TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT FOR THE PROPOSED CONSTRUCTION AND UPGRADING OF ROAD D5010 AND D5021 INCLUDING THE ASSOCIATED INFRASTRUCTURE WITHIN THE LEPELLE-NKUMPI AND FETAKGOMO TUBATSE LOCAL MUNICIPALITIES, CAPRICORN AND SEKHUKHUNE DISTRICT MUNICIPALITIES, LIMPOPO PROVINCE (RAL/T1282/2025).



This report addresses the terrestrial biodiversity impacts associated with the proposed bridge construction, in line with the requirements of the Terrestrial Biodiversity Protocol (2020).

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October 2026

CONDITIONS RELATING TO THIS REPORT

DECLARATION OF INTEREST

Ntumbuluko Consulting Pty (Ltd) has no vested interest in the property studied nor is it affiliated with any other person/body involved with the property and/or proposed development. Ntumbuluko Consulting Pty (Ltd) is not a subsidiary, legally or financially of the proponent. The study was undertaken by Mr Tshuxekani Maluleke, he is a registered Natural Scientists with the following details:

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EXECUTIVE SUMMARY

Ntumbuluko Consulting (Pty) Ltd was appointed by QEMS Management and Business Solutions CC, on behalf of the Roads Agency Limpopo (RAL), to undertake a Terrestrial Biodiversity Impact Assessment for the proposed construction of a bridge along Road D5010 in Nkotokwane, and the installation of culverts and a new section of Road D5021 between Nkotokwane and Apel. The project falls within the Fetakgomo Tubatse Local Municipality (Sekhukhune District) and the Lepelle-Nkumpi Local Municipality (Capricorn District).

The national Screening Tool initially classified the terrestrial biodiversity theme as "Very High" sensitivity, but the field assessment confirmed that the actual on-site sensitivity is Low due to extensive historical disturbance, livestock grazing, informal access routes, and long-term vegetation transformation. The footprint occurs within the Sekhukhune Plains Bushveld (SVcb 27) vegetation unit, which is Vulnerable, and is mapped as a Critical Biodiversity Area 1 (CBA 1) adjacent to a CBA 2 associated with the Olifants River.

The spring survey recorded low floral diversity within the footprint, with no indigenous ethnobotanical species present and only a single *Catharanthus roseus* individual observed. Protected trees *Boscia albitrunca* and *Spirostachys africana* occur in the surrounding bushveld but outside the development footprint. Invasive alien plants, including *Argemone mexicana* and *Solanum mauritianum*, are present and require active management.

The broader bushveld and riparian-associated terrestrial habitats support moderate faunal value, including several bird species and dragonflies along the riverbank. Within the footprint, faunal activity is limited to common arachnids, reflecting the degraded habitat condition. Grazing livestock were observed onsite, contributing to soil compaction, reduced groundcover, and suppression of indigenous vegetation recruitment.

Overall, the proposed development is expected to result in localised, short-term impacts on terrestrial biodiversity, primarily associated with vegetation clearing, soil disturbance, and temporary faunal displacement. These impacts are manageable and reversible with appropriate mitigation.

Key Recommendations

- Maintain strict adherence to the approved footprint to avoid impacts on nearby protected trees and intact bushveld habitat.

- Implement alien plant control targeting *Argemone mexicana* and *Solanum mauritianum*.
- Prevent encroachment into riparian-associated terrestrial habitat linked to the Olifants River.
- Manage livestock access during construction to reduce soil disturbance and support rehabilitation.
- Rehabilitate disturbed areas using locally appropriate indigenous species.

With mitigation in place, the project is unlikely to result in significant long-term impacts on terrestrial biodiversity or compromise ecological functioning within the surrounding bushveld and riparian corridor.

The proposed bridge may be supported for approval subject to strict adherence to the Environmental Management Programme (EMPr) and all associated environmental and permitting requirements. Construction activities must remain within the authorised footprint, avoid sensitive terrestrial biodiversity receptors wherever feasible, and implement all mitigation and rehabilitation measures as prescribed. Compliance with the EMPr will ensure that the bridge upgrade proceeds without compromising ecological integrity or the functioning of surrounding habitats.

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LIST OF ABBREVIATIONS

ALARP	As Low as Reasonably Practicable
BES	Biodiversity and Ecosystem Services
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CR	Critically Endangered
ESA	Ecological Support Areas
EN	Endangered
GIS	Geographic Information System
I&APS	Interested & Affected Parties
IPPC	International Plant Protection Convention
IUCN	International Union for Conservation of Nature
LC	Least Concern
NBF	National Biodiversity Framework
NEMA	National Environmental Management Act (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NT	Near Threatened
PA	Protected Areas
SANBI	South African National Biodiversity Institute
SSC	Species of Special Concern
VU	Vulnerable

DEFINITIONS

Alien animal	(a) Any live vertebrate, including a bird and a reptile, but excluding a fish, belonging to a species or subspecies that is not a recognised domestic species and the natural habitat of which is not in the Republic; or (b) The egg of such vertebrate.
Biodiversity	Means the diversity of animals, plants or other organisms, including the diversity of animals, plants or other organisms found within and between— (a) Ecosystems; (b) Habitats; (c) The ecological complexes of which these systems and habitats are part; and (d) Species.
CITES	Means the Convention on International Trade in Endangered Species of Wild Fauna and Flora;
Endangered Species	Means a species is endangered when it is facing a very high risk of extinction in the wild in the near future and includes— (*a*) Any living or dead specimen of such a species; or (*b*) Any egg, skin, bone, feather, seed, flower or any other part or derivative of such a species.
Environment	Means the surroundings within which humans exist and that are made up of— (*a*) The land, water and atmosphere of the earth; (*b*) Microorganisms, plant and animal life; (*c*) Any part or combination of (*a*) and (*b*) and the interrelationships amongst and between them; and (*d*) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
Indigenous plant	(*a*) Means any living or dead plant which is indigenous to the Republic, whether artificially propagated or in its wild state; and (*b*) Includes the flower, pollen, seed, cone, fruit, bulb, tuber, stem or root or any other part or derivative of such plant but does not include a plant declared a weed in terms of any legislation.

Protected area	Means— (*a*) A provincial nature reserves; (*b*) A site of ecological importance; (*c*) A protected environment; (*d*) A private nature reserves; or (*e*) A resource use area.
Protected environment	Means an area declared a Protected Environment or Private Nature Reserve in terms of section 21 (1) (*a*).

1 INTRODUCTION

Ntumbuluko Consulting (Pty) Ltd has been appointed by QEMS Management and Business Solutions CC, on behalf of the Roads Agency Limpopo (RAL) (SOC) Ltd (hereafter referred to as RAL), to conduct a Terrestrial Biodiversity Impact Assessment for the proposed construction of a bridge associated with the upgrading of Roads D5010 and D5021, including all related supporting infrastructure, within the Lepelle-Nkumpi and Fetakgomo Tubatse Local Municipalities, situated in the Capricorn and Sekhukhune District Municipalities, Limpopo Province (RAL/T1282/2025).

The purpose of this assessment is to describe and characterise the terrestrial environment, habitats and species present within the bridge development footprint. Biodiversity is defined according to the National Environmental Management: Biodiversity Act of 2004 (NEMBA), as "the variability among living organisms from all sources including, terrestrial, aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems". The NEMBA legislation upholds the country's commitment to the protection of South Africa's biological resources, and it is imperative that development takes place in a sustainable way to achieve this.

A terrestrial biodiversity survey was conducted on **09 October 2026**, during the early wet season. The survey covered the full extent of the proposed development footprint and was undertaken using a stratified sampling methodology. Habitat types and sensitive terrestrial biodiversity receptors were identified and described across the project area, and potential impacts on these receptors were assessed.

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements. As per the results of the Screening Report generated for the proposed shopping centre the terrestrial biodiversity theme sensitivity is classified as "Very High".

Due to the "Very High" sensitivity rating of the site, a full Terrestrial Biodiversity Specialist Assessment (this report) has been undertaken as part of the Environmental Impact

Assessment Process. The findings and recommendations of this report should inform the Environmental Assessment Practitioner (EAP) and regulatory authorities to make informed decisions as to the ecological viability of the existing development.

2 BACKGROUND AND PROJECT DESCRIPTION

The proposed project entails the upgrading of Road D5010 in Nkotokwane and the installation of culverts and the construction of a new section of Road D5021 between Nkotokwane and Apel. Both roads will be upgraded from gravel to a bituminous surfaced standard. The proposed development also includes the construction of a new 1,687 m² bridge which is 140m long over the Olifants River (**Figure *2-1***). The total length of the proposed road works is approximately 3.6 km, comprising 2.2 km for the upgrading of Road D5010 and 1.4 km for the construction of the new Road D5021(**Figure *2-2***). In addition, the project includes applications for the excavation of five borrow pits to provide construction materials for the road and bridge works.

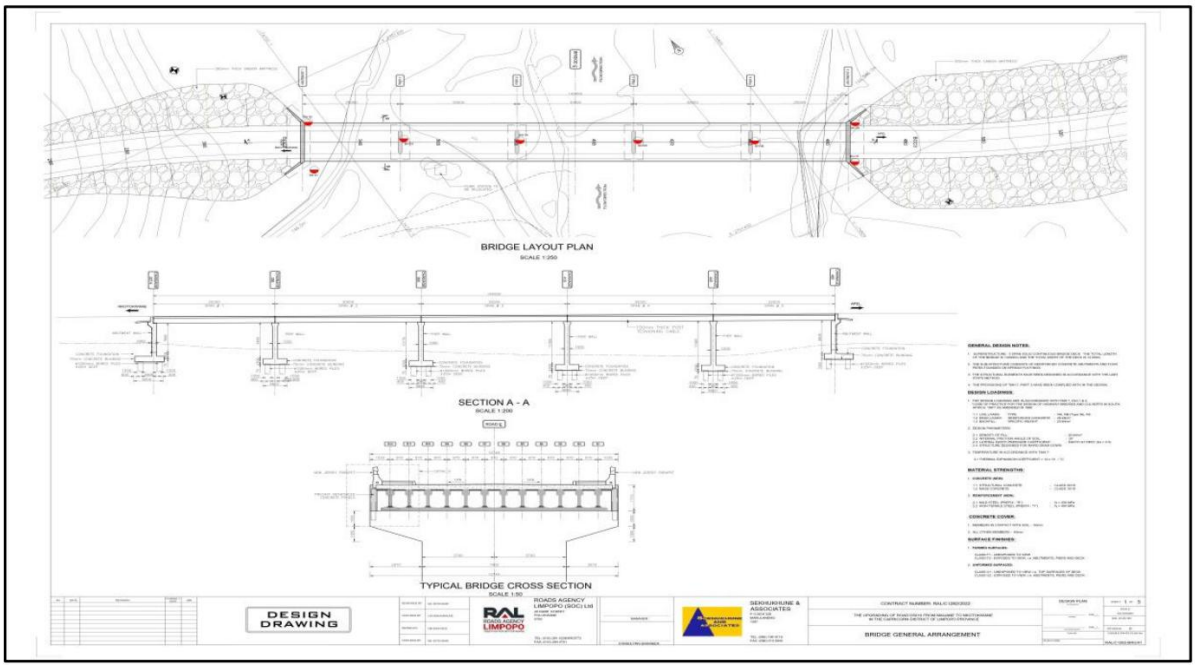


Figure 2-1: Design Drawings of the proposed bridge

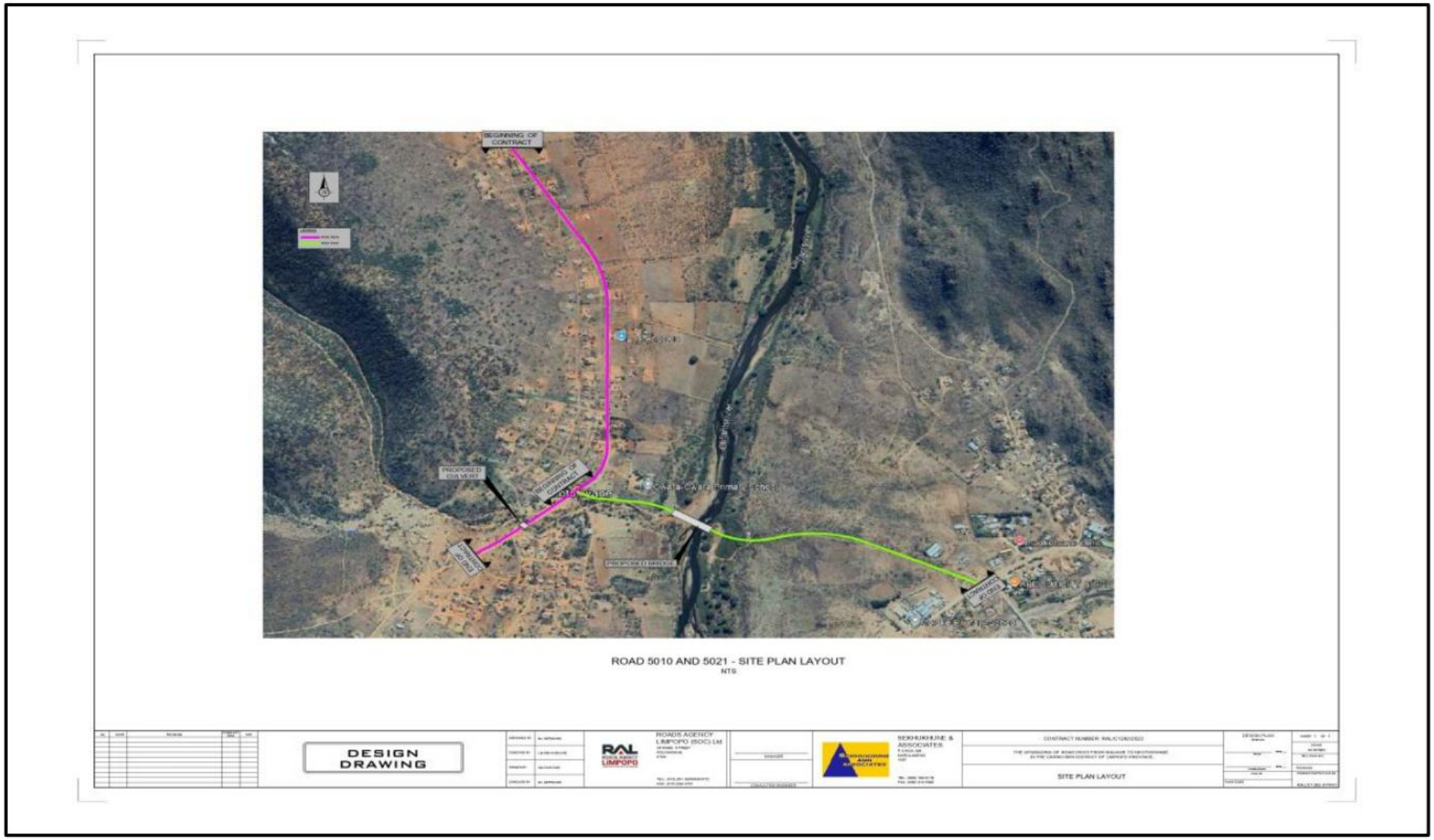


Figure 2-2: Project Layout Plan

3 STUDY AREA

The proposed new Road D5021 will be located on Portion 0 of Farm Olifantspoort 479 KS, Portions 0 and 2 of Farm Mooiplaats 516 KS, and Portion 0 of Farm Eerste Recht 502 KS in Apel and Nkotokwane villages. The road traverses both the Fetakgomo Tubatse Local Municipality, Sekhukhune District Municipality, and the Lepelle-Nkumpi Local Municipality, Capricorn District Municipality.

The proposed bridge over the Olifants River will be located on Portion 0 of Farm Olifantspoort 479 KS, Portions 0 and 2 of Farm Mooiplaats 516 KS, and Portion 0 of Farm Eerste Recht 502 KS. The bridge site spans the boundary between the Fetakgomo Tubatse Local Municipality within the Sekhukhune District Municipality and the Lepelle-Nkumpi Local Municipality within the Capricorn District Municipality.

Road D5010 is located on Portion 0 of Farm Olifantspoort 479 KS in Nkotokwane Village, within the Lepelle-Nkumpi Local Municipality, Capricorn District Municipality, Limpopo Province (**Figure 3-1** and **Figure 3-2**). The coordinates of the Bridge are outlined below:

Start point: 24°24'50.92"S 29°44'12.54"E

End point: 24°24'51.38"S 29°44'18.21"E

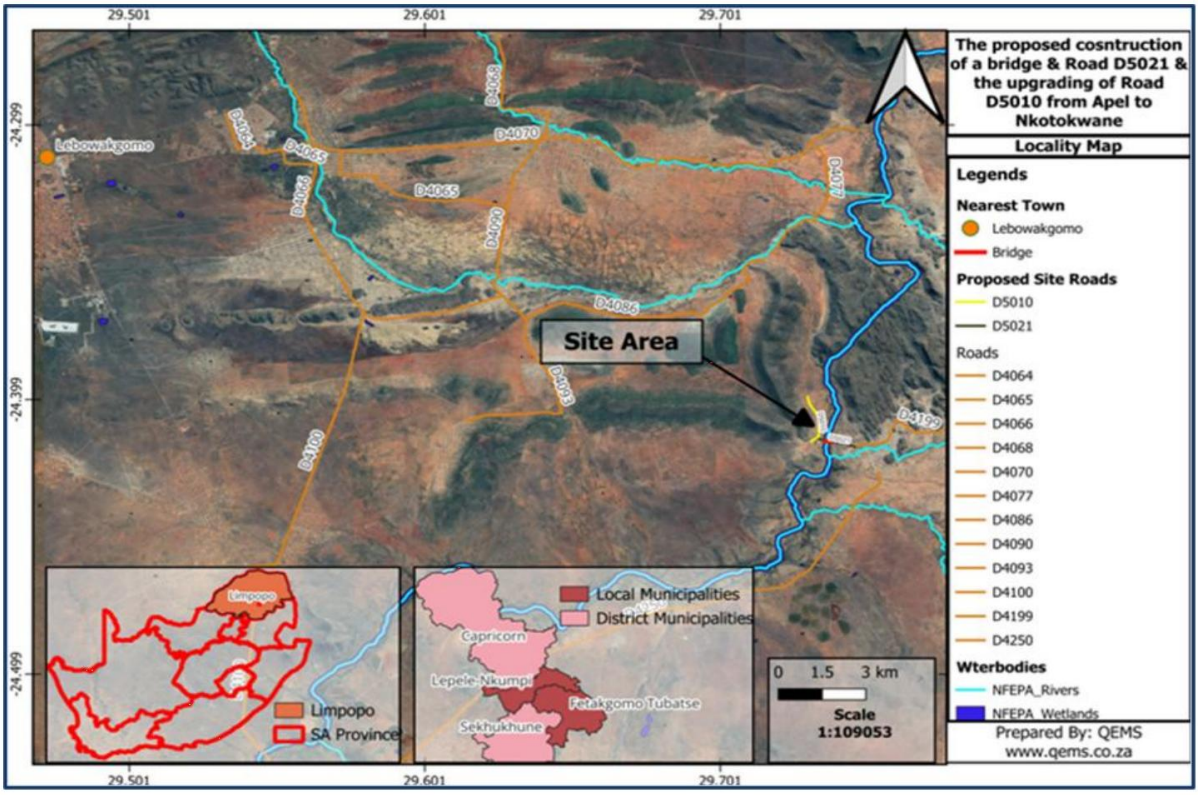


Figure 3-1: Overview of the study area (Source: QEMS, 2026)

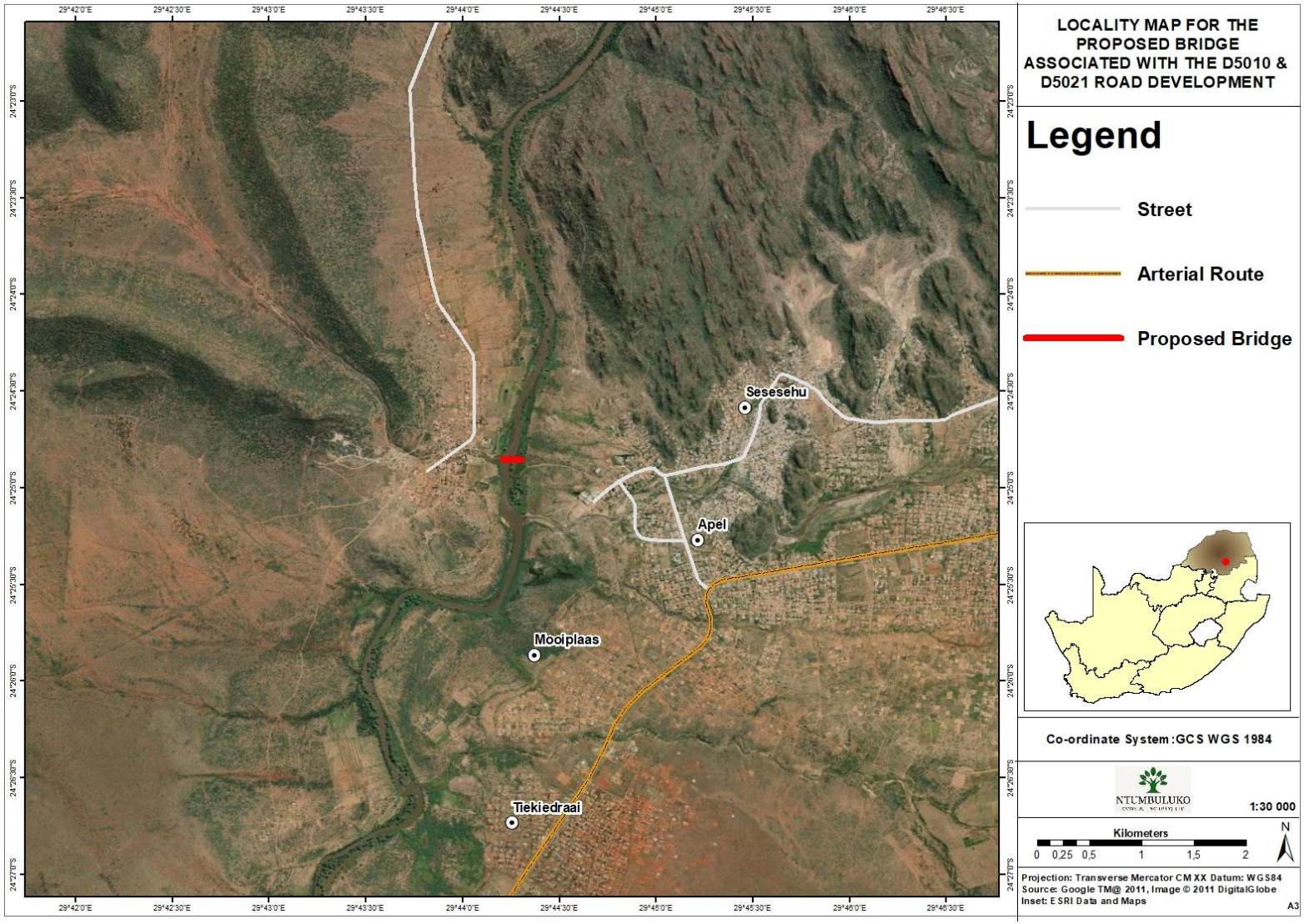


Figure 3-2: Locality Map for the Bridge

4 TERMS OF REFERENCE

Ntumbuluko Consulting Pty (Ltd) has been appointed to undertake the following specialist functions:

- Assess the impacts of the proposed construction of the bridge on both the fauna and flora.
- Provide mitigation measures, rehabilitation process and/or vegetation removal procedures that would reduce the potential impacts of the developments on biodiversity.

4.1 SCOPE OF STUDY

4.1.1 Floral study:

- Conduct fieldwork to locate and identify the current state of vegetation on the around the bridge development footprint.
- Determine the species that are present within the bridge development footprint.
- Identify sensitive vegetation types and critical biodiversity areas within the bridge development footprint.
- Identify Critical Biodiversity and Ecological Support Areas within the bridge development footprint.
- Determine whether the location of the proposed development is located within the distribution range of species listed as Vulnerable, Endangered or Critically Endangered and Protected.
- Provide photographic evidence of the current state of vegetation onsite (i.e. natural or transformed, disturbed etc.) identify and describe the conservation value and conservation planning that are relevant to the site.
- Determine alien species present onsite and the recommended management actions.
- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on the vegetation species during construction, operation and decommissioning phases of the project.
- Identification of issues and potential direct, indirect and cumulative biodiversity impacts.
- Provide monitoring requirements, mitigation measures and recommendations.

4.1.2 Faunal study:

- Conduct fieldwork to describe and assess the current state of terrestrial fauna in the area.
- Describe the existing micro-habitats, and the species associated with those habitats.
- Provide a description of species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
    - This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development.

5 LEGAL FRAMEWORK

The following national and provincial legislative guidelines and requirements were followed as part of this study:

5.1 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO 107 OF 1998) (NEMA) AS AMENDED

This Act embraces all three (3) fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures. NEMA provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

5.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO 10 OF 2004) (NEM: BA)

NEMBA was signed into law in mid-2004 and entered into effect on 1 September 2004. NEM: BA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. Certain activities, known as Restricted Activities, are

regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

5.3 THE NATIONAL BIODIVERSITY FRAMEWORK (2017-2022)

The National Biodiversity Framework (NBF) is a requirement under Section 38 of the National Environmental Management: Biodiversity Act (Act 10 of 2004, hereafter referred to as the 'Biodiversity Act'). The NBF is a short to medium-term coordination tool that shows the alignment between the strategic objectives and outcomes identified in the National Biodiversity Strategy and Action Plan (NBSAP v.2, 2015) and other key national strategies, frameworks and systems that currently guide the work of the biodiversity sector and identifies mechanisms through which this work is coordinated. It also identifies a set of interventions or "acceleration measures" that can unlock or fast-track implementation of the NBSAP and indicates the relative roles of the many agencies involved in implementing these activities. The purpose of the NBF is not to provide a comprehensive review of all work currently undertaken in the biodiversity sector, nor to list all of the actions required to conserve and manage South Africa's biodiversity in support of sustainable development.

5.4 LIMPOPO ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 7 OF 2003)

This Act makes provision with respect to the protection and conservation of the environment in the Limpopo Province. It makes provision for a wide variety of matters regarding the environment including protected areas, hunting of wild and exotic animals, the establishment of Wildlife Councils, inland fishing and the protection and aquatic systems. The Act prioritizes the protection of indigenous plants, the application of CITES, restrictions on development and environmental impact reports. The Act makes provision for the declaration and protection:

- Site of Ecological Importance;
- Protected Environments and Private Nature Reserves; and
- Mountain catchment area.

5.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO 43 OF 1983) (CARA):

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

5.6 THE NATIONAL FOREST ACT (ACT NO 84 OF 1998) (NFA)

The main objective of the National Forests Act, 1998 is to promote sustainable management and development of forests and to provide protection for certain forests and trees. This said protection is provided through the protection of all natural forests (Section 7 (1), the protection of all trees declared to be protected in terms of section 12(1) of the Act, and the regulation of certain activities in a proclaimed State Forest (Section 23(1)(a) – (k)). It should be noted that there are other environmental legislation administered by other State Departments that also regulate natural resources. The Act is responsible for:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in South Africa;
- Provide special measures for the protection of certain forests and protected trees;
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promotes community forestry; and
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

5.7 CONVENTION ON BIOLOGICAL DIVERSITY

The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species, and genetic resources.

5.8 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

The CITES aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Through its three appendices, the Convention accords varying degrees of protection to more than 30,000 plant and animal species.

5.9 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS

The CMS, or the Bonn Convention aims to conserve terrestrial, marine and avian migratory species throughout their range. Parties to the CMS work together to conserve migratory species and their habitats by providing strict protection for the most endangered migratory species, by concluding regional multilateral agreements for the conservation and management of specific species or categories of species, and by undertaking co-operative research and conservation activities.

5.10 THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security. The Treaty covers all plant genetic resources for food and agriculture, while it's Multilateral System of Access and Benefit-sharing covers a specific list of 64 crops and forages. The Treaty also includes provisions on Farmers' Rights.

5.11 CONVENTION ON WETLANDS (POPULARLY KNOWN AS THE RAMSAR CONVENTION)

The Ramsar Convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The convention covers all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

5.12 WORLD HERITAGE CONVENTION (WHC)

The primary mission of the WHC is to identify and conserve the world's cultural and natural heritage, by drawing up a list of sites whose outstanding values should be preserved for all humanity and to ensure their protection through a closer co-operation among nations.

5.13 INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC aims to protect world plant resources, including cultivated and wild plants by preventing the introduction and spread of plant pests and promoting the appropriate measures for their control. The convention provides the mechanisms to develop the International Standards for Phytosanitary Measures (ISPMs), and to help countries to implement the ISPMs and the other obligations under the IPPC, by facilitating the national capacity development, national reporting and dispute settlement. The Secretariat of the IPPC is hosted by the Food and Agriculture Organization of the United Nations (FAO).

6 SITE CHARACTERISTICS

6.1 GEOLOGY & SOILS

The study area is underlain by a complex assemblage of mafic and ultramafic intrusive rocks associated with the main to lower zones of the Rustenburg Layered Suite, forming part of the eastern lobe of the Bushveld Igneous Complex (Vaalian age). The geological architecture is characterised by concentric belts of norite, gabbro, anorthosite, and pyroxenite, reflecting the layered magmatic differentiation typical of the Rustenburg Suite.

Localised intrusions and lithological variations occur throughout the landscape, including magnetite and chromitite seams, serpentinised harzburgite, olivine diorite, and isolated pockets of shale, dolomite, and quartzite. This geological heterogeneity contributes to the unique edaphic conditions and high levels of plant endemism characteristic of the Sekhukhune region.

The soils derived from these substrates are predominantly red apedal soils, which dominate much of the plains. Deep, loamy Valsrivier soils are typical of the more level plains and valley bottoms, providing relatively fertile conditions compared to the surrounding ultramafic substrates. In contrast, shallow Glenrosa soils occur on the low-lying rocky hills and footslopes, where lithic contact is close to the surface.

Patches of erodible, black melanic structured horizons are frequently encountered around small mountains and isolated hills, often associated with colluvial deposition and localised moisture accumulation. In certain areas, Steendal soils underlain by gypsum are present, reflecting evaporitic processes linked to the region's semi-arid climate and restricted drainage. Land types within the study area are dominated by Ae, Ib, Ea and Ia, each reflecting variations in soil depth, texture, parent material, and landscape position. These land types collectively support the characteristic vegetation structure and ecological processes of the Sekhukhune Plains Bushveld.

6.2 CLIMATE

The region is characterised by a summer-rainfall climate with very dry winters, typical of the Sekhukhune Plains. The Mean Annual Precipitation (MAP) ranges between 400–600 mm, although rainfall is generally at the lower end of this range on the central plains,

increasing to approximately 500 mm on the plains situated east of the Leolo Mountains. Rainfall is strongly seasonal, with the majority of precipitation occurring between October and March, often in the form of short-duration convective thunderstorms.

Frost is very infrequent, reflecting the relatively warm winter conditions of the lower-lying plains. Temperature regimes are characterised by high summer maxima and cool winter minima, with mean monthly maximum and minimum temperatures for Tswelopele recorded at 37.3 °C in January and –0.9 °C in June, respectively. Daily temperatures vary considerably across the landscape, with higher temperatures on the western plains and lower temperatures on the elevated plateaus and foothills.

These climatic conditions correspond with the SVcb 27 Sekhukhune Plains Bushveld climate profile, which is shaped by the interplay between altitude, ultramafic geology, and the region's semi-arid rainfall regime.

6.3 VEGETATION UNIT- SEKHUKHUNE PLAINS BUSHVELD (GM 12)

The site is situated within the SVcb 27 Sekhukhune Plains Bushveld vegetation unit, which is characterised by semi-arid plains and open valleys occurring between chains of hills and small mountains that run broadly parallel to the escarpment. The landscape supports a short, open to closed thornveld, with a notable abundance of *Aloe* species and a diverse assemblage of succulent shrubs, reflecting the influence of ultramafic substrates and the region's semi-arid climate.

Vegetation condition across the broader unit is highly variable, with extensive areas showing signs of heavy degradation due to long-term anthropogenic pressures. These include subsistence and commercial cultivation, mining activities, overgrazing, and rapid urban expansion. Both natural and anthropogenic erosion dongas are common, particularly in areas where soils contain clays enriched with heavy metals, which are prone to structural instability.

The unit is also affected by encroachment by indigenous microphyllous trees, a process driven by historical grazing patterns and altered fire regimes. Invasion by alien plant species is widespread, further contributing to habitat transformation and reduced ecological functionality.

The Sekhukhune Plains Bushveld extends across parts of the Limpopo and Mpumalanga Provinces, occupying a broad lowland zone from Burgersfort and the lower Steelpoort River basin in the south, northwards through the plains of the Motse River basin to Jobskop

and Legwareng, situated south of the Strydpoort Mountains. The vegetation unit continues northwards along the Olifants River basin to the vicinity of Tswaing, including the valleys of the Lepellane and Mohlaletsi Rivers. The altitude ranges predominantly between 700–1 100 m, with local variation influenced by the presence of foothills, low mountains, and dissected plains.

The taxa associated with the dominant veldtype onsite are summarized on **Table 6-1 below**.

Table 6-1: Important Taxa associated Sekhukhune Plains Bushveld (Mucina and Rutherford 2006)

PLANT FORM	SPECIES
Tall Trees	*Acacia erioloba, Philenoptera violacea.*
Small Trees	*Acacia mellifera subsp. detinens (d), A. nilotica (d), A. tortilis subsp. heteracantha (d), Boscia foetida subsp. rehmanniana (d), Acacia grandicornuta, Albizia anthelmintica, Balanites maughamii, Combretum imberbe, Commiphora glandulosa, Maerua angolensis, Markhamia zanzibarica, Mystroxylon aethiopicum subsp. schlechteri, Ptaeroxylon obliquum, Schotia brachypetala, Ziziphus mucronata.*
Succulent Tree	*Euphorbia tirucalli (d)*
Tall Shrubs	*Rhus engleri (d), Cadaba termitaria, Dichrostachys cinerea, Ehretia rigida subsp. rigida, Grewia bicolor, Karomia speciosa, Maerua decumbens, Rhigozum brevispinosum, R. obovatum, Tinnea rhodesiana, Triaspis glaucophylla.*
Low Shrubs	*Felicia clavipilosa subsp. transvaalensis (d), Seddera suffruticosa (d), Gnidia polycephala, Gossypium herbaceum subsp. africanum, Jamesbrittenia atropurpurea, Jatropha latifolia var. latifolia, Lantana rugosa, Melhania rehmannii, Monechma divaricatum, Myrothamnus flabellifolius, Pechuel-Loeschea leubnitziae, Plinthus rehmannii.*
Succulent Shrubs	*Aloe cryptopoda (d), Euphorbia enormis (d), Kleinia longiflora (d), Aloe castanea, A. globuligemma.*
Woody Succulent Climber	*Sarcostemma viminale.*
Herbaceous Climbers	*Coccinia rehmannii, Decorsea schlechteri.*
Graminoids	*Cenchrus ciliaris (d), Enneapogon cenchroides (d), Panicum maximum (d), Urochloa mosambicensis (d), Aristida adscensionis, A. congesta, Eragrostis*

	barbinodis, Paspalum distichum, Schmidtia pappophoroides, Stipagrostis hirtigluma subsp. patula, Tragus berteronianus.
Herbs	*Becium filamentosum (d), Phyllanthus maderaspatensis (d), Blepharis integrifolia, Corchorus asplenifolius, Hibiscus praeteritus, Ipomoea magnusiana.*
Geophytic Herbs	*Drimia altissima, Sansevieria pearsonii*

6.3.1 SVcb 27 Sekhukhune Plains Bushveld's Conservation Status

The Sekhukhune Plains Bushveld (SVcb 27) is classified as Vulnerable, with a national conservation target of 19%. Only ~2% of the vegetation unit is formally conserved within statutory protected areas, including Potlake Nature Reserve, Bewaarkloof Nature Reserve, and the Wolkberg Caves Nature Reserve. This limited formal protection leaves the majority of the unit exposed to ongoing and future land-use pressures.

Approximately 25% of the vegetation unit has been transformed, primarily through dry-land subsistence cultivation, which is widespread across the plains. Additional pressure arises from chrome and platinum mining activities, particularly around the ultramafic geological belts of the region. Associated urbanisation and infrastructure expansion further contribute to habitat loss and fragmentation. Given the mineral richness of the area, these pressures are expected to increase in the future, depending on commodity demand and mining expansion.

Much of the remaining natural vegetation is highly degraded due to unsustainable harvesting, overgrazing, and long-term utilisation pressures. Erosion is widespread, typically at high to very high levels, with extensive donga formation in areas where soils contain heavy-metal-rich clays that are structurally unstable when disturbed.

Alien invasive species are present throughout the vegetation unit, generally in scattered but persistent populations. Common invaders include Agave spp., *Caesalpinia decapetala*, *Lantana camara*, *Melia azedarach, Nicotiana glauca*, *Opuntia* spp., *Verbesina encelioides*, and *Xanthium strumarium*. These species contribute to further degradation, reduced ecological functioning, and displacement of indigenous flora.

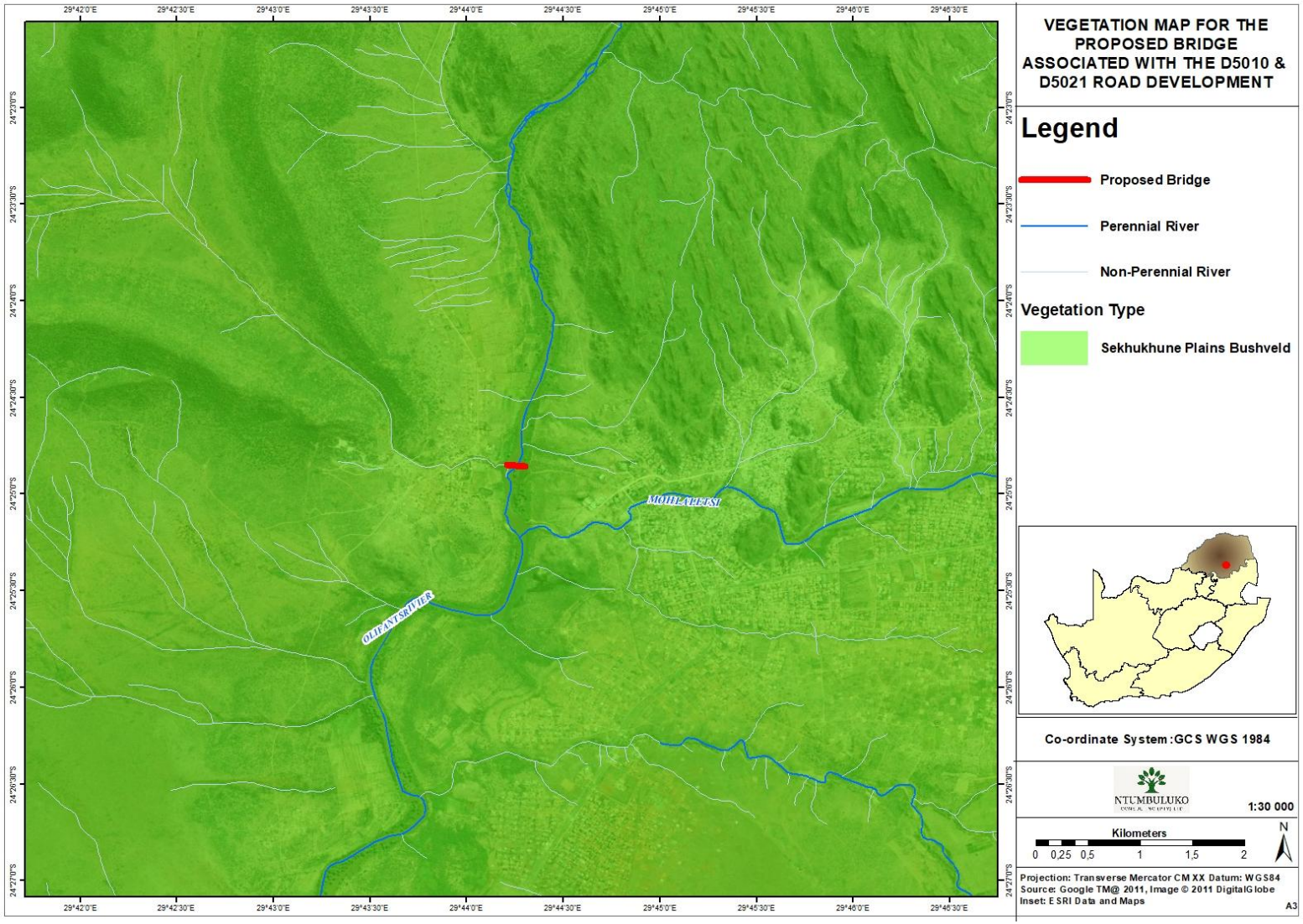


Figure 6-1: Vegetation Map

6.4 ONLINE SCREENING TOOL

The National Screening Tool identifies the following Very High Terrestrial Biodiversity Sensitivity features within the proposed development footprint (**Figure 6-2**):

- **Critical Biodiversity Area 2 (CBA 2)**: Areas that are important for meeting provincial biodiversity targets and maintaining ecological processes. Although not irreplaceable like CBA 1, CBA 2 areas still contain high-value natural habitat and require strong avoidance and minimisation measures.
- **Endangered Ecosystem: Sekhukhune Plains Bushveld (EN)** : A nationally listed endangered ecosystem characterised by limited remaining natural extent, high levels of transformation, and the presence of species and ecological processes at risk. Any further habitat loss within this ecosystem is considered highly significant.

These sensitivity features collectively elevate the biodiversity risk rating of the project area and trigger the need for a Terrestrial Biodiversity Specialist Assessment under the Terrestrial Biodiversity Protocol (2020), with emphasis on avoidance, minimisation, and protection of remaining natural habitat.

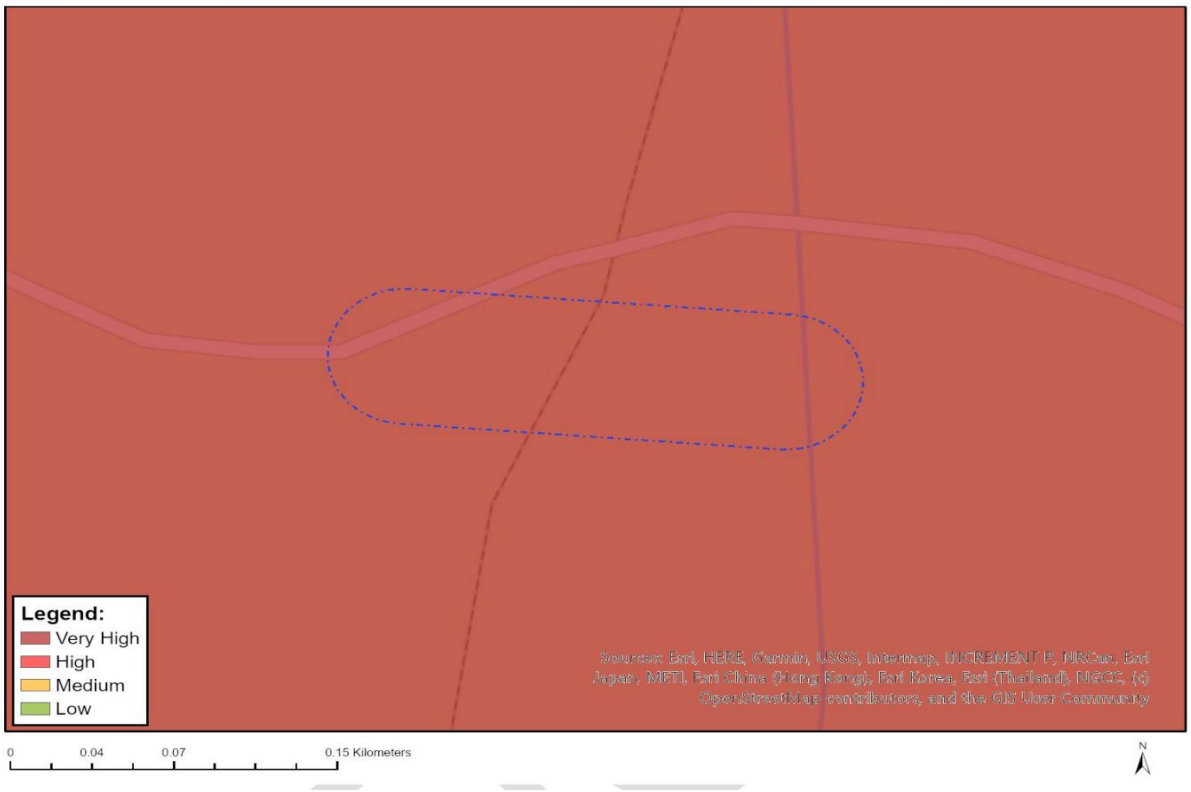


Figure 6-2: Map of Relative Terrestrial Biodiversity Theme Sensitivity.

6.5 2018 LIMPOPO PROVINCE MAP OF CRITICAL BIODIVERSITY AREAS AND ECOLOGICAL SUPPORT AREAS

According to the 2018 Limpopo Conservation Plan (LCP v2), the proposed development footprint is located within a Critical Biodiversity Area 1 (CBA 1) associated with the Olifants River system (**Figure 6-3**). CBA 1 areas represent sites that are irreplaceable for achieving provincial biodiversity targets and maintaining ecological processes. These areas are designated due to their high ecological value, intact natural habitat, and their role in supporting species of conservation concern, ecological connectivity, and ecosystem functioning at a landscape scale. The screening tool report identified the bridge development footprint as being located within a CBA 2 area. However, detailed spatial analysis confirmed that the bridge development footprint is in fact located within a CBA 1 area, immediately adjacent to a CBA 2 area.

The Olifants River corridor is recognised as one of Limpopo's primary ecological linkages, facilitating movement of fauna, maintaining riparian vegetation communities, and supporting hydrological and geomorphological processes essential for downstream ecosystems. The river system forms part of a broader network of ecological corridors that connect fragmented natural areas across the Sekhukhune and Capricorn Districts.

Development within CBA 1 areas triggers strict avoidance and minimisation requirements under both the Limpopo Conservation Plan and the Terrestrial Biodiversity Protocol (2020). Infrastructure placement must avoid sensitive riparian features, intact natural vegetation, and areas supporting ecological processes. The mitigation hierarchy requires prioritisation of avoidance, followed by minimisation and rehabilitation, with biodiversity offsets considered only where residual impacts are unavoidable and scientifically justified.

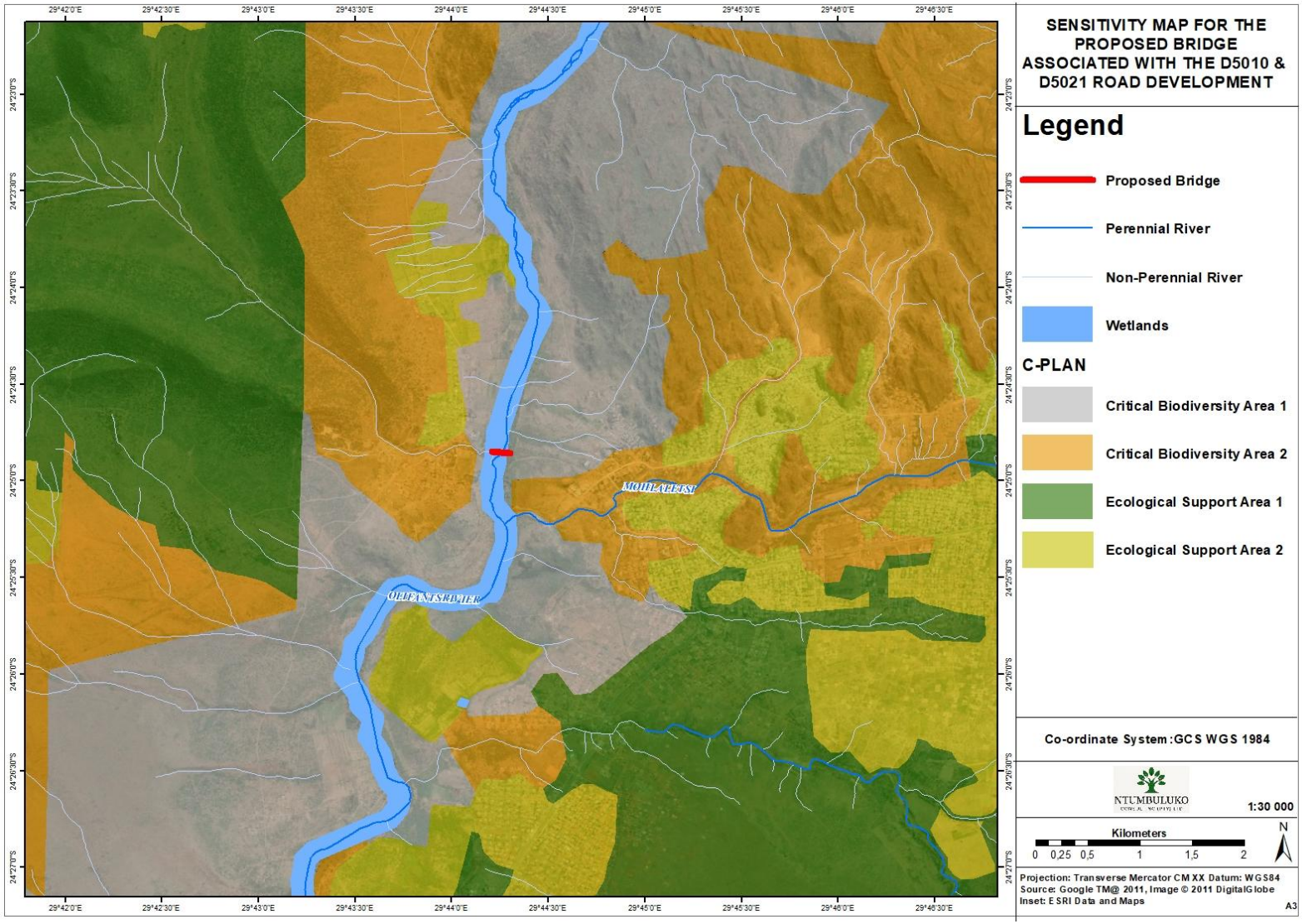


Figure 6-3: Sensitivity Map

7 METHODOLOGY

A site inspection was conducted on **09 October 2026** to assess the terrestrial ecological characteristics of the proposed development footprint. The field survey involved systematically walking the entire study site, ensuring full spatial coverage of all habitat units present. Both floral and faunal components were investigated during the survey.

The primary objectives of the fieldwork were to:

- Identify and characterise the current floral and faunal assemblages occurring within the study area.
- Detect any Species of Conservation Concern (SCC), including protected, threatened, or provincially listed species that may be present on site.
- Assess habitat condition, ecological functionality, and the degree of disturbance or transformation.
- Verify the presence of sensitive features, such as protected trees, important microhabitats, movement corridors, or areas supporting high structural or compositional diversity.

The survey included active searching, habitat scanning, and targeted inspections of microhabitats such as rocky outcrops, drainage lines, termite mounds, and areas with intact vegetation structure. Observations were recorded using standard ecological field methods, and all species encountered were identified in situ where possible.

7.1 SPECIES OF SPECIAL CONCERN (SSC)

The International Union of Conservation Networks (IUCN) is the international authority for Red Data species. In South Africa, the Threatened Species Programme (TSP) undertakes this role, in collaboration with the South Africa National Biodiversity Institute (SANBI). SSC include any national Red Data, Nationally Protected, Provincially Protected or endemic species recorded on site. The Red Data listed flora and fauna species identified were classified according to the following categories:

- Extinct (EX) – No known individuals remaining;
- Extinct in the Wild (EW) – Known only to survive in captivity, or as a naturalized population outside its historic range;
- Critically Endangered (CR) – Extremely high risk of extinction in the wild;
- Endangered (EN) – High risk of extinction in the wild;

- Vulnerable (VU) – High risk of endangerment in the wild;
- Near Threatened (NT) – Likely to become endangered in the near future;
- Least Concern (LC) – Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category;
- Data Deficient (DD) – Not enough data to make an assessment of its risk of extinction; and
- Not Evaluated (NE) – Has not yet been evaluated against the criteria.

7.2 IMPACTS ASSESSMENT

The potential impacts of the proposed expansion, existing operations and the alternatives were rated using a clearly defined rating scale. The significance rating formula is as follows:

Significance = Consequence x Probability

Where

Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)

And

Probability = Likelihood of an Impact Occurring

In addition, the formula for calculating consequence:

***Type of Impact** = **+1** (Positive Impact) or **-1** (Negative Impact)*

The weight assigned to the various parameters for positive and impacts to biodiversity is provided for in the formula and is presented in **Table 7-1**. The probability consequence matrix is displayed in **Table 7-2**, with the impact significance rating described in **Table 7-3**.

Table 7-1: Biodiversity Impact Assessment Parameter Ratings

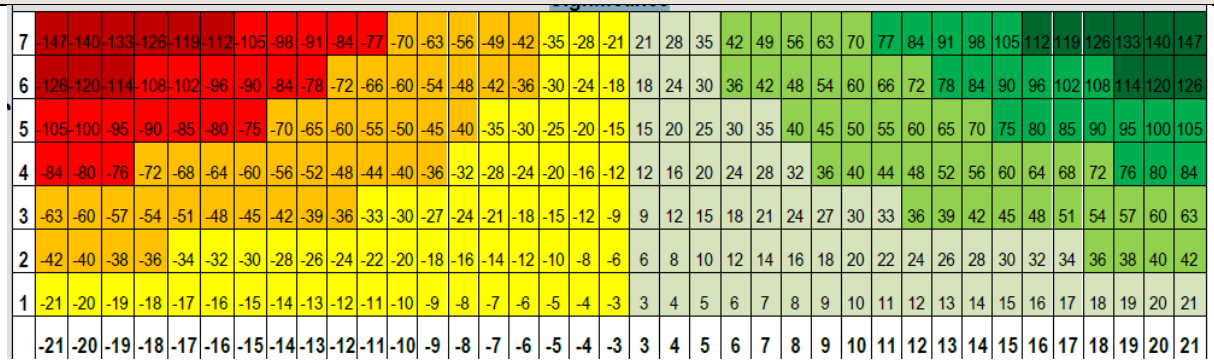
Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.	International The effect will occur across international borders.	Permanent: No Mitigation The impact will remain long after the life of the Project.	Certain/ Definite. There are sound scientific reasons to expect that the impact will definitely occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.	National Will affect the entire country.	Beyond Project Life The impact will remain for some time after the life of a Project.	Almost certain/Highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment	On-going and widespread positive benefits to local	Province/ Region	Project Life	Likely The impact may occur.

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
	of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	communities which improves livelihoods, as well as a positive improvement to the receiving environment.	Will affect the entire province or region.	The impact will cease after the operational life span of the project	
4	Serious medium-term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	Municipal Area Will affect the whole municipal area.	Long term 6-15 years.	Probable Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
	specialists and can be done in less than a month. On-going social issues. Damage to items of cultural significance.				that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by very few of population.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year.	Rare/ improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.

Rating	Intensity		Spatial scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	**Positive Impacts (Type of Impact = +1)**			
1	Limited damage to minimal area of low significance that will have no impact on the environment. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level social and environmental benefits felt by very few of the population.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely/None Expected never to happen.

Table 7-2: Probability Consequence Matrix

	Significance
Probability	
	Consequence

7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 7-3: Significance Threshold Limits

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	High Positive
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	Medium Positive
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	Low Positive
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	Low
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	Medium-Low
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the	Medium-High

Score	Description	Rating
	implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects.	High Negative
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Very High Negative

7.3 STUDY LIMITATIONS

- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

8 RESULTS OF THE FLORA ASSESSMENT

8.1 HABITAT ASSESSMENT

The proposed bridge footprint commences within an existing gravel road corridor that has been subject to long-term disturbance associated with road construction, maintenance activities, and regular vehicular use. Consequently, the habitat within the immediate footprint is highly modified, with limited indigenous vegetation and reduced ecological integrity. This disturbed corridor is bordered by SVcb 27 Sekhukhune Plains Bushveld, which constitutes the dominant terrestrial habitat within the study area.

Beyond the disturbed road reserve, the surrounding bushveld habitat comprises a mosaic of indigenous grasses, shrubs, and scattered trees typical of the Sekhukhune Plains Bushveld vegetation unit. Although signs of disturbance such as grazing and alien plant encroachment were evident in places, the habitat retains a moderate degree of ecological functionality and contributes to landscape-scale habitat connectivity for terrestrial fauna.

The proposed bridge crossing traverses the riparian habitat associated with the Olifants River, which forms a distinct ecological zone separating the bushveld habitats on either side of the river. This riparian habitat supports vegetation adapted to higher soil moisture conditions and periodic flooding and serves important ecological functions, including bank stabilisation, flood attenuation, habitat provision, and faunal movement. The riparian zone therefore represents the most sensitive habitat within the study area, while the bushveld habitat occurring on both banks of the river is considered to be of moderate ecological value and sensitivity.

Given that the bridge approaches will largely utilise an existing disturbed road alignment, direct impacts on intact bushveld habitat are expected to be limited. The primary biodiversity considerations are therefore related to disturbance of the riparian habitat and associated vegetation within the immediate crossing area (**Figure 8-1**). With the implementation of appropriate mitigation measures, impacts on both the riparian and surrounding bushveld habitats are anticipated to remain localised and manageable.



Figure 8-1: Habitat Assessment

8.2 VEGETATION ASSESSMENT

The vegetation within the study area comprised two distinct habitat types, namely the Sekhukhune Plains Bushveld (SVcb 27) and the riparian vegetation associated with the Olifants River (**Figure 8-2**). The proposed bridge footprint originates within an existing gravel road corridor, which has experienced long-term anthropogenic disturbance resulting from regular vehicular traffic and periodic road maintenance activities. Consequently, vegetation within the road reserve is sparse, with extensive areas of exposed soil and reduced ground cover evident (**Figure 8-2**).



Figure 8-2: Overview of the proposed bridge site, showing the disturbed bushveld vegetation and the Phragmite species.

The surrounding bushveld habitat exhibited a moderate to good level of vegetation structure, characterised by a relatively intact woody layer consisting of dense shrubs and scattered trees. Although the habitat remains largely vegetated, signs of disturbance were observed, including localized bare patches, trampling, historic vegetation clearing, and areas showing evidence of grazing pressure. These disturbances have reduced the condition of the herbaceous layer in places, resulting in patchy grass cover and exposed soil surfaces. Despite these impacts, the woody component remains well represented and contributes to the ecological functioning of the habitat (**Figure 8-3**).



Figure 8-3: Woody trees observed close to the development footprint but outside.

The riparian habitat associated with the Olifants River displayed a higher level of vegetation density and structural complexity than the adjacent bushveld habitat. The riverbanks support dense woody vegetation and provide important ecological functions, including bank stabilisation, habitat provision, and landscape connectivity. While some disturbance was noted in proximity to the existing crossing point, the riparian vegetation appeared largely intact and continues to support the ecological integrity of the river corridor (**Figure 8-4**).



Figure 8-4:Condition Riverbank.

Overall, the vegetation condition within the proposed bridge footprint is considered moderate, with the immediate road crossing area exhibiting a low to moderate ecological condition due to historical disturbance, while the adjacent bushveld and riparian habitats are considered to be in a moderate to good ecological condition. The riparian zone represents the most sensitive vegetation community within the study area and warrants particular consideration during the planning and construction phases of the proposed bridge development.

8.3 FLORA SPECIES OF SPECIAL CONCERN

South Africa has become the first country to fully assess the status of its entire flora (Domitilla and Raimondo, 2011). Major threats to the South African flora are identified in terms of the number of plant taxa Red-Listed as threatened with extinction as a result of threats like, habitat loss (e.g. infrastructure development, urban expansion, crop cultivation and mines), invasive alien plant infestation (e.g. outcompeting indigenous plant species), habitat degradation (e.g. overgrazing, inappropriate fire management etc.), unsustainable harvesting, demographic factors, pollution, loss of pollinators or dispersers, climate change and natural disasters (e.g. such as droughts and floods)[1]. South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. However, due to its strong focus on determining risk of extinction, the IUCN system does not highlight species that are at low risk of extinction but may nonetheless be of high conservation importance. As a result, SANBI uses an amended system of categories in order to highlight species that may be of low risk of extinction but are still of conservation concern (SANBI, 2015).

The following species protected are known to be found in the area (**Table *8-1***).

Table 8-1: Plant Species of Special Concern

NO.	SPECIES NAME	Threat Status	RECORDED ONSITE (YES/NO)
1	*Combretum imberbe*	Provincially Protected	**No**
2	*Euphorbia waterbergensis*	Rare	**No**
3	*Corchorus psammophilus*	Threatened	**No**
4	*Ilex mitis (L.) Radlk. var. mitis*	Declining	**No**

[1] RAIMONDO, Domitilla. The Red List of South African plants: a global first. S. Afr. j. sci., Pretoria , v. 107, n. 3-4, p. 01-02, Apr. 2011 . on 17 Aug. 2021. http://dx.doi.org/10.4102/sajs.v107i3/4.653.

5	*Ledebouria atrobrunnea S.Venter*	Vulnerable	**No**
6	*Myrothamnus flabellifolius Welw.*		**No**
7	*Acacia erioloba*	Provincially Protected	**No**
8	*Acacia haematoxylon*	Provincially Protected	**No**
9	*Boscia albitrunca*	Vulnerable	**Yes**

The Shepherd's Tree (*Boscia albitrunca*) was observed within the surrounding bushveld habitat during the site assessment (Figure 8-5). The species occurred outside of the proposed bridge development footprint, adjacent to the gravel road. The observed individual(s) contribute to the structural diversity and ecological functioning of the surrounding bushveld habitat and provide habitat and forage resources for a variety of faunal species. *Boscia albitrunca* is a characteristic species of bushveld ecosystems and is recognised for its ecological importance within arid and semi-arid landscapes.



Figure 8-5:Shepherd's tree observed onsite (24°24'50.27"S 29°44'08.68"E).

A mature Tamboti tree (*Spirostachys africana*) is located approximately 80 m outside the delineated development footprint (Figure 8-6). Tamboti is recognised as an indigenous, protected tree species under the National Forests Act, 1998 (Act No. 84 of 1998). As such, the tree may not be damaged, destroyed, pruned, or removed without a valid permit issued by the Department of Forestry, Fisheries and the Environment (DFFE).



Figure 8-6: Tamboti tree observed onsite (24°24'48.15"S 29°44'13.20"E).

8.3.1 Ethnobotanical plant species

Ethnobotany/ Ethnoecology is a branch of botany that focuses on the use of plants for medicines, cultural and recreational purposes. The overexploitation of indigenous plants for ethnobotanical purposes can be detrimental to populations of those particular plant species, and the other species that depend on its existence for their survival.

South Africa has a rich diversity of medicinal plants that not only have a global significance but also have a cultural and historical role (van Wyk *et al.* 2009). There is a rapidly growing concern for conservation of medicinal plants that are dwindling in number due to illegal harvesting (Institute of Natural Resources 2003). This is particularly apparent in rural areas where medicinal plants are overexploited by traditional doctors.

No notable indigenous ethnobotanical or culturally significant plant species were recorded within the development footprint. The footprint is highly disturbed, and historical land-use activities have reduced the likelihood of traditional medicinal or utilitarian species persisting in this area.

However, a single individual of *Catharanthus roseus* (Madagascar Periwinkle) was observed onsite (**Figure 8-7**). Although this species is not indigenous to South Africa, it is widely recognised for its medicinal properties, particularly in traditional and pharmaceutical contexts (notably as a source of alkaloids used in cancer-related treatments). Its presence is incidental and reflects the disturbed nature of the site rather than a naturally occurring ethnobotanical resource.



Figure 8-7: *Catharanthus roseus* observed along the development footprint.

The surrounding natural areas outside the footprint especially the riparian corridor and intact woodland patches are more likely to support indigenous species with recognised ethnobotanical value. These areas fall outside the direct impact zone but form part of the broader ecological and socio-cultural landscape associated with the project.

8.3.2 Invasive Alien Species

The disturbed construction footprint shows clear evidence of infestation by *Mexican Poppy (*Argemone mexicana) and *Bugweed (*Solanum mauritianum) (**Figure 8-8**), both of which are strongly associated with degraded or previously transformed areas. *Argemone mexicana* is a widespread annual weed that rapidly colonises open, disturbed soils, while Bugweed forms dense, competitive stands that suppress indigenous vegetation and spread through bird-dispersed seeds. Under the NEMBA Alien and Invasive Species Regulations (2020), both species are classified as Category 1b invasive alien plants, requiring compulsory control and removal. Their presence within the footprint confirms reduced ecological integrity and highlights the need for targeted alien plant management during construction and rehabilitation phases.



Figure 8-8:A-*Solanum mauritianum* and B-*Argemone mexicana* observed onsite.

9 RESULTS OF THE FAUNA ASSESSMENT

9.1 MAMMALS

According to the desktop study conducted, the species listed in **Table 9-1** were identified as being possible to occur within the study area or the immediate vicinity of the proposed construction area. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal.

Table 9-1: mammals that are likely to occur onsite.

#	Species code	Family	Scientific name	Common name	Red list category
2	192040	Felidae	Felis nigripes	Black-footed Cat	Vulnerable (2016)
3	192800	Felidae	Leptailurus serval	Serval	Near Threatened (2016)
4	218020	Muridae	Gerbilliscus brantsii	Highveld Gerbil	Least Concern (2016)
5	147490	Muridae	Mastomys coucha	Southern African Mastomys	Least Concern (2016)
6	148270	Muridae	Mus (Nannomys) minutoides	Southern African Pygmy Mouse	Least Concern
7	151102	Muridae	Otomys auratus	Southern African Vlei Rat (Grassland type)	Near Threatened (2016)
8	150360	Muridae	Rhabdomys pumilio	Xeric Four-striped Grass Rat	Least Concern (2016)
9	217730	Mustelidae	Hydrictis maculicollis	Spotted-necked Otter	Least Concern (IUCN 2008)
10	136620	Nesomyidae	Dendromus mystacalis	Chestnut African Climbing Mouse	Least Concern (2016)
12	161460	Soricidae	Crocidura mariquensis	Swamp Musk Shrew	Near Threatened (2016)
13	163350	Soricidae	Myosorex varius	Forest Shrew	Least Concern (2016)

9.1.1 Field Investigation Findings

None of the sensitive or conservation-important mammal species expected for the broader Sekhukhune region were observed during the site inspection. The long-term transformation of the habitat, historical clearing for agriculture and mining, and ongoing intensive grazing have removed the structural complexity and natural cover required to support small to medium-sized mammals, particularly those that are habitat-specialists or sensitive to disturbance. The only mammals recorded on site were domestic livestock, which dominate the landscape and further contribute to habitat degradation through trampling and overgrazing (**Figure 9-1**). As a result, the site currently provides very limited ecological functionality and offers no suitable habitat for sensitive mammalian fauna.



Figure 9-1: livestock observed onsite.

9.2 REPTILE

There are no sensitive reptile species onsite. A Full list of reptile's species that are likely to be found onsite are listed on **Table 9-2**.

Table 9-2: List of Reptile Species likely to be found onsite.

Species code	Scientific name	Common name	Red list category
1	*Crotaphopeltis hotamboeia*	Red-lipped Snake	Least Concern (SARCA 2014)
2	*Naja mossambica*	Mozambique Spitting Cobra	Least Concern (SARCA 2014)
3	*Lygodactylus ocellatus*	Spotted Dwarf Gecko	Least Concern (SARCA 2014)

4	*Pachydactylus affinis*	Transvaal Gecko	Least Concern (SARCA 2014)
5	*Pachydactylus capensis*	Cape Gecko	Least Concern (SARCA 2014)
6	*Boaedon capensis*	Brown House Snake	Least Concern (SARCA 2014)
7	*Lycodonomorphus inornatus*	Olive House Snake	Least Concern (SARCA 2014)
8	*Lycodonomorphus rufulus*	Brown Water Snake	Least Concern (SARCA 2014)
9	*Lycophidion capense capense*	Cape Wolf Snake	Least Concern (SARCA 2014)
10	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)
11	*Leptotyphlops sp.*		
12	*Leptotyphlops scutifrons conjunctus*	Eastern Thread Snake	Least Concern (IUCN 2021, sp. level)
13	*Trachylepis capensis*	Cape Skink	Least Concern (SARCA 2014)
14	*Trachylepis punctatissima*	Speckled Rock Skink	Least Concern (SARCA 2014)
15	*Afrotyphlops bibronii*	Bibron's Blind Snake	Least Concern (IUCN 2022)
16	*Causus rhombeatus*	Rhombic Night Adder	Least Concern (IUCN 2021)

9.2.1 Field investigation findings

None of the expected reptiles were observed on site during the site visit.

9.3 AVIFAUNA-

Birds are generally regarded as good ecological indicators, because their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are directly linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species. **All birds that could be present within the vicinity of the study area are listed in (Table 9-3).**

Table 9-3:Bird species potentially found within the study site.

Scientific Name	Common Name	IUCN Status
Geronticus calvus	Southern Bald Ibis	VU
Sagittarius serpentarius	Secretary bird	NT
Gyps coprotheres	Cape Vulture	VU
Stephanoaetus coronatus	African Crowned Eagle	NT
Circus ranivorus	African Marsh-Harrier	VU
Circus maurus	Black Harrier	NT

Scientific Name	Common Name	IUCN Status
Falco biarmicus	Lanner Falcon	LC
Alcedo semitorquata	Half Collared Kingfisher	CR
Bugeranus carunculatus	Wattled Crane	VU
Anthropoides paradiseus	Blue Crane	VU
Balearica regulorum	Grey Crowned Crane	VU
Eupodotis senegalensis	White-bellied Korhaan	VU

9.3.1 Field investigation findings

The site supports a notable diversity of bird species (**Figure 9-2-Figure 9-3**), owing to the presence of suitable habitat types associated with the surrounding bushveld vegetation and the riparian habitat linked to the Olifants River. The mosaic of woodland, shrubveld, and riverine vegetation provides essential resources such as foraging opportunities, nesting sites, shelter, and access to water. These habitat conditions collectively create a favourable environment for both resident and migratory bird species, contributing to the overall avifaunal richness of the area.



Figure 9-2: *Merops bullockoides* observed onsite.



Figure 9-3: Common bird species observed onsite.

9.4 INVERTEBRATES

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope or endemic species (specific habitat requirements with populations concentrated in a small area) which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch and therefore identify. A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in **Table 9-4**.

Table 9-4: Butterfly species expected to occur on site.

Scientific Name	Common Name
Melanitis leda Helena	Evening Brown
Acraea anemosa	Broad-bordered Acraea
Acreae neobule	Wandering Acraea
Danaus chrysippus	African Monarch butterfly
Junonia hierta cebrene	Yellow Pansy butterfly
Danays chrysippus	Southern Milkweed
Charaxes jasius	Koppie Emperor
Cyclyrius pirithous	Common Blue
Hyalites esebria	Dusky Acrea butterfly
Phalantha aethiopica	Poplar Leopard

Scientific Name	Common Name
Alaena amazoula	Yellow Zulu
Catacroptera cloanthe	Pirate butterfly
Charaxes achaemenses	Bushveld Emperor
Pinacopteryx eriphia	Zebra White butterfly
Eurema brigitta	Broad-bordered yellow
Vanessa cardui	Painted Lady
Papilio demodocus	Citrus Swallowtail butterfly

9.4.1 Field investigation findings

With regard to invertebrates, several dragonflies were observed along the riverbank, where the presence of permanent water and riparian vegetation provides suitable breeding and foraging habitat for odonate species (**Figure 9-4**).



Figure 9-4: Dragon fly observed onsite.

Within the development footprint itself, a number of spider webs were recorded (**Figure 9-5**), indicating the presence of common ground- and shrub-dwelling arachnid species typically associated with disturbed terrestrial environments. Overall, the invertebrate activity reflects the contrast between the more intact riparian zone and the modified footprint area.



Figure 9-5: Spiderweb observed onsite.

10 IMPACT ASSESSMENT

The impact assessment is aimed predicting potential impacts of the proposed project. Impact assessment strives to avoid damage, loss of ecosystems services, and where they cannot be avoided, to reduce and mitigate these impacts (DEA, 2013). Offsets to compensate for loss of habitat are regarded as a last resort, after all efforts have been made to avoid, reduce and mitigate. The mitigation hierarchy is represented in **Table 10-1**.

Table 10-1: Mitigation hierarchy of impacts

Avoid or Prevent	Refers to considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts on biodiversity, associated ecosystem services and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts, construction should not take place. In such cases, it is unlikely to be possible or appropriate to rely on the other steps in the mitigation.
Minimise	Refers to considering alternatives in the project location, sitting, scale, layout, technology and phasing that would minimise impacts on biodiversity, associated ecosystem services. In cases where there are environmental constraints, every effort should be made to minimise impacts.
Rehabilitate	Refers to rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to near natural state or an agreed land use after mine closure. Rehabilitation can, however, fall short of replicating the diversity and complexity of natural systems.
Offset	Refers to measures over and above rehabilitation to compensate for the residual negative impacts on biodiversity after every effort has been made to minimise and then rehabilitate the impacts. Biodiversity offsets can provide a mechanism to compensate for significant residual impacts on biodiversity.

The construction of the proposed bridge will result in localised but notable disturbances to the terrestrial and riparian environments associated with the Olifants River. Direct impacts will arise from vegetation clearing, earthworks, excavation, and the establishment of temporary construction infrastructure. These activities may lead to habitat disturbance, soil compaction, loss of groundcover, and displacement of fauna within and immediately adjacent to the development footprint.

10.1 LOSS OF HABITAT

The study site still has areas that have vegetation regarded as disturbed, with scattered indigenous species, as a result of this, the impacts of the proposed construction activities, although limited in extent are regarded as Medium-High. Due to disturbance of the soil and removal of vegetation, it is likely that alien plants will continue establish on site.

Alien plants often reduce the diversity of an area due to their invasive habit. Invasive plants grow prolifically and out-compete native species. Loss of vegetation will be irreversible and although rehabilitation can be aimed at reinstating the land to some form of land-use, restoration of the natural habitat on site cannot be achieved. This is particularly significant in an area where some plant species remain undescribed. Many species in this habitat are adapted to specific soil composition and structure and the natural species composition cannot be restored after disturbance to the soil (Victor et al. 2005). The impacts attributed with the loss of habitat are listed below in the phase they occur.

10.1.1 Construction Phase

Table 10-2: Loss of habitat during Construction phase

Loss of habitat					
Phase	**Construction**				
Criteria	**Details / Discussion**				
Description of impact	• Removal of vegetation • Disturbance of the soil • Vehicle operation				
Mitigation required	• Minimise the impacted area and clear only what is required • Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)

10.1.2 Operational phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur.

Table 10-3: Loss of habitat during operation phase

Loss of habitat					
Phase	**Operational**				
Criteria	**Details / Discussion**				
Description of impact	• Establishment of alien plant species in disturbed areas				
Mitigation required	• Manage alien invasive species establishment continually through chemical or mechanical removal • Reinstate vegetation cover through concurrent rehabilitation • Erect signage to control the speed limit for trucks and other vehicles moving through the site				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)

10.1.3 Decommissioning phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur as vehicles and machinery move throughout the site and disturb the soil.

Table 10-4: Loss of habitat during decommissioning

Loss of habitat	
Phase	**Decommissioning**
Criteria	**Details / Discussion**
Description of impact	• Removal infrastructure and equipment • Disturbance of the soil • Vehicle operation
Mitigation required	• Minimise the impacted area and revegetate with indigenous where disturbed

	• Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)

10.1.4 Post-closure phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion should be monitored for up to three years after closure.

Table 10-5: Loss of habitat during post-closure phase

Loss of habitat					
Phase	**Post-closure**				
Criteria	**Details / Discussion**				
Description of impact	• On-going establishment of alien plant species in disturbed areas				
Mitigation required	• Manage alien invasive species establishment continually through chemical or mechanical removal. • Revegetation of the site where previously disturbed.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Very Significant (7)	National (6)	Permanent (6)	Likely (6)	Major (negative) (115)
Post Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)

10.2 POTENTIAL LOSS OF SPECIES OF SPECIAL CONCERN

Although the identified individuals occur outside of the approved development footprint, their close proximity to the construction area increases the likelihood of indirect disturbance. A mature *Spirostachys africana* (Tamboti) and several *Boscia albitrunca* (Shepherd's Trees) were recorded adjacent to the site. These species are sensitive to root disturbance, soil compaction, and accidental damage during vegetation clearing, machinery movement, and earthworks. Without appropriate controls, construction activities may result in partial root zone disturbance or physical injury to these SCC individuals.

10.2.1 Construction Phase

Table 10-6: Loss of habitat during Construction phase

Loss of habitat	
Phase	**Construction**
Criteria	**Details / Discussion**
Description of impact	The construction of the proposed bridge will involve vegetation clearing, excavation, earthworks, establishment of temporary access routes, and movement of heavy machinery. These activities may result in direct and indirect disturbance to the surrounding terrestrial environment, including soil compaction, alteration of micro-habitats, and potential damage to nearby Species of Special Concern (SCC) such as *Spirostachys africana* (Tamboti) and *Boscia albitrunca* (Shepherd's Tree). Although these SCC individuals occur outside the development footprint, their close proximity increases the likelihood of accidental disturbance. Strict avoidance, demarcation, and buffer establishment will be required to minimise construction-related impacts.
Mitigation required	• Conduct a pre-construction walk-down with the ECO to confirm the exact location of SCC individuals (Tamboti and Shepherd's Tree). • Establish a minimum 10 m no-go buffer around SCC individuals and demarcate with danger tape and protective fencing. • Prohibit stockpiling, parking, fuel storage, and machinery movement within SCC buffer zones. • Restrict vegetation clearing strictly to the approved footprint. • Ensure all contractors receive SCC awareness training before site establishment. • Implement controlled access routes to prevent unnecessary disturbance to adjacent vegetation.

	• Avoid trenching, excavation, or compaction within the root zones of SCC individuals. • ECO to conduct weekly monitoring during active construction. • Immediately report and address any accidental damage to SCC individuals.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.2.2 Operational phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur. In addition, vehicular transport through the site may increase the risk of roadkill of fauna species that occur.

Table 10-7: Potential loss of SCC

Loss of habitat	
Phase	**Operational**
Criteria	**Details / Discussion**
Description of impact	During the operational phase, the bridge and associated road infrastructure will introduce long-term changes to the local environment. Potential impacts include edge effects, altered drainage patterns, increased human activity, and periodic maintenance activities. While the risk to SCC individuals is significantly reduced compared to the construction phase, maintenance vehicles and vegetation management may still pose a minor risk of soil compaction or accidental damage if not properly controlled. With appropriate operational protocols, impacts are expected to remain low and manageable.
Mitigation required	• Maintain the established SCC buffer zones during all maintenance activities. • Ensure maintenance crews are briefed on SCC locations and sensitivity. • Prevent soil compaction near SCC root zones by restricting heavy-vehicle movement. • Avoid pruning, removal, or disturbance of SCC individuals unless authorised by DFFE.

	• Maintain natural drainage patterns to prevent waterlogging or erosion near SCC trees. • Conduct annual ecological monitoring to assess SCC health and detect any operational impacts. • Implement alien vegetation control along the bridge and road verges to reduce ecological pressure on SCC individuals.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.2.3 Decommissioning phase

No direct loss of habitat is expected during this phase of the project. Alien plant invasion is, however expected to occur as vehicles and machinery move throughout the site and disturb the soil.

Table 10-8: Potential loss of SCC

Loss of habitat	
Phase	**Decommissioning**
Criteria	**Details / Discussion**
Description of impact	Should the bridge and associated infrastructure be decommissioned in the future, impacts may arise from demolition activities, removal of structural components, and rehabilitation of disturbed areas. These activities may temporarily increase noise, dust, and physical disturbance to adjacent vegetation, including SCC individuals. However, decommissioning also presents an opportunity for ecological restoration. With proper planning, controlled demolition, and implementation of rehabilitation measures, the decommissioning phase can result in long-term ecological improvement and reinstatement of natural habitat conditions.
Mitigation required	• Conduct a pre-decommissioning ecological survey to reassess SCC locations and vulnerability. • Maintain SCC buffer zones during demolition and rehabilitation activities.

	• Use controlled demolition techniques to minimise vibration, dust, and physical disturbance. • Avoid stockpiling rubble or debris near SCC individuals. • Rehabilitate disturbed areas using locally indigenous vegetation to restore ecological function. • Implement erosion-control measures (e.g., silt fences, contouring) during site rehabilitation. • ECO to oversee decommissioning activities and ensure compliance with SCC protection measures. • Conduct post-decommissioning monitoring to confirm successful rehabilitation and SCC stability.				
Parameters	***Intensity***	***Spatial scale***	***Duration***	***Probability***	***Significance***
Pre-Mitigation	Serious (4)	Limited (2)	Short-term (3-5 years) (3)	Likely (6)	Moderate (negative) (54)
Post Mitigation	Limited (1)	Minor (2)	Short-term (3-5 years) (3)	Likely (4)	Minor (negative) (24)

10.3 CUMULATIVE IMPACTS

When considered within the broader landscape context, the proposed bridge construction contributes incrementally to existing terrestrial biodiversity pressures already present in the area. Although the development footprint itself is highly disturbed and supports low ecological sensitivity, the cumulative effects arise when the project's impacts are viewed alongside ongoing regional habitat transformation, alien plant proliferation, and progressive fragmentation of bushveld and riparian-associated terrestrial habitats.

The surrounding landscape has been subjected to long-term disturbance from historical land use, informal access routes, grazing, and the spread of invasive alien plants such as Mexican Poppy (*Argemone mexicana*) and Bugweed (*Solanum mauritianum*). Construction activities vegetation clearing, earthworks, machinery movement, and increased human presence add incrementally to these pressures by contributing to localised habitat disturbance, soil compaction, and temporary faunal displacement. These impacts, although limited in scale, reinforce existing patterns of ecological degradation and edge-effect expansion within the region.

The footprint contains no notable indigenous ethnobotanical species, with only a single individual of Catharanthus roseus recorded, reflecting the already-modified nature of the site. However, the surrounding natural bushveld and riparian-associated terrestrial habitats continue to support faunal species such as birds, small mammals, reptiles, and invertebrates (including dragonflies along the riverbank). Any additional disturbance however minor contributes to the cumulative reduction of intact habitat patches and microhabitat diversity across the landscape.

Overall, the project's cumulative impact on terrestrial biodiversity is assessed as low to moderate, primarily due to the already-transformed condition of the footprint. Nonetheless, without effective mitigation particularly strict footprint adherence, alien plant control, and protection of adjacent natural areas the project could contribute to the incremental decline of terrestrial ecological condition within the broader Olifants River corridor.

Refer to Table 10-9 for the impact assessment.

Table 10-9: Cumulative Impact Assessment

Impact Theme	Existing Regional Pressures	Project Contribution (Bridge Construction)	Cumulative Impact Description	Overall Cumulative Significance
Terrestrial Habitat Loss & Transformation	Widespread historical disturbance, informal tracks, grazing, bushveld fragmentation	Localised vegetation clearing and soil disturbance within an already-modified footprint	Adds incrementally to long-term loss of intact bushveld habitat patches in the broader landscape	**Moderate (negative)**
Disturbance to Terrestrial Fauna (Birds, Small Mammals, Reptiles, Invertebrates)	Ongoing human activity, noise, habitat fragmentation	Temporary displacement of fauna due to construction noise, machinery, and human presence	Minor additional disruption to faunal movement and foraging in a landscape already under pressure	**Low (Negative)**
Loss of Indigenous Flora & Ethnobotanical Species	Decline of indigenous ethnobotanical species due to land transformation	Footprint contains no notable indigenous ethnobotanical species; one *Catharanthus roseus* individual present	Negligible contribution to regional decline; surrounding natural areas retain ethnobotanical value	**Low (Negative)**
Spread of Terrestrial Invasive Alien Plants	Existing infestations of *Argemone mexicana* and *Solanum mauritianum* in disturbed areas	Soil disturbance may facilitate further spread of invasive species if unmanaged	Adds to regional alien plant burden and increases pressure on remaining indigenous vegetation	**Moderate (negative)**
Soil Compaction & Surface Disturbance	Existing compaction from livestock, informal access routes, and past land use	Machinery movement and earthworks increase localised compaction	Minor addition to broader soil degradation trends affecting vegetation recovery	**Low (Negative)**
Edge Effects & Habitat Fragmentation	Progressive fragmentation of bushveld and riparian-associated terrestrial habitat	Creation of new edges around the footprint and temporary disturbance zones	Slight increase in edge effects contributing to long-term fragmentation patterns	**Moderate (negative)**
Loss of Microhabitats (e.g., spider webs, groundcover niches)	Decline of microhabitats due to disturbance and invasive species	Clearing and earthworks reduce microhabitat availability within the footprint	Small incremental reduction in microhabitat diversity in an already-modified area	**Low (Negative)**

11 DISCUSSION

The terrestrial biodiversity conditions associated with the proposed bridge construction and road upgrades along Roads D5010 and D5021 reflect a landscape that has undergone extensive historical disturbance and long-term transformation. Although the national Screening Tool initially classified the terrestrial biodiversity theme as "Very High" sensitivity, the field assessment confirmed that the actual on-site sensitivity is Medium, owing to the degraded condition of the development footprint. This highlights the importance of site-specific verification, particularly in areas mapped as sensitive due to regional conservation priorities rather than current ecological condition.

The project area falls within the SVcb 27 Sekhukhune Plains Bushveld vegetation unit, which is classified as Vulnerable, and is mapped as a Critical Biodiversity Area 1 (CBA 1) in the 2018 Limpopo Conservation Plan (LCP v2). The footprint is situated adjacent to a CBA 2 associated with the Olifants River riparian corridor. While these designations emphasise the regional ecological importance of the broader landscape, the development footprint itself has been significantly altered by past land-use activities, resulting in reduced habitat integrity, limited species diversity, and a dominance of disturbance-tolerant vegetation.

The spring survey was undertaken during the peak growing and faunal activity season, ensuring optimal detectability of species. Within the surrounding bushveld habitat, a Shepherd's Tree (*Boscia albitrunca*), a protected species under the National Forests Act was recorded, confirming the presence of intact indigenous vegetation outside the disturbed footprint. A mature Tamboti (*Spirostachys africana*) tree was also observed approximately 80 m outside the delineated footprint, further emphasising the ecological value of the surrounding natural areas.

Floral diversity within the footprint is low, with no notable indigenous ethnobotanical species recorded. A single individual of *Catharanthus roseus* was observed, reflecting the disturbed nature of the site rather than a naturally occurring medicinal resource. In contrast, the surrounding bushveld and riparian-associated terrestrial habitats retain higher ecological value and are more likely to support indigenous ethnobotanical species and intact vegetation structure.

Evidence of invasive alien plants including *Mexican Poppy (Argemone mexicana*) and *Bugweed (Solanum mauritianum*) was recorded within the footprint. Both species are listed as Category 1b invasive alien plants under NEMBA and are strongly associated with

degraded environments. Their presence confirms reduced ecological integrity and highlights the need for targeted alien plant management during construction and rehabilitation.

The site supports a notable assemblage of bird species, primarily due to the presence of suitable habitat types associated with the surrounding bushveld vegetation and the riparian zone linked to the Olifants River. The mosaic of woodland, shrubveld, and riverine vegetation provides essential resources such as foraging opportunities, nesting sites, shelter, and access to water. Birds observed onsite reflect typical species associated with mixed bushveld and riparian systems, demonstrating the ecological importance of these habitats as biodiversity conduits in an otherwise fragmented landscape.

Invertebrate observations further illustrate the habitat gradient present on site. Several dragonflies were recorded along the riverbank, where permanent water and riparian vegetation provide suitable breeding and foraging habitat for *odonata* species. Within the disturbed footprint, multiple spider webs were observed, indicating the persistence of common arachnid species in microhabitats associated with secondary vegetation and exposed soil.

Grazing livestock were observed within and around the development footprint, further confirming the disturbed and transformed nature of the site. Livestock grazing contributes to reduced groundcover, soil compaction, suppression of indigenous vegetation recruitment, and the proliferation of disturbance-tolerant and invasive plant species. Continuous grazing pressure also reduces habitat suitability for more sensitive terrestrial fauna, reinforcing the low ecological sensitivity of the footprint.

Overall, the terrestrial biodiversity sensitivity within the footprint is low, but the surrounding bushveld and riparian-associated terrestrial habitats hold moderate ecological value. The proposed bridge construction will introduce short-term disturbances, but these impacts are localised and manageable, provided that construction remains strictly within the approved footprint and that alien plant control, riparian protection, and standard environmental management measures are effectively implemented.

12 CONCLUSION AND RECOMMENDATIONS

The terrestrial biodiversity assessment confirms that the proposed bridge construction and associated road upgrades will occur within a disturbed and transformed footprint that

supports low ecological sensitivity. Although the broader landscape is situated within the Vulnerable Sekhukhune Plains Bushveld and mapped as a CBA 1 adjacent to a CBA 2, the actual footprint has been significantly altered by historical land-use activities, livestock grazing, access route, and the presence of disturbance-tolerant and invasive alien plant species. No protected trees or sensitive flora occur within the footprint, and faunal activity is limited to common species, with higher biodiversity value present in the surrounding bushveld and riparian-associated habitats.

Given the degraded condition of the footprint, the anticipated impacts on terrestrial biodiversity are localised, short-term, and readily manageable through standard mitigation.

Key Recommendations

- **Strict adherence to the approved footprint** to avoid indirect impacts on nearby protected trees (*Boscia albitrunca* and *Spirostachys africana*) and intact bushveld habitat.
- **Implement alien plant control** targeting *Argemone mexicana* and *Solanum mauritianum* during construction and rehabilitation.
- **Protect riparian-associated terrestrial habitat** by preventing encroachment, unnecessary clearing, or stockpiling near the Olifants River corridor.
- **Manage livestock access** during construction to reduce soil compaction, vegetation loss, and interference with rehabilitation efforts.
- **Rehabilitate disturbed areas** using locally appropriate indigenous species to stabilise soil and prevent post-construction weed proliferation.

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