



BLUELEAF
ENVIRONMENTAL

Terrestrial Biodiversity and Plant Species Assessment

Proposed Infrastructure Development and Upgrades within the Great Fish River Nature Reserve, Eastern Cape

Prepared for:

Ms Cherise Coetzee
Environmental Scientist
JG Africa
Tel: +27 41 390 8700
Email: coetzeec@jgafrika.com

Date submitted: March 2022

Mr Roy de Kock M.Sc (Pri.Nat.Sc.)
Ecologist and Biodiversity specialist
Blue Leaf Environmental (Pty) Ltd.
Cell: +27 76 281 9660
Email: roy@blueleafenviro.co.za

Port Elizabeth:
38 Tulip Avenue
Sunridge Park
Port Elizabeth
6045

East London:
163 Cowrie Crescent
Cove Rock Country Estate
East London
5213

Table of Contents

3.1	Project description.....	7
3.2	Legislative context	12
3.3	Alternatives	13
3.4	Public consultation	13
3.5	Objectives	13
3.6	Assumptions and limitations.....	14
4.	Approach and methodology	15
4.1	Vegetation mapping	15
4.2	Species classification	15
4.3	Biodiversity	17
4.4	Protected areas.....	18
4.5	Sensitivity assessment	18
4.6	Impact Assessment	18
5.	Site assessment	21
5.1	Topography	21
5.2	Geology and Soils	21
5.3	Land use	22
5.4	Biodiversity	23
5.5	Vegetation	24
5.6	Sensitive plant species	27
5.7	Provincial Ordinance Permits	27
5.8	Site observations.....	28
5.9	Current threats to plants and biodiversity.....	29
6.	Site sensitivity verification.....	29
7.	Impact assessment	31
8.	Conclusion.....	39
8.1.	Site sensitivity	39
8.2.	Alternatives.....	40
8.3.	Cumulative impacts.....	40

8.4.	Levels of acceptable change	40
8.5.	Levels to be avoided.....	40
8.6.	Current impacts.....	40
8.7.	Mitigations.....	41
8.8.	General rehabilitation measures	42
8.9.	Additional mitigations.....	42
8.10.	Specialist opinion	42
9.	Reference	44
	Appendix A: Lists of faunal species	45

1. Declaration of independence

I, Roy de Kock as duly authorized representative of Blue Leaf Environmental (Pty) Ltd, hereby confirm my independence (as well as that of BlueLeaf) as a specialist and declare that neither I nor BlueLeaf have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which JG Africa was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Environmental Impact Assessment for the proposed Great Fish River Nature Reserve Development. I further declare that I am confident in the results of the studies undertaken and conclusions drawn because of it – as is described in this report.



Full Name: Roy de Kock

Title / Position: Ecologist

Qualification(s): BSc (Hons) Geology; MSc Botany; Candidate PhD Botany

Experience (years/ months): 15 years

Registration(s): SACNASP (400216/16)

Tel: +27 76 281 9660

Email: roy@blueleafenviro.co.za

2. Expertise of specialist

Roy has over 15 years' experience in environmental consulting and specialist services in the Eastern Cape. Various projects throughout South Africa as well as Africa at large have also been undertaken. Projects include baseline studies, impact assessments and compliance auditing for various large-scale projects including numerous wind farms, roads (National and Provincial), and infrastructure development projects. Roy has also conducted numerous specialist studies including but not limited to Ecological and Botanical assessments, Biodiversity studies, Plant and Animal Search and Rescue, Fauna and Flora permits, Aquatic Assessments, Agricultural and Soil Assessments and Environmental and Venomous animals training workshops.

Roy holds a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela University in Port Elizabeth. He is currently busy with his PhD (Doctorate degree) in Botany and Soil Science. He has over 15 years' experience in the environmental consulting focusing on Ecological and Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies.

Roy is a registered as a professional natural scientist (Pri.Sci.Nat.) with SACNASP (Registration nr: 400216/16).

This study complies with the requirements as listed in the Gazetted protocols for both terrestrial biodiversity and plant species specialist assessments (GN. R 320 of 2020) as well as the minimum report content requirements and the Ecosystem Environmental Assessment Guideline.

Projects Roy worked on in the last 3 years include:

- Lukhozi Retreat Housing Development Ecological Assessment, Muizenberg, Western Cape
- Lukhozi Vrygrond Housing Development Ecological Assessment, Muizenberg, Western Cape
- SANRAL Utentwe Bridge and various road upgrades, Lusikisiki, Eastern Cape
- Enviroworks Addo Elephant National Park Development Ecological Assessment, Eastern Cape
- Habitat Link Wolwerton Farm Plant and Animal Search and Rescue, Sunland, Eastern Cape
- Ilifa Ecological Impact Assessment of a road between Koster and Rustenburg, Northwest
- Knight Piesoldt Ecological Assessment of the N1 from Louis Trichardt to Musina, Limpopo
- Lwhethu Vegetation study for a new mine outside King Williams Town, Eastern Cape Province
- Vegetation Assessment for a proposed new housing expansion, Robberg, Western Cape.
- UWP Consulting Ecological Assessment of the R63 between Komga and the N9 Bridge, Eastern Cape Province

3. Introduction

The Eastern Cape Parks and Tourism Agency (ECPTA) is undertaking the upgrading of infrastructure in the Great Fish River Nature Reserve (GFRNR) in the Eastern Cape Province (Figure 3.1).

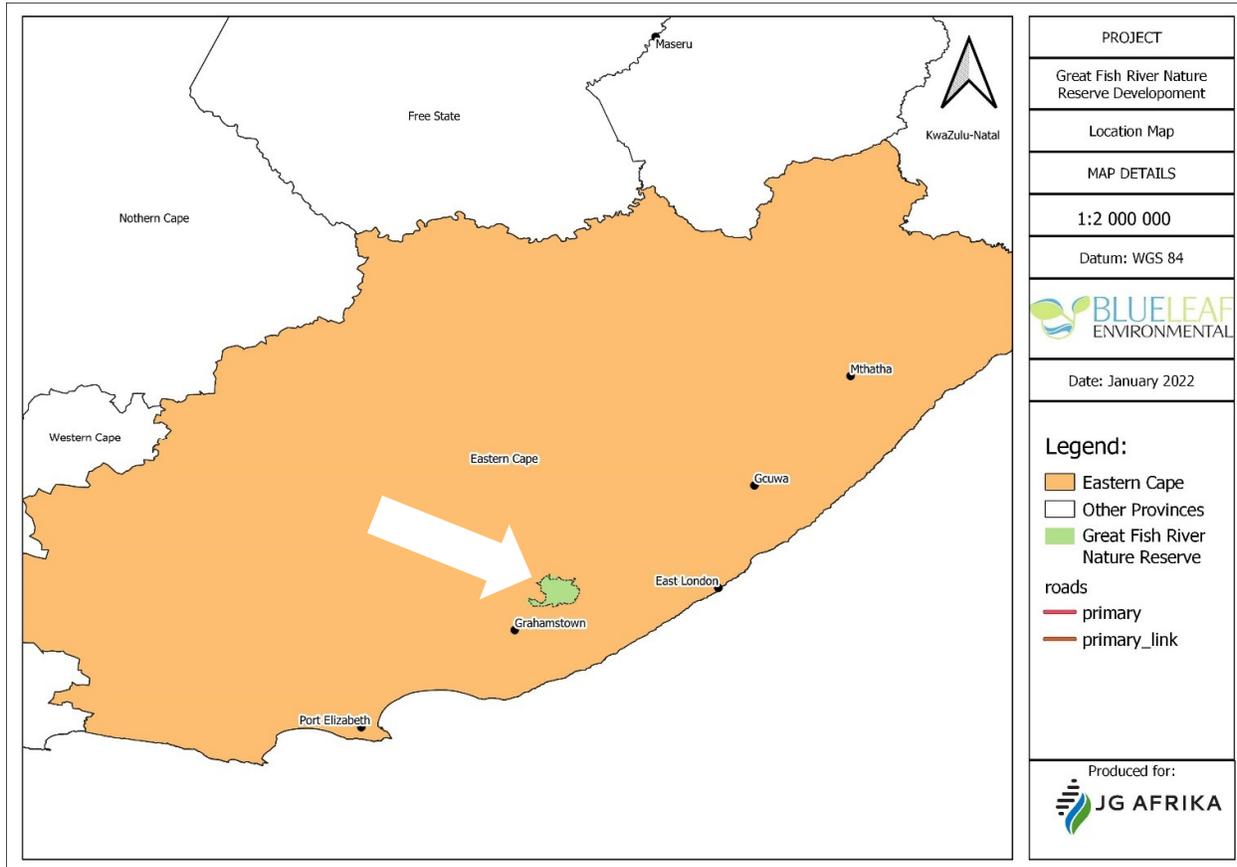


Figure 3.1: Location of the Great Fish River Nature Reserve

JG Africa has been appointed to undertake an Environmental Impact Assessment (EIA) on behalf of the developer. The DFFE Screening Report that JG Africa generated specified specialist studies to be conducted as part of the EIA process. This report addresses two of the identified sensitivity themes identified by this Screening Report namely:

1. Terrestrial Biodiversity Assessment, and
2. Plant Species Assessment

The Screening Report further indicated the:

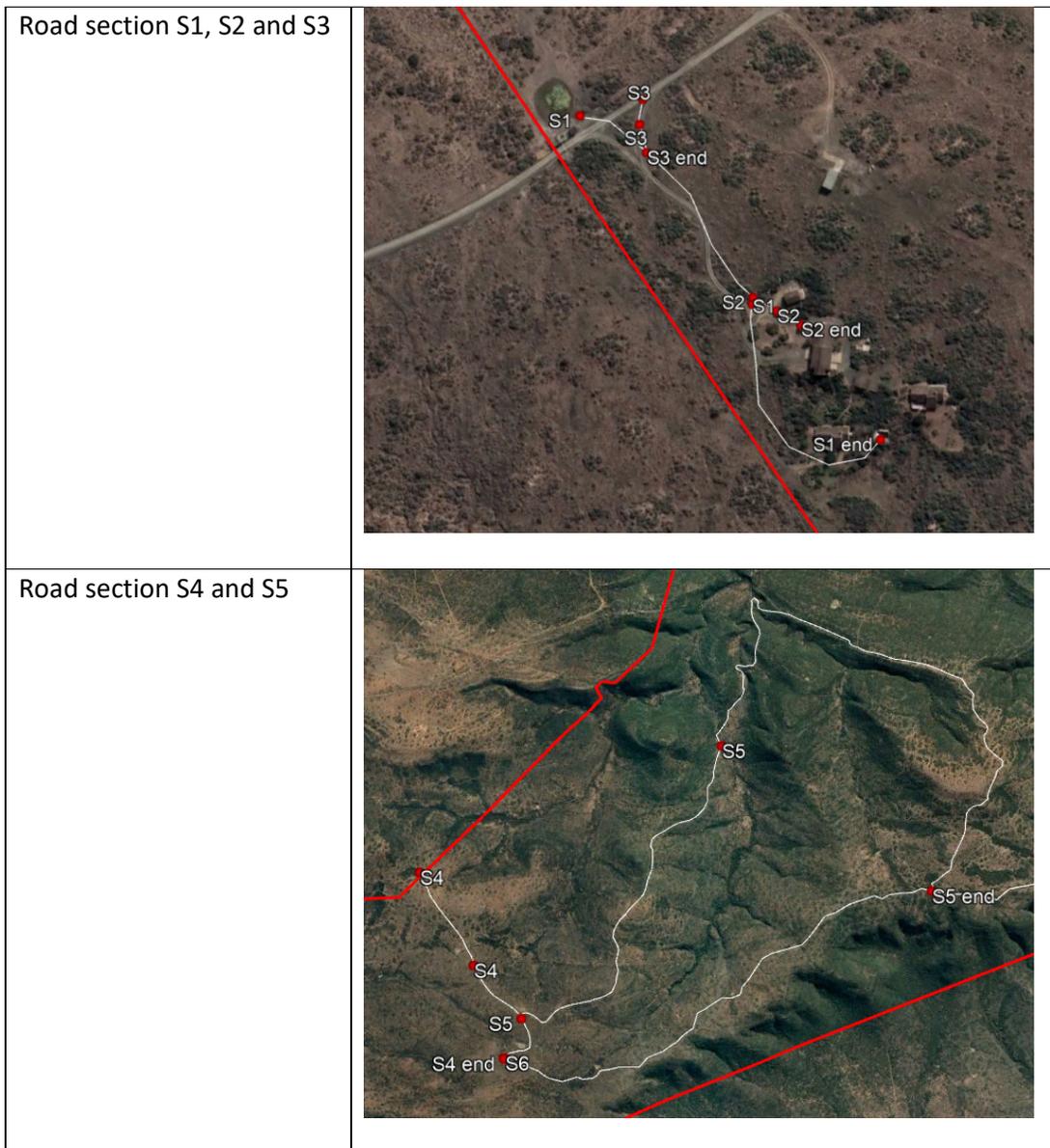
- Plant Species Theme Sensitivity as **MEDIUM SENSITIVITY** and the
- Terrestrial Biodiversity Theme Sensitivity as **VERY HIGH SENSITIVITY**.

The screening report also lists several plant species as sensitive. BlueLeaf Environmental (Pty) Ltd (BlueLeaf) was appointed to conduct a full Terrestrial Biodiversity and Plant Species Impact Assessment as part of the Basic Assessment for the proposed development of the Great Fish River Nature Reserve Project located in the Eastern Cape Province.

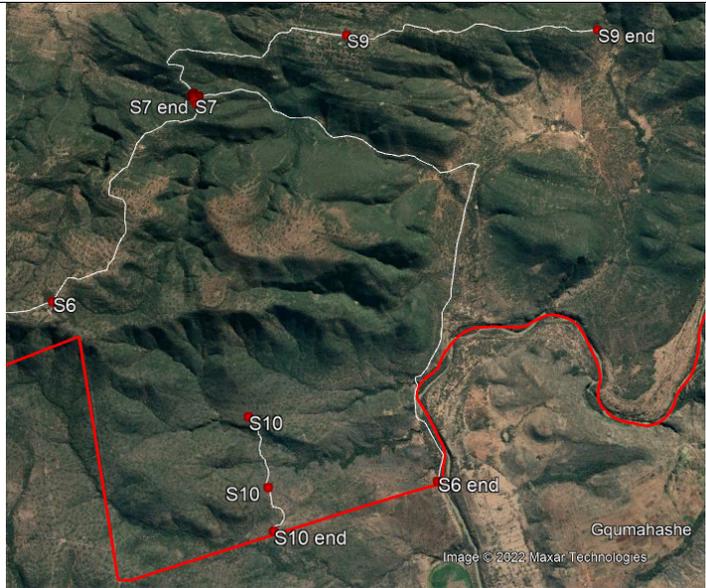
3.1 Project description

The following infrastructure development within the Great Fish River Nature Reserve is proposed Refer to Figure 3.2 for layout orientations:

- **Construction of Ranger and Manager houses.**
 - Various new houses will be constructed in four different clusters throughout the GFNR
- **Various gravel roads and tracks upgrade.**
 - All road upgrades are numbered as followed:



Road section S6, S7, S9 and S10

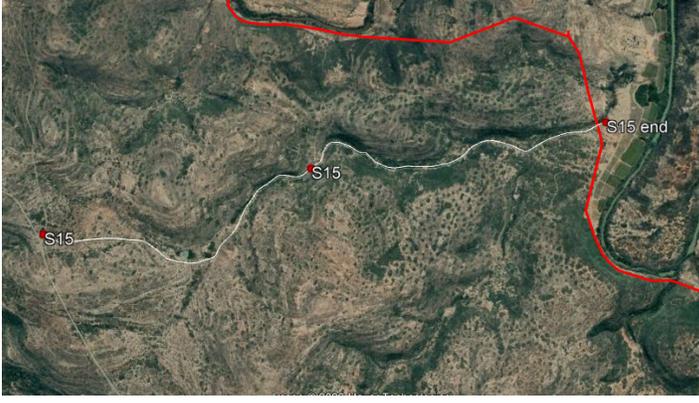


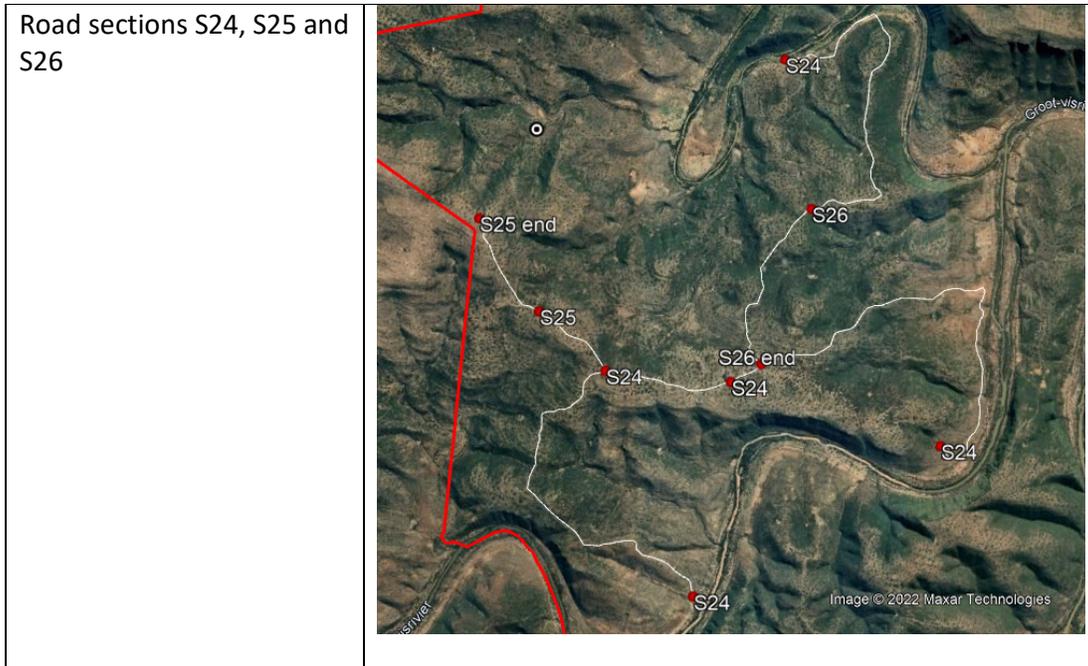
Road section S11



Road sections S12 and S13



<p>Road section S15</p>	 A satellite map showing a road section labeled S15. The road is highlighted in white, and its boundaries are marked with red lines. The terrain is hilly and semi-arid. Labels include 'S15' at two points and 'S15 end' at the right boundary.
<p>Road section S16</p>	 A satellite map showing a road section labeled S16. The road is highlighted in white, and its boundaries are marked with red lines. The terrain is hilly and semi-arid. Labels include 'S16' at two points and 'S16 end' at the right boundary. The 'Kalahari' river is visible on the right side.
<p>Road sections S17, S18, S19, S20, S21, S22 and S23</p>	 A satellite map showing a series of road sections labeled S17 through S23. The road is highlighted in white, and its boundaries are marked with red lines. The terrain is hilly and semi-arid. Labels include 'S17', 'S17 end', 'S18', 'S18 end', 'S19', 'S19 end', 'S20', 'S20 end', 'S21', 'S21 end', 'S22', 'S23', and 'S23 end'. The 'Groot-Kalahari' river is visible on the left side. A copyright notice 'Image © 2022 Maxar Technologies' is present at the bottom.



- Various new and existing upgrades of culverts where roads cross streams and drainages throughout the GFNR.
- Various new gabion constructions throughout the GFNR.
- Upgrade of three dams.
- Development of a fuel storage site near the existing Kamadalo Runway.
- Extension of the existing Kamadalo Runway.

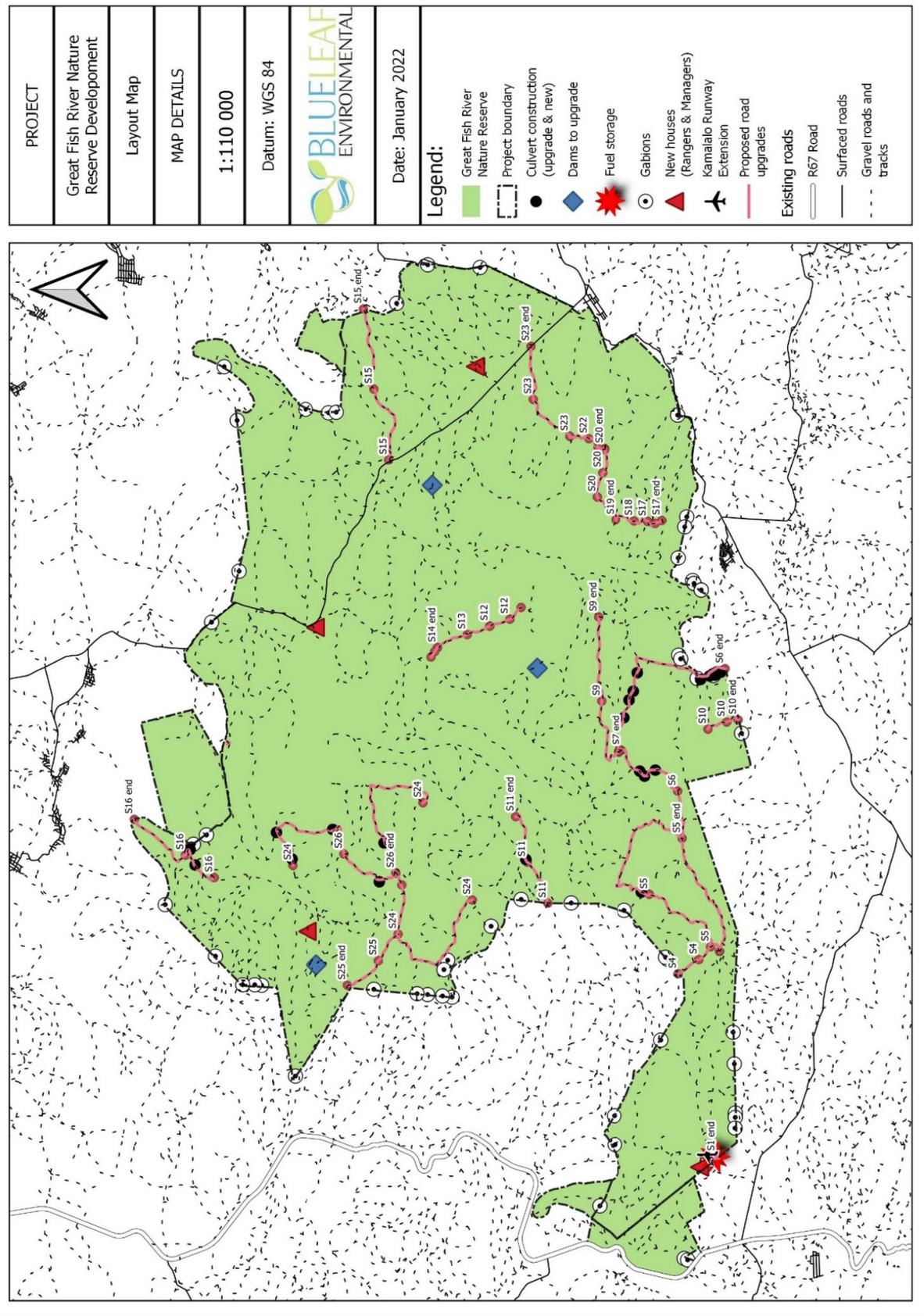


Figure 3.2: Layout of the various proposed infrastructures within the GFRNR

3.2 Legislative context

The following legislation is directly relevant when assessing the ecological environment relating to the proposed Great Fish River Nature Reserve Development Project in the Eastern Cape Province:

National Environmental Management Act (NEMA) (107 of 1998; as amended), and the Specialist Assessment Protocols (GNR 320 of 2020):

The contents of this specialist report comply with the legislated requirements as described in the following specialist assessment protocol as listed in the projects’ Screening Report:

- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species.
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity.

National Environmental Management Act (NEMA) (107 of 1998; as amended), and the EIA regulations (as amended):

Although the Specialist Assessment Protocol (as listed above) supersedes this legislative requirement, the contents of this specialist report still comply with the legislated requirements as described in Appendix 6 of the National Environmental Management Act (No 107 of 1998; NEMA) Regulations of 2014 and updated in 2017 (GN R. 326 of 2017).

Other national legislation

Other national legislation relative to this project include:

Title of legislation or guideline	Administering authority	Applicability to the project
National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations 2014 as amended (Act No. 107 of 1998)	National Department of Forestry, Fisheries and Environment (DFFE)	<i>The activity triggers activities listed in NEMA EIA Regulations GN R. 327, GN R.325 and GN R. 324.</i>
National Water Act, 1998 (Act No. 36 of 1998)	Department of Water & Sanitation (DWS)	<i>Infrastructure may impact on existing surface water drainage systems. This impact is only mentioned in this report and NOT discussed in detail.</i>
National Environment Management: Biodiversity Act (NEMBA) (No. 10 of 2004)	DEDEAT	The proposed development must: <ul style="list-style-type: none"> • Conserve endangered ecosystems and protect and promote biodiversity. • Assess the impacts of the proposed development on endangered ecosystems. • No protected species may be removed or damaged without a permit; and • The proposed site must be cleared of alien vegetation using appropriate means.
National Forest Act (84 of 1998)	Provincial Department of Forestry	Requires that a permit be obtained should any forests or protected trees be removed during the construction phase of the project.

Relevant Provincial legislation include:

Title of legislation or guideline	Administering authority	Applicability to the project
Eastern Cape Biodiversity Conservation plan (ECBCP; 2019)	DEDEAT	Listing of critical biodiversity areas and ecological support areas within the study site. The discussion in this report is based on vegetation types, connectivity, and presence of Red List Threatened species.
Nature and Environmental Conservation Ordinance (No.19 of 1974)	DEDEAT	Listing of protected plants. Permits are required for removal and replanting any protected plants.

3.3 Alternatives

No site alternatives or layout are proposed.

3.4 Public consultation

No consultation requirements were identified during the drafting of this specialist report. The findings of this report can be presented to stakeholders and I&APs as part of the EIA Public Participation Process (PPP).

No comments were received to date on this report.

3.5 Objectives

The objectives of the project are listed below. These objectives are based on the requirements of the specialist protocol as listed in the Screening Report:

- Describe both the existing area as well as the area prior to construction in terms of its current plant and terrestrial biodiversity characteristics and the general sensitivity of these components to change.
- Confirm if there are any outright fatal flaws to the establishment of the proposal at its current location from a plant and terrestrial biodiversity perspective.
- Map all existing areas to be directly affected by the proposals in terms of its current and previous plant and terrestrial biodiversity sensitivities (constraints).
- Map all 'No-Go' areas.
- Describe the likely scope, scale, and significance of impacts (positive and negative) on plant and terrestrial biodiversity components of the area associated with the construction of the proposals.
- Make recommendations on the scope of any mitigation measures that may be applied during construction to avoid/reduce the significance of the identified construction-related impacts.
- Describe the likely scope, scale, and significance of impacts (positive or negative) on the faunal components associated with the operation or use of the proposals.
- Make recommendations on the scope of any mitigation measures that may be applied to avoid/reduce the significance of the operations-related impacts. These mitigation measures could also be design recommendations as well as operational controls, monitoring programmes, management procedures and the like.
- It will be particularly important to identify any rehabilitation measures that can be reasonably applied on the completion of the construction works.

- Broadly comment on the cumulative plant and terrestrial biodiversity impacts (positive or negative) associated with the construction and/or operation of the proposals.

It should be noted that only datasets and base data relevant to the study area and affected environmental features are discussed below.

3.6 Assumptions and limitations

- The report is based on currently available information and, as a result, limited by the information provided by the Client.
- The report is limited by seasonality as the presented data will be based on a single site survey of plant species and ecosystems conducted within a single season (summer) of a single year (2021).

4. Approach and methodology

The aim of this assessment is to identify areas of plant and terrestrial biodiversity importance and to evaluate these in terms of their conservation importance. To do so, both the plant and terrestrial biodiversity sensitivities of the area are assessed as well as an identification of potential plant Species of Conservation Concern (SCC) that may occur in ecosystems present in the area. To a large extent, the condition and sensitivity of vegetation as well as the number of plant SSC will determine site sensitivity.

The study site and surrounding areas were assessed using a two-phased approach. Firstly, a desktop assessment of the site was conducted in terms of current plant and terrestrial biodiversity programmes and plans.

Further to the above, a site visit was conducted in November 2021. The site visit served to inform potential impacts of the proposed project and how significantly it would impact on the surrounding terrestrial plant and terrestrial biodiversity environment.

It is not the aim of this study to produce a complete list of all plant species occurring in the local area, but rather to examine a representative sample. It is, however, important to note that areas of high sensitivity have been identified as far as possible, either from records from the site or a review of their habitat requirements, and whether these habitats occur within the site.

4.1 Vegetation mapping

Mucina and Rutherford (2006) developed the National Vegetation Map (VegMap). The latest update of the VegMap took place in 2018. This map describes each vegetation type in detail, along with the most important species including endemic species and those that are biogeographically important. This is the most comprehensive data for vegetation types in South Africa.

4.2 Species classification

To identify plant SCC that potentially occur naturally in the project area firstly required an understanding of the broad ecosystems in the area. Ecosystems were identified according to various biological and environmental characteristics, including vegetation type (SANBI VegMap; 2018), the degree of transformation of the vegetation, geology and soil type, and topography.

The potential occurrence of plant SCC within the project area was determined according to the ecosystem characteristics of the area, and the species' habitat requirements. Published literature and online resources that are continuously updated with new species observations were consulted to compile lists of plant SCC, including:

- SANBI (South African National Biodiversity Institute) Red List of South African Plants (<http://www.redlist.sanbi.org/>).
- IUCN (International Union for Conservation of Nature) Red List of Threatened Species (<http://www.iucnredlist.org/>).
- CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) (<http://www.cites.org/>).
- NEMBA Threatened or Protected Species Regulations (ToPS) (Notice 255 of 2015 of NEMBA).
- Atlas of African Orchids (OrchidMAP).

- Tree Atlas of Southern Africa (TreeMAP).
- New Plants of South Africa (New POSA).
- iNaturalist, and the
- Global Biodiversity Information Facility (GBIF)

The SANBI Red List system contains nine categories, with the main purpose of classifying species from lowest (Least Concern or LC) to highest (Critically Endangered) risk of extinction. Species that are at high risk of extinction are placed in one of three categories: Vulnerable (VU), Endangered (EN) or Critically Endangered (CR). If a species is classified into one of these three categories, it is considered an SCC. NEMBA’s ToPS list as well as the PNCO further identifies plants as Protected (PR) or Endangered (EN)

Species of Conservation Concern (SCC) were limited to indigenous flora, and were defined to include:

- Flora with their distribution ranges limited to the Eastern Cape Province.
- Red Data species identified using the IUCN Red List of Threatened Species.
- Red Data species identified using the Red List of South African Species. This includes all species that are assessed according to the IUCN Red List Criteria as Critically Endangered, Endangered, Vulnerable, Near Threatened, Rare, Extremely Rare, or Data Deficient. Listings were corroborated with data from the South African orchid and tree conservation assessments.
- Flora listed in terms of Section 56 of the National Environmental Management: Biodiversity Act, 2004 (NEMBA) (Act 10 of 2004, as amended), and regulated by the Threatened or Protected Species (TOPS) Regulations, 2007. This includes species that are Critically Endangered, Endangered, Vulnerable, and Protected.

In addition to plant SCC, the following plants were also identified:

- Flora protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Flora listed in terms of the Nature and Environmental Conservation Ordinance (NECO) (No 19 of 1974).

The inclusion of floral species on CITES Appendices (I–III) and NECO Schedules (1–2) are not necessarily equivalent to the species’ conservation status and therefore not classified as plant SCC. Many common species are pragmatically included on these lists even though their conservation status may not be of demonstrated concern. A permit is however required for the removal of species that occur on CITES and NECO lists.

Several sensitive plant species, identified by the Department of Forestry, Fisheries, and the Environment’s (DFFE) National Web-based Environmental Screening Tool as important, required specific consideration. These species include:

ALLOCATED SENSITIVITY	SPECIES NAME
Medium	Sensitive species 1252
Medium	Sensitive species 72
Medium	<i>Tetradenia barberae</i>
Medium	<i>Duvalia pillansii</i>
Medium	Sensitive species 248
Medium	<i>Asparagus spinecent</i>
Medium	Sensitive species 828

ALLOCATED SENSITIVITY	SPECIES NAME
Medium	<i>Syringodea flavaganii</i>
Medium	Sensitive species 354
Medium	Sensitive species 1248
Medium	Sensitive species 19

The names of some of the species have been omitted and were only made available to the Specialist and EAP. These names have been withheld as the species may be prone to illegal harvesting and must be protected.

Because the likelihood of detecting any of the above listed SCC during a site investigation is extremely low (even with optimal search methods and during optimal seasonal sampling; SANBI 2020) the precautionary principle was therefore applied in the following way during the assessment for species habitat suitability in the project area:

1. If the Screening Tool predicts the occurrence of the species in the vicinity of the project area, and
2. Potentially suitable habitat exists in relatively proximity of known locations for the species, then the species is assumed to be present.

The following criteria were evaluated during the site visit to assess habitat suitability for these species:

1. Vegetation type and cover.
2. Geology and soil type.
3. Rock cover, and
4. Topography.

Sensitive habitats were identified as those habitats that are vulnerable to disturbances and potentially support SCC in the project area.

On 17 to 19 November 2021 (late spring) a visit to the project area was conducted to:

1. Assess the micro-positioning for infrastructure,
2. Confirm the occurrence of broad vegetation habitats,
3. Identify broad habitats that could not be identified as part of an initial desktop analysis,
4. Assess the extent of current threats (not project related) on vegetation communities (e.g., evidence for direct exploitation, habitat transformation, etc.).

4.3 Biodiversity

Critical Biodiversity Areas (CBAs) are features critical for the conservation of biodiversity and maintenance of ecosystem functioning and should remain in a natural state as far as possible. CBAs also include freshwater components.

To assist in the development of these CBAs, each planning unit was classified by C-plan and Marxan based on a combination of factors including vegetation type, connectivity, habitat condition and presence of Red List Threatened species.

All features were grouped into the following CBA categories as listed in the Eastern Cape Biodiversity Conservation Plan Handbook (ECBCP; 2019):

Critical Biodiversity Area Category	Critical Biodiversity Area Name
Protected areas (PA)	Areas that are proclaimed as protected areas under national or provincial legislation.
Critical Biodiversity Area 1 (CBA 1)	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
Critical Biodiversity Area 2 (CBA 2)	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems, or ecological processes and infrastructure.
Ecological Support Area 1 (ESA 1)	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.
Ecological Support Area 2 (ESA 2)	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs and are often vital for delivering ecosystem services.
Natural to Near-Natural (ONA)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.
No Natural Remaining	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructure functions, even if they are never prioritized for conservation action.

4.4 Protected areas

The National Environmental Management Protected Areas Act (No 57 of 2003; NEMPAA) was developed to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. Refer to section 4.8 for more detail on this matter.

The NEMBA National List of Ecosystems that are Threatened and in need of Protection (G. NR. 1002 of 2011) contains a national list of threatened terrestrial ecosystems.

4.5 Sensitivity assessment

Section 6 of this report identifies and maps zones of high, moderate, and low sensitivity within the study area.

4.6 Impact Assessment

The impacts that may result from the planning and design phase, construction phase, operation phase of the proposed GFRNR project was assessed according to several criteria to arrive at an overall significance rating. The criteria used were as follows (based on DEAT 2002 - Impact Significance, IEM Information Series 5; and DEAT 2006 - Assessment of Alternatives and Impacts in support of the EIA Regulations, IEM Guideline Series 5):

Table 4.1: Criteria used in determining significance ratings to potential impacts

CRITERIA	DESCRIPTION OF ELEMENTS THAT ARE CENTRAL TO EACH ISSUE	
The criteria below describe the anticipated impact on the identified environmental aspect.		
Nature and consequence of impact	This is an appraisal/evaluation of the type of effect the construction, operation and/or maintenance of a development would have on the affected environment. It should describe the impact, as well as the consequences of the impact on the specific environmental aspect. This description should include what is to be affected and how.	
Cumulative Impacts	Cumulative impacts result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present, or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.	
Indirect Impacts	Indirect impacts are not a direct result of the project but are often produced away from or because of a complex impact pathway related to the project.	
Residual Impacts	Any impact, or part of an impact remaining after mitigation and management measures have been applied.	
The following criteria is used to determine the significance of an impact using the following formula: <i>(Extent + Duration + Intensity) x Probability = Impact Significance</i>		
Extent of the impact	NONE	The impact will not have an area of effect
	SITE SPECIFIC	Extends only as far as the activity; or Limited to the site and its immediate surroundings
	LOCAL	Extends beyond the site and its immediate surroundings to within 5km of the site
	REGIONAL	Will have an impact on the region/province beyond 5km of the site
	NATIONAL	Will have an impact on a national scale - particularly if an ecosystem or species of national significance is affected
	INTERNATIONAL	Will have an impact across international borders or will impact on an ecosystem or species of international significance.
Duration of impact	IMMEDIATE	The impact will not have any lasting effects
	SHORT TERM	0 – 2 years
	MEDIUM TERM	2 – 20 years
	LONG TERM	>20 years - the impact will cease after the operational or working life of the activity, either due to natural process or by human intervention
	PERMANENT	Mitigation or moderation by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient or temporary
Intensity of impact (Positive or negative)	ZERO	Natural, cultural, and social functions and processes are not affected
	VERY LOW	Natural, cultural, or social functions or processes would be negligibly altered
	LOW	Natural, cultural, or social functions or processes would be able to continue, although in a slightly modified way
	MEDIUM	Natural, cultural, or social functions or processes would be able to continue, although in a modified way
	HIGH	Natural, cultural, or social functions or processes would be substantially altered to the extent that they temporarily cease
	VERY HIGH	Natural, cultural, or social functions or processes are altered to the extent that they would permanently cease
Probability of impact occurring	IMPROBABLE	< 5% chance of the impact occurring
	LOW	5 – 25 % chance of the impact occurring
	MEDIUM	Probable – 25 – 75 % chance of the impact occurring
	HIGH	Highly Probable – 75 – 99 % chance of the impact occurring
	DEFINITE	Impact will occur regardless of any prevention measures

CRITERIA	DESCRIPTION OF ELEMENTS THAT ARE CENTRAL TO EACH ISSUE	
The criteria below are used in addition to the criteria used for impact significance determination to further describe the impact, however, these criteria are not used in the calculation.		
Degree of Reversibility	HIGH	Impact can be reversed with mitigation
	MEDIUM	Impact may be reversed, but residual impacts are evident
	LOW	Impact cannot be reversed despite mitigation measures
Irreplaceability of a resource	LOW	Impact will result in a partial loss of a resource; however, natural, cultural, and social functions will not be affected
	MEDIUM	Impact will result in a partial loss of a resource
	HIGH	Impact will result in the irreplaceable loss of a resource
Mitigatory potential of impacts	LOW	Little or no mechanism to mitigate negative impacts
	MEDIUM	Potential to mitigate negative impacts. Implementation of mitigation measures will reduce some negative effects
	HIGH	High potential to mitigate negative impacts. Mitigation will result in negative impacts becoming insignificant

Based on a synthesis or combination of the information contained in the above-described criteria; and drawing on legal policies and guidelines as well as the status of the impacts and potential risks, the overall significance were determined as follows:

Table 4.2: Definition of significance ratings (positive and negative)

Significance	Description
Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
High (H)	An impact of high significance which could influence a decision about whether to proceed with the proposed project, regardless of available mitigation options.
Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether to proceed with a proposed project. Mitigation options should be re-evaluated at.
Medium (M)	If left unmanaged, an impact of medium significance could influence a decision about whether to proceed with a proposed project.
Low-Medium (LM)	An impact of Low-medium significance would have some effect during decision making about whether to proceed with a proposed project, however, mitigation for this type of impact would be minimal.
Low (L)	An impact of low significance would have little effect on decision making and only a small influence on project design or alternative motivation.
Very low (VL)	An impact of very low significance is likely to contribute to positive decisions about whether to proceed with the project. It will have little effect and is unlikely to have an influence on project design or alternative motivation.
Negligible / zero impact	There will be no impact, or any impact identified can be viewed as negligible. This rating will be unlikely to have an influence on project design or alternative motivation.
Positive impact (+)	A positive impact is likely to result in a positive consequence/effect and is likely to contribute to positive decisions about whether to proceed with the project.

5. Site assessment

This chapter compares baseline information with field survey data collected. A site visit was conducted in November 2021. Data collected during the site visit were then compared to existing literature on the site.

5.1 Topography

The landscape within the GFRNR is diverse. The Park covers a total area of 45 000 ha. The Great Fish River cuts through the center of the GFRNR, geologically causing a canyon that the river has cut through the strata over millennia and where elevation suddenly drops a 100 m (Figure 5.1). This essentially divides the GFRNR into 2 sections, one on either side of the Great Fish River.

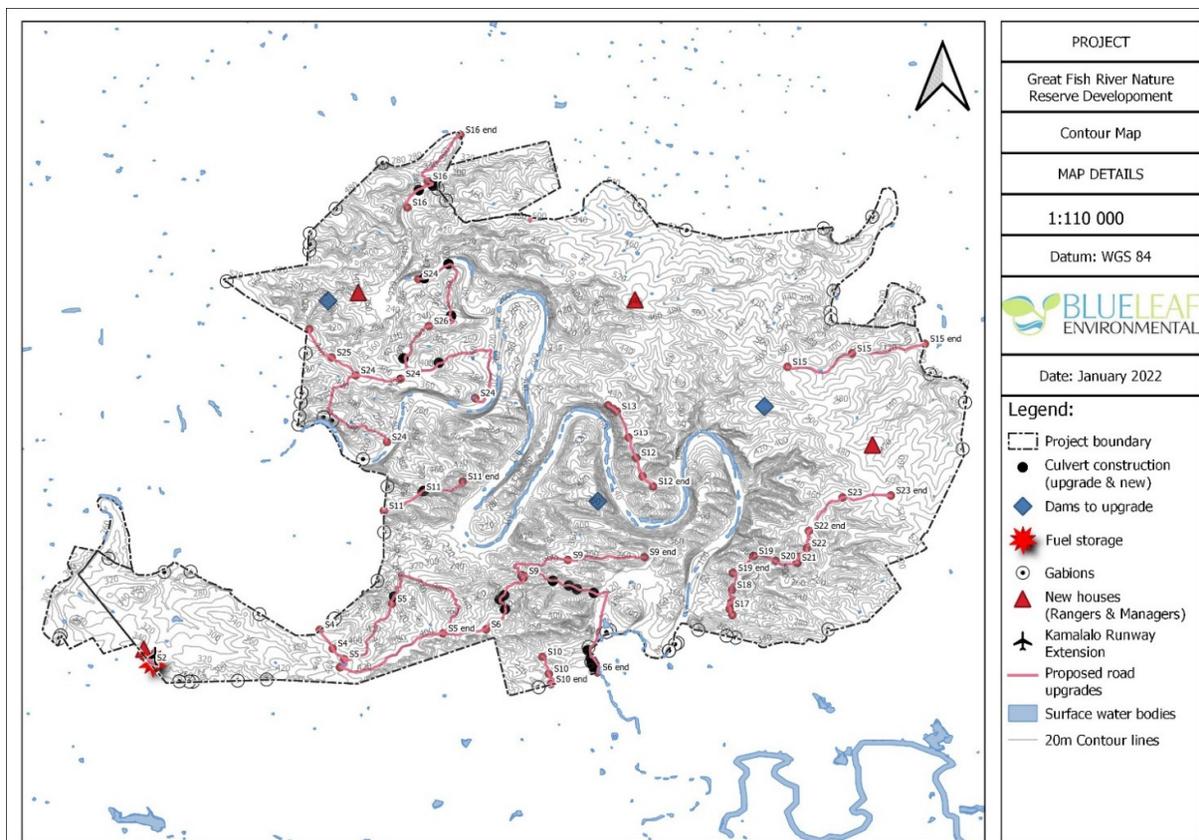


Figure 5.1: Topography of the study site and surrounding areas

Elevation ranges between 500 meters above sea level (m.a.s.l) at its highest points to 100 m.a.s.l. at the Great Fish River.

5.2 Geology and Soils

The project site shows a divide between younger Adelaide Subgroup rocks (of the Beaufort Group) and older Ecca Group rocks, more particular rocks from the Fort Brown Formation within the Ecca Group. Both these layers forms part of the Karoo Supergroup of rocks which covers most of inland South Africa.

Rocks from the Fort Brown Formation consist of rhythmite and mudrock with minor sandstone

intercalations and displays an overall coarsening-upward tendency. Rocks from the Adelaide Subgroup are typically alternating bluish-grey, greenish-grey, or greyish red mudrocks with grey, very fine to medium-grained, lithofeldspathic sandstones.

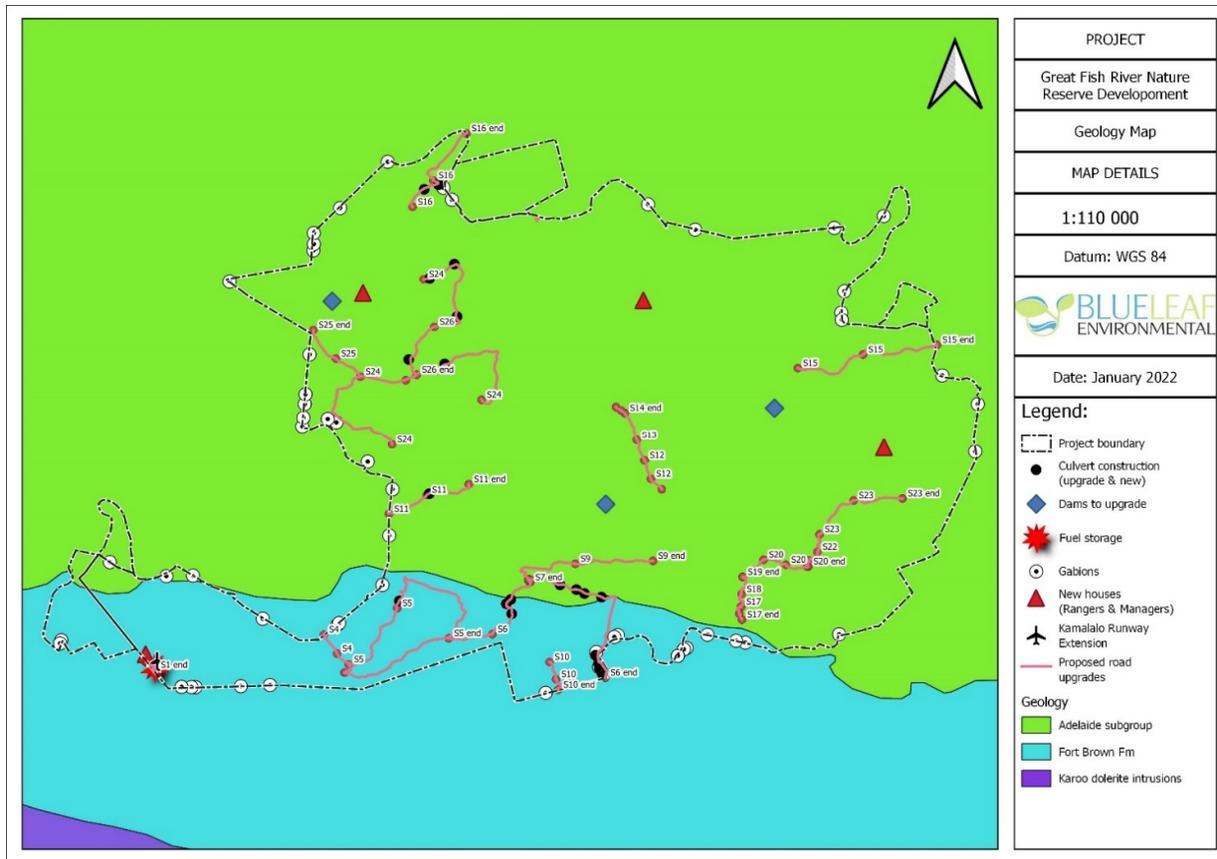


Figure 5.2: Regional geology of the study site and surrounding areas

Half of the site falls within soil type Fc, with Fb the only other land type of some importance.

5.1 Land use

The entire site is a proclaimed Provincial Nature Reserve. Land cover consist of natural grasslands interspersed with open woodlands (Figure 5.3). Minimal development occurs.

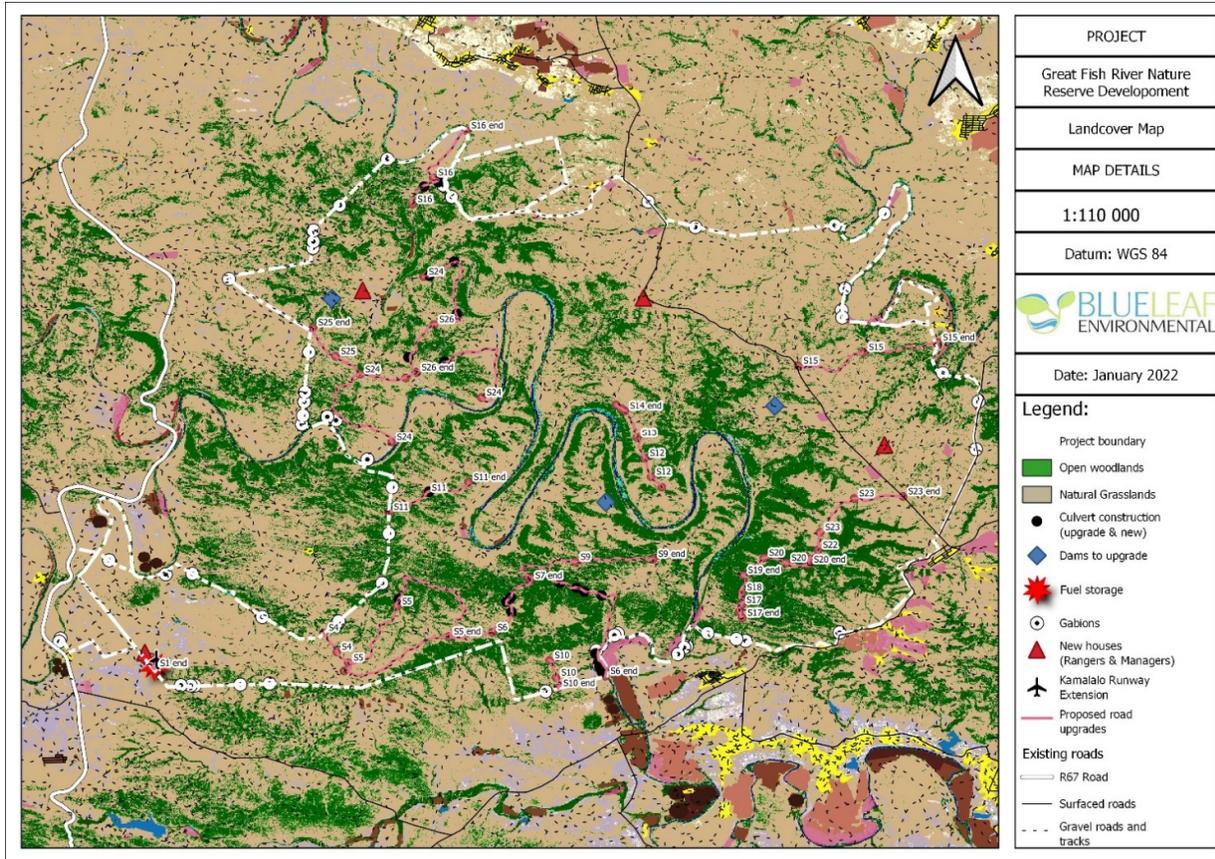


Figure 5.3: Land cover of the study site and surrounding areas

5.3 Biodiversity

The entire project site is considered a Protected Area (Figure 5.4) and therefore biodiversity is considered as extremely high. Usually, according to ECBCP’s management strategies for protected areas, development would be limited. As development of the GFRNR will result in a positive increase in site management (upgraded roads for easier access and more and better accommodation of rangers), the proposed development activities may be allowed provided all mitigation activities as described in this report are implemented.

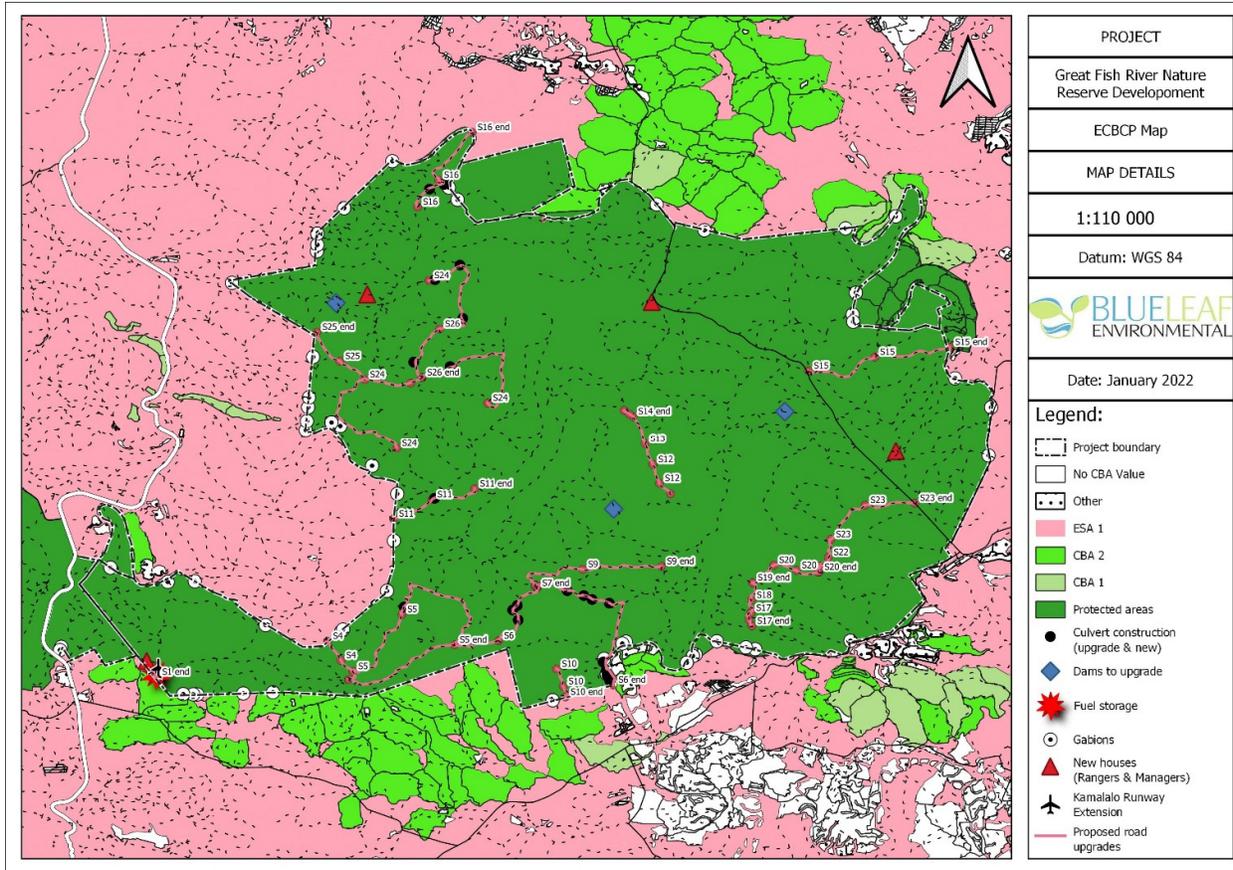


Figure 5.4: Biodiversity allocation of the study site and surrounding areas (ECBCP; 2019)

5.4 Vegetation

The South African National Biodiversity Institute (SANBI) vegetation map (called the VegMap; 2018) lists various vegetation types occurring within the GFRNR areas. Two biomes namely Savanna and Albany thicket meet within the GFRNR.

Albany thicket is a dense, woody, semi-succulent and thorny vegetation type of average height (2-3 m) and relatively impenetrable in an unaltered condition. The following thicket vegetation units occur within the study site. The proposed development activities within each vegetation unit are also listed. Refer to Figure 5.1 below for layout orientation:

Albany Thicket Vegetation Units	Activities proposed within the Vegetation unit
<p>Crossroads Grassland Thicket</p> <p>Thicket clumps are typical of Fish Thicket with sneezewood (<i>Ptaeroxylon obliquum</i>), katdoring (<i>Scutia myrtina</i>) and the emergent kiepersol (<i>Cussonia spicata</i>) as dominants. The rooigras - (<i>Themeda triandra</i>) dominated grassland matrix lacks sweet thorn (<i>Vachelia karroo</i>) when in a pristine condition.</p>	<ul style="list-style-type: none"> ➤ Road section S23. ➤ Two of the Ranger and Manager house clusters (merely an expansion of an existing cluster of houses). ➤ Small portion of the start of road section S15.
<p>Doubledrift Karroid Thicket</p> <p>Thicket clumps consist of species typical of Fish Valley Thicket, such as katdoring (<i>Scutia myrtina</i>); and the matrix is a mosaic of succulent karoo (<i>Pteronia incana</i> and <i>Aloiampelos tenuior</i>) and grassland (<i>Themeda</i></p>	<ul style="list-style-type: none"> ➤ Numerous gabion upgrades along the property boundary. ➤ Small portion of the start of road section 23. ➤ Small portion of the start of road section 22. ➤ One of the three dam upgrades. ➤ Most of road section S15.

Albany Thicket Vegetation Units	Activities proposed within the Vegetation unit
<i>triandra</i>).	
<p>Fish Arid Thicket</p> <p>Grows in the driest parts of the thicket biome, usually where the rainfall is less than 300 mm yr⁻¹. This thicket is much sparser in cover than the other types (it is often easy to walk between the thicket clumps) and is much shorter, seldom exceeding 3m in height. Universally common plants are gwarrie (<i>Euclea undulata</i>), spekboom (<i>Portulacaria afra</i>), pendoring (<i>Gymnosporia polyacantha</i>) and species of noors (<i>Euphorbia coerulescens</i> and <i>E. bothae</i>)</p>	<ul style="list-style-type: none"> ➤ Numerous gabion upgrades along the property boundary. ➤ One of the Ranger and Manager house clusters (merely an expansion of an existing cluster of houses). ➤ Road section S1. ➤ Road section S2. ➤ Road section S3. ➤ Development of a fuel storage site near the existing Kamadalo Runway. ➤ Extension of the existing Kamadalo Runway.
<p>Fish Mesic Thicket</p> <p>Denser forest like thicket occurring where there is abundant water.</p>	<ul style="list-style-type: none"> ➤ Road section S22.
<p>Fish Valley Thicket</p> <p>Woody trees such as doppruim (<i>Pappea capensis</i>) and gwarrie (<i>Euclea undulata</i>) are abundant, along with shrubs such as needlebush (<i>Azima tetraantha</i>), but tree euphorbias (<i>Euphorbia tetragona</i>) are sparse. This unit gives way rapidly to other thicket units in areas where fire can reach, while grazing impacts this unit so much that it appears nowadays to be as a mosaic thicket type.</p>	<ul style="list-style-type: none"> ➤ Road section S4, S5, S6 and S7. ➤ Road section S9, S10, S11, S12 and S13. ➤ Road section S15, S16, S17, S18, S19, S20 and S21. ➤ Road sections S24, S25 and S26. ➤ Two of the three dam upgrades. ➤ Numerous gabion upgrades along the property boundary ➤ Various culvert upgrades

Most **Savanna** has an herbaceous layer usually dominated by grass species and a discontinuous to sometimes very open tree layer. Savanna grasslands may grade into tree savanna, shrub savanna, savanna woodland and savanna parkland. Only one savanna type vegetation unit occurs within the GFRNR, namely Bhisho Thornveld.

Savanna Vegetation Unit	Activities proposed within the Vegetation unit
<p>Bhisho Thornveld</p> <p>Is a sub-escarpment type savanna that occurs on undulating to moderately steep slopes, sometimes in shallow, incised drainage valleys. The open savanna component is characterized by small trees of <i>Vachellia natalitia</i> with a short to medium, dense, sour grassy understory, usually dominated by <i>Themeda triandra</i> when in good condition. A diversity of other woody species also occurs, often increasing under conditions of overgrazing.</p>	<ul style="list-style-type: none"> ➤ A Single gabion upgrades along the property boundary

All these vegetation units are in pristine to near pristine conditions on site and carries a high probability for high plant biodiversity to occur. Various common as well as sensitive plant species occur on site. The GFRNR is a proclaimed protected area (according to the National Environmental Management Protected Areas Act; NEMPAA) which increases the probability for high biodiversity environments and a variety of plant SCC's. Land management as per the ECBCP Handbook (2019)

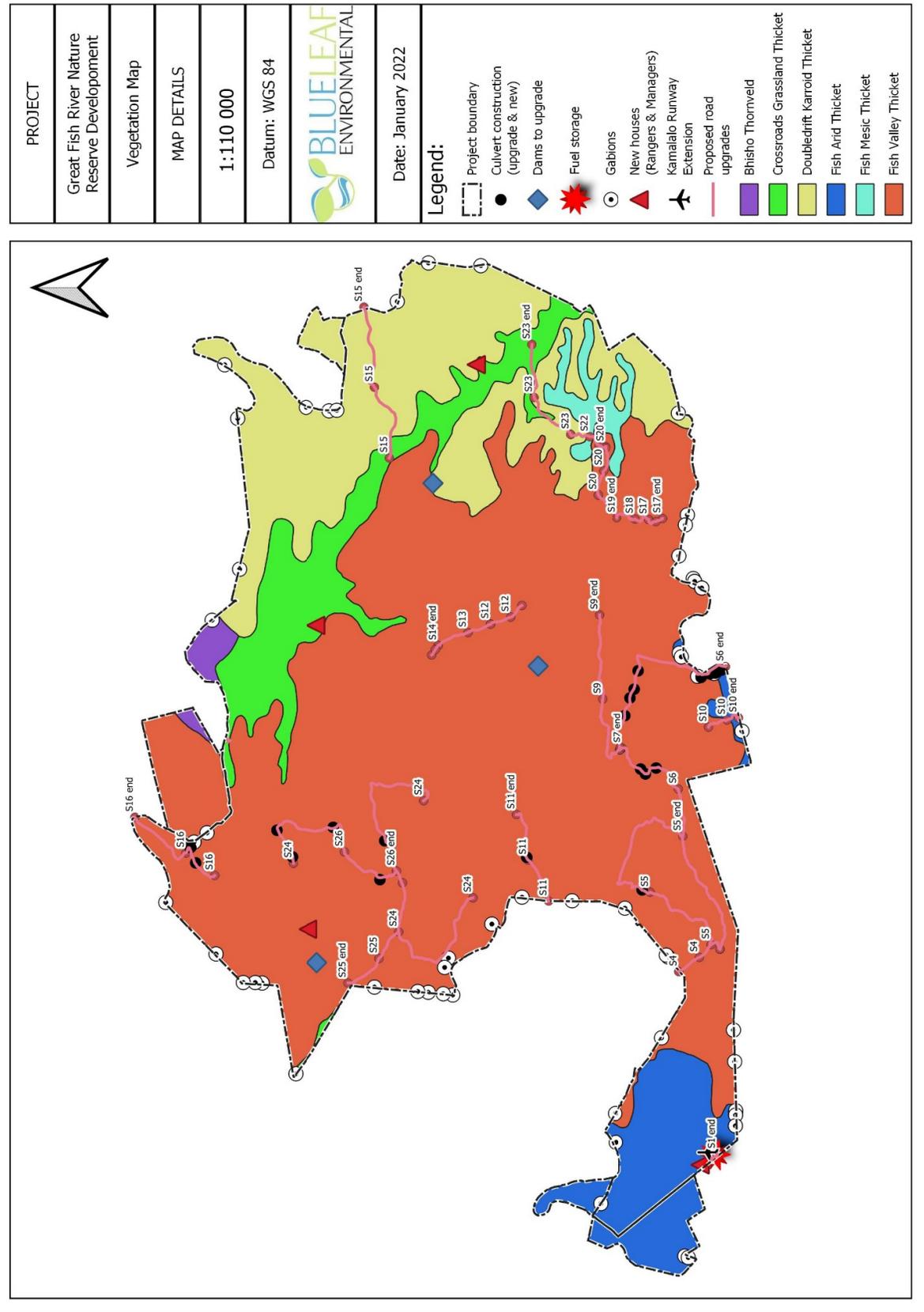


Figure 5.5: SANBI VegMap of the study site

5.5 Sensitive plant species

A variety of plant species were identified during the site visit. See Appendix A for a full list of all plant species identified on site. Species biodiversity is considered as high to very high with little alien invasive plants present. Various plant SCCs were observed during the site visit and are included in Table 5.1. The list also includes potential species not observed but indicated in literature to potentially occur in the area. Species listed in the Screening Report are also included. According to SANBI, the names of some of the sensitive species identified in the Screening Report may not appear in the final BAR report nor any of the specialist reports released into the public domain and are therefore just referred to as “Sensitive Species #”

It is important to note that the list is probably not complete. The size of the site was enormous while the proposed development sections were scattered throughout the site. A variety of vegetation units also exist, each with unique species that occur within their boundaries.

Table 5.1: List of plant SCC that may occur on site

FAMILY	SPECIES NAME	COMMON NAME	SENSITIVITY CLASSIFICATION
-	Sensitive species 1252*	-	VU (Red Data List)
-	Sensitive species 72*	-	VU (Red Data List)
-	Sensitive species 248*	-	VU (Red Data List)
-	Sensitive species 828*	-	VU (Red Data List)
-	Sensitive species 354*	-	VU (Red Data List)
-	Sensitive species 1248*	-	VU (Red Data List)
-	Sensitive species 19*	-	VU (Red Data List)
Apocynaceae	<i>Pachypodium bispinosum</i>	Thick foot	VU (Red Data List)
Fabaceae	<i>Aspalathus steudeliana</i>	Cape gorse	VU (Red Data List)
Geraniaceae	<i>Pelargonium exhibens</i>	Pelargonium	NT (Red Data List)

All proposed development footprints must undergo a Search and Rescue (S&R) exercise before any clearing commences. The S&R must be done by a qualified botanist. A Threatened or Protected Species (ToPS) permit must be obtained for any SCC found on site. This includes species found on site but not listed in this report.

5.1 Provincial Ordinance Permits

The following plant species are NOT considered as SCC but will still require permits for relocation as per Ordinance 19 of 1974. These permits must be obtained prior to commencement of any activity on site:

Table 5.2: List of plant species requiring permits

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
Aizoaceae	<i>Malephora verruculoides</i>		Sc 4 (PNCO)
	<i>Mesembryanthemum cordifolium</i>		Sc 4 (PNCO)
	<i>Mesembryanthemum granulicaule</i>		Sc 4 (PNCO)
	<i>Mesembryanthemum splendens</i>		Sc 4 (PNCO)
Amaryllidaceae	<i>Cyrtanthus smithiae</i>		Sc 4 (PNCO)
	<i>Haemanthus albiflos</i>		Sc 4 (PNCO)
Apocynaceae	<i>Ceropegia ampliata</i>		Sc 4 (PNCO)
	<i>Ceropegia haygarthii</i>		Sc 4 (PNCO)
	<i>Cynanchum gerrardii</i>		Sc 4 (PNCO)
	<i>Cynanchum ellipticum</i>		Sc 4 (PNCO)
	<i>Pachypodium succulentum</i>		Sc 4 (PNCO)
	<i>Raphionacme zeyheri</i>		Sc 4 (PNCO)

FAMILY	SPECIES NAME	COMMON NAME	CONSERVATION STATUS
	<i>Raphionacme flanaganii</i>		Sc 4 (PNCO)
Iridaceae	<i>Moraea polystachya</i>		Sc 4 (PNCO)
	<i>Tritonia laxifolia</i>		Sc 4 (PNCO)
Orchidaceae	<i>Eulophia streptopetala</i>		Sc 4 (PNCO)
	<i>Mystacidium capense</i>		Sc 4 (PNCO)
Scrophulariaceae	<i>Diascia cuneata</i>		Sc 4 (PNCO)

5.6 Site observations

The project area is in a dynamic landscape with a diversity of ecosystems and ecotones, which provide diverse opportunities for plant species diversity.

The site comprises largely of natural vegetation occurring on undulating landscape ranging between various thicket, and thornveld savanna ecotones. Water is readily available as the Great Fish River transects the GFRNR. The GFRNR is a legislated Nature Reserve where no agricultural or urban developments are allowed.

All these factors contribute greatly to providing a variety of ecosystems and species variety. Various existing databases were investigated during the desktop section to determine the potential of finding specific faunal species on site. This was done in addition to the site visit so that all potential species could be identified and not just the species observed during the site visit. As the Eastern Cape is in the middle of an ongoing drought and the site visit was conducted early summer this assessment could not only rely to what was observed on site.

Some of the ecosystems observed where development is proposed are illustrated below:



Denser thornveld occur mostly in the GFRNR:



Dense thicket in the background:



5.2 Current threats to plants and biodiversity

While ecosystems in the GFRNR are all intact, meaning intact plant communities and biodiversity-mediated processes, the GFRNR is a closed system with various impacts being exerted from outside the Nature Reserve. This includes encroachment of alien vegetation that pose a threat to the long-term survival of the Nature Reserve, and it is imperative to control them. Other common anthropogenic threats: for example, illegal plant removal for traditional medicines and trade – are imperceptible in the management of the GFRNR.

Threats to plant species also means threats to the ecological processes facilitated by plant communities, including loss in biodiversity (plant and animal loss), transport (pollination, seed dispersal, nutrient dispersal), and habitat architecture (plant forms).

6. Site sensitivity verification

Site plant species as well as terrestrial biodiversity sensitivities were determined for the entire GFRNR in the Eastern Cape Province. As more than 95% of the site will not be impacted by the proposed development, environmental constraints were identified and aligned with specific characteristics of the site within the impacted footprint only. The remainder of the GFRNR were classified as high sensitive as a default because of the site’s protection status (as per NEMPAA) The following site characteristics contributed to determining site sensitivity:

Site characteristic	Description of characteristic	Sensitivity allocation	Mitigatory requirements
Biodiversity	➤ The entire GFRNR is a protected landscape as per NEMPAA	High	All activities must be closely monitored by a qualified ECO to ensure that all proposed mitigation measures are implemented to manage and minimize potential impacts on the environment. Permits must be obtained to relocate all sensitive plants prior to commencement of any vegetation clearing.
	➤ Impacted areas	Moderate	
Vegetation	➤ Intact thicket containing various plant SCC.	High	
	➤ Section of vegetation throughout the GFRNR is transformed from previous land use	Moderate	These areas are preferred for housing infrastructure. Current houses are currently located in impacted landscapes.
	➤ Riverine areas along the Great Fish River	Very High	These areas should be avoided during construction. If impossible, mitigation in this report must be followed. Footprint outside the proposed construction footprint are considered as No-Go areas and must be avoided.

A detailed sensitivity map (Figure 6.1) for the study area was developed based on the above listed environmental characteristics found within the site.

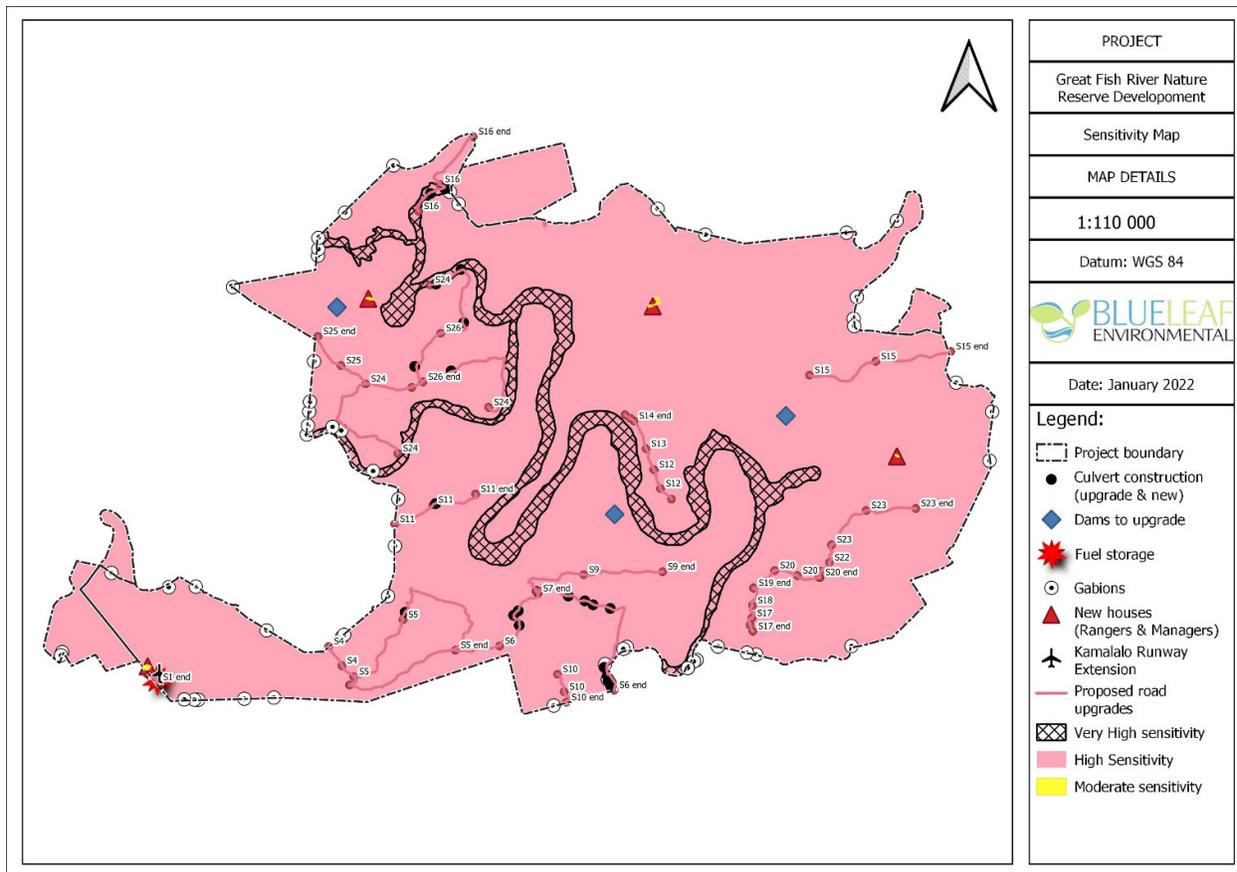


Figure 6.1: Terrestrial Plant and Biodiversity sensitivity map of the entire GFRNR

All housing development, fuel storage facility, and the Kamadalo runway extension will take place in areas already impacted by previous land uses and not considered as pristine vegetation. Existing houses are also

located in these areas. As a result, all these areas were given a moderate sensitivity (Figure 6.1). Minimal mitigations are required during construction.

Roads, culverts, and gabion infrastructure will be in high sensitivity areas. These areas will require a vegetation Search and Rescue (S&R) to relocate all plant SCC and other important species identified before any clearing commences. The S&R must be done by a qualified botanist. A Threatened or Protected Species (ToPS) as well as an Ordinance permit must be obtained from the competent authorities for plants relocated. This includes species subsequently found on site but not listed in this report.

Some minor roads will occur in Very High sensitive areas. These areas ARE NOT considered as No-Go areas and merely required additional mitigations as specified in section 7 below.

7. Impact assessment

The following issues were identified during the assessment of the GFRNR development area.

7.1 Identified impacts

The following faunal issues were identified during the assessment of the GFRNR development area:

#	Activity causing impact (Issue)	Description of impact
1.	Non-compliance to existing legislation	<p>1.1. Legal compliance Non-compliance with laws and policies of South Africa could lead to unnecessary delays in establishment activities, and potentially criminal cases, based on the severity of the non-compliance, being brought against the proponent and his/her contractors.</p>
2.	Vegetation clearing and construction	<p>2.1. Loss of natural vegetation Clearing will result in the loss of endemic thicket vegetation which acts as faunal habitats for various species.</p>
		<p>2.2. Loss of plant SCC Clearing may result in the loss of identified animal SCC.</p>
		<p>2.3. Spread of alien and invasive plant species Clearing of natural vegetation will increase the risk of alien plant species invasion.</p>
		<p>2.4. Illegal harvesting of plant species Illegal harvesting of SCC and other protected plant species by contract workers.</p>
		<p>2.5. Erosion of impacted areas Cleared areas with no ground cover has a high potential of soil erosion.</p>
3.	Rehabilitation of impacted areas	<p>2.6. Degradation of impacted areas Incorrect rehabilitation methods or a lack of any rehabilitation may result in the degradation of the impacted environment and loss of biodiversity.</p>

All impacts identified above were assessed as per the assessment methodology described in Chapter 4.3 of this report. Each impact was described below on how it will impact within a specific phase of the project, namely Planning and Design, Construction and Operations.

Consequence of Issue	Non-compliance with laws and policies of South Africa could lead to unnecessary delays in establishment activities, and potentially criminal cases, based on the severity of the non-compliance, being brought against the proponent and his/her contractors. Permits will be required for the removal of any protected animal species.
Number of impacts identified associated with this issue	Only 1 (Impact 1.1)

Impact 1.1: Legal compliance		
Phase of development: Planning and Design Phase		
Nature of impact	Non-compliance with faunal laws and policies of South Africa could lead to unnecessary delays in establishment activities, and potentially criminal cases, based on the severity of the non-compliance, being brought against the proponent and his/her contractors.	
Cumulative impact	None	
Indirect impacts	None	
Residual impacts	None	
Classification of impact	Consequence of Impact	
Duration of impact	Short term	Only during construction phase.
Extent of impact	National	Provincial approval will be required.
Probability of impact occurring	Medium	Impact will occur on commencement of construction.
Intensity of impact	Very low	Legislated approval is required to impact on any protected animal species.
Degree of reversibility	High	Permits and authorizations may be required.
Irreplaceability	Low	No resource will be lost.
Mitigations	Mitigatory potential	Recommended mitigations
	High	All relevant permits must be obtained prior to commencement of any activity on site from the competent authorities to remove protected and permitted plant species.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	High negative	Low negative

Consequence of issue	Clearing of natural vegetation will result in a range of issues including reducing the extent of existing vegetation communities, potential loss of plant species, an increasing the risk of alien vegetation spreading, poaching and increase in risk of erosion.
Number of impacts	5 (Impacts 2.1 to 2.5)

Impact 2.1: Loss of natural vegetation		
Phase of development: Construction Phase		
Nature of impact	Clearing will result in the loss of natural thicket and thornveld vegetation.	
Cumulative impact	Loss of pristine vegetation types	
Indirect impacts	Loss of habitat for animals	
Residual impacts	Permanent loss of natural intact vegetation.	
Classification of impact		Consequence of Impact
Duration of impact	Permanent	Clearing will result in the permanent loss of natural intact vegetation
Extent of impact	Site specific	Only vegetation within the construction footprint will be lost. This amounts to less than 1% of the vegetation within the GFRNR
Probability of impact occurring	Definite	Impact will occur on commencement of construction.
Intensity of impact	High negative	Some ecological processes will be altered.
Degree of reversibility	Moderate negative	Impact cannot be reversed but can be reduced through mitigations
Irreplaceability	Low	Extent of vegetation communities will be permanently lost within the construction footprint but are mitigatable through conservation targets within the GFRNR.
Mitigations	Mitigatory potential	Recommended mitigations
	Medium	<ul style="list-style-type: none"> - The construction footprint must be surveyed and demarcated prior to construction commencing. All contractors must be made aware of this demarcation. - All areas outside the demarcated footprint will be considered as No-Go areas. - No construction activities (temporary or permanent) will be allowed in these No-Go areas. - Temporary infrastructure such as the site camps, laydown areas and storage areas must be placed in areas already transformed and within the construction footprint. - No on-site fires will be permitted. This will reduce the risk of accidental veld fires and further vegetation loss. - The GFRNR rules and regulations must be always adhered to.
Significance of impact	Pre-mitigation significance	
	High negative	Low negative

Phase of development: Construction Phase		
Nature of impact	Clearing may result in the loss of identified and non-identified plant SCC.	
Cumulative impact	Reduction in individual protected plant species numbers.	
Indirect impacts	Loss in genetic variability within a specific protected plant species.	
Residual impacts	Reduction in individual protected plant species numbers.	
Classification of impact		Consequence of Impact
Duration of impact	Short term	Removal of SCC and other permitted plants will only occur during the initial stages of clearing.
Extent of impact	Site specific	Only SCC and other permitted plant species on site will be removed.
Probability of impact occurring	Definite	Impact will occur on commencement of construction.
Intensity of impact	High negative	Stu
Degree of reversibility	Low negative	Impact can be reversed through mitigation.
Irreplaceability	High	Individual plant species will be permanently lost.
Mitigations	Mitigatory potential	Recommended mitigations
	Medium	<ul style="list-style-type: none"> - Permits must be obtained to remove any plant SCC and protected species identified prior to commencement of any activity on site. - A Plant Search and Rescue must be conducted by a qualified botanist prior to commencement of any activity on site. - As many SCC and permitted plants as possible must be relocated into the surrounding areas. - A nursery will not be required if all plant species are immediately relocated to the surrounding environment. - No plant harvesting will be allowed.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	High negative	Low negative

Phase of development: Construction Phase		
Nature of impact	Clearing of natural vegetation will increase the risk of alien plant species invasion.	
Cumulative impact	Increase in regional spread of alien plants.	
Indirect impacts	Degradation of pristine faunal habitats by alien invasive plants.	
Residual impacts	Decreased risk of loss of faunal habitats outside the construction footprint.	
Classification of impact	Consequence of Impact	
Duration of impact	Medium term	Clearing will mostly occur in the first few months of construction.
Extent of impact	Regional	The construction footprint as well as surrounding areas will be impacted.
Probability of impact occurring	Medium	Impact will occur throughout construction phase.
Intensity of impact	Low negative	Areas will be cleared of vegetation.
Degree of reversibility	Moderate negative	Impact can be managed throughout all phases.
Irreplaceability	Low	Partial loss of resource. Natural functions are not affected.
Mitigations	Mitigatory potential	Recommended mitigations
	Medium	<ul style="list-style-type: none"> - Develop and implement an Alien Vegetation Management Plan to mitigate the establishment and spread of undesirable alien plant species during construction. - All visible alien plants must be continually removed during construction phase. - Removal must occur through appropriate methods such as hand pulling, application of chemicals, cutting, etc. as in accordance with the NEMBA: Alien Invasive Species Regulations.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	Moderate negative	Low negative

Phase of development: Construction Phase		
Nature of impact	Illegal harvesting of SCC and other permissible plant species by contract workers.	
Cumulative impact	Increase risk in sensitive plant species loss	
Indirect impacts	Loss in biodiversity and plant numbers	
Residual impacts	Decreased risk in loss of plant species.	
Classification of impact		Consequence of Impact
Duration of impact	Medium term	Risk of harvesting will occur throughout construction.
Extent of impact	Study area	Construction sites within the GFRNR area will be impacted.
Probability of impact occurring	Medium	Impact will occur throughout construction phase.
Intensity of impact	Low negative	Loss of both plant SCC and non-protected species
Degree of reversibility	Moderate negative	Impact can be managed throughout all phases.
Irreplaceability	Low	No loss of resource can be mitigated.
Mitigations	Mitigatory potential	Recommended mitigations
	Medium	<ul style="list-style-type: none"> - No harvesting of any plants will be allowed. - All construction workers will undergo a detailed induction before working on site. GFRNR will contribute information to this induction. - The GFRNR rules and regulations must be always adhered to.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	Low negative	Low negative

Phase of development: Construction Phase		
Nature of impact	Cleared areas with no ground cover has a high potential of soil erosion.	
Cumulative impact	Increase in regional erosional potential	
Indirect impacts	Sedimentation of surrounding rivers and streams	
Residual impacts	Decreased risk in loss of plant species and biodiversity.	
Classification of impact		Consequence of Impact
Duration of impact	Medium term	Risk of erosion will be highest during construction and rehabilitation.
Extent of impact	Study area	Construction areas within the GFRNR area will be impacted.
Probability of impact occurring	Medium	Impact will occur throughout construction and rehabilitation phases.
Intensity of impact	Moderate negative	High amount of healthy topsoil will be lost
Degree of reversibility	Moderate negative	Impact can be managed throughout all phases.
Irreplaceability	Low	Minimal loss of viable top and subsoil can be mitigated.
Mitigations	Mitigatory potential	Recommended mitigations
	Medium	<ul style="list-style-type: none"> - Weekly monitoring of site and surrounding areas for erosion. - Maintain a monitoring register. - Any erosion must be addressed immediately. - Develop and implement a Rehabilitation Management Plan (RMP). This can also be in the form of a method statement - Rehabilitated areas must be monitored until the entire site is revegetated by primary growth.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	Moderate negative	Low negative

Consequence of Issue	Incorrect rehabilitation methods or a lack of any rehabilitation may result in the degradation of the impacted environment and loss of biodiversity.
Number of impacts identified associated with this issue	Only 1 (Impact 3.1)

Impact 3.1: Degradation of impacted areas		
Phase of development: Construction Phase		
Nature of impact	Rehabilitation is an important part of construction, especially in high sensitivity areas. Incorrect rehabilitation methods or a lack of any rehabilitation may result in the degradation of the impacted environment and lead to the loss of a biodiversity sensitive area.	
Cumulative impact	Increase in natural vegetation loss.	
Indirect impacts	Erosion and sedimentation of surrounding aquatic environments. Loss of animal habitats.	
Residual impacts	Decreased risk in plant and biodiversity loss.	
Classification of impact	Consequence of Impact	
Duration of impact	Medium term	During construction and rehabilitation phases.
Extent of impact	Study site	Impacted and surrounding areas.
Probability of impact occurring	Medium	Impact will occur on commencement of construction.
Intensity of impact	Medium	All impacted areas will be affected
Degree of reversibility	High	All impacted areas can be rehabilitated back to vegetated areas.
Irreplaceability	Moderate	Some areas will be lost. These mostly included developed areas.
Mitigations	Mitigatory potential	Recommended mitigations
	High	<ul style="list-style-type: none"> - Implement all previous mentioned mitigation measures throughout construction and rehabilitation. - Draft all proposed Management Plans/method statements prior to commencement of construction for approval by the EAP/Environmental Officer. - Avoid any risk of veldfires on site. No fires will be allowed on site.
Significance of impact	Pre-mitigation significance	Post-mitigation significance
	High negative	Low negative

8. Conclusion

The ECPTA is undertaking the upgrading of infrastructure in the GFRNR in the Eastern Cape Province. JG Africa has been appointed to undertake a Basic Assessment on behalf of the developer. The DFFE Screening Report that JG Africa generated specified specialist studies to be conducted as part of the Basic Assessment process. The Screening Report further indicated the Plant Species Theme Sensitivity as **MODERATE SENSITIVITY** and Terrestrial Biodiversity as **HIGH SENSITIVITY**. BlueLeaf Environmental (Pty) Ltd (BlueLeaf) was appointed to conduct a full Plant Species as well as a Terrestrial Biodiversity Impact Assessment as part of the Basic Assessment for the proposed development of the GFRNR in the Eastern Cape Province. This report addresses both themes as listed in the Screening Report.

The project area is in a dynamic landscape with a diversity of habitat types and ecotones, which provide great diversity in plant communities.

The area itself comprises largely of a vegetated undulating landscape ranging between various thicket ecotones ranging between open patched, almost savanna type vegetation to dense valley thicket. Water is readily available as the Great Fish River transects the GFRNR. The GFRNR is a legislated Nature Reserve where no agricultural or urban development are allowed.

All these factors contribute greatly to providing a variety of vegetation units. Various existing databases were investigated during the desktop section to determine the potential of finding specific plant species on site. This was done in addition to the site visit so that all potential species could be identified and not just the species observed during the site visit. As the Eastern Cape is in the middle of an ongoing drought and the site visit was conducted early summer this assessment could NOT only rely to what was observed on site.

A total of 244 plant species were identified to potentially occur in the GFRNR. Refer to Appendix 1 for a complete list of all plant species. A high amount of plant species is expected to occur in the construction area, some only seasonally and depending on the availability of resources like water and sunlight.

Ten plant SCC (including those identified in the DFFE Screening Report) and 18 other plants requiring permits before relocation were identified. While most of these species were not observed during the site visit, they are still included due to the vastness of the site and proposed construction.

8.1. Site sensitivity

Site sensitivity was determined for two environmental themes as listed in the DFFE Screening Report as well as for the entire GFRNR. Because the site is a Nature Reserve with intact and pristine faunal habitats occurring throughout the site, the entire GFRNR site has been classified as follows:

- **Very High to High Sensitivity for Terrestrial Biodiversity**
- **High of Plant Species**

This would usually mean that no development be allowed in the site but because of the nature of the proposed development within the GFRNR (upgrading internal infrastructures to improve security and management efficiency), the proposed development activities may be allowed provided all mitigation activities as described in this report are implemented. This will ensure a reduced risk on identified plant

and terrestrial biodiversity sensitivities within the GFRNR.

8.2. Alternatives

No site alternatives or layout alternatives are proposed. The proposed development is NOT considered as fatally flawed provided that all mitigation measures provided in this report are implemented.

8.3. Cumulative impacts

In terms of Environmental Impact Assessment, Cumulative Impact is defined as:

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

The following cumulative impacts were identified:

1. Loss of natural plant communities. This will result in the loss of natural plant communities providing ecological support for a variety of ecosystem services. This impact is mitigated by classifying all areas outside the construction footprint as No-Go areas. No construction, temporary or permanent, must occur in the No-Go area.
2. Loss of sensitive plant species. This will result in the loss of a variety of plant SCC and other sensitive species located within the GFRNR. As per point 1, this impact is mitigated by classifying all areas outside the construction footprint as No-Go areas. No construction, temporary or permanent, must occur in the No-Go area.
3. Increased risk of alien vegetation spreading to surrounding areas because of vegetation clearing. This impact can be easily managed through the development and implementation of an Alien and Invasive Species Management Plan. It is important to note that this plan must be implemented in both construction and operational phases of the proposed new development.

8.4. Levels of acceptable change

The proposed development is considered as an acceptable change to the environment provided all proposed mitigations are implemented.

8.5. Levels to be avoided

The proposed development may result in the negative impact on biodiversity and plant species loss. Provided that all mitigation measures proposed in this report are implemented, including the classification of the No-Go area where no construction activities, vegetation clearing or poaching may occur, these risks are considered as an acceptable change to the local environment.

8.6. Current impacts

The following impacts are currently occurring on site and will be reduced/altered through the proposed development:

- Encroachment of alien vegetation that pose a threat to the long-term survival of the Nature Reserve. Left unmitigated, it is likely that alien vegetation will continue to spread and reduce the quality of local habitats.
- Plant harvesting for trade or use in traditional medicines is always an indirect threat to plant species, especially sensitive species within the Nature Reserve. It is believed that developing the park and upgrading infrastructure will result in better management opportunities to reduce this risk.

8.7. Mitigations

The following mitigations must be included into the final EMP for the project:

Legal compliance

- All relevant permits must be obtained prior to commencement of any activity on site from the competent authorities to remove SCC and protected plant species.

Loss of natural vegetation

- The construction footprint must be surveyed and demarcated prior to construction commencing. All contractors must be made aware of this demarcation.
- All areas outside the demarcated footprint will be considered as No-Go areas.
- No construction activities (temporary or permanent) will be allowed in these No-Go areas.
- Temporary infrastructure such as the site camps, laydown areas and storage areas must be placed in areas already transformed and within the construction footprint.
- No on-site fires will be permitted. This will reduce the risk of accidental veld fires and further vegetation loss.
- The GFRNR rules and regulations must be always adhered to.

Loss of plant SCC

- Permits must be obtained to remove any plant SCC and protected species identified prior to commencement of any activity on site.
- A Plant Search and Rescue must be conducted by a qualified botanist prior to commencement of any activity on site.
- As many SCC and permitted plants as possible must be relocated into the surrounding areas.
- A nursery will not be required if all plant species are immediately relocated to the surrounding environment.
- No plant harvesting will be allowed.

Spread of Alien and Invasive plant species

- Develop and implement an Alien Vegetation Management Plan to mitigate the establishment and spread of undesirable alien plant species during construction.
- All visible alien plants must be continually removed during construction phase.
- Removal must occur through appropriate methods such as hand pulling, application of chemicals, cutting, etc. as in accordance with the NEMBA: Alien Invasive Species Regulations.

Illegal harvesting of plant species

- No harvesting of any plants will be allowed.
- All construction workers will undergo a detailed induction before working on site. GFRNR will contribute information to this induction.
- The GFRNR rule and regulations must be always adhered to.

Erosion of impacted areas

- Weekly monitoring of site and surrounding areas for erosion.
- Maintain a monitoring register.
- Any erosion must be addressed immediately.
- Develop and implement a Rehabilitation Management Plan (RMP). This can also be in the form of a method statement.
- Rehabilitated areas must be monitored until the entire site is revegetated by primary growth.

Degradation of impacted areas

- Implement all previous mentioned mitigation measures throughout construction and rehabilitation.
- Draft all proposed Management Plans/method statements prior to commencement of construction or approval by the EAP/Environmental Officer.
- Avoid any risk of veldfires on site. No fires will be allowed on site.

8.8. General rehabilitation measures

A Rehabilitation Plan are recommended for inclusion into the EMPr. This plan should include (at minimum) measures for control alien vegetation management. The following rehabilitation conditions must be included into the EMPr:

Alien Vegetation Management

- Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented.
- Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish.
- Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds.

8.9. Additional mitigations

Any specific faunal mitigations enforced by the GFRNR as part of their Management Plan for the Nature Reserve must be acknowledged and incorporated into the project EMPr.

8.10. Specialist opinion

The proposed development is NOT considered to be Fatally Flawed and no components of the proposed project have been identified as flawed.

No site or layout alternatives are proposed.

Both Terrestrial Biodiversity as well as Plant Species impacts of all aspects for the proposed GFRNR development project were assessed and considered to be acceptable, provided that all mitigation measures provided in this report are implemented.

9. Reference

ACOCKS, J.P.H. 1953, 1988. Veld types of South Africa. Memoir of the Botanical Survey of South Africa 57: 1-146.

COATES-PALGRAVE, K & COATES-PALGRAVE, M. 2003. Trees of southern Africa. 3rd edition. Struik, Cape Town.

DRIVER, M., RAIMONDO, D., MAZE, K., PFAB, M.F. AND HELME, N.A. 2009. APPLICATIONS OF THE RED LIST FOR CONSERVATION PRACTITIONERS. IN: D. RAIMONDO, L. VON STADEN, W. FODEN, J.E. VICTOR, N.A. HELME, R.C. TURNER, D.A. KAMUNDI AND P.A. MANYAMA (EDS). Red List of South African Plants. *Strelitzia* 25:41-52. South African National Biodiversity Institute, Pretoria.

GERMISHUIZEN, G. & MEYER, N.L. (Eds). 2003. Plants of southern Africa: an annotated checklist. *Strelitzia* 14. NBI, Pretoria.

GIBBS RUSSELL, G.E. et al. 1990. Grasses of southern Africa. Memoir of the Botanical Survey of South Africa 58: 1 – 437.

IUCN. 2012. Red List of Threatened Species. IUCN Species Survival Commission, Cambridge Available: <http://www.iucnredlist.org/> (Accessed 03/03/2017).

MUCINA, L. & RUTHERFORD, M.C. 2012. The vegetation of South Africa, Lesotho and Swaziland. SANBI, Pretoria.

NEM:BA. 2014. National Environmental Management Act: Biodiversity Act (No. 10 of 2004) – Alien and Invasive Species lists, 2014. Government Gazette, No. 37320, 12 February 2014.

NFA. 1998. National Forests Act (No. 84 of 1998).

Appendix A: Lists of faunal species

The following lists were obtained through a mixture of field observations, interviews with Rangers and existing floral databases. It is important to note that the list is probably not complete. The size of the site was enormous while the proposed development sections were scattered throughout the site. A variety of vegetation units also exist, each with unique species that occur within their boundaries. These lists further contain species that may potentially occur on site and were not necessarily observed on site. Floral SCC are highlighted green while Non-SCC species requiring permits for removal/relocation are highlighted red:

FAMILY	SPECIES NAME		CONSERVATION STATUS
-	Sensitive species 1252*	-	
-	Sensitive species 72*	-	-
-	Sensitive species 248*	-	-
-	Sensitive species 828*	-	-
-	Sensitive species 354*	-	-
-	Sensitive species 1248*	-	-
-	Sensitive species 19*	-	-
Acanthaceae	<i>Barleria</i>	<i>pungens</i>	LC
	<i>Blepharis</i>	<i>capensis</i>	LC
	<i>Blepharis</i>	<i>sinuata</i>	LC
	<i>Isoglossa</i>	<i>origanoides</i>	LC
Aizoaceae	<i>Aizoon</i>	<i>glinoides</i>	LC
	<i>Malephora</i>	<i>verruculoides</i>	Sc 4 (PNCO)
	<i>Mesembryanthemum</i>	<i>cordifolium</i>	Sc 4 (PNCO)
	<i>Mesembryanthemum</i>	<i>granulicaule</i>	Sc 4 (PNCO)
	<i>Mesembryanthemum</i>	<i>splendens</i>	Sc 4 (PNCO)
Amaranthaceae	<i>Salsola</i>	<i>kali</i>	Alien invasive
	<i>Suaeda</i>	<i>fruticosa</i>	LC
	<i>Cyrtanthus</i>	<i>smithiae</i>	Sc 4 (PNCO)
	<i>Haemanthus</i>	<i>albiflos</i>	Sc 4 (PNCO)
Anacardiaceae	<i>Searsia</i>	<i>longispina</i>	LC
	<i>Searsia</i>	<i>dentata</i>	LC
	<i>Searsia</i>	<i>magalismontana</i>	LC
Apiaceae	<i>Heteromorpha</i>	<i>arborescens</i>	LC
	<i>Lichtensteinia</i>	<i>interrupta</i>	LC
Apocynaceae	<i>Ceropegia</i>	<i>ampliata</i>	Sc 4 (PNCO)
	<i>Ceropegia</i>	<i>haygarthii</i>	Sc 4 (PNCO)
	<i>Cynanchum</i>	<i>gerrardii</i>	Sc 4 (PNCO)
	<i>Cynanchum</i>	<i>ellipticum</i>	Sc 4 (PNCO)
	<i>Pachypodium</i>	<i>succulentum</i>	Sc 4 (PNCO)
	<i>Pachypodium</i>	<i>bispinosum</i>	VU (Red Data List)
	<i>Raphionacme</i>	<i>zeyheri</i>	Sc 4 (PNCO)
	<i>Raphionacme</i>	<i>flanaganii</i>	Sc 4 (PNCO)
Aponogetonaceae	<i>Aponogeton</i>	<i>desertorum</i>	LC
Araceae	<i>Lemna</i>	<i>gibba</i>	LC
Araliaceae	<i>Cussonia</i>	<i>spicata</i>	LC
Asparagaceae	<i>Asparagus</i>	<i>africanus</i>	LC
	<i>Asparagus</i>	<i>mariae</i>	LC

FAMILY	SPECIES NAME		CONSERVATION STATUS
	<i>Asparagus</i>	<i>subulatus</i>	LC
	<i>Asparagus</i>	<i>multiflorus</i>	LC
	<i>Asparagus</i>	<i>striatus</i>	LC
Asphodelaceae	<i>Aloe</i>	<i>ferox</i>	LC
	<i>Aloiampelos</i>	<i>tenuior</i>	LC
	<i>Bulbine</i>	<i>longifolia</i>	LC
	<i>Bulbine</i>	<i>frutescens</i>	LC
	<i>Gasteria</i>	<i>bicolor</i>	LC
	<i>Gasteria</i>	<i>excelsa</i>	LC
	<i>Haworthia</i>	<i>cymbiformis</i>	Not evaluated
	<i>Haworthia</i>	<i>cooperi</i>	Not evaluated
	<i>Haworthiopsis</i>	<i>attenuata</i>	LC
	<i>Haworthiopsis</i>	<i>coarctata</i>	LC
	<i>Haworthiopsis</i>	<i>nigra</i>	LC
	<i>Haworthiopsis</i>	<i>tessellata</i>	LC
	<i>Haworthiopsis</i>	<i>coarctata</i>	LC
Asteraceae	<i>Amellus</i>	<i>strigosus</i>	LC
	<i>Berkheya</i>	<i>decurrens</i>	LC
	<i>Cineraria</i>	<i>deltoidea</i>	LC
	<i>Curio</i>	<i>talinoides</i>	LC
	<i>Curio</i>	<i>radicans</i>	LC
	<i>Doellia</i>	<i>cafra</i>	LC
	<i>Eriocephalus</i>	<i>africanus</i>	LC
	<i>Euryops</i>	<i>spathaceus</i>	LC
	<i>Felicia</i>	<i>fascicularis</i>	LC
	<i>Felicia</i>	<i>ovata</i>	LC
	<i>Garuleum</i>	<i>bipinnatum</i>	LC
	<i>Helichrysum</i>	<i>pentzioides</i>	LC
	<i>Hilliardiella</i>	<i>aristata</i>	LC
	<i>Hilliardiella</i>	<i>hirsuta</i>	LC
	<i>Hypochaeris</i>	<i>microcephala</i>	Alien naturalised
	<i>Ifloga</i>	<i>glomerata</i>	LC
	<i>Phymaspermum</i>	<i>parvifolium</i>	LC
	<i>Pteronia</i>	<i>incana</i>	LC
	<i>Pteronia</i>	<i>teretifolia</i>	LC
	<i>Pulicaria</i>	<i>scabra</i>	LC
	<i>Schkuhria</i>	<i>pinnata</i>	Alien naturalised
	<i>Senecio</i>	<i>angulatus</i>	LC
	<i>Senecio</i>	<i>brachypodus</i>	LC
	<i>Senecio</i>	<i>oxyodontus</i>	LC
	<i>Troglophyton</i>	<i>capillaceum</i>	LC
	<i>Verbesina</i>	<i>encelioides</i>	Alien naturalised
Balanophoraceae	<i>Sarcophyte</i>	<i>sanguinea</i>	LC
Boraginaceae	<i>Lappula</i>	<i>heteracantha</i>	Alien naturalised
Brassicaceae	<i>Heliophila</i>	<i>suavissima</i>	LC
	<i>Heliophila</i>	<i>brachycarpa</i>	LC
	<i>Raphanus</i>	<i>raphanistrum</i>	Alien invasive

FAMILY	SPECIES NAME		CONSERVATION STATUS
Campanulaceae	<i>Wahlenbergia</i>	<i>undulata</i>	LC
Capparaceae	<i>Boscia</i>	<i>oleoides</i>	LC
	<i>Cadaba</i>	<i>aphylla</i>	LC
	<i>Cadaba</i>	<i>natalensis</i>	LC
	<i>Capparis</i>	<i>sepiaria</i>	LC
Celastraceae	<i>Cassine</i>	<i>peragua</i>	LC
	<i>Gymnosporia</i>	<i>capitata</i>	LC
	<i>Mystroxyton</i>	<i>aethiopicum</i>	LC
	<i>Pleurostyliia</i>	<i>capensis</i>	LC
	<i>Putterlickia</i>	<i>pyracantha</i>	LC
Colchicaceae	<i>Colchicum</i>	<i>melanthioides</i>	LC
Commelinaceae	<i>Commelina</i>	<i>benghalensis</i>	LC
Convolvulaceae	<i>Cuscuta</i>	<i>campestris</i>	Alien invasive
	<i>Falkia</i>	<i>repens</i>	LC
	<i>Ipomoea</i>	<i>pes-caprae</i>	LC
	<i>Ipomoea</i>	<i>oenotheroides</i>	LC
Crassulaceae	<i>Cotyledon</i>	<i>velutina</i>	LC
	<i>Crassula</i>	<i>expansa</i>	LC
	<i>Crassula</i>	<i>cordata</i>	LC
	<i>Crassula</i>	<i>mesembryanthoides</i>	LC
	<i>Crassula</i>	<i>socialis</i>	LC
	<i>Crassula</i>	<i>capitella</i>	LC
	<i>Crassula</i>	<i>tetragona</i>	LC
Cucurbitaceae	<i>Kedrostis</i>	<i>africana</i>	LC
Cyperaceae	<i>Cyperus</i>	<i>longus</i>	Not evaluated
	<i>Cyperus</i>	<i>usitatus</i>	LC
	<i>Cyperus</i>	<i>pulcher</i>	LC
	<i>Cyperus</i>	<i>difformis</i>	LC
	<i>Cyperus</i>	<i>laevigatus</i>	LC
	<i>Cyperus</i>	<i>congestus</i>	LC
	<i>Isolepis</i>	<i>cernua</i>	LC
Didiereaceae	<i>Portulacaria</i>	<i>afra</i>	LC
Ebenaceae	<i>Diospyros</i>	<i>scabrida</i>	LC
Euphorbiaceae	<i>Acalypha</i>	<i>ecklonii</i>	LC
	<i>Adenocline</i>	<i>acuta</i>	LC
	<i>Croton</i>	<i>rivularis</i>	LC
	<i>Dalechampia</i>	<i>capensis</i>	LC
	<i>Euphorbia</i>	<i>rhombifolia</i>	LC
	<i>Euphorbia</i>	<i>huttoniae</i>	LC
	<i>Euphorbia</i>	<i>pentagona</i>	LC
	<i>Euphorbia</i>	<i>tetragona</i>	LC
	<i>Euphorbia</i>	<i>stellata</i>	LC
	<i>Euphorbia</i>	<i>caerulescens</i>	LC
	<i>Jatropha</i>	<i>capensis</i>	LC
Fabaceae	<i>Aspalathus</i>	<i>cinerascens</i>	LC
	<i>Aspalathus</i>	<i>steudeliana</i>	VU (Red Data List)
	<i>Calpurnia</i>	<i>aurea</i>	LC

FAMILY	SPECIES NAME		CONSERVATION STATUS
	<i>Crotalaria</i>	<i>capensis</i>	LC
	<i>Dolichos</i>	<i>hastaeformis</i>	LC
	<i>Indigastrum</i>	<i>niveum</i>	LC
	<i>Indigofera</i>	<i>colutea</i>	LC
	<i>Indigofera</i>	<i>dimidiata</i>	LC
	<i>Rhynchosia</i>	<i>ciliata</i>	LC
	<i>Schotia</i>	<i>afra</i>	LC
	<i>Schotia</i>	<i>afra</i>	LC
	<i>Schotia</i>	<i>afra</i>	LC
	<i>Schotia</i>	<i>latifolia</i>	LC
	<i>Senegalia</i>	<i>caffra</i>	LC
	<i>Sesbania</i>	<i>punicea</i>	Alien invasive
	<i>Tephrosia</i>	<i>multijuga</i>	LC
	<i>Tephrosia</i>	<i>capensis</i>	LC
Funariaceae	<i>Funaria</i>	<i>rottleri</i>	LC
Geraniaceae	<i>Monsonia</i>	<i>vanderietiae</i>	LC
	<i>Pelargonium</i>	<i>elongatum</i>	LC
	<i>Pelargonium</i>	<i>inquinans</i>	LC
	<i>Pelargonium</i>	<i>sidoides</i>	LC
	<i>Pelargonium</i>	<i>ionidiflorum</i>	LC
	<i>Pelargonium</i>	<i>laxum</i>	LC
	<i>Pelargonium</i>	<i>exhibens</i>	NT (Red Data List)
Hyacinthaceae	<i>Drimia</i>	<i>intricata</i>	LC
	<i>Drimia</i>	<i>acarophylla</i>	LC
	<i>Lachenalia</i>	<i>bowkeri</i>	LC
	<i>Ledebouria</i>	<i>undulata</i>	LC
Hypoxidaceae	<i>Empodium</i>	<i>plicatum</i>	LC
Icacinaceae	<i>Apodytes</i>	<i>dimidiata</i>	LC
Iridaceae	<i>Moraea</i>	<i>polystachya</i>	Sc 4 (PNCO)
	<i>Tritonia</i>	<i>laxifolia</i>	Sc 4 (PNCO)
Kewaceae	<i>Kewa</i>	<i>bowkeriana</i>	LC
Lamiaceae	<i>Leonotis</i>	<i>martinicensis</i>	LC
	<i>Leonotis</i>	<i>pentadentata</i>	LC
	<i>Ocimum</i>	<i>burchellianum</i>	LC
	<i>Plectranthus</i>	<i>neochilus</i>	LC
	<i>Salvia</i>	<i>aurita</i>	LC
	<i>Tetradenia</i>	<i>barberae</i>	LC
Lobeliaceae	<i>Monopsis</i>	<i>scabra</i>	LC
	<i>Monopsis</i>	<i>unidentata</i>	LC
Loranthaceae	<i>Erianthemum</i>	<i>dregei</i>	LC
Malvaceae	<i>Abutilon</i>	<i>grantii</i>	LC
	<i>Grewia</i>	<i>robusta</i>	LC
	<i>Hermannia</i>	<i>sp.</i>	LC
	<i>Hermannia</i>	<i>gracilis</i>	LC
	<i>Hibiscus</i>	<i>aridus</i>	LC
	<i>Malvastrum</i>	<i>coromandelianum</i>	Alien invasive
	<i>Sida</i>	<i>ternata</i>	LC

FAMILY	SPECIES NAME		CONSERVATION STATUS
Marsileaceae	<i>Marsilea</i>	<i>macrocarpa</i>	LC
Menispermaceae	<i>Cissampelos</i>	<i>capensis</i>	LC
Molluginaceae	<i>Pharnaceum</i>	<i>trigonum</i>	LC
Moraceae	<i>Ficus</i>	<i>burkei</i>	LC
Oleaceae	<i>Jasminum</i>	<i>multipartitum</i>	LC
Orchidaceae	<i>Eulophia</i>	<i>streptopetala</i>	Sc 4 (PNCO)
	<i>Mystacidium</i>	<i>capense</i>	Sc 4 (PNCO)
Orobanchaceae	<i>Striga</i>	<i>gesnerioides</i>	LC
Oxalidaceae	<i>Oxalis</i>	<i>flava</i>	LC
	<i>Oxalis</i>	<i>stenorrhyncha</i>	LC
	<i>Oxalis</i>	<i>semiloba</i>	LC
Phyllanthaceae	<i>Flueggea</i>	<i>verrucosa</i>	LC
Poaceae	<i>Aristida</i>	<i>congesta</i>	LC
	<i>Aristida</i>	<i>diffusa</i>	LC
	<i>Cenchrus</i>	<i>ciliaris</i>	LC
	<i>Digitaria</i>	<i>eriantha</i>	LC
	<i>Eleusine</i>	<i>coracana</i>	LC
	<i>Eragrostis</i>	<i>cilianensis</i>	LC
	<i>Eragrostis</i>	<i>obtusa</i>	LC
	<i>Leptochloa</i>	<i>eleusine</i>	LC
	<i>Oropetium</i>	<i>capense</i>	LC
	<i>Panicum</i>	<i>deustum</i>	LC
	<i>Panicum</i>	<i>stapfianum</i>	LC
	<i>Paspalum</i>	<i>distichum</i>	Alien invasive
	<i>Setaria</i>	<i>nigrirostris</i>	LC
	<i>Setaria</i>	<i>sphacelata</i>	LC
	<i>Sporobolus</i>	<i>fimbriatus</i>	LC
	<i>Sporobolus</i>	<i>nitens</i>	LC
	<i>Tenaxia</i>	<i>disticha</i>	LC
<i>Tribolium</i>	<i>curvum</i>	LC	
<i>Urochloa</i>	<i>panicoides</i>	LC	
Polygalaceae	<i>Polygala</i>	<i>uncinata</i>	LC
	<i>Polygala</i>	<i>virgata</i>	LC
	<i>Polygala</i>	<i>myrtifolia</i>	LC
Polygonaceae	<i>Triplaris</i>	<i>americana</i>	Alien invasive
Pteridaceae	<i>Cheilanthes</i>	<i>hirta</i>	LC
	<i>Cheilanthes</i>	<i>hirta</i>	LC
Rhamnaceae	<i>Ziziphus</i>	<i>mucronata</i>	LC
Rubiaceae	<i>Coddia</i>	<i>rudis</i>	LC
	<i>Pavetta</i>	<i>capensis</i>	LC
	<i>Psychotria</i>	<i>capensis</i>	Not evaluated
Ruppiaceae	<i>Ruppia</i>	<i>cirrrosa</i>	LC
Ruscaceae	<i>Sansevieria</i>	<i>hyacinthoides</i>	LC
Rutaceae	<i>Agathosma</i>	<i>ovata</i>	LC
Salvadoraceae	<i>Azima</i>	<i>tetracantha</i>	LC
Santalaceae	<i>Osyridicarpos</i>	<i>schimperianus</i>	LC
	<i>Viscum</i>	<i>rotundifolium</i>	LC

FAMILY	SPECIES NAME		CONSERVATION STATUS
	<i>Allophylus</i>	<i>natalensis</i>	LC
Sapindaceae	<i>Allophylus</i>	<i>decipiens</i>	LC
Scrophulariaceae	<i>Chaenostoma</i>	<i>polyanthum</i>	LC
	<i>Diascia</i>	<i>cuneata</i>	Sc 4 (PNCO)
	<i>Jamesbrittenia</i>	<i>albanensis</i>	LC
	<i>Limosella</i>	<i>grandiflora</i>	LC
	<i>Nemesia</i>	<i>cynanchifolia</i>	LC
	<i>Nemesia</i>	<i>floribunda</i>	LC
	<i>Selago</i>	<i>paniculata</i>	LC
	<i>Zaluzianskya</i>	<i>peduncularis</i>	LC
	<i>Zaluzianskya</i>	<i>vallispiscis</i>	LC
Solanaceae	<i>Lycium</i>	<i>oxycarpum</i>	LC
	<i>Solanum</i>	<i>linnaeanum</i>	LC
	<i>Solanum</i>	<i>humile</i>	LC
Tecophilaeaceae	<i>Cyanella</i>	<i>lutea</i>	LC
Urticaceae	<i>Droguetia</i>	<i>ambigua</i>	LC
Verbenaceae	<i>Chascanum</i>	<i>cuneifolium</i>	LC
	<i>Lantana</i>	<i>rugosa</i>	LC
	<i>Lippia</i>	<i>javanica</i>	LC
Vitaceae	<i>Cyphostemma</i>	<i>quinatum</i>	LC
	<i>Rhoicissus</i>	<i>tridentata</i>	Not evaluated
Zygophyllaceae	<i>Roepera</i>	<i>foetida</i>	LC



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

TERRESTRIAL PLANT SPECIES ASSESSMENT FOR THE PROPOSED INFRASTRUCTURE DEVELOPMENT AND UPGRADES IN THE GREAT FISH RIVER NATURE RESERVE, WITHIN THE MAKANA LOCAL MUNICIPALITY, RAYMOND MAHLABA LOCAL MUNICIPALITY AND NGQUSHWA LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	BlueLeaf Environmental (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
Specialist name:	Mr Roy de Kock		
Specialist Qualifications:	MSc (Botany) - 2010.		
Professional affiliation/registration:	SACNASP (400216/16) SAAB IAIAsa		
Physical address:	38 Tulip Avenue, Sunridge Park, Port Elizabeth		
Postal address:	38 Tulip Avenue, Sunridge Park, Port Elizabeth		
Postal code:	6045	Cell:	076 281 9660
Telephone:	-	Fax:	-
E-mail:	roy@blueleafenviro.co.za		

2. DECLARATION BY THE SPECIALIST

I, Roy de Kock, declare that –

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


Signature of the Specialist

BlueLeaf Environmental (Pty) Ltd

Name of Company:

28 June 2023

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Roy de Kock, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

BlueLeaf Environmental (Pty) Ltd

Name of Company

28 June 2023

Date



Signature of the Commissioner of Oaths

28 June 2023

Date

COMMISSIONER OF OATHS
CHARL MEISTRE
Ex Officio - Professional Accountant (SA)
23 Bernard Road, Charlo, Port Elizabeth, 6070
082 737 1406

Curriculum Vitae

I worked as an environmental consultant for the past 14 years and since December 2019 have been self-employed as a botanical, agricultural and soil specialist. I have a BSc Hons in Geology, an MSc in Botany and is currently completing a PhD in Botany/Soil science. I have experience in project management and have led numerous EIAs in the Eastern Cape, Northern Cape, Gauteng, Mpumalanga, and North West Provinces. My projects include SANRAL road projects, renewable energy developments, mining applications (quarries and BPs), mixed-use developments and numerous smaller infrastructure EIAs. My largest project was a multi-million Rand Special Economic Zone (SEZ) development in Upington, Northern Cape. Before studying I worked as a financial advisor for ABSA Bank for 9 years and have 3 years high school mathematics and science teaching experience.

Personal Details

Name	Roy de Kock
Identification number	7606 2205 3202 082
Current address	31 Aster Avenue, Sunridge Park, Port Elizabeth, Eastern Cape, South Africa
Email	roy@blueleafenviro.co.za
Contact number	+27 76 281 9660
Driver's license	Code 08 (EB)
Language competencies	English (excellent verbal and writing) Afrikaans (excellent verbal and writing)

Education

Qualification	Institution	Year
PhD Botany and Soil Science	Nelson Mandela University	Current
MSc Botany	Nelson Mandela University	2010
BSc (Hons.) Geology	Nelson Mandela University	2008
BSc Botany & Geology	Nelson Mandela University	2007
Diploma in Marketing	University of Witwatersrand	2003

Skill Highlights

Project Management and Environmental Consulting	<ul style="list-style-type: none">– Extensive experience in project management and have led numerous projects of various scales throughout South Africa.– Managed over 200 projects over an 11-year period.– Managed up to 15 projects at a single time.
---	--

	<ul style="list-style-type: none"> – My projects included SANRAL road projects, renewable energy developments, mining applications (quarries and BPs), mixed-use developments and numerous smaller infrastructure EIAs. – My largest project was a multi-million Rand Special Economic Zone development in Upington, Northern Cape. – Experience in conservation management and have developed various management plans for protected areas within the Eastern Cape and Gauteng.
Environmental Legislation	<p>I have extensive experience in interpreting and applying the following International, National, Provincial legislation:</p> <p><u>International:</u></p> <ul style="list-style-type: none"> – IFC Performance Standards – Equator Principles <p><u>National:</u></p> <ul style="list-style-type: none"> – National Environmental Management Act – National Environmental Management Act (EIA Regulations) – National Environmental Management Waste Act – National Environmental Management Air Quality Act – National Environmental Management Biodiversity Act – National Environmental Management Protected Areas Act – National Water Act – National Forestry Act – Conservation of Agricultural Resources Act <p><u>Provincial</u></p> <p>I am well versed in provincial environmental legislation and regulations in the following provinces:</p> <ul style="list-style-type: none"> – Gauteng – Western Cape – Eastern Cape – Northern Cape – North West – Mpumalanga
Specialist consulting	<ul style="list-style-type: none"> – Worked as a specialist for the last 11 years while managing projects. – Self-employed as a botanical and soil specialist since January 2020. – SACNASP registered as a Professional Natural Scientist. – Written over 50 botanical, ecological and biodiversity assessments.

	<ul style="list-style-type: none"> – Done over 25 agricultural and soil assessments for numerous mining (and other) EIAs throughout SA and Mozambique and even have experience drafting rehabilitation and closure plans for large mines (graphite, REEs, Iron). – In the last 2-3 years I have started drafting wetland and river assessments – Drafted a few visual assessments throughout the years. – Done numerous Water Use Licences for a variety of clients including farmers, contractors and developers
Finance	<ul style="list-style-type: none"> – 9 years working experience as a financial advisor for ABSA Bank. – Consulted commercial clients to assist in cash flow issues – Done retail consulting for small businesses and private individuals
Teaching	<ul style="list-style-type: none"> – 3 years' experience in teaching Mathematics, Science, Biology and Geography to High School grades. – 1-year experience in teaching advance mathematics as an online course to Secondary School grades.
Environmental Auditing	<ul style="list-style-type: none"> – Drafted over 100 environmental and safety protocols for various developers throughout South Africa – Implemented and audited numerous environmental and safety protocols during all phases of development (Planning, construction, operations, decommissioning and closure) – Drafted numerous Environmental and Social Management Systems (ESMS) for international clients – Audited various ESMS's throughout South Africa

Work Experience

Environmental and Soil Consultant

BlueLeaf Environmental (Pty) Ltd – 12/2019 to current

- Conducting specialist studies for various projects in South Africa including:
 - Ecological assessments
 - Biodiversity studies
 - Agricultural and Soil assessments
 - Aquatic assessments
 - Visual assessments
- Water Use Licensing (abstraction, borehole, bridges & culverts)

- Plant and animal relocation permits (National and Provincial)
- Plant and animal Search and Rescue.
- Environmental Risk Assessments
- Mine Rehabilitation and Closure Plans

Principal Environmental Consultant

Employer: CES Environmental and Social Advisory Services, East London, Eastern Cape - 04/2010 to 12/2019

- Managed numerous projects of various sizes including budget management, client liaison, timeframe targets, managing junior consultants and sub-consultants.
- Prepared environmental impact assessment (EIA) reports in terms of relevant EIA legislation and regulations for development proposals including: Infrastructure projects: bulk water and waste water, roads, electrical, mining, ports, aquaculture, renewable energy (solar and wind), industrial processes, housing developments, golf estates and resorts, etc.
- Projects have also included preparation of applications in terms of other statutory requirements, such as water-use and mining license /permit applications.

Feasibility assessments

- Managed projects to develop pre-feasibility and feasibility assessments for various projects, including various tourism developments, infrastructure projects, etc.

Specialist studies

- Conducting specialist studies for various projects in both South Africa and the rest of Africa (Mozambique, Madagascar, Zambia, Malawi) including:
 - Ecological assessments
 - Agricultural and Soil assessments
 - Aquatic assessments
 - Water Use Licensing (abstraction, borehole, bridges & culverts)
 - Plant and animal relocation permits (National and Provincial), and
 - Plant and animal Search and Rescue.

Laboratory technician

Nelson Mandela University (Faculties of Botany, Zoology and Biochemistry, Port Elizabeth, Eastern Cape – 02/2009 to 03/2010

Assisting students and postgraduates in receiving, labeling, and analyzing samples, design, set-up and conducting of experiments. Designing and executing laboratory testing according standard procedures. General laboratory maintenance of equipment including calibrations, glassware, and chemicals.

School Teacher

Hananja Private School, Jeffreys Bay, Eastern Cape – 01/2007 to 12/2009
Private online tutor East London, Eastern Cape – 01/2020 to current

Teaching Grades 8 to 12 Mathematics, Geography, Biology and Science.
Online teaching Advanced Mathematics and Science Grades 4-7 (2019-current)

Financial Advisor

ABSA Bank Florida, Gauteng – 02/1995 to 12/2003

Assisting clients to determine their expenses, income, insurance coverage, financial objectives, tax status, risk tolerance, or other information needed to develop a financial plan. Answering client questions about financial plans and strategies and giving financial advice. Also worked as:

- Bankteller
- Enquiries clerk
- Administrative assistant
- Treasurer
- Retail sales consultant

Professional Registrations

- SACNASP – Registered as a professional natural scientist (Ref 400216/16)
- IAIASa – Registered as an environmental practitioner
- SAAB – South African Association of Botanists
- LaRSSA – Land Rehabilitation Society of South Africa



herewith certifies that

Roy de Kock

Registration Number: 400216/16

is a registered 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 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **21 September 2016**

Expires **31 March 2024**



Chairperson

Chief Executive Officer

