AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED ENERGY STORAGE SYSTEM PROJECT

Aquatic Biodiversity Theme

Booysendal South, located in Thaba Chweu Local Municipality, Ehlanzeni District Municipality, Mpumalanga Province, South Africa

16/03/2026

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Report Name	**AQUATIC BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED ENERGY STORAGE SYSTEM PROJECT**
Specialist Theme	Aquatic Biodiversity Theme
Project Reference	SSVR – Booysendal South BESS
Date	19 March 2026
Technical Support	Celine Klinkert (SACNASP r*egistry in progress*)[1] 
Responsible Specialist	Rian Pienaar (Pr Sci Nat 135544) 
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no personal stake in the project, other than to provide a professional service within the constraints of the project (timing, time, and budget) based on the principals of science.

[1] All work was completed under the supervision of a Professional Registered Scientist (Rian Pienaar - Pr. Sci. Nat. 135544)

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Table of Abbreviations and Units of Measure

Abbreviation / Unit	Full Meaning / Description
"	Second (used in GPS coordinates)
'	Minute (used in GPS coordinates)
°	Degree (used in GPS coordinates)
BESS	Battery Energy Storage System
Cand. Nat. Sci.	Candidate Natural Scientist (SACNASP registration)
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ESA	Ecological Support Areas
FEPA	Freshwater Ecosystem Priority Area
GN	Government Notice
GPS	Global Positioning System
ha	Hectare (unit of area)
km	Kilometre (unit of distance)
m	Metre (unit of length)
m²	Square metre (unit of area)
MW	Megawatt (unit of power)
MWh	Megawatt-hour (unit of energy)
NEMA	National Environmental Management Act
NFEPA	National Freshwater Ecosystem Priority Area
Pr. Sci. Nat.	Professional Natural Scientist (SACNASP registration)
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SSV	Site Sensitivity Verification
SSVR	Site Sensitivity Verification Report
SACNASP	South African Council for Natural Scientific Professions
SWSA	Strategic Water Source Areas
TBC	The Biodiversity Company

Executive Summary

This Aquatic Biodiversity Site Sensitivity Verification Report has been prepared for the proposed Booysendal South (BS) Battery Energy Storage System (BESS) Project, located within the existing Booysendal Platinum Mine in the Thaba Chweu Local Municipality, Ehlanzeni District Municipality, Mpumalanga Province.

The proposed Project involves the construction, operation, and eventual decommissioning of a containerised, utility-scale battery energy storage facility with a capacity of up to 25 megawatts/50 megawatt-hours. The facility is intended to enhance energy security and operational resilience at the Mine, while reducing reliance on the national electricity grid.

Assessment Overview

The Biodiversity Company was appointed to conduct a Site Sensitivity Verification (SSV) in line with the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the "*Adoption of the Norm for the Exclusion of Identified Activities Associated with the Development and Expansion of Battery Storage Facilities in Areas of Low or Medium Environmental Sensitivity and the Exclusion of Identified Activities from the Requirement to obtain an Environmental Authorisation"* (Government Notice (GN) No. 4557, 27 March 2024) (BESS Exclusion Norm).

The SSV verifies the environmental sensitivity ratings generated by the Department of Forestry, Fisheries and the Environment National Web-based Environmental Screening Tool (Screening Tool) and assesses the site's suitability for potential exclusion from environmental authorisation requirements. The assessment included a desktop review and a wet season field survey (26–30 January 2026) to identify the presence or absence of watercourse features within the proposed Project area.

Key Findings

- The Screening Tool rated the site as 'Very High' for Aquatic Biodiversity due to the Project Area overlapping with a Freshwater Ecosystem Priority Area subcatchment and Ecological Support Area: Important subcatchment;
- Field surveys revealed the absence of natural or artificial watercourse features within the proposed Project area; and
- It is anticipated that there will be no impacts on freshwater resources from the proposed BS BESS Project.

Conclusions and Recommendations

- There is an absence of watercourse features within the proposed Project area.
- The specialist assessment disputes the Screening Tool's 'Very High' sensitivity rating, finding that actual site conditions warrant lower sensitivity classifications resulting from the absence of watercourse features within the proposed Project area.
- No mitigation measures or impact management is required with regards to freshwater resources.
- The findings support the site's suitability for registration under the BESS Exclusion Norm, subject to compliance with prescribed norms requirements.

The specialist confirms that the proposed BS BESS Project meets the requirements of the BESS Exclusion Norm, based on the assessment's findings of Low aquatic sensitivity and no identified

watercourses within the proposed Project area. The site is therefore suitable for registration under the BESS Exclusion Norm process.

1 Introduction

The Biodiversity Company was appointed to undertake a wetland Site Sensitivity Verification (SSV) report for the proposed Booysendal South (BS) Battery Energy Storage System (BESS) Project. The proposed Project is located on Portion 8 of Farm Sterkfontein No. 53, near Mashishing, within the Thaba Chweu Local Municipality, Ehlanzeni District Municipality in the Mpumalanga Province, South Africa (Figure 1-1).

1.1 Background

Booysendal Platinum Proprietary Limited, a subsidiary of Northam Platinum Limited (Northam), proposes the development of the BS BESS Project at the existing BS mining operation in the Mpumalanga Province of South Africa. The proposed Project aligns with Northam's objectives to enhance energy resilience and improve the reliability of electricity supply at its mining operations.

The proposed BS BESS Project involves the construction, operation, and eventual decommissioning of a utility-scale, behind-the-metre battery energy storage facility with an installed capacity of up to 25 megawatts (MW) and an energy storage capacity of up to 50 megawatt-hours (MWh). The system will store electrical energy during periods of lower demand and release stored energy during peak demand periods or times of grid instability. The proposed Project will be developed entirely within the existing BS mining footprint and will connect to established electrical infrastructure associated with the Mine.

The Biodiversity Company was appointed to conduct a SSV for the proposed BS BESS Project. The SSV was undertaken to independently verify the environmental sensitivity ratings generated by the National Web-based Environmental Screening Tool (Screening Tool) and to determine whether the site is suitable for potential registration under the "*Adoption of the Norm for the Exclusion of Identified Activities Associated with the Development and Expansion of Battery Storage Facilities in Areas of Low or Medium Environmental Sensitivity and the Exclusion of Identified Activities from the Requirement to obtain an Environmental Authorisation"* (Government Notice (GN) No. 4557, 27 March 2024) (BESS Exclusion Norm).

The assessment was conducted within the context of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the BESS Exclusion Norm, which allows for the exclusion of qualifying battery energy storage developments from the requirement to obtain an environmental authorisation (EA), provided that all prescribed conditions are met.

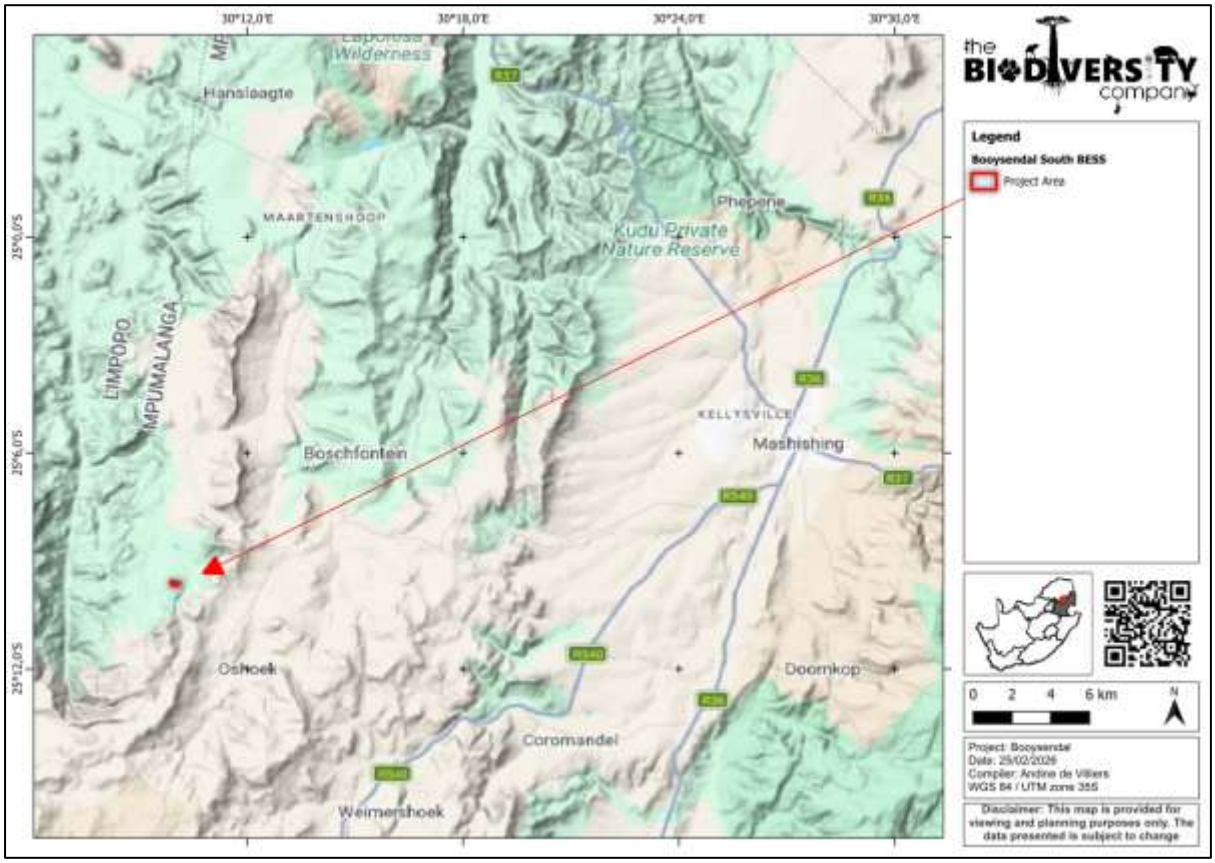


Figure 1-1 Map illustrating the regional locality of the proposed Project area

1.2 Legal Framework

1.2.1 National Environmental Management Act, 1998

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment (EIA) Regulations 2014 (Government Notice Regulation (GNR) 982, of 4 December 2014, as amended) of the NEMA. The assessment also considered the Department of Forestry, Fisheries and the Environment (DFFE) Environmental Screening Tool (2025) (Screening Tool).

The approach further took cognisance of GN 320 of 20 March 2020, published in terms of NEMA, titled *"Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation."* (Reporting Criteria) These procedures outline the required assessment protocols and minimum reporting criteria for environmental themes identified by the Screening Tool.

1.2.2 Battery Energy Storage Exclusion Norm, 2024

This report has been compiled with consideration of the BESS Exclusion Norm, which provides for the exclusion of identified activities associated with the development and expansion of battery storage facilities in areas of low or medium environmental sensitivity from the requirement to obtain an EA.

The Exclusion Norm establishes the rules under which activities associated with the development and expansion of battery storage facilities, identified in terms of Section 24(2)(a) and (b) of the NEMA and listed in EIA Regulations Listing Notices 1, 2, or 3 of 2014, promulgated under Section 24(5) of NEMA, may be excluded from the requirement to obtain EA prior to commencement, while still meeting the objectives and principles of NEMA.

1.2.3 Department of Forestry, Fisheries and the Environment Screening Tool

The Screening Tool, developed by the DFFE, is prescribed in terms of the EIA Regulations, 2014, and is used to identify environmental sensitivities associated with a proposed Project area. The Screening Tool provides a spatially based sensitivity rating (Very High, High, Medium, or Low) based on the presence or absence of environmental features such as watercourses and other biodiversity attributes.

These sensitivity ratings inform the scope of specialist assessments required and the applicable regulatory pathway, including the potential applicability of exclusion norms. For projects seeking to rely on the BESS Exclusion Norm, the Screening Tool outputs form the baseline sensitivity classification, which must be independently verified through a SSV undertaken by suitably qualified specialists.

1.2.4 Government Notice 320 Assessment and Reporting Requirements

In accordance with the Reporting Criteria, the requirements for a SSV are presented in Table 1-1 below.

Table 1-1 Aquatic biodiversity Site Sensitivity Verification information requirements as per the relevant protocol, including the location of the information within this report

Information to be Included (as per GN 320, 20 March 2020)	Report Section
The Area sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.	6.2
The Area sensitivity verification must be undertaken through the use of: (a) a desktop analysis, using satellite imagery; (b) a preliminary on-Area inspection; and (c) any other available and relevant information	3.1, 3.2 and 3.3
The outcome of the Area sensitivity verification must be recorded in the form of a report that: (a) confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc; and (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.	3.4

The Site Sensitivity Verification Report (SSVR) must be submitted together with the relevant assessment report prepared in accordance with the requirements of the BESS Exclusion Norms.

1.3 Scope of Work

In accordance with the Reporting Criteria the current use of the land and the environmental sensitivity of the area under consideration as identified by the Screening Tool, must be confirmed by undertaking a SSV.

The outcome of this SSV is to:

- Confirm or dispute the current use of the land and the environmental sensitivity as identified by the Screening Tool; and
- Motivate and provide evidence of either the verified or different use of the land and environmental sensitivity of the area.

1.4 Project Description

The following information was provided by GCS Environment South Africa (Pty) Ltd and pertains to the proposed BS South BESS Project:

Northam proposes the development of the BS BESS Project at the existing Booysendal Platinum Mine (the Mine) in the Mpumalanga Province of South Africa. The proposed Project entails the construction, operation and eventual decommissioning of a utility-scale, behind-the-metre BESS with an installed capacity of up to 25 MW and an energy storage capacity of 50 MWh. The BS BESS Project will store

electrical energy during periods of lower electricity demand and release stored energy during periods of peak demand or grid instability.

The proposed BS BESS Project is intended to enhance electricity supply reliability and operational resilience at the BS Mine, while reducing reliance on, and pressure upon, the national electricity grid. The development will be located entirely within the existing mining footprint and will connect directly to established electrical infrastructure associated with the BS Mine.

1.4.1 Project Location and Area Context

The proposed BS BESS Project is located on Portion 8 of Farm Sterkfontein No. 53, near Mashishing, within the Thaba Chweu Local Municipality, which forms part of the Ehlanzeni District Municipality in the Mpumalanga Province, South Africa. The proposed Project area lies approximately 30 kilometres (km) west of Mashishing and is accessed via the R577 regional road, followed by established Mine access roads.

1.4.2 Overview of the Facility

The proposed BS BESS Project comprises the development of a containerised battery energy storage facility located within the existing operational footprint of the Mine. The facility will occupy a total fenced development area of approximately 2900 square metres (m²) and has been designed to integrate fully with the Mine's established electrical and operational infrastructure.

The proposed BS BESS Facility will operate as a behind-the-metre energy storage installation, providing electrical storage capacity for exclusive on-Area use. Stored electrical energy will be discharged directly to Mine infrastructure through a dedicated medium-voltage electrical connection to the existing BS consumer substation.

The Project has been purposefully designed to minimise environmental disturbance through the use of modular, containerised infrastructure and by situating the development entirely within an established industrial mining area. This approach limits additional land transformation, avoids encroachment into undeveloped or environmentally sensitive areas, and enables efficient construction, operation and eventual decommissioning of the facility.

1.4.3 Installed Capacity

The proposed Project will have an installed power capacity of up to 25 MW and an energy storage capacity of up to 50 MWh.

The BESS will supply electricity during peak demand periods to reduce the Mine's reliance on expensive Eskom peak Time-of-Use tariffs. In addition, the system will manage short-term load fluctuations and provide reliable backup capacity during periods of grid instability or electricity supply interruption.

1.4.4 Battery Technology

The proposed BS BESS Project will utilise Lithium Iron Phosphate (LFP) battery technology. This battery chemistry has been selected based on its proven performance, operational reliability and enhanced safety characteristics when compared with alternative lithium-ion technologies.

LFP batteries are characterised by high thermal stability and a significantly reduced risk of thermal runaway, which is a critical consideration for large-scale stationary energy storage applications. The chemistry exhibits strong resistance to overheating and fire propagation, thereby reducing potential safety risks to personnel, infrastructure and the surrounding environment.

In addition to its safety advantages, LFP technology offers a longer operational cycle life, high charge–discharge efficiency and stable performance under frequent cycling conditions. These attributes make LFP batteries particularly suitable for behind-the-metre industrial applications where daily load shifting, peak shaving and backup power functions are required.

LFP battery systems are widely deployed internationally in utility-scale and industrial energy storage facilities, including mining operations, due to their durability, predictable performance characteristics and reduced environmental risk profile over the Project lifecycle.

The proposed Project area is indicated in Figure 1-2 below.

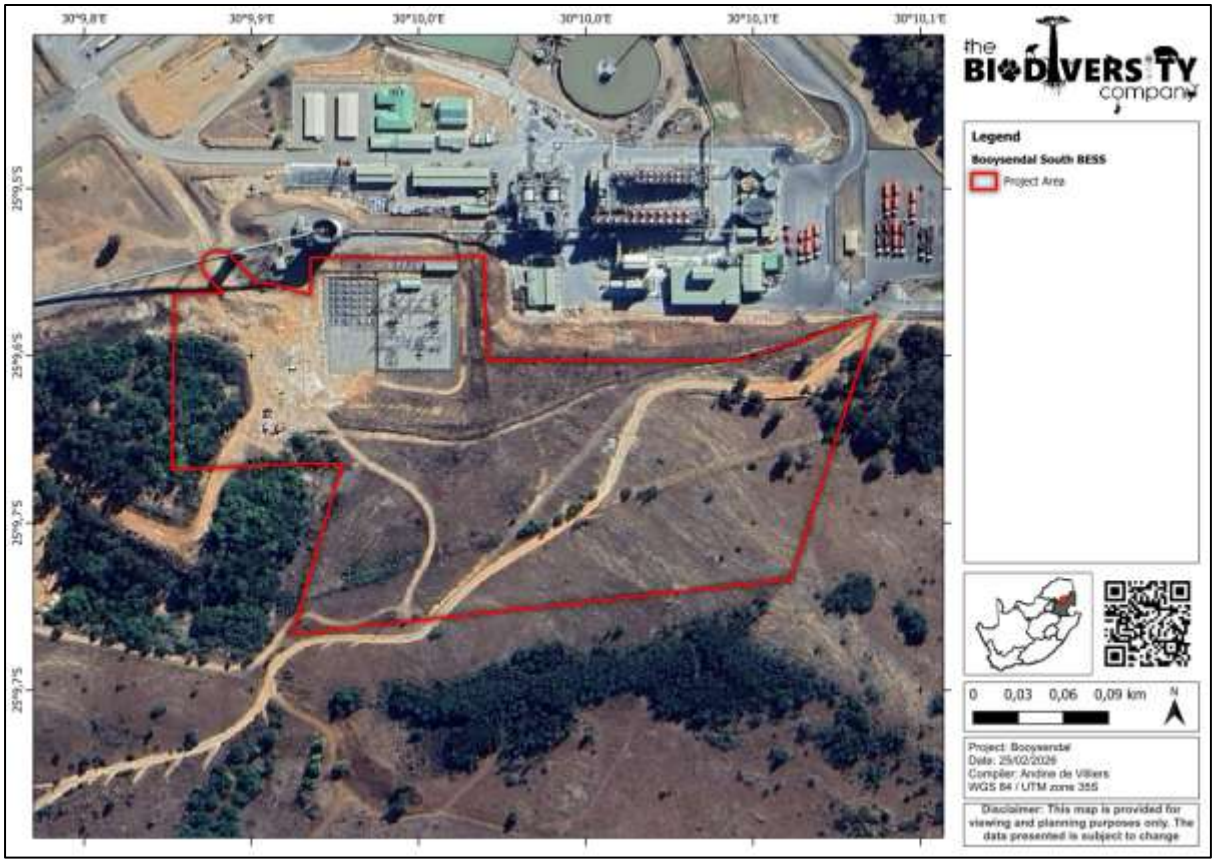


Figure 1-2 Assessment area and proposed Project area of the Booysendal South Battery Energy Storage System

2 Approach

A field survey for the assessment area was undertaken from the 26th to 30th of January 2026, constituting as a wet season survey, to determine the presence of surface aquatic features (wetlands). Specialist declarations and a Curriculum Vitae (CV) including the South African Council for Natural Scientific Professions registration numbers are provided in Appendix A and Appendix B, respectively. This SSVR has been prepared in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (GN 320).

Figure 2-1 Map illustrating the Global Positioning System tracks of the specialist during the field survey

2.1 Assumptions and Limitations

The following is applicable:

- The seasonality of the survey is not considered to be a limiting factor with regard to identifying watercourse features;
- Representative sampling within the assessment area was conducted and by its nature would result in some areas of the assessment area not being covered on foot. However, the results derived were sufficient to derive a meaningful assessment for the presence/absence of freshwater ecosystems to be identified; and
- The Global Positioning System (GPS) used for delineations is accurate to within five metres. Therefore, the delineation plotted digitally may be offset by at least five metres to either side.

3 Results and Discussion

3.1 Desktop Assessment

The datasets listed below were incorporated to establish the relation between the proposed Project and ecologically important or sensitive freshwater entities. Emphasis was placed around the following spatial datasets:

- South African Inventory of Inland Aquatic Ecosystems (SAIIAE), NBA 2018 Rivers and Wetlands (Van Deventer *et al*. 2019);

- National Freshwater Priority Areas, Rivers and Wetlands, 2011 (Nel *et al*. 2011);
- Strategic Water Source Areas (Lötter and Le Maitre, 2021); and
- Mpumalanga Provincial Conservation Plan.

The table below below has been produced because of the spatial data collected and analysed as provided by relevant sources. The relevance presented in the table below refers to the proposed Project area.

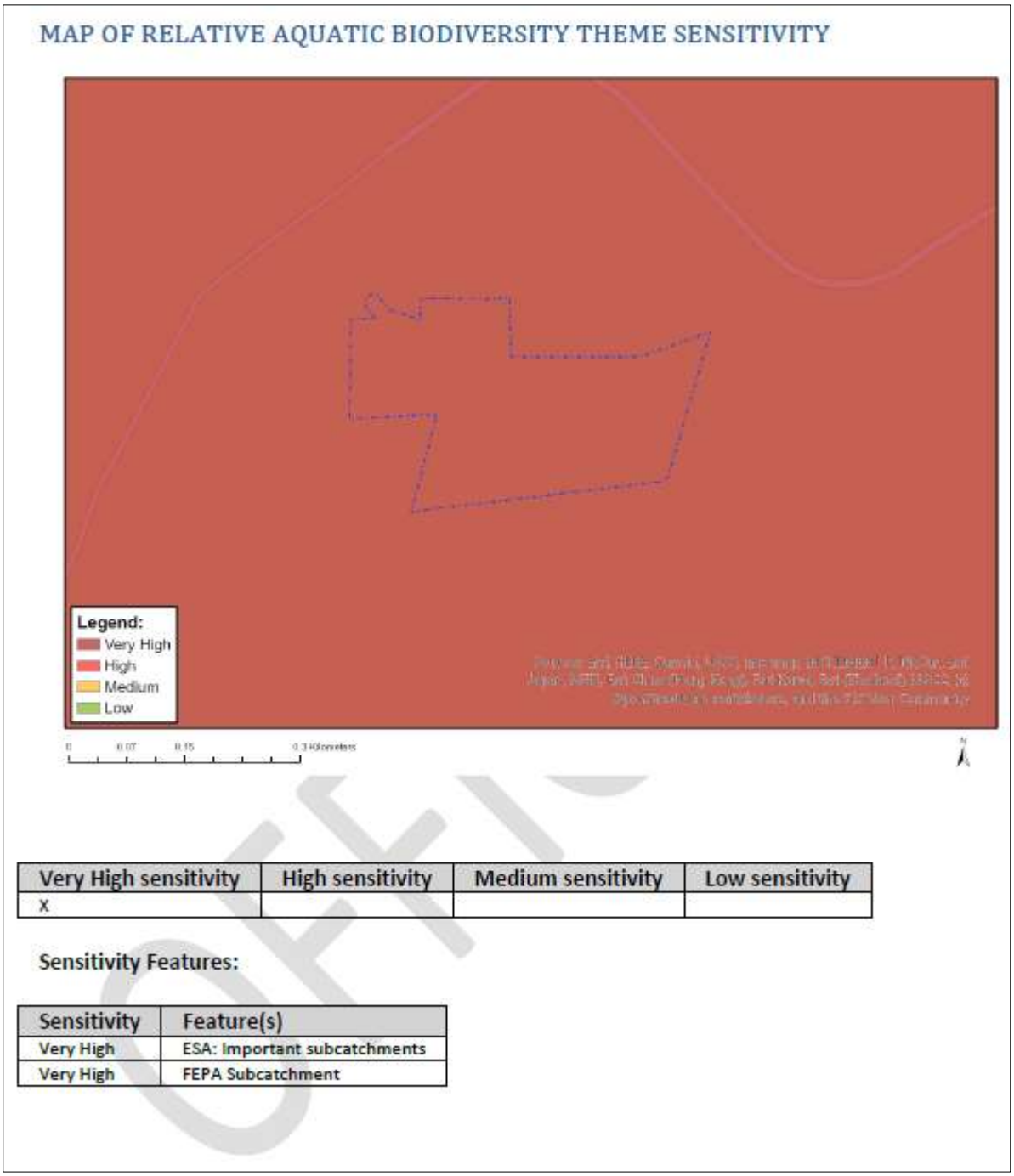
Table 3-1 Summary of relevance of the proposed Project to ecologically important landscape features

Desktop Information Considered	Relevance	Reasoning
Provincial Conservation Plan	Relevant	Project area (development area) does not overlap with Ecological Support Areas (ESA): Important subcatchments.
South African Inventory of Inland Aquatic Ecosystems (SAIIAE, 2021)	Irrelevant	Project area does not overlap with SAIIAE wetlands or rivers.
National Freshwater Priority Area (NFEPA, 2011)	Irrelevant	Project area does not overlap with NFEPA wetlands or rivers.
Strategic Water Source Areas (SWSA)	Irrelevant	Project area does not overlap with National or Groundwater SWSA.

3.2 Desktop Ecological Sensitivity

The following is deduced from the National Web-based Environmental Screening Tool (Screening Tool) as prescribed in terms of Regulation 16(1)(v) of the EIA Regulations, 2014:

- Aquatic Biodiversity Theme Sensitivity as “Very High” for the proposed Project area, due to the presence of:
    - Ecological Support Areas (ESA): Important subcatchments; and
    - Freshwater Ecosystem Priority Areas (FEPA) subcatchment (Figure 3-1).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	ESA: Important subcatchments
Very High	FEPA Subcatchment

Figure 3-1 Aquatic Biodiversity Theme Sensitivity for the Project area

3.3 Survey Results

The following sections discuss the results from the field survey that was conducted to verify the aquatic biodiversity theme sensitivity of the proposed Project area.

Representative sample points are described in Table 3-2. During the site visit no natural or artificial watercourse features were identified within the proposed Project area, resulting from the absence of characteristic wetland features within the area. The proposed Project area presented with limited terrestrial vegetation, disturbed and cleared areas, disturbed rocky landscape.

Table 3-2 Spatially representative survey area

Survey Point	Description	Photographs
Area GPS Reference: **Photo 1** **Date: 28/01/2026** **GPS Coordinates:** **25° 9'37.33"S** **30° 9'54.42"E**	Disturbed terrestrial environment.	
Area GPS Reference: **Photo 2** **Date: 28/01/2026** **GPS Coordinates:** **25° 9'37.65"S** **30° 9'53.45"E**	Disturbed environment with exotic invasive tree species present.	
Area GPS Reference: **Photo 3** **Date: 28/01/2026** **GPS Coordinates:** **25° 9'37.96"S** **30° 9'59.28"E**	Rocky landscape presenting disturbed terrestrial vegetation.	
Area GPS Reference: **Photo 4** **Date: 28/01/2026** **GPS Coordinates:** **25° 9'40.58"S** **30°10'1.69"E**	Rocky landscape presenting disturbed terrestrial vegetation.	

3.4 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas in Table 3-3 below. A summative explanation for each result is provided as relevant. The specialist assigned sensitivity ratings are based largely on the presence or absence of wetlands and is presented in Figure 3-2.

Table 3-3 Summary of the Screening Tool vs specialist assigned sensitivities

Aspect	Screening Tool Theme	Screening Tool	Specialist Finding	Tool Validated or Disputed by Specialist - Reasoning
Project area	**Aquatic Biodiversity Theme**	**Very High**	**Low**	Disputed – The area is largely representative of cleared and transformed land, with areas of terrestrial vegetation. The area did not present any natural or artificial watercourse features, in addition to portions of the Project area and its surroundings having experienced partial vegetation clearance from existing developments. The development is not anticipated to alter the hydrological regime of the landscape, as such, the area has been rated with a "Low" aquatic sensitivity. The development footprint is not located in a designated ESA nor FEPA subcatchment.

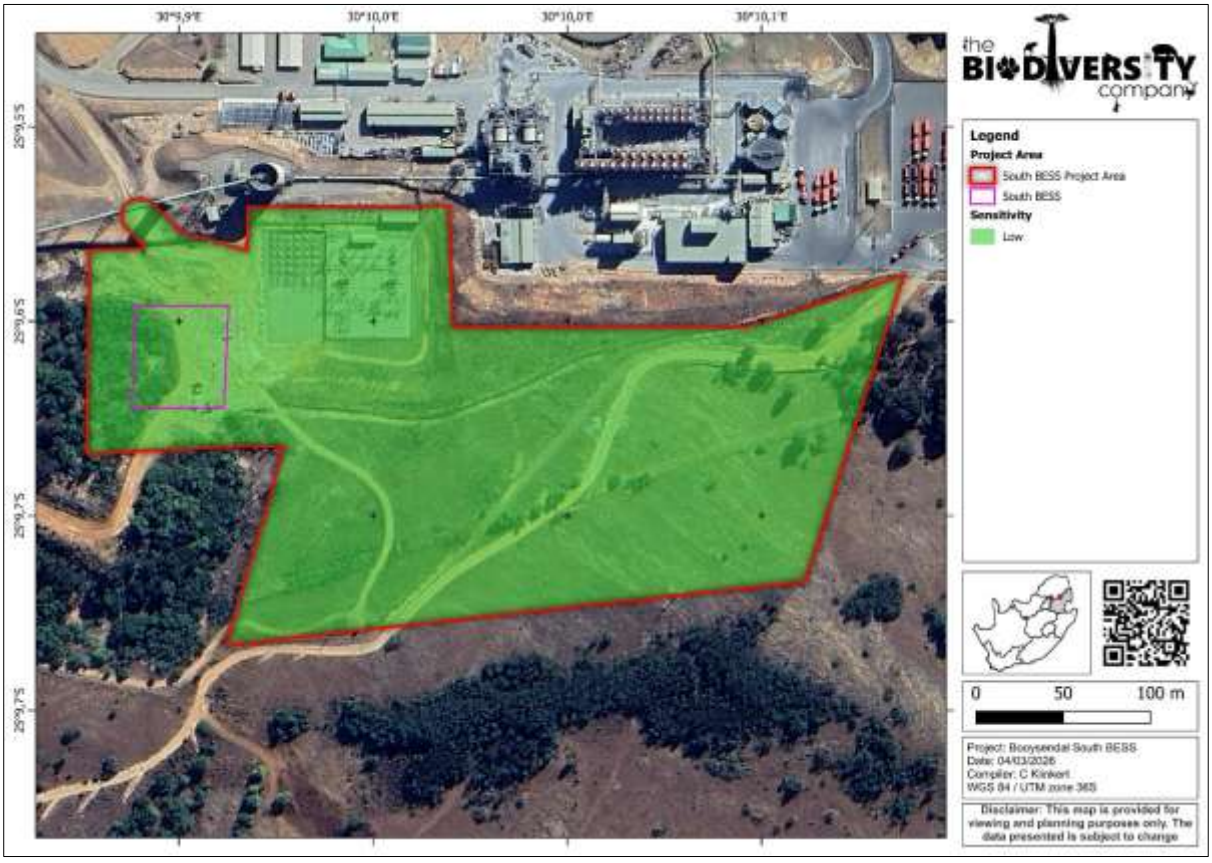


Figure 3-2 Freshwater sensitivity map of the proposed Project area

4 Conclusion

The aquatic biodiversity theme sensitivity for the Project area is characterised by areas of “Low” sensitivity attributed to the absence of watercourse features within the proposed Project area.

Areas of “Low” sensitivity are favourable for development, as such the entire proposed Project area is developable given that no natural watercourse features were identified within the Project area.

Resulting from the absence of watercourse features present within the Project area, there are no anticipated impacts to freshwater resources from the proposed BS BESS Project. As such, no impact management or mitigation measures are required with regards to freshwater resources for the proposed BS BESS Project.

Additionally, it is anticipated that the cumulative impacts on freshwater resources from the proposed Project will be Low, considering that the Project in insolation poses no impact on freshwater resources.

It is the opinion of the specialist that the proposed BS BESS Project can be favourably considered for authorisation. It is recommended that the development implement measures of best practise during the construction and operation phases of the development.

5 References

The Biodiversity Company. (2023). Freshwater Ecology Baseline & Impact Assessment for the proposed Booysendal Mine Expansion Project.

Lotter, M.C., Le Maitre, D. 2021. Fine-scale delineation of Strategic Water Source Areas for surface water in South Africa using Empirical Bayesian Kriging Regression Prediction: Technical report. Prepared for the South African National Biodiversity Institute (SANBI), Pretoria. 33p.

Nel, J. L., Driver, A., Strydom, W. F., Maherry, A. M., Petersen, C. P., Hill, L., Roux, D. J., Nienaber, S., van Deventer, H., Swartz, E. R. & Smith-Adao, L. B. (2011). Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources, WRC Report No. TT 500/11. Water Research Commission, Pretoria.

National Environmental Screening Tool. 2025. National Environmental Screening Tool, 2026. Available from the Department of Forestry, Fisheries and the Environmental webArea: https://screening.environment.gov.za/screeningtool/#/pages/welcome.

National Environmental Screening Tool. 2025. National Environmental Screening Tool, 2026. Available from the Department of Forestry, Fisheries and the Environmental webArea: https://screening.environment.gov.za/screeningtool/#/pages/welcome.

6 Appendix Items

6.1 Appendix A – Specialist Declaration of Independence

Declaration

I, Rian Pienaar, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Rian Pienaar

Ecologist

The Biodiversity Company

February 2026

6.2 Appendix B – Specialist CV

Rian Pienaar

Pr Sci Nat 135544 | +27 78 505 0201 | rian@thebiodiversitycompany.com

PROFILE SUMMARY

Environmental scientist and Pri Sci Nat (SACNASP 135544) with ~5+ years' specialist consulting experience across Southern Africa. Specialist expertise in wetland delineation and ecological assessments, wetland offset strategy design, rehabilitation and monitoring plans, as well as soil classification and agricultural potential assessments. Experienced in delivering high-quality field surveys and technical reporting aligned with in-country legislative requirements and international lender standards, and currently manages the operations at TBC.

PERSONAL INFO

Nationality: South African

Date of birth: 23 May 1994

EXPERIENCE

Environmental Impact Assessments (EIA)

Environmental Management Programmes (EMP)

Project Management

Logistics

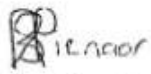
SKILLS

- ✓ Wetland functional assessments
- ✓ Ecology
- ✓ Rehabilitation
- ✓ Monitoring & Management Plans

LANGUAGES

English – Proficient

Afrikaans – Proficient



Signed: Rian Pienaar

ACADEMIC QUALIFICATIONS

North-West University (2020): MASTER OF SCIENCE (MSc) – Environmental Sciences (Cum Lauda):
Title: The use *Clarias gariepinus* and associated helminthic parasites as bio-indicators of metal pollution in a subtropical ecosystem.

North-West University (2018): BACHELOR OF SCIENCE HONOURS IN ENVIRONMENTAL SCIENCE – Aquatic Ecosystem Health

North-West University (2018): BACHELOR OF SCIENCE IN ENVIRONMENTAL AND BIOLOGICAL SCIENCES – Zoology and Microbiology

PROFESSIONAL EXPERIENCE

Sept 2020 – Present **The Biodiversity Company**
Wetland Ecology

Jan 2018 – Dec 2018 **National Aquatic Bioassay Facility (NABF)**
Intern

INTERNATIONAL EXPERIENCE

South Africa, Mozambique, Botswana

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Rian Stephanus Pienaar

Registration Number: 135544

is a registered scientist

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

Environmental Science (Professional Natural Scientist)

Effective **3 March 2021** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code