.2).

In the centre of the project area where the seven tent platforms are located, is a patch of Boland Granite Fynbos (referred to as the "impacted patch of Boland Granite Fynbos") (Figure 4.3). The north-western portion of this patch (where tents 4, 6 and 7 are located) is characterised as near intact with species such as *Cliffortia ruscifolia, Hermannia hyssopifolia, Leucadendron salicifolium, Osteospermum moniliferum, Searsia angustifolia* and *Dicerothamnus rhinocerotis* present. *Searsia angustifolia* (a small tree species) was also present within the patch. The eastern portion of this patch is more degraded and has a higher number of alien invasive species (Figure 4.5 and Figure 4.5). On the eastern edge of this patch is a stand of large pine trees (Figure 4.6). Refer to Figure 4.3 which shows the distribution of the vegetation in relation to the tent platforms.

There are also a large number of alien/weedy species within impacted patch of Boland Granite Fynbos, specifically the degraded patch. These include species such as *Acacia longifolia, Pinus cf. pinaster, Verbena bonariensis, Echium plantagineum, Phytolacca octandra, Solanum mauritanium and Pittosporum undulatum.* Refer to section 4.4 for further details on alien invasive species.

The Mess Tent (platform 8), Guest Support Tent (platform 9), Staff Office Tent (platform 10) and power boxes are all located in an area that was previously transformed. Based on historical imagery, this area was once an agricultural field used for crops. These areas are now covered in lupins, grasses and species such as *Echium plantagineum, Verbena bonariensis* and *Acacia longifolia.*

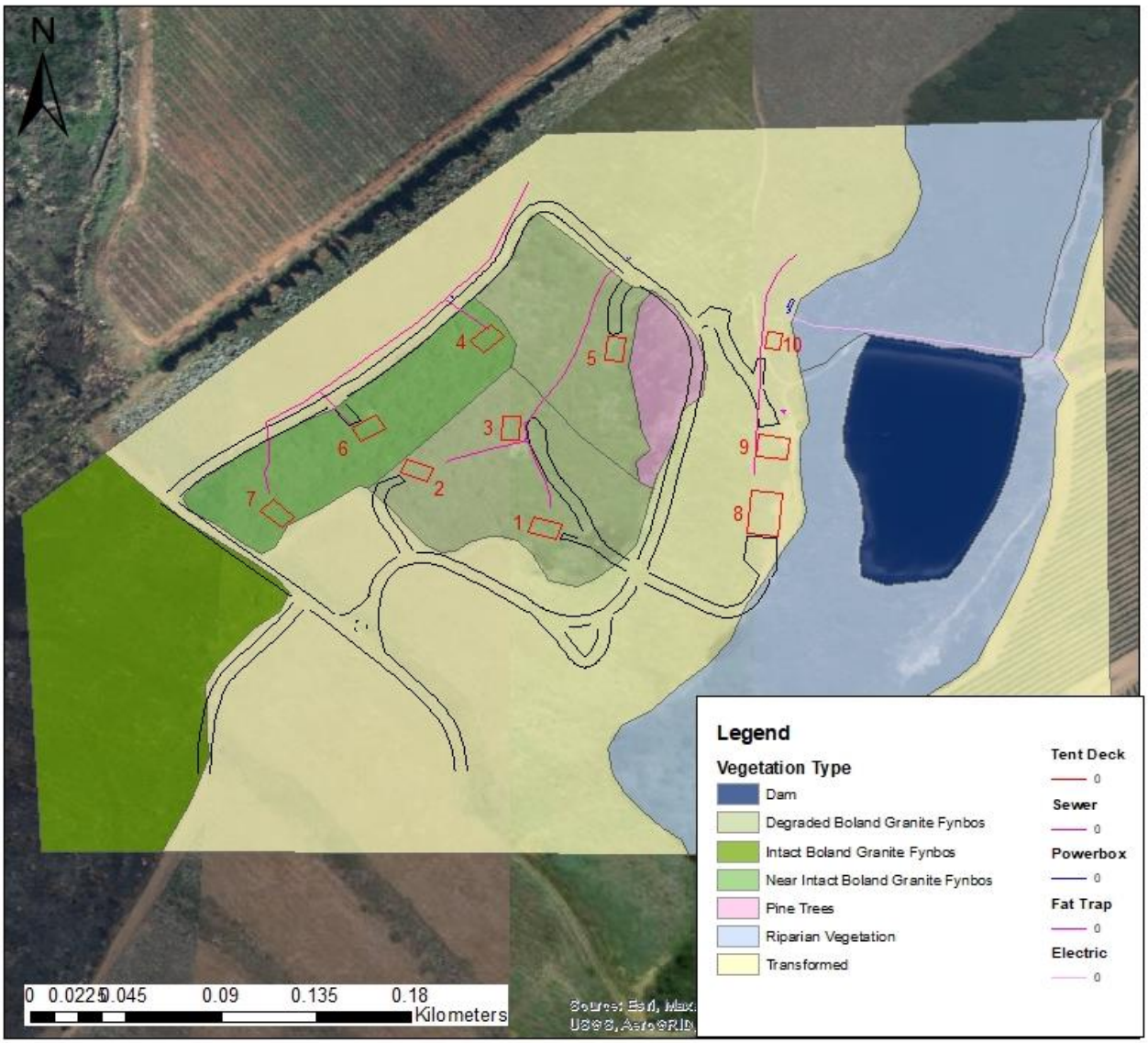

Figure 4.2: Vegetation map of the project area based on data collected from the field survey

Figure 4.3: Near intact Boland Granite Fynbos at tent 6

Figure 4.4: Degraded Boland Granite Fynbos

Figure 4.5: Degraded Boland Granite Fynbos

Figure 4.6: Degraded Boland Granite Fynbos in the foreground with the stand of pine trees in the background. The foreground is infested with alien species such as *Acacia longifolia* and *Pinus sp.*

Figure 4.7: Transformed area where the Mess Tent (platform 8), Guest Support Tent (platform 9) and Staff Office Tent (platform 10) are located

4.3. Floristics

Thirty-one species were recorded within the project area. Of these species, seven alien invasive and/or ruderal species (Section 4.5), two species of conservation concern (section 4.4.2) and 21 indigenous species were recorded. Appendix 1 provides a list of species recorded on site.

4.4. Species of Conservation Concern

4.4.1. Predicted Species of Conservation Concern

A list of species of conservation concern that could occur within the project site was compiled during the desktop study. This list draws on records from the POSA database, the DFFE screener and the baseline study undertaken by Helme (2019) and produced a list of 103 species of conservation concern that were either critically endangered (CR), endangered (EN) or vulnerable (VU) that could occur within the site. The likelihood of occurrence for each species was assessed by comparing the habitat preference of each species to the available habitat within the project area. Where there was a high likelihood of occurrence, the distribution of each species was also assessed. Of the 103 identified species, one was confirmed to occur on site, one was confirmed to occur directly adjacent to the site, thirteen have a high likelihood of occurrence, 23 have a medium likelihood of occurrence and 65 have a low likelihood of occurrence.

Given the number of species that were assessed, the assessment for those that were either confirmed or have a high likelihood of occurrence have been included in Table 4.1. The assessment for species with a medium or low likelihood of occurrence have been included in Appendix 1.

Table 4.1: List of Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species that have a high likelihood of occurrence on site or were confirmed to occur on site.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
MALVACEAE	*Hermannia rugosa*	VU	Confirmed	This species was confirmed to occur within the impacted area.
Proteaceae	*Protea burchellii*	VU	Confirmed	This species habitat is variable although it is associated with richer soils (Rebelo *et al.,* 2009). Helme (2019) notes that this species is common within Boschendal Estate on the alluvium east of Dwars River. This species was within the intact fynbos to the west of the site. The likelihood of occurrence within the impacted project site is this high.
ERICACEAE	*Erica filiformis var. filiformis*	VU	High	Suitable habitat is present for this species and as such the likelihood of occurrence is high.
Proteaceae	*Leucadendron daphnoides*	EN	High	Although suitable habitat exists, this species was not recorded within the impacted area. However, it was recorded by Helme (2019) on the slopes of Simonsberg Mountain on Boschendal Estate.
Proteaceae	*Leucadendron lanigerum var. lanigerum*	EN	High	Although suitable habitat exists, this species was not recorded within the impacted area.
Proteaceae	*Leucospermum grandiflorum*	EN	High	Although suitable habitat exists, this species was not recorded within the impacted area. However, it was recorded by Helme (2019) on the slopes of Simonsberg on Boschendal Estate.
Proteaceae	*Leucospermum lineare*	VU	High	Although suitable habitat exists, this species was not recorded within the impacted area. However, it was recorded by Helme (2019) on the upper slopes of Simonsberg on Boschendal Estate.
Boraginaceae	*Lobostemon capitatus*	VU	High	This species occurs within the transition zone between fynbos and renosterveld and has a distribution that ranges from

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				Porterville to Bredasdorp (Buys *et al.,* 2006). The likelihood of occurrence within the project area is therefore high.
GERANIACEAE	*Sensitive species 588*	EN	High	This species is associated with clay and granite slopes and flats in renosterveld (Raimondo *et al.,* 2007). Suitable habitat is available within the project are. The likelihood of occurrence is thus high.
Iridaceae	*Sensitive species 602*	EN	High	This species is associated with clay slopes in Renosterveld (Goldblatt *et al.*, 2007). Since this habitat is present the likelihood of occurrence is high.
ASTERACEAE	*Muraltia decipiens*	EN	High	This species was recorded by Helme (2019) on alluvium east of Dwars Rivier on Boschendal Estate. It is associated with clay flats and lower mountain slopes. The likelihood of occurrence within the general project area is high.
RHAMNACEAE	*Phylica strigulosa*	VU	High	This species is associated with renosterveld and occurs on stony clay and sandstone slopes at low elevations of 30-760 m (Helme, 2006). Since habitat is available and the site intersects with this species' distribution, the likelihood of occurrence is high.
Proteaceae	*Protea scorzonerifolia*	VU	High	This species is typically limited to granite and shale soils on upper mountain slopes although it has also been recorded on sandstone where there are traces of clay soils (Rebelo *et al.*, 2005). This species was recorded by Helme (2019) on Boschendal Estate within the alluvium east of Dwars River.
PROTEACEAE	*Serruria gracilis*	VU	High	This species is associated with granite fynbos and has a distribution range that intersects with the project site (Rebelo *et al.*, 2015). Although not recorded within the project site the likelihood of occurrence is high.
PROTEACEAE	*Serruria kraussii*	VU	High	This species is associated with granite and sandstone soils and occurs between Helderberg and Jonkershoek (Rebelo *et al.,* 2009). Although available habitat is present the author is unaware of any

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				collection records on the eastern slopes of Simonsberg Mountain. The likelihood of occurrence has therefore been rated as medium for this species.

4.4.2. Confirmed Species of Conservation Concern

One species of conservation concern (*Hermannia rugosa* listed as VU) was confirmed to occur within the impacted project area and one species (*Protea burchelli* listed as VU) was recorded immediately to the west of the site and is therefore likely to occur within the site (Figure 4.8).

Figure 4.8: Confirmed Species of Conservation Concern on or directly adjacent to the project site. A) *Hermannia rugosa* and B) *Protea burchelli.*

4.4.3. Species requiring permits

Although a species may not be considered species of conservation concern due to their red list status, a number of species still require permits for their removal and/or destruction. Permits can be applied for through the permitting office at Cape Nature. Species recorded on site that require permits have been listed in Table 4.2.

Table 4.2: Species recorded on site requiring permits for their removal and/or destruction

Family	Species	Red List	PNCO
Ericaceae	*Erica plukenetii*	LC	Schedule 4
Hyacinthaceae	*Lachenalia lutea*	LC	Schedule 4
Hyacinthaceae	*Lachenallia orchidiodes*		Schedule 4
Iridaceae	*Chasmanthe floribunda*	LC	Schedule 4
Proteaceae	*Leucadendron salicifolium*	LC	Schedule 4
Proteaceae	*Protea cf burchelli*	VU	Schedule 4
Proteaceae	*Protea nitida*	LC	Schedule 4

4.5. **Alien Species**

Seven alien invasive species classified as Category 1b on the National Environmental Management: Biodiversity Act (2004) Alien Invasive Species Lists, 2020 were recorded within the project area (refer to Table 4.3 for a list of species and Figure 4.9 for images of six of the seven species). Of relevance to this site is that allowing the spread of a category 1b species is prohibited. An alien invasive management plan for the removal of this species will thus be required as part of the EMPr.

There is a stand of pine trees to the east of the project area that appears to have been present for several years. If these qualify as heritage trees their removal will be exempted. If they are not classified as heritage trees then these trees will need to be removed as part of the alien invasive management plan.

Table 4.3: Alien invasive species recorded within the project area that will require removal

Family	*Species*	Category
Fabaceae	*Acacia longifolia*	1b
Boraginaceae	*Echium plantagineum*	1b
Phytolaccaceae	*Phytolacca octandra*	1b
Pinaceae	*Pinus pinaster*	1b unless a heritage tree
Pittosporaceae	*Pittosporum undulatum*	1b
Solanaceae	*Solanum mauritianum*	1b
Verbenaceae	*Verbena bonariensis*	1b

Figure 4.9: Alien invasive species recorded within the project area. A) *Acacia longifolia,* B) *Verbena bonariensis,* C) *Solanum mauritianum,* D) *Phytolacca octandra,* E) *Echium plantagineum* and F) *Pittosporum undulatum*

5. FAUNA

5.1. Amphibians

The Western Cape hosts 62 amphibian species, of which 36 are endemic to the province, eight are threatened and seven are near-threatened (Turner & Villiers, 2017).

The Boschendal Tented Camp site intersects the distribution range of 19 amphibian species of which 12 are endemic and four are Near-Threatened (Table 5.1).

The only amphibian that may have occurred on site during the time of development is the Cape Rain Frog (*Breviceps gibbosus*) previously listed as vulnerable and its status has since been updated to near-threatened (IUCN SSC, 2017). This species favours Renosterveld fynbos heathland and is also found in disturbed habitats in burrows in well-drained soil (du Preez & Carruthers, 2017; IUCN SSC, 2017). It is unclear what means was used to clear vegetation and soil i.e. machinery or by hand, and what was done if this species was found on site. However, it appears as though vegetation clearing was kept to a minimum for the development and only a small portion (15%) of the impacted Boland Granite Fynbos patch was affected.

Table 5.1: Amphibian species with a distribution and includes the Tented Camp area. The highlighted species is the only one that might have occurred on site.

Common name	Scientific name	Treat Status		Endemic
		(IUCN, 2021)	(Minter *et al*., 2004)	
Cape River Frog	*Amietia fuscigula*	LC	LC	
Landroskop Moss Frog	*Arthroleptella landdrosia*	NT	NT	WC Endemic
Villiersdorp Moss Frog	*Arthroleptella villiersi*	LC	LC	WC Endemic
Strawberry Rain Frog	*Breviceps acutirostris*	LC	LC	WC Endemic
Cape Rain Frog	*Breviceps gibbosus*	NT	VU	WC Endemic
Cape Mountain Rain Frog	*Breviceps montanus*	LC	LC	WC Endemic
Sand Rain Frog	*Breviceps rosei*	LC	LC	WC Endemic
Boettger's Caco	*Cacosternum boettgeri*	LC	LC	
Cape Caco	*Cacosternum capense*	NT	VU	WC Endemic
Cape Ghost Frog	*Heleophryne purcelli*	LC	LC	WC Endemic
Arum Lily Frog	*Hyperolius horstockii*	LC	LC	WC Endemic
Painted Reed Frog	*Hyperolius marmoratus*	LC	LC	
Marsh Frog	*Poyntonia paludicola*	NT	NT	WC Endemic
Raucous Toad	*Sclerophrys capensis*	LC	LC	
Banded Stream Frog	*Strongylopus bonaespei*	LC	LC	WC Endemic
Clicking Stream Frog	*Strongylopus grayii*	LC	LC	
Cape Sand Frog	*Tomopterna delalandii*	LC	LC	
Cape Sand Toad	*Vandijkophrynus angusticeps*	LC	LC	WC Endemic
Common Platanna	*Xenopus laevis*	LC	LC	

5.2. Reptiles

The Western Cape Province hosts 155 reptile species of which 22 are endemic and 21 species are either threatened of near-threatened (Turner & Villiers, 2017). Approximately 53 of these reptile species have a distribution range that includes the Boschendal tented camp area (Appendix C).

The Southern Rock Agama (*Agama atra*) was observed during the field survey, four individuals were seen on the rocks that border the ring road around the tented camp (Figure 5.1). Six SCC have a distribution range which includes the Boschendal tented camp area (Table 5.2).

Reptiles that inhabited the site immediately prior to construction of the tented camp likely would have moved out of the area due to the disturbance. The tented camp would create minimal and intermittent operational disturbance to reptiles and the remaining habitat likely hosts reptiles that have either returned to the area, or are new inhabitants.

Figure 5.1: Southern Rock Agama (Agama atra) observed at the project area

Table 5.2: Reptile SCC

Common name	Scientific name	Red list category		Endemic
		National (Minter *et al*., 2004)	Global (IUCN, 2021)	
Geometric Tortoise	*Psammobates geometricus*	CE		X
Southern adder	*Bitis armata*	VU		X
Fork-marked Whip Snake	*Psammophis leightoni*	VU		X
Cape Dwarf Chameleon	*Bradypodion pumilum*	VU	NT	X
Robertson Dwarf Chameleon	*Bradypodion gutturale*	LC		X
Graceful Crag Lizard	*Hemicordylus capensis*	LC		X

5.3. Mammals

The Western Cape hosts approximately 172 mammal species of which 24 species are threatened and 13 species are near threatened. Eight species are endemic and ten species are near endemic (Birss, 2017).

One vulnerable, six near threatened, three endemic and five near endemic mammal species have a distribution which includes the tented camp area (table 5.3). No zebra occur at the tented camp area. No antelope and feline species were expected to use the tented camp area permanently and only if utilised would be for intermittent foraging and/or cover. Small mammals, namely rodents, golden moles and hares are expected to use the area. These would have been disturbed during construction but would have returned once construction ceased. Evidence of moles (mole mounds) and hares (foraging) was observed along the roads in and around the tented camp.

Figure 5.2: Signs of mammals in the tented camp area

Table 5.3: SCC with a distribution that includes the tented camp area

Common name	Species name	Conservation status /CITES)		Endemism
		National (Child et al., 2019)	Global (IUCN)	
Leopard	*Panther pardus*	VU	VU	-
White-tailed Rat	*Mystromys albicaudatus*	VU	VU	
Grey Rhebok	*Pelea capreolus*	NT	NT	-
Spectacled Dormouse	*Graphiurus ocularis*	NT	LC	-
Laminate Vlei Rat	*Otyomys laminnatus*	NT	NT	-
Serval	*Leptailurus serval*	NT	LC	-
Fynbos Golden Mole	*Amblysomus corriae*	NT	NT	-
African Clawless Otter	*Aonyx capensis*	NT	NT	-
Cape Spiny Mouse	*Acomys subspinosus*	LC	LC	WC Endemic
Cape Dune Mole Rat	*Bathyergus suillus*	LC	LC	WC Endemic
Cape Gerbil	*Gerbilliscus afra*	LC	LC	WC Endemic
Cape Golden Mole	*Chrysochloris asiatica*	LC	LC	Near endemic
Cape Grysbok	*Raphicerus melanotis*	LC	LC	Near endemic
Cape Mountain Zebra	*Equus zebra*	LC	VU	Near endemic
Cape Mole Rat	*Georychus capensis*	LC	LC	Near endemic
Verreaux's Mouse	*Myomyscus verreauxi*	LC	LC	Near endemic

5.4. Birds

The western Cape hosts 608 bird species (including offshore water birds) and the South African Bird Atlas Project records state 124 species have been recorded in the same pentad as the tented camp area. A previous study by CES (2019) recorded 62 bird species on the Boschendal estate including the Cape Sugarbird specific to the Fynbos vegetation near the tented camp. The western cape hosts 28 threatened and 19 near threatened bird species of which 10 threatened and 13 near-threatened birds have a distribution which includes the tented camp area.

The Black Harrier, Cape Rockjumper and Ground Woodpecker were recorded in the pentad on SABAP2 in 2019 and the study by CES (2019) recorded the Forest Buzzard and Blue Crane. The larger bird species (vultures, eagles) and waterbirds would not have been negatively influenced by the habitat removed for the tented camp.

Table 5.4: SCC with a distribution that includes the tented camp area

Common name	Scientific name	Red list category		SABAP2
		National (Minter, et al., 2014)	Global (IUCN)	
Bank Cormorant	*Phalacrocorax neglectus*	Endangered	Endangered	-
Black Harrier	*Circus maurus*	Endangered	Endangered	X
Cape Cormorant	*Phalacrocorax capensis*	Endangered	Endangered	-
Cape Vulture	*Gyps coprotheres*	Endangered	Endangered	-
Fynbos Buttonquail	*Turnix hottentottus*	Endangered	Endangered	
Black Bustard	*Eupodotis afra*	Vulnerable	Vulnerable	-
Blue Crane	*Anthropoides paradiseus*	Vulnerable	Vulnerable	X
Damara Tern	*Sternula balaenarum*	Vulnerable	Vulnerable	-
Maccoa Duck	*Oxyura maccoa*	Vulnerable	Vulnerable	-
Martial Eagle	*Polemaetus bellicosus*	Vulnerable	Endangered	-
Secretary Bird	*Sagittarius serpentarius*	Vulnerable	Endangered	-
Bar-tailed Godwit	*Limosa lapponica*	NT	NT	-
Cape Rockjumper	*Chaetops frenatus*	NT	NT	X
Chestnut-banded Plover	*Charadrius pallidus*	NT	NT	-
Crowned Cormorant	*Microcarbo coronatus*	NT	NT	-
Curlew Sandpiper	*Calidris ferruginea*	NT	NT	-
Denham's Bustard	*Neotis denhami*	NT	NT	-
Eurasian Curlew	*Numenius arquata*	NT	NT	-
Forest Buzzard	*Buteo trizonatus*	NT	NT	X
Ground Woodpecker	*Geocolaptes olivaceus*	NT	NT	X
Lesser Flamingo	*Phoeniconaias minor*	NT	NT	-
Protea Canary	*Crithagra leucoptera*	NT	NT	-
Red Knot	*Calidris canutus*	NT	NT	-
Sentinel Rock-Thrush	*Monticola explorator*	NT	NT	-

6. SENSITIVITY ASSESSMENT

6.1. Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan (WCBSP, 2017) maps biodiversity priority areas, including Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) which require safeguarding to ensure the persistence of biodiversity and ecosystems functioning, through a systematic conservation planning process.

CBA's are defined as "areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species" (WCBSP Handbook, 2017). The provided map distinguishes between CBA 1 areas, which are those that are likely to be in a natural condition, and CBA 2 areas, which are areas that are potentially degraded or represent secondary vegetation.

ESA's are "Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of Protected Areas (Pas) or CBAs and are often vital for delivering ecosystem services. They support landscape connectivity, encompass the ecological infrastructure from which ecosystem goods and services flow, and strengthen resilience to climate change." ESA's should be maintained in a functional and natural state although some habitat loss may be acceptable. As with the CBAs, a distinction is made between ESA 1 that are areas in a natural, near natural or moderately degraded condition and ESA 2 which are degraded and need to be restored.

According to the WCBSP (2017), the footprint of the tented camp falls within an ESA 1 area with a small portion along the eastern boundary falling within an ESA 2.

The desired management objectives of the affected biodiversity priority areas are tabulated below (Table 6.1).

Table 6-2: Biodiversity priority areas affected by the project infrastructure

Category	Sensitivity Features	Desired Management Objective	Recommendation
ESA 1	Terrestrial	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	The construction of the tent platforms and paths through the site appear to have been kept to a minimum and have had a relatively low impact on the ecological functioning of the patch of fynbos in which they have been built. It is advised that clearing is kept to an absolute minimum and that the alien invasive species that are present within the site are removed.
ESA 2	Terrestrial	Restore and/or manage to minimize impact on ecological infrastructure functioning; especially soil and water-related services.	Although the guest support tent and mess tent are located within an ESA2 area, the field survey indicates that this site has been transformed and used for agriculture for a number of years. This is supported by the historical satellite imagery available for the site. The impact of these structures on the ESA2 has therefore been minimal.

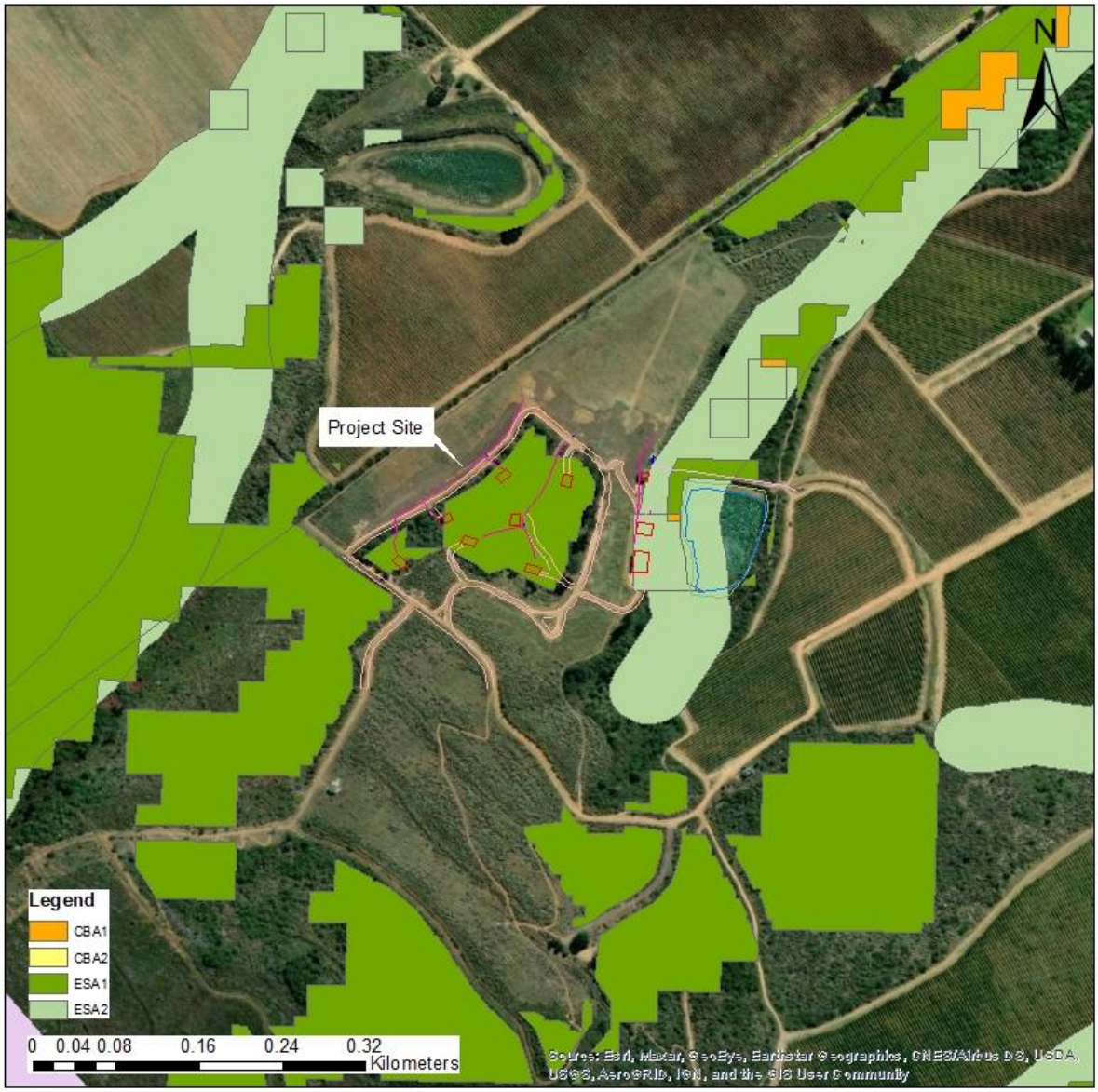

Figure 6.1: The project site in relation to identified CBAs and ESAs.

6.2. Ecosystem Threat Status

According to the Western Cape Biodiversity Spatial Plan (2017), the threat status of the ecosystem (Boland Granite Fynbos) present within the project area is listed as Vulnerable. However, the NBA (2018) lists this vegetation type (Boland Granite Fynbos) as Endangered.

6.3. Sensitivity Assessment

The Site Ecological Importance (SEI) was assessed for each vegetation type identified for the project site.

6.3.1. Near Intact and Degraded Boland Granite Fynbos

The near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos was determined to have a high conservation importance (CI) due to the confirmed presence of *Hermannia rugosa* (VU Category B) species and the high likelihood that *Protea burchelli* is also present on site based on it being recorded in natural habitat to the west of the site. This vegetation type is listed as endangered and since 0.08% of the remaining extent has been impacted, the CI is listed as high rather than very high as <0.1% of this vegetation type has been lost. Although the impacted patch of Boland Granite Fynbos is small and three of its four sides have been exposed to disturbance for at least 20 years, there is good habitat connectivity on its western side to intact Degraded Boland Granite Fynbos allowing ecological processes to continue. It also has good rehabilitation potential. As such the Functional Integrity (FI) was determined to be high.

The Species Environmental Assessment Guideline (2020) defines resilience as *"the estimated recovery time required to restore an appreciable portion of functionality to the receptor"*. It goes on to say that resilience is linked to a particular disturbance or impact and can therefore vary depending on the type of disturbance. For example, the clearing of vegetation for a 5m wide road that is 1km in length will result in the clearance of 5000m^2 which is significantly more than the clearing of 250m^2 for three tent platforms. In this example, the resilience of the impacted vegetation type will be higher for the tent platforms than the road as the area that will be disturbed is smaller and therefore recovery is likely to be quicker.

Resilience has therefore been assessed in relation the project infrastructure which in this instance was the clearing of 250m^2 of vegetation for the building of three tent platforms.

The vegetation present within the area identified as near-intact and degraded Boland Granite Fynbos is likely to recover to its current state relatively quickly (5-10 years), restoring species composition and functionality of the site if topsoil is replaced on the disturbed sites and the alien invasive species are removed from the area. Species diversity is likely to increase if alien species are managed as seed dispersal from the intact Boland Granite Fynbos to the west is possible.

Although this vegetation type has a high sensitivity due to its status of Endangered, the SEI specific to this project infrastructure, which has a small footprint and is of low impact, is rated as medium. However, if additional clearing occurs within this patch of vegetation, this score is likely to increase to high.

6.3.2. Intact Boland Granite Fynbos

The intact patch of Boland Granite Fynbos to the west of the impacted site is highly likely to support the occurrence of CR, EN and VU plant species (Refer to table 4.1 for a list of species that have a high likelihood of occurrence) and as such has a CI of Very High. FI is rated as Very High due to this vegetation forming part of the indigenous vegetation found on the Simonsberg Mountain range.

As with the near intact Boland Granite Fynbos, Receptor Resilience for this type of infrastructure which is typically low impact is rated as high, especially if soil layers are not disturbed. Overall SEI for this vegetation type is high.

6.3.3. Transformed Land

The agricultural land surrounding the near-intact and degraded Boland Granite Fynbos is classified as transformed and thus has a very low CI and medium FI. Receptor resilience is considered very high as this area can easily be rehabilitated back to its current state. Overall SEI is very low.

The method used to assess site sensitivity has been described in Section 2.4 above. Table 6.1 provides a summary of how each tower was assessed and Figure 6.2 illustrates the sensitivity at each site.

Table 6.2: Evaluation of Site Ecological Importance (SEI) of habitat and SCC

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience	SEI
Near-intact and Degraded Boland Granite Fynbos	**High** One confirmed vulnerable species listed under criterion B and one vulnerable species listed under criterion A were recorded within or directly adjacent to the project site. In addition, it is calculated that approximately 0.08% of this endangered vegetation type has been lost to project infrastructure.	**High** The impacted patch of Boland Granite Fynbos is small (1.6 ha) and has experienced edge effects due to being surrounded by agricultural land on three of its four sides. However, there is good habitat connectivity on its western side to intact Degraded Boland Granite Fynbos allowing ecological processes to continue. The impacted Boland Granite Fynbos	**High** Due to the small footprint of the project infrastructure within this vegetation type (15% of the patch was cleared for the tents and 0.08% of the remaining extent of this vegetation type), the vegetation present within the area identified as near-intact and degraded Boland Granite Fynbos is likely to recover to its current state relatively quickly (5-10 years). However, this is only if the alien invasive species are removed from the area. Species diversity is likely to increase if alien species are managed as seed dispersal into the project site from the neighbouring area to the west is possible and there has been limited impact to the topsoil	**MEDIUM**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience	SEI
		also has good rehabilitation potential.	within the site other than where each tent is located. Although this vegetation type has a high sensitivity, the SEI specific to this project infrastructure, which has a small footprint and is of low impact, for near-intact Boland Granite Fynbos is Medium. However, if additional clearing occurs within this vegetation this score will increase to high.	
Intact Boland Granite Fynbos	**Very High**	**High**	**High**	**HIGH**
	The intact patch of Boland Granite Fynbos to the west of the impacted site is highly likely to support the occurrence of CR, EN and VU plant species (Refer to Table 4.1).	This vegetation occurs on the lower slopes of the Simonsberg Mountains. The vegetation on the mid to upper slopes is indigenous although there is infestation of alien invasive plant species. This area has good habitat connectivity with functional ecosystems and there are limited signs of disturbance.	For reasons discussed above, the resilience related to impacts associated with this project has been determined to be High.	
Transformed Land	**Very Low**	**Medium**	**Very High**	**VERY LOW**
	No natural habitat remaining and no confirmed and highly unlikely populations of SCC and/or range	Transformed agricultural land with low rehabilitation potential.	Habitat can be easily returned to its current state.	

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience	SEI
	restricted species.			

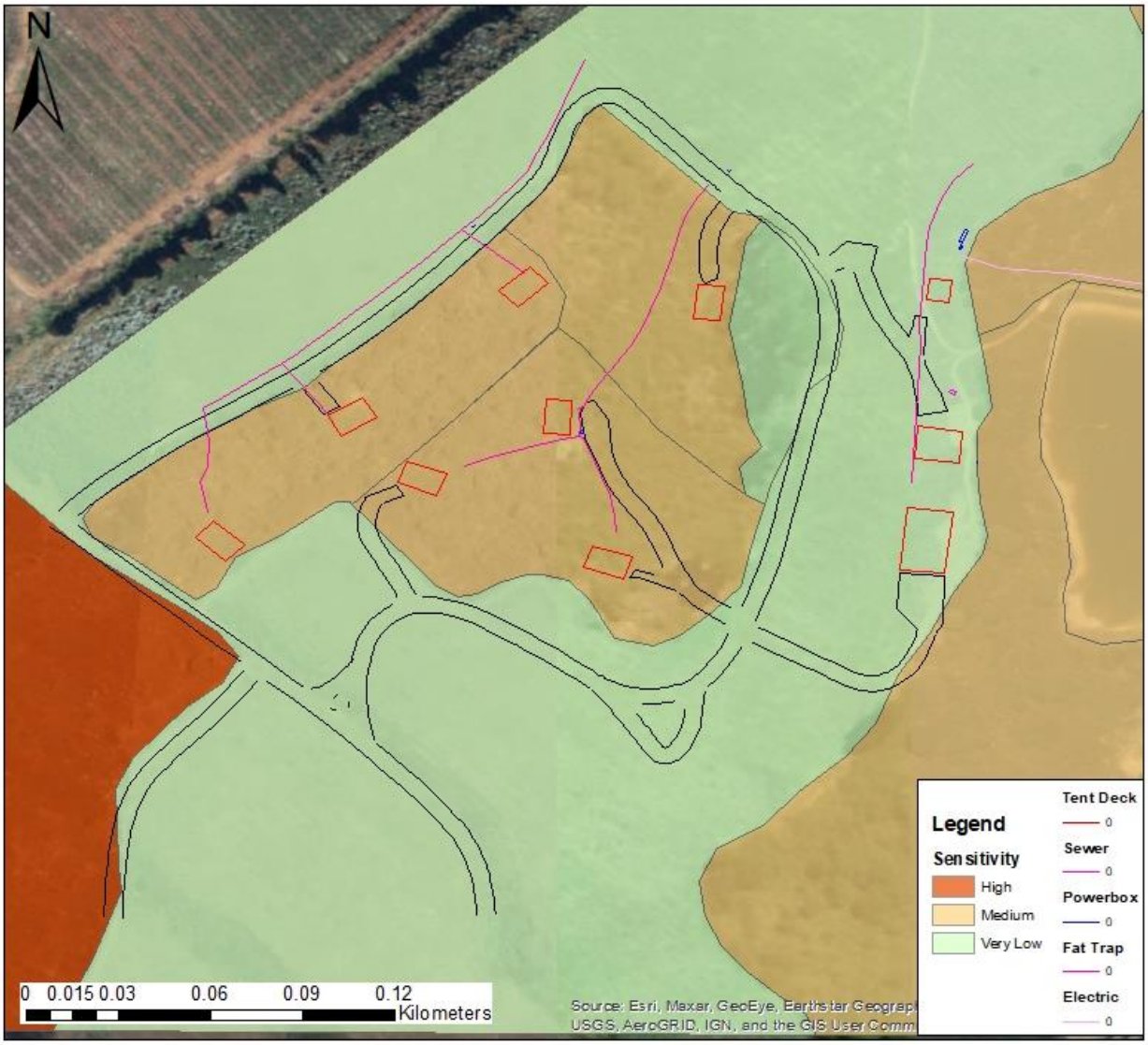

Figure 6.2: SEI map of the project area based on data collected from the field survey. Note that the SEI will change depending on the type of impact.

7. IMPACT ASSESSMENT

7.1. Construction and Operational Phase Impacts

Since construction of the site started without Environmental Authorisation and this ecological assessment was undertaken once clearing and construction had commenced, historic satellite imagery was consulted to assist with determining potential impacts (Figure 7.1). The imagery shows that the impacted patch of Boland Granite Fynbos has remained almost static since at least 2011 and the area to the immediate north, east and south has been used for agriculture for just as long. Edge effects on this patch of fynbos, which are likely to have contributed to the introduction of alien invasive species, have been present since before the development of the site in 2019.

Four impacts have been identified for the project. Three of these are of moderate significance prior to implementing mitigation measures and one is of low significance. However, if the suggested mitigation measures are implemented this can be reduced to one moderate impact and three low impacts.

Figure 7.1: Historical satellite imagery of the project site for 2011, 2014, 2018, 2019 (construction), 2020 and 2021.

Table 7.1: Construction and operational phase impacts

Impact 1:	Loss of extent near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos
Nature of impact:	The clearing of vegetation for the construction of seven tent platforms (three in near-intact granite fynbos and four within degraded granite fynbos) and associated access paths has resulted in the permanent loss of 0.24 ha of vegetation. This accounts for 15% of the total impacted patch of natural vegetation and 0.08% of the total remaining extent of this vegetation type within the Western Cape Province.
Extent of impact:	Low
Duration of Impact:	High
Intensity (severity) of Impact:	Moderate Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	There are no known similar developments within the immediate area and as such the cumulative impact is not applicable in this instance.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Moderate
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	It is noted that clearing of natural vegetation for the construction of the tent platforms and access paths has been kept to a minimum thus reducing the impact of the project footprint. No further clearing should occur within this vegetation type. Only species indigenous to the vegetation associated with Simonsberg Mountain should be planted within this vegetation type. It is recommended that the vegetation around the tent platforms is restored using species indigenous to Boland Granite Fynbos to increase diversity.
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Although the diversity at the site can be improved based on the recommended mitigation measures, the loss of extent of this vegetation type, which is listed as Endangered, is permanent and cannot be mitigated unless the impacted areas are restored to their natural state. As such, this impact will remain Moderate even after mitigation.

	Moderate
No-Go Alternative	If the project did not go ahead, there would be no loss of vegetation within this patch and the impact under the no-go alternative would be negligible.
Impact 2:	**Loss of Plant Species of Conservation Concern**
Nature of impact:	There are two confirmed SCC (one within the site and one directly adjacent to the site) that were recorded during the field survey as well thirteen SCC that have a high likelihood of occurrence within or adjacent to the site. The clearing of vegetation within the impacted Boland Granite Fynbos has resulted in the loss of biodiversity and may have resulted in the loss of some SCC.
Extent of impact:	Low
Duration of Impact:	Medium
Intensity (severity) of Impact:	Moderate Negative
Probability of occurrence:	Moderate
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	There are no known similar developments within the immediate area and as such the cumulative impact is not applicable in this instance.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Moderate
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	It is noted that clearing of natural vegetation for the construction of the tent platforms and access paths has been kept to a minimum thus reducing the impact of the project footprint. No further clearing should occur within this vegetation type. Only species indigenous to the vegetation associated with Simonsberg Mountain should be planted within this vegetation type. It is recommended that *Protea burchelli* and *Hermannia rugosa* are replanted within the impacted patch of Boland Granite Fynbos.
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Given that the footprint of the development is small (15% of the patch of Boland Granite Fynbos), if the recommended mitigation measures are implemented this impact can be reduced to low. Low
No-Go Alternative	If the project did not go ahead, there may be some loss of SCC within this patch due to the displacement of species by alien

	invasive plant species. The impact under the no-go alternative would be low.
Impact 3:	**Disruption of Ecosystem Function and Process**
Nature of impact:	Habitat fragmentation occurs when a large expanse or strip of habitat is transformed such that the natural landscape is cut into smaller patches that are isolated from each other resulting in a reduction in ecological functioning, species diversity and species richness. This impact occurs when areas are cleared resulting in reduced movement due to the absence of ecological corridors. The impacted patch of Boland Granite Fynbos has been exposed to some habitat fragmentation and edge effects prior to the construction of the project infrastructure as the area surrounding it has been previously used for agriculture. The clearing of an additional 15% of this patch will have further contributed to fragmentation. However, it should be noted that clearing for the construction of access roads and the tent platforms appears to have been kept to a minimum as the vegetation surrounding these areas is well established indicating minor impacts. Further to this, the platforms are raised off the ground allowing for free the movement of faunal species and dispersal of seeds. So, although some habitat fragmentation has occurred this has been minimised by the low-impact design of the tent platforms.
Extent of impact:	Low
Duration of Impact:	Low
Intensity (severity) of Impact:	Low Negative
Probability of occurrence:	Medium
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	Habitat fragmentation within this patch has already occurred prior to construction. The cumulative impact associated with the construction of infrastructure in relation to the existing impact is therefore low.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	High
Proposed mitigation:	No further clearing should occur within this vegetation type. Only species indigenous to the vegetation associated with Simonsberg Mountain should be planted within this vegetation type. Access roads should not be widened.

	Any future infrastructure required for this site must be located within the transformed area (fallow land).
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
No-Go Alternative	If the project did not go ahead, there may be increased habitat fragmentation if the alien invasive plant species that are present were not managed. The impact under the no-go alternative would be low.
Impact 4:	**Infestation of Alien Plant Species**
Nature of impact:	There are seven alien invasive species present within the site. These are common in areas that have been recently disturbed such as along the access roads, paths and around the tent platforms. There is also evidence of alien invasive species tree species such as *Acacia longifolia* and *Pinus pinaster* within the patch. It is highly probable that this patch was already infested with alien species given the size of some of these and because areas adjacent to the site show evidence of infestation. Nevertheless, the construction of the infrastructure within this patch has exacerbated the level of infestation.
Extent of impact:	Low
Duration of Impact:	Low
Intensity (severity) of Impact:	High Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	Medium
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Moderate
Degree to which the impact can be mitigated:	High
Proposed mitigation:	An alien invasive management plan must be included in the EMPr. With the exception of the large pine trees on the north eastern corner of the site which could be heritage trees (this needs to be confirmed) all category 1b species must be removed. The removal will need to be managed and maintained until these species have been eradicated. It is suggested that locally indigenous species specific to this vegetation type are planted in the gaps left by the removal of alien invasive plants. No exotic species should be planted within this patch of fynbos.

Cumulative impact post mitigation:	Medium
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	The removal and management of alien invasive species, especially in a small area of 1.6ha is easily manageable and as such this impact is easily mitigated. Low
No-Go Alternative	If the project did not go ahead, infestation of alien invasive plant species is likely to continue. The impact under the no-go alternative would be low neagtive.
Impact 5:	**Disturbance to terrestrial faunal species due to construction and operation of the tented camp**
Nature of impact:	Habitat clearing for the construction of the tent platforms and access paths would have created a disturbance to faunal species using the site for foraging, shelter and breeding.
Extent of impact:	Low
Duration of Impact:	Low
Intensity (severity) of Impact:	Moderate Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	There are no known similar developments within the immediate area and as such the cumulative impact is not applicable in this instance.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Habitat clearing for the construction of the tent platforms and access paths has been kept to a minimum thus reducing the impact of the project footprint. The tents have also been elevated to allow for faunal movement and external lighting kept to a minimum. It is unknown if clearing was done by machinery or by hand and if slow moving species were moved out of harm's way prior to clearing.
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	The impact associated with habitat clearing and disturbance to faunal foraging, shelter and breeding sites has already occurred and no mitigation will reverse it.

	N/A
No-Go Alternative	If the project did not go ahead, there would be no loss of habitat or disturbance of faunal species within this patch and the impact under the no-go alternative would be negligible.

7.2. Decommissioning Phase Impacts

It is anticipated that the tented camp will be decommissioned after five years of use. Impacts associated with the decommissioning phase are similar to the construction phase and will include loss of vegetation, infestation of alien plant species and impacts associated on faunal populations as a consequence of increased noise from heavy machinery.

Impact 6:	**Loss of extent near-intact Boland Granite Fynbos and degraded Boland Granite Fynbos**
Nature of impact:	The decommissioning of the tented camp and removal of tent platforms and infrastructure will require laydown areas and will disrupt vegetation that has re-established around the areas that were disturbed during the construction phase. Given the nature of the tents and the platforms, it is anticipated that the removal of these can be done with limited impact to the surrounding vegetation.
Extent of impact:	Low
Duration of Impact:	Low
Intensity (severity) of Impact:	Low Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	There are no known similar developments within the immediate area and as such the cumulative impact is not applicable in this instance.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	High
Proposed mitigation:	Remove the tents and platforms using the access path created to access each tent. The foundations must be left intact to reduce disturbance. Rehabilitate each tent site that occurs within previously indigenous vegetation. back to Boland Granite Fynbos using locally indigenous species representative of the site.
Cumulative impact post mitigation:	N/A

Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Impact 7:	**Infestation of Alien Plant Species**
Nature of impact:	There are seven alien invasive species present within the site. These are common in areas that have been recently disturbed such as along the access roads, paths and around the tent platforms. There is also evidence of alien invasive species tree species such as *Acacia longifolia* and *Pinus pinaster* within the patch. Disturbance associated with the decommissioning of the site can lead to further infestation of existing alien invasive species.
Extent of impact:	Low
Duration of Impact:	Low
Intensity (severity) of Impact:	High Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	Medium
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Moderate
Degree to which the impact can be mitigated:	High
Proposed mitigation:	As per the recommendation above, an alien invasive management plan must be included in the EMPr and must be implemented for the duration of the project and up to at least five years after decommissioning phase or up until a botanist signs off that the site has been adequately rehabilitated and infestation of alien species is no longer a threat.
Cumulative impact post mitigation:	Medium
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Impact 5:	**Disturbance to terrestrial faunal species due to construction and operation of the tented camp**
Nature of impact:	Habitat clearing for the decommissioning of the tent platforms and access paths would have created a disturbance to faunal species using the site for foraging, shelter and breeding.
Extent of impact:	Low

Duration of Impact:	Low
Intensity (severity) of Impact:	Moderate Negative
Probability of occurrence:	High
Degree to which the impact can be reversed:	Reversible
Degree to which the impact may cause irreplaceable loss of resources:	Low
Cumulative impact prior to mitigation:	There are no known similar developments within the immediate area and as such the cumulative impact is not applicable in this instance.
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	Areas that were previously natural habitat prior to construction must be rehabilitated back to their original state.
Cumulative impact post mitigation:	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

8. CONCLUSIONS AND RECOMMENDATIONS

8.1. Conclusions

A tented camp was constructed within an area of natural vegetation listed as Endangered by the National Biodiversity Assessment (2018). This vegetation type typically has a high number of SCC and is considered well protected. Based on the data available in the NBA, it is estimated that approximately 299ha of natural vegetation remain within the Western Cape Province. The patch of impacted Boland Granite Fynbos that the tented camp occurs within is 1.6ha or 0.54% of the total extent of remaining natural habitat. The area impacted by the infrastructure associated with the tented camp (tent platforms, access roads, paths) is approximately 0.24ha or 0.08% of the total remaining extent.

Based on the field survey and the low impact associated with the nature of the tented camp, which has a small footprint and due to the raised platforms allows for certain ecological processes to continue uninterrupted, the SEI for the site was determined to be of moderate sensitivity. However, if any further clearing is to occur within this vegetation patch it is likely that the SEI will increase to high.

Impacts associated with this infrastructure were typically of moderate significance prior to mitigation with all but one being reduced to low sensitivity after mitigation measures are implemented.

8.2. Recommendations

It is recommended that the following conditions are included in the Final EMPr as well as the conditions of the Environmental Authorisation (EA), if granted:

- No further construction activities may occur until Environmental authorisation has been received and the required permits are in place;
- No further clearing within the impacted Boland Granite Fynbos patch may occur for additional roads or tents;
- No infrastructure must be placed in areas of high sensitivity.
- If any SCC are to be impacted, these must be relocated to nearest appropriate habitat;
- It is recommended that the 1.6ha patch that the project infrastructure is located within is restored to represent natural Boland Granite Fynbos and as such a restoration plan for the site should form part of the EMPr. This includes removal of aliens and re-introduction of representative species;
- Similarly, alien species should be removed from the area to the west of the impacted patch to ensure that these do not spread downhill and back into the area around the tented camp.
- Alien invasive plant clearing should be undertaken in line with an Alien Vegetation Management plan, which should be compiled as part of the EMPr and implemented with immediate effect;

- Only indigenous plant species typical of the local vegetation and approved by a botanist should be used for rehabilitation purposes.
- Once the tent platforms within the areas of indigenous vegetation have been decommissioned, the sites must be restored back to Boland Granite Fynbos using only locally indigenous species representative of the site.

8.3. Ecological Statement and Opinion of the Specialist

The impacted Boland Granite Fynbos vegetation patch is not pristine and has been subjected to edge effects and likely infestation of alien plant species for several years. Although further loss of an endangered vegetation type, even if degraded, should be avoided, the impact associated with the tented camp has generally been moderate to low given the small footprint of the project and the limited disturbance of soil, the considered clearing of the site by the contractors (which appears to have been limited to the infrastructure footprint) and the current condition of the vegetation on site.

If the remaining patch of this vegetation is managed appropriately through the removal of alien invasive plant species and the restoration of the remaining patch (not impacted by the access roads and tent platforms) to its natural state, this will improve diversity within the site and contribute towards the conservation of the remaining portion of this vegetation type within the impacted area. The specialist therefore recommends that disturbed areas not required for the tented camp, are restored using locally indigenous species representative of Boland Granite Fynbos. Further to this, once the tented camp has been decommissioned, the areas under the tent platforms and the access routes to each platform must be restored.

Based on the SEI and the identified impacts, the specialist has determined that these are acceptable provided the mitigation recommendations are implemented.

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APPENDIX 1: LIST OF SPECIES RECORDED ON SITE

Family	Species	Red List	PNCO status	Invasive Status
FABACEAE	*Acacia longifolia*	Weed	-	1b
RUTACEAE	*Adenandra marginata*	LC	-	-
FABACEAE	*Aspalathus ciliaris*	LC	-	-
IRIDACEAE	*Chasmanthe floribunda*	LC	Schedule 4	-
ROSACEAE	*Cliffortia polygonifolia*	LC	-	-
ROSACEAE	*Cliffortia ruscifolia*	LC	-	-
ASTERACEAE	*Dicerothamnus rhinocerotis*	LC	-	-
BORAGINACEAE	*Echium plantagineum*	weed	-	1b
ERICACEAE	*Erica plukenetii*	LC	Schedule 4	-
ASTERACEAE	*Helichrysum petiolare*	LC	-	-
MALVACEAE	*Hermannia hyssopifolia*	LC	-	-
MALVACEAE	*Hermannia rugosa*	VU	-	-
HYACINTHACEAE	*Lachenalia lutea*	LC	Schedule 4	-
HYACINTHACEAE	*Lachenallia orchidiodes*		Schedule 4	-
PROTEACEAE	*Leucadendron salicifolium*	LC	Schedule 4	-
FABACEAE	*Lupinus angustifolium*	weed	-	-
ASTERACEAE	*Metalasia densa*	LC	-	-
POLYGALACEAE	*Muraltia heisteria*	Lc	-	-
SCROPHULARIACEAE	*Oftia africana*	LC	-	-
ASTERACEAE	*Osteospermum moniliferum*	LC	-	-
GERANIACEAEA	*Pelargonium myrrhifolium cf. ssp myrrhifolium*	LC	-	-
PHYTOLACCACEAE	*Phytolacca octandra*	Weed	-	1b
	Pinus	Weed	-	1b unless a heritage tree
PITTOSPORACEAE	*Pittosporum undulatum*	Weed	-	1b
FABACEAE	*Podalyria myrtillifolia*	LC	-	-
PROTEACEAE	*Protea burchelli*	VU	Schedule 4	-
PROTEACEAE	*Protea nitida*	LC	Schedule 4	-
ANACARDIACEAE	*Searsia angustifolia*	LC	-	-
SOLANACEAE	*Solanum mauritianum*	Weed	-	1b
ASTERACEAE	*Stoebe plumosum*	LC	-	-
VERBENACEAE	*Verbena bonariensis*	Weed	-	1b

APPENDIX 2: SPECIES LIKLIHOOD OF OCCURRENCE

Table 1: List of Critically Endangered, Endangered and Vulnerable species that have a medium and low likelihood of occurrence within the project site.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
APONOGETONACEAE	*Aponogeton angustifolius*	NT	Medium	This species is localised to seasonal streams and wetlands (Mitshali *et al.,* 2009). It might occur within the adjacent dam and wetland. However, if it does, it has not been impacted by project activities which have been limited to the terrestrial environment.
ASTERACEAE	*Arctotis angustifolia*	EN	Medium	This specie is typically associated with Lowland acid fynbos, below 100 m. Although found on Boschendal Estate (Helme, 2019) it was associated with alluvium east of the Dwars River. The likelihood of occurrence within the project site is medium due to the lack of alluvium within the site.
IRIDACEAE	*Aristea lugens*	EN	Medium	Over 90% of this species habitat has been lost and it is now found in agricultural and urban areas (Raimondo, 2006). This species occurs on Renosterveld in low granitic hills and there is therefore a medium likelihood of occurrence at the project site.
FABACEAE	*Aspalathus aculeata*	VU	Medium	This species prefers nutrient rich soils and is dependent on fires for regeneration. There are an estimated 36 small, severely fragmented subpopulations remaining. Approximately 80 to 90% of this species' habitat has been lost to agricultural and urban expansion and urban expansion. It is likely this species was once present on site but its likelihood of occurrence within the impacted Boland Granite Fynbos patch, which has been exposed to edge effects for over 20 years and shows infestation of alien invasive species, is medium. This species was not recorded by N. Helme (2019) within the Boschendal Estate.
FABACEAE	*Aspalathus araneosa*	VU	Medium	This species was formerly once quite common but now less than ten populations remain. It is likely that this species occurs within the intact Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species. This species was not recorded by N. Helme (2019) within the Boschendal Estate.
FABACEAE	*Aspalathus attenuata*	EN	Medium	This species is known from five locations and is threatened by the loss of habitat for cultivation of vineyards, wheat and deciduous fruit. It is possible that this species occurs within the intact Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species. This species was not recorded by N. Helme (2019) within the Boschendal Estate.
FABACEAE	*Aspalathus lebeckioides*	VU	Medium	This species is known from fewer than 10 locations and is threatened by the loss of habitat for the cultivation of vineyards, wheat and deciduous fruit and infestation of alien species. It is possible that this species occurs within the intact Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species. This species was not recorded by N. Helme (2019) within the Boschendal Estate.
FABACEAE	*Aspalathus muraltioides*	EN	Medium	This species is known from fewer than 7 locations and is threatened by the loss of habitat. It is possible that this species occurs within the intact Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species. It should also be noted that previous studies did not record this species within the Boschendal Estate (Helme, 2019).
ROSACEAE	*Cliffortia phillipsii*	VU	Medium	Fewer than five populations are known, two of which are extinct. It is possible that this species occurs within the intact

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species. It should also be noted that previous studies did not record this species within the Boschendal Estate (Helme, 2019).
IRIDACEAE	*Codonorhiza azurea*	EN	Medium	This species 13 to 15 populations of this species remain between Stellenbosch, Malmesbury and Saron. This species is locally extinct on the Cape Peninsula. It is possible that this species occurs within the intact Boland Granite Fynbos on the slopes of the mountain west of the impacted site but this likelihood drops to medium for the impacted patch itself as this area has been exposed to edge effects for a number of years and shows infestation of alien and ruderal species which are likely to have displaced it.
RUSCACEAE	*Sensitive species 364*	VU	Medium	This species occurs from the Cape Flats to Vanrhynsdorp but populations in the southern range of its extent are mostly extinct (Helme and Raimondo, 2007). The likelihood of occurrence within the general project area is Medium.
IRIDACEAE	Sensitive species 458	VU	Medium	This species is associated with clay flats and lower slopes. It has an EOO and is only know from eight locations (Raimondo and Goldblatt, 2006). The likelihood of occurrence within the impacted area is medium.
AIZOACEAE	*Lampranthus dilutus*	EN	Medium	The survey of the patch of degraded Boland Fynbos that has been impacted by the infrastructure did not appear to have a succulent component present. This fairly small patch of 1.6 ha has had farming activities surrounding it since at least the early 2000's but possibly as far back as the 1980's and has therefore been exposed to edge effects for some time. Further to this, a previous baseline survey undertaken by Helme (2019) did not record this species within the Boschendal Estate. The likelihood of occurrence of this species at the site is Medium.
AIZOACEAE	*Lampranthus peacockiae*	VU	Medium	The survey of the patch of degraded Boland Fynbos that has been impacted by the infrastructure did not appear to

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				have a succulent component present. This fairly small patch of 1.6 ha has had farming activities surrounding it since at least the early 2000's but possibly as far back as the 1980's and has therefore been exposed to edge effects for some time. Further to this, a previous baseline survey undertaken by Helme (2019) did not record this species within the Boschendal Estate. The likelihood of occurrence of this species at the site is Medium.
PROTEACEAE	*Leucospermum gueinzii*	EN	Medium	This species is associated with granite-derived clay soils near streams and in kloofs, 300-1000 m. The likelihood of occurrence of this species within the impacted area is medium. However, it should be noted that this species was not recorded within the impacted area.
ASTERACEAE	*Muraltia macropetala*	VU	Medium	This species is associated with clay flats in renosterveld and Boland Granite Fynbos. However, this species was not recorded during the field survey nor was it recorded in the baseline survey for Boschendal undertaken by Helme (2019). The likelihood of occurrence is therefore Medium.
FABACEAE	*Otholobium rotundifolium*	VU	Medium	This species is associated with montane fynbos occurring on granite and shale slopes (Helme and Raimondo, 2005). Although habitat exists for this species within the project site, it was not recorded during the field survey nor in the baseline survey of Boschendal Estate undertaken in 2019 (Helme, 2019). The likelihood of occurrence within the site is therefore Medium.
GERANIACEAE	Sensitive species 676	VU	Medium	This species is associated with loamy alluvial sands, and clay flats and its distribution range coincides with the project area (Helme and von Satden, 2013). This species was recorded by Helme (2019) on alluvium east of Dwars River. Since this species is also associated with clay the likelihood of occurrence at the project site has been rated as medium.
GERANIACEAE	Sensitive species 690	VU	Medium	This species is associated with clay flats (Raimondo and Helme, 2007). The likelihood of occurrence of this species on the slope has therefore been rated as medium.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
RHAMNACEAE	*Phylica thunbergiana*	EN	Medium	This species is associated with renosterveld, on lower clays slopes and flats (Raimondo and Helme, 2006). Although there are elements of Renosterveld present within the site, the project area is primarily comprised of fynbos. This species is also known from only 10 small, fragmented populations. The likelihood of occurrence of this within the project site is therefore listed as medium
RESTIONACEAE	*Restio duthieae*	VU	Medium	This species is associated with slight seepages on loamy soils derived from granites or coastal sand (Raimondo and Turner, 2007). Since no seeps were observed on site the likelihood of occurrence is medium.
IRIDACEAE	Sensitive species 766	EN	Medium	Although suitable habitat is present for this species, it is only known from five locations which include the lower slopes of Paarl Mountain, Breede River Valley and Du Toits Kloof. It is unlikely that this species occurs within the project site and the likelihood of occurrence is conservatively rated as medium.
FABACEAE	*Xiphotheca lanceolata*	VU	Medium	This species is associated with renosterveld-fynbos mosaic (van der Colff *et al.,* 2015). The likelihood of occurrence within the project site is medium.
ASTERACEAE	*Arctotis angustifolia*	CR	Low	Only two known and severely fragmented populations remain (Helme *et al.,* 2009). This species is unlikely to occur within the 1.6 ha impacted patch of Boland Granite Fynbos.
IRIDACEAE	Sensitive species 72	VU	Low	The likelihood of this species occurring within the project area is low as it is outside of its known distribution. This species is known to occur in the hills between Darling and Mamre as well as the Tulbagh Valley. There are some isolated records from Wellington, Klapmuts and Bottelary Hills.
IRIDACEAE	Sensitive species 78	EN	Low	This species is typically found between Malmesbury and Darling and is only know from four locations. The likelihood of it occurring within the project site which has been exposed to edge effects on three of its sides is low.
IRIDACEAE	Sensitive species 85	CR	Low	This species is associated with seasonally wet clay flats. The likelihood of

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				occurrence within the project site is low as the required habitat is not available.
IRIDACEAE	Sensitive species 96	EN	Low	This species is associated with seasonally moist areas on clay flats and slopes within renosterveld and shale fynbos. The likelihood of occurrence within the project site is low as the required habitat is not available.
RESTIONACEAE	*Cannomois arenicola*	EN	Low	This species is associated with coastal lowlands occurring on well drained sandy plains. The likelihood of occurrence within the project site is low as the required habitat is not available.
PROTEACEAE	*Diastella buekii*	CR	Low	Three to four populations remain within the Berg River Valley between Franschhoek and Paarl. This species is associated with moist areas on alluvial sandy flats. This species is unlikely to occur within the impacted path of Boland Granite Fynbos as the preferred habitat is not available.
ORCHIDACEAE	Sensitive species 293	EN	Low	Although suitable habitat is available, this species is currently only known from two sub-populations. Since the project site is outside of this species known range, the likelihood of occurrence within the project area is low.
ORCHIDACEAE	Sensitive species 299	CR	Low	This species is currently restricted to the area between Wellington and Ceres (von Staden *et al.*, 2012). Since the project area occurs outside of the known distribution, the likelihood of occurrence is low.
AIZOACEAE	*Drosanthemum hispifolium*	VU	Low	This species occurs from Clanwilliam to Koeberg and is associated with flats in loamy soil. It is unlikely to occur within the impacted site as habitat is not available.
RESTIONACEAE	*Elegia squamosa*	EN	Low	This species has become very rare due to habitat loss. It is associated with seasonally damp clay flats and lower slopes with heavy soils. It is unlikely to occur within the impacted project site as no available habitat is present.
AIZOACEAE	*Erepsia patula*	VU	Low	Known from less than 10 locations between Wellington and Somerset West. There was no evidence of succulent species within or adjacent to the site and its likelihood of occurrence is this low.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
AIZOACEAE	*Erepsia ramosa*	VU	Low	Once fairly common, populations of this species have declined. This species occurs from Piketberg to the Cape Flats. There was no evidence of succulent species within or adjacent to the site and its likelihood of occurrence is this low.
ERICACEAE	*Erica abietina subsp. perfoliosa*	VU	Low	This localised species has an EOO of 11km^2 within the Jonkershoek Valley. It is associated with moist, lower south to southwest facing granite slopes. The project area faces east and is dry Boland Granite Fynbos and is therefore unlikely to provide suitable habitat for this species.
ERICACEAE	*Erica aspalathoides*	VU	Low	This species is typically found on the upper summit slopes of mountains and associated with damp, peaty overhangs and rocky ledges. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
ERICACEAE	*Erica limosa*	VU	Low	This species is associated with peaty accumulate with quartzitic sands ins eeps and wetlands. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	*Geissorhiza erosa*	EN	Low	This species is associated with damp clay flats. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	*Geissorhiza humilis*	VU	Low	This species is associated with fynbos, in coarse, sandy soils. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	*Gladiolus trichonemifolius*	VU	Low	This species is associated with wet sandy flats. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
ISOETACEAE	*Isoetes capensis*	EN	Low	This species occurs within seasonally flooded depressions and in pools on flats with sandy clay soils. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	*Ixia erubescens*	EN	Low	This species is associated with seasonally damp, heavy clay or granitic alluvium.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	*Ixia rouxii*	CR	Low	Although this species used to occur from Porterville to Stellenbosch, only fragmented populations remain near Wellington and Wolseley. As such this species is unlikely to occur within the impacted area.
IRIDACEAE	*Ixia sarmentosa*	EN	Low	This species is associated with seasonally wet, lowland flats and slopes. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
HYACINTHACEAE	Sensitive species 526	EN	Low	This species is associated with seasonally moist, stony clay flats renosterveld (Von Satden *et al., 2019)*. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
HYACINTHACEAE	*Lachnaea uniflora*	VU	Low	This species is associated with sandy flats and sandy areas on lower mountain slopes (Helme *et al., 2006).* Although recorded by Helme (2019) on alluvium on Boschendal Estate, the project area does not provide suitable habitat for this species and its likelihood of occurrence is thus low.
HYACINTHACEAE	*Lachnaea capitata*	VU	Low	This species is associated with acid sand flats that are seasonally damp. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
AIZOACEAE	*Lampranthus filicaulis*	VU	Low	This species is associated with seasonally wet alluvial sands overlaying koffieklip. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
AIZOACEAE	*Lampranthus glaucus*	VU	Low	This species is associated with seasonally waterlogged acid sands. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
AIZOACEAE	*Lampranthus schlechteri*	CR	Low	This species is associated with sandy flats in Swartland Alluvium Fynbos (Klak *et al.*, 2012). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
AIZOACEAE	*Lampranthus sociorum*	EN	Low	The project area does not occur within the specie's distribution range.
PROTEACEAE	*Leucadendron argenteum*	EN	Low	This species is associated with moist, south-facing slopes. Since project site

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				faces east it is unlikely that this species is or was present.
PROTEACEAE	*Leucadendron corymbosum*	VU	Low	This species is associated with wet clay soils in valley bottoms. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
PROTEACEAE	*Leucospermum hypophyllocarpodendron subsp. canaliculatum*	VU	Low	This species is associated with flats with deep sandy soils at elevations between 0 and 200m. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
BORAGINACEAE	*Lobostemon regulareflorus*		Low	This species is associated with moist, shaded kloofs. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
ASTERACEAE	*Metalasia capitata*	VU	Low	This species is associated with acid sand flats. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	Sensitive species 599	VU	Low	This species is associated with seasonally wet flats in sandy soil or rocky alluvium (Goldblatt and Raimondo, 2006). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
IRIDACEAE	Sensitive species 640	VU	Low	This species is associated with seasonally damp depressions at elevations below 300m (Koopman and Raimondoa, 2008). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
ASTERACEAE	Sensitive species 666	VU	Low	This species is associated with shales and sandy flats (von Staden, 2018). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
OXALIDACEAE	Oxalis strigosa	EN	Low	This species is known from two localities between Tygerberg and Stellenbosch (Helme *et al.*, 2012). It's likelihood of occurrence within the project site is thus low.
GERANIACEAE	Sensitive species 697	EN	Low	This species is associated with grassy renosterveld (Raimondo and Helme, 2007). Since the vegetation present was predominantly fynbos with some renosterveld elements, the likelihood of occurrence of this species within the project area is low.
POACEAE	*Pentameris bachmannii*	EN	Low	This species is associated with seasonally waterlogged sands and shales on

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				lowlands (Raimondo and Helme, 2007). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
FABACEAE	*Podalyria argentea*	EN	Low	This species is associated with wet, peaty soil (Schutte-Vlok, and Raimondo, 2012). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
FABACEAE	*Podalyria sericea*	VU	Low	This species is associated with granite outcrops on well-drained, humic, sandy loams (Schutte-Vlok, and Raimondo, 2012). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
PROTEACEAE	*Protea lacticolor*	VU	Low	This species is associated with high altitude shale bands on south and east facing slopes. It typically occurs along stream banks (Rebelo et al., 2019). Although the slope of the project site is east facing, the likelihood of occurrence of this species is low as the site is not adjacent to a river bank.
PROTEACEAE	*Protea rupicola*	EN	Low	This species is associated with high altitude summit ridges occurring in rocky cracks and crevices where it is protected from fire. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
FABACEAE	*Psoralea alata*	VU	Low	This species is associated with seasonally damp clay soils on lowland and flat areas (von Staden and Helme, 2012). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
FABACEAE	*Psoralea fascicularis*	EN	Low	This species is associated with moist areas of lowland fynbos that occur on granite and shale (Stirton *et.al.,* 2018). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
RESTIONACEAE	*Restio paludosus*	VU	Low	This species is associated with seasonally wet sands (Turner et al., 2007). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
RESTIONACEAE	*Restio papillosus*	VU	Low	This species is associated with coastal flats and slopes occurring on sand and clay soil (Turner, 2007). Given that the site is not located near the coast, the likelihood of occurrence is low.

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
RESTIONACEAE	*Restio pratensis*	EN	Low	This species is associated with seasonally waterlogged areas (Turner and Linder, 2007). Given that the site is typically dry due to its position on the slope, the likelihood of occurrence is low due to the lack of suitable habitat.
RESTIONACEAE	*Restio rigoratus*	EN	Low	This species is associated with seasonally waterlogged areas that typically overlay shale or ferricrete (Helme et al., 2014). Given that the site is typically dry due to its position on the slope, the likelihood of occurrence is low due to the lack of suitable habitat.
AIZOACEAE	*Ruschia geminiflora*	VU	Low	This species is associated with clay flats and alluvial sands, neither of which are present within the project site (Helme *et al.,* 2008). Additionally, there was no succulent component observed within the project area or surrounds during the field survey. As such the likelihood of occurrence is low.
AIZOACEAE	*Ruschia schollii*	EN	Low	This species is associated with lowland shale and granite derived soils (Helme and von Staden, 2006). Although habitat for this species is present, there was no succulent component observed within the project area or surrounds during the field survey. As such the likelihood of occurrence is low.
ORCHIDACEAE	Sensitive species 718	VU	Low	This species is associated with moist flats and slopes in coarse, often stony, sandstone-derived soils (von Staden, 2006). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
Iridaceae	Sensitive species 764	CR	Low	This species occurs within granite derived gritty clay and is typically associated with renosterveld (Dorse *et al.,* 2006). This species is only known from two locations, one near Stellenbosch and one near Bottelary Hills, and has a very small EOO 20km^2. The likelihood of occurrence at the impacted site is therefore low.
PROTEACEAE	*Serruria pinnata*	CR	Low	This species is associated with alluvial fynbos on the lowlands adjacent to renosterveld (Rebelow *et al., 2015).* There are fewer than 20 mature individuals remaining in three isolated populations. Given this specie's status it

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				is unlikely to occur within the project area.
Proteaceae	*Serruria stellata*	VU	Low	This species is associated with high altitude sandy flats (Rebelo *et al.,* 2019). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
Aizoaceae	*Skiatophytum skiatophytoides*	VU	Low	This species is associated with lowland coastal fynbos (von Staden *et al.,* 2016). Since the project site is not near the coast, the likelihood of occurrence is low.
Aizoaceae	*Skiatophytum tripolium*	VU	Low	This species is associated with lowland coastal fynbos (von Staden *et al.,* 2016). Since the project site is not near the coast, the likelihood of occurrence is low.
ASPHODELACEAE	Sensitive species 744	VU	Low	This species is associated with damp, loamy sands and typically occurs on the lower mountain slopes and flats. The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
CYPERACEAE	Trianoptiles solitaria	EN	Low	This species is associated with damp depressions in acidic sand (von Witt et al., 2015). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
HAEMODORACEAE	Wachendorfia brachyandra	VU	Low	This species is associated with damp sandstone or granites (Raimondo et al., 2007). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
Iridaceae	Sensitive species 772	CR	Low	This species is associated with seasonally wet clay and loamy alluvial flats (Goldblatt et al., 2013). Although this species was recorded by Helme (2019) on alluvium east of Dwars River, the likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
FABACEAE	*Xiphotheca reflexa*	EN	Low	This species is associated with sandy plains (Victor *et al.,* 2005). The likelihood of occurrence at the impacted site is low due to the lack of suitable habitat.
AIZOACEAE	*Antimima aristulata*	VU	Low	There are fewer than 20 populations of this species remaining in severely fragmented habitats (Raimondo *et al.,* 2006).

Family	*Scientific Name*	Red List Status	Probability of occurrence on site	Comment
				The survey of the patch of degraded Boland Fynbos that has been impacted by the infrastructure did not appear to have a succulent component present. This fairly small patch has had farming activities around it since at least the early 2000's but possibly as far back as the 1980's and has therefore been exposed to edge effects for some time.

APPENDIX 3: IMPACT ASSESSMENT METHODOLOGY

EVALUATION METHODS FOR ENVIRONMENTAL IMPACTS

The evaluation method for determining significance of impacts is shown below.[1]

Note that an adjustment was made, which involved changing the consequence column to the significance column, due to the fact that probability should not necessarily determine significance, as, for example, catastrophic events would be highly significant, even though the probability of such an event occurring is low.

Definitions of or criteria for environmental impact parameters

The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

(a) Extent (spatial scale):

Ranking criteria

L	M	H
Impact is localized within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

Take into consideration:
- Access to resources; amenity
- Threats to lifestyles, traditions and values
- Cumulative impacts, including possible changes to land uses at and around the site.

(b) Duration:

Ranking criteria

L	M	H
Quickly reversible, less than project life, short term (0-5 years)	Reversible over time; medium term to life of project (5-15 years)	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

Take into consideration:
- Cost – benefit economically and socially (e.g. long or short term costs/benefits)

(c) Intensity (severity):

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat/biodiversity/resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/ diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g. pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement
Community response	Vigorous	Widespread complaints	Sporadic complaints	No observed reaction	Some support	Favourable publicity

[1] (Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes

Take into consideration:

- Cost – benefit economically and socially (e.g. high nett cost = substantial deterioration)
- Impacts on human-induced climate change
- Impacts on future management (e.g. easy/practical to manage with change or recommendation)

(d) Probability of occurrence:

Ranking criteria

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

The specialist study must attempt to quantify the magnitude of impacts and outline the rationale used. Where appropriate, international standards are to be used as a measure of the level of impact.

(e) Status of the impact:

Describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

Based on a synthesis of the information contained in (a) to (e) above, the specialist will be required to assess the significance of potential impacts in terms of the following criteria:

(f) Significance: (Duration X Extent X Intensity)

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	M	H
		Extent		

Positive impacts would be ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

(g) Degree of confidence in predictions:

State the degree of confidence in the predictions, based on the availability of information and specialist knowledge.

APPENDIX 4: COMMENT ON HABITAT CONDITION

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing/harvesting regimes etc).
Natural	0%	N/A
Near Natural (includes areas with low to moderate level of alien invasive plants)	23%	The patch of Boland Granite Fynbos that has been impacted by the project is infested with alien invasive species. Based on the historical satellite imagery available for the site and the size of some of the established trees, this appears to have been infested prior to construction. However, the construction of the platforms and upgrading of the ring road have exacerbated this.
Degraded (includes areas heavily invaded by alien plants)	0%	N/A
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	77%	The transformed areas are currently fallow fields covered by ruderal species and Paterson's curse. Previously these areas were used to grow crops.

APPENDIX 5: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Tarryn Barbara Lee Martin

Registration Number: 008745

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **29 January 2014** Expires **31 March 2022**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

RHODES UNIVERSITY

THIS IS TO CERTIFY THAT

TARRYN BARBARA LEE MARTIN

WAS THIS DAY AT A CONGREGATION OF THE UNIVERSITY
ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

WITH DISTINCTION

VICE CHANCELLOR

DEAN OF THE FACULTY OF SCIENCE

REGISTRAR

GRAHAMSTOWN
10 APRIL 2010

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Amber Leah Jackson

Registration number: 100125/12

is registered as a

Candidate Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule I of the Act)

Environmental Science **15 August 2012**

15 August 2012
Pretoria

President

Executive Director

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

SPES BONA

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

UNIVERSITY OF CAPE TOWN MDCCCLXVIII

Hugh Amoore

Registrar

APPENDIX 6: CV

CONTACT DETAILS

Name	**Tarryn Martin**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Botanical Specialist and Environmental Manager
E-mail	tarryn@biodiversityafrica.com
Office number	+27 (0)71 332 3994
Education	2010: Master of Science with distinction (Botany) 2004: Bachelor of Science (Hons) in African Terrestrial Vertebrate Biodiversity 2003: Bachelor of Science
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) **SAAB**: Member of the South African Association of Botanists **IAIASa**: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon and Malawi.

She has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

EMPLOYMENT EXPERIENCE

Director and Botanical Specialist, Biodiversity Africa

July 2021 - present

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant, Branch Manager and Botanical Specialist, Coastal and Environmental Services

May 2012-June 2021

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets
- Cape Town branch manager
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients

- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements, main camp events and assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

November 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counselor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2010

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data
- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University

March 2007 - October 2008

Operations Assistant, Green Route DMC

September 2005 - February 2007

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction

PUBLICATIONS

- Ripley, B.; Visser, V.; Christin, PA.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C_3 and C_4 grasses depends on evolutionary history and frequency of burning but not photosynthetic type. *Ecology.* 96 (10): 2679-2691. 2015
- Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C_4 grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
- Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C3 and C4 subspecies of *Alloteropsis semialata. Journal of Ecology.* 98 (5): 1196 - 1203. 2010
- South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C3 and C4 Panicoid and non-Panicoid grasses to fire. January 2010
- South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C3 and C4 (NADP-ME) grasses to fire. January 2008

COURSES

- Rhodes University and CES, Grahamstown
- EIA Short Course 2012
- Fynbos identification course, Kirstenbosch, 2015.
- Photography Short Course, Cape Town School of Photography, 2015.
- Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

- 2020 – 2021: Project manager for the 2Africa subsea cable ESIA in Mozambique.
- 2020 – 2021: Project manager for the Category B EIA for the Wihinana Graphite Mine, Cabo delgado, Mozambique
- 2020 – 2021: Project manager for the category B exploration ESIA for Sofala Heavy Minerals Mine, Inhambane, Mozambique
- 2020: Critical Habitat Assessment for a graphite mine in Cabo Delgado, Mozambique. This assessment was to IFC standards.
- 2020: Analysed the botanical dataset for Lurio Green Resources and provided comment on the findings and gaps.
- 2020: Biodiversity Management Plan and Monitoring Plan for mine at Pilivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2019: Botanical Assessment for a cocoa plantation, Tanzania. This assessment was to IFC standards.
- 2019: Critical Habitat Assessment, Biodiversity Management Plan and Ecosystem Services Assessment for JCM Solar Farm in Cameroon. This assessment was to IFC standards.
- 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2012 – Present: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.

- 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
- 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
- 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
- 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
  I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.

- 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivili Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
- 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.
- 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiveristy monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
- 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
- 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.
- 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
- 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.
- 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
- 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.
- 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
- 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

- 2021 - Present: Project Manager for the Sturdee Energy Solar PV facility, Western Cape

- 2021: Ecological Assessment for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Rehabilitation plan for a housing development (Hope Village)
- 2020: Ecological Assessment for the Eskom Juno-Gromis Powerline deviation, Western Cape
- 2020: Project Manager for the Basic Assessment for SANSA development at Matjiesfontein (Western Cape). Project received authorization in 2021.
- 2020: Ecological Assessment for construction of satellite antennae, Matjiesfontein, Western Cape
- 2019: Ecological Assessment for a wind farm EIA, Kleinzee, Northern Cape
- 2019: Ecological Assessment for two housing developments in Zeerust, North West Province
- 2019: Botanical Assessment in Retreat, Cape Town for the DRDLR land claim.
- 2019: Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
- 2018: Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
- 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
- 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
- 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
- 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.
- 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
- 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.
- 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
- 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
- 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
- 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
- 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
- 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.

CONTACT DETAILS

Name	**Amber Jackson**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Faunal Specialist and Environmental Manager
E-mail	amber@biodiversityafrica.com
Office number	+27 (0)78 340 6295
Education	2011 M. Phil Environmental Management (University of Cape Town) 2008 BSc (Hons) Ecology, Environment and Conservation (University of the Witwatersrand) 2007 BSc 'Ecology, Environment and Conservation' and Zoology (WITS)
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession (100125/12) **ZSSA**: Zoological Society of Southern Africa **HAA**: Herpetological Association of Southern Africa **IAIASa**: Member of the International Association for Impact Assessments South Africa
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets

EMPLOYMENT EXPERIENCE

Director and Faunal Specialist, Biodiversity Africa

July 2021 - present

- Faunal assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitats and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant and Faunal,

Coastal and Environmental Services

September 2011-June 2021

- Faunal and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitat and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Coordinating specialists and site visits
- Faunal Impact Assessment
- Project Management, including budgets, deliverables and timelines.
- Environmental Impact Assessments and Basic Assessments project
- Environmental Control Officer
- Public/client/authority liaison
- Mentoring and training of junior staff

COURSES

- **Herpetological Association of Southern Africa Conference- Cape St Frances** September 2019
- **International Finance Corporation Environmental and Social Risk Management (ESRM) Program** January – November 2018
- **IAIA WC EMP Implementation Workshop** 27 February 2018
- **IAIAsa National Annual Conference** August 2017
  Goudini Spa, Rawsonville.
- **Biodiversity & Business Indaba, NBBN** April 2017
  Theme: Moving Forward Together (Partnerships & Collaborations)
- **Snake Awareness, Identification and Handling course, Cape Reptile Institute (CRI)** November 2016
- **Coaching Skills programme, Kim Coach** November 2016
- **Western Cape Biodiversity Information Event, IAIAsa** May 2016
  Theme: Biodiversity offsets & the launch of a Biodiversity Information Tool
- **Photography Short Course** 2015.
  Cape Town School of Photography,
- **Mainstreaming Biodiversity into Business: WHAT, WHY, WHEN and HOW** June 2014 Hosted by Dr Marie Parramon Gurney on behalf of the NBBN at the Rhodes Business School
- **IAIAsa National Annual Conference** September 2013
  Thaba'Nchu Sun, Bloemfontein
- **St Johns Life first aid course** July 2012

CONSULTING EXPERIENCE

International Projects

- 2018-Crooks Brothers Post EIA Work- Environmental and Social EMPr, Policies, E&S Management Plans and Monitoring Programmes
- 2018-Triton Ancuabe Graphite Mine (ESHIA), Mozambique. IFC Standards.
- 2016-Bankable Feasibility Study of Simandou Infrastructure Project – Port and Railway Summary of critical habitat, biodiversity offset plan and monitoring and evaluation plan.
- 2016-Lurio Green Resources Forestry Projects ESIA project upgrade to Lender standards including IFC, EIB, FSC and AfDB.
- 2014-Green Resources Woodchip and MDF plant (EPDA).
- 2014-Niassa Green Resources Forestry Projects ESIA to Lender standards including IFC, EIB, FSC and AfDB.
- 2020-Kenmare Faunal Biodiversity Management Plan, Mozambique.
- 2020-Kenmare Faunal Monitoring Pogramme (year 1)- Baseline, Mozambique.
- 2019-Kenmare addendum ESIA Faunal Impact Assessment, Mozambique.
- 2019-Kenmare infrastructure corridor ESIA Faunal Impact Assessment, Mozambique.
- 2019/20-Olam Cocoa Plantation Faunal Impact Assessment, Tanzania.
- 2019-JCM Solar Voltaic project Faunal desktop critical habitat assessment, Cameroon.
- 2018-Suni Resources Balama Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017/18-Battery Minerals Montepuez Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Triton Minerals Nicanda Hills Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Sasol Biodiversity Assessment, Mozambique.
- 2014-Lesotho Highlands Water Project Faunal Impact Assessment, Lesotho.
- 2012-Malawi Monazite mine Projects (ESIA) EMP ecological management contribution
- Liberia Palm bay & Butow (ESIA)
- PGS Seismic Project (ESIA), Mozambique.

South African Projects

- 2018-Port St Johns Second Beach Coastal Infrastructure Project - E&S Risk Assessment
- 2015-Blouberg Development Initiative- E&S Risk Assessment
- 2019-Boulders Powerline BA Faunal desktop impact assessment, WC, SA.
- 2019-Ramotshere housing development BA Faunal desktop impact assessment, NW, SA.
- 2019-Cape Agulhas Municipality Industrial development faunal impact assessment, WC, SA.
- 2019-SANSA Solar PV BA Faunal desktop impact assessment, WC, SA.
- 2019-Wisson Coal to Urea Faunal desktop assessment, Mpumalanga.
- 2019-Assessment Boschendal Estate Faunal Opportunities and Constraints, WC, SA.
- 2019-Ganspan-Pan Wetland Reserve Recreational and Tourist Development Avifaunal Impact Assessment, NC, SA.
- 2018-City of Johannesburg Municipal Reserve Proclamation for Linksfield Ridge and Northcliff Hill Faunal Assessment, South Africa.
- 2017-Augrabies falls hydro-electric project Hydro-SA Faunal Impact Assessment.
- Port St Johns Second Beach Coastal Infrastructure Project (EIA), South Africa.
- Woodbridge Island Revetment checklist.
- Belmont Valley Golf Course and Makana Residential Estate (EIA)
- Belton Farm Eco Estate (BA).

- Ramotshere housing development (BA).
- G7 Brandvalley Wind Energy Project (EIA)
- G7 Rietkloof Wind Energy Project (EIA)
- G7 Brandvalley Powerlines (BA)
- G7 Rietkloof Powerlines (BA)
- Boschendal wine estate Hydro-electric schemes (BA, 24G and WULA)
- Mossel Bay Wind Energy Project (EIA)
- Mossel Bay Powerline (BA) 132kV interconnection
- Inyanda Farm Wind Energy (EIA)
- Middleton Wind Energy (EIA)
- Peddie Wind Energy (EIA)
- Cookhouse Wind Energy Project (EIA)
- Haverfontein Wind Energy Project (EIA)
- Plan 8 Wind Energy Project (EIA)
- Brakkefontein Wind Energy Project (EIA)
- Grassridge Wind Energy Project (EIA) (Coega)
- St Lucia Wind Energy Project (EIA)
- ACSA ECO CT (Lead ECO)
- Enel Paleisheuwel Solar farm (Lead ECO)
- NRA Caledon road upgrade ECO
- Solar Capital DeAar Solar farm annual audits
- Eskom Pinotage substation WUL offset compliance