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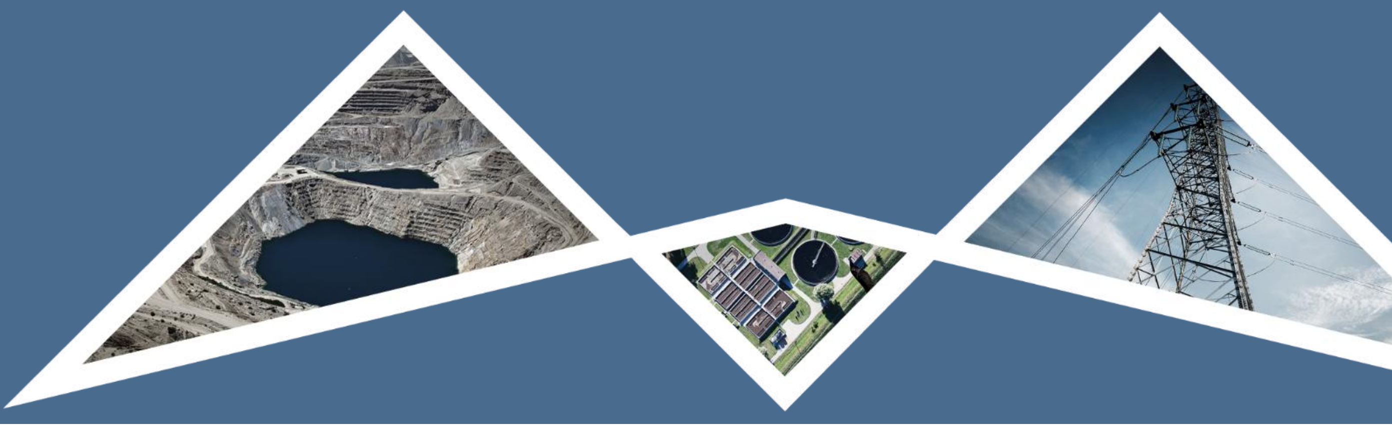
ENVIRONMENTAL ASSESSMENT REPORT

RCW BATCHING PLANT SECTION 24G
DECEMBER 2025



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Acronyms and Abbreviations

Acronym	Meaning
AIP	Alien Invasive Plant
APPA	Air Pollution Prevention Act
ARC	Agricultural Research Council
ASAPA	Association of Southern African Professional Archaeologists
ASTM	American Society for Testing and Materials
BLSA	BirdLife South Africa
BPDM	Bojanala Platinum District Municipality
CBA	Critical Biodiversity Area
CD: NGI	Chief Directorate: National Geospatial Information
CI	Cumulative Impact
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
CR	Critically Endangered
CRM	Cultural Resource Management
CSA	Conservation South Africa
DALRRD	Department of Agriculture, Land Reform and Rural Development
DFFE	Department of Forestry, Fisheries and the Environment
DMPR	Department of Mineral and Petroleum Resources
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Report
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment

Acronym	Meaning
EIMS	Environmental Impact Management Services
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Areas
GA	General Authorisation
GHG	Greenhouse Gas
GIS	Geographic Information System
GN	Government Notice
ha	Hectares
HGM	Hydrogeomorphic
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
MBMP	Magaliesberg Biosphere Management Plan
MSDS	Material safety datasheet
NBA	National Biodiversity Assessment
NEM:BA	National Environmental Management: Biodiversity Act
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management: Air Quality Act
NEM:WA	National Environmental Management: Waste Act
NHRA	National Heritage Resources Act
NPAES	National Protected Areas Expansion Strategy
NP	Not Protected

Acronym	Meaning
NT	Near Threatened
NWA	National Water Act
PAOI	Project Area of Influence
PCD	Pollution Control Dam
PES	Present Ecological State
POSA	Plants of Southern Africa
PPP	Public Participation Process
REC	Recommended Ecological Category
RLE	Red List of Ecosystems
RLM	Rustenburg Local Municipality
SACAD	South African Conservation Areas Database
SAHRA	South African Heritage Resources Agency
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SAPAD	South African Protected Areas Database
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEI	Site Ecological Importance
SSVR	Site Sensitivity Verification Report
SWMP	Stormwater Management Plan
SWSA	Strategic Water Source Area
WET-EcoServices	Wetland Ecosystem Services Assessment
WMA	Water Management Area
WUL	Water Use Licence
WULA	Water Use Licence Application
www	World Wide Web

EXECUTIVE SUMMARY

This Environmental Assessment Report (EAR) addresses the retrospective application for environmental authorisation in terms of Section 24G of the National Environmental Management Act (NEMA) for the Rietfontein Civil Works (RCW) Concrete Batching Plant, located on Portion 11 of the farm Rietfontein 338 JQ, Rustenburg Local Municipality, North West Province. The site covers approximately 1.38 hectares (ha) and is adjacent to the Rustenburg Chrome Mine.

1 INTRODUCTION AND OVERVIEW

Environmental Impact Management Services (Pty) Ltd (EIMS) was appointed as the Environmental Assessment Practitioner (EAP) to assist Clover Alloys SA (Pty) Ltd (Pty) Ltd (hereafter referred to as the Applicant), with undertaking the required authorisation processes, including the statutory public participation, and to compile and submit the required documentation in support of an application for:

- Retrospective Environmental Authorisation (EA) in accordance with the National Environmental Management Act - Act 107 of 1998 (NEMA) Section 24G for - Listed activities detailed in section 4 of this report.

The plant commenced operations without prior authorisation, triggering the need for retrospective compliance.

The batching plant consists of various infrastructure for the mixing of concrete, including:

- Main entrance off an unnamed gravel road;
- Offices with a septic tank for greywater/sewage collection;
- Firebreak with road acting as a berm;
- Bunded diesel storage (2 x 4.5m^3 tanks); [a]
- Concrete base working area;
- Water storage water storage tanks (10 X 10m^3 tanks);
- Bunded storage tanks of Quad 487 (5000 litres) and Optima 100 (5000 litres)
- Aggregate storage bays;
- 2 x Cement silos;
- Concrete mixer; and
- Pollution Control Dam (PCD) and Stormwater channels and a stormwater dam (still to be constructed).

2 REGULATORY FRAMEWORK AND PROCESS

The project requires authorisation in accordance with:

- NEMA Section 24G for listed activities including vegetation clearance (>1 ha), and infrastructure within 32 m of a watercourse;
- National Water Act (NWA) for water uses (Sections 21 a, b, c, i, g) (which will be applied for as part of the Rustenburg Chrome Mine (RCM) water use license application; and

[a] Specialist assessments were undertaken based on the information available at the time, which indicated 2 x 23 m^3 diesel storage tanks. Subsequent verification confirmed that the actual installation comprises two 4.5 m^3 diesel storage tanks. The assessment findings remain unchanged, however, conclusions should be interpreted in light of the corrected tank capacities.

- Compliance with the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA), the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA), the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), and other relevant legislation. The site overlaps Critical Biodiversity Area (CBA 2), Ecological Support Area (ESA 1), and the Magaliesberg Biosphere transition zone, within degraded Marikana Thornveld (Endangered ecosystem). A wetland occurs within 500 m downslope of the site. Sensitivity mapping and specialist studies informed mitigation measures.

3 RECEIVING ENVIRONMENT

The project area is situated within the Savanna biome, specifically within the Marikana Thornveld vegetation type, which is classified as Endangered. The site and its surroundings have been heavily modified by historical mining and agricultural activities, resulting in degraded thornveld habitat interspersed with alien invasive species. Natural ecological functionality is significantly reduced.

3.1 PHYSICAL ENVIRONMENT

- Climate: semi-arid Highveld zone with hot summers, mild winters, and summer rainfall averaging 500–600 mm annually;

- Geology & Soils: underlain by mafic intrusive rocks of the Bushveld Igneous Complex; soils include shallow Mispah and anthropogenic Technosols, with very low agricultural potential; and

- Water Resources: the site falls within the Crocodile (West) & Marico Water Management Area, quaternary catchment A22H. A wetland (unchannelled valley-bottom) occurs ~40 m downslope, classified as “Largely Modified” but ecologically important.

3.2 BIOLOGICAL ENVIRONMENT

- Flora: dominated by degraded thornveld species; one nationally protected tree the *Sclerocarya birrea* (Marula) was recorded. The survey also recorded high densities of alien invasive plants, notably the *Lantana camara* (West Indian Lantana) and *Ipomoea purpure* (Common Morning-glory). These species are known to spread aggressively, outcompeting indigenous flora and contributing to further habitat degradation.

- Fauna: common mammals and avifauna present; several Species of Conservation Concern (SCC) such as *Crocidura maquassiensis* (Makwassie Musk Shrew), *Dasymys robbertsii* (African Marsh Rat) and the *Atelerix frontalis* (South African Hedgehog) likely in surrounding habitats; and

- Wetlands: provide intermediate ecosystem services (flood attenuation, water quality improvement) but are at risk from adjacent activities.

3.3 SOCIAL & CULTURAL ENVIRONMENT

- The site is located within the Rustenburg Local Municipality and the Magaliesberg Biosphere transition zone. The heritage assessment identified remnants of a Late Iron Age settlement and a potential Middle Stone Age site, requiring conservation measures.

4 PUBLIC PARTICIPATION

The Public Participation Process (PPP) in line with Regulation 41(2) of the NEMA Environmental Impact Assessment (EIA) Regulations, 2014 as amended and the Section 24G fines regulations have commenced. To date the following PPP has been conducted:

Initial call to register:

- Newspaper Advertisement: Placement of advertisement in English and Afrikaans in the Rustenburg Herald Newspaper on 12 September 2025;
- Placement of site notices: Placement of 4 A1 Correx site notices in English and Afrikaans at locations along, within and surrounding the perimeter of the proposed project study area on 10 September 2025;
- Notification of landowners, occupiers and other key I&APs: Notification letters, were distributed to pre-identified I&APs through either email, fax, and/or registered mail where contacts were available on 08 September 2025.
- The Environmental Assessment Report (EAR) will be made available to Interested and Affected Parties (I&APs) for comment for a minimum period of 30 days at a date to be confirmed after submission to the competent authority.. All comments received during this period will be included in the Final EAR for submission to the Northwest Department of Economic Development, Environment, Conservation and Tourism (DEDECT) as the competent authority for review and decision-making.

5 ENVIRONMENTAL IMPACT STATEMENT

The findings of the assessment and associated specialist studies conclude that there are no environmental fatal flaws that should prevent the project from being retrospectively authorised, provided that the recommended mitigation and management measures are implemented. Based on the nature and extent of the project, the local level of disturbance predicted as a result of the concrete batching activities, the findings of the specialist studies, and the understanding of the significance level of potential environmental impacts, it is the opinion of the project team and the EAP that the significance score of the majority of identified negative impacts can generally be reduced to an acceptable level by implementing the recommended mitigation measures and the project should be authorized. The only impact where mitigation cannot specifically reduce the significance score is the loss of fossil heritage. This impact is scored as low due to the low sensitivity and the unlikelihood of fossil material being discovered on site.

The following impacts were determined to have a potentially medium to high negative significance after mitigation:

Impacts on terrestrial biodiversity:

- Destruction, loss and fragmentation of the vegetation community for the proposed infrastructure during the construction phase.
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching) for the proposed infrastructure during the construction phase.
- Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials for the proposed infrastructure during the construction phase.
- Destruction, loss and fragmentation of the vegetation community caused by the construction of existing infrastructure.
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching) for the existing infrastructure during the construction phase.
- Clearing of vegetation leading to soil erosion and loss of topsoil for the existing infrastructure during the construction phase.
- Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials for the existing infrastructure during the construction phase for the existing infrastructure during the operational phase.

- Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.
- Environmental pollution due to water/ mine drainage runoff and increased dustfall for the existing infrastructure during the operational phase.

1 INTRODUCTION

Environmental Impact Management Services (Pty) Ltd (EIMS) was appointed as the Environmental Assessment Practitioner (EAP) to assist Rietfontein Civil Works (Pty) Ltd, to undertake the retrospective environmental authorisation process in terms of Section 24G of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) for the concrete batching plant established on Portion 11 of the farm Rietfontein 338 JQ.

The batching plant, situated approximately 5.3 km east of Kroondal and directly adjacent to the Rustenburg Chrome Mine (RCM), was constructed in March 2025 without the requisite Environmental Authorisation (EA) or Water Use Licence (WUL). Its development involved vegetation clearing exceeding 1 hectare and the establishment of infrastructure, including diesel storage tanks, aggregate bays, a septic tank system, and proposed stormwater management structures, within an area of high environmental sensitivity. The site falls within a Conservation Biodiversity Area (CBA) 2, the National Protected Area Expansion Strategy (NPAES) focus area, and the endangered Marikana Thornveld vegetation unit, and is located directly adjacent to a delineated watercourse/wetland. Applications for the following listed activities are being submitted:

- Retrospective Environmental Authorisation (EA) in accordance with the National Environmental Management Act - Act 107 of 1998 (NEMA) Section 24G for - Listed activities detailed in subsection 3.1.2.2 of this report.
- Water Use Licence (WUL) amendment in accordance with the National Water Act – NWA (Act 36 of 1998) - Listed activity/ies:
    - Section 21 (a);
    - Section 21 (b);
    - Section 21 (c) and (i); and
    - Section 21 (g).

The batching plant consists of various infrastructure for the mixing of concrete, including:

- Main entrance off an unnamed gravel road;
- Offices with a septic tank for greywater/sewage collection;
- Firebreak with road acting as a berm;
- Bunded diesel storage (2 x 4.5m^3 tanks); [b]
- Concrete base working area;
- Water storage tanks (10 X 10m^3 tanks);
- Bunded storage tanks of Quad 487 (5000 litres) and Optima 100 (5000 litres)
- Aggregate storage bays;
- 2 x Cement silos;
- Concrete mixer; and
- Pollution Control Dam (PCD) and stormwater channels; (still to be constructed);

[b] Specialist assessments were undertaken based on the information available at the time, which indicated 2 x 23 m³ diesel storage tanks. Subsequent verification confirmed that the actual installation comprises 2 x 4.5 m³ diesel storage tanks. The assessment findings remain unchanged, however, conclusions should be interpreted in light of the corrected tank capacities

1.1 DETAILS OF THE EAP

EIMS has been appointed as the independent Environmental Assessment Practitioner (EAP) to prepare and submit the Section 24G application and undertaking a Public Participation Process (PPP) for the retrospective licensing of the Rietfontein Civil Works Concrete Batching Plant. The contact details of the EIMS consultant and EAP who compiled this Report are as follows:

Table 1: EAP Details

Name of Practitioner	Ms Monica Niehof (EAP)	Mr Andre van Rooyen (Candidate EAP/compiler)
Tel No.:	+27 11 789 7170	+27 11 789 7170
Fax No.:	+27 86 571 9047	+27 86 571 9047
E-mail:	monica@eims.co.za	andre@eims.co.za

1.1.1 EXPERTISE OF THE CANDIDATE EAP

In terms of Regulation 13 of the EIA Regulations, 2014, as amended, an independent EAP, must be appointed by the applicant to manage the application. These regulations are relevant to the Section 24G process as an E is required to conduct an Environmental Impact Assessment to assess the extent, duration, magnitude and cumulative impacts of the illegal commencement. EIMS is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, as well as Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA’s;
- Comply with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 30 years’ experience in conducting EIA’s. Please refer to the EIMS website (www.eims.co.za) for further details of expertise and experience.

The experience of the Candidate EAP is as follows:

Andre van Rooyen is a current Environmental Assessment Practitioner with 2 years’ working experience. He is a registered candidate natural scientist with the South African Council for Natural Scientific Professions (SACNASP), (Reg. #164675). He is also a Registered Candidate Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA Reg. #2023/6845). Andre has background in Environmental Sciences having academic qualifications which focused on these disciplines as well as relevant work experience. Andre has experience in various environmental assessment projects ranging from environmental screening, auditing, and compliance evaluation among other . In addition, Andre has undertaken Water Use Authorisations applications through both the general authorisation and water use authorisation processes, including the compiling of related documentation such as the Integrated waste and water management plan.

1.1.2 EXPERTISE OF THE EAP

Ms Monica Niehof is an Environmental Assessment Practitioner (EAP) and environmental auditor. She is registered as an Environmental Assessment Practitioner (EAP) with EAPASA and she holds a Bachelor of Science

Honours degree in Environmental Management from the University of South Africa. She has 13 years' experience in the environmental field, during which Environmental Impact Assessment Process has been one of her main responsibilities. She has extensive experience in Environmental Impact Assessments, including for Environmental Authorisation (EA), Water Use License (WUL), Air Emission License (AEL) and Waste Management License (WML) applications, as well as auditing of EAs and other authorisations and licenses. Experience was gained in sectors including residential, retail, manufacturing, mining, energy, fuel infrastructure etc. Either being part of the EAP or auditing team, or as auditor and as Senior EAP. Clients included Municipalities, Private Companies, individuals, State Owned Entities etc.

The Curriculum Vitae of the Candidate EAP and the EAP is included in Appendix A.

1.2 DESCRIPTION OF THE PROJECT AREA

Table 2 indicates the details of the project area for the proposed project including details on the project location as well as the distance from the proposed project area to the nearest towns.

Table 2: Locality details.

Project Area	Portion 11 of the farm Rietfontein 338 JQ
Application Area (ha)	1.38
Cadastral description	T0JQ00000000033800011
Magisterial District	North West Province
District Municipality	Bojanala District Municipality
Local Municipalities	Rustenburg Local Municipality
Nearest Town	~5.3 Km East of Kroondal
Centre point	-25.732290°S, 27.367811°E

The locality of the proposed project is shown in Figure 1.

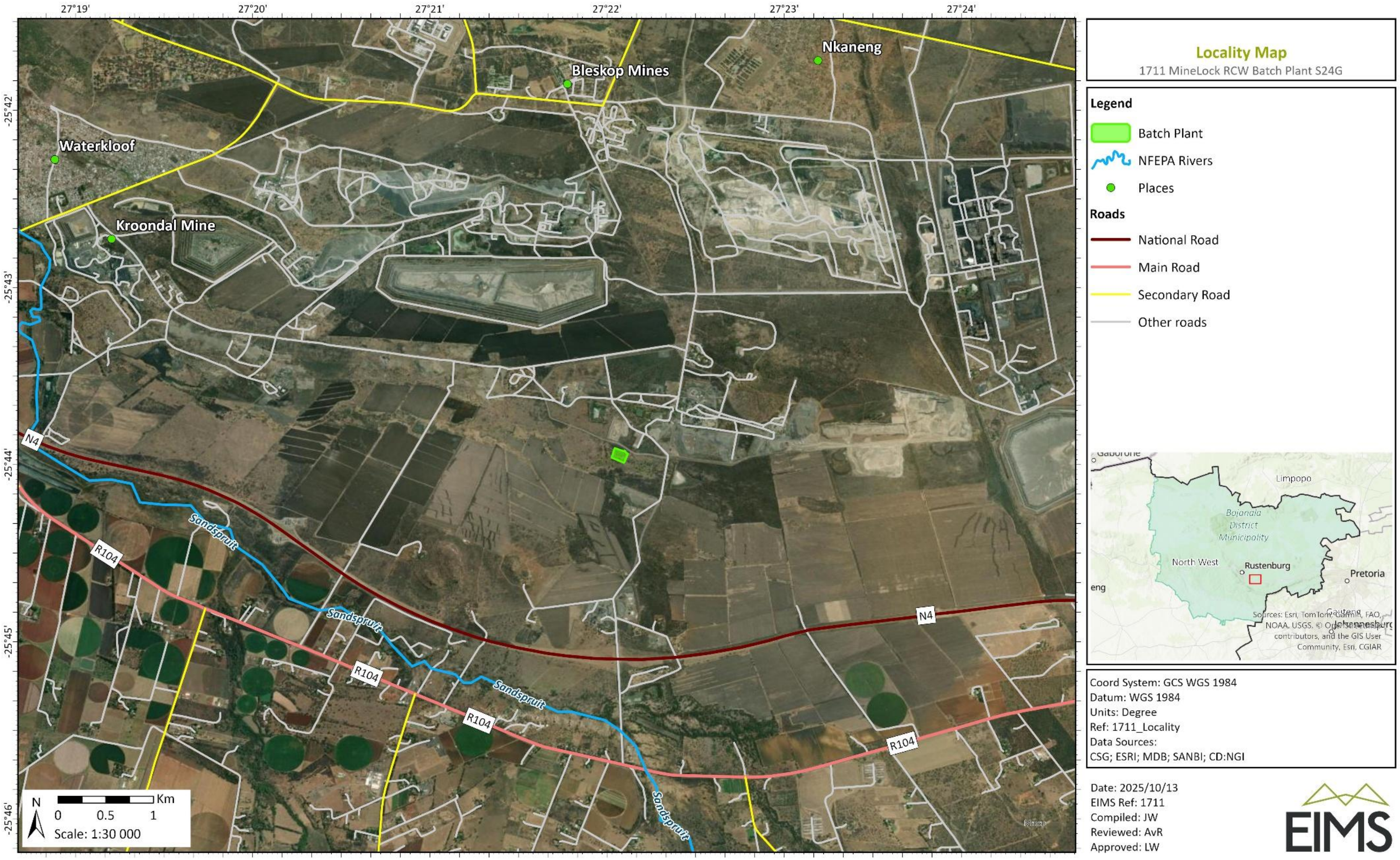

Figure 1: Locality map.

2 DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

This section provides a detailed description for the proposed project. Most of the key information presented in this chapter was obtained from the applicant. The aim of the project description is to describe the activities which have already been undertaken as well as those planned to take place at the project area. Furthermore, the project description is designed to facilitate the understanding of the project related activities which are anticipated to lead to environmental impacts and have caused impacts, identified and assessed in this report, and for which management measures have been designed.

2.1 PROJECT DESCRIPTION

The site is located approximately 5.3km east of Kroondal with the concrete batching plant located on Portion 11 of the farm Rietfontein 338 JQ in the Rustenburg Local Municipality, North West Province. The plant is directly adjacent to the existing Rustenburg Chrome Mine.

The batching plant layout is shown in Figure 1 and the typical infrastructure includes:

- Main entrance off an unnamed gravel road;
- Offices with a septic tank for greywater/sewage collection;
- Firebreak with road acting as a berm;
- Bunded diesel storage (2 x 4.5m^3 tanks); [c]
- Concrete base working area;
- Stormwater channels and a Pollution Control Dam (PCD – yet to be constructed);
- Water storage tanks (10 X 10m^3 tanks);
- Bunded storage tanks of Quad 487 (5000 litres) and Optima 100 (5000 litres)
- Aggregate storage bays;
- 2 x Cement silos; and
- Concrete mixer.

It is understood that construction of the batching plant was undertaken in March 2025.

2.1.1 PROJECT OVERVIEW

The section will discuss the specific components of the project including the relevant infrastructure and processes involved in the plant operations.

2.1.2 PROJECT TIMELINE

This section will provide a brief overview of the expected timelines relative to the development of the site. The section will discuss both what has already been constructed and the timeframes in which the additional infrastructure will be constructed.

- Unlawfully commenced / undertaken aspects:
  - Concrete mixer and storage silos;
  - Aggregate storage areas;

[c] Specialist assessments were undertaken based on the information available at the time, which indicated 2 x 23 m³ diesel storage tanks. Subsequent verification confirmed that the actual installation comprises 2 x 4.5 m³ diesel storage tanks. The assessment findings remain unchanged, however, conclusions should be interpreted in light of the corrected tank capacities

- Fuel storage;
- Reagent storage;
- Site offices;
- Concrete lab;
- Septic tank and associated pipeline; and
- Water storage area and the abstraction point for water supply.

- Proposed additional Infrastructure:
  - Stormwater management infrastructure including the pollution control dam and the associated silt trap.

It is anticipated that the construction of the remaining infrastructure would conclude within approximately three months of an environmental authorisation being issued.

Please refer to Figure 2 for the layout of the site which shows works completed to date and planned infrastructure locations.

2.1.3 PROJECT COMPONENTS AND ASSOCIATED ACTIVITIES AND INFRASTRUCTURE

This section will provide an overview of the infrastructure on site. Further discussion in this section will also focus on origin of materials used and requirements in respect to natural resources for the operation of the plant.

2.1.3.1 ADMINISTRATION

A small administrative office is located on site. The office is constructed from containers. A second container building occurs close to the office building which houses the control room as well as the concrete lab on site. Some storage areas are also present in these buildings.

2.1.3.2 ROADS, TRAFFIC AND TRANSPORT.

The plant does not require new roads to be constructed. The plant is situated in an area dominated by mining activities where unnamed roads already exist.

2.1.3.3 WASTE MANAGEMENT

All waste generated on site is securely stored in wheelie bins and collected as part of routine operations. The management of this waste is fully integrated into RCM's established waste handling systems, which have been systematically expanded to accommodate RCW activities. This approach ensures consistency with existing protocols while maintaining compliance with environmental standards.

2.1.3.4 WATER

The primary source of water on-site is abstracted from a borehole located on the site. The plant has storage facilities which makes use of water storage tanks (10 x10m3 tanks) which are placed on a concrete pad.

2.1.3.5 SEWAGE AND WASTEWATER

In order to provide for ablutions at the plant, an underground septic tank has been installed at the site. The tank holds a capacity of approximately 12 500 litres (L) and is buried underground and encased in concrete. The septic tank is serviced by a service provider which is incorporated in the wider RCM operations.

2.1.3.6 STORMWATER MANAGEMENT

The proposed infrastructure development will result in an increase in impervious surfaces such as the concrete base for the plant (batching area, parking areas) and the buildings which can impede natural infiltration and increase surface runoff. Without appropriate stormwater management, this could result in increased erosion and sedimentation of nearby watercourses, etc. A Stormwater Management Plan (SWMP) is therefore essential to ensure that stormwater is managed in a sustainable and responsible manner.

The proposed SWMP for the development area was developed by MineLock Environmental Engineers. The proposed SWMP design is shown in Figure 2. Stormwater will be diverted into a PCD in a controlled manner to prevent scouring, sedimentation or erosion from forming. The design of the PCD is intended for dry operation and will therefore only contain runoff when rainfall events occur. A spillway is present downgradient of the PCD in order to capture any spillage that could occur in the unlikely event of an overflow of the PCD.

For further information regarding the conceptual design of the Stormwater Management Plan, please refer to Appendix H.

2.1.3.7 SECURITY

The entire site is surrounded by a fence which serves as security measures with a guard house built at the main entrance to the batching plant as shown in Figure 2.

2.1.3.8 NATURAL RESOURCE USE AND REQUIREMENTS

The plant makes use of materials from various sources as indicated below:

- Aggregates: Supplied by Quick Stone Crusher, a legal and registered company working with Sibanye Kroondal on its environmental plan to reduce mining residues. All materials are fully legal and accounted for with Sibanye;
- Cement Powder: provided by Sephaku Cement;
- Fly Ash: sourced from Matla Power Station via Kik-Bulk Distribution; and
- Admixtures: supplied by Chryso.

All materials are accompanied by Material Safety Data Sheets (MSDS). As a result, the only direct use of natural resources are limited to the use of abstracted groundwater.

Figure 2: Site layout

3 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which relates to the proposed project.

3.1 NATIONAL LEGISLATION

3.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act No. 108 of 1996) makes provisions for environmental issues and declares that: *"Everyone has the right -*

a) to an environment that is not harmful to their health or well-being; and

b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

i. prevent pollution and ecological degradation;

ii. promote conservation; and

iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

The EIA and associated impact mitigation actions are conducted to fulfil the requirement of the Bill of Rights.

3.1.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. In South Africa, EIA's became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant EA. On 21 April 2006, the Minister of Environmental Affairs and Tourism (now Department of Forestry, Fisheries and the Environment – DFFE) promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended a number of times between 2010 and 2022. The NEMA EIA Regulations, 2014, as amended, are applicable to this project.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that are triggered by the proposed project. The purpose of these procedures is to provide the competent authority with adequate information to make informed decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

NEMA sets out the general objectives of IEM in South Africa, including to (section 23(2)), of which the following two are of relevance for this report:

- Identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities. This is to be done with a view to minimising negative impacts, maximising benefits and promoting compliance with the principles of environmental management set out in section 2 (of NEMA).
- Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.

3.1.2.1 SECTION 24G

In terms of Section 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998), a person who has commenced with a listed or specified activity under NEMA EIA Regulations, 2014 as amended without the required environmental authorisation may apply for retrospective authorisation from the competent authority. This provision serves as a mechanism to rectify non-compliance, subject to the payment of an administrative fine. The Section 24G Fine Regulations (Government Notice No. R. 698 of 2017), promulgated under Section 44(1) of NEMA, outline the procedure and criteria for determining the quantum of such fines. These regulations require the establishment of a fine committee by each competent authority, which considers factors such as the nature and extent of the environmental impact, compliance history, and socio-economic and heritage impacts when recommending the fine amount. The application process must also include public participation and submission of relevant environmental reports to inform the authority's decision.

Section 24G of NEMA and the Section 24G fine regulations (GN R. 698) makes provision for activities which have commenced without the prior environmental authorisation being obtained and outline the process to be followed. The application in terms of Section 24G does not guarantee that an authorisation will be issued, where the competent authority may require the applicant to rehabilitate the area in which activities were undertaken. An administrative fine is also prescribed which may not exceed R 5 million for first offences and not exceed R 10 million for induvial/entities who have previously been required to submit a Section 24G application. The application also includes proposed infrastructure of a stormwater management system which includes various channels on site and a PCD with a silt trap which are included in the Section 24G application as part of the final site design.

3.1.2.2 LISTED ACTIVITIES

In accordance with the provisions of Sections 24(5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIA's in order to apply for, and be considered for, the issuing of an EA. These EIA Regulations provide a detailed description of the process to be followed when applying for EA for any listed activity.

The principles of the regulations will be applied to this application and are guided by the requirements of the Section 24G fine regulations (GN R. 698). The Table 3 below identifies the listed activities the project triggers and consequently requires retrospective authorisation.

Table 3: NEMA listed activities to be authorised

Legislative Reference	Reason for Applicability	Status
NEMA GNR 983 (Listing Notice 1) **Activity 27**: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	More than 1 hectare of indigenous vegetation has been cleared as part of the batching plant construction activities. This listed activity has been triggered without first obtaining an Environmental Authorisation and therefore a Section 24G rectification application is required.	This activity has already been commenced with in the course of the construction of the batching plant.
NEMA GNR 985 (Listing Notice 3) **Activity 12**: The clearance of an area of 300 square metres or more of indigenous	More than 1 hectare of indigenous vegetation has been cleared as part of the batching plant construction activities.	This activity has already been commenced with in the course of the construction of the batching plant.

Legislative Reference	Reason for Applicability	Status
vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. h. North West (i) World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; **(ii) A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation;** **(iii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);** **(iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;** (v) **Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or** **(vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.**	The site falls within a CBA and is also located within 100m of a watercourse/ wetland to the south of the site and therefore this clearance of indigenous vegetation exceeds the 300m^2 threshold of this listed activity. This listed activity has been triggered without first obtaining an Environmental Authorisation and therefore a Section 24G rectification application is required.	
<u>NEMA GNR 985 (Listing Notice 3)</u> **Activity 14**: The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or	The site falls within a CBA and the septic tank and portions of the pipeline are located within 32m of a watercourse. The proposed PCD (yet to be constructed) would exceed 10m^2 and would be located	This activity has been triggered by the construction of the batching plant. This activity will also be triggered by the construction of the PCD which has not yet been constructed.

Legislative Reference	Reason for Applicability	Status
(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or **(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;** excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. h. North West (i) World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; **(ii) A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation;** **(iii) All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999);** (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; (v) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or **(vi) Areas within 5 kilometres from protected areas**	within 32m of the watercourse based on the layout. This listed activity may or may not have already been triggered by the septic tank infrastructure however this activity will certainly be triggered by the proposed stormwater dam once constructed.	

Legislative Reference	Reason for Applicability	Status
identified in terms of NEMPAA or from the core areas of a Biosphere reserve.		

The DFFE have published a number of guidelines and protocols which have been considered in the compilation of this report and include but not limited to:

- Public Participation Guideline in terms of NEMA EIA Regulations (2014) as amended.
- Need and desirability Guideline in terms of NEMA (2012).
- National guideline on minimum information requirements for preparing Environmental Impact Assessments for mining act activities that require environmental authorisation (2018).
- 2004 Information Series covering various aspects of the EIA process.
- Procedures for assessment and minimum criteria for specialist studies (various specialist protocols).

3.1.2.3 SCREENING TOOL

A Screening Tool Report was generated from the DFFE Screening tool as per the requirements of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and Regulation 16 (1)(b)(v) of the EIA Regulations 2014, as amended, and was included in the Application for EA. The screening Tool provided a list of specialist studies for consideration and inclusion in the process. The Screening Tool identified environmental sensitivities are presented in Table 4.

Table 4: Screening Tool environmental sensitivities.

Aspect	Very High	High	Medium	Low
Agriculture Theme	☐	☐	☒	☐
Animal species Theme	☐	☐	☐	☒
Aquatic Biodiversity Theme	☐	☐	☐	☒
Archaeological and Cultural Heritage	☐	☐	☐	☒
Civil Aviation Theme	☐	☒	☐	☐
Defence Theme	☐	☐	☐	☒
Palaeontology Theme	☐	☐	☒	☐
Plant Species Theme	☐	☐	☐	☒
Terrestrial Biodiversity Theme	☒	☐	☐	☐

In this regard, as Site Sensitivity Verification Report (SSVR) has been compiled to consider the recommendations of the DFFE Screening Tool Report and to provide a rationale for the selection of specialist studies included in the assessment report. Please refer to Table 5 for a summary of the verification process and to APPENDIX B for the SSVR.

Table 5: SSVR findings and motivation.

Screening Tool Specialist Study Required:	Level of Sensitivity:	Suggested Sensitivity:	Required level of Assessment	Motivation
Agriculture Impact Assessment	Medium	Medium	Compliance Statement	The medium sensitivity for this theme can be confirmed by the EAP as some surrounding properties consist of cultivated land. Based on the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources (GN 320, 2020, as amended), an Agricultural Compliance Statement must be undertaken for the application.
Archaeological and Cultural Heritage Impact Assessment	Low	Very High	Full Study	The low sensitivity assigned by the Screening Tool is disputed as during the site inspection, evidence of heritage features were observed, therefore a full assessment was undertaken in accordance with the requirements of Section 38 of the National heritage Resources Act 25 (1999).
Palaeontology Impact Assessment	Medium	Low	Desktop Study	The SAHRIS PaleoMap shows that the area has a grey (zero) potential for palaeontological resources. The EAP recommends that at a minimum a desktop assessment be undertaken in line with the protocols.
Terrestrial Biodiversity Impact Assessment	Very High	Medium	Full Study	Although the site has sparse vegetation and is disturbed, a full Biodiversity assessment was conducted for the project in line with the protocols as published in GN 320 of 2020 (as amended) to establish the baseline and potential impacts that resulted from the commencement and recommend suitable mitigation measures. This is especially important as the site is located within a Marikana thornveld complex (endangered ecosystem), critical biodiversity area (CBA 2) and an ecological support area (ESA 1) national protected areas expansion strategy area (NPAES) and

Screening Tool Specialist Study Required:	Level of Sensitivity:	Suggested Sensitivity:	Required level of Assessment	Motivation
				occurs within the Magaliesberg biosphere transition zone.
Aquatic Biodiversity Impact Assessment	Low	High	Full Study	The low sensitivity for this sensitivity is disputed by the EAP. The site occurs in close proximity to a wetland, within a Marikana thornveld complex (endangered ecosystem), critical biodiversity area (CBA 2) and an ecological support area (ESA 1) national protected areas expansion strategy area (NPAES) and occurs within the Magaliesberg biosphere transition zone. A full aquatic assessment was conducted for the project in line with the protocols (GN 320, 2020, as amended).
Landscape/Visual Impact assessment	A visual impact assessment is not considered necessary for the batching plant, as the surrounding landscape is already heavily influenced by historical and ongoing mining and agricultural activities. The visual character of the area is defined by existing infrastructure, disturbed land, and operational facilities, which collectively diminish the potential for the batching plant to introduce any significant additional visual intrusion. As such, the proposed development is expected to be visually consistent with the existing land use and character of the region.			
Plant Species Assessment	Low	Medium	Full Study	The site is located within the Marikana thornveld complex, which is classified as an endangered ecosystem, further the site is located within a critical biodiversity area and an ecological support area and occurs within the Magaliesberg biosphere transition zone. Therefore, the low sensitivity is disputed by the EAP, and a minimum of medium sensitivity is recommended. The EAP recommends a full Biodiversity assessment was conducted for the project in line with the protocols as published in GN 320 of 2020 (as amended) to establish the baseline and potential impacts that resulted from the commencement and recommend suitable mitigation measures. This is especially important as the site is located within a critical biodiversity (CBA 2) area and an ecological support area (ESA 1) national protected areas expansion

Screening Tool Specialist Study Required:	Level of Sensitivity:	Suggested Sensitivity:	Required level of Assessment	Motivation
				strategy area (NPAES) and occurs within the Magaliesberg biosphere transition zone.
Animal Species Assessment	Low	Medium	Full Study	Although the site has sparse vegetation and is disturbed, a full Biodiversity assessment was conducted for the project in line with the protocols as published in GN 320 of 2020 (as amended) to establish the baseline and potential impacts that resulted from the commencement and recommend suitable mitigation measures. This is especially important as the site is located within a the Marikana thornveld complex (endangered ecosystem), critical biodiversity area (CBA 2) and an ecological support area (ESA 1), national protected areas expansion strategy area (NPAES) and occurs within the Magaliesberg biosphere transition zone.

3.1.3 NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT

The National Environmental Management Protected Areas Act (Act No. 57 of 2003 – NEMPAA) is intended to *"provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes"* and creating a *"national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity".*

The NEMPAA defines various kinds of protected areas, namely: *"special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments; world heritage sites; marine protected areas; specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act, 1998 (Act 84 of 1998); and mountain catchment areas declared in terms of the Mountain Catchment Areas Act, 1970 (Act 63 of 1970)".*

The project is located within several key areas including CBA2, ESA 1, NPAES expansion area and the Magaliesberg Biosphere transition zone as indicated in Figure 3.

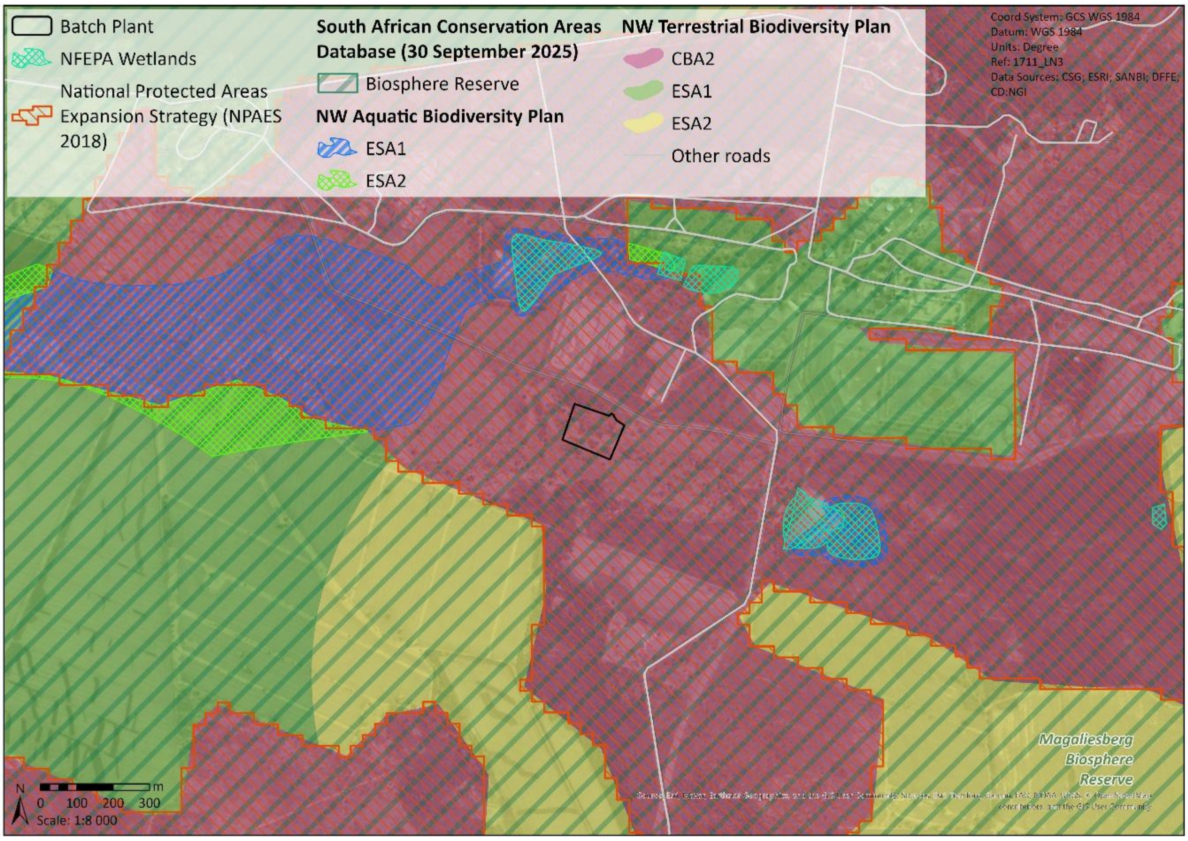

Figure 3: Protected areas related to the project

3.1.4 NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT (NEMAQA)

The National Environmental Management: Air Quality Act (Act No. 39 of 2004 as amended – NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

- To protect the environment by providing reasonable measures for –
    - i. the protection and enhancement of the quality of air in the republic;
    - ii. the prevention of air pollution and ecological degradation; and
    - iii. securing ecologically sustainable development while promoting justifiable economic and social development; and
- Generally, to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

The NEMAQA mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and Minimum National Emission Standards were published on the 22nd of November 2013 (Government Gazette No. 37054).

3.1.4.1 NATIONAL AMBIENT AIR QUALITY STANDARDS

National Ambient Air Quality Standards (NAAQS) were determined based on international best practice for particulate matter less than 10 and 2.5 µm in aerodynamic diameter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb) and benzene. The NAAQS were published in the Government Gazette (no. 32816) on 24 December 2009 for PM_{10} and other pollutants (South Africa, 2009). The $PM_{2.5}$ NAAQS were published in 2012 (South Africa, 2012).

The NEMAQA also provides for the monitoring and reporting of GHG emissions. The National Greenhouse Gas Emission Reporting Regulations (South Africa, 2017) were published in terms of Section 53 (aA), (o) and (p) of NEM: AQA on 3 April 2017 and amended on 11 September 2020 (South Africa, 2020). The purpose of these Regulations is to implement a single national reporting system for the transparent reporting of GHG emissions.

3.1.4.2 THE NATIONAL POLLUTION PREVENTION PLANS REGULATIONS

The National Pollution Prevention Plans Regulations were published in March 2014 (Government Gazette 37421) and tie in with the National Greenhouse Gas (GHG) Emission Reporting Regulations which took effect on 3 April 2017. In summary, the Regulations aim to prescribe the requirements that pollution prevention plans of greenhouse gases declared as priority air pollutants, need to comply with in terms of the NEMAQA. The Regulations specify who needs to comply, and by when, as well as prescribing the content requirements.

3.1.4.3 THE NATIONAL DUST CONTROL REGULATIONS

The National Dust Control Regulations are promulgated under the NEMAQA and the purpose of these Regulations is to prescribe general measures for the control of dust in all areas. Dustfall is assessed for nuisance impact and not for inhalation health impact. The National Dust Control Regulations (Department of Environmental Affairs, 2013) prescribes measures for the control of dust in residential and non-residential areas. Acceptable dustfall rates are measured (using American Standard Testing Methodology (ASTM) D1739:1970 or equivalent) at and beyond the boundary of the premises where dust originates. In addition to the dustfall limits, the National Dust Control Regulations prescribe monitoring procedures and reporting requirements. Dust that may be created from the project (including but not limited to the construction phase) will be managed in accordance with these Regulations.

According to the NEMAQA, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

Based on a review of the project details and NEMAQA Listed Activities, the concrete batching plant will not trigger any listed activities in terms of NEM:AQA and no air quality assessment is being undertaken for the plant as the nature of the activity is anticipated to have a significant impact on air quality.

3.1.5 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT (NEMBA)

The National Environmental Management Biodiversity Act (Act No. 10 of 2004 – NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. A summary of these regulations is presented below.

The National List of Ecosystems that are Threatened and Need of Protection (GN 1002 of 2011) are promulgated under the NEMBA and these Regulations provide for listing of threatened or protected ecosystems in one of the following categories:

- Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;

- Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and
- Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

Further regulations published under the NEMBA are the threatened or protected Species Regulations (GN R 152 OF 2007) which aims to:

(a) further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;

(b) provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;

(c) provide for the regulation of the carrying out of a specific restricted activity, namely hunting;

(d) provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;

(e) provide for the protection of wild populations of listed threatened species; and

(f) provide for the composition and operating procedure of the Scientific Authority.

The Alien and Invasive Species Lists are promulgated under the NEMBA with the aim of protecting the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- Category 1a Listed Invasive Species: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;
- Category 1b Listed Invasive Species: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;
- Category 2 Listed Invasive Species: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and
- Category 3 Listed Invasive Species: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

In giving effect to the above, the Alien and Invasive Species Regulations (GNR 1020 of 2020) provide for amongst others, the prevention of the spread or allowing the spread of, any specimen of a listed invasive species.

As discussed in section 3.1.3, the project is located within several key conservation and or sensitive areas including CBA2, ESA 1, NPAES expansion area and the Magaliesberg Biosphere transition zone. The site also occurs in a habitat designated as the Marikana thornveld system which is categorised as endangered (EN). It should be noted that the quality of the habitat is listed as degraded thornveld. A full biodiversity assessment was conducted for the project by The Biodiversity Company. No floral species of conservation concern were noted on site. Mammal SCC's were identified during the desktop assessment including *Aonyx capensis* (Cape Clawless Otter), *Atelerix frontalis* (South African Hedgehog), *Crocidura maquassiensis* (Makwassie Musk Shrew), *Crocidura mariquensis* (Swamp Musk Shrew), *Dasymys robbertsii* (African Marsh Rat), *Felis nigripes* (Black-footed Cat), *Hydrictis maculicollis* (Spotted-necked Otter), *Mystromys albicaudatus* (White-tailed Rat), *Ourebia ourebi*

(Oribi), *Panthera pardus* (Leopard), *Parahyaena brunnea* (Brown Hyaena), *Pelea capreolus* (Grey Rhebok), and *Redunca fulvorufula* (Mountain Reedbuck). No reptilian or amphibian SCCs was identified during the desktop assessment. Twenty-one avifaunal SCCs were also identified in the desktop assessment including, *Alcedo semitorquata* (Half-collared Kingfisher), *Anas erythrorhyncha* (Red-billed Teal), *Anas undulata* (Yellow-billed Duck), *Anhinga rufa* (African Darter), *Aquila rapax* (Tawny Eagle), *Aquila verreauxii* (Verreaux's Eagle), *Ardea alba* (Great Egret), *Asio capensis* (Marsh Owl), *Calidris ferruginea* (Curlew Sandpiper), *Charadrius pecuarius* (Kittlitz's Plover), *Ciconia nigra* (Black Stork), *Dendrocygna bicolor* (Fulvous Whistling Duck), *Elanus caeruleus* (Black-winged Kite), *Eupodotis senegalensis* (White-bellied Bustard), *Falco biarmicus* (Lanner Falcon), *Falco naumanni* (Lesser Kestrel), *Glareola nordmanni* (Black-winged Pratincole), *Gyps africanus* (White-backed Vulture), *Gyps coprotheres* (Cape Vulture), *Hydropogne caspia* (Caspian Tern), *Mirafra cheniana* (Melodious Lark), *Mycteria ibis* (Yellow-billed Stork), *Netta erythrophthalma* (Southern Pochard), *Nycticorax nycticorax* (Black-crowned Night Heron), *Oxyura maccoa* (Maccoa Duck), *Phoeniconaias minor* (Lesser Flamingo), *Phoenicopterus roseus* (Greater Flamingo), *Podiceps cristatus* (Great Crested Grebe), *Polemaetus bellicosus* (Martial Eagle), *Pterocles gutturalis* (Yellow-throated Sandgrouse), *Sagittarius serpentarius* (Secretarybird), *Sarkidiornis melanotos* (Knob-billed Duck), *Scopus umbretta* (Hamerkop), *Spatula smithii* (Cape Shoveler), and *Thalassornis leuconotus* (White-backed Duck).

3.1.6 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (NEMWA)

On 2 June 2014, the NEMWA came into force. The objectives of this Act are:

a) to protect health, well-being and the environment by providing reasonable measures for-
    i. minimising the consumption of natural resources;
    ii. avoiding and minimising the generation of waste;
    iii. reducing, re-using, recycling and recovering waste;
    iv. treating and safely disposing of waste as a last resort;
    v. preventing pollution and ecological degradation;
    vi. securing ecologically sustainable development while promoting justifiable economic and social development;
    vii. promoting and ensuring the effective delivery of waste services;
    viii. remediating land where contamination presents, or may present, a significant risk of harm to health or the environment; and
    ix. achieving integrated waste management reporting and planning;
b) to ensure that people are aware of the impact of waste on their health, well-being and the environment;
c) to provide for compliance with the measures set out in paragraph (a); and
d) generally, to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being.

Section 16 of the NEMWA states:

1. A holder of waste must, within the holder's power, take all reasonable measures to-
    a) "*Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
    b) *Reduce, re-use, recycle and recover waste;*
    c) *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*

d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;

e) Prevent any employee or any person under his or her supervision from contravening the Act; and

f) *Prevent the waste from being used for unauthorised purposes.*"

The NEMWA provides for specific waste management measures to be implemented, as well as providing for the licensing and control of waste management activities.

3.1.6.1 WASTE MANAGEMENT ACTIVITIES

GNR 921 provides a list of waste management activities that have, or are likely to have, a detrimental effect on the environment, and consequently require a Waste Management Licence. The project does not trigger any listed activities in terms of the waste act.

3.1.6.2 WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS

The Waste Classification and Management Regulations (GNR 634) are published under the NEMWA. The purpose of these Regulations is to –

- Regulate the classification and management of waste in a manner which supports and implements the provisions of the Act;
- Establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence;
- Prescribe requirements for the disposal of waste to landfill;
- Prescribe requirements and timeframes for the management of certain wastes; and
- Prescribe general duties of waste generators, transporters and managers.

Waste classification, as presented in Chapter 4 of these regulations, entails the following:

- Wastes listed in Annexure 1 of these Regulations do not require classification in terms of SANS 10234;
- Subject to sub regulation (1), all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation;
- Waste must be kept separate for the purposes of classification in terms of sub regulation (2), and must not be mixed prior to classification;
- Waste-must be re-classified in terms of sub regulation (2) every five (5) years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors;
- Waste that has been subjected to any form of treatment must be re-classified in terms of sub regulation (2), including any waste from the treatment process; and
- If the Minister reasonably believes that a waste has not been classified correctly in terms of sub regulation (2), he or she may require the waste generator to have the classification peer reviewed to confirm the classification.

Furthermore, Chapter 8 of the Regulations stipulates that unless otherwise directed by the Minister to ensure a better environmental outcome, or in response to an emergency so as to protect human health, property or the environment –

- Waste generators must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act prior to the disposal of the waste to landfill;

- Waste generators must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act; and

- Waste managers disposing of waste to landfill must only do so in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7 (1) of the Act.

3.1.6.3 NEMWA NATIONAL NORMS AND STANDARDS FOR THE ASSESSMENT OF WASTE FOR LANDFILL DISPOSAL, 2013 (GN R. 635)

These Norms and Standards prescribe the requirements for the assessment of waste prior to storage or disposal to landfill. The aim of the waste assessment tests is to characterise the material to be deposited or stored in terms of the above-mentioned waste assessment guidelines set by the DFFE. The waste generated at the proposed project which is not listed under Annexure 1 of the Waste Classification and Management Regulations, must be assessed in accordance to these Norms and Standards to determine the waste type. In terms of Regulation 12(1) of GN R 634 with regards to the classification of waste, the potential level of risk associated with disposal or downstream use of waste must be determined by following the prescribed and appropriate analysis protocol as detailed in these Norms and Standards. The assessment of the waste should:

- Identify the chemical substances present in the waste;

- Sampling and analysis to determine the total concentration (TC) and leachable concentration (LC) of the elements and chemical substances that have been identified within the waste according to section 6 of this regulation;

- Based on the TC and LC limits of the identified elements and chemical substances in the analysed waste exceeding the corresponding TC and LC thresholds respectively, the waste type will be determined (Type 0 Waste to Type 4 Waste); and

- The waste type will then be used determine to which landfill class site the waste must be disposed and / or the suitable containment barrier design for storage.

A waste classification is not required for the batching plant since waste produced consists of mostly municipal waste.

3.1.6.4 NEMWA NATIONAL NORMS AND STANDARDS FOR THE DISPOSAL OF WASTE TO LANDFILL, 2013 (GN R. 636)

Once the waste has been assessed and waste type determined, these Norms and Standards can be used to determine the minimum requirements for the landfill and containment barrier design. This will distinguish between Class A, Class B, Class C, or Class D landfills and the associated containment barrier requirements. Although these Norms and Standards prescribe the containment barrier or liner design for each determined waste type, the recent amendments in chapter 3 of the regulations to the planning and management of residue stockpiles and residue deposits, a competent person must recommend the pollution control measures suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis as contemplated in regulations 4 and 5 of the regulations. The recommendation should be founded on a risk analysis based on the characteristics and classification in regulation 4 and 5 of these Regulations, towards determining the appropriate mitigation and management measures.

The waste produced on site consists of domestic waste and sewage from the septic tank which is removed by a service provider who services the sewage removal at the adjacent Rustenburg Chrome Mine.

3.1.7 THE NATIONAL WATER ACT (NWA)

The purpose of the NWA is to ensure that the nation’s water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors:

a) meeting the basic human needs of present and future generations;

b) promoting equitable access to water;

c) redressing the results of past racial and gender discrimination;

d) promoting the efficient, sustainable and beneficial use of water in the public interest;

e) facilitating social and economic development;

f) providing for growing demand for water use;

g) protecting aquatic and associated ecosystems and their biological diversity;

h) reducing and preventing pollution and degradation of water resources;

i) meeting international obligations;

j) promoting dam safety;

k) managing floods and droughts,

and for achieving this purpose, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation.

The NWA makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the NEMA EIA Regulations. A person may use water if the use is –

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

The above water use processes are described in Figure 4.

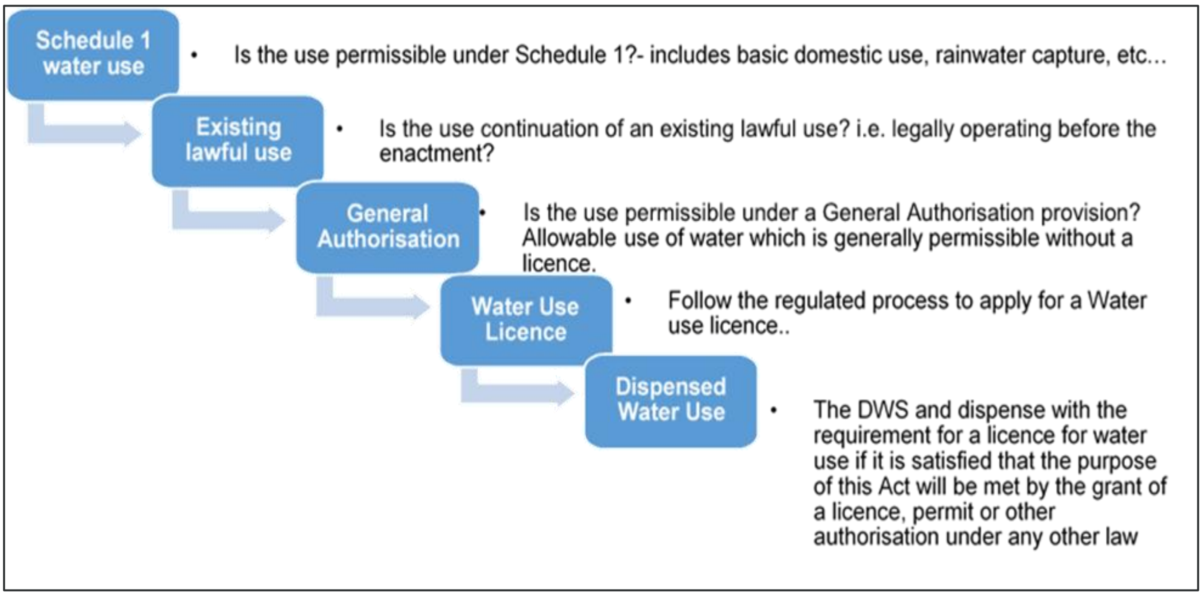

Figure 4: Authorisation processes for new water uses.

The NWA defines 11 water uses in Section 21 of the Act. A water use may only be undertaken if authorised by the DWS. The water uses for which an authorisation or licence can be issued include:

a) Taking water from a water resource;

b) Storing water;

c) Impeding or diverting the flow of water in a watercourse;

d) Engaging in a stream flow reduction activity contemplated in section 36;

e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;

g) Disposing of waste in a manner which may detrimentally impact on a water resource;

h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

i) Altering the bed, banks, course or characteristics of a watercourse;

j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

k) Using water for recreational purposes.

A watercourse is defined in terms of the Act as follows:

a) a river or spring;

b) a natural channel in which water flows regularly or intermittently;

c) a wetland, lake or dam into which, or from which, water flows; and

d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks;

The regulated area of a watercourse for section 21(c) or (i) of the Act water uses, is similarly defined in terms of the Act as follows:

a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;

b) In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or

c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

As part of this EA process, the relevant water uses will be identified and applied for. The water uses applicable to this project are presented in Table 6 below and shall be discussed and agreed upon with the DWS during the WULA process.

Table 6: Likely NWA Section 21 water uses triggered by this project.

Section 21 water use	Description	Applicability
a	Taking water from a water resource.	The plant abstracts water from a borehole on site.
b	Storage of water	The plan utilises ten Water storage tanks with a capacity of 10 000L each, and a combined storage of 100000L which equates to $100m^3$ of water being stored on site.

Section 21 water use	Description	Applicability
c & i	Impeding or diverting the flow of water in a watercourse and/or altering the bed, banks, course or characteristics of a watercourse.	The entire site falls within 500m of a wetland, as such Section 21 c&I water uses will be applied for.
g	Disposing of waste in a manner which may detrimentally impact on a water resource.	The PCD on site will require licensing in terms of section 21g of the act as this will function as a dirty water containment. In addition, the silt trap associated with the PCD will also need to be licensed in terms of section 21g.

The required water use licencing application will run concurrently with this EIA process and in consultation with the DWS, additional water uses may be identified.

3.1.7.1 WATER MANAGEMENT AREAS

South Africa was divided into nineteen Water Management Areas (WMAs) in the first National Water Resources Strategy (NWRS). However, due to concerns about the capacity to support 19 separate Catchment Management Agencies (CMAs), the number of WMAs was subsequently reduced to nine in NWRS 2. The delegation of water resource management from central government to catchment level is achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the CMS which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources.

The project site is situated within quaternary catchment A22H, which falls under the broader Crocodile (West) & Marico Water Management Area, WMA 3, (DWS, 2012). The catchment is part of the northern slopes of the Magaliesberg region, draining generally northwards via tributaries of the Hex River and other smaller streams. Common water uses in the area include agricultural and mining related water uses, this is corroborated by the surrounding land uses in the area which consist mostly of mining and agriculture (RLM IDP Review 2024/2025, 2024). Concerns in the area focus on water demand, which is rapidly growing and threatening the resource availability.

3.1.8 NATIONAL HERITAGE RESOURCES ACT (NHRA)

The National Heritage Resources Act (Act 25 of 1999 – NHRA) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA states that, "*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…*" The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through the NEMA, MPRDA and the Development Facilitation Act (FDA) legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for a development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impact Processes required by the NEMA and MPRDA.

The NEMA 23(2)(b) gives effect to the NHRA and states that an integrated environmental management plan should, "*…identify, predict and evaluate the actual and potential impact on the environment, socio-economic* *conditions and cultural heritage*". A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken into account of in the EIA Regulations under the NEMA relates to the Specialist Report requirements (Appendix 6 of EIA Regulations 2014, as amended) which apply to Heritage Impact Assessments.

The MPRDA also gives effect to the NHRA as this Act defines 'environment' as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the NHRA that are to be impacted on by activities governed by the MPRDA. Section 40 of the MPRDA requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities.

In accordance with the legislative requirements and EIA rating criteria, the regulations of the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive and legally compatible Heritage Report is compiled.

A phase 1 heritage impact assessment was undertaken for the project by Dr Lucien James of EIMS. It has been found that stone wall structures occur on site (section 7.3.8) and have been disturbed by the development. The destruction of heritage features without the required authorisation/permit is subject to section 51(1) of the NHRA which states:

" (1) Notwithstanding the provisions of any other law, any person who contravenes -

(a) …;

(b) …;

(c) sections 28 (3) or 34 (1) is guilty of an offence and liable to a fine or imprisonment or both such fine and imprisonment as set out in item 3 of the Schedule;

(d) ….;

(e) sections 27 (23) (b), 32 (17), 35 (3), 36 (3) or 51 (8) is guilty of an offence and liable to a fine or imprisonment or both such fine and imprisonment as set out in item 5 of the Schedule;

(f) …"

The heritage specialist also identified a potential middle stone age site. The full heritage impact assessment is provided in APPENDIX D.

3.1.9 ENVIRONMENT CONSERVATION ACT (ECA)

The Environment Conservation Act ECA (Act 73 of 1989) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however, Section 25 of the Act and the Noise Regulations (GN R. 154 of 1992) promulgated under this section are still in effect. These Regulations serve to control noise and general prohibitions relating to noise impact and nuisance.

3.1.10 NATIONAL NOISE CONTROL REGULATIONS (NCR)

In terms of section 25 of the ECA, the National Noise Control Regulations (GN R. 154 – NCRs) published in Government Gazette No. 13717 dated 10 January 1992, were promulgated. The NCRs were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Provincial noise control regulations have been promulgated in Gauteng, Free State and Western Cape Provinces.

The NCRs will need to be considered in relation to the potential noise that may be generated mainly during the construction phase of the proposed project. The two key aspects of the NCRs relate to disturbing noise and noise nuisance.

Section 4 of the Regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Regulations as "*a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more*."

Section 5 of the NCRs in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as "*any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person".* The South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these Regulations.

There are a few South African National Standards (SANS) relevant to noise from mines, industry and roads. They are:

- South African National Standard (SANS) 10103:2008 – 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004 – 'Calculating and predicting road traffic noise';
- SANS 10328:2008 – 'Methods for environmental noise impact assessments';
- SANS 10357:2004 – 'The calculation of sound propagation by the Concave method';
- SANS 10181:2003 – 'The Measurement of Noise Emitted by Road Vehicles when Stationary'; and
- SANS 10205:2003 – 'The Measurement of Noise Emitted by Motor Vehicles in Motion'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se. A noise assessment for the site is not deemed necessary.

3.1.11 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The law on Conservation of Agricultural Resources (Act 43 of 1983) aims to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. In order to achieve the objectives of this Act, control measures related to the following may be prescribed to land users to whom they apply:

- The cultivation of virgin soil;
- The utilisation and protection of land which is cultivated;
- The irrigation of land;
- The prevention or control of waterlogging or salination of land;
- The utilisation and protection of vleis, marshes, water sponges, water courses and water sources;
- The regulating of the flow pattern of run-off water;
- The utilisation and protection of the vegetation;
- The grazing capacity of veld, expressed as an area of veld per large stock unit;

- The maximum number and the kind of animals which may be kept on veld; The prevention and control of veld fires;
- The utilisation and protection of veld which has burned;
- The control of weeds and invader plants;
- The restoration or reclamation of eroded land or land which is otherwise disturbed or denuded;
- The protection of water sources against pollution on account of farming practices;
- The construction, maintenance, alteration or removal of soil conservation works or other structures on land; and
- Any other matter which the Minister may deem necessary or expedient in order that the objects of this Act may be achieved.

Further, different control measures may be prescribed in respect of different classes of land uses or different areas or in such other respects as the Minister may determine. Impacts on the soil, biodiversity and water resources have been identified with regards to the proposed project, and mitigation and management measures recommended.

3.1.12 THE NATIONAL FORESTS ACT (NFA)

According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that "*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*."

The site occurs in an important biodiversity area overlapping with various protected areas as discussed in section 3.1.3. The likelihood of occurrence of protected species on and around the site can therefore not be overlooked. A terrestrial biodiversity assessment was compiled by The Biodiversity Company. The site is established in the Marikana thornveld habitat which is classified as and endangered habitat type. One nationally protected tree was observed in the project area of influence, *Sclerocarya birrea* (Marula) and no other SCC's were observed.

3.1.13 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (SPLUMA)

The Spatial Planning and Land Use Management Act (Act 16 of 2013 – SPLUMA) is set to aid effective and efficient planning and land use management, as well as to promote optimal exploitation of minerals and mineral resources. The SPLUMA was developed to legislate for a single, integrated planning system for the entire country. Therefore, the Act provides a framework for a planning system for the country and introduces provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes (LUS); and municipal planning tribunals.

3.1.14 NATIONAL VELD AND FOREST FIRE ACT

The National Veld and Forest Fire Act 101 of 1998 is a key piece of legislation in South Africa aimed at reforming the legal framework surrounding veld and forest fires. Its primary purpose is to prevent and manage wildfires through coordinated efforts, particularly in rural and fire-prone areas. The Act encourages the formation of Fire Protection Associations (FPAs), which are legally recognized bodies that facilitate local collaboration among landowners, municipalities, and other stakeholders to predict, prevent, and suppress veldfires. These associations play a vital role in fire management by offering training, support, and technical expertise to their members.

For private developers and landowners, the Act imposes several important obligations. They are legally required to take reasonable precautions to prevent fires from starting or spreading from their property. This includes maintaining firebreaks, ensuring that controlled burns are conducted safely and in accordance with regulations, and joining or cooperating with local FPAs. Failure to meet these responsibilities can result in legal liability, especially if negligence leads to damage or loss caused by a fire. In such cases, landowners may face civil claims for damages, making it essential for them to understand and comply with the Act's provisions.

In essence, the Act not only promotes proactive fire management but also establishes a framework for accountability. Private developers and landowners must be vigilant and informed, as their actions—or lack thereof—can have significant legal and financial consequences. By participating in FPAs and adhering to fire safety regulations, they contribute to a safer and more resilient environment for their communities and the broader ecosystem.

3.2 PROVINCIAL POLICY AND PLANNING CONTEXT

3.2.1 NORTH WEST BIODIVERSITY SECTOR PLAN

The North West Biodiversity Sector Plan (READ, 2015) classifies areas within the province on the basis of their contributions to reaching the associated conservation targets within the province. These areas are primarily classified as either Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole.

- CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).
- ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

Provincial CBAs and ESAs are often further classified into sub-categories, such as CBA1 and CBA2 or ESA1 and ESA2. These present fine scale habitat and biodiversity area baseline requirements and associated land management objectives or outcomes. The highest categorisation level is often referred to as an 'Irreplaceable Critical Biodiversity Area' which usually represents pristine natural habitat that is very important for conservation.

The main infrastructure is partially located within CBA 2, ESA 1, and ESA 2 area according to the North West Terrestrial Biodiversity plan as indicated in Figure 3.

3.2.2 THE MAGALIESBERG BIOSPHERE MANAGEMENT PLAN

The Magaliesberg Biosphere Management Plan (2015) (hereafter MBMP (2015)) states that the Transition Zones are to be co-operative where various activities are allowed such as settlements, agriculture, mining, support services and infrastructure. However, the focus of this area is for collaboration of various stakeholders to increase environmental public awareness, education and specialist training aimed at reducing the impact on the Magaliesberg area while also enhancing community benefits and promoting sustainable development practices (MBMP, 2015). The evaluation criteria for development/activity proposals within the Transition Area as described in Annexure 1 of the Magaliesberg Biosphere Management Plan should be considered. The site is located within the Magaliesberg Biosphere Transition Zone and as such the information requirements stipulated are included in this report.

3.3 MUNICIPAL POLICY AND PLANNING CONTEXT

The Bojanala Platinum District Municipality Environmental Management Framework (EMF) (2018) (hereafter referred to as the BPDM EMF (2018)) aims to provide a decision support tool regarding environmental impact matters of proposed developments and human activities. An EMF is an Integrated Environmental Management (IEM) tool that assists competent authorities with their decisions regarding the granting or refusal of environmental authorisations by also providing geographical context of the environmental impacts that could occur as a result of the proposed development.

The BPDM EMF (2018) covers the local municipalities of Rustenburg, Moretele, Madibeng, Kgetlengrivier and Moses Kotane in the North West Province. The site falls within the outer area of the Magaliesberg Biosphere Reserve Transitional Area (Zone), as such, the BPDM EMF (2018) requires that the management authority of the Magaliesberg Biosphere is consulted for new developments. The Magaliesberg Biosphere Management Authority drafted land use guidelines that are to be considered in the EIA process.

The Rustenburg Local Municipality Integrated Development Plan (IDP) is a strategic planning instrument intended to guide and inform budgeting, planning, management and the decision-making process. The priorities and objectives are aimed at addressing strategic challenges within the Rustenburg Local Municipality (RLM).

The Rustenburg Spatial Development Framework (SDF) is a policy document that is designed to guide spatial planning and development within the RLM and is mandated in terms of Section 12(1) of SPLUMA. The document is intended to guide and inform decisions regarding land use and development within the RLM, and to give effect to the goals, objectives and visions of the municipal IDP.

Based on the available Spatial Development Framework (SDF) and Integrated Development Plan (IDP) maps, the site appears to fall within an area designated for mining activities. However, due to the limitations of the mapping clarity and the absence of formal confirmation from the relevant authorities, the applicant must ensure that the property is correctly zoned for the proposed use and undertake a zoning application if required.

4 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

The needs and desirability analysis component of the “Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)” includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development’s ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.). Table 7 presents the needs and desirability analysis undertaken.

Table 7: Needs and desirability analysis for the proposed project

Ref No.	Question	Response
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The site occurs within several protected areas namely, NPAES area and the Magaliesberg Biosphere Transition Zone. The vegetation surrounding the site consists mainly of degraded Marikana Thornveld ecosystem which provides context to the vegetation that was cleared for the development. Various assessments in this regard were carried out including: • Terrestrial Biodiversity Impact assessment; • Wetlands impact assessment; • Soils and agriculture impact assessment; and • Heritage Impact Assessment; • Desktop Palaeontology Assessment; • Hydropedology study. These studies and further information are available in section 7 and Appendix E.
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise,	Waste generated on site will be limited. During the final construction activities on site, some rubble and domestic

Ref No.	Question	Response
	reuse and / or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	waste will be generated. The waste will be handled in accordance with the requirements of NEMWA for storage and disposal of waste. Operationally it is anticipated that domestic waste will be produced as well as the sewage contained in the septic tank. Waste is, and will, be removed from site and disposed of at the appropriate licensed facilities.
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. A heritage impact assessment was carried out for the site. The results of the HIA indicated that the remains of a late iron age site was present on site which had been partially destroyed by the development. A further suspected *in-situ* middle stone age site was also noted in the HIA Appropriate mitigation measures have been made by the heritage specialist regarding the heritage resources on site.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The impact associate with the project are described and assessed in section 8 of this report. The Project overview in section 2.1 also describes the plant reliance on the natural resources.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the ecosystem jeopardise the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were	

Ref No.	Question	Response
	taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)?	
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts:	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. Please refer to section 10 for assumptions and limitations as they relate to this report. The impact associated with the project are described and assessed in section 8 of this report. The Project overview in section 2.1 also describes the plant reliance on the natural resources.
1.8.2	What is the level of risk associated with the limits of current knowledge?	
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms following?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The impact associate with the project are described and assessed in section 8 of this report. The Project overview in section 2.1 also describes the plant reliance on the natural resources.

Ref No.	Question	Response
		The project is located outside of urban areas and the surrounding landscape is characterised by extensive historical and current mining activities.
1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The impact associate with the project are described and assessed in section 8 of this report. The Project overview in section 2.1 also describes the plant reliance on the natural resources. Since the project site has already been developed, thus necessitating the application in terms of Section 24G impact avoidance during the majority of construction activities had not been considered. The project does however plan to institute stormwater management measures to minimise the impact of the site to the existing footprint as described in section 2.
1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The current application is being conducted in terms of section 24G of EMA for retrospective environmental authorisation. As discussed in section 7.2, the ecological setting of the site had already been degraded before the development had begun (degraded thornveld) which reduces the impact of the site. The impact of the activities are further described and discussed in section 8.3.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation.

Ref No.	Question	Response
		The nature of the application inherently implies that alternatives are not available as the site has already been established. The implementation of mitigation measures are therefore of vital importance in the future operation and construction activities to be carried out on site. Alternatives are discussed in section 5.
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. As discussed in section 7.2, the ecological setting of the site had already been degraded before the development had begun (degraded thornveld) which reduces the impact of the site. The impact of the activities are further described and discussed in section 8.3.
2	Promoting justifiable economic and social development	
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following:	
2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area	Details of the socio-economic context of the area in terms of the Bojanala Platinum District Municipality IDP and Rustenburg Local Municipality IDP are detailed Section 7.3.
2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The project area is located a fair distance from any human habitation and is in line with the SDF for the area.
2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	Refer to Section 7 for the Environmental Attributes and Baseline Environment.
2.1.4	Municipal Economic Development Strategy ("LED Strategy").	The proposed project will promote and support the sustainable economic growth of the business.

Ref No.	Question	Response
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	The Batching plant will provide concrete to customers in the surrounding area thereby supporting development of other businesses and the batching plant. The plant has provided for additional employment opportunities in the area.
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The development will ensure the long-term survival of the business which will in turn complement the local socio-economic initiatives of the area.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to the Public Participation Process undertaken for this project (Section 6) as well as the identified impacts, their assessment and recommended mitigation measures in Section 8.3 of this report.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	The Batching plant will provide concrete to customers in the surrounding area thereby supporting development of other businesses and the batching plant. The plant has provided for additional employment opportunities in the area.
2.5	In terms of location, describe how the placement of the proposed development will:	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other.	The Batching plant already has several employees sources from local labour. The need for additional residential areas not necessary for the plant.
2.5.2	Reduce the need for transport of people and goods.	The batching plant is located in an area that is dominated by agricultural and mining activities. The plant due to its location will allow for supply to customers with reduced travel distance owing to the plant being located close to the active mining an d agricultural areas.

Ref No.	Question	Response
2.5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of public transport),	The Batching plant already has several employees sources from local labour. The need for additional residential areas not necessary for the plant.
2.5.4	Compliment other uses in the area,	The batching plant is located in an area that is dominated by agricultural and mining activities. The plant due to its location will allow for supply to customers with reduced travel distance owing to the plant being located close to the active mining and agricultural areas.
2.5.5	Be in line with the planning for the area.	Based on the available Spatial Development Framework (SDF) maps, the site appears to fall within an area designated for mining activities. However, due to the limitations of the mapping clarity and the absence of formal confirmation from the relevant authorities, the applicant must ensure that the property is correctly zoned for the proposed use and undertake a zoning application if required.
2.5.6	For urban related development, make use of underutilised land available with the urban edge.	Not applicable. The project area is outside an urban area.
2.5.7	Optimise the use of existing resources and infrastructure,	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The batching plant is located in an area that is dominated by agricultural and mining activities. The plant due to its location will allow for supply to customers with reduced travel distance owing to the plant being located close to the active mining and agricultural areas.
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	The proposed development is situated in a predominantly mining area and the nature of the application means that infrastructure is already in place. Additional

Ref No.	Question	Response
		infrastructure to be constructed consists of the stormwater management infrastructure for the site.
2.5.9	Discourage "urban sprawl" and contribute to compaction / densification.	The plant is located on a portion of portion 11 of the Farm Rietfontein 338JQ and the current footprint is not expected to expand.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	Not applicable. The plant is constructed outside of urban areas and a limited number of staff are employed at the plant.
2.5.11	Encourage environmentally sustainable land development practices and processes	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The batching plant is located in an area that is dominated by agricultural and mining activities. The plant has already been constructed with concrete pads underlaying the majority of the site. Additional stormwater infrastructure is yet to be constructed but will ensure that the runoff from the site is captured thereby preventing potential dirty water contamination. For more information about the impacts associated please refer to section 8.3.
2.5.12	Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. The batching plant is located in an area that is dominated by agricultural and mining activities. The plant due to its location will allow for supply to customers with reduced travel distance owing to the plant being located close to the active mining an d agricultural areas.

Ref No.	Question	Response
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	The plant is located in an area dominated by mining and agriculture. The plant will be readily able to supply concrete to the surrounding mines thereby ensuring that customers for the product will be available.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	A suitably qualified Archaeologist (Dr Lucien James, EIMS) and Palaeontologist (Elize Butler, Banzai Environmental) undertook a Heritage Impact Assessment and a Palaeontological Desktop Assessment respectively. The results of which can be found in Appendix E. The palaeontological impact assessment found that the impacts (both retrospective and potential) were minimal as the area is typified by very low potential for paleontological resources. The heritage impact assessment found various heritage features, the most significant of which consists of the remnants of a late iron age settlement which has been partially destroyed as a result of the development. The specialist has recommended that steps be taken to conserve what is left of this site which will result in a reduction of the sensitivity of the sit. A potential middle stone age site was also observed on site with suitable recommendations for archaeological monitoring during excavation being recommended. Other sites had also been identified during the fieldwork and appropriate mitigation measures have been proposed.
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	It is not anticipated that the project will have an impact on the existing settlements in the area.
2.6	How was a risk-averse and cautious approach applied in terms of socio-economic impacts:	

Ref No.	Question	Response
2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	The current application is being conducted in terms of section 24G of NEMA for retrospective environmental authorisation. Please refer to section 10 for assumptions and limitations as they relate to this report. The impact associated with the project are described and assessed in section 8 of this report. The Project overview in section 2.1 also describes the plant reliance on the natural resources.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report. Alternatives are discussed in section 5.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	

<table>
<tr><th>Ref No.</th><th>Question</th><th>Response</th></tr>
<tr><td>2.11</td><td>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</td><td>The potential impacts have been identified assessed as part of this Environmental Impact Report and mitigation measures have been recommended to prevent negative impacts in this regard. Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report.</td></tr>
<tr><td>2.12</td><td>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</td><td>The application for the plant is being conducted in terms of section 24G of NEMA for rectification of commencement without prior environmental authorisation. This step ensures that the plant complies with the enviro-legal requirements for developments. In addition, the proposed stormwater infrastructure aims to improve the surrounding environment by ensuring the pollution control mechanisms are in place.

Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report.</td></tr>
<tr><td>2.13</td><td colspan="2">What measures were taken to:</td></tr>
<tr><td>2.13.1</td><td>Ensure the participation of all interested and affected parties.</td><td rowspan="5">Refer to Section 6 for details regarding the public participation process undertaken for this project. The public participation process will continue as planned for the duration of the EAR review period.

Notification of Interested & Affected Parties have included:
• Notification Letters via Emails, Faxes and/or Registered Mail where details were available.
• SMS notifications.</td></tr>
<tr><td>2.13.2</td><td>Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</td></tr>
<tr><td>2.13.3</td><td>Ensure participation by vulnerable and disadvantaged persons,</td></tr>
<tr><td>2.13.4</td><td>Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</td></tr>
<tr><td>2.13.5</td><td>Ensure openness and transparency, and access to information in terms of the process,</td></tr>
</table>

Ref No.	Question	Response
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	• Publication of a Newspaper Advertisement. Publication of a Gazette Notice (North West Provincial Gazette).
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Workers will be educated on a regular basis as to the environmental and safety risks that may occur within their work environment. Furthermore, adequate measures will be undertaken to ensure that the appropriate personal protective equipment is issued to workers based on the areas that they work and the requirements of their job. Their right to refuse work (if considered dangerous) will be included in the education programme.
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1	The number of temporary versus permanent jobs that will be created.	??
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	The new labour opportunities can be filled by the existing skills in the area.
2.16.3	The distance from where labourers will have to travel.	On-site accommodation is provided for staff members. Should the need arise for workers to travel, the travel distance to site will be approximately 15-20km.

Ref No.	Question	Response
2.16.4	The location of jobs opportunities versus the location of impacts.	The location of potential job opportunities is in the same location as the impacts as assessed in this report. It is important to note however that minimal new jobs (approximately eight new jobs) will be created by this project as the development will mainly support the existing Rietfontein plant workers.
2.16.5	The opportunity costs in terms of job creation.	The opportunity costs in terms of job creation is considered low.
2.17	What measures were taken to ensure:	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	The Section 24G process requires governmental departments to communicate regarding any application. In addition, all relevant Departments and key stakeholders have been notified about the project by the EAP and registered as Interested and Affected Parties. They will continue to be notified and engaged with regarding the project throughout the Section 24G process. Should any conflicts of interest between organs of state be identified, these will be resolved through the appropriate channels.
2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Environmental attributes that may be impacted by this project have been identified and where relevant, specialist input has been solicited to ensure that a rigorous impact assessment process is undertaken. Where positive impacts on the interests of the public have been identified (e.g. job creation, impact on existing land use, etc.), mitigation measures are put forward to enhance positive impacts and/or reduce negative impacts.

Ref No.	Question	Response
		Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	The application for the plant is being conducted in terms of section 24G of NEMA for rectification of commencement without prior environmental authorisation. This step ensures that the plant complies with the enviro-legal requirements for developments. In addition, the proposed stormwater infrastructure aims to improve the surrounding environment by ensuring the pollution control mechanisms are in place. Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	The plant consists of pre-existing infrastructure which contextualises the need for retrospective environmental authorisation in terms of section 24G of NEMA. As a result of the infrastructure already being in place, little to no alternatives are applicable in this case. Alternatives are discussed in section 5.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to the identified impacts, their assessment and recommended mitigation measures in Section 8 of this report

5 PROJECT ALTERNATIVES

The current application is being undertaken in terms of Section 24G of NEMA. The nature of the application inherently means that the infrastructure has already been constructed which limits the possibility of alternatives. Alternatives for the proposed stormwater management system will be discussed in this section.

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the environmental assessment process. An alternative is defined as "…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

(a) property on which or location where it is proposed to undertake the activity;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) Includes the option of not implementing the activity."

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the EIA Process and each role is detailed as follows:

The role of the environmental assessment practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- Identify reasonable alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.

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Table 8 outlines the various alternative types that must be considered for each development. The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented in the table are derived from both the EIA Regulations (2014) as amended as well as the Department of Environmental Affairs and Tourism's (now Department of Environmental, Fisheries and Forestry) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this Report. The alternatives discussed further in this report are as follows:

- The No-Go Option; and
- Design alternatives.

Table 8: Project alternatives as per NEMA EIA Regulations, 2014 as amended

ALTERNATIVE	COMMENT
No-go Option	The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson *et al.,* 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. This alternative must be discussed on all projects as it allows for an assessment of impacts should the activity not be undertaken. **This alternative is discussed in this report.**
Activity alternatives	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity. This would entail a process where a different project is proposed instead of the Rietfontein Civil Works Concrete Batching Plant. Based on project information, there is one proposed activity and no other activity alternative. **Therefore, this alternative is considered <u>not</u> feasible and will not be discussed in this report.**
Location / property alternatives	Location alternatives could be considered for the entire proposal or for a component of a proposal, for example the location of a processing plant within the property boundary. The latter is sometimes considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate, and alternative locations that are in proximity. In the case of the latter, alternative locations in the same geographic area are often referred to as alternative sites. Based on the nature of the project in terms of Section 24G of NEMA, the location of the site is fixed as the main plant has already been constructed. Location alternatives for the PCD and stormwater infrastructure is fixed as a result of limited space. **This alternative is therefore considered to be neither feasible nor reasonable.**
Process alternatives	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process. An industrial process could be changed, or an alternative technology could be used. **Alternatives for the stormwater system are not possible in this case as the alternative is not constructing a stormwater system which is considered to not be reasonable.**
Demand alternatives	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service. An example of this would be where there is a need to provide housing units. Examples of alternatives can be through managing demand through various methods or providing additional housing through either single dwelling residential units or

ALTERNATIVE	COMMENT
	mixed-use developments. **Specific to the proposed project, alternatives regarding the demand are considered not feasible and will not be discussed in this report.**
Scheduling alternatives	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise several components, which can be scheduled in a different order or at different times and as such produce different impacts. **These alternatives are considered not feasible to the project as there will be no significant impact variation due to scheduling.**
Input alternatives	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes. **Supply structures to the plant are already in place and therefore this alternative is not considered feasible and will not be discussed in this report.**
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport, and pipeline routes. There are stormwater channels assessed in this report however the layout of existing infrastructure makes routing alternatives would are limited to the catchment area for stormwater on the site. **Therefore, routing alternatives are not feasible to this development and will not be discussed further.**
Site layout alternatives	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity. The layout of the plant has already been constructure. The stormwater system layout is limited by the available footprint which is limited. **Based on this, site layout alternatives are considered currently not feasible.**
Scale alternatives	In some cases, activities that can be broken down into smaller units can be undertaken on different scales. For example, a housing development within an overall mixed-used development could have the option of 1 000, 2 000 or 4 000 housing units. Each of these scale alternatives may have different impacts. However, the proposed stormwater system and PCD cannot be broken down into smaller units. **For this reason, scale alternatives are considered not feasible and will not be discussed further.**
Design alternatives	This entails the consideration of different designs for aesthetic purposes or different construction materials to optimise local benefits, and sustainability would constitute design alternatives. Different designs are assumed to have different impacts. Generally, the design alternatives could be incorporated into the project proposal and so be part of the project description and need not be evaluated as separate alternatives. Design alternatives for the PCD and stormwater channels would entail the construction of an unlined infrastructure. **Therefore, design alternatives are considered feasible and will be discussed in this report.**
Operational alternatives	The Operational Alternative is where you can specify controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves. **In the case of the proposed stormwater infrastructure, feasible operational alternatives were not identified and are not discussed further.**

As this application relates only to the construction of proposed stormwater infrastructure on site , there are limited feasible and/or reasonable alternatives that can be considered, and which are described and motivated below.

5.1 DESIGN ALTERNATIVES

Design alternatives are the consideration of different designs for technical efficiency, aesthetic purposes or different construction materials in an attempt to optimise local benefits and sustainability. The following design alternatives were considered for the project.

A stormwater management system has limited design alternatives where the major alternatives are a lined and unlined scenario. The conveyance of stormwater to a central sink can also be achieved by either a lined or unlined method. The design of the stormwater management system has been completed and accordingly what will be discussed is the following:

- Lining Desings:
  - Unlined stormwater system; and
  - Lined stormwater system.

5.1.1 UNLINED PCD AND STORMWATER CHANNELS

In the context of the batching plant, an unlined Pollution Control Dam (PCD) presents a significantly elevated pollution risk to the adjacent wetland system (HGM 1), which lies approximately 40–55 m downslope of the plant. The wetland has been assessed as "At Risk" and holds a High Ecological Importance and Sensitivity (EIS) rating due to its role in groundwater recharge, nutrient assimilation, and downstream ecological functioning. Although the system is currently in a D – Largely Modified Present Ecological State, it still performs important water quality and flow-regulation functions, meaning its vulnerability to further degradation is high.

An unlined PCD poses a substantial risk of vertical seepage of contaminated stormwater containing suspended solids, cementitious materials, hydrocarbons, and fine sediments typical of batching plant runoff. Such seepage could mobilise pollutants into the subsurface and percolate downslope toward the wetland. Because the wetland already shows altered hydrology, increased erosion susceptibility, alien plant encroachment, and catchment-related nutrient inputs, any additional pollutant load would negatively affect:

- Groundwater recharge;
- Nutrient assimilation;
- Flow regulation; and
- Supporting downstream ecological functioning.

An **unlined system** would allow vertical seepage and lateral migration of dirty water containing:

- Suspended solids originating from stockpiles and the chrome mud processing plant fine sediments;
- Hydrocarbons from vehicle movements and diesel storage; and
- Elevated TSS and potential metal residues associated with chrome beneficiation activities.

Given that the underlying soils consist of reworked norite material with variable permeability, the risk of infiltration into the vadose zone is significant. Such seepage may percolate downslope and mobilise contaminants into the adjacent wetland, where existing hydrological alteration and erosion vulnerability already increase sensitivity to further impacts.

An unlined scenario would exacerbate:

- Toxicant loading, reducing the wetland's already-stressed assimilation capacity;
- Sediment deposition within the wetland, potentially altering hydrogeomorphic responses;
- Nutrient enrichment, contributing to eutrophication and algal proliferation; and

- Habitat degradation, worsening alien encroachment and further suppressing indigenous species.

Furthermore, an unlined PCD would not comply with the requirements of **NWA Section 21(c) and (i)**, which apply due to the proximity of infrastructure to the wetland, nor with **GN704**, which requires containment of contaminated water and prevention of uncontrolled releases. The risk of regulatory non-compliance, environmental degradation, and future liability would remain high.

5.1.2 LINED PCD AND STORMWATER CHANNELS

A lined Pollution Control Dam, designed and constructed in accordance with engineering specifications, significantly reduces the pollution potential to the adjacent wetland. Impermeable lining prevents subsurface seepage, ensuring that water, contaminated stormwater, and cementitious residues remain contained within the engineered system. This containment is fundamental in a landscape characterised by:

- High infiltration capacity of local soils;
- Proximity of the wetland downslope of the plant; and
- The site being located within a Strategic Water Source Area (Kroondal/Marikana groundwater SWSA).

A properly lined PCD also allows for controlled stormwater management, enabling effective settlement of suspended solids and safe reuse or disposal of captured water. This reduces the risk of:

- Hydrocarbon leaching from diesel storage areas;
- pH-elevated runoff from cement handling surfaces;
- Elevated sediment loads and erosion downstream; and
- Unregulated discharge during high-flow events.

When paired with engineered stormwater channels, bunding, and regular maintenance, a lined PCD supports the mitigation hierarchy by preventing contamination rather than relying on downstream remediation. This scenario aligns with the "Low" residual risk ratings presented in the risk assessment.

Overall, the lined scenario contributes significantly to maintaining the wetland's current ecological condition.

Table 9: Advantages and disadvantages of the unlined and lined scenarios.

Advantages	Disadvantages
Unlined PCD	
• Lower upfront construction cost. • Simplified construction and shorter installation time.	• High risk of groundwater and wetland contamination due to seepage of polluted stormwater. • Increased nutrient and toxicant loading to HGM 1. • Potential to accelerate erosion and alter natural hydrology. • Not compliant with best practice; difficult discharge control. • May trigger refusal or stricter conditions under NWA Section 21(c) & (i).
Lined PCD	
• Prevents seepage, protecting groundwater and wetland. • Enables controlled collection, treatment, and reuse.	• Higher capital cost. • Requires periodic liner inspection and maintenance. • Potential repair costs if liner is damaged. • Slightly longer construction time.

Advantages	Disadvantages
• Reduces contamination, erosion, and hydrological alteration. • Complies with NWA and best practice; reduces long-term liability.	

Based on the advantages and disadvantages indicated in Table 9 above, it is the EAPs opinion that a lined stormwater system is the more favourable design. Based on the completed designs, the proposed stormwater system will follow the lined stormwater system design and the unlined stormwater system will not be assessed for impacts in this report, since it is not a feasible alternative option, due to the high risk of pollution of an already stressed environment.

5.2 NO GO ALTERNATIVE

The No-Go Alternative would imply that no Pollution Control Dam (PCD) or associated stormwater management infrastructure is constructed for the batching plant, and that the plant continues operating in its current state. Given that the batching plant has already been unlawfully established and is fully operational, the No-Go Alternative would result in two potential outcomes, **continue operating without a formalized, compliant stormwater management system**, or **suspend or cease batching operations until compliant infrastructure is constructed and authorised**.

Under the first outcome, the batching plant would continue generating contaminated stormwater and wash-water that would be inadequately managed in the absence of a properly engineered PCD. This scenario would result in ongoing uncontrolled runoff from hardened surfaces, aggregate bays, cement handling areas, and diesel storage zones. Such runoff contains elevated sediment loads, hydrocarbons, and cementitious residues, all of which pose a significant pollution risk to the downslope unchannelled valley-bottom wetland (HGM 1), which has been assessed as **"At Risk"** and holds a **High Ecological Importance and Sensitivity (EIS)** rating. Allowing operations to continue without a lined PCD would exacerbate existing degradation within the wetland, increase erosion potential, alter hydrological pathways, and contribute to long-term contamination of both surface and subsurface water resources.

Moreover, the continuation of operations without the required water-use controls would place the facility in continued non-compliance with **NWA Section 21(c) and (i)** requirements and the **NEMA duty of care**, exposing the proponent to escalating regulatory, legal, and financial risks. The second outcome—halting batching operations—would have significant operational and socio-economic consequences. The batching plant was constructed to service nearby mining and industrial activities, and ceasing operations would disrupt supply of batching materials, delay construction schedules, and impose substantial financial losses on the operating company. This would also negatively impact workers, contractors, transporters, and local businesses that rely on the batching plant's continued functionality. The interruption of operations would further undermine the company's financial planning and medium-term business commitments. In addition, stopping the use of the facility without implementing the necessary compliance measures does not resolve existing environmental impacts within the wetland buffer, nor does it meet the requirements of the Section 24G rectification process, which requires both rehabilitation and implementation of mitigation measures.

Given the environmental risks associated with not constructing a compliant PCD, combined with the socio-economic and operational impacts of suspending batching activities, the No-Go Alternative is considered **neither feasible nor reasonable**. It would result in increased environmental degradation, and significant financial and social consequences. As such, the No-Go Alternative is **not supported** for this project.

6 STAKEHOLDER ENGAGEMENT

This section will focus on the stakeholder engagement process followed during the section 24G application process.

6.1 OBJECTIVES OF PUBLIC PARTICIPATION

South Africa, being one of the countries with the most progressive constitutions, enshrined the public's right to be involved in decisions that may affect them in its Constitution. Section 57(1) of the Constitution states that: "*The National Assembly may (b) make rules and orders concerning its business, with due regard to representative and participatory democracy, accountability, transparency and public involvement".* This provision, along with several others gave rise to many new trends in South African legislation. In environmental legislation, the idea of public participation (or stakeholder engagement) features strongly and especially the National Environmental Management Act (Act 107 of 1998, NEMA) and the recent regulations passed under the auspices of this Act makes very strict provisions for public participation in environmental decision-making.

Public participation can be defined as..."*a process leading to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce better decisions than if they had acted independently*"[1]. From this definition, it can be seen that the input of the public is regarded as very important indeed.

The Public Participation Process (PPP) is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner in order to assist them to during the Environmental Authorisation:

- Verify that their issues have been recorded;
- Comment on the findings of the environmental assessments; and
- Provide relevant local information and knowledge to the environmental assessment.

The PPP is a requirement of several pieces of South African Legislation and aims to ensure that all relevant I&APs are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the necessary authorisation required for the project needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with international best practice options;
- Compliance with national legislation;
- Establishment and management of relationships with key stakeholder groups; and
- Encouragement of involvement and participation in the environmental study and authorisation/approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project and process for the authorisation project;
- Explain the environmental authorisation;
- Determine and record issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&APs and the project team;
- Identify all significant issues for the project; and

- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximise and/or promote positive environmental impacts associated with the project.

This Public Participation Report (PPR), Appendix D, lists all verbal and written issues raised by I&APs during the call to register period from the 08th of September 2025 to date. A breakdown of the PPP is given within the remaining sections of this PPR.

6.2 LEGAL COMPLIANCE

The PPP must comply with all environmental legislation that requires public participation as part of an application for authorisation or approval; namely, the National Environmental Management Act (NEMA, Act No. 107 of 1998).

Adherence to the requirements of the above-mentioned Act will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirements for public participation referenced in the Act. The details of the Integrated PPP are provided below.

6.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES (I&APS)

An initial I&AP database has been compiled from historic projects in the area, and Windeed searches were conducted to obtain the contact details of the surrounding landowners. The I&APs referred to in the PPR include:

- Pre-identified and registered landowners and surrounding landowners;
- Pre-identified and registered key stakeholders;
- Regulatory authorities;
- Specialist interest groups; and
- All I&APs who responded to the initial notifications and requested to be registered.

Efforts to identify key I&APs involved various avenues such as consultation with the proponent and known landowners within the study area, review of related previously conducted studies, and identification of key interest groups and authorities within the vicinity of the study area and municipality. Refer to APPENDIX C for the Key Stakeholder/I&AP Database.

6.3.1 LIST OF ORGANS OF STATE IDENTIFIED AND NOTIFIED

The following key I&APs, but not limited to, were notified of the proposed project and invited to participate in the public participation process:

- Agri SA
- Agricultural Research Council
- Bojanala Platinum District Municipality
- Eskom Soc Ltd
- Glencore Western Chrome Mines
- National Department of Agriculture Land Reform and Rural Development
- National Department of Co-operative Governance and Traditional Affairs
- National Department of Forestry, Fisheries, and the Environment (DFFE)
- National Department of Human Settlements
- Department of Mineral and Petroleum Resources (DMRP)
- National Department of Rural Development and Land Affairs
- National Department of Water and Sanitation
- National House of Traditional Leaders

- North West Department of Corporate Governance and Traditional Affairs
- North West Department of Economic Development, Environment, Conservation and Tourism
- North West Department of Public Works and Roads
- North West Department of Social Development
- North West Wetland Forum
- Rustenburg Local Municipality
- Rustenburg Platinum Mines
- South African Heritage Resources Agency (SAHRA)
- Sibanye Rustenburg Platinum Mines Pty Ltd
- Transnet Soc Ltd

6.3.2 LIST OF OTHER KEY I&APS IDENTIFIED AND NOTIFIED

- Pre-identified and registered landowners and surrounding landowners
- Centre for Environmental Rights
- Conservation South Africa (CSA)
- Council of Geoscience
- Federation for a Sustainable Environment
- Kroondal and Wards Environmental Forum (KWEF)
- Mining Affected Communities United in Action (MACUA)
- Mining and Environmental Justice Community Network of South Africa (Mejcon SA)
- Natural Justice
- Wildlife and Environment Society of South Africa (WESSA)

6.4 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

This section provides details on the notifications that were distributed as part of the consultation process to date.

6.4.1 INITIAL NOTIFICATION OF KEY I&APS

The PPP commenced on the 08th of September 2025 with an initial call to register notification. Notification during this initial consultation was given in the manner described below.

6.4.1.1 FAXES, REGISTERED MAIL AND EMAILS

Notification letters (in English and Afrikaans) were distributed to pre-identified I&APS through either faxes, SMSs, registered mail, and/or emails on the 08th of September 2025.

The notification documents included the following information:

- Authorisations required;
- Sufficient detail of the proposed development to enable I&APs to assess/surmise what impact the development will have on them or the use of their land;
- The purpose of the proposed project;
- Details of the application processes associated with proposed activities;
- Details of the affected properties;
- Details of the South African environmental legislation that must be adhered to;
- Relevant EIMS contact person for the project.

Please refer to APPENDIX C for initial notification and proofs.

6.5 SUMMARY OF PUBLIC PARTICIPATION OPPORTUNITIES

The table below provides a summary of the opportunities provided to I&APs for participation in the public participation process to date.

Table 10: Summary of Public Participation Opportunities

Action	Description	Publication/Place	Date
Initial Call to Register	Notification of landowners, occupiers, and other key I&APs.	Affected landowners and key I&APs were notified via email, fax, SMSs and/or post.	08 September 2025
	Placement of site notices.	Four (4) A2 Correx site notices (in English and Afrikaans) were placed at 4 locations along the proposed project study area.	10 September 2025
	Newspaper advertisement and Gazette Notice.	Advertisements (in English and Afrikaans) describing the proposed project and EA process were placed in the Rustenburg Herald Newspaper. The Gazette Notice was placed in the North West Provincial Gazette.	12 September 2025 (Newspaper) 09 September 2025 (Gazette Notice)
Availability of Environmental Assessment Report for public review and comment.	Notification of landowners, occupiers, and other key I&APs.	Affected landowners and key I&APs were notified via email, fax, SMSs and/or post.	21 February 2026 to 25 March 2026.

6.6 RECORD OF ISSUES RAISED

Comments on the proposed project were solicited from pre-identified and registered I&APs and key stakeholders. To date, the following comments have been received:

- I&AP registration.
- Transnet Pipeline: Confirmed that their infrastructure is not affected by the proposed project.

All comments and/or queries received to date are included in the public participation report and presented in APPENDIX C.

7 ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the Environmental Assessment Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area and where relevant specialist assessments.

7.1 PHYSICAL ENVIRONMENT

This section will discuss the physical receiving environment based on available information and the specialist assessments conducted as part of the impact assessment.

7.1.1 CLIMATE AND WEATHER

This section will discuss the climate and weather in the regional setting where the site occurs.

7.1.1.1 CURRENT CLIMATE

The site is located approximately 13km East-South-East of Rustenburg, within the Bojanala Platinum District Municipality (BPDM). The BPDM is situated in the Highveld Climatic Zone that experiences mild temperatures. The region north of the Magaliesberg Mountains experience moderate winters and hot summers where temperatures in the shade are known to reach a maximum of 35°C - 40°C (BPDM EMF: Status Quo report (Final Rev13), 2018).

Rustenburg is known to experience long, warm summers with the warm season starting in mid-late September and ending mid-late March with an average daily high of 27°C. Winters are short and cold with the cool season between late May and early August with an average high of 22°C (Weather Spark, 2024).

Summer rainfall patterns are experienced in the BPDM region with afternoon showers, and occasional rains during winter occur due to the passing of frontal systems. Large-scale flooding is known to occur in the region and north of the Magaliesberg Mountains. Spatial variation in the mean annual precipitation occurs across the BPDM with the southern region and Pilanesberg area experiencing more rain than the northern and western low-lying regions. Summer experiences north-westerly prevailing winds while winter experiences light south-westerly prevailing winds (BPDM EMF: Status Quo report (Final Rev13), 2018).

The wet season in Rustenburg occurs between early-mid September to mid-May, with the most rain occurring in January. The dry season occurs in the remaining months, with the driest month being July (Weather Spark, 2024). Figure 5 below shows the average monthly rainfall and temperature experienced in the Rustenburg area.

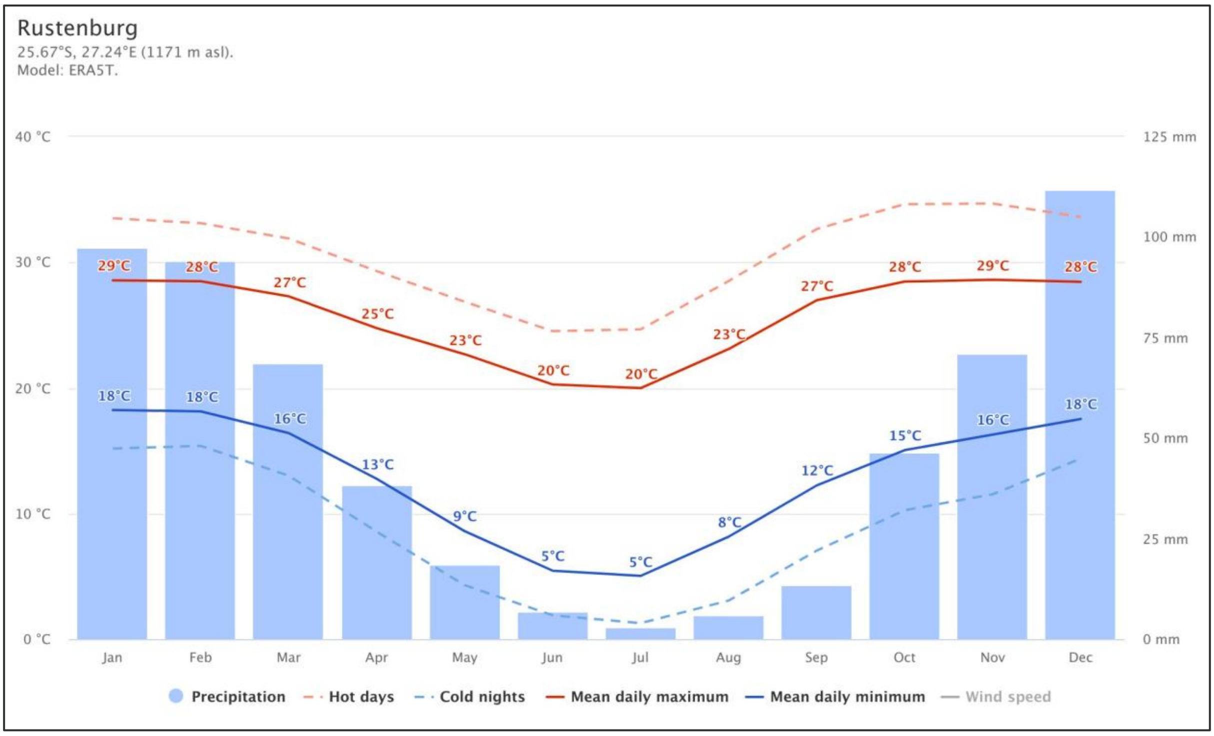


Figure 5: Graph showing the average annual precipitation (right axis) and temperature (left axis) in Rustenburg (Simulated historical climate & weather data for Rustenburg, 2024).

7.1.1.2 PREDICTED FUTURE CLIMATE

The future climate of the North West province faces challenges such as increased drought periods, increasing temperatures and rainfall variability, as well as an increase in the number of storm and flood events. The agricultural sector, rural livelihoods and natural ecosystems are most vulnerable due to these impacts. The mining sector is of concern due to the predicted increase in drought and rainfall variability due to the sector's heavy reliance on water resources, as well as susceptibility to increased temperatures affecting working conditions (BPDM EMF: Status Quo report (Final Rev13), 2018; RLM SDF Draft, 2023).

In terms of the Rustenburg Local Municipality, and according to the RLM SDF (2023), a number of climatic changes are expected to occur such as: an increase of 0-80mm in rainfall, which is expected to be offset by increased evaporation as a result of higher temperatures; an increase in temperatures of up to 3°C in the northern regions of the RLM, and 2.5°C in the southern regions; an increase in the number of "very hot days" (days exceeding 35°C) by ~35 days in the northern regions and; an increase in the predicted number of fire-danger days. The RLM will face increasing pressures on water resources. It is expected that by the population will have increased by 69.94%, regional urban water supply will increase by 0.06%, whereas mean annual evaporation will increase by 11.46% while mean annual run-off will decrease by 15.72%. There is little to no change expected for groundwater recharge in the RLM, with Molote identified as the only settlement to be at moderate risk for groundwater depletion (RLM SDF Draft, 2023). Table 11 below represents the sectors.

Table 11: Sectors of the Rustenburg Local Municipality vulnerable to climate change as per the vulnerability index.

Sector	Vulnerability Index[4]
Economic	8.49
Socio-economic	2.32

[4] Vulnerability Index ranges from 1 (low vulnerability) to 10 (high vulnerability)

Sector	Vulnerability Index[4]
Physical	6.80
Environmental	6.19

(*Data Source:* RLM SDF Draft (2023), p. 51)

7.1.2 GEOLOGY

The Bojanala Platinum District Municipality region has a diverse geological profile with the major feature being the Bushveld Igneous Complex – a volcanic intrusive rock. This complex is known for its rock formations which are rich in various minerals thus attracting mining activities throughout the region (BPDM EMF: Status Quo report (Final Rev13), 2018).

A Simplified Geology map is depicted in Figure 6 below. The site is underlain by the Vlakfontein and Ruigjhoek Subsuites of the Rustenburg Layered Suite of the Bushveld Complex. The Bushveld Complex comprise of the largest mafic intrusion in the world and underlie an area of almost 65 000 km2. The maximum thickness of these rocks is almost 8 km while individual layers can be followed for about 150 km. This intrusion is world renowned for the ore reserves of platinum-group elements namely chromium and vanadium. The Bushveld Complex is divided in 4 groups namely the Lebowa Granite Suite, Rashoop Granophyre Suite, Rustenburg Layered Suite and Rooiberg Group. The latter Group of felsic and minor volcanic rocks may be genetically closer related to the Bushveld event as to the Transvaal Supergroup (Hutton and Schweitzer, 1995). The Rustenburg Layered Suite reveals a complete differentiation sequence of magma and is made up of various rock layers ranging from dunite, gabbro, norite, and pyroxenite, and anorthosite to magnetite and apatite- rich diorite. Mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catena and some freely drained, deep soils. The land types associated with this geology are Ea, Ba and Ae.

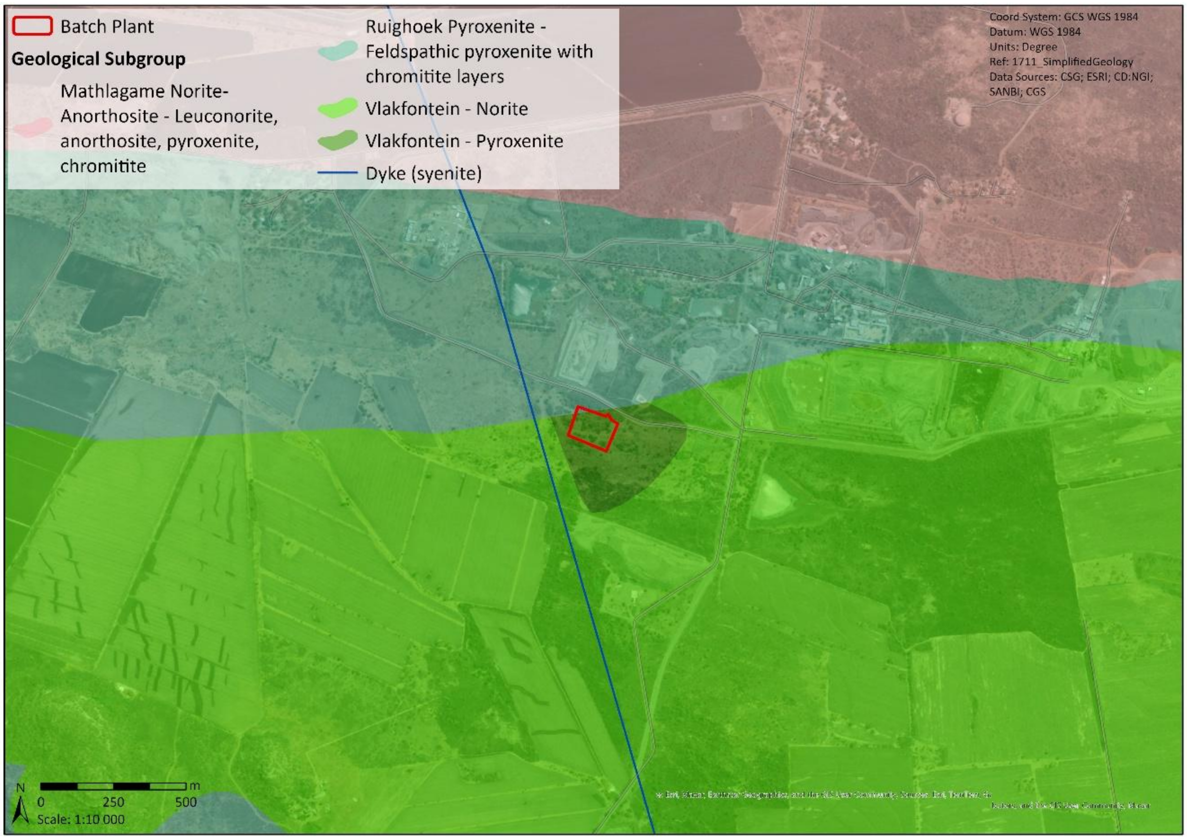


Figure 6: Simplified Geology Map (Council for Geoscience, 2022).

7.1.3 SOILS AND LAND CAPABILITY

The field survey was completed on the 14th to the 16th of April 2025 to determine the soil forms and current land uses within the assessed area. A map illustrating the field work tracks is presented in Figure 7 below.

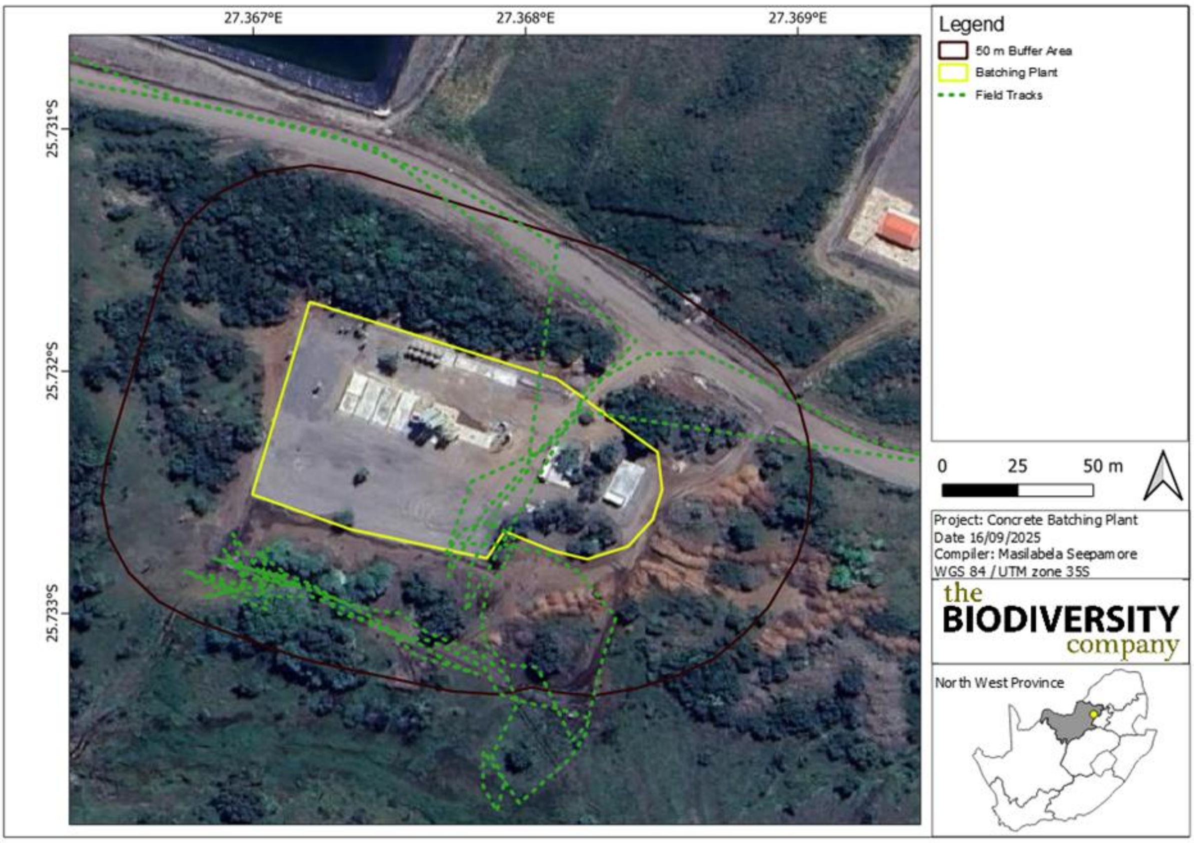


Figure 7: Map illustrating the field coverage.

The geology of the area is mostly dominated by mafic intrusive rocks of the Rustenburg layered suite of the Bushveld Igneous Complex. The rocks found within the area includes gabbro, norite, pyroxenite, anorthosite, shales and quartzites. The geology gives rise to mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catena and some freely drained, deep soils. The land types associated with this geology are Ea, Ba and Ae.

According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment area to be focused on mainly falls within the Ea 3 land type (Figure 8). The Ea 3 land type mainly consists of Arcadia and Oakleaf soil forms according to the Soil classification working group (1991), with the occurrence of other soils and rocky areas within the landscape. The Ea land types are also characterised by vertic, melanic, red-structured diagnostic horizons and undifferentiated soils. The land terrain units for the featured Ea 3 land type are illustrated in Figure 9 with the expected soils listed in Table 12.

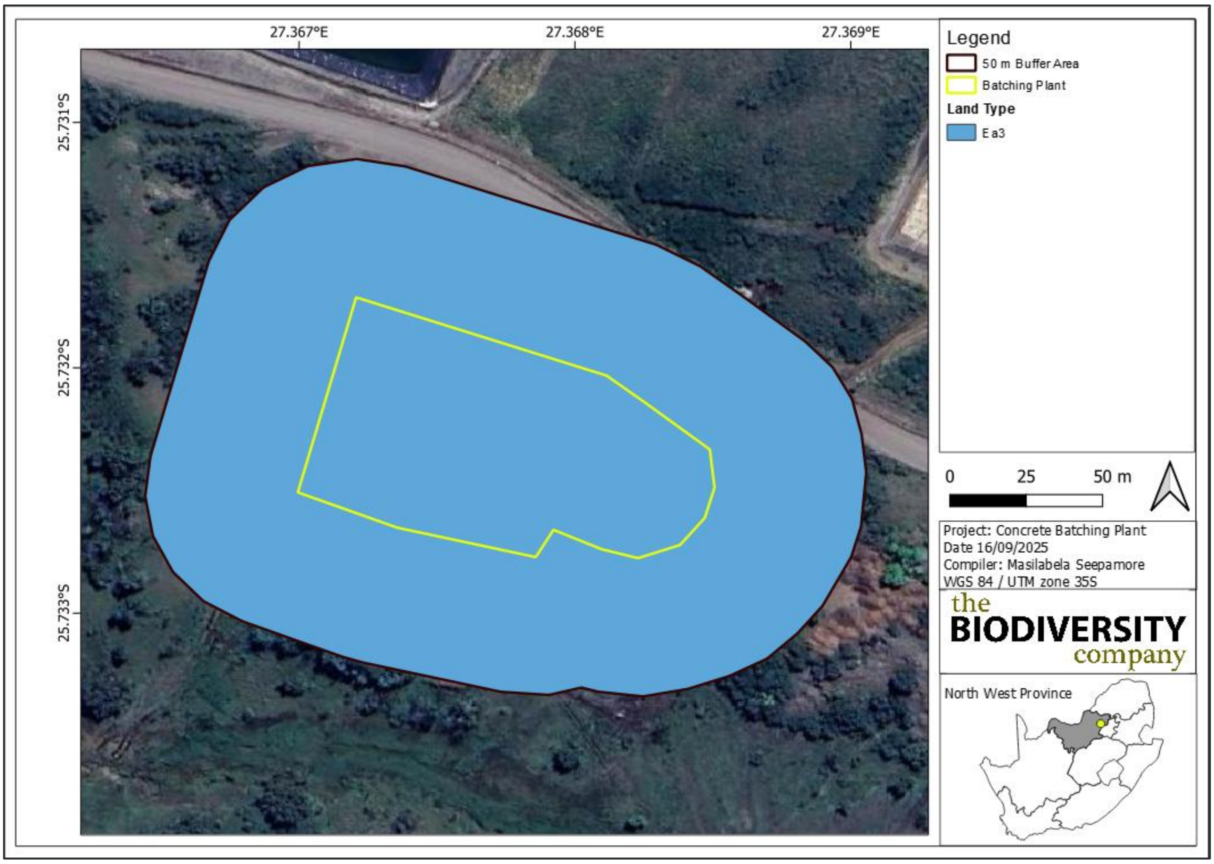


Figure 8: Land type associated with the proposed project area.

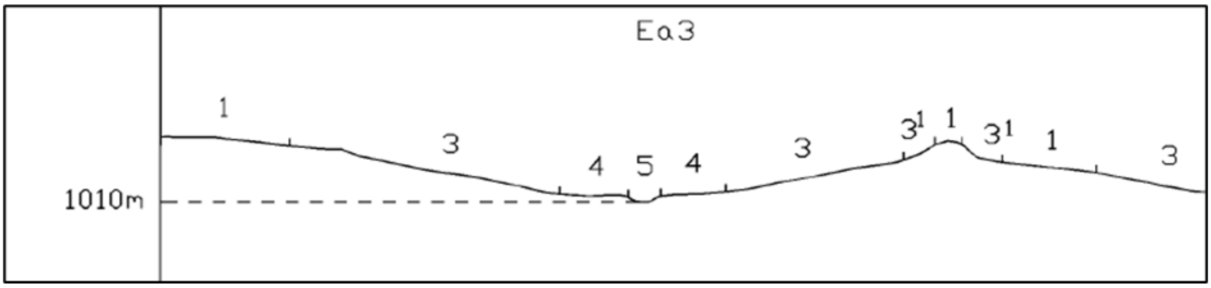


Figure 9: Illustration of land type Ea 3 terrain units (Land Type Survey Staff, 1972-2006).

Table 12: Soils expected at the respective terrain units within the Ea 3 land type (Land Type Survey Staff, 1972 - 2006).

Terrain Units											
1 (30%)		**1(0.5)**		**3 (44.5%)**		**3(1) (1%)**		**4(15%)**		**5(9%)**	
Arcadia	70 %	Bare Rocks	80 %	Arcadia	76 %	Bare Rocks	70 %	Arcadia	89 %	Oakleaf	67 %
Bare rock	14 %	Mispah	20%	Bare Rocks	10 %	Mispah	30 %	Hutton	3%	Arcadia	22 %
mispah	9%			Mispah	6%			Shortlands	3%	Shortlands	6%

Terrain Units											
1 (30%)		**1(0.5)**		**3 (44.5%)**		**3(1) (1%)**		**4(15%)**		**5(9%)**	
Hutton	4%			Hutton	4%			Swartland	3%	Hutton	5%
Shortlands	3%			Shortlands	3%			Bare Rocks	2%		
				Swartland	1%						

7.1.3.1 BASELINE FINDINGS

Three (3) representative soil forms were identified in the 50 m buffer of the proposed project area namely, Mispah, Grabouw and Johannesburg soil forms (Figure 3-4). The proposed project area is dominated by shallow soil with restrictive limitations. The remaining extent of the proposed project area coincides with anthropogenic soils due to the current land use.

The Mispah soil form consists of an orthic topsoil horizon underlain with a hard rock substratum horizon. This soil has a limited soil profile, which in turn restricts its agricultural potential due to low water-holding capacity, poor root penetration, and inadequate aeration. As a result, the soil is more suitable for grazing purposes to support livestock and wildlife practices.

Two anthropogenic soils identified within the proposed project area includes the Grabouw and Johannesburg soil forms. The Grabouw soil form is characterised as physically disturbed Anthrosols, where the land is physically disturbed due to anthropogenic activities. The Johannesburg soil form is characterised as urban Technosols, where the land is under various urban uses. These soil forms have extreme limitation and are not suitable for crop production, livestock grazing and afforestation. Some of the identified soil horizons within the proposed project area, as well as the current land uses are illustrated in Figure 11 and Figure 12, respectively.

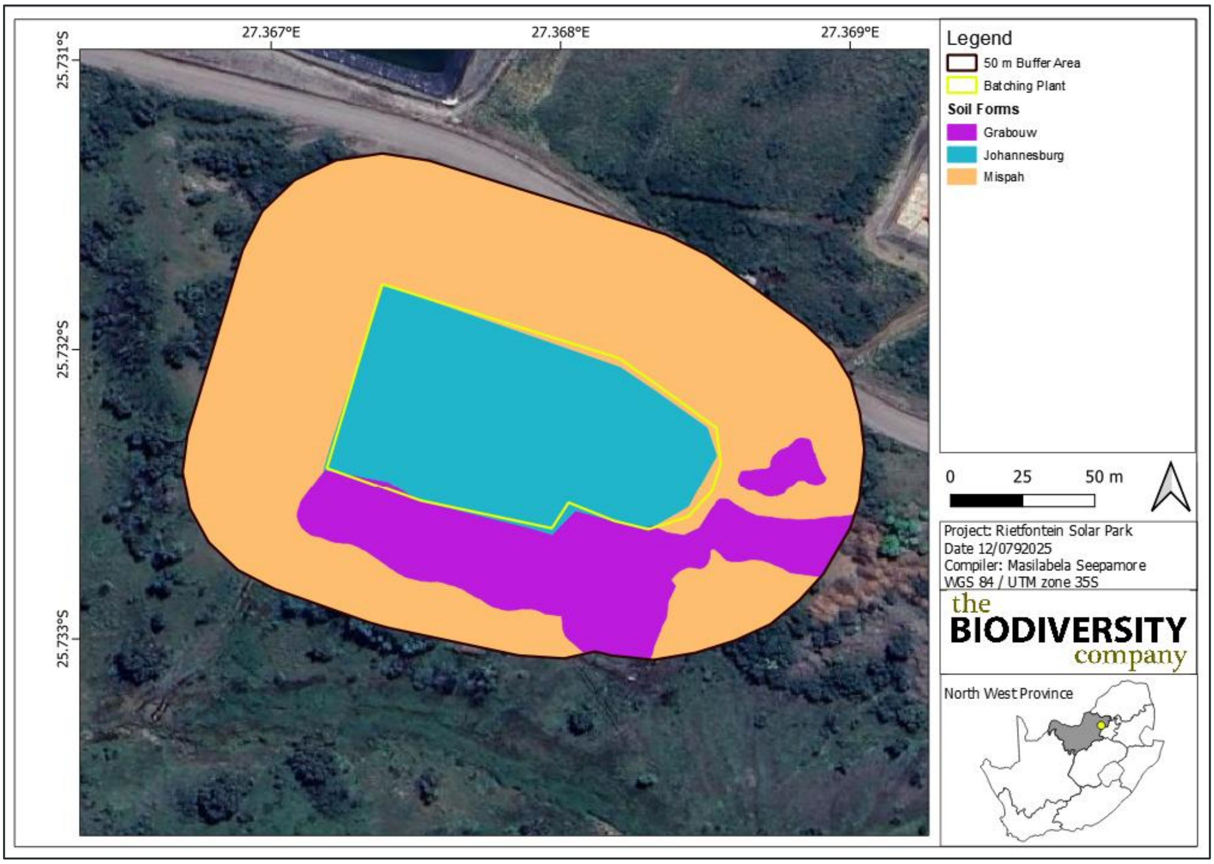


Figure 10: Soil forms found within the proposed project area.

Figure 11: Diagnostic soil horizons identified on-site: A) Uban Technosols; Physical disturbed Anthrosols; and C) Mispah soil form.

Figure 12: Current land use found within the 50 m buffer of the proposed project area; A) Common vegetation; and B) & C) Current land use within the concrete batching plant.

Accordingly, following Smith, (2006) which the national DAFF, (2017) land capabilities protocols were further expanded from, the above-mentioned identified soil forms associated with the project area are restricted to land “VI” (i.e. Mispah soil form) categorised between LC 1-5 (Low), and land capability “VIII” (i.e. Grabouw and Johannesburg soil forms) categorised between LC 1-5 (Very Low to Low). The baseline soil land capability was aligned and compared to the National Land Capability data (DAFF, 2017), respectively.

The land capability classes of the above-mentioned soils have been determined to be class “VI” and “VIII” according to Smith (2006). The land capability class “VI” is characterised by limitations that preclude cultivation and is suitable for pasture cultivation, veld and afforestation. The land capability class “VIII” is characterised by extremely severe limitations, requires total protection from agriculture and is only suitable for wildlife practices. A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. By using the determined land capability classes and the determined climate capability, land potential “L7” and “L8” were calculated. According to Smith (2006), the proposed project area is found to be non-arable.

The following land potential levels have been determined:

- Land potential level 7 (this land potential is characterised by low potential. Severe limitations due to soil, slope, temperatures or rainfall). Non-arable; and
- Land potential level 8 (this land potential is characterised by very low potential. Very severe limitations due to soil, slope, temperatures or rainfall). Non-arable.

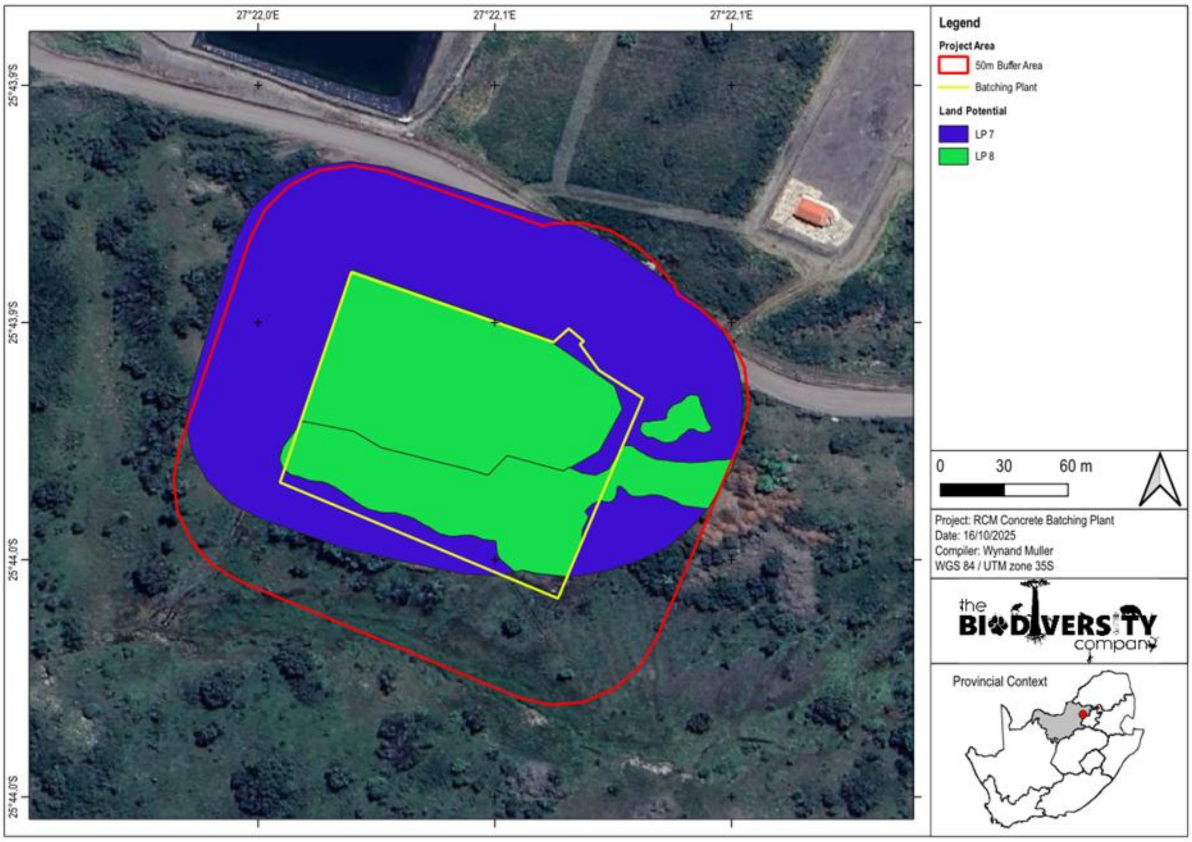


Figure 13: Land Potential of the proposed project area.

7.1.3.2 SENSITIVITY VERIFICATION

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

Agriculture Theme Sensitivity indicates that the proposed 50 m buffer of the project area falls predominately within the 'Medium' agricultural sensitivity (Figure 14).

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	07. Low-Moderate

Figure 14: Map of Relative Agricultural Theme Sensitivity for the concrete batching plant generated by the Environmental Screening Tool Site Ecological Importance (SEI).

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which one potential land capability classes are located within the assessment area, including:

- Land Capability 7 (Low-Moderate Sensitivity).

The land capability dataset (DAFF, 2017) indicates that the proposed project area falls predominately within the “Low-Moderate” land capability sensitivity (see Figure 14). Furthermore, the agricultural theme tool indicates the absence of highly sensitive field crop boundaries (DFFE 2025; Figure 14). The proposed project areas do not fall within the Protected Agricultural Areas (PAA), as stipulated by the DARLRRD (2020) and Figure 14.

The baseline soil findings, current land uses and the calculated land potential dispute the agricultural theme tool, in all areas demarcated with “Low-Moderate” land capability sensitivity due to the presence of low to very low potential soils. Moreover, there is no active cropping together with irrigation infrastructure such centre pivot, drip irrigation or canals for flood found within the proposed project area.

The current project area and associated activities of the proposed project will have acceptable expected changes to soil resources. As a result, based on the verified baseline findings, the proposed development will have a minimal impact on the soil resources.

Figure 15: Overall site verified sensitivity of the project area.

Considering the soil properties, agricultural potential as well as the current land use of the proposed development area, the area has a predominately "Low" agricultural sensitivity (see Figure 15). The allocated sensitivities for the theme are either disputed or validated in Table 13 below.

Table 13: Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Feature	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Agricultural Theme	Low-Moderate (LC 7)	Medium	Low	Disputed – Very Low to Low land capability. The presence of low potential soil with restrictive limitations such as Mispah soil form. Additionally, the presence of anthropogenic soils with extremely severe limitations such as Johannesburg and Grabouw soil forms.

7.1.4 GROUNDWATER

Groundwater occurs throughout the Bojanala Platinum District Municipal area, although high potential groundwater resources are restricted to few dolomitic aquifers and associated fountains. Groundwater is a particularly important water source for rural areas and the drier regions in particular, where groundwater is often the main source of water for rural domestic use, stock watering, and for the towns (BPDM EMF: Status Quo report (Final Rev13), 2018). The fractured, and fractured and intergranular aquifers in the Western Bushveld

Complex Hydrogeological region, as well as most of the Rustenburg Municipal area have a low to medium development potential (BPDM EMF: Status Quo report (Final Rev13), 2018; RLM SDF Draft, 2023). Mining in the belt north of the Magaliesberg Mountain Range has led to extensive dewatering, the impacts of which affect agriculture and natural vegetation in the region (BPDM EMF: Status Quo report (Final Rev13), 2018; RLM SDF Draft, 2023).The groundwater quality is relatively good in the BPDM, however, contributions to groundwater pollution include activities associated with mining and agriculture, as well as industrial activities, insufficient treatment of water at waste water treatment plants, and landfill sites (BPDM EMF: Status Quo report (Final Rev13), 2018).

Strategic Water Source Areas (SWSAs) are areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. The areas supplying ≥ 50% of South Africa's water supply (which were represented by areas with a mean annual runoff of ≥ 135 mm/year) represent national Strategic Water Source Areas (SANBI, 2013). These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing. Groundwater and interflow play a key role in sustaining surface water flows during the dry season and account for up to 42% of river baseflow, thereby sustaining aquatic and water-dependent biota. Therefore, the protection and management of these areas are imperative (Le Maitre et al., 2018).

According to the SWSAs of South Africa, Lesotho and Swaziland, the site is overlapping with the Kroondal / Marikana groundwater strategic water source areas (Lotter and Le Maitre, 2021). Ecological infrastructure in this region should be protected as far as possible, and emphasis should be placed on management of land uses and associated activities with high potential for surface water pollution (RLM SDF Draft, 2023).

7.1.5 SURFACE WATER AND DRAINAGE

The site is situated within the Limpopo stem of the Limpopo-Olifants Water Management Area (WMA) in the A22H Quaternary Catchment. The region has a semi-arid climate with the Limpopo stem of the WMA experiencing a wide range in Mean Annual Precipitation (MAP) with the southern regions experiencing the most rainfall. The southern regions of the WMA can experience up to 600mm of annual rainfall during the driest years. The main economic activities within the region include mining and farming (livestock and irrigation). The WMA is currently experiencing challenges due to increased urban growth and expansion of key economic sectors such as agriculture and mining. According to the Business Case for the Limpopo-Olifants Catchment Management Agency (2022) it is expected that water demand will increase by 46% by 2025. The agriculture sector is said to account for 60% of the water use in the Limpopo-Olifants WMA (DWS, 2022). The WMA is currently receiving ~500 million cubic metres of water from the Orange-Senqu River Basin to accommodate the demand for water in the region – water usage is exceeding the water generated in the WMA via surface runoff (Limpopo-Olifants CMA Annual Performance Plan: 2024/25 to 2026/27, 2024).

The rivers within the Rustenburg Local Municipality area form part of the Crocodile River system and drainage is generally towards the north east. The Hex River and its tributaries, including the Sandspruit are considered the main rivers within the RLM (refer to Figure 16). The four major dams in the RLM include Bospoort, Buffelspoort, Olifantsnek and Vaalkop dams (RLM SDF Draft, 2023).

Surface water quality within the RLM is considered poor in general, with main concerns associated with pollution from anthropogenic activities such as agriculture, mining, and the poor functioning of wastewater treatment works (RLM SDF Draft, 2023).

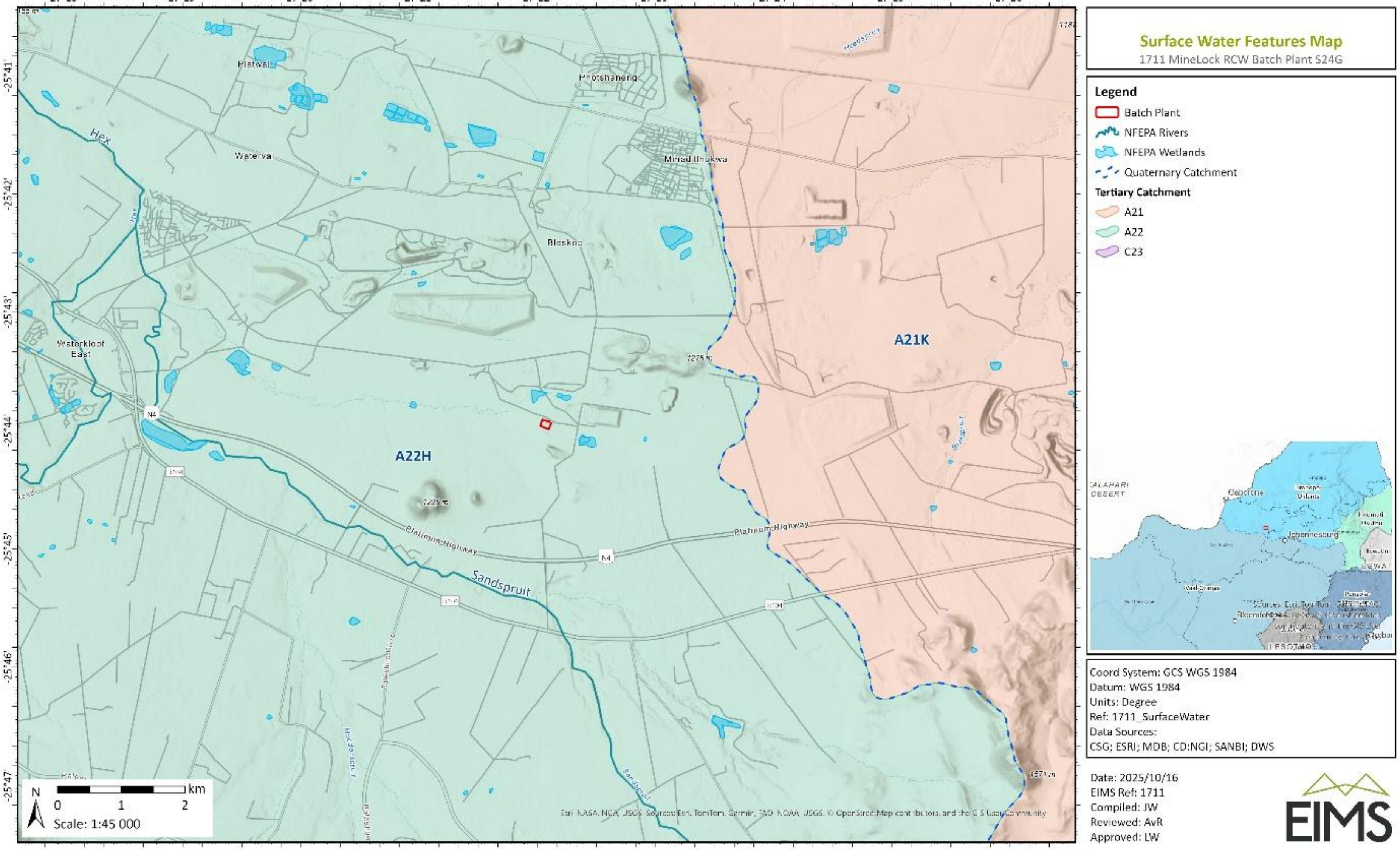


Figure 16: Surface Water Features Map.

7.2 BIOLOGICAL ENVIRONMENT

7.2.1 ECOLOGICALLY IMPORTANT AREAS

One (1) early dry season field survey was undertaken for the project on the 14th and 15th of April 2025 to confirm the presence of Species of Conservation Concern (SCC), as well as any sensitive habitat features. These observations pertain largely to the current state of the area, which has been affected by the recent land clearing. Effort was made to cover all the different habitat types within the limits of time and access. During the survey the floral communities surrounding the project development footprint were assessed and photographs were captured. The field survey tracks can be seen presented in Figure 17.

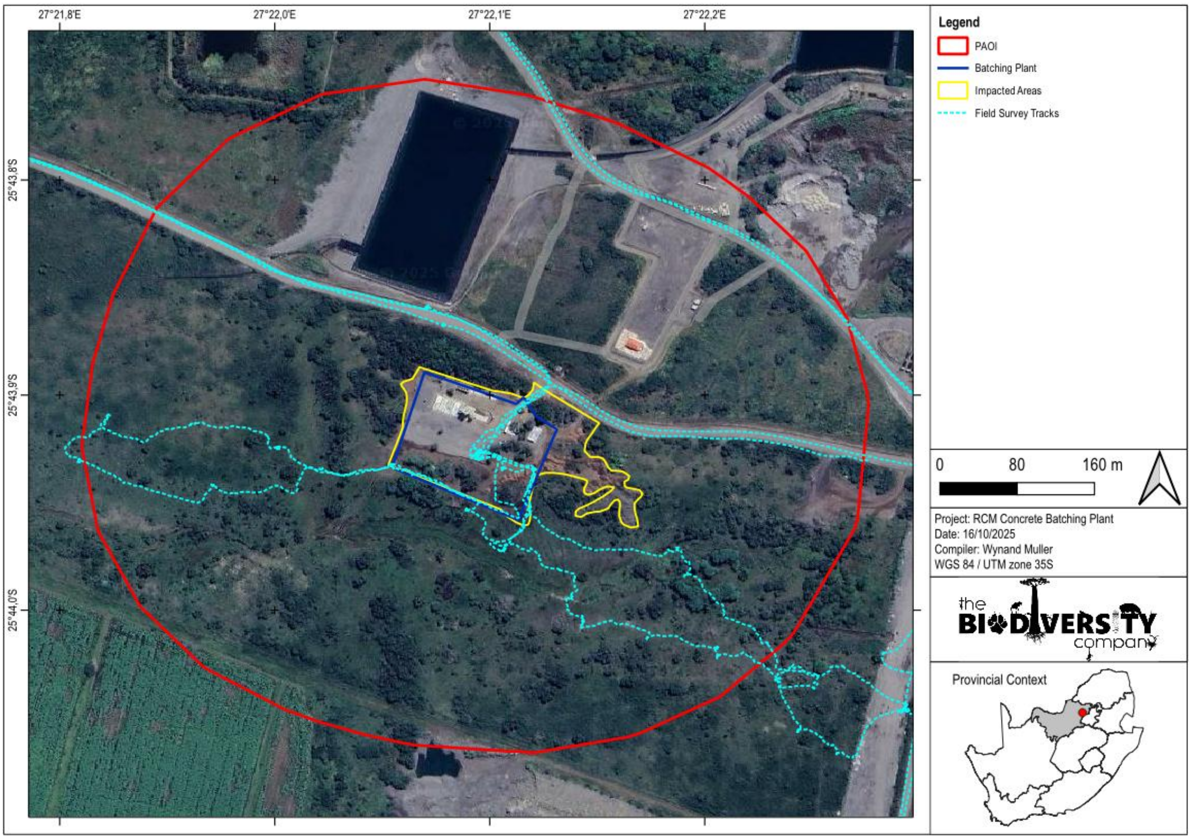


Figure 17: Map illustrating the field survey tracks.

The relevance of the proposed development to ecologically important landscape features are summarised in Table 14.

Table 14: Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevance	Reasoning
Ecosystem Threat Status	Relevant	Overlaps with an Endangered (EN) ecosystem (RLE, 2022)
Ecosystem Protection Level	Relevant	Overlaps with a Poorly Protected (PP) Ecosystem (NBA, 2018)
Provincial Conservation Plan	Relevant	Overlaps with a Critical Biodiversity Area (CBA) 2 and marginally with an Ecological Support Area (ESA) 2

Desktop Information Considered	Relevance	Reasoning
National Protected Areas Expansion Strategy (NPAES)	Relevant	Overlaps with NPAES Priority Focus Areas (NPAES, 2018).
Key Biodiversity Areas (KBA)	Relevant	Located ~5.3 km northwest of the Magaliesberg KBA (2024).
South African Protected and Conservation Areas Databases (SAPAD & SACAD)	Relevant	Falls within the Magaliesberg Biosphere Reserve Transition Area (SAPAD & SACAD, 2025).
National Freshwater Ecosystem Priority Area (NFEPA)	Relevant	Overlaps with a non-priority FEPA wetland (NFEPA, 2011).
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant	Overlaps marginally with a Least Concern (LC) wetland (NBA, 2018).
Strategic Water Source Area (SWSA)	Relevant	Overlaps with the Kroondal/Marikana Groundwater Strategic Water Source Area (SWSA, 2018).

7.2.1.1 RED LIST OF ECOSYSTEMS

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the Red List of Ecosystems dataset (Skowno & Monyeki, 2021) the PAOI overlaps with an EN ecosystem (Figure 18).

Figure 18: Map illustrating the Red List of Ecosystems (2021) dataset in relation to the PAOI.

7.2.1.2 ECOSYSTEM PROTECTION LEVEL

Indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The PAOI overlaps with a PP ecosystem (Figure 19).

Figure 19: Map illustrating the ecosystem protection level associated with the PAOI.

7.2.1.3 PROVINCIAL CONSERVATION PLAN

The North-West Department of Rural, Environment, and Agricultural Development (READ), as custodian of the environment in the North West, is the primary implementing agent of the Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by READ. The purpose of a Biodiversity Sector Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision-making guidelines (READ, 2015).

According to the North West Biodiversity Sector Plan, the PAOI overlaps with a CBA 2 and marginally with an ESA 2 (Figure 20).

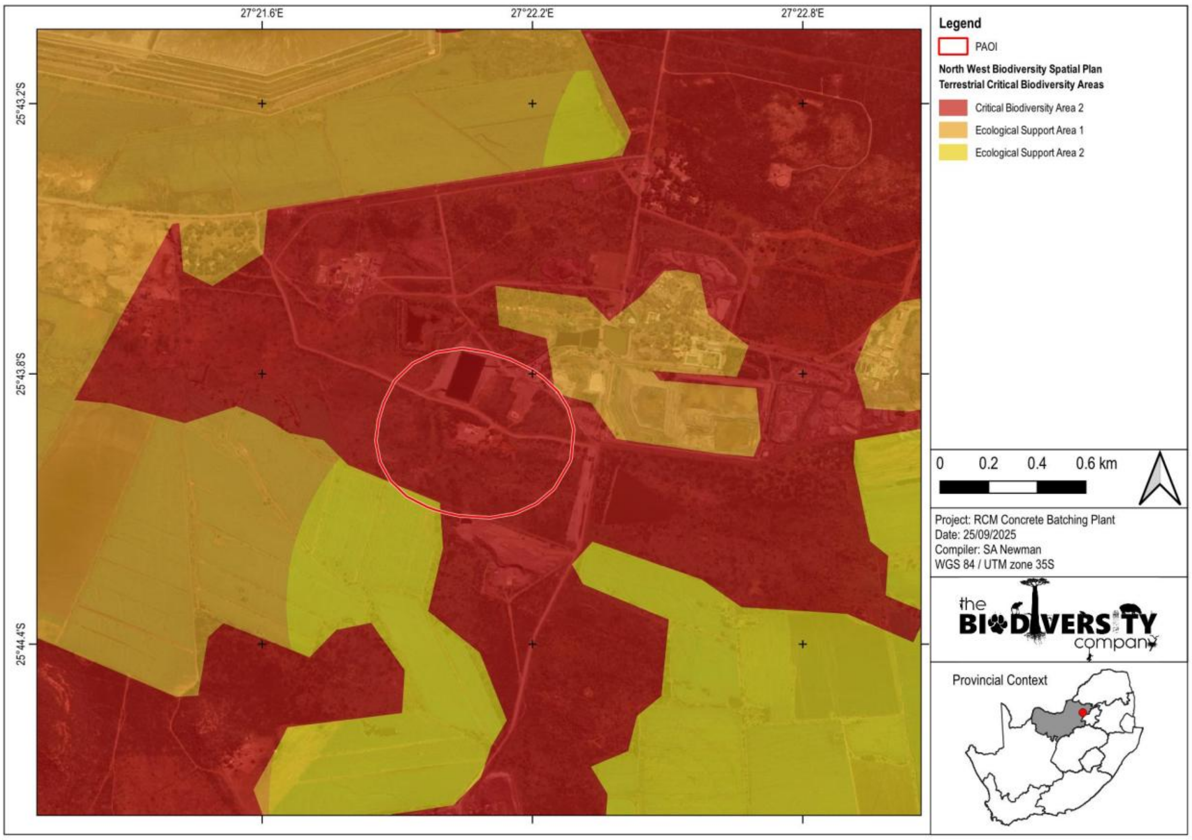


Figure 20: Map illustrating the PAOI in relation to the North West Biodiversity Sector Plan.

7.2.1.4 NATIONAL PROTECTED AREAS EXPANSION STRATEGY

The Department of Environmental Affairs (now the Department of Forestry, Fisheries and the Environment) led the development of the National Protected Areas Expansion Strategy (NPAES) in consultation with the protected area agencies and other key private and public sector stakeholders. The need for the development of the NPAES was established in the National Biodiversity Framework in 2009 (Department of Forestry, Fisheries and the Environment (DFFE), 2021b).

South Africa's protected area network currently falls far short of representing all ecosystems and maintaining healthy functioning ecological processes. In this context, the goal of the NPAES is to achieve cost effective protected area expansion, thus enabling better ecosystem representation, ecological sustainability, and resilience to climate change. A comprehensive set of priority areas was compiled based on the priorities identified by provincial and other agencies in their respective protected area expansion strategies. These focus areas are generally large, intact and unfragmented and are, therefore, of high importance for biodiversity, climate resilience and freshwater protection (DFFE, 2021b). The PAOI overlaps with NPAES Priority Focus Areas (Figure 21).

Figure 21: Map illustrating the PAOI in relation to the NPAES (2018) dataset.

7.2.1.5 KEY BIODIVERSITY AREAS

A new set of Key Biodiversity Areas (KBA) specific to South Africa has been identified using the Global Standard for the Identification of Key Biodiversity Areas version 1.2 (IUCN 2016), applied to South African species and ecosystems. KBAs are critical sites that play a vital role in maintaining global biodiversity by serving as essential habitats for species. The identification of KBAs enables governments and civil society to pinpoint key locations crucial for species and their habitats worldwide. This understanding facilitates collaborative efforts to manage and conserve these areas, thereby safeguarding global biological diversity and supporting international biodiversity objectives.

Unlike the Important Bird Areas (IBAs), which primarily focus on birds, the KBA framework encompasses a broader spectrum of biodiversity, including mammals, amphibians, plants, and other taxa. BirdLife South Africa (BLSA), in consultation with the KBA National Coordination Group, has opted to retire IBAs and integrate KBAs into its conservation strategy. This strategic shift acknowledges the necessity of investing resources effectively to protect avian and other macroecological elements at the site level within a comprehensive framework of biodiversity conservation (KBA NCG, 2024).

The PAOI is located ~5.3 km northwest of the Magaliesberg KBA (Figure 22).

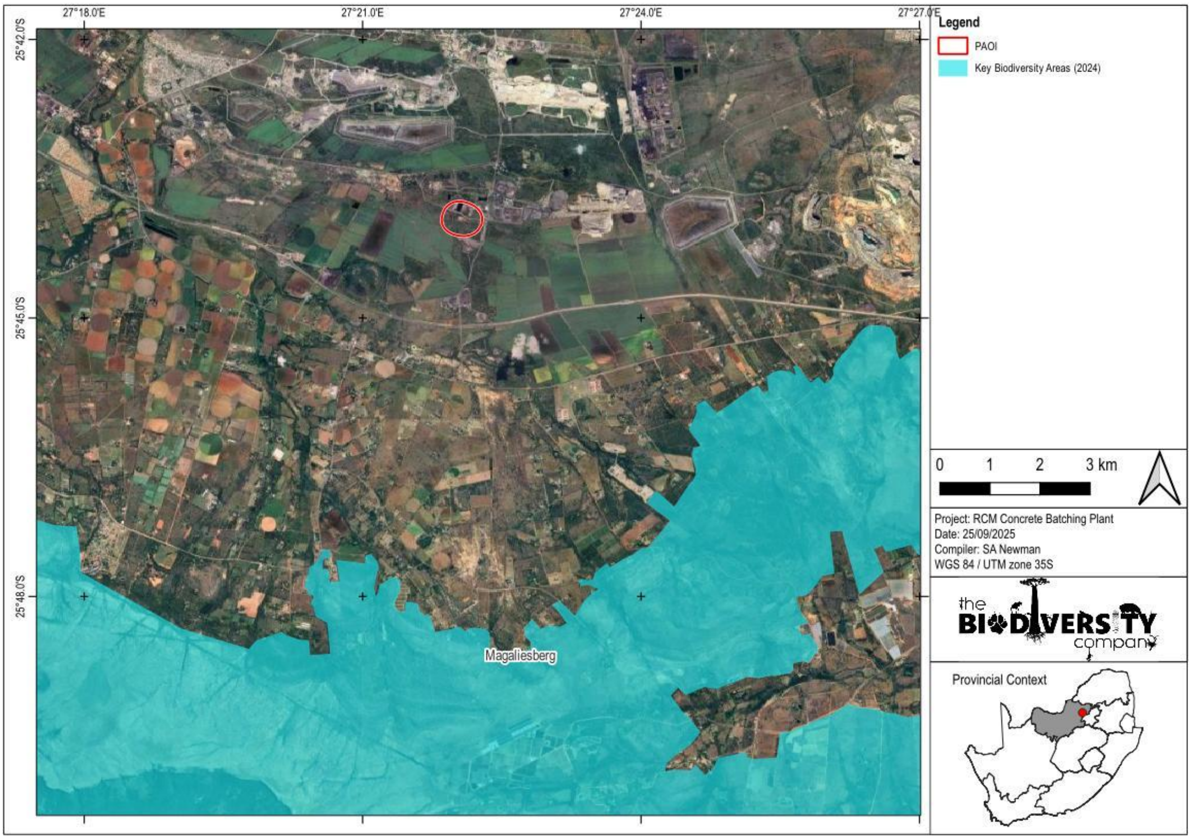


Figure 22: Map presenting the PAOI in relation to the Key Biodiversity Areas dataset.

7.2.1.6 PROTECTED AREAS

According to the protected area spatial datasets from SACAD (DFFE, 2024), the PAOI falls within the transition area of the Magaliesberg Biosphere Reserve (Figure 23).

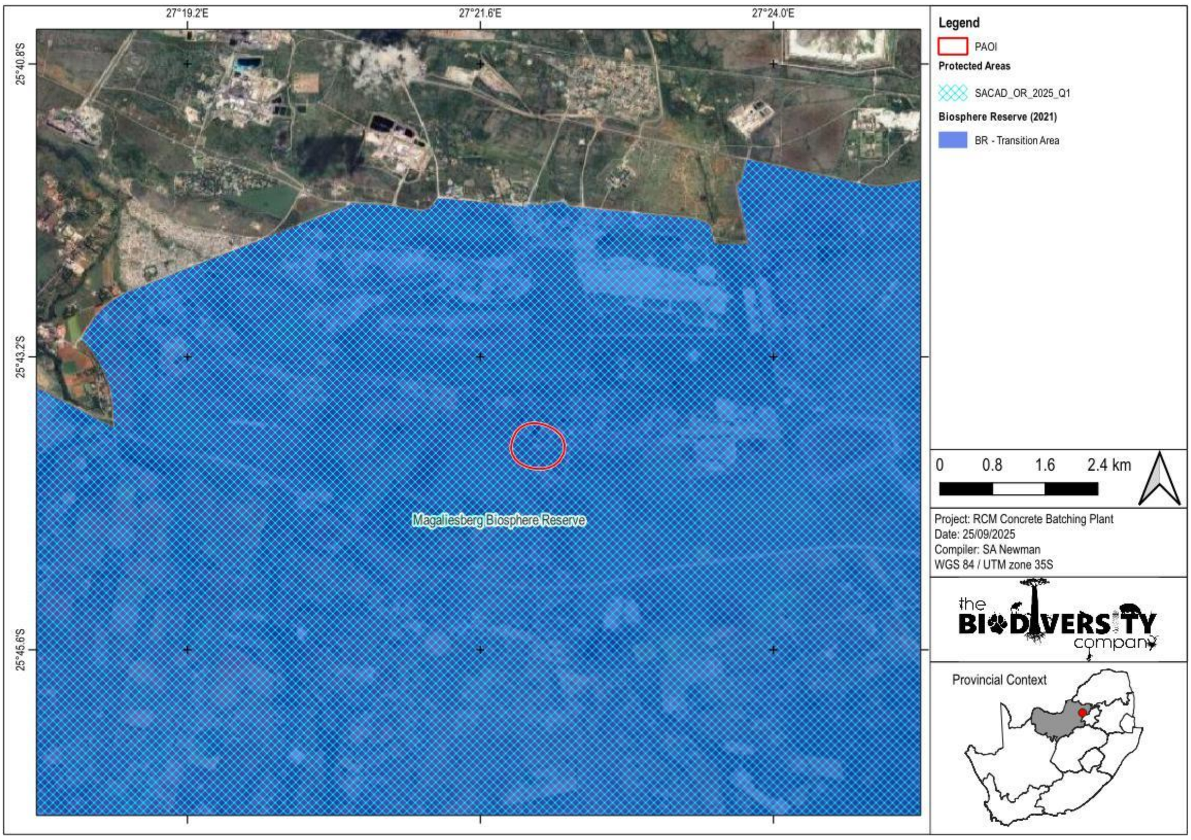


Figure 23: Map illustrating the location of protected areas proximal to the PAOI.

7.2.1.7 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA STATUS

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al., 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel et al., 2011). The PAOI overlaps marginally with a non-priority wetland (Figure 24).

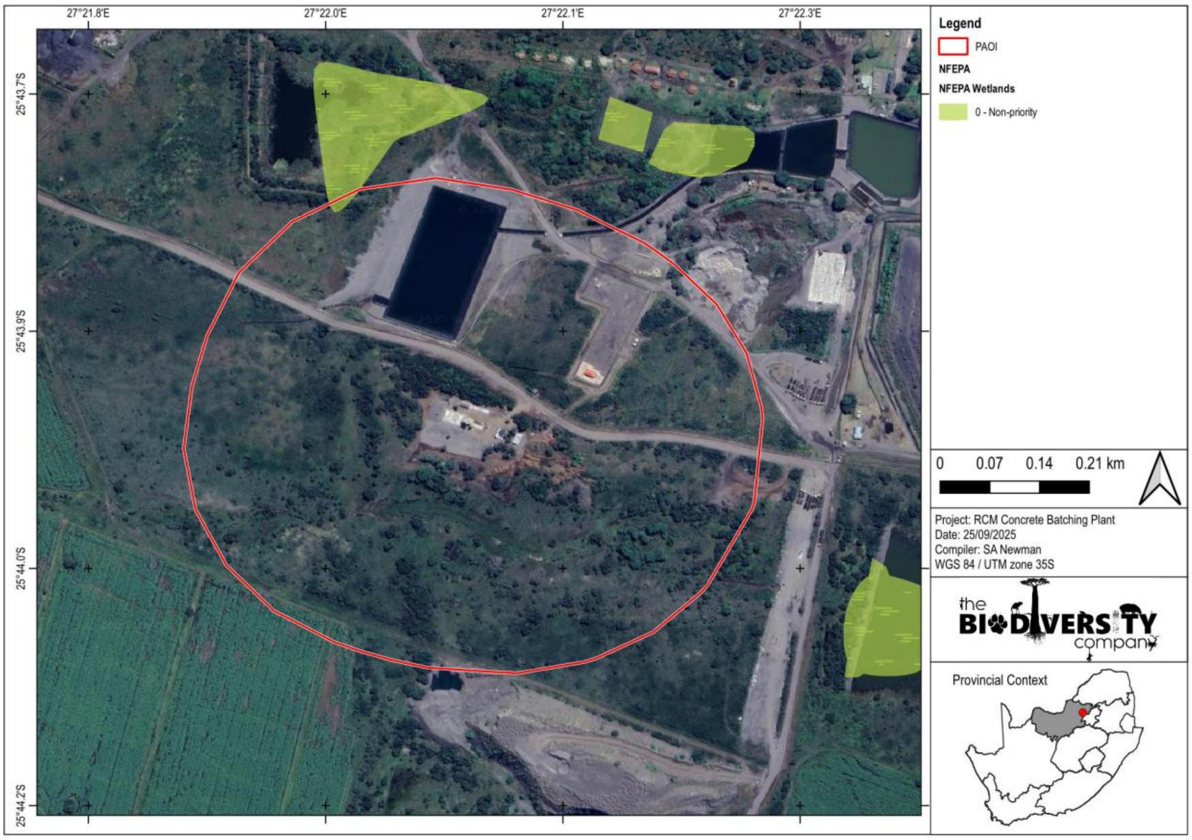


Figure 24: Map illustrating the PAOI in relation to the National Freshwater Ecosystem Priority Status dataset.

7.2.1.8 SOUTH AFRICAN INVENTORY OF INLAND AQUATIC ECOSYSTEMS

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA in 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer et al., 2019; Skowno et al., 2019). The PAOI overlaps marginally with a LC wetland (Figure 25).

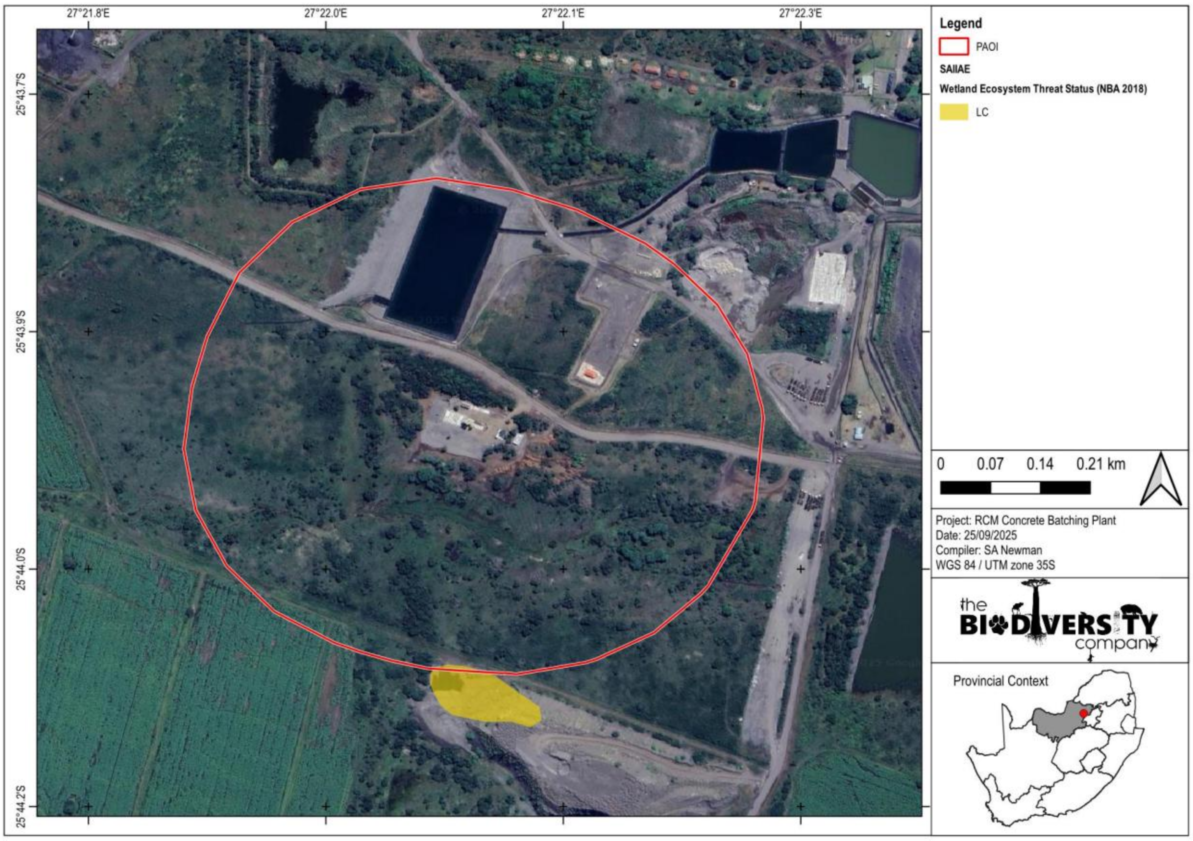


Figure 25: Map illustrating the PAOI in relation to the South African Inventory of Inland Aquatic Ecosystems dataset.

7.2.1.9 STRATEGIC WATER SOURCE AREAS

Strategic Water Source Areas (SWSAs) are defined as areas of land that supply a disproportionate quantity of mean annual surface water runoff in relation to their size, and therefore contribute considerably to the overall water supply of the country, as well as national aquatic and terrestrial biodiversity resources. These are considered key ecological infrastructure assets and the effective protection of SWSAs is vital for national security because a lack of water security will compromise national security and human wellbeing on all levels.

The PAOI overlaps with the Kroondal / Marikana Groundwater SWSA (Figure 26).

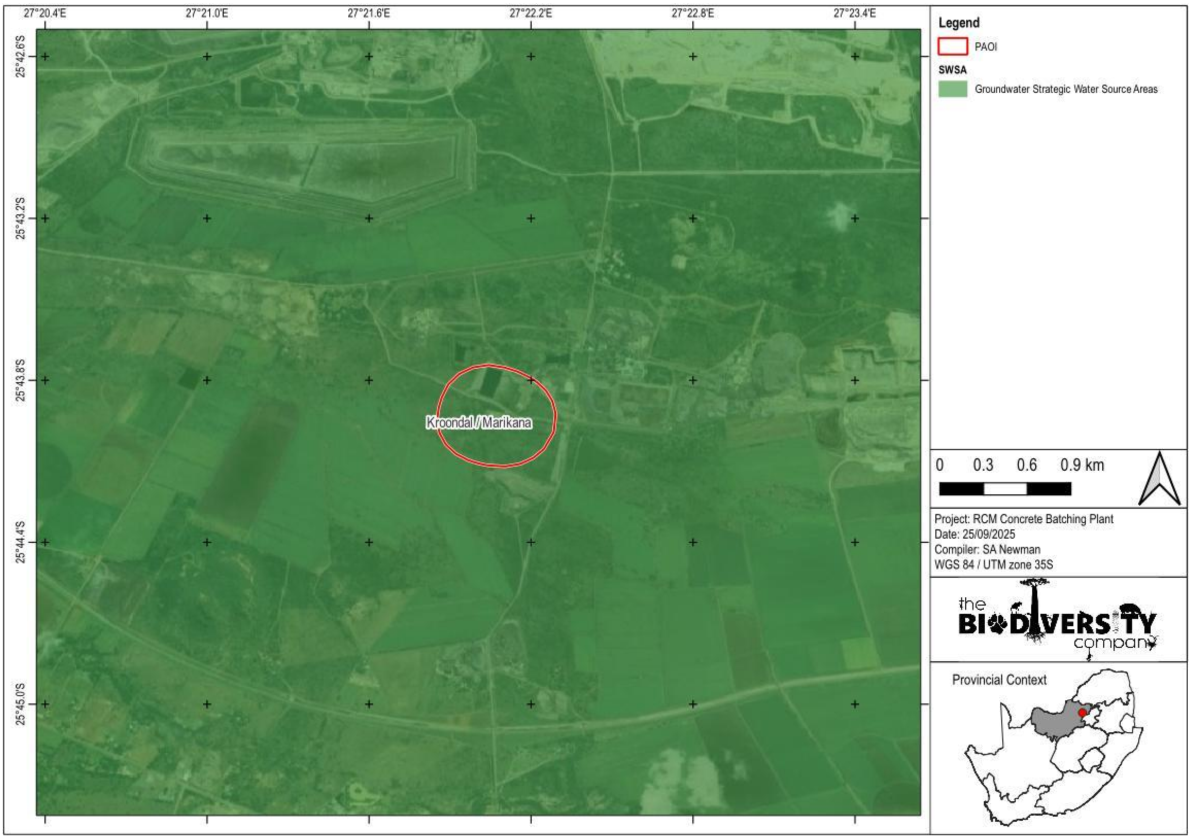


Figure 26: Map illustrating the PAOI in relation to the Strategic Water Source Areas dataset.

7.2.2 FLORA

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species.

7.2.2.1 VEGETATION TYPE

The PAOI is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include a seasonal precipitation and a sub-tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer (Mucina & Rutherford, 2006). At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia* and *Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993).

The PAOI is situated in the Marikana Thornveld vegetation type according to SANBI (2024) (Figure 27), which is a member of the Central Bushveld Bioregion.

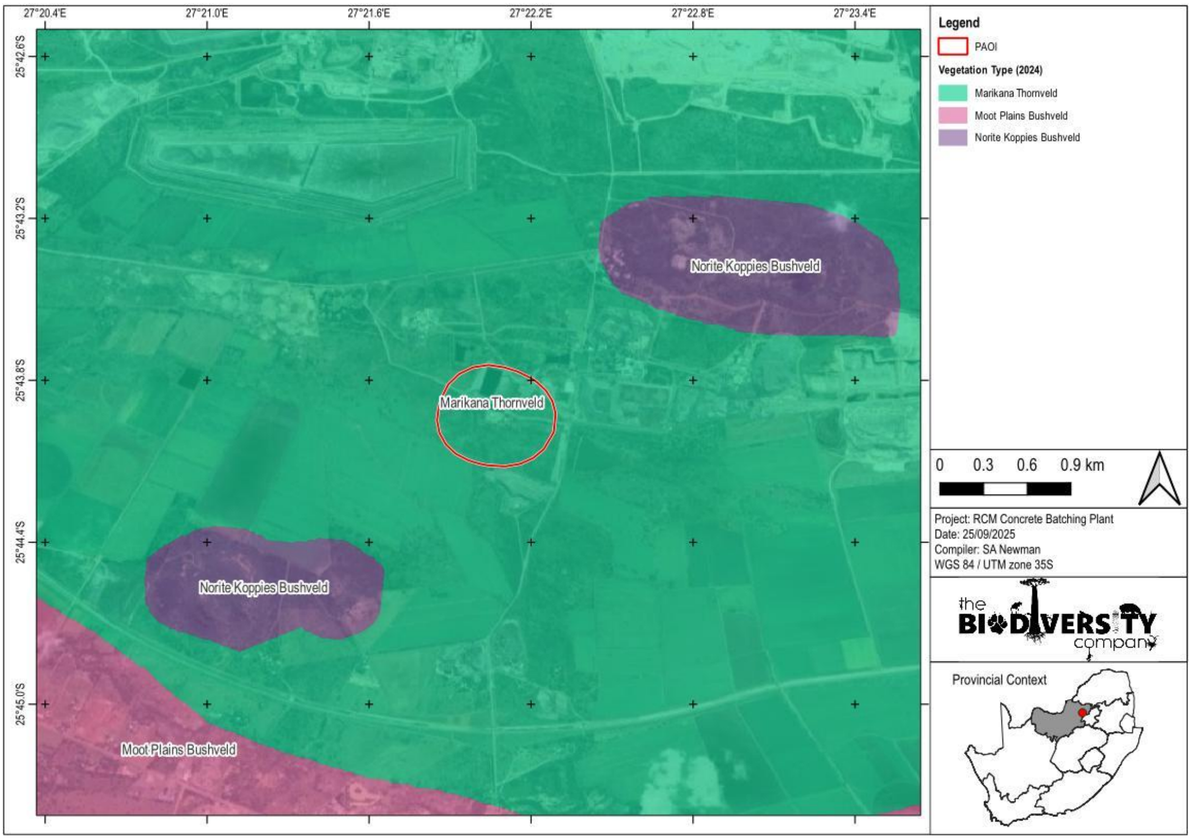


Figure 27: Map illustrating the vegetation types associated with the PAOI and surrounding landscape based on the Vegetation Map of South Africa, Lesotho & Swaziland.

7.2.3 MARIKANA THORNVELD

Marikana Thornveld extends on the broad plains from Rustenburg in the West, through Marikana and Brits, and towards Pretoria in the East (Mucina & Rutherford, 2006). It is characterised by open *Vachellia karroo* woodland, which occurs in valleys and on undulating plains and hills (Mucina & Rutherford, 2006). Fire-protected habitats, such as drainage lines, rocky outcrops and termitaria are typically dominated by denser, shrub-dominated vegetation (Mucina & Rutherford, 2006).

7.2.3.1.1 IMPORTANT PLANT TAXA IN THE MARIKANA THORNVELD

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Marikana Thornveld vegetation type:

Tall Tree: *Senegalia burkei*.

Small Trees: *Senegalia caffra, Vachellia gerrardii, Vachellia karroo, Combretum molle, Searsia lancea, Ziziphus mucronata, Vachellia nilotica, Vachellia tortilis subsp. heteracantha, Celtis africana, Dombeya rotundifolia, Pappea capensis, Peltophorum africanum, Terminalia sericea*.

Tall Shrubs: *Euclea crispa subsp. crispa, Olea europaea subsp. africana, Searsia pyroides var. pyroides, Diospyros lycioides subsp. guerkei, Ehretia rigida subsp. rigida, Euclea undulata, Grewia flava, Pavetta gardeniifolia*.

Low Shrubs: *Asparagus cooperi, Rhynchosia nitens, Indigofera zeyheri, Justicia flava*.

Woody Climbers: *Clematis brachiata, Helinus integrifolius*.

Herbaceous Climbers: *Pentarrhinum insipidum, Cyphostemma cirrhosum*.

Graminoids: *Elionurus muticus, Eragrostis lehmanniana, Setaria sphacelata, Themeda triandra, Aristida scabrivalvis subsp. scabrivalvis, Fingerhuthia africana, Heteropogon contortus, Hyperthelia dissoluta, Melinis nerviglumis, Pogonarthria squarrosa*.

Herbs: *Hermannia depressa, Ipomoea obscura, Barleria macrostegia, Dianthus mooiensis subsp. mooiensis, Ipomoea oblongata, Vernonia oligocephala*.

Geophytic Herbs: *Ledebouria revoluta, Ornithogalum tenuifolium, Sansevieria aethiopica*.

7.2.3.1.2 CONSERVATION STATUS

According to Mucina and Rutherford (2006), this vegetation type is classified as Endangered, with its national conservation target being 19%. Over 48% has already been transformed by urban expansion and cultivation, and alien invasive plants occur in high densities, especially along drainage lines (Mucina & Rutherford, 2006). Erosion is very low to moderate (Mucina & Rutherford, 2006). Less than 1% is conserved in the Magaliesberg Nature Area, De Onderstepoort Nature Reserve and other reserves. Erosion is very low to moderate (Mucina & Rutherford, 2006).

7.2.3.2 EXPECTED FLORA SPECIES

The POSA database indicates that 318 species of indigenous plants are expected to occur within the PAOI. No SCC are expected to occur within the PAOI based on the POSA database. The Screening Tool did not list any flora SCC for the PAOI.

7.2.3.3 FIELD ASSESSMENT

This section details the observations recorded during an on-site field survey conducted to ground truth the habitat and floral features of the PAOI. These observations pertain largely to the current state of the area, which has been affected by the unauthorised land clearing. The field survey for the PAOI was conducted on the 15th and 16th of April 2025. During the survey the floral communities surrounding the project development footprint were assessed and photographs were captured.

7.2.3.4 FLORA ASSESSMENT

The Precautionary Principle is a critical approach in biodiversity surveys for environmental assessments, particularly when the status of biodiversity receptors cannot be precisely determined. This principle operates on the assumption that the sensitivity of these biodiversity receptors is high, thereby ensuring that any potential risks to ecosystems and species are minimised. By adopting this cautious stance, environmental assessments prioritise the protection of biodiversity, even in the face of scientific uncertainty. This approach is essential for maintaining ecological integrity, as it prevents irreversible damage to biodiversity that might occur if the sensitivity of receptors were underestimated (Cooney, 2004). For example, in scenarios involving habitat destruction or the introduction of new species, the Precautionary Principle necessitates comprehensive impact assessments and the implementation of robust mitigation measures to protect sensitive biodiversity receptors (Raffensperger and Tickner, 1999). Consequently, the Precautionary Principle serves as a guiding framework for environmental decision-making, promoting sustainable development and conservation efforts by assuming high sensitivity of biodiversity receptors and prioritising their protection.

In the case of this assessment, the Precautionary Principle is applied when assuming the state of the habitats on site prior to vegetation clearing, as well as the vegetation composition. In the absence of seeing the site prior to clearing, it can be assumed that the vegetation that was cleared was largely indigenous, albeit degraded.

The PAOI was composed predominantly of degraded and modified areas. Assessment of the habitats surrounding the Impacted Areas suggests that the natural areas within the PAOI were originally composed of Degraded Thornveld habitat.

High numbers of alien and invasive plant species were recorded throughout the PAOI and pose a serious threat to the natural habitats in and around the PAOI. Dominant alien and invasive plant species include, *Tagetes minuta, Bidens pilosa, Solanum seaforthianum, Xanthium strumarium, Datura ferox, Argemone ochroleuca, Datura stramonium, Campuloclinium macrocephalum, Flaveria bidentis, Lantana camara, Ipomoea purpurea* and *Melia azedarach*. These high numbers necessitate the implementation of an Alien Invasive Plant (AIP) management plan.

No flora SCCs were recorded from the PAOI, and none are expected. One nationally protected tree species was recorded from the site, *Sclerocarya birrea* (Marula), which is protected under the National Forests Act of 1998 (Act 84 of 1998). Any individuals recorded during a protected plant walkdown are not to be disturbed in any way without acquiring the relevant permits for their relocation or destruction. It is possible that individuals of this species were removed during the unauthorised vegetation clearing.

A list of the species recorded from the surrounding area can be found at https://www.inaturalist.org/projects/clover-alloys. Some examples of indigenous flora species recorded in and around the PAOI can be seen depicted in Figure 28 and some examples of the alien and invasive plant species recorded from the PAOI can be seen depicted in Figure 29.

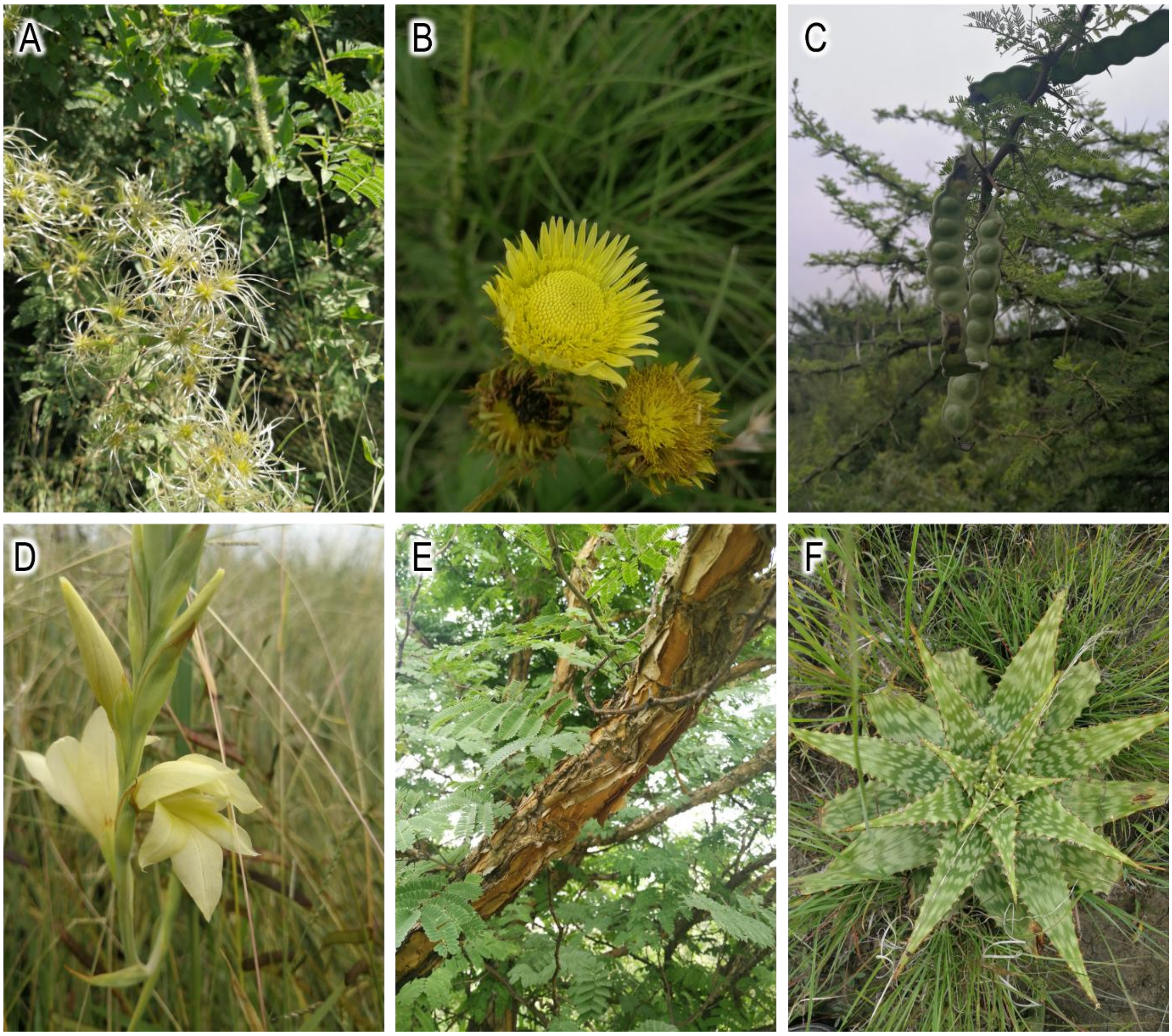


Figure 28: Photographs presenting some of the indigenous flora species recorded from and around the PAOI: A) *Clematis brachiata,* B) *Berkheya radula*, C) *Vachellia nilotica,* D) *Gladiolus sericeovillosus ssp. calvatus and* E) *Senegalia galpinii* and F) *Aloe davyana.*

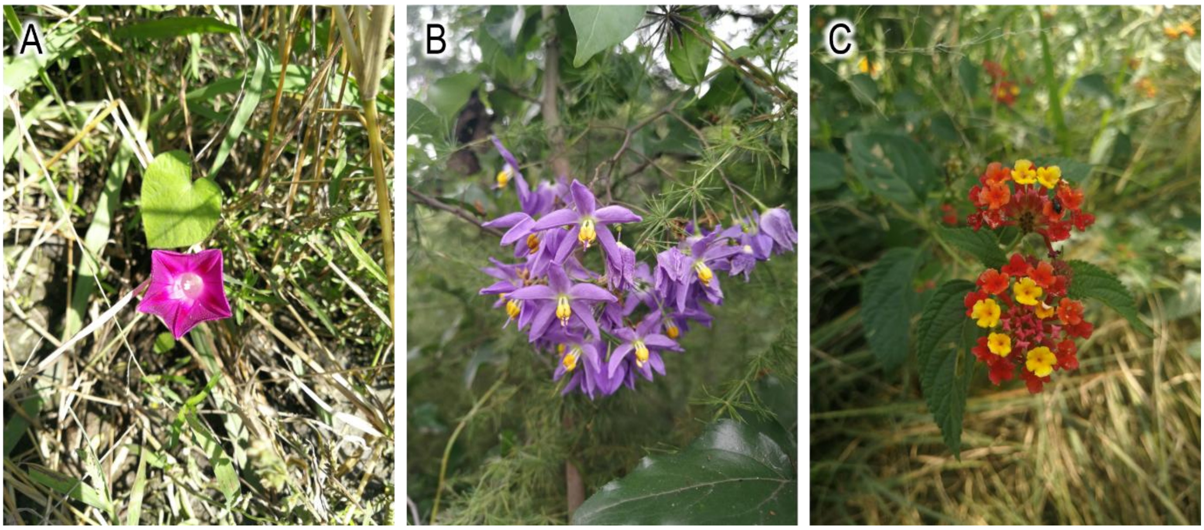


Figure 29: Photographs presenting some of the alien and invasive plant species recorded from the PAOI: A) *Ipomoea purpurea*, B) *Solanum seaforthianum,* and C) *Lantana camara.*

7.2.4 FAUNA

7.2.4.1 MAMMALS

The MammalMAP database lists 73 non-volant mammal species that could be expected to occur within the area. This list excludes large mammal species that are normally restricted to protected areas. Thirteen of these expected species are regarded as SCC (Table 15). No species were listed by the Screening Tool.

Table 15: List of mammal Species of Conservation Concern that may occur in the PAOI. EN = Endangered, NT = Near Threatened, LC = Least Concern and VU = Vulnerable.

Scientific name	Common name	Screening Tool	Red list		Likelihood of Occurrence	Reason
			SANBI	IUCN		
Aonyx capensis	Cape Clawless Otter	-	NT	NT	Moderate	Some suitable habitat present on site
Atelerix frontalis	South African Hedgehog	-	NT	LC	Moderate	Some suitable habitat present on site
Crocidura maquassiensis	Makwassie Musk Shrew	-	VU	-	Moderate	Some suitable habitat present on site
Crocidura mariquensis	Swamp Musk Shrew	-	NT	LC	Moderate	Some suitable habitat present on site
Dasymys robbertsii	African Marsh Rat	-	NT	LC	Low	No suitable habitat present on site

Scientific name	Common name	Screening Tool	Red list SANBI	Red list IUCN	Likelihood of Occurrence	Reason
Felis nigripes	Black-footed Cat	-	VU	VU	Low	No suitable habitat present on site
Hydrictis maculicollis	Spotted-necked Otter	-	VU	NT	Low	No suitable habitat present on site
Mystromys albicaudatus	White-tailed Rat	-	VU	EN	Low	No suitable habitat present on site
Ourebia ourebi	Oribi	-	EN	LC	Low	No suitable habitat present on site
Panthera pardus	Leopard	-	VU	VU	Low	No suitable habitat present on site
Parahyaena brunnea	Brown Hyaena	-	NT	NT	Low	No suitable habitat present on site
Pelea capreolus	Grey Rhebok	-	NT	LC	Low	No suitable habitat present on site
Redunca fulvorufula	Mountain Reedbuck	-	EN	LC	Low	No suitable habitat present on site

7.2.4.2 REPTILES

Based on the ReptileMAP database, 66 reptile species are expected to occur within the area. No reptile SCCs are expected to occur within the area. No species were listed by the Screening Tool.

7.2.4.3 AMPHIBIANS

Based on the FrogMap database, 22 amphibian species are expected to occur within the area No amphibian SCCs are expected to occur within the area. No species were listed by the Screening Tool.

7.2.4.4 AVIFAUNA

The SABAP2 database lists 359 avifauna species that could be expected to occur within the PAOI and surrounding landscape. Twenty-one (21) of these expected species are regarded as SCC (Table 16). No species were listed by the Screening Tool.

Table 16: List of avifauna Species of Conservation Concern that may occur in the PAOI. EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable.

Scientific Name	Common Name	Screening Tool	RED List SANBI	RED List IUCN	Likelihood of Occurrence	Reason
Alcedo semitorquata	Kingfisher, Half-collared	-	VU	LC	Low	No suitable habitat on site

Scientific Name	Common Name	Screening Tool	RED List		Likelihood of Occurrence	Reason
			SANBI	IUCN		
Anas erythrorhyncha	Teal, Red-billed	-	NT	LC	High	Suitable habitat on site
Anas undulata	Duck, Yellow-billed	-	NT	LC	High	Suitable habitat on site
Anhinga rufa	Darter, African	-	NT	LC	Low	No suitable habitat on site
Aquila rapax	Eagle, Tawny	-	EN	VU	Low	No suitable habitat on site
Aquila verreauxii	Eagle, Verreaux's	-	VU	LC	Low	No suitable habitat on site
Ardea alba	Egret, Great	-	NT	LC	Moderate	Some suitable habitat on site
Asio capensis	Owl, Marsh	-	NT	LC	Moderate	Some suitable habitat on site
Calidris ferruginea	Sandpiper, Curlew	-	VU	VU	Low	No suitable habitat on site
Charadrius pecuarius	Plover, Kittlitz's	-	NT	LC	Low	No suitable habitat on site
Ciconia nigra	Stork, Black	-	EN	LC	Low	No suitable habitat on site
Dendrocygna bicolor	Duck, Fulvous Whistling	-	NT	LC	Low	No suitable habitat on site

Scientific Name	Common Name	Screening Tool	RED List		Likelihood of Occurrence	Reason
			SANBI	IUCN		
Elanus caeruleus	Kite, Black-winged	-	NT	LC	High	Suitable habitat on site
Eupodotis senegalensis	Bustard, White-bellied	-	VU	LC	Low	No suitable habitat on site
Falco biarmicus	Falcon, Lanner	-	NT	LC	High	Suitable habitat on site
Falco naumanni	Kestrel, Lesser	-	VU	LC	Low	No suitable habitat on site
Glareola nordmanni	Pratincole, Black-winged	-	LC	NT	Low	No suitable habitat on site
Gyps africanus	Vulture, White-backed	-	CR	CR	Low	No suitable habitat on site
Gyps coprotheres	Vulture, Cape	-	VU	VU	Moderate	Some suitable habitat on site
Hydropogne caspia	Tern, Caspian	-	VU	LC	Low	No suitable habitat on site
Mirafra cheniana	Lark, Melodious	-	NT	LC	Low	No suitable habitat on site
Mycteria ibis	Stork, Yellow-billed	-	VU	LC	Low	No suitable habitat on site
Netta erythrophthalma	Pochard, Southern	-	NT	LC	Low	No suitable habitat on site
Nycticorax nycticorax	Heron, Black-crowned Night	-	NT	LC	Moderate	Some suitable

Scientific Name	Common Name	Screening Tool	RED List SANBI	IUCN	Likelihood of Occurrence	Reason
						habitat on site
Oxyura maccoa	Duck, Maccoa	-	VU	EN	Low	No suitable habitat on site
Phoeniconaias minor	Flamingo, Lesser	-	VU	NT	Low	No suitable habitat on site
Phoenicopterus roseus	Flamingo, Greater	-	NT	LC	Low	No suitable habitat on site
Podiceps cristatus	Grebe, Great Crested	-	VU	LC	Low	No suitable habitat on site
Polemaetus bellicosus	Eagle, Martial	-	EN	EN	Moderate	Some suitable habitat on site
Pterocles gutturalis	Yellow-throated Sandgrouse	-	NT	LC	High	Suitable habitat on site
Sagittarius serpentarius	Secretary bird	-	VU	EN	Moderate	Some suitable habitat on site
Sarkidiornis melanotos	Duck, Knob-billed	-	NT	LC	Low	No suitable habitat on site
Scopus umbretta	Hamerkop	-	NT	LC	High	Suitable habitat on site
Spatula smithii	Shoveler, Cape	-	NT	LC	Low	No suitable habitat on site
Thalassornis leuconotus	Duck, White-backed	-	NT	LC	Low	No suitable habitat on site

7.2.4.5 FIELD ASSESSMENT

This section details the observations recorded during an on-site field survey conducted to ground truth the habitat and floral features of the PAOI. These observations pertain largely to the current state of the area, which has been affected by the unauthorised land clearing. The field survey for the PAOI was conducted on the 15th and 16th of April 2025. During the survey the floral communities surrounding the project development footprint were assessed and photographs were captured.

7.2.4.5.1 FAUNA ASSESSMENT

Some common fauna species (LC) were recorded from the PAOI during the survey, including *Xerus inauris* (Cape Ground Squirrel), *Cynictis penicillata* (Yellow Mongoose) and *Atilax paludinosus* (Marsh Mongoose). Additional common species are expected.

Common avifauna species (LC) were recorded for the site, including *Merops bullockoides* (White-fronted Bee-eater), *Vanellus coronatus* (Crowned Lapwing), *Bostrychia hagedash* (Hadeda Ibis), *Spilopelia senegalensis* (Laughing Dove), *Cisticola juncidis* (Zitting Cisicola), *Euplectes albonotatus* (White-winged Widow Bird), *Trachyphonus vaillantii* (Crested Barbet) and *Corythaixoides concolor* (Grey Go-away-bird). Many more common avifauna species are expected for the PAOI.

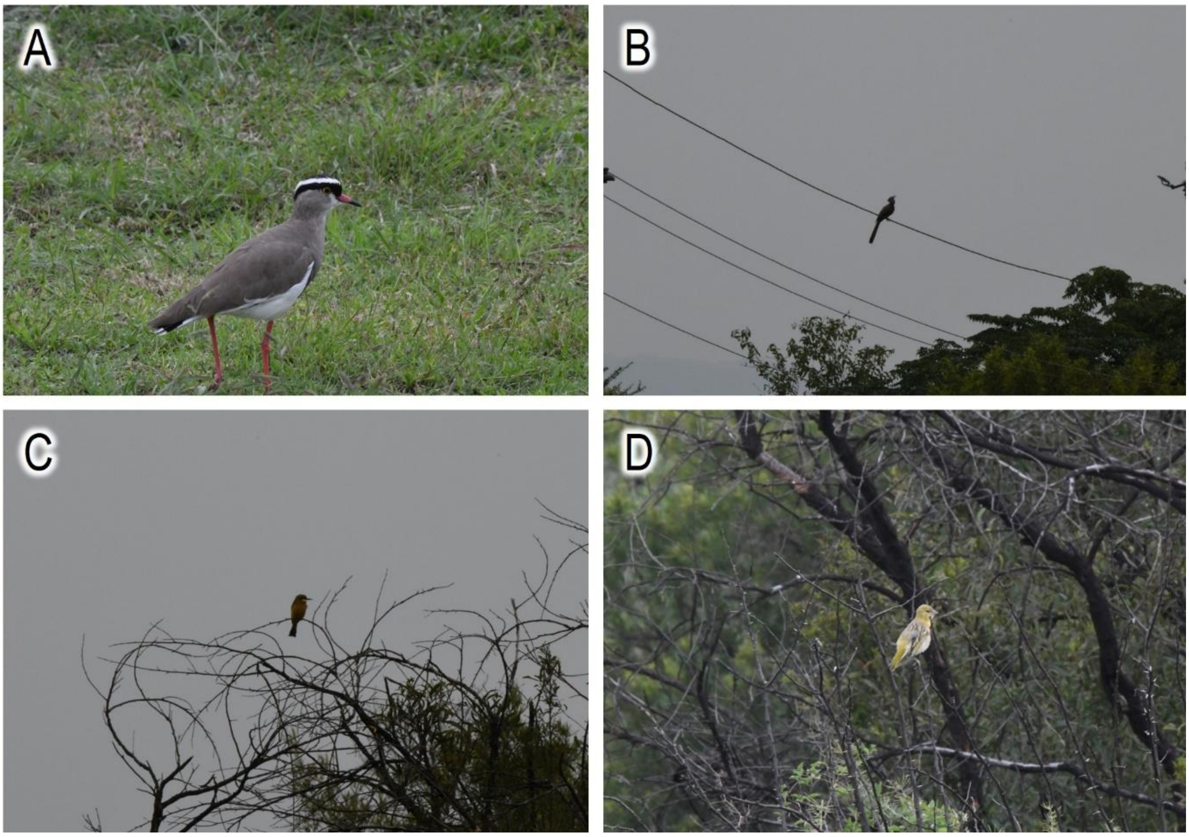


Figure 30: Photographs presenting some of the avifauna species recorded from in and around the PAOI: A) *Vanellus coronatus* (Crowned Lapwing), B) *Corythaixoides concolor* (Grey Go-away-bird), C) *Merops bullockoides* (White-fronted Bee-eater) and D) *Ploceus velatus* (Southern Masked Weaver).

7.2.5 HABITATS

The habitat survey is conducted in a manner that utilises the data collected from the PAOI and surrounds (during the field survey), as well as satellite imagery between 2004 and 2025, to make assumptions on the state of the habitats prior to land clearing. The Precautionary Approach is applied here when assuming the state of the habitats expected on site prior to unauthorised vegetation clearing.

The main habitat types identified across the PAOI were initially identified largely based on aerial imagery from 2024, before the area was cleared of vegetation in preparation for development. These main habitat types were then refined based on the field coverage and data collected during the survey.

- Three (3) main habitat types were identified across the PAOI and include:
- Degraded Thornveld (Figure 32);
- Water Resource (Figure 33); and
- Modified (Figure 34).

The habitat units delineated for the pre-development PAOI can be seen presented in Figure 31 and a description of the habitat units can be found in Table 17.

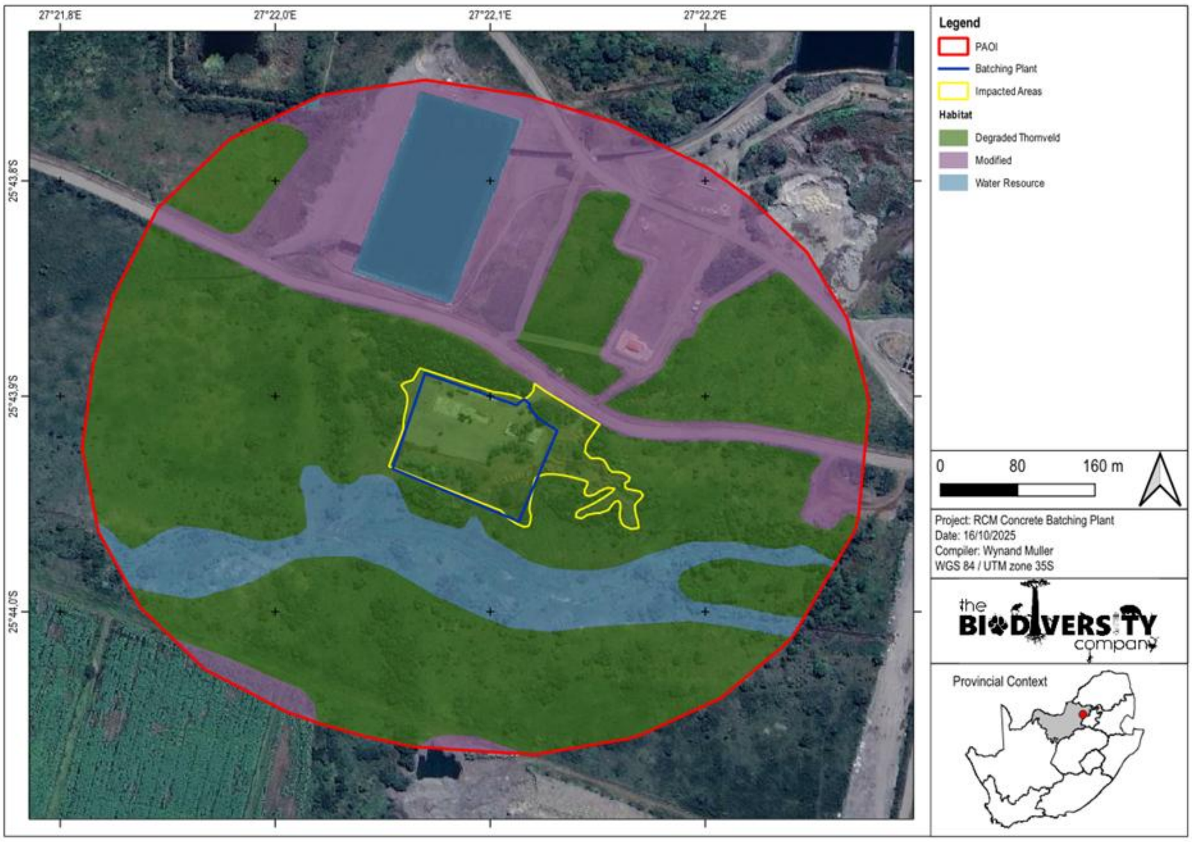


Figure 31: Map illustrating the pre-clearing habitats delineated for the PAOI.

Table 17: Table providing descriptions of the habitat units delineated for the PAOI.

Habitat	Description and Condition
Degraded Thornveld	This habitat unit is characterised by thornveld habitat that has experienced severe levels of degradation owing to the ongoing mining activities in the area, as well as nearby agricultural practices. This habitat unit exists in small, fragmented patches that experience frequent human ingress, and the associated impacts, such as littering and illegal dumping. Bush encroachment *by Dichrostachys cinerea* and *Vachellia tortilis* in some areas is so dense that it is impenetrable. This habitat unit also experiences invasions and infestations by alien and invasive plant species, such as *Tagetes minuta, Bidens pilosa, Solanum seaforthianum, Xanthium strumarium, Datura ferox, Argemone ochroleuca, Datura stramonium,*

Habitat	Description and Condition
	Campuloclinium macrocephalum, Tecoma stans, Flaveria bidentis, Lantana camara, Ipomoea purpurea and *Melia azedarach*. This habitat unit has lost much of its functionality and can be considered a poor representation of the Marikana Thornveld which it once was. Without active rehabilitation, it will continue to degrade further until it eventually loses all functionality, as it has done in some areas. Dominant species within this habitat unit, apart from those listed above, include; *Themeda triandra, Aristida congesta, Paspalum urvillei, Aristida diffusa, Hyparrhenia hirta, Setaria sphacelata, Cymbopogon caesius, Heteropogon contortus, Hilliardiella elaeagnoides, Aloe davyana* and *Vachellia robusta*. No flora or fauna SCC were recorded and none are expected for this habitat unit.
Water Resource	This is a non-terrestrial habitat made up of wetlands, drainage features, and artificial dams within the PAOI. This habitat unit is associated with hydrophytes and provides habitat for many fauna species, as well as an important source of water for fauna passing through the area. It is associated with high levels of degradation due to the ongoing mining and agricultural activities in the area, as well as human ingress. No fauna or flora SCC were recorded and none are expected. Additional information regarding this habitat unit may be found in the accompanying wetland assessment (TBC, 2025).
Modified	This habitat unit includes all areas that maintain little to no native vegetation and/or where anthropogenic activity has substantially modified an area's primary ecological functions and species composition. Within the PAOI, these areas are mostly comprised of the concrete batching plant area (post-clearing only), the associated infrastructure, existing roads and mining infrastructure. These areas include very few, if any, indigenous species and are associated with alien and invasive plant species. No fauna or flora SCC were observed, and none are expected for the habitat unit.

Figure 32: Photograph illustrating the Degraded Thornveld habitat type.

Figure 33: Photographs illustrating the Water Resource habitat type.

Figure 34: Photographs illustrating the Modified habitat type.

7.2.5.1 SITE ECOLOGICAL IMPORTANCE

7.2.5.1.1 DESKTOP ECOLOGICAL SENSITIVITY

Based on the criteria provided in Appendix B of the TBC report, the delineated habitat types have been allocated a sensitivity category, or SEI, and this breakdown is presented in Table 18 below. To identify and spatially present sensitive features in terms of the relevant specialist discipline, the sensitivity of the habitat type delineated within the PAOI is mapped in Figure 35. Take note that these sensitivities apply to the pre-clearance habitats.

It is important to note that the map does not replace any local, provincial, or national government legislation relating to these areas or the land use capabilities or sensitivities of these environments.

Table 18: Summary of the PAOI Site Ecological Importance (SEI) prior to clearance.

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity Importance	Project Component in relation to habitat type	Receptor Resilience	Site Ecological Importance Guidelines
Degraded Thornveld	High	Low	Medium	Concrete Batching Plant	High	Low
	Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type	Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area.			Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality.	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Water Resource (Pollution Control Dam & Collection Dam)	Low	Medium	Low	Concrete Batching Plant	Medium	Low
	< 50% of receptor contains natural habitat with limited potential to support SCC.	Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.			Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality.	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
	High	Low	Medium		Medium	Medium

Habitat Type	Conservation Importance	Functional Integrity	Biodiversity Importance	Project Component in relation to habitat type	Receptor Resilience	Site Ecological Importance Guidelines
Water Resource: (HGM 1 – Unchannelled Valley-bottom)	Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type	Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area		Concrete Batching Plant	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities
Modified	Very Low	Low	Very Low	Concrete Batching Plant	High	Very Low
	No natural habitat remaining.	Several minor and major current negative ecological impacts.			Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

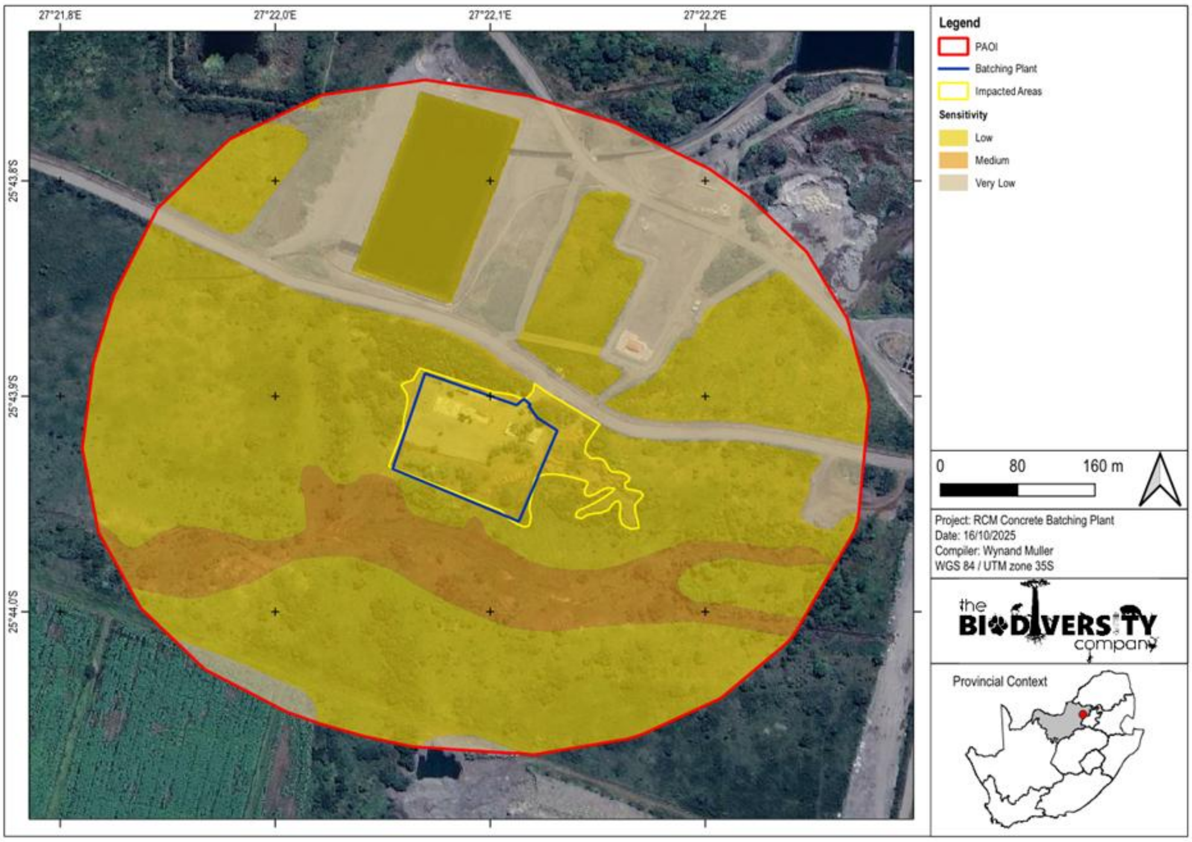


Figure 35: Map illustrating Site Ecological Importance (SEI) of the habitat types within the PAOI prior to clearance.

Consider the following guidelines when interpreting SEI in the context of any proposed development or disturbance activities (noted in conjunction with provincial guidelines pertaining to CBA areas):

- Medium: Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
- Low: Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
- Very Low: Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

7.2.5.2 SCREENING TOOL COMPARISON

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

Terrestrial Biodiversity Theme sensitivity is 'Very High' for the development area, due to it overlapping with a CBA 2, NPAES Priority Focus Area and Endangered Marikana Thornveld vegetation type (Figure 36);

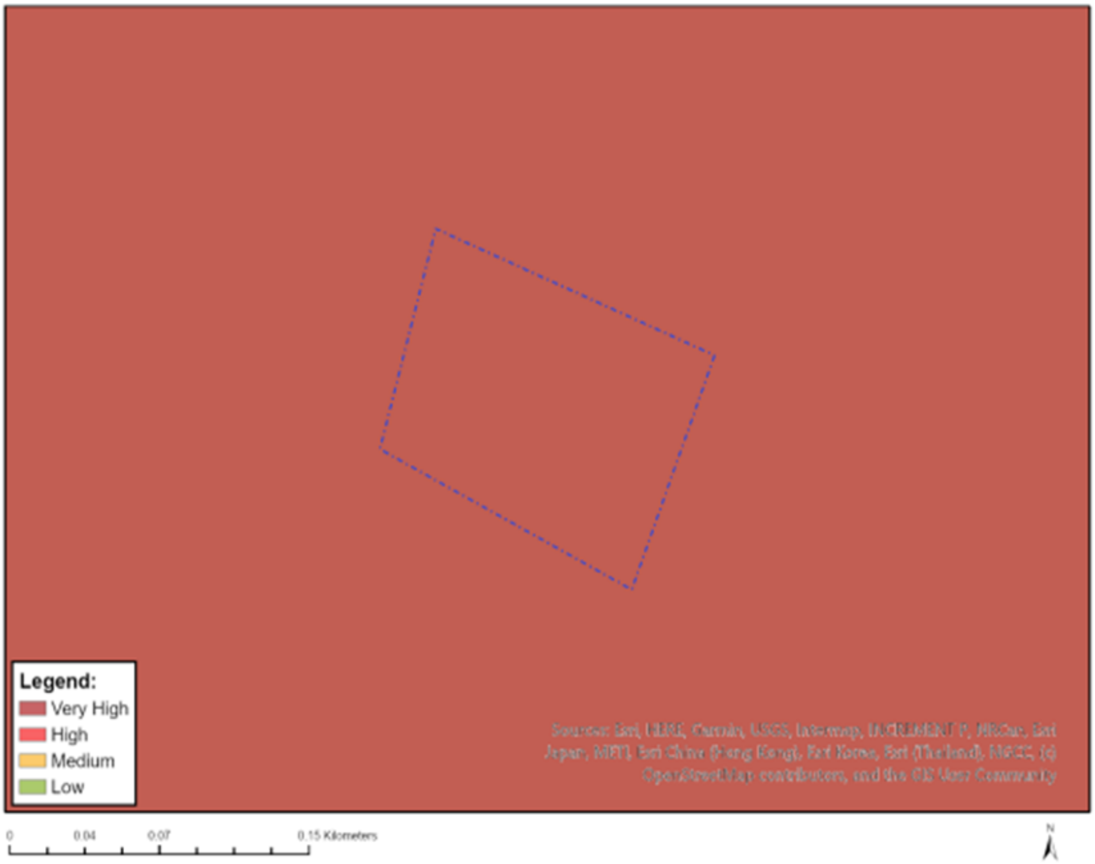
Plant Species Theme sensitivity is 'Low' due to the unlikely presence of flora SCC (Figure 37); and

Animal Species Theme sensitivity is 'Low' due to the unlikely presence of fauna SCC (Figure 38).

The completion of the terrestrial biodiversity desktop and field assessments disputes the 'Very High' sensitivity presented by the screening report for the PAOI, for both periods immediately before and after the development. A sensitivity of 'Low' has been assigned to the Degraded Grassland habitat. Water Resource habitats range from 'Low' to 'Medium' sensitivity. Modified habitats receive a 'Very Low' sensitivity due to their modified nature.

The Plant Species Theme will retain its low sensitivity due to a low likelihood that plant SCC will occur on site. The Animal Species Theme will instead be assigned a medium sensitivity as several avifauna SCC have a high likelihood of occurring in the habitats within the PAOI, but are unlikely to be severely impacted by the project activities and will remain on site during the operational phase.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	CBA2
Very High	National Protected Area Expansion Strategy (NPAES)
Very High	EN_Marikana Thornveld

Figure 36: Relative Terrestrial Biodiversity Theme Sensitivity for the PAOI.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

Figure 37: Relative Plant Species Theme Sensitivity for the PAOI.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Subject to confirmation

Figure 38: Relative Animal Species Theme Sensitivity for the PAOI.

7.2.6 WETLANDS

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 19. Only features that were identified to be relevant to the proposed project were further discussed.

Table 19: Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant – PAOI overlaps with SAIIAE wetlands.
National Freshwater Priority Area	Relevant – PAOI overlaps with NFEPA wetlands.
Provincial Conservation Plan	Relevant – The PAOI overlaps with Aquatic ESA's.
Strategic Water Source Areas	Relevant – The PAOI overlap with a SWSA.

7.2.6.1 SOUTH AFRICAN INVENTORY OF INLAND AQUATIC ECOSYSTEMS

A single wetland type was identified within the PAOI by the use of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), which was classified as one depression wetland (Figure 39). The wetlands condition as per the dataset is "A/B - Natural / Largely Natural". The depression is classified as "Least Concern" with regard to Ecosystem Threat Status and "Poorly Protected" with regard to Ecosystem Protection Level.

7.2.6.1.1 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS

The National Freshwater Ecosystem Priority Areas dataset identified three unchannelled valley-bottom and one channelled valley-bottom within the PAOI (Figure 39). All the unchannelled valley-bottom wetlands were classified as being artificial, whereas the channelled valley-bottom was classified as natural according to the dataset. The channelled valley-bottom was classified as having a "C – Moderately Modified" condition and unchannelled valley-bottoms as having a "Z3 – Heavily to Critically Modified" condition.

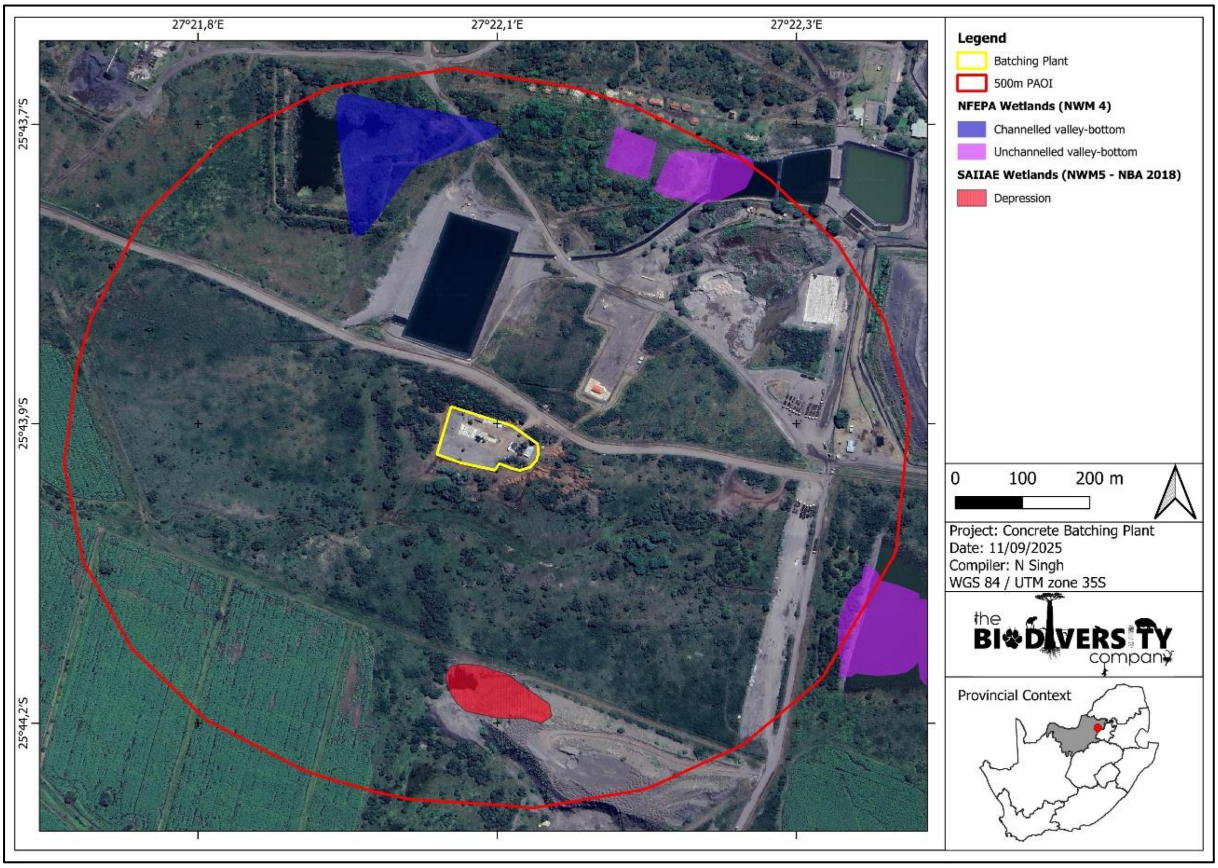


Figure 39: Wetland features identified within the project area of influence according to the South African Inland Inventory of Aquatic Ecosystems and National Freshwater Ecosystem Priority Areas dataset.

7.2.6.1.2 PROVINCIAL CONSERVATION PLAN

The North West Biodiversity Sector Plan (READ, 2015) classifies areas within the province on the basis of their contributions to reaching the associated conservation targets within the province. These areas are primarily classified as either Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole.

CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).

ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

Provincial CBAs and ESAs are often further classified into sub-categories, such as CBA 1 and CBA 2 or ESA 1 and ESA 2. These present fine scale habitat and biodiversity area baseline requirements and associated land management objectives or outcomes. The highest categorisation level is often referred to as an 'Irreplaceable Critical Biodiversity Area' which usually represents pristine natural habitat that is very important for conservation.

According to the North West BSP dataset for aquatic biodiversity (Figure 40) the PAOI overlaps with ESA 1 and ESA 2 areas.

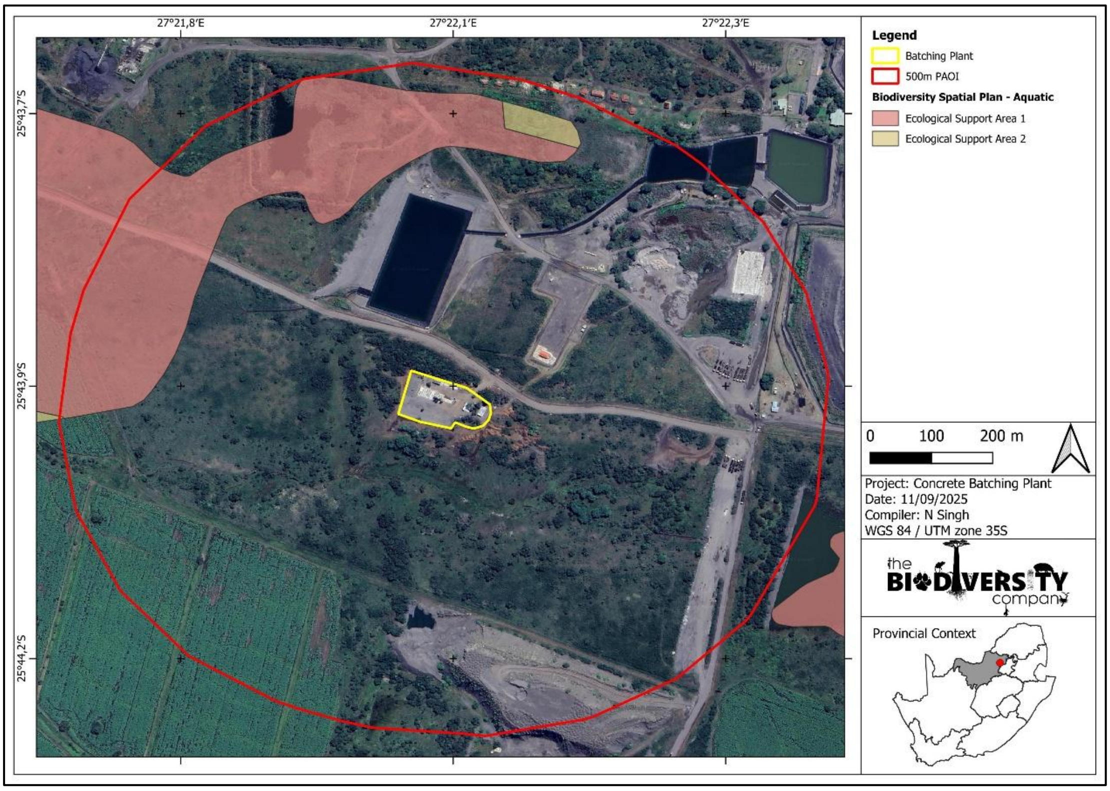


Figure 40: Map illustrating the project area of influence in relation to the North West Biodiversity Sector Plan for aquatic biodiversity.

7.2.6.1.3 STRATEGIC WATER SOURCE AREAS

Strategic Water Source Areas (SWSAs) are areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. The areas supplying ≥ 50% of South Africa's water supply (which were represented by areas with a mean annual runoff of ≥ 135 mm/year) represent national Strategic Water Source Areas (SANBI, 2013). Groundwater and interflow play a key role in sustaining surface water flows during the dry season and account for up to 42% of river baseflow, thereby sustaining aquatic and water-dependent biota. Therefore, the protection and management of these areas are imperative (Le Maitre et al., 2018).

According to the SWSAs of South Africa, Lesotho and Swaziland, the proposed site PAOI is overlapping with the Kroondal / Marikana groundwater SWSA (Figure 41).

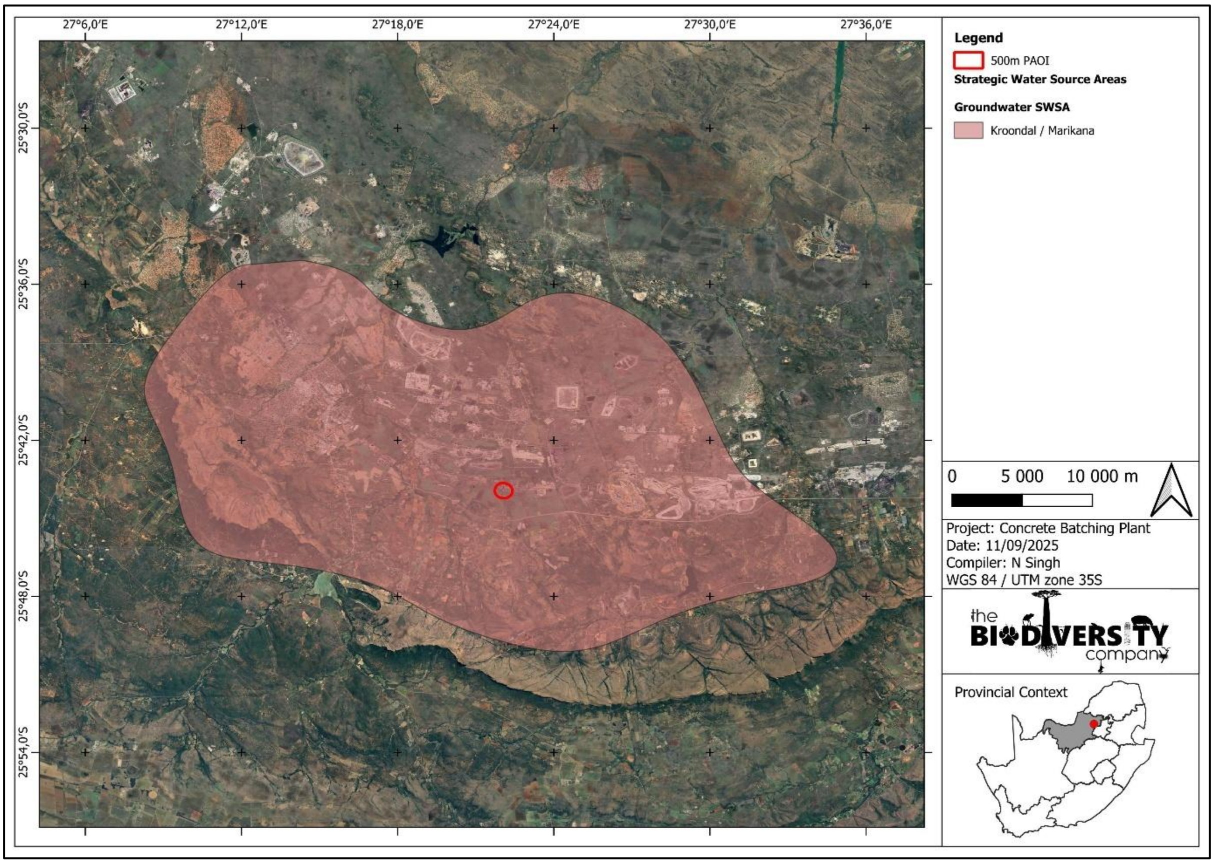


Figure 41: Strategic Water Source Areas overlapping with the project area of influence.

7.2.6.2 WETLAND ASSESSMENT

7.2.6.2.1 DELINEATION

One (1) Hydrogeomorphic (HGM) unit was identified within the encompassing 500 m PAOI. This unit was classified as an unchannelled valley-bottom wetland (HGM 1; Figure 42 and Figure 43). Additionally, several artificial features were identified and classified as an artificial channel, artificial seeps, a collection dam, an in-stream dam and, a pollution control dam. Not of the features occur directly within the Batching Plant boundary however, HGM 1 is located less than 55 m downslope of the Batching Plant.

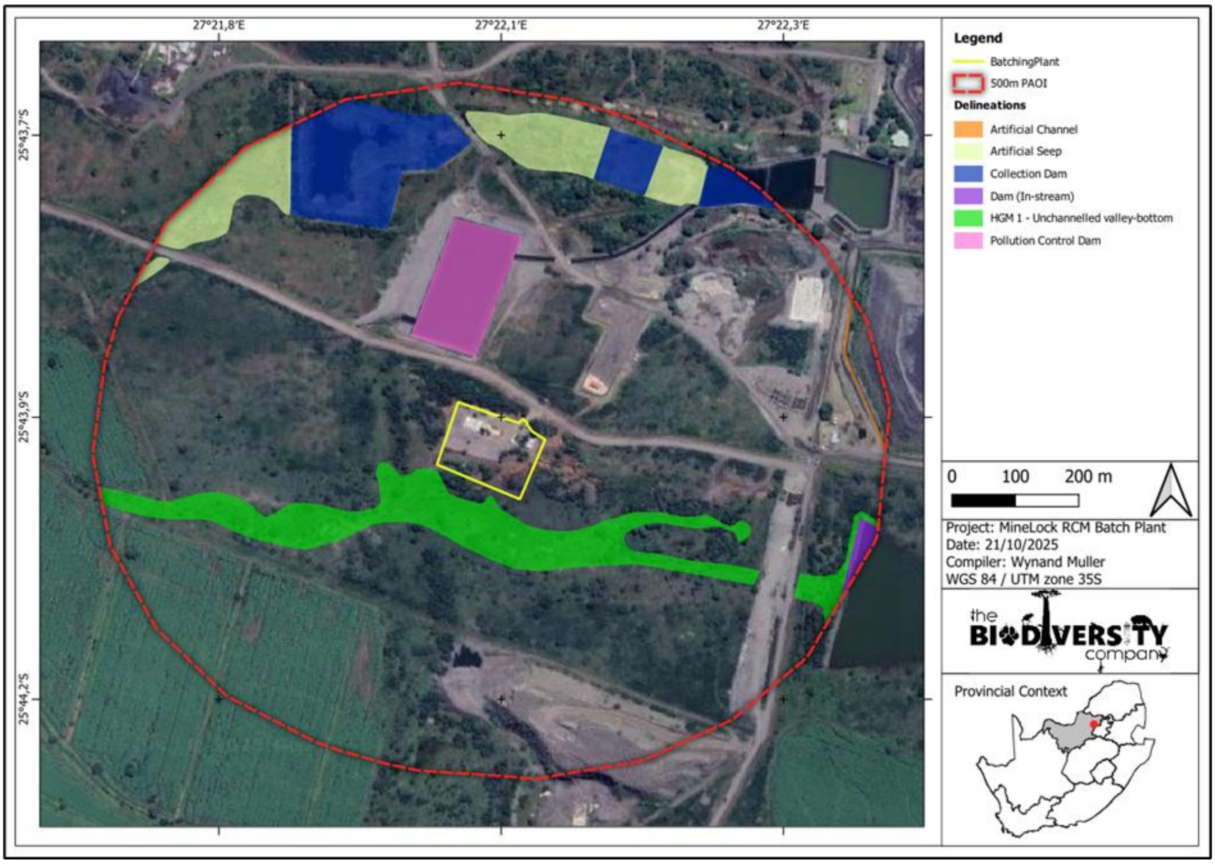


Figure 42: Delineation of wetland features within the project area of influence.

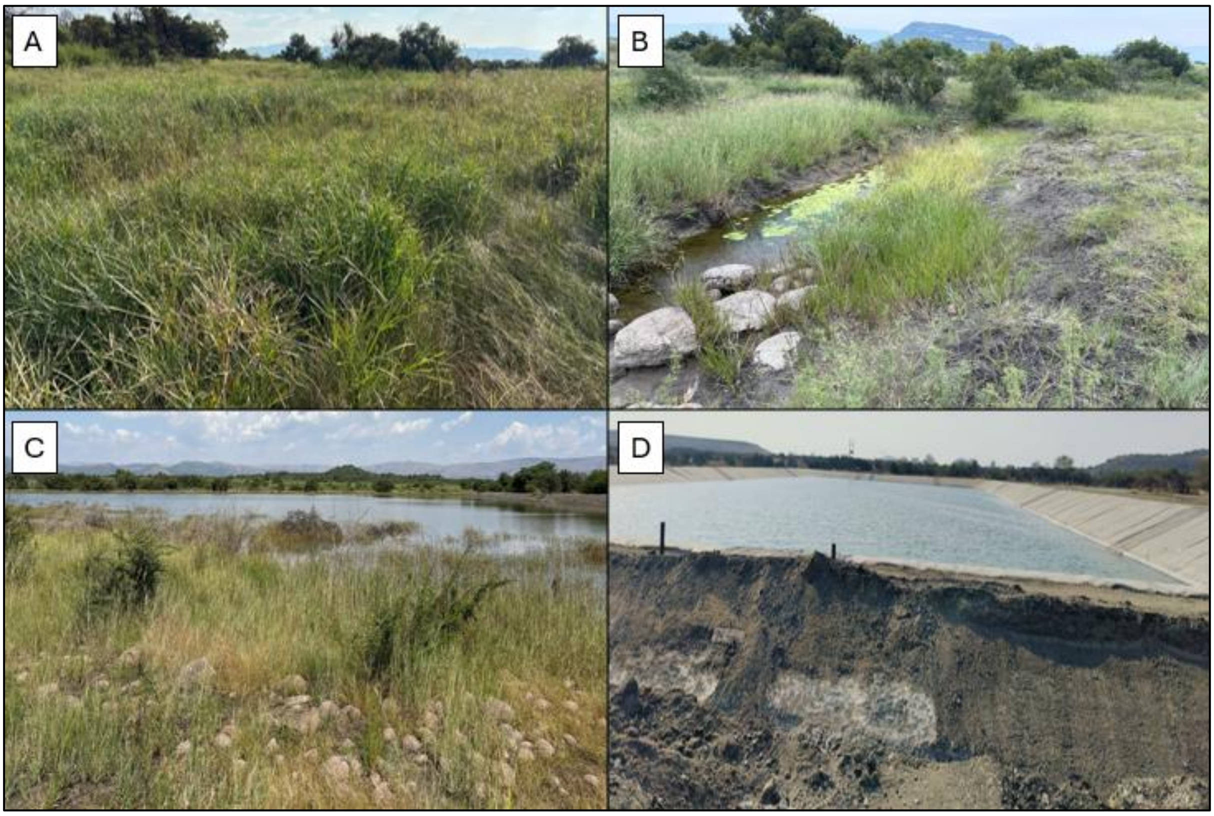


Figure 43: Representative photographs of the different wet areas within the project area. A & B) HGM 1; C) Instream Dam and; D) Pollution Control Dam.

7.2.6.2.2 CLASSIFICATION AND DESCRIPTION

The watercourse feature classification as per SANBI guidelines (Ollis *et al.,* 2013) is presented in Table 20.

Table 20: Classification as per SANBI guideline (Ollis et al., 2013).

Wetland Unit	Level 1	Level 2		Level 3	Level 4		
	System	**DWS Ecoregion/s**	**NFEPA Wet Veg Group/s**	**Landscape Unit**	**4A (HGM)**	**4B**	**4C**
HGM 1	Inland	Bushveld Basin	Central Bushveld Group 2	Valley Floor	Unchannelled valley-bottom	N/A	N/A

An unchannelled valley-bottom wetland, is a wetland located on a valley floor, characterised by the absence of a distinct river channel (Ollis *et al.,* 2013). These wetlands are defined by their diffuse water flows, which are not confined within channel banks, allowing water to spread across the valley floor. The primary water inputs for unchannelled valley-bottom wetlands include diffuse surface and subsurface flows from upstream channels that lose confinement, as well as seepage from adjacent valley side-slopes. The hydrodynamics of these wetlands are dominated by horizontal, unidirectional, diffuse surface flow, although infiltration and evapotranspiration can also be significant. This setting allows unchannelled valley-bottom wetlands to function as important sites for sediment deposition, water filtration, and habitat provision, supporting a diverse range of plant and animal species. Their unique hydrological and geomorphological characteristics make them vital components of the landscape, contributing to the overall ecological health of the valley systems in which they occur. Figure 44 presents a diagram of a typical unchannelled valley-bottom wetland, showing the dominant movement of water into, through and out of the system.

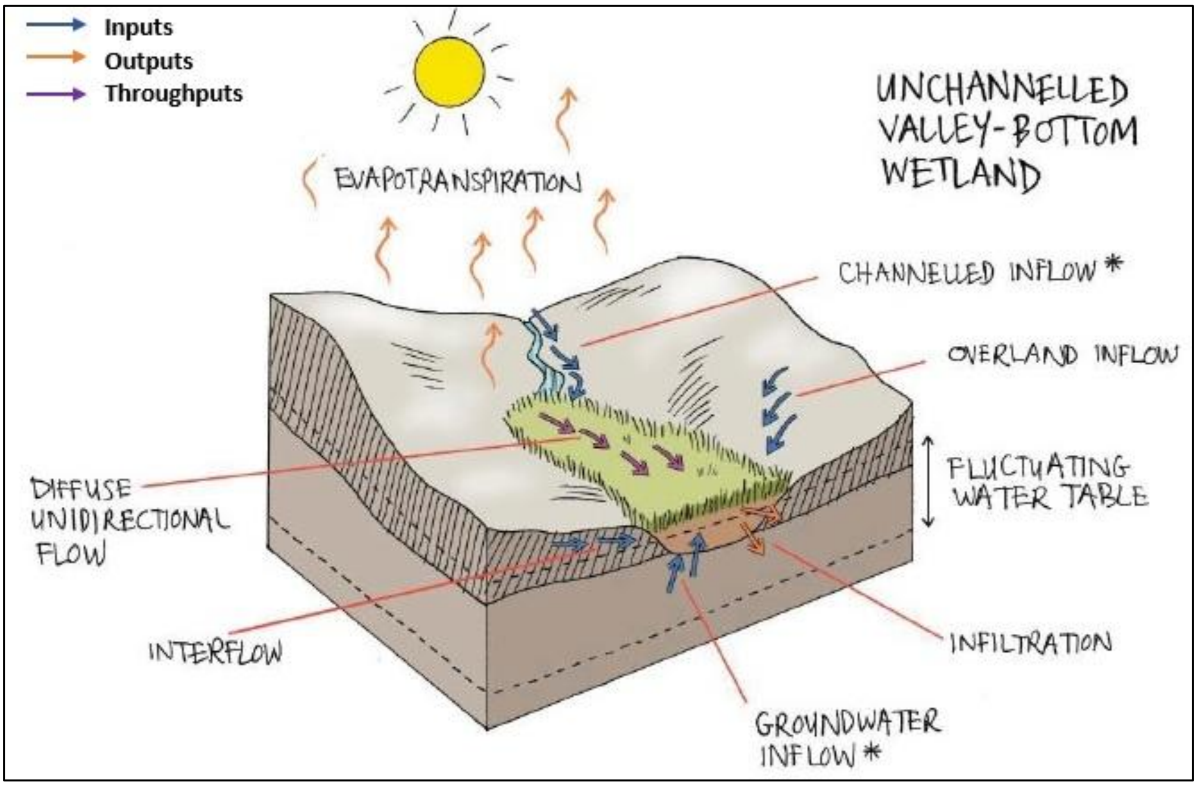


Figure 44: Amalgamated diagram of a typical unchannelled valley bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis *et al.*, 2013).

7.2.6.2.3 WETLAND AREA

The total wetland area within the PAOI amounts to 5.58 ha (Table 21). It should be noted that none of the delineated wetland area within the PAOI is directly intersected by the Batching Plant but portions of the wetland have been disturbed by ancillary activities (vehicle movement) within the wetland and buffer.

Table 21: Summary of natural wetland area within the project area of influence.

Features	Delineated within 500m PAOI		Intersected by Batching Plant
	Area (Ha)	Percentage of Wetland Area (%)	Area (Ha)
HGM 1	5.58	100	0
Total	**5.58**	**100.00**	**0**

7.2.6.2.4 RISK SCREENING

Table 22 provides the results of risk screening for the delineated wetlands and provides motivation for each of the determined categories. HGM 1 was identified to be "At Risk" from the proposed development activities attributed to the proximity of the wetlands to the activities.

Table 22: Risk status of the delineated wetlands.

HGM unit	Risk Status	Rationale
HGM 1	At Risk	This feature was identified ≈40 m downslope of the activities and has been determined as "At Risk". It is anticipated that direct and indirect impacts to the wetland systems are potential.
Instream Dam	Not At Risk	This feature is located a considerable distance away from the proposed activities and is not located in a position of the landscape where impacts will be potential and has therefore been determined as "Not At Risk".
Artificial Seeps, Artificial Channels, Collection and Pollution Control Dams	Not Applicable	These are not natural wetland systems. Instead, they are artificial or engineered water management structures. As such, the risk assessment framework used for natural HGM units does not apply to these features, and therefore, no risk status regarding potential impacts from the proposed activities is deemed necessary.

7.2.6.3 FUNCTIONAL ASSESSMENT

It should be noted that only natural features which are at risk from the proposed activities have been considered for the ecological assessments.

7.2.6.3.1 GENERAL FUNCTIONAL DESCRIPTION

Unchannelled valley-bottom wetlands are characterised by their location in valley bottoms without a distinct stream channel, resulting in diffuse water flow across the wetland. These wetlands are highly effective in sediment trapping due to their gentle gradients and the extensive areas that remain permanently saturated, which promote the deposition of sediments carried by runoff waters. The high levels of soil organic matter in these wetlands enhance their capacity for nitrate and toxicant removal, as the prolonged contact with runoff waters facilitates these processes. However, phosphate retention may be lower compared to other wetland types due to potential remobilization under prolonged anaerobic conditions. Unchannelled valley-bottom wetlands also contribute to streamflow regulation to some extent, although this is influenced by factors such as vegetation transpiration and soil characteristics. These wetlands play a crucial role in maintaining water quality and providing habitat for diverse species, making them vital components of the landscape (Kotze *et al.,* 2009).

It should be noted that these characteristics are representative of ideal wetland features and may not necessarily represent the characteristics of all wetlands. The functionality of wetlands and the provision of benefits is largely dependent on wetland size and influence from abiotic drivers.

7.2.6.3.2 ECOSYSTEM SERVICES

The ecosystem services provided by the relevant wetland unit on site were assessed and rated using the WET-EcoServices method (Kotze *et al.,* 2009). The results of the assessment are presented in Table 23. The average ecosystem services score of HGM 1 falls within the "Intermediate" class.

Table 23: Summary of the average ecosystem scores for the assessed systems.

Wetland Unit						**HGM 1**
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation			2.2
			Streamflow regulation			1.2
			Water Quality enhancement benefits	Sediment trapping		2.8
				Phosphate assimilation		2.6
				Nitrate assimilation		2.7
				Toxicant assimilation		2.5
				Erosion control		1.8
			Carbon storage			1.2
	Direct Benefits	Biodiversity maintenance				1.9
		Provisioning benefits	Provisioning of water for human use			0.4
			Food for livestock			1.0
			Provisioning of harvestable resources			1.5
			Provisioning of cultivated foods			1.7
		Cultural benefits	Cultural heritage			0
			Tourism and recreation			0.3
			Education and research			1.0
Class						**Intermediate**

HGM 1 has potential to deliver ecosystem services on a significant scale due to its connectivity (or potential) with other wetlands located downstream. The wetland has therefore been scored within the "Intermediate" ecosystem service score range. Flood attenuation is supported due to the topography of the wetland and the presence of dams within the wetlands path which increases its storage limits. Furthermore, valley-bottoms usually host more robust vegetation due to frequent saturation from surrounding hillslopes which enhances their ability to provide water quality benefits. The wetland also serves an ecological corridor and therefore makes a notable contribution to the maintenance of biodiversity in an overall disturbed landscape. The wetland's catchment includes areas of agriculture, which increases the likelihood of nutrient inputs. As a result, nutrient assimilation is likely to be an important ecosystem service provided by the wetland, helping to improve downstream water quality. The potential for the wetland to be used for tourism and recreation and the provisioning of harvestable resources is unlikely due to the setting and type of vegetation present. The provisioning of cultivated foods and food for livestock occurs on a smaller scale than the other benefits. The provisioning of water for human use is likely, given that the wetland does have dams within its path which support the storage of water and the use thereof by people. The use of the wetlands for cultural benefits is not supported.

7.2.6.3.3 PRESENT ECOLOGICAL STATE

The wetland has exhibited different degrees of modification resulting from natural physical changes as well as anthropogenically induced impacts at both the local and catchment level. Resultingly, the wetland has scored an average Present Ecological State (PES) score within the "D – Largely Modified" PES class. The results of the wetland health and integrity assessment is provided in the table below.

Table 24: Average Present Ecological State scores for the assessed wetlands.

Unit	PES Assessment	Hydrology	Geomorphology	Water Quality	Vegetation
HGM 1	**Impact Score**	4.4	3.2	3.5	6.0
	Ecological Category	D	C	C	E
	Combined Impact Score	**4.3**			
	Combined Ecological Category	**D – Largely Modified**			

The wetland has experienced disturbance related to geomorphic structural changes resulting from impoundments created by damming within the watercourse and intersecting roads. These impoundments and road crossings have altered the system's hydrology by restricting natural flows and creating concentrated flow paths during wet seasons. The wetland's catchment is predominantly used for agriculture, which is assumed to have led to the loss of wetland vegetation in some areas. This loss of vegetation has contributed to changes in the flow and sediment dynamics of the system. Disturbance within the catchment and along the wetland's periphery, particularly the removal of natural vegetation, has facilitated the proliferation of alien plant species such as *Bidens pilosa*, *Cirsium vulgare*, and *Verbena bonariensis*. Additionally, hydrological changes have created conditions more favourable for sedges, rushes, and grasses, rather than the reeds and reed grasses typically found in valley-bottom wetlands. The shift in vegetation composition, ongoing disturbance, and altered hydrology have also contributed to an increased erosion risk within the wetland system.

7.2.6.3.4 ECOLOGICAL IMPORTANCE AND SENSITIVITY

The Ecological Importance and Sensitivity (EIS) assessment was applied to the HGM unit in conjunction with the ecosystem service scores in the preceding sections, to assess the levels of sensitivity and ecological importance of the wetland. The results indicate that the wetland falls within "High" EIS class as noted in the table below.

Table 25: Summary of the Ecological Importance and Sensitivity assessment.

HGM	NFEPA Wet Veg			NBA Wetlands			SWSA (Y/N)	CBA / ESA (Y/N)	EIS Rating
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018	Ecosystem Protection Level			
HGM 1	Central Bushveld Group 2	Vulnerable	Moderately Protected	D Largely Modified (Field Visit)	Critically Endangered	Not Protected	Y	N	B – High

7.2.6.3.5 RECOMMENDED ECOLOGICAL CATEGORY AND RECOMMENDED MANAGEMENT OBJECTIVE

The Recommended Ecological Category (REC) and Recommended Management Objective (RMO) for the wetland area was determined from the results of the PES and EIS assessments. These assessments indicated that the wetland feature within the PAOI, had underwent transformation as a result of historical and current impacts. Nevertheless, despite the altered ecological integrity of the systems, they are considered to provide ecological services.

The results of the assessment indicate that the REC for the wetland is a class C/D, with the RMO for the wetland being to Improve on the current condition.

7.2.6.3.6 BUFFER REQUIREMENTS

The buffer requirements for the wetland were calculated using the Site-Based Tool: Determination of buffer zone requirements for wetland ecosystems (Macfarlane *et al.,* 2014). The recommended buffer zones are presented in Figure 45. The recommended post-mitigation buffer for the development is 20 m. It is noted that minor parts of the wetland buffer in relation to HGM 1 has already been modified or disturbed by the unlawful activities and these areas should be rehabilitated and marked as no-go areas for all future activities relating to the Batching Plant. The other existing activities within the buffer such as the access road in the eastern areas just downstream of the instream dam and the agricultural fields in the western areas may continue in their current extent however, all new development as part of the project must be set-back by the proposed 20 m buffer.

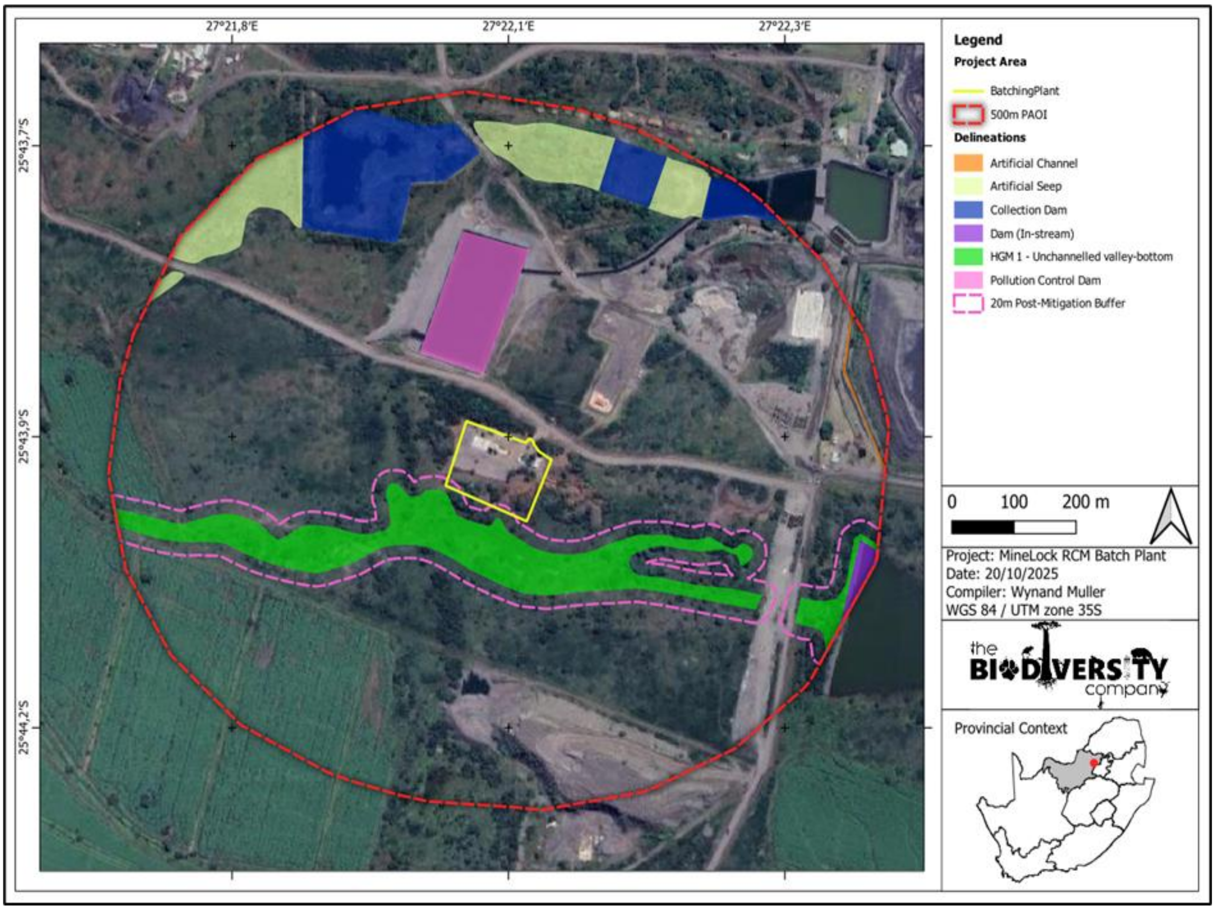


Figure 45: Recommended buffer for the wetlands.

7.2.6.3.7 REGULATION ZONES

Table 26 and Figure 46 presents the legislated zones of regulation that would be applicable to the wetland and riparian areas.

In accordance with Government Notice (GN) 4167 of 2023 and GN 509 of 2016, as it relates to the NWA (1998), the regulated area of a watercourse for Section 21 (c) and 21 (i) of the NWA (1998) must be considered if the proposed development and associated infrastructure fall within the applicable zones of regulation as defined in the Act.

Additionally, listed activities in terms of the NEMA EIA Regulations, 2014, as amended, must be taken into consideration if any infrastructure is to be placed within the applicable zone of regulation.

Given the proximity of the activities in relation to the wetland, both types of authorisations are deemed applicable for the project.

Table 26: Legislated zones of regulation.

Regulatory authorisation required	Zone of applicability
Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998). GN 4167 as published in the Government Gazette 49833 of 2023.	In accordance with GN 4167 of 2023 and GN 509 of 2016, as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as: • the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured

Regulatory authorisation required	Zone of applicability
GN 509 as published in the Government Gazette 40229 of 2016.	from the middle of the watercourse of a river, spring, natural channel, lake or dam; • in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or • a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.
Environmental Authorisation in terms of the Listed activities of the NEMA EIA Regulations 2014, as amended.	Activity 12 of Listing Notice 1 of the NEMA EIA regulations, 2014 (as amended) states that: The development of: (xii) Infrastructure or structures with a physical footprint of 100 square meters or more; Where such development occurs— Within a watercourse; In front of a development setback; or If no development setback has been adopted, within 32 meters of a watercourse, measured from the edge of a watercourse. … (dd) where such development occurs within an urban area… Activity 19 of Listing Notice 1 (GN 327) of the NEMA EIA regulations, 2014 (as amended) states that: “The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.”

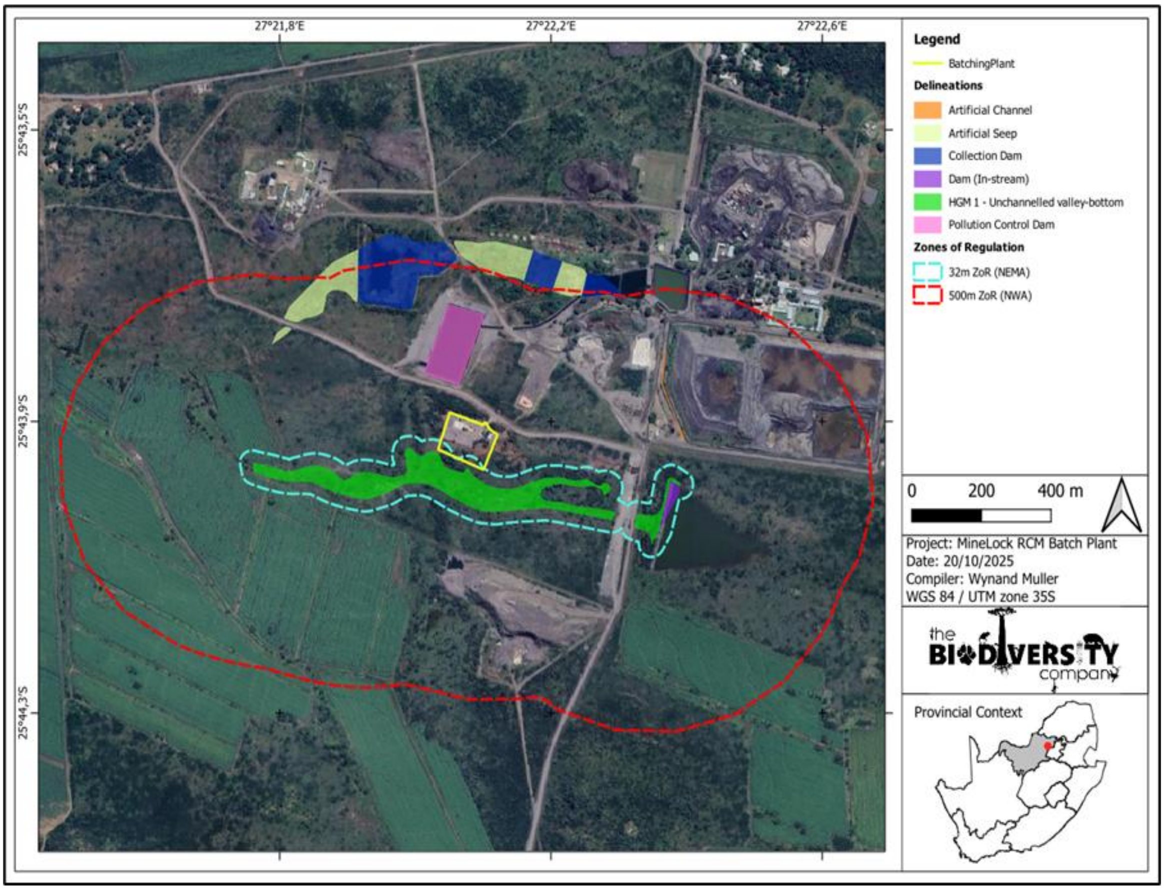


Figure 46: Recommended zones of regulation for the wetlands.

7.2.6.4 SITE SENSITIVITY VERIFICATION

7.2.6.4.1 DESKTOP ECOLOGICAL SENSITIVITY

- The following is deduced from the National Web-based Environmental Screening Tool (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

Aquatic Biodiversity Theme sensitivity as “Low” for the Batching Plant (Figure 47), attributed to the absence of wetlands.

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

Figure 47: Aquatic Biodiversity Theme Sensitivity of the Batching Plant.

7.2.6.4.2 SCREENING TOOL COMPARISON

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas as presented in Table 27 below and a sensitivity map showing the results of the sensitivity verification is presented in Figure 48. It should be noted that the National Web-based Environmental Screening Tool allocates sensitivities to freshwater resources identified through the available national freshwater datasets based on their presence (very high) or absence (low). The specialist-assigned sensitivity ratings presented herein consider the presence of features, their ecological characteristics as discussed in the previous sections, the observed biodiversity value and functionality and consideration is given to any observed or likely presence of sensitive fauna and flora.

Table 27: Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Aspect	Environmental Screening Tool Sensitivity	Specialist Sensitivity	Tool Validated or Disputed by Specialist - Reasoning
Aquatic Biodiversity Theme	**HGM 1 and Instream Dam**	**Very High**	**Very High**	Validated – These areas are representative of natural wetlands that provide suitable habitat and functionality to support freshwater biodiversity.
		Low		Disputed – These areas are representative of natural wetlands that provide suitable habitat and functionality to support freshwater biodiversity.
	Artificial Seeps and Collection Dam	**Very High**	**Medium**	Disputed – These watercourses are artificial, and no functional assessments have been included for them. However, the wetlands are perceived to have some functionality as wetland vegetation was present and seasonal saturation of the seep is likely. The assigned sensitivity considers that the artificial features were identified through the North West Biodiversity Sector Plan as being an Ecological Support Area.
	Artificial Channels and Pollution Control Dams	**Low**	**Low**	Validated – These watercourses are artificial, and no functional assessments have been included for them. The hydrological characteristics are dependent on human intervention, and any wetland (or potential) conditions would cease without this intervention.
	20 m Wetland Buffer	**Low**	**Medium**	Disputed – These areas are representative of the wetland area periphery and are of importance in terms of supporting intactness of the features they encompass.
	Remaining Area	**Low**	**Low**	Validated – These areas are not representative of natural wetlands and lack typical wetland indicators.
		Very High		Disputed – These areas are not representative of natural wetlands and lack typical wetland indicators.

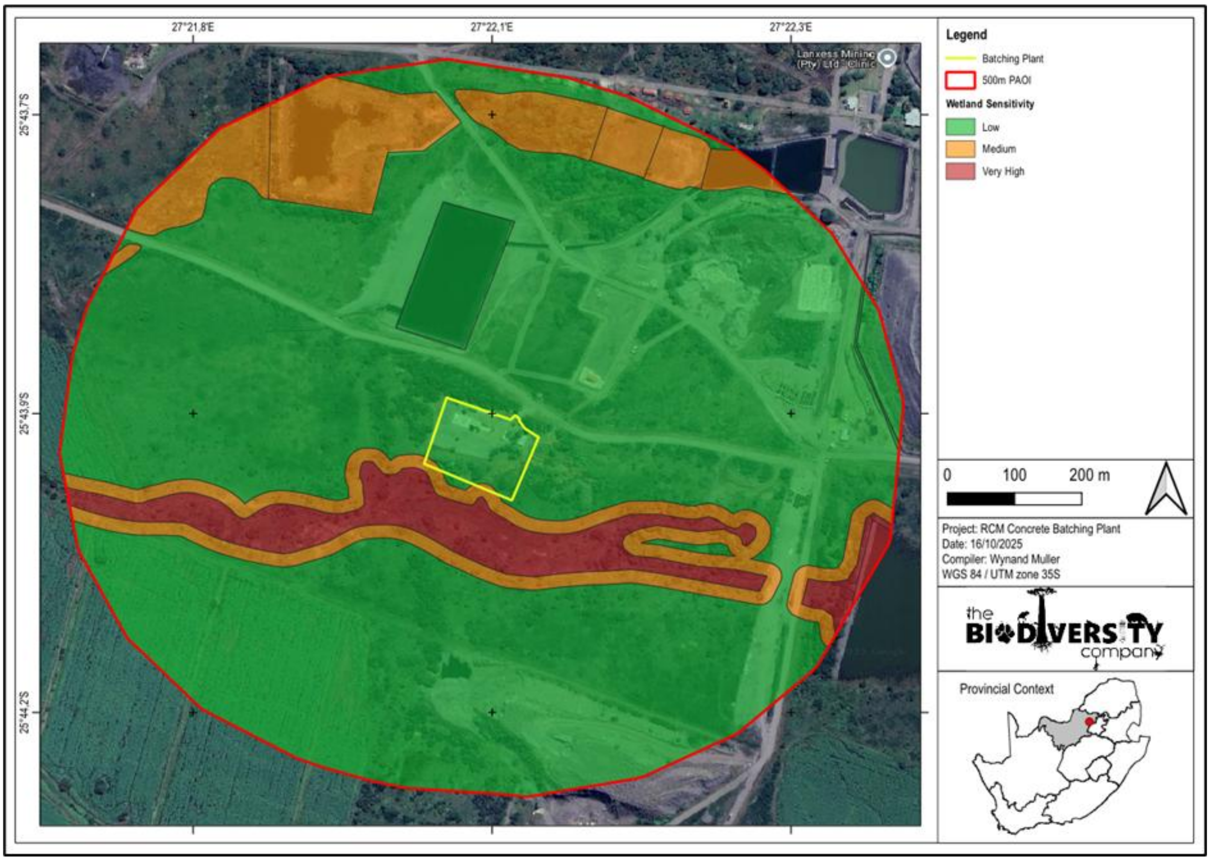


Figure 48: Sensitivity classification of the PAOI in relation to aquatic biodiversity.

7.2.7 SOILS AND AGRICULTURE

The field survey was completed on the 14th to the 16th of April 2025 to determine the soil forms and current land uses within the assessed area. A map illustrating the field work tracks is presented in Figure 49 below.

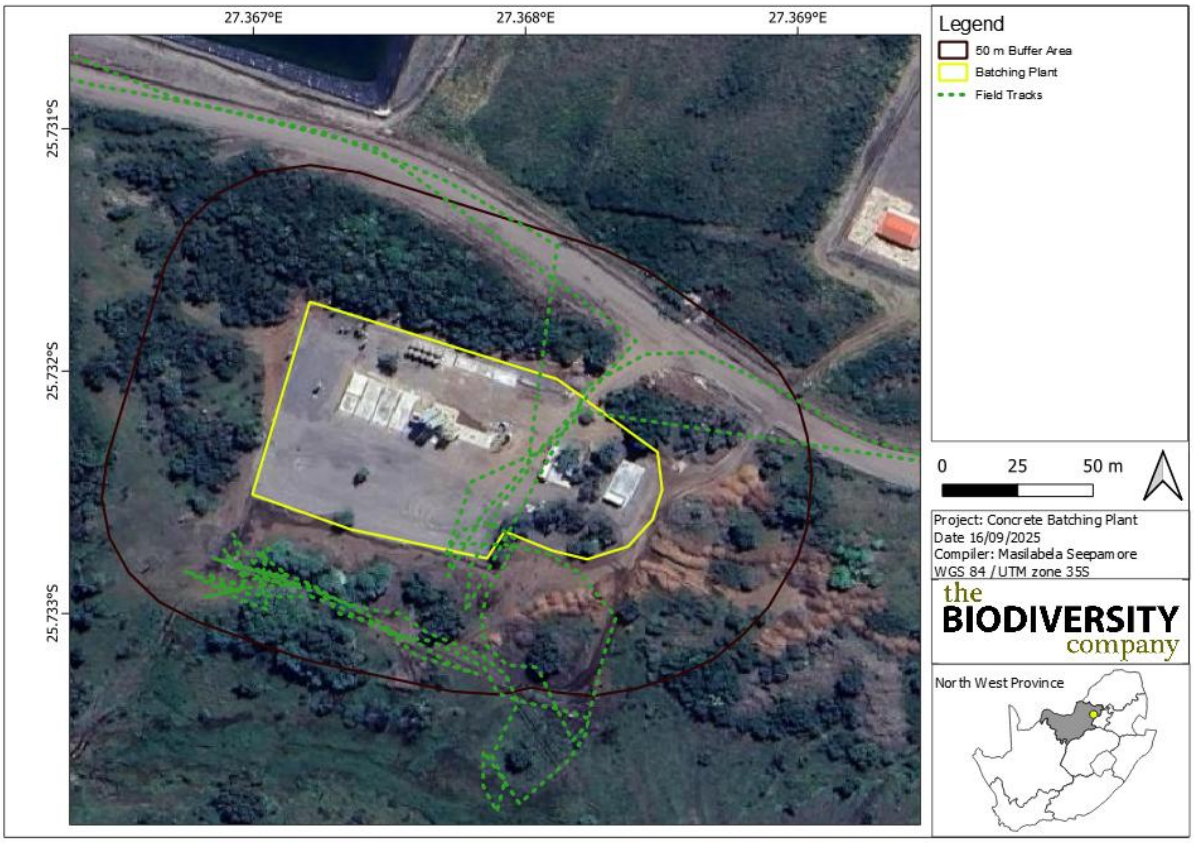


Figure 49: Map illustrating the field coverage

7.2.7.1 BASELINE FINDINGS

Three (3) representative soil forms were identified in the 50 m buffer of the proposed project area namely, Mispah, Grabouw and Johannesburg soil forms (Figure 50). The proposed project area is dominated by shallow soil with restrictive limitations. The remaining extent of the proposed project area coincides with anthropogenic soils due to the current land use.

The Mispah soil form consists of an orthic topsoil horizon underlain with a hard rock substratum horizon. This soil has a limited soil profile, which in turn restricts its agricultural potential due to low water-holding capacity, poor root penetration, and inadequate aeration. As a result, the soil is more suitable for grazing purposes to support livestock and wildlife practices.

Two anthropogenic soils identified within the proposed project area includes the Grabouw and Johannesburg soil forms. The Grabouw soil form is characterised as physically disturbed Anthrosols, where the land is physically disturbed due to anthropogenic activities. The Johannesburg soil form is characterised as urban Technosols, where the land is under various urban uses. These soil forms have extreme limitation and are not suitable for crop production, livestock grazing and afforestation. Some of the identified soil horizons within the proposed project area, as well as the current land uses are illustrated in Figure 51 and Figure 52, respectively.

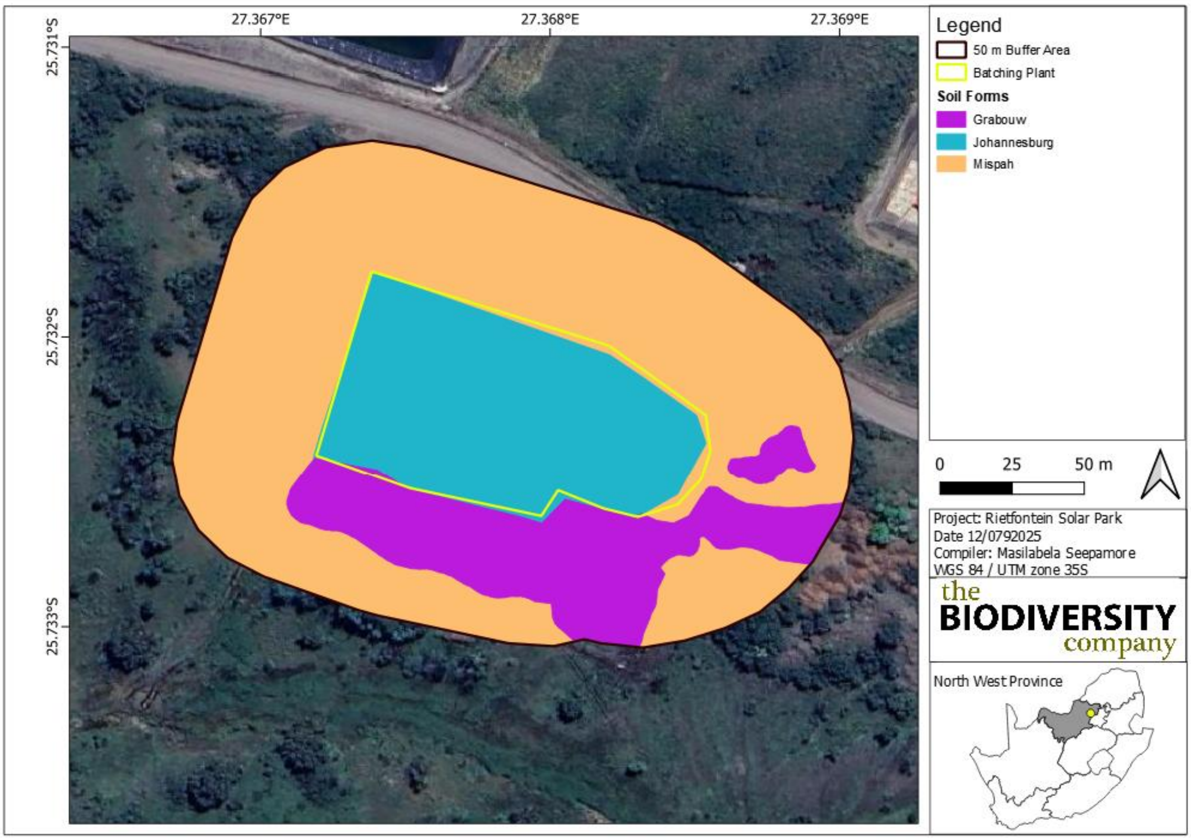


Figure 50: Soil forms found within the proposed project area.

Figure 51: Diagnostic soil horizons identified on-site: A) Uban Technosols; Physical disturbed Anthrosols; and C) Mispah soil form.

Figure 52: Current land use found within the 50 m buffer of the proposed project area; A) Common vegetation; and B) & C) Current land use within the concrete batching plant.

Accordingly, following Smith, (2006) which the national DAFF, (2017) land capabilities protocols were further expanded from, the above-mentioned identified soil forms associated with the project area are restricted to land “VI” (i.e. Mispah soil form) categorised between LC 1-5 (Low), and land capability “VIII” (i.e. Grabouw and Johannesburg soil forms) categorised between LC 1-5 (Very Low to Low). The baseline soil land capability was aligned and compared to the National Land Capability data (DAFF, 2017), respectively.

The land capability classes of the above-mentioned soils have been determined to be class “VI” and “VIII” according to Smith (2006). The land capability class “VI” is characterised by limitations that preclude cultivation and is suitable for pasture cultivation, veld and afforestation. The land capability class “VIII” is characterised by extremely severe limitations, requires total protection from agriculture and is only suitable for wildlife practices. A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. By using the determined land capability classes and the determined climate capability, land potential “L7” and “L8” were calculated. According to Smith (2006), the proposed project area is found to be non-arable.

The following land potential levels have been determined (Figure 53).

- Land potential level 7 (this land potential is characterised by low potential. Severe limitations due to soil, slope, temperatures or rainfall). Non-arable; and
- Land potential level 8 (this land potential is characterised by very low potential. Very severe limitations due to soil, slope, temperatures or rainfall). Non-arable.

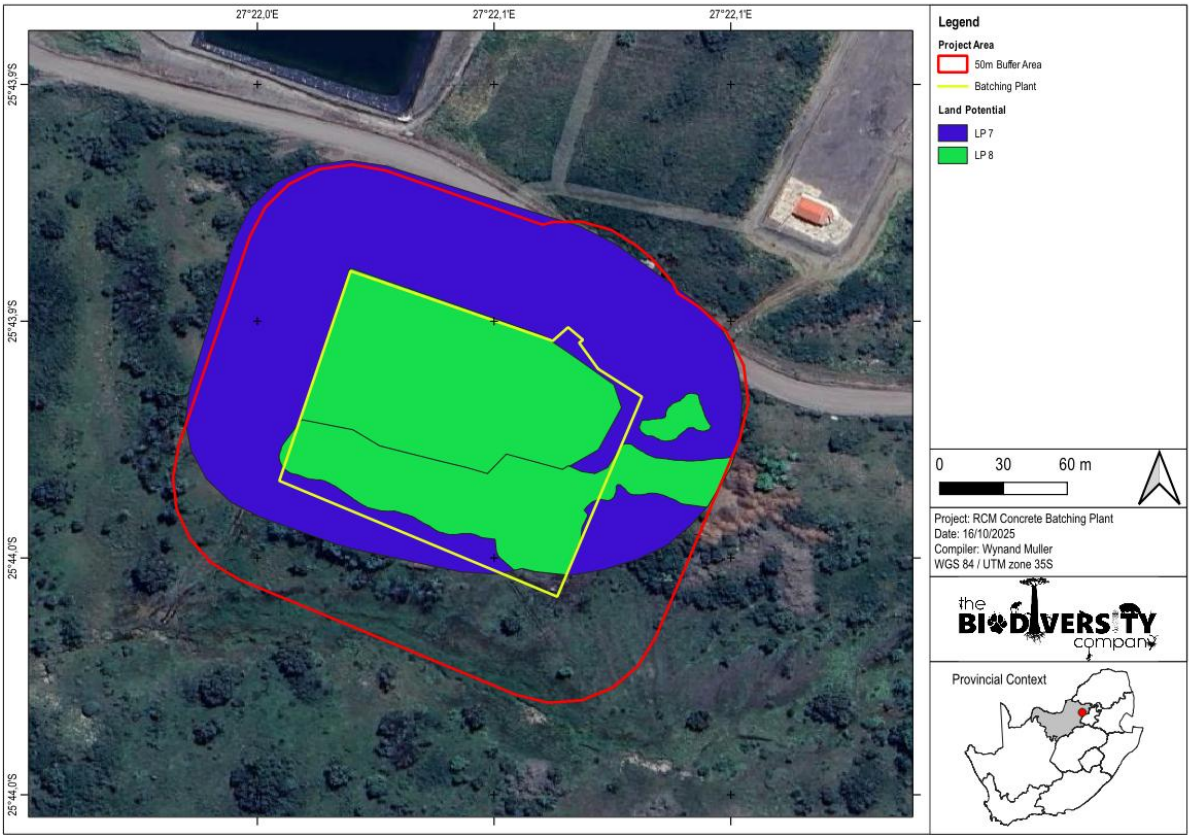


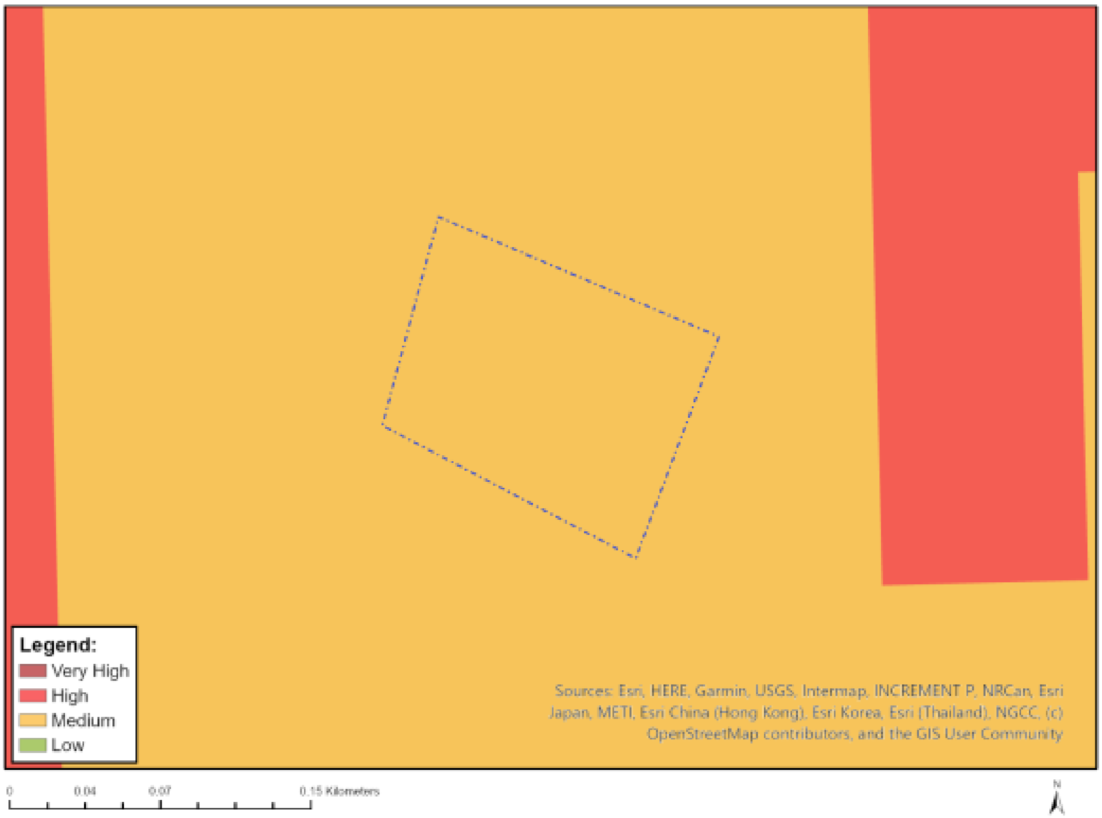
Figure 53: Land Potential of the proposed project area

7.2.7.2 SENSITIVITY VERIFICATION

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Agriculture Theme Sensitivity indicates that the proposed 50 m buffer of the project area falls predominately within the 'Medium' agricultural sensitivity (Figure 52).

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	07. Low-Moderate

Figure 54: Map of Relative Agricultural Theme Sensitivity for the Concrete Batching Plant generated by the Environmental Screening Tool Site Ecological Importance (SEI).

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which one potential land capability classes are located within the assessment area, including:

- Land Capability 7 (Low-Moderate Sensitivity).

The land capability dataset (DAFF, 2017) indicates that the proposed project area falls predominately within the "Low-Moderate" land capability sensitivity (see Figure 53). Furthermore, the agricultural theme tool indicates the absence of highly sensitive field crop boundaries (DFFE 2025; Table 53). The areas do not fall within the Protected Agricultural Areas (PAA), as stipulated by the DARLRRD (2020) and Figure 53.

The baseline soil findings, current land uses and the calculated land potential dispute the agricultural theme tool, in all areas demarcated with "Low-Moderate" land capability sensitivity due to the presence of low to very low potential soils. Moreover, there is no active cropping together with irrigation infrastructure such centre pivot, drip irrigation or canals for flood found within the proposed project area.

The current project area and associated activities of the proposed project will have acceptable expected changes to soil resources. As a result, based on the verified baseline findings, the proposed development will have a minimal impact on the soil resources.

Figure 55: Overall site verified sensitivity of the project area.

Considering the soil properties, agricultural potential as well as the current land use of the development area, the area has a predominately "Low" agricultural sensitivity (see Table 53). The allocated sensitivities for the theme are either disputed or validated in Table 28 below.

Table 28: Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Feature	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Agricultural Theme	**Low-Moderate (LC 7)**	**Medium**	**Low**	Disputed – Very Low to Low land capability. The presence of low potential soil with restrictive limitations such as Mispah soil form. Additionally, the presence of anthropogenic soils with extremely severe limitations such as Johannesburg and Grabouw soil forms.

7.2.8 HYDROPEDOLOGY

7.2.8.1 HYDROPEDOLOGICAL FLOW PATHS

Given that hydropedology is a relatively new field, a short literature review has been added on this interdisciplinary research field. This literature is an excerpt from van Tol *et al*., (2017).

Soil physical properties and hydrology play significant roles in the fundamentals of hydropedology. Physical properties including porosity, hydraulic conductivity, infiltration etc. determine micro preferential flow paths through a soil profile. The hydrology in turn is responsible for the formation of various morphological processes in soil, including mottling, colouration, and the accumulation of carbonate.

These processes are used to construct models illustrating sub-surface flow paths, storage, and interconnection between these flow paths. Hydropedology can therefore be used for a variety of functions. These functions include process-based modelling, digital soil mapping, pollution control management, impact of land use change on water resources, wetland protection, characterising ground and sub-surface flows as well as wetland protection and rehabilitation, of which the latter will be the main focus during this report (see Figure 56). The latter mentioned enables effective water resource management regarding wetlands and sub-surface flows in general.

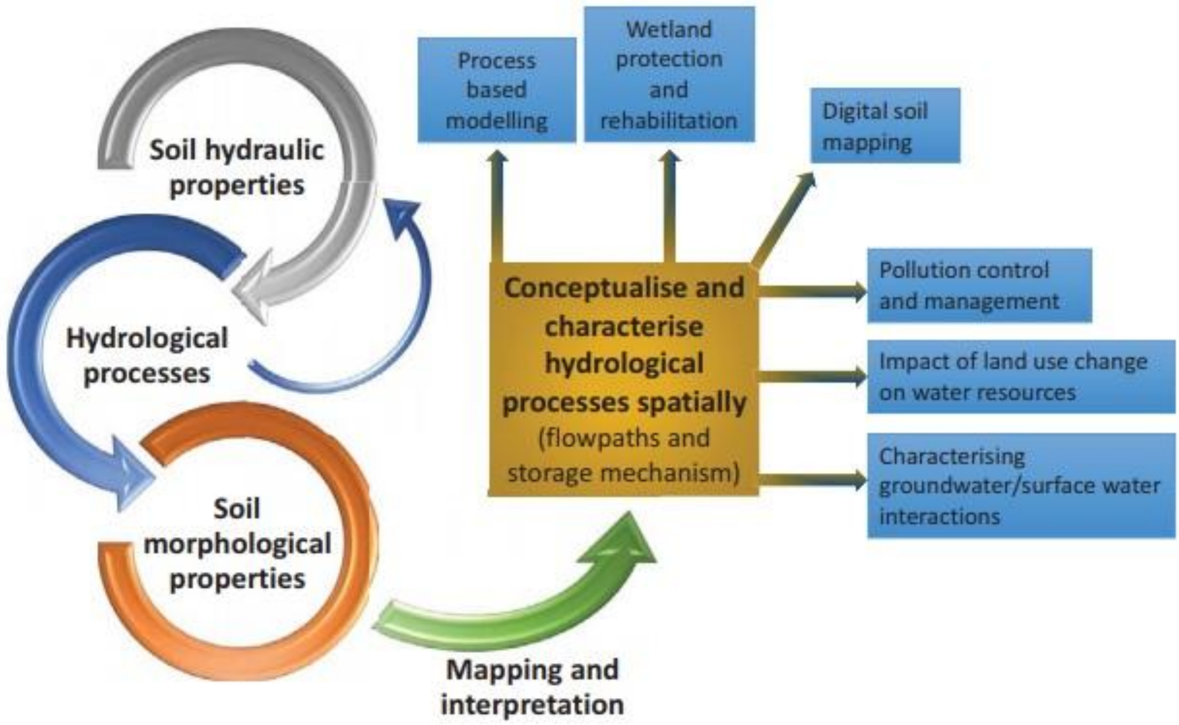


Figure 56: Illustration of the interactive nature of hydropedology and its potential applications (van Tol et al., 2017).

As can be seen in Figure 57, the hydropedological behaviour of soil types can differ significantly. Figure 57 (a) illustrates a typical red coloured soil (top- and sub-soil). This soil type will typically have a vertical flow path throughout the soil profile. Water will therefore infiltrate the topsoil and freely drain into the profile to such an extent that the water rapidly reaches the bedrock. After reaching this layer, water will penetrate the ground water source or be transported horizontally towards lower laying areas. This soil type is known as a recharge soil, given its ability to recharge ground and surface water sources.

Figure 57 (b) illustrates interflow soils. Lateral flows are dominant in this soil type and occurs due to differences in the hydraulic conductivity of soil horizons. The “sp” soil horizon restricts vertical movement and promotes lateral flows at the A/B interface. The lighter colour in this profile indicates leaching which is caused by lateral flows which often occurs on top of a bedrock layer due to the impermeable nature thereof. Mottles often occur above this impermeable layer due to fluctuating water levels, see the magnified illustration in Figure 57 (b-i).

Figure 57 (c) illustrâtes responsive soil. This hydropedological soil type is characterised (in this case) by a dark top-soil and a grey coloured sub-soil. Other indicators include mottling and gleying. These soil types are saturated for very long periods. Therefore, rainfall is unlikely to infiltrate this layer and would likely be carried off via overland flow and are mostly fed by lateral sub-surface flows. Shallow soils are equally responsive in the sense that the soil profile will rapidly be saturated during precipitation, after which rainfall will be carried off by means of overland flows.

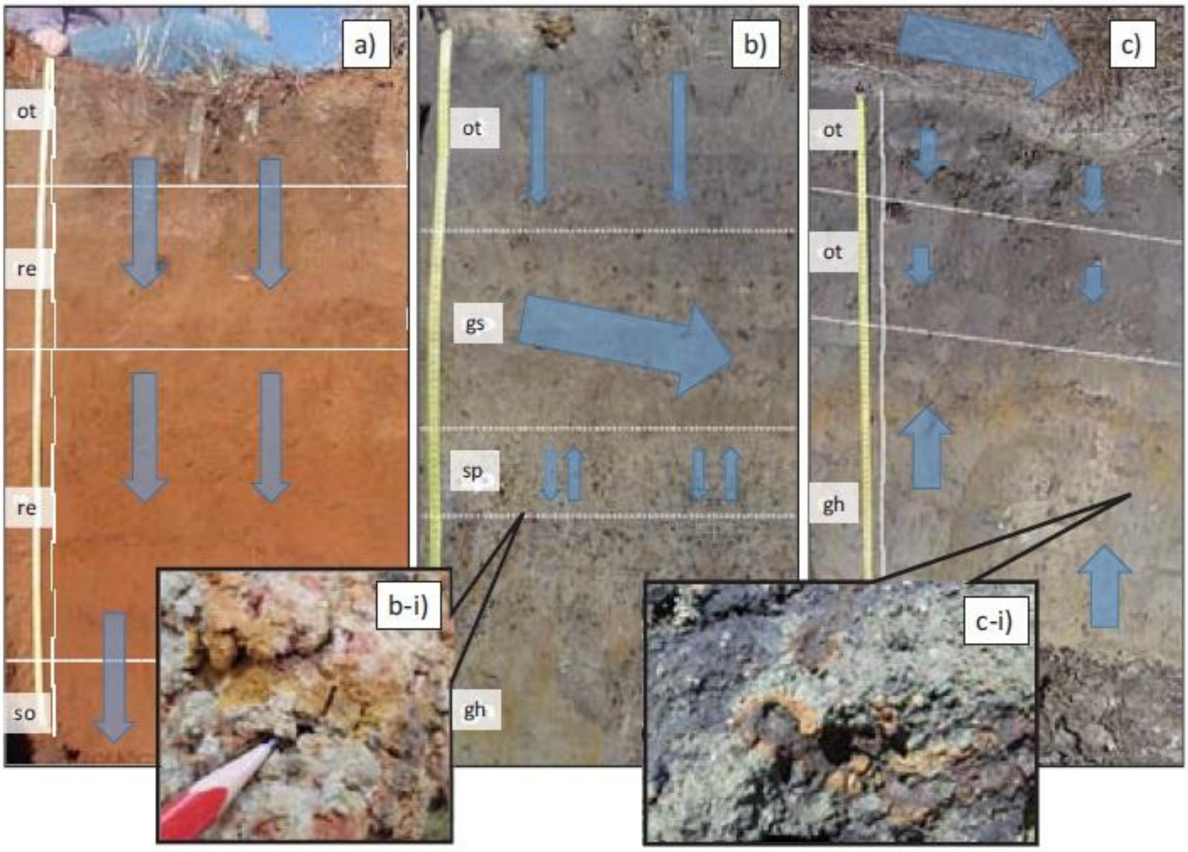


Figure 57: Illustration of different hydropedological soil types (van Tol et al., 2017).

A typical example of the hydropedological processes through a hillslope is illustrated in Figure 58. In this example, a recharge soil type is located at the upper reaches of the slope. Rainfall infiltrates this soil type and percolates vertically towards the bedrock. Water then, infiltrates into this bedrock given the permeability thereof and could now recharge groundwater or flow down-gradient towards soils in lower lying positions. The second soil type (the interflow zone) indicates lateral flows at the A/B interface and again at the soil/bedrock interface which feeds the responsive zone. The responsive zone is then simultaneously fed by lateral sub-surface flows and ground water recharge.

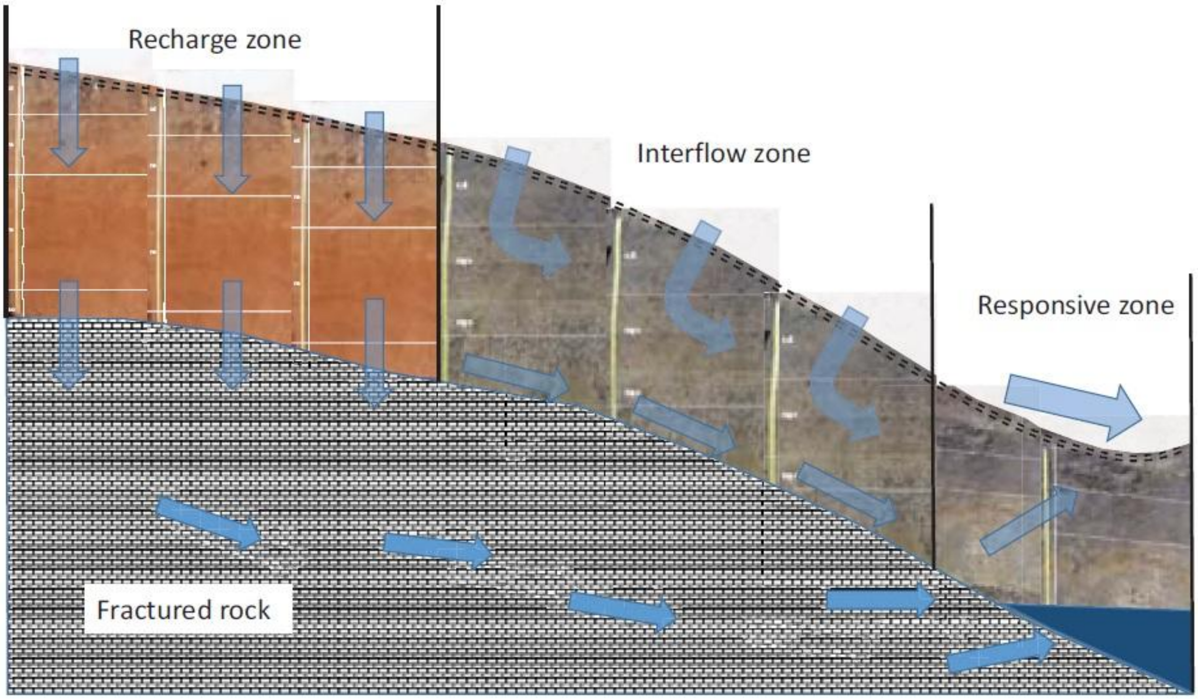


Figure 58: Illustration of different hydropedological soil types (van Tol et al., 2017).

The methodology of van Tol *et al.,* (2017) has since been updated to include a "stagnant" hydropedological type. According to van *Tol et al.,* (2019), four different hydropedological types exist, namely Recharge, Interflow, Responsive and Stagnating hydropedological types. These soil types are divided into seven subgroups depending on the morphology of the relevant soil form. The latest addition to this methodology, as mentioned, is known as a stagnating hydropedological type.

This soil type is characterised by restrictive movement of water through profiles (both laterally and vertically) and is dominated by evapotranspiration. The A- and B-horizon of such a soil type usually has a high permeability with morphological indicators indicating very little movement through the profile. Lime and iron concretions as well as cementation of silica are typical indicators of such a soil form.

7.2.8.2 METHODOLOGY

7.2.8.2.1 DESKTOP ASSESSMENT

The following information sources were considered for the desktop assessment:

- Aerial imagery (Google Earth Pro);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);
- Topographical river line data;
- Contour data (5 m); and
- Mucina & Rutherford (2006).

7.2.8.2.2 FIELD PROCEDURE

The slopes within the project area have been assessed during the desktop assessment to identify possible transects (Figure 59) that will represent typical terrain and soil distribution patterns. These locations were then altered slightly during the survey depending on the extent of vegetation, slopes, access, and any features that will improve the accuracy of data acquired.

7.2.8.2.3 IDENTIFICATION OF SOIL TYPES AND HYDROLOGICAL SOIL TYPES

Soil types have been identified according to the South African soil classification system (Soil Classification Working Group, 2018) after which the link between soil forms and hydropedological response were established (van Tol & Le Roux, 2019), and the soils regrouped into various hydropedological soil types as shown in. The relevance of the proposed development to ecologically important landscape features is summarised in Table 29 and Table 30.

Table 29: Hydrological soil types of the studied hillslopes (van Tol *et al*., 2019).

Hydrological soil type	Description	Subgroup	Symbol
Recharge	Soils without any morphological indication of saturation. Vertical flow through and out the profile into the underlying bedrock is the dominant flow direction. These soils can either be shallow on fractured rock with limited contribution to evapotranspiration or deep freely drained soils with significant contribution to evapotranspiration.	Shallow	
		Deep	
Interflow (a/b)	Duplex soils where the textural discontinuity facilitates build-up of water in the topsoil. Duration of drainable water depends on rate of ET, position in the hillslope (lateral addition/release) and slope (discharge in a predominantly lateral direction).	A/B	
Interflow (soil/bedrock)	Soils overlying relatively impermeable bedrock. Hydromorphic properties signify temporal build of water on the soil/bedrock interface and slow discharge in a predominantly lateral direction.	Soil/Bedrock	
Responsive (shallow)	Shallow soils overlying relatively impermeable bedrock. Limited storage capacity results in the generation of overland flow after rain events.	Shallow	
Responsive (saturated)	Soils with morphological evidence of long periods of saturation. These soils are close to saturation during rainy seasons and promote the generation of overland flow due to saturation excess.	Saturated	
Stagnating	In these soils outflow of water is limited or restricted. The A and/or B horizons are permeable but morphological indicators suggest that recharge and interflow are not dominant. These includes soils with carbonate accumulations in the subsoil, accumulation and cementation by silica, and precipitation of iron as concretions and layers. These soils are frequently observed in climate regions with a very high evapotranspiration demand. Although infiltration occurs readily, the dominant hydrological flow path in the soil is upward, driven by evapotranspiration.		

Table 30: Revised hydrological soil types of the representative hillslopes (van Tol *et al.,* and Bouwer, 2024).

Hydrological soil type	Description		Subgroup	Symbol
Recharge	Soils without any morphological indication of saturation. Vertical flow through and out the profile into the underlying bedrock is the dominant flow direction. These soils can either be shallow on fractured rock with limited contribution to evapotranspiration or deep freely drained soils with significant contribution to evapotranspiration.	These soils can either be shallow on fractured rock with limited contribution to evapotranspiration	Shallow	
		Deep freely drained soils which can contribute significantly to evapotranspiration	Deep	
		Soils with high clay contents and low conductivity	Slow	
Interflow	Three types of interflow soils occur, those where interflow is dominant at the A/B horizon interface, those where interflow is dominant at the soil/bedrock interface and those with morphological indicators of periodic saturation, but low hydraulic conductivities will limit significant flow through these soils.	This type occurs in duplex soils where the textural discontinuity facilitates build-up of water in the topsoil	shallow	
		Freely drained soils overly relatively impermeable bedrock. Hydromorphic properties signify periodic saturation associated with a water table at the soil bedrock/interface	Deep	
		Actual flow volumes and lateral transport is minimal as most of the water is either stagnant or evapotranspirated before it could make a significant contribution to streams or wetlands in lower lying positions.	Slow	
Responsive	Soils with morphological evidence of long periods of saturation. These soils are close to saturation during rainy seasons and promote the generation of overland flow due to saturation excess.	These soils 'respond' quickly to rain events and typically generate overland flow. These soils can either be shallow and overly relatively impermeable bedrock, with limited storage capacity which is quickly exceeded following a rain event	Shallow	
		They are soils with morphological indications of long periods of saturation.	Wet	

Hydrological soil type	Description		Subgroup	Symbol
		Since these soils are close to saturation during the rainy season additional precipitation will typically flow overland due to saturation excess		
		Soils with crusts or very low surface infiltration rates will promote overland flow due to infiltration excess, also known as Hortonian overland flow.	Hortonian	

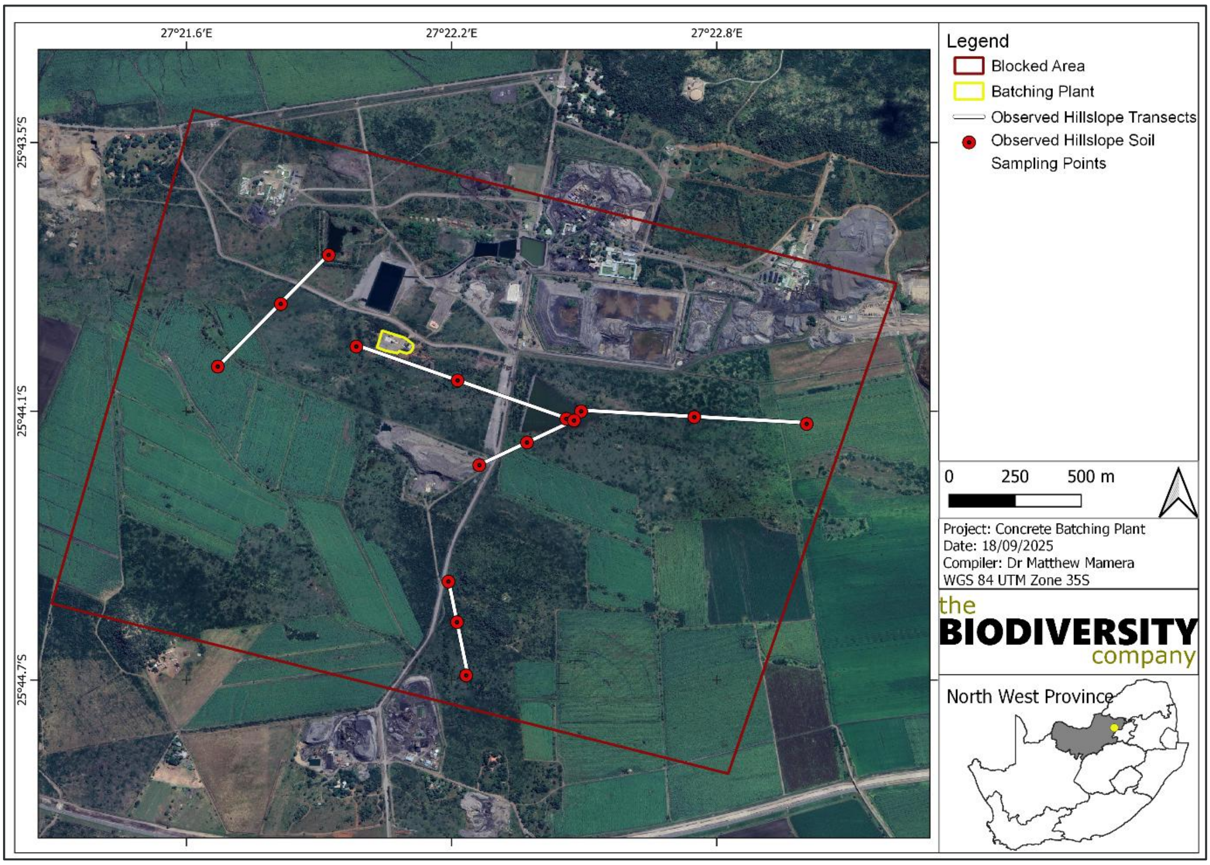


Figure 59: Transects and Observation Sites.

7.2.8.3 GEOLOGY & SOILS

The geology of the area includes mafic intrusive rocks of the Rustenburg layered suite of the Bushveld Igneous Complex, gabbro, norite, pyroxenite, anorthosite, shales and quartzites. According to the land type database (Land Type Survey Staff, 1972 - 2006) the transects relevant to the project is located in the Ea 3 land types. The Ea 3 land type mainly consists of Arcadia, Oakleaf soil forms and rocky areas, according to the Soil classification working group (1991), with the occurrence of other soils within the landscape. The Ea land type is characterised by vertic, melanic, red-structured diagnostic horizons and undifferentiated soils. The relevant terrain units for the land types are illustrated below in the respective figures and tables.

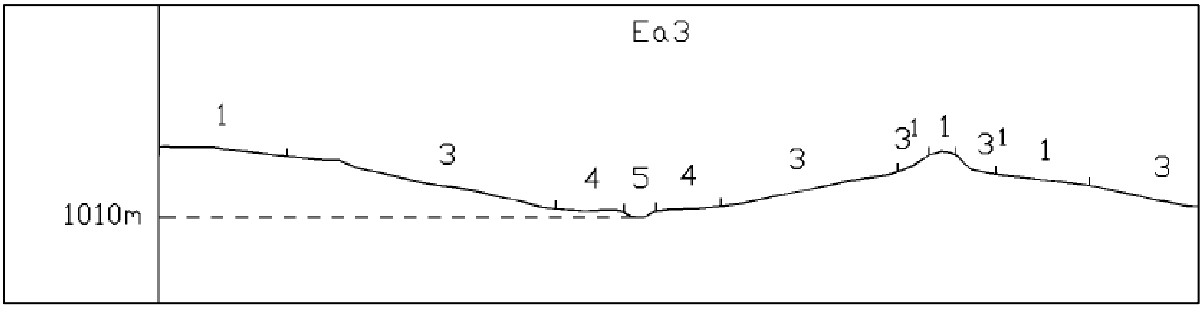


Figure 60: Illustration of land type Ea 3 terrain units (Land Type Survey Staff, 1972 - 2006).

Table 31: Soils expected at the respective terrain units within the Ea 3 land type (Land Type Survey Staff, 1972 - 2006).

Terrain Units									
1 (30%)		1 (0.5%)		3 (44.5%)		4 (15%)		5 (9%)	
Arcadia	70%	Bare Rocks	80%	Arcadia	76%	Arcadia	89%	Oakleaf	67%
Bare rock	14%	Mispah	20%	Bare Rocks	10%	Hutton	3%	Arcadia	22%
mispah	9%			Mispah	6%	Shortlands	3%	Shortlands	6%
Hutton	4%			Hutton	4%	Swartland	3%	Hutton	5%
Shortlands	3%			Shortlands	3%	Bare Rocks	2%		
				Swartland	1%				

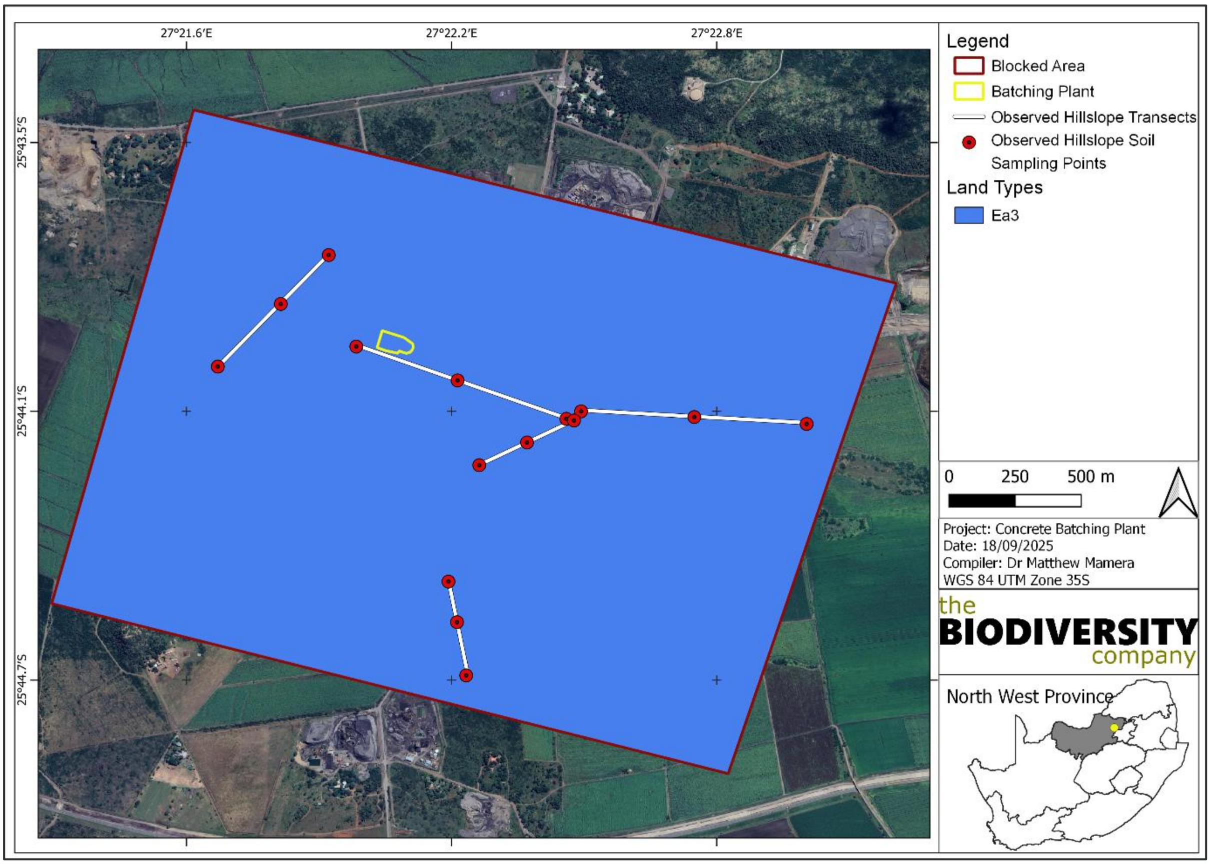


Figure 61: Land types present within the Concrete Batching Plant Project`s surroundings Identified Soil Forms.

The following soil forms were identified on-site whilst surveying the relevant transects;

- Arcadia (Vertic topsoil on top of a lithic horizon below);
- Rustenburg (Vertic topsoil on top of a Hardrock substratum below);
- Rensburg (Vertic topsoil on top of a Gley horizon below);
- Etosha (Orthic topsoil on top of a neocutanic horizon with a soft carbonate horizon below);
- Mispah (Orthic topsoil on top of a hard rock layer below); and
- Witbank (Transported anthropogenic material from mining activities with some evidence of the original diagnostic horizons or partially processed saprolithic material).

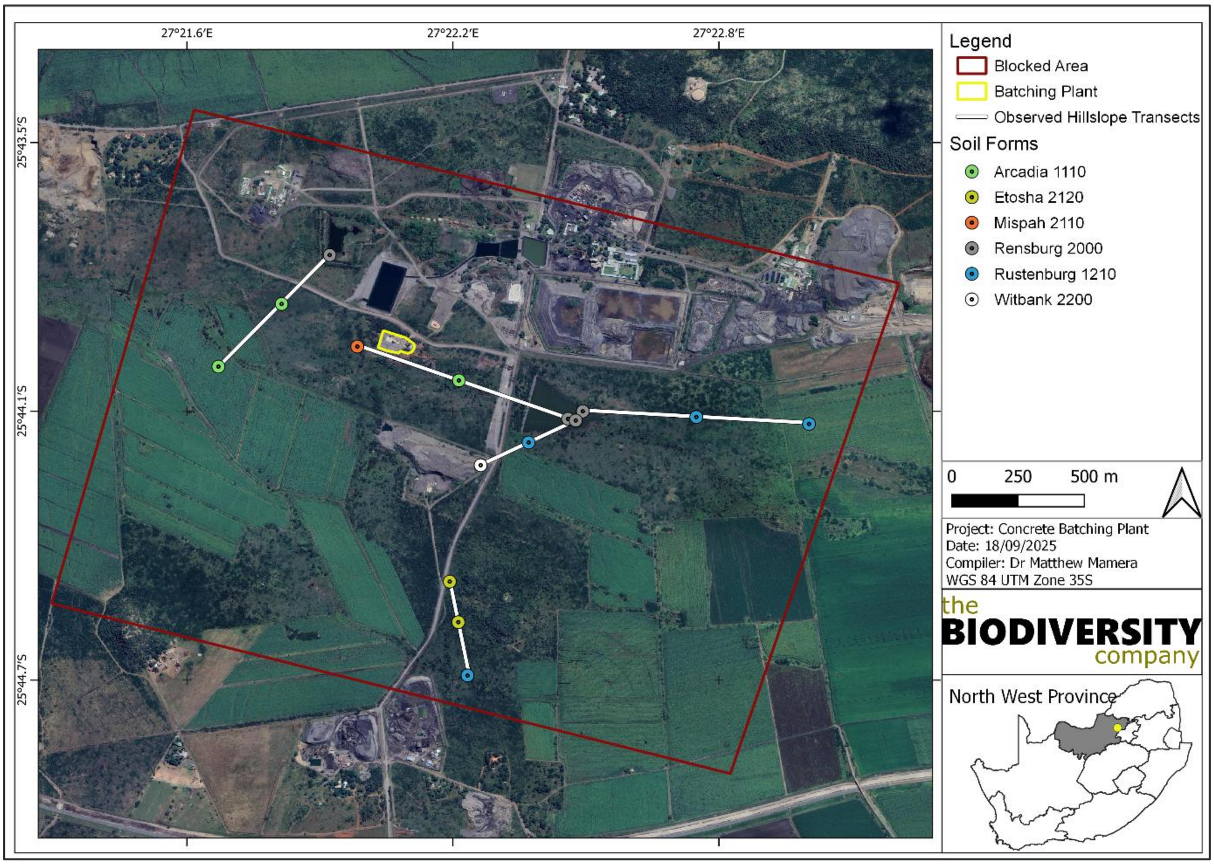


Figure 62: Soil forms identified within representative hillslope transects.

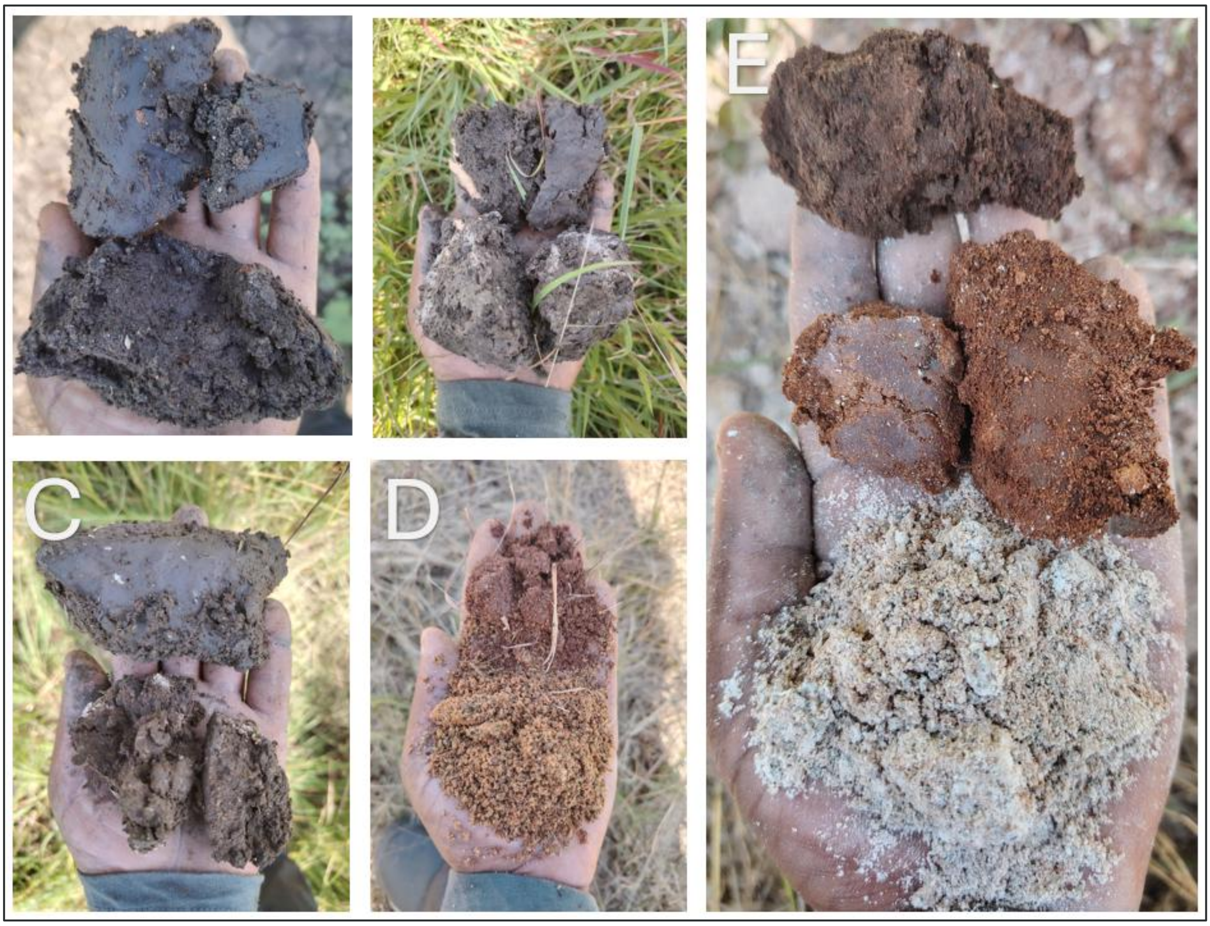


Figure 63: Diagnostic soil horizons identified on-site: A-C) Vertic horizons. D) Transported material. D) Orthic topsoil horizon with a lithic horizon. E) Neocutanic subsurface horizon with soft carbonate.

Figure 64: Diagnostic soil horizons identified on-site: A- B) Vertic horizon over gley horizon below.

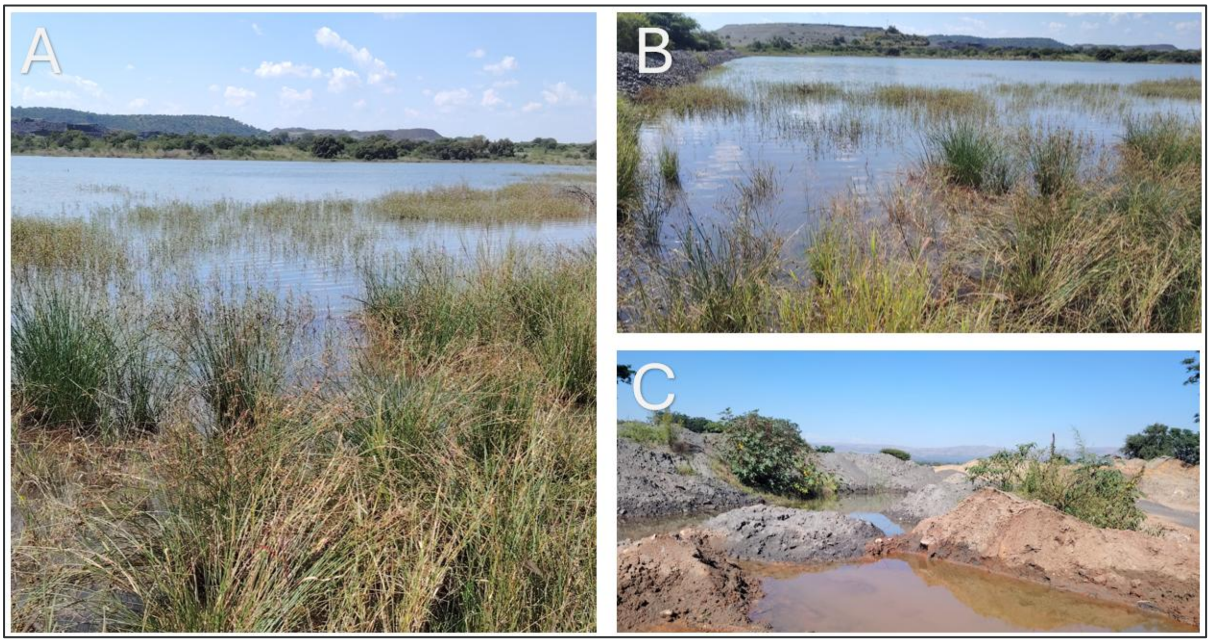


Figure 65: Diagnostic soil horizons identified on-site: A-C) Examples of surface return/overland flows and lateral flows pathways.

7.2.8.4 HILLSLOPE HYDROLOGY

The survey was conducted to obtain information regarding the soil morphology to their respective soil family levels and hydropedological flow paths relevant to the hillslope by means of several representative transects (see Table 32). The hillslope hydrology of slopes intersected by the proposed Concrete Batching Plant project and associated infrastructure are characterised by their distinct hydropedological patterns. The majority of the slopes for the first distinctive hydropedological patterns are characterised by recharge (slow) and responsive (Hortonian) (see Figure 66) hydropedological types. These patterns occur from the crest to the midslope transecting to recharge (slow) at the valley bottom merging to a watercourse.

The second distinctive hydropedological patterns are characterised with recharge (shallow) and responsive (Hortonian and wet) (Figure 67). These patterns occur from the crest to midslope with recharge (shallow) transecting to responsive (Hortonian) to the lower midslope transecting to responsive (wet) in the valley bottom section merging to the watercourse. The third to fourth distinctive hydropedological patterns are characterised with recharge responsive (shallow, hortonian and wet) (Figure 68 to Figure 69). These patterns occur from the crest to lower midslope with responsive (shallow or hortonian) transecting to responsive (wet) in the valley bottom section merging to the watercourse. These patterns occur from the crest to the valley bottom section merging to the watercourse. Restrictions in the water flow occurs within the responsive soils due to the presence of a high clay content and partially or unfractured parent material (see Figure 67 to Figure 69).

Table 32: Identified hillslope dominant soil forms and hydropedological groups.

Terrain Morphological Unit (TMU)							
1&2		3		4		5	
Soil form	Hydroped	Soil form	Hydroped	Soil form	Hydroped	Soil form	Hydroped
Rustenburg 1210	Responsive (Hortonian)	Etosha 2120	Recharge (Slow)	Etosha 2120	Recharge (Slow)	Etosha 2120	Recharge (Slow)

Terrain Morphological Unit (TMU)							
Rustenburg 1210	Responsive (Hortonian)	Rustenburg 1210	Responsive (Hortonian)	Rustenburg 1210	Responsive (Hortonian)	Rensburg 2000	Responsive (Wet)
Witbank	Responsive (Shallow)	Rustenburg 1210	Responsive (Hortonian)	Rustenburg 1210	Responsive (Hortonian)	Rensburg 2000	Responsive (Wet)
Mispah	Recharge (shallow)	Acardia 1110	Responsive (Hortonian)	Acardia 1110	Responsive (Hortonian)	Rensburg 2000	Responsive (Wet)
Acardia 1110	Responsive (Hortonian)	Acardia 1110	Responsive (Hortonian)	Acardia 1110	Responsive (Hortonian)	Rensburg 2000	Responsive (Wet)

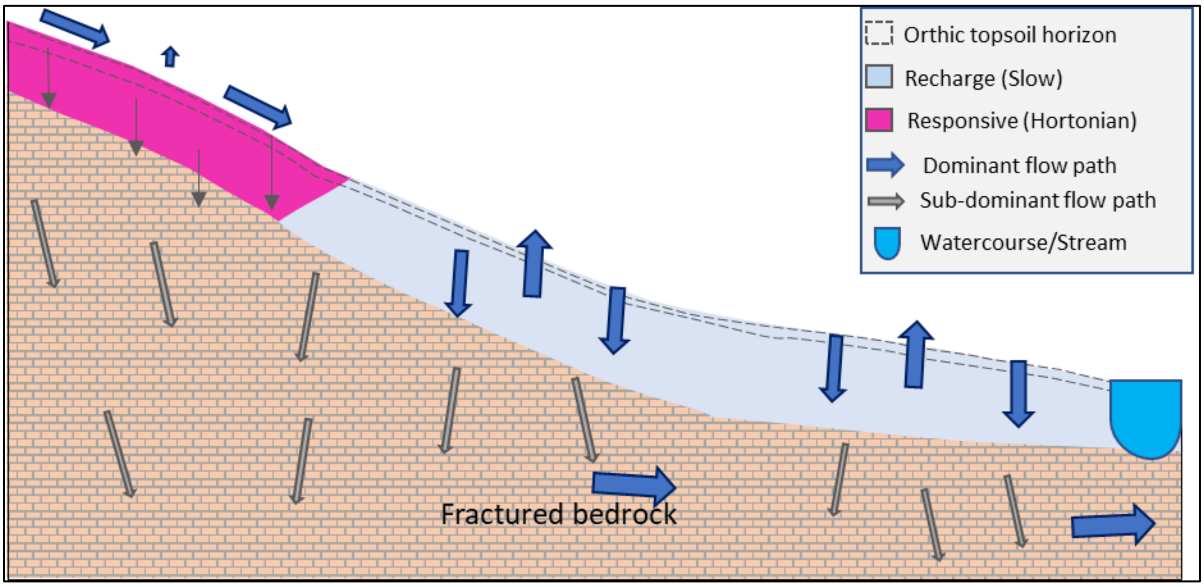


Figure 66: Hillslope hydrology one of four of the distinct hydropedological patterns prior to construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

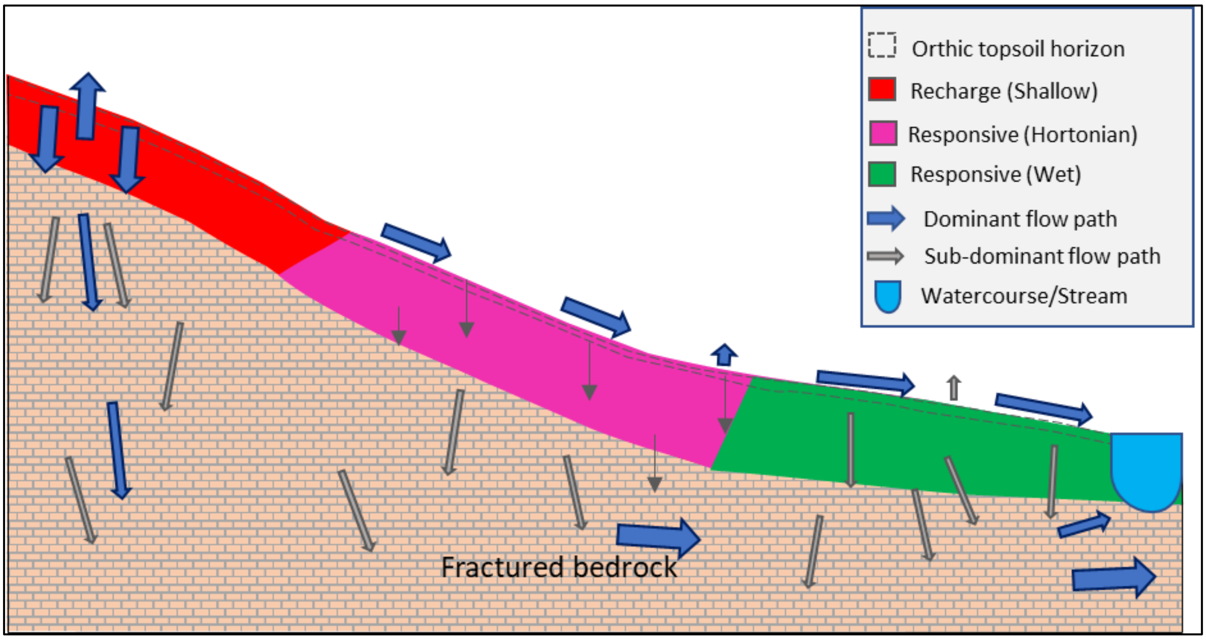


Figure 67: Hillslope hydrology two of four of the distinct hydropedological patterns prior to construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

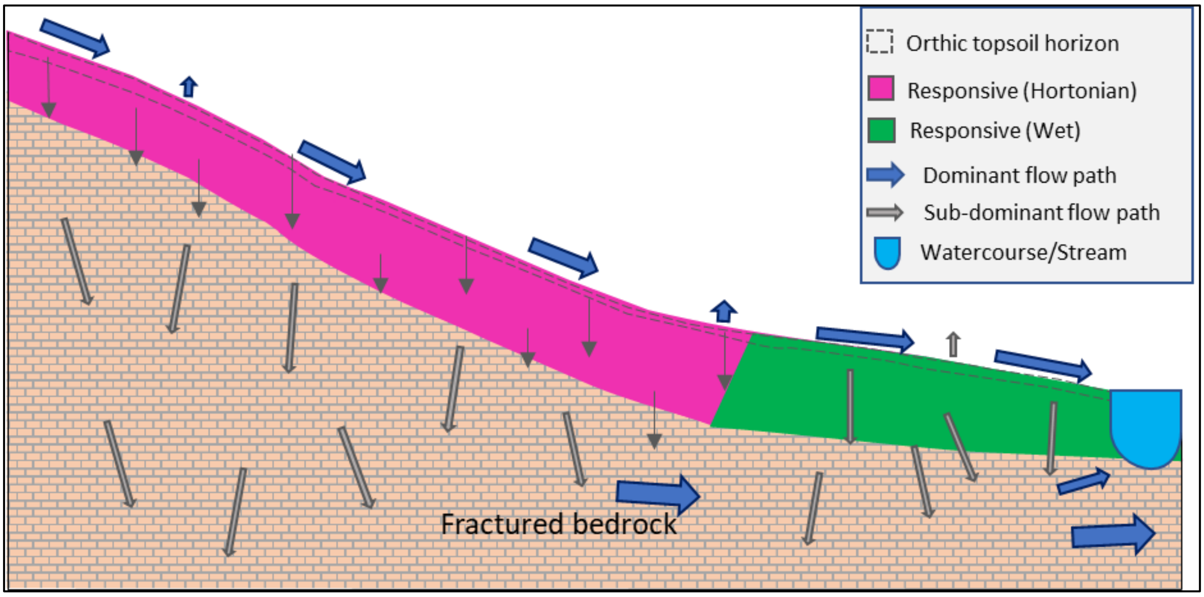


Figure 68: Hillslope hydrology three of four of the distinct hydropedological patterns prior to construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

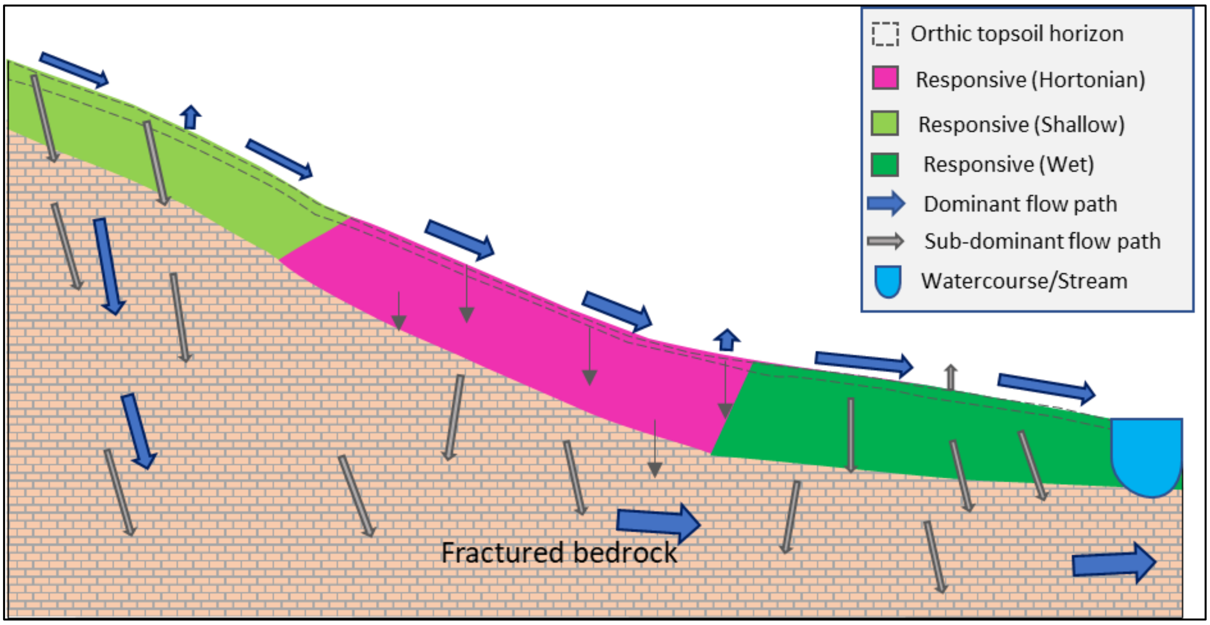


Figure 69: Hillslope hydrology four of four of the distinct hydropedological patterns prior to construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

The shallow Mispah soil forms identified on-site are characterised with well drained profiles. The Mispah soil forms consist of an orthic topsoil with a hard rock layer below. Clear horizons of apedal horizons were evident and visible in the profile. These profiles are characterised by extremely high permeability soil hydraulic conductivity (Ks) rates, including the lower lithic horizon which can also be available below the B1 subsurface horizon in most cases. The Ea 3 land types are commonly characterized with these shallow soils the crest midslope areas.

No signs of leaching or oxidation/reduction processes were identified throughout the soil profiles, which, together with the high Ks emphasises rapid vertical recharge of the groundwater storage as being the dominant flow path.

Some of the upper areas are characterized by responsive (Shallow) hydropedological types. These soils commonly have high clay contents in the top and subsurface horizon with low conductivity; volume of water flow infiltration is low due to the textural discontinuity resulting in surface stagnations. If the evaporative demand is higher most of the water is lost through evaporation processes. The soils associated to these areas include Witbank soils with inversed horizon due to human activities.

Some of the crest to midslope areas are characterized by responsive (Hortonian) hydropedological types. These soils commonly have high clay contents in the topsoil horizon with low conductivity; volume of water flow is low due to the textural discontinuity resulting in surface stagnations. If the evaporative demand is higher most of the water is lost through evaporation processes. Most of the water flows occur on the surface as overflows as due to restrictions in infiltration of the soils. The soils associated to these areas include Arcadia and Rustenburg soil forms with a vertic topsoil horizon.

Vertic topsoils are characterised by dark high smectite clay soils with strong structure and visible slickensides on the wedge-shaped aggregates. The horizon exhibits large cracks when its dry and also present the swelling and shrinking properties as a result of change in water content. Vertic topsoils have high clay content with smectic clay particles being dominant. The smectic clays have swell and shrink properties during wet and dry periods, respectively. Peds will be shiny, well-developed with a highly plastic consistency during wet periods as a result of the dominance of smectic clays. During shrinking periods, cracks form on the surface and rarely occurs in shallow vertic clays (Soil Classification Working Group, 2018).

Some of the midslope to lower landscapes areas are characterized by recharge (Slow) hydropedological types. These soils commonly have high clay contents in the B1 horizon with low conductivity; volume of water flow is low due to the textural discontinuity resulting in surface stagnations. If the evaporative demand is higher most of the water is lost through evaporation processes. The soils associated to these areas include, Etosha soil forms with a neocutanic or pedocutanic B1 horizon.

Neocutanic horizon is a young weakly-structured subsurface layer with variations in the soil matrix. The horizon is commonly associated to the processes of transportation of materials usually colluvial or alluvial origins in the valley bottoms or flats terrains and river terraces that have been subjected to an intermediate stage of pedogenic changes. The colour differences in the neocutanic horizon are usually caused by illuvial material that coats weak structural units (Soil Classification Working Group, 2018)

The valley bottom regions are characterised by recharge (slow) and responsive (wet) hydropedological types. The Ea 3 land types are commonly characterized with these soils in the footslope or valley bottom landscapes areas. The soil form relevant to the responsive (wet) hydropedological types, observation point is that of the Rensburg soil forms. The Rensburg soil forms are characterised by gley horizon as the subsoil, which is indicative of prolonged/permanently saturated soils which result in the formation of "responsive soils." Responsive soils will be subject to overland/return flow during precipitation events (due to the naturally high-water content which will ensure rapid saturation). Between rainfall events, these soil forms will steadily feed watercourses and will lose moisture by means of Evapotranspiration (ET).

Gley horizons that are well developed and have homogenous dark to light grey colours with smooth transitions. Stagnant and reduced water over long periods is the main factor responsible for the formation of a gley horizon and could be characterised by green or blue tinges due to the presence of a mineral called Fougerite which includes sulphate and carbonate complexes. Even though grey colours are dominant, yellow, and/or red striations can be noticed throughout a gley horizon. The structure of a gley horizon mostly is characterised as strong pedal, with low hydraulic conductivities due to high clay content (clayey texture), although sandy gley horizons are also known to occur. The gley soil form commonly occurs at the toe of hillslopes (or benches) where lateral water inputs (sub-surface) are dominant and the underlaying geology is characterised by a low hydraulic conductivity. The gley horizon usually is second in diagnostic sequence in shallow profiles yet is known to be lower down in sequence and at greater depths (Soil Classification Working Group, 2018).

7.2.8.5 CONCEPTUAL IMPACT PREDICTION

The Concrete Batching Plant project and associated infrastructure will have acceptable impacts on the hydropedology behaviour of most relevant hillslopes, due to the position of the development area and associated infrastructure like the access road; offices with a septic tank; firebreak with road acting as a berm; bunded diesel storage; bunded Water storage tank, aggregate storage, cement silos; concrete mixer and the proposed infrastructure expansion for the concrete base working area and stormwater channels and a stormwater dam (crest, lower and mid-slope).

The following hydrological flows are expected from the representative hillslopes;

1. In the upper crest areas (Figure 71), vertical flows are expected to remain dominate due to the presence of recharge soils such as the recharge shallow (Mispah soil forms). The presence of the batching plant and other associated infrastructure will have minimal interception to the vertical flows;
2. The vertical flows will eventually become sub-dominate in the fracture or semi-permeable parent material; lateral flows will also occur towards the midslope areas. If the evaporation process is high some of the water will be lost especially on the available recharge shallow and slow from the topsoil layers.
3. In areas with either exposed bare rocky areas (Figure 71), responsive (Hortonian) (Figure 70 and Figure 72) and/or responsive shallow (Figure 73),overland flow or surface runoffs will occur following rainfall events which contributes towards the midslope and lower areas in the landscape.
4. In the midslope and the valley bottoms with recharge (Slow) or responsive (Hortonian) hydropedological type (see Figure 70 to Figure 73), with the Witbank soil forms (Recharge) and Arcadia and Rustenburg soil forms (Hortonian) (will result in overland flows or lateral flows occurring between the soil/bedrock layer, recharging the watercourses or wetlands below. Lateral seeps from the proposed or existing activities or the associated pipelines will also contribute on the surface flows

towards the wetlands (artificial or natural) or watercourse. During the rainy periods, surface overland flows are prominent recharging the wetland areas. Some of the stagnant surface water flows can be lost through evaporation as percolation will be slow in these soils due to lower conductivity as the clay contents increase.

5. The other transects with responsive (wet) hydropedological types (i.e. Rensburg soil forms) in the valley bottom (Figure 71 to Figure 73), are characterised with dominate surface overland flows or runoffs recharging wetlands and watercourses. These areas act as responsive receptors recharging the groundwater stores. Usually, development and the associated surface infrastructure should avoid these areas. These responsive (wet) hydropedological types of areas also have a high tendency to promote contaminates migrations towards available water resources.
6. In the landscape percolation effects can occur into either a fractured bedrock or semi-permeable layer, even though the effects are usually sub-dominate recharging the groundwater stores for the catchment. This effect is expected to be minimal due to the arid to semi-arid climatic conditions which promotes evapotranspiration.

The Concrete Batching Plant project and associated infrastructure located within the available recharge hydropedological type is not expected to affect the hillslope hydrology in any manner. Flow changes can occur in the lateral flows due to increased water regimes and underlying restrictive impermeable layers which can disconnect these lateral flows. Surface sealing due to increased compaction activities can also reduce such flows. These effects are however expected to have acceptable impact significance towards the total streamflow or total deductible water regime losses of sensitive receptors (downstream rivers and wetlands) and groundwater storage. Measures which can promote infiltration and reduce surface overland flows will result in the addition of the potential water regime losses back in the catchment.

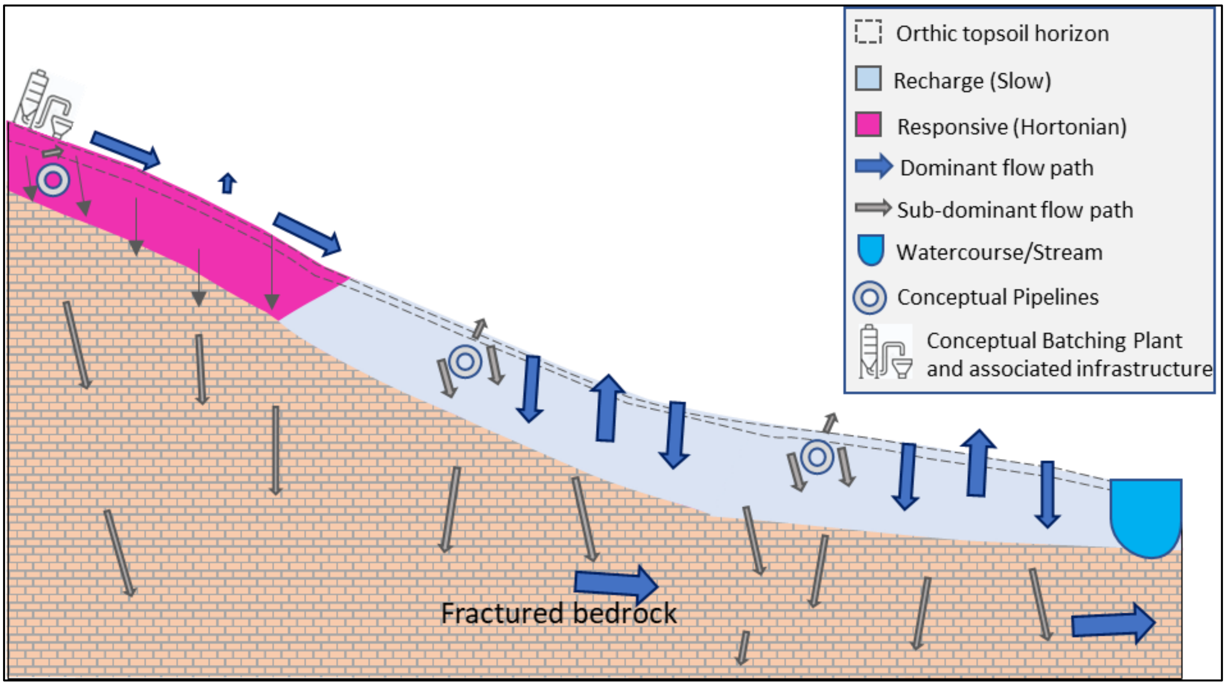


Figure 70: Hillslope hydrology one of four of the distinct hydropedological patterns after the construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

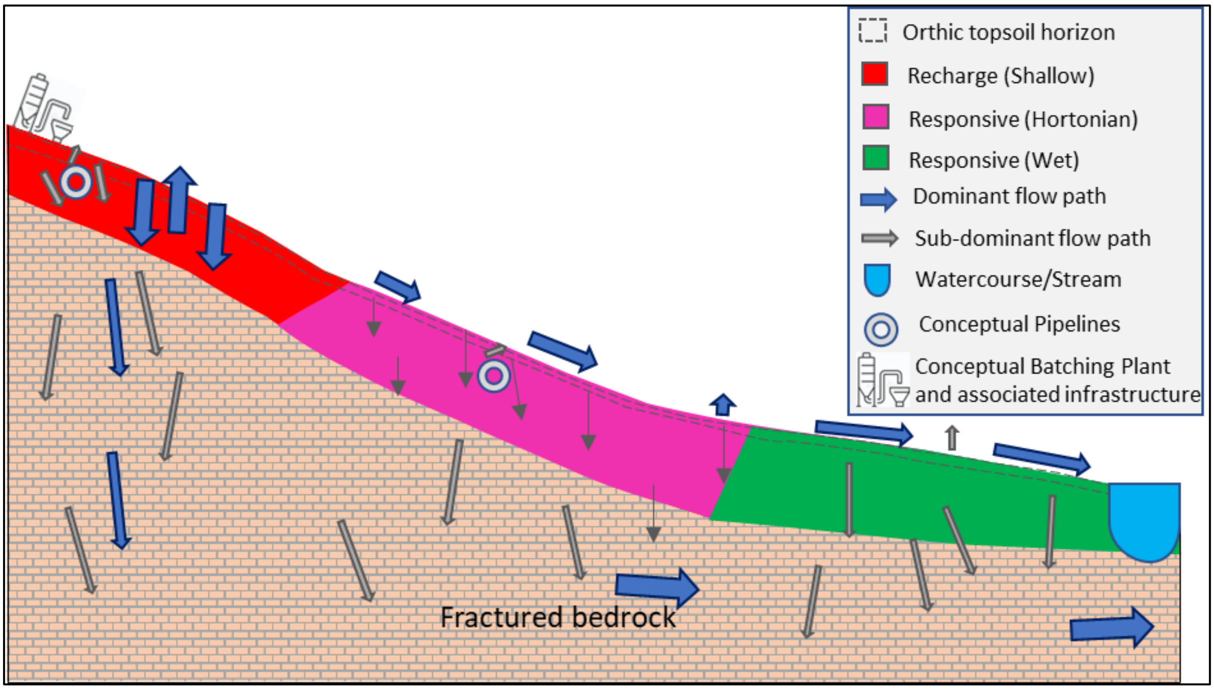


Figure 71 Hillslope hydrology two of four of the distinct hydropedological patterns after the construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

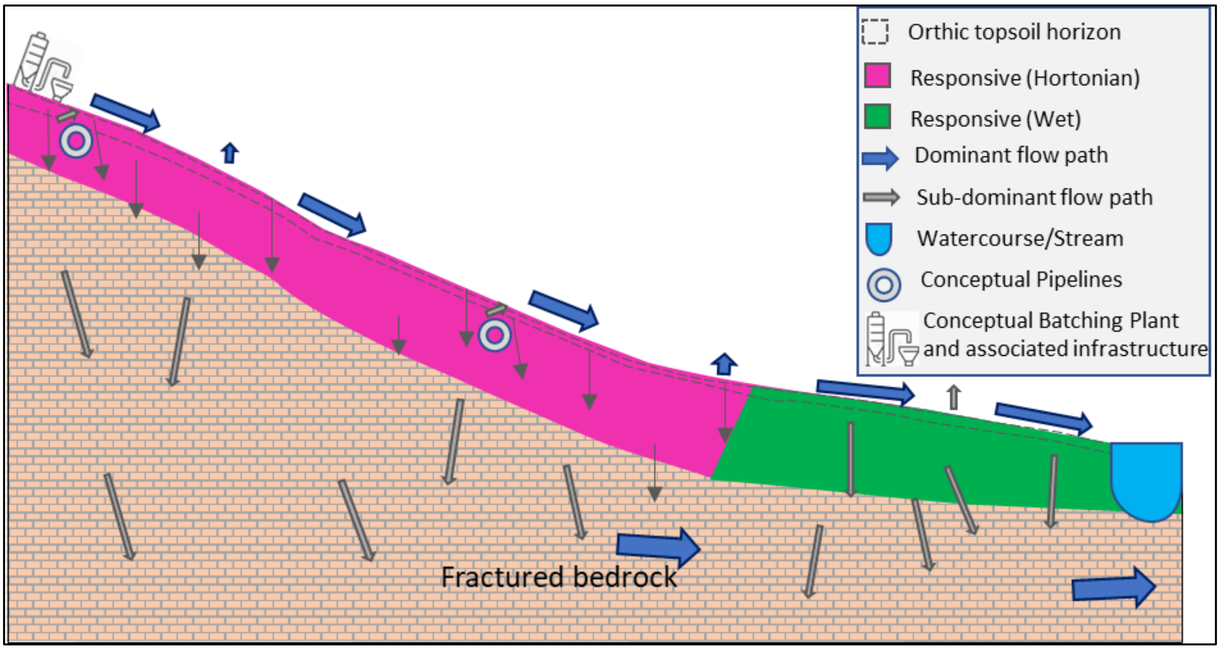


Figure 72: Hillslope hydrology three of four of the distinct hydropedological patterns after the construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

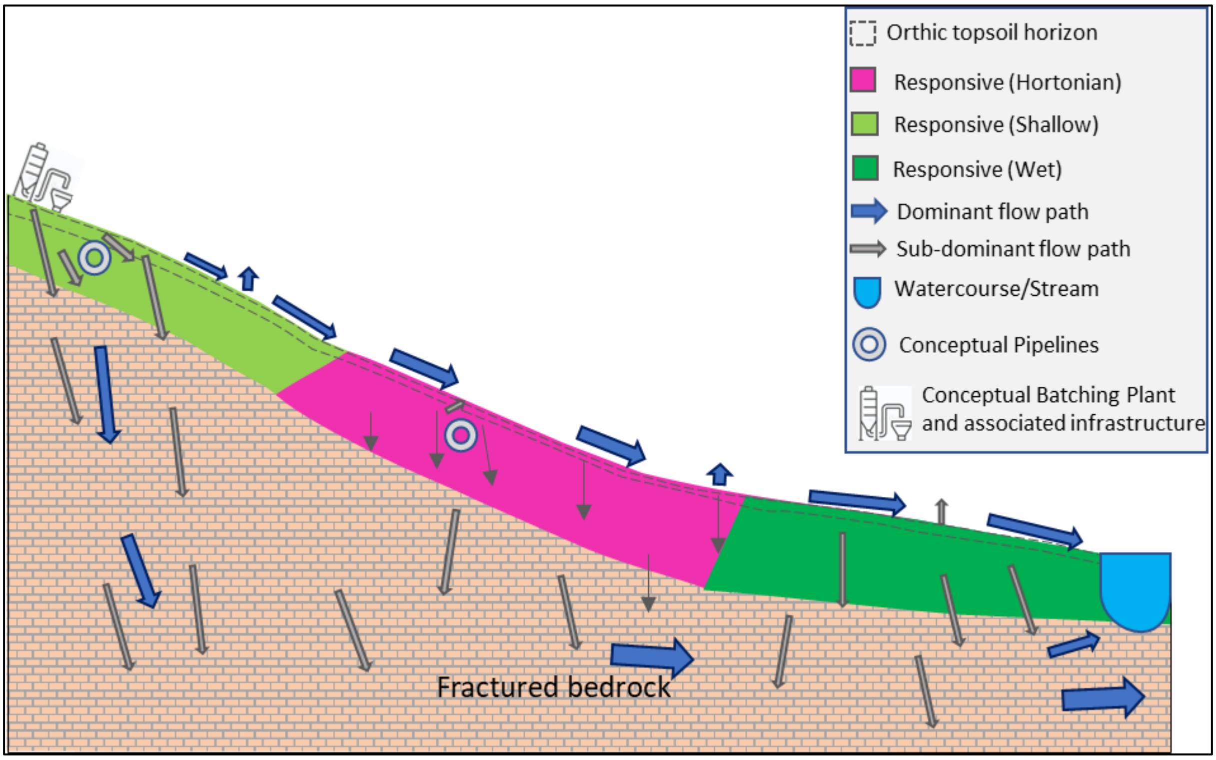


Figure 73: Hillslope hydrology four of four of the distinct hydropedological patterns after the construction of the Concrete Batching Plant Infrastructure Project and associated infrastructure.

7.3 SOCIAL AND CULTURAL ENVIRONMENT

The plant is located in Ward 32, and directly adjacent to Ward 35 and 33 of the Rustenburg Local Municipality (RLM) which falls under the Bojanala Platinum District Municipality (BPDM) of the North West Province.

7.3.1 BOJANALA PLATINUM DISTRICT MUNICIPALITY

The Bojanala Platinum District Municipality forms one of the four District Municipalities of the North West Province, and covers an area of approximately 18 300km^2. The neighbouring municipalities include Waterberg District Municipality in Limpopo, the West Rand District and Tshwane Metropolitan Municipalities in Gauteng, as well as the Ngaka Molema and Dr. Kenneth Kaunda District Municipalities of the North West Province. Five Local Municipalities fall within the BPDM including Madibeng, Rustenburg, Kgetlengrivier and Moses Kotane Local Municipalities. The seat of the BPDM is the city of Rustenburg in the Rustenburg Local Municipality. Due to the BPDM's rich source of mining minerals, especially the platinum group metals, mining is a large contributor to the BPDM's economy, as well as other industries such as agriculture and tourism.

7.3.2 RUSTENBURG LOCAL MUNICIPALITY

The Rustenburg Local Municipality (RLM) covers an area of 3 423km^2 within the Bojanala Platinum District Municipality. The Royal Bafokeng Nation is the traditional tribal community of the northern region of the RLM and covers an area of 1 500km^2. Rustenburg is situated approximately 120km from Johannesburg and Thswane, linked by the R24 and the N4 Freeway. Most of the BPDM's platinum mining activities are located in the RLM, mainly within the 'N4 Platinum Development Corridor' that runs from the east of the RLM to the west. The platinum mining belt extends along the northern region of the Magalies Mountain range, from the Pilanesburg area to the City of Tshwane. The urban settlement pattern has been largely controlled by the Platinum mines and a number of informal settlements have been established in this mining region. Rural villages and small towns (mostly under traditional leadership) are located in more northern regions of the municipality (RLM IDP Review 2024/2025, 2024). Settlements such as Tlaseng, Thekwane, Photsaneng, Luka, Phokeng, Chaneng, and Rankelenyane fall under the Bafokeng tribal land (RLM IDP Review 2024/2025, 2024).Land-use

7.3.3 DEMOGRAPHICS

North West has a growing population of 3 804 547. Rustenburg Local Municipality has the highest population density in the North West with a population of 562 315. The working age population (aged between 15 and 64 years old) comprises 71.3% of the population in RLM (Stats SA, 2022).

The most common language spoken in the North West is Setswana (72.8%) followed by Sesotho (5.9%) and Afrikaans (5.2%) (Stats SA, 2022).

Table 33: Population growth rate estimates (sources: Census 2011, Census 2022).

Area	Population (2011)	Population (2022)	Population Growth (% p.a.)
North West Province	3 509 953	3 804 547	0.8
Bojanala Platinum District Municipality	1 507 505	1 624 428	0.7
Rustenburg Local Municipality	549 575	562 315	0.2

7.3.4 ECONOMY

The mining sector is generally the main contributor to economic growth in the North West Province. Figure 74 represents the Gross Value Added (GVA) by Broad Economic Sector for the year 2021 as per the BPDM 2024/2025 Reviewed IDP. The GVA is an indicator of the sectors' contribution to the overall economy. The mining sector in 2021 contributed the most to the economies for the North West, the BPDM and RLM.

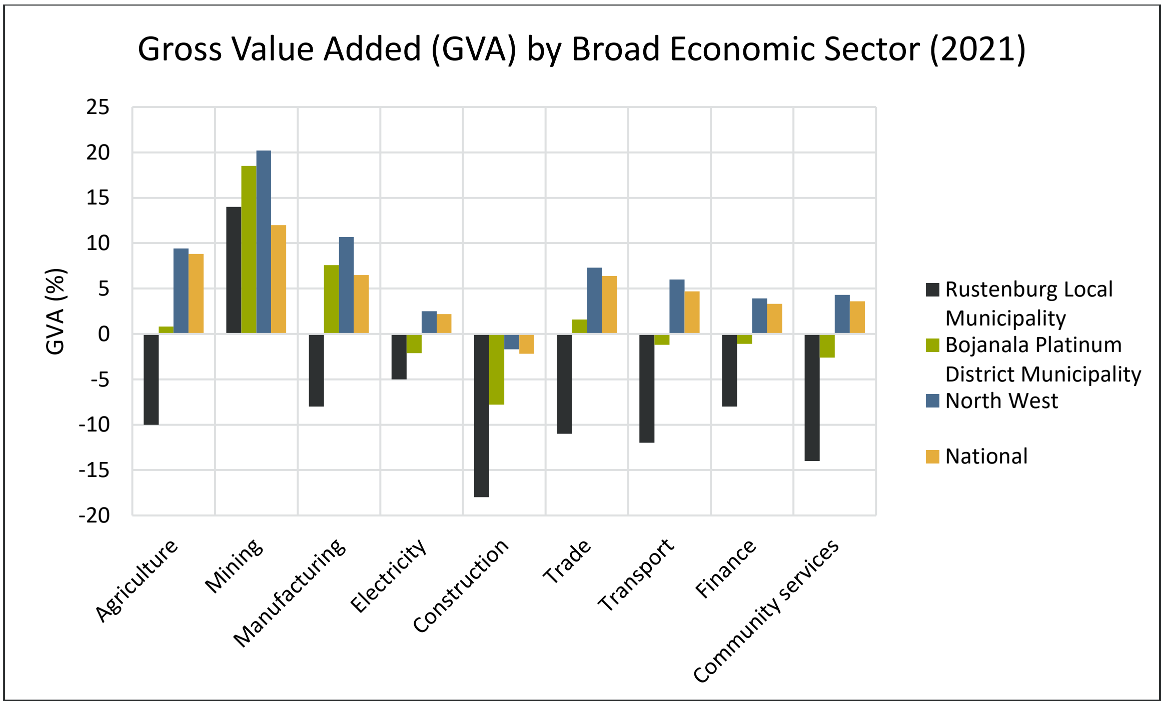


Figure 74: Gross Value Added (GVA) by Broad Economic Sector for the year 2021 (Data source: BPDM - 2024/2025 Reviewed IDP, p. 41 - 42).

The Rustenburg Local Municipality contributed 36.30% towards the Bojanala Platinum District Municipality's Gross Domestic Product (GDP) (R158 billion) in 2020 and is forecasted to have an annual GDP growth rate of 3.68% from 2020 to 2025. The GDP of RLM experienced an increase from R38.2 billion in 2010 to R57.3 billion in 2020. The Rustenburg Local Municipality's economy is heavily reliant on the mining sector which contributed to 80.5% (R43.7 billion) of the total Gross Value Added (GVA) of the RLM in 2020, this was followed by the finance

(6.2%) and community services (5.0%) sectors. The lowest contributor to the RLM GVA was the agricultural sector (below 1%) in 2020 (RLM IDP Review 2024/2025, 2024).

Key contributors to the inhibition of economic development in the Bojanala Platinum District Municipality include factors such as high rates of unemployment and poverty, social inequality (mainly amongst women, youth and people with disability), limited integration between stakeholders, poor roads infrastructure, shortages of energy and water, among others (BPDM - 2024/2025 Reviewed IDP).

7.3.5 EMPLOYMENT

Rustenburg Local Municipality has shown an increasing trend in unemployment with an unemployment rate of 56.6% recorded for 2021 (BPDM - 2024/2025 Reviewed IDP). Unemployment of the economically active youth population (142,219) was calculated to be at a rate of 34.7% (Stats SA, 2011). In 2020, it was estimated that 12.95% of households in the RLM received an annual income of R30 000 or less (RLM IDP Review 2024/2025, 2024). According to the RLM IDP Review 2024/2025 (2024), 49.1% of the Rustenburg Local Municipality's population is living in poverty.

A key challenge that is experienced by the RLM is that the main economic contributor is the mining sector, leading to a lack of diversity in the economic space, thereby limiting alternative job opportunities (RLM IDP Review 2024/2025, 2024).

7.3.6 INFRASTRUCTURE AND PUBLIC SERVICES

The Rustenburg Local Municipality is currently facing challenges with housing and development of settlements, according to the RLM IDP Review 2024/2025 (2024), there are approximately 400 000 families in Rustenburg that do not have adequate shelter. Of the total 203,658 households in the RLM, 53% of households have access to piped water, and 94.5% of households have access to electricity for lighting (Stats SA, 2022). Local authorities remove refuse from 75.6% of households at least once a week, and 1.6% of households less frequently. 72.8% of households have access to flushing toilets which is followed by 24% of households making use of pit toilets (Stats SA, 2022).

7.3.7 EDUCATION

According to Census 2022, over 31% of the population aged between 5 and 24 years old in the RLM did not attend an educational institution. 3.9% of the population over the age of 20 did not receive schooling, while 42.1% received a matric (Stats SA, 2022).

7.3.8 CULTURAL HERITAGE

A Heritage Impact Assessment was undertaken by Dr Lucien James (Environmental Impact Management Services (Pty) Ltd) (APPENDIX D**)**.

7.3.8.1 SITE-SPECIFIC BACKGROUND

The North West Province is associated with a long archaeological record that spans across pre-colonial and colonial periods. Most notable is the area's significance during the South African War (1899-1902). The closest town to the site in question being Kroondal, is specifically important in this regard.

7.3.8.1.1 IRON AGE WALLED STRUCTURES

Firstly, Kroondal 304JQ (all portions included), that is the property with which the settlement shares a name, has been associated with Bafokeng or Batswana Stone Walled Structures (Pistorius, 1999). The structures have been studied extensively with three main sites identified. These have been named KRO001, KRO002, and KRO003 respectively, with KRO002 being the subject of mapping and excavations. Figure 75 is adapted from Pistorius' (1999) study, indicating the locations of the three structures. It is important to note that over the years, the three sites have been extensively disturbed by surrounding mining activity, however, much of these structures are still intact.

Although no further assessment was undertaken as part of the desktop assessment, the research done on these structures was of interest to contextualise the heritage significance of the greater area. KRO002 was of particular interest in Pistorius's (1999) study, with a large section (KRO002.1) of the structure having been mapped and excavated. The structure is an example of more complex stone walled structures, which would have included multiple huts, cattle kraals, and courtyard areas. Figure 78 is a map of the structure itself.

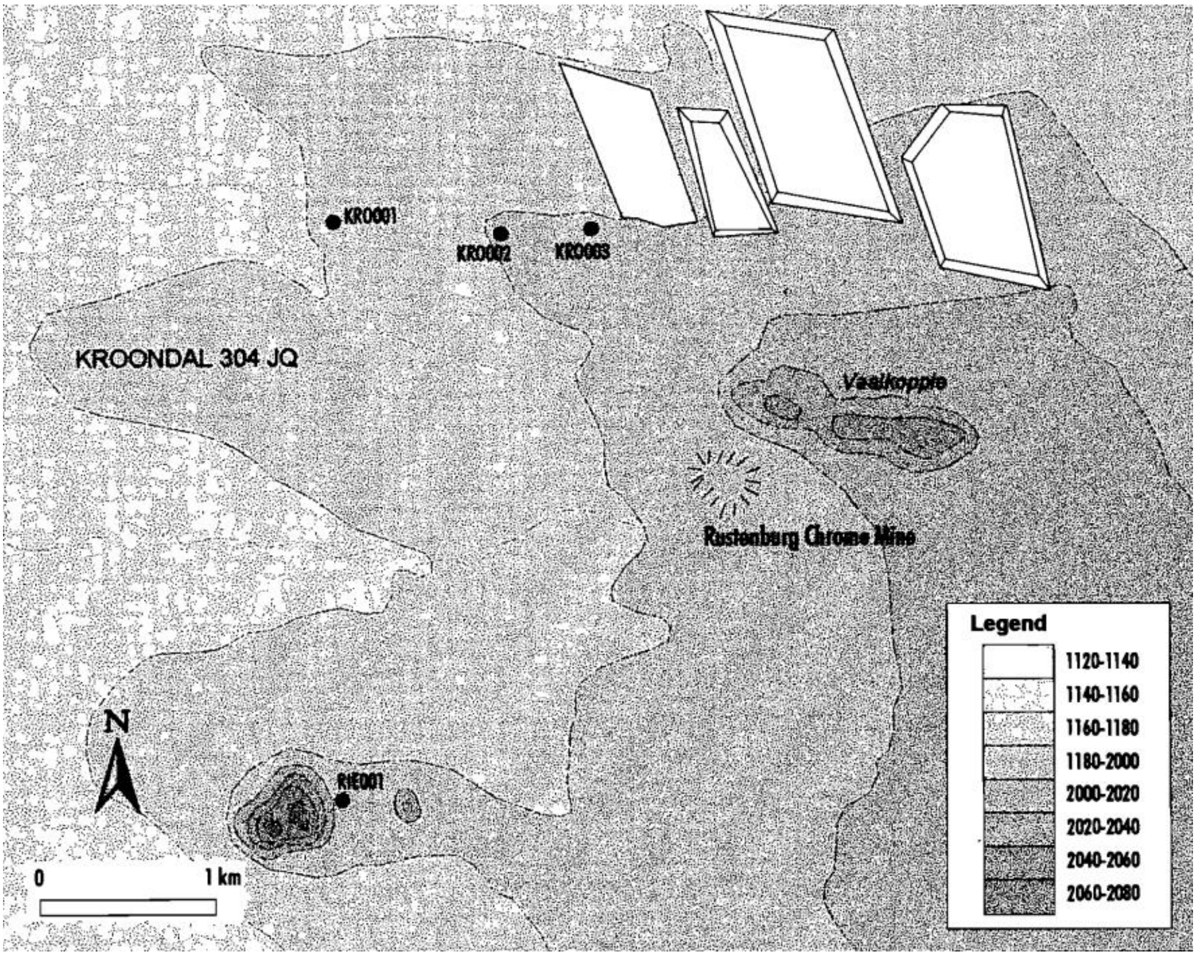


Figure 75: Location of the three stone walled structures (KRO001, KRO002, KRO003) identified on Farm Kroondal 304JQ (after Pistorius, 1999).

Figure 76: Mapped layout of KRO002.1, a section of KRO002. Layout includes different sections of the stone walled complex. (After Pistorius (1999)).

7.3.8.1.2 CULTURAL HERITAGE OF KROONDAL

Kroondal, the closest town to the study site, is associated with a unique cultural heritage background. Dating back to the late 1800s, Kroondal was founded by German missionaries (the Hermannsburg Mission)(Melck, 2012). Kroondal continued to develop during the 1800s, remaining exclusively German until and even throughout the South African War. Many of Kroondal's inhabitants participated in the war, and this had repercussions on the cultural integrity of the town, which at a point during the war was almost deserted or abandoned. However, the town remained and still is to this day, a rare representation of German culture in South Africa.

Key landmarks and tangible representations can be observed through the architecture of the town. The Kroondal Church, having been constructed in 1896, is a key feature and testimony of the town's German heritage (Figure 77). The integrity of the church has been preserved despite its age as a monument and symbol of Kroondal's German cultural heritage. The building is still in use with many German-speaking residents of the town continuing to attend religious events held at the church (Figure 78).

Figure 77: Photograph of Kroondal Church taken in 1896 (after www.ruralexploration.co.za/kroondal).

Figure 78: Photograph of Kroondal Church taken in 2014.

7.3.8.2 DATABASES AND COLLECTIONS

As a key resource centre, the Mafikeng Museum represents the largest collection found in the North-West Province. While this museum is further away from the site, it represents much of the history of the province. Further, the Paul Kruger Country House Museum is a key location capturing historical contexts of Rustenburg, the closest large town or city to the site.

7.3.8.3 PREVIOUS RELEVANT IMPACT ASSESSMENTS

In the context of the current assessment, a background examination of previous historical finds and associations was conducted. Considering available information through the SAHRIS database and previous Archaeological assessments of the area, the following key reports on finds have come to light:

- A report on a Cultural Heritage Impact Assessment for a Proposed Filling Station Development on Portion 140 (A portion of Portion 73) of the Farm Kroondal 304 JQ close to Rustenburg, North-West Province.

The report above was identified as one of the closest Cultural Heritage Studies conducted in proximity to the project site in question. No key finds were noted.

- A survey for Heritage Resources in the Lonmin Marikana Mine Lease Area in the Brits (Madibeng) and Rustenburg (Bafokeng) districts in the North-West Province.

This report involved a large-scale assessment of Archaeological sites and finds across the Lonmin Marikana Mine Lease Area. It represents one of the biggest studies done in the area. The assessment identified numerous sites across the larger area. These include stone wall structures, evidence of historical settlements, historical houses, graveyards, Stone Age sites, as well as LSA sites. While these sites only include examples which are further from the proposed development, these provided some context on the nature of the material anticipated.

- Heritage Impact Assessment: A National Environmental Management Act (Act 107 of 1998) as amended Section 24G Application on the Existing Rietfontein Chrome Wash Plant and Proposed Plant Expansion on the Farm Rietfontein 338JQ, near Kroondal, Rustenburg Local Municipality, Bojanala District Municipality, North West Province.

As the most recent and most in proximity to the current study, this HIA retrospectively assessed the impacts of an existing Rietfontein Chrome Wash Plant and proposed plant expansion ~1,5kms south of the current study area. As key finds of this assessment, an Iron Age settlement, and possible graves were disturbed or destroyed by the unauthorised development. Mitigations were proposed to address affected and to be impacted heritage resources so that impacts can be reduced to an acceptable level to allow for the project's activities to continue.

7.3.8.4 METHODOLOGY

The following section describes the methodology used to gather information on potential heritage resources and impacts in this report. Firstly, an initial desktop assessment was conducted to identify key areas of heritage sensitivity and potential features identified in the past. A field survey was then conducted to verify the significance of any identified features as well as identify any additional features.

7.3.8.4.1 INITIAL DESKTOP ASSESSMENT

To evaluate the overall sensitivity and extent of Archaeological and Heritage features within and around the development footprint, a desktop assessment of the area was conducted. The desktop assessment involved making use of existing information related to heritage resources of the area.

As an initial step, the Screening Tool of the Department of Forestry, Fisheries and the Environment was consulted. The Screening Tool includes a geospatial database of recorded and identified sensitivities relating to Archaeological and Cultural Heritage sites or finds. The information available through the Screening Tool provided a basis which informed further desktop assessments and the extent to which the field survey would be conducted. This information was then corroborated with information available through the South African Heritage Resources Information System (SAHRIS), Chief Directorate: National Geospatial Information (CD:NGI), as well as Google Earth Imagery. Various aerial photographs and 1st Edition Topographic maps were consulted to verify the extent of heritage and archaeological sensitivity in and around the development footprint. Altogether, the data consulted included geospatial records dating as far back as 1955.

7.3.8.4.2 FIELD SURVEY

To verify and add to the observations made through the desktop assessment, a single-day field survey was conducted by Dr Lucien James on 10 September 2025. The field survey involved traversing the footprint of the development to be assessed, with a focus on assessing areas which may have been of heritage significance, and have since been disturbed. The survey also included consulting personnel on site, to gather more insight on any known archaeological sites and finds.

The Archaeologist surveyed key areas of the development footprint, as well as key areas immediately outside of the development footprint, for example, some surrounding roads, undisturbed areas, and areas where the displacement and stockpiling of earth was observed. A Garmin eTrex 10 was used to record track logs of the extent of the survey itself.

7.3.8.4.3 DOCUMENTATION AND ANALYSIS

All observations gathered through the desktop assessment as well as the field survey were documented and analysed in terms of their significance. Through remote sensing, any sites noted through the Screening Tool and SAHRIS were documented in relation to the development. During the field survey, the location of larger Archaeological and Heritage finds was recorded.

Geotagged photographs were taken throughout the survey. This included the photographing of finds, as well as the surrounding environment. Physical scales were included in all photographs which require an understanding of dimensions, sizes and the colour of finds. For larger finds, a 1,5-meter scale divided into 10cm segments was used. For smaller finds, an IFRAO Standard Scale (Figure 79) was used.

Figure 79: IFRAO Standard Scale used for photography of Archaeological finds.

The appointed Archaeologist also kept written notes about the different findings as well as their context. These were recorded in the Archaeologist's personal field journal.

Sites and finds were subsequently analysed in terms of their significance. Several criteria were used to assess the significance of finds and their bearing on the overall heritage significance and sensitivity of the affected area. Table 34 provides a list of the different criteria considered when assessing the significance of finds and or site. In relation to each criterion, different questions were embedded in the analysis of sites and finds.

Table 34: Different criteria and questions which guided the analysis of Archaeological and Heritage finds or sites.

Criterion	Questions which guided analysis
Overall Integrity or condition	1. Is the find or site recognisable beyond initial identification? 2. Is the find or site well or poorly preserved? 3. Has the find or site been disturbed or removed from their original context? 4. Has the find been exposed to severe post-depositional damage or disturbance? 5. What types of meteorological and geomorphological events may have disturbed or compromised the integrity of the find or site?
Context	1. Has the surrounding area been highly disturbed? 2. Is it likely that the find has been removed from its original context? 3. Have other individual finds been located within 15 meters of the find, meriting the description of the find as part of a site? 4. Does the find form part of a collection of more than 3 finds located within 15 meters of each other? 5. Could the find form part of a larger, chronologically or contextually related collection of finds in the area?
Spatial relation to other sites	1. Are there any identified sites located near the find or site? 2. To what extent can the find or site be related to all other sites identified? 3. How close are the other sites to the site or find? 4. Does the occurrence of this site or find change the regional heritage or archaeological narrative?

Criterion	Questions which guided analysis
Prehistoric and historical provenance	1. Can the find or site be identified in terms of which period it relates to, i.e. Stone Age, Iron Age, or Historical? 2. Does the find corroborate or correlate with general understandings of the period it relates to? 3. Does the find or site fit into the heritage narrative of the region or province? 4. Does this find or site add new insight to contemporary understandings of the period it relates to? 5. Does this find or site add new insight to contemporary understandings of Archaeology in South Africa?

7.3.8.4.4 CLASSIFICATION OF SITES

Considering the above-described documentation and analysis methods, heritage finds and sites were classified or graded according to the SAHRA Minimum Standards (2007) recommendations. The grading system adopted in this report is captured in Table 35.

Table 35: Classification of heritage sites as per the SAHRA Minimum Standards (2007) and adopted in this report.

Level	Grade	Significance	Action
National	I	High	Nominate for Field Rating/Grade I
Provincial	II	High	Nominate for Field Rating/Grade II
Local	IIIA	High	Retain as heritage register site, no mitigation advised
Local	IIIB	High	Mitigate and retain as heritage register site
General Protection A	IV A	High/Medium	Mitigate before destruction
General Protection B	IV B	Medium	Record before destruction
General Protection C	IV C	Low	No further recording required

The different criteria considered when analysing finds and sites allowed for subsequent grading and classification. In this regard, prehistoric and historic provenance, spatial relations to other sites, and context allowed for the identification of the level of importance of the site or find. In this regard, finds and sites were graded according to if they were of National, Provincial, Local or General significance. Overall Integrity or condition and context guided the advised mitigation action.

7.3.8.5 FINDINGS

The following section presents the findings of both the desktop assessment as well as the field survey. In summary, a single area of interest was noted through the desktop assessment. The presence of this site was verified through the field survey.

7.3.8.5.1 DESKTOP ASSESSMENT RESULTS

An initial desktop assessment was undertaken to ascertain the overall sensitivity of the area in terms of heritage features. The DFFE Screening Tool was used as an initial point of reference in this regard. The Screening Tool suggested that the area to be developed is of Low Sensitivity as captured in Figure 80.

The DFFE Screening Tool highlighted no heritage features within or in close proximity of the area to be affected by the proposed activities.

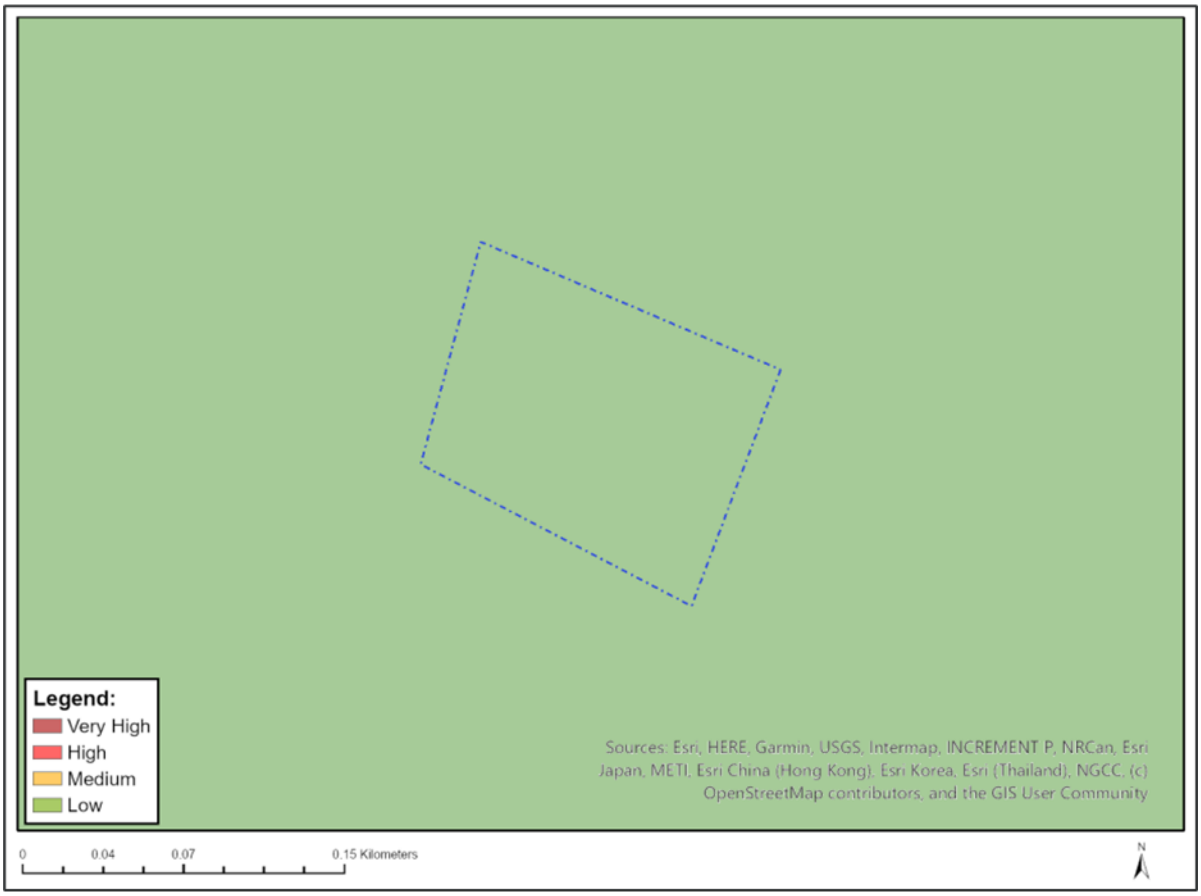


Figure 80: Map of relative Archaeological and Cultural Heritage Sensitivity (DFFE Screening Tool).

The affected area was assessed using Google Earth as well as available surveys and mapping resources via the CDNGI Geospatial Portal (http://www.cdngiportal.co.za/cdngiportal/). The First Edition Topographic map (2527CB) of the area was analysed. As the map was drawn in 1968, it would include information on observations within the footprint of the development. An assessment of the map revealed that the area in question was not developed prior to the assessed development and associated impact of development. A single building and road were noted to the north of the development as the only features in proximity to the area prior to development of the assessed site.

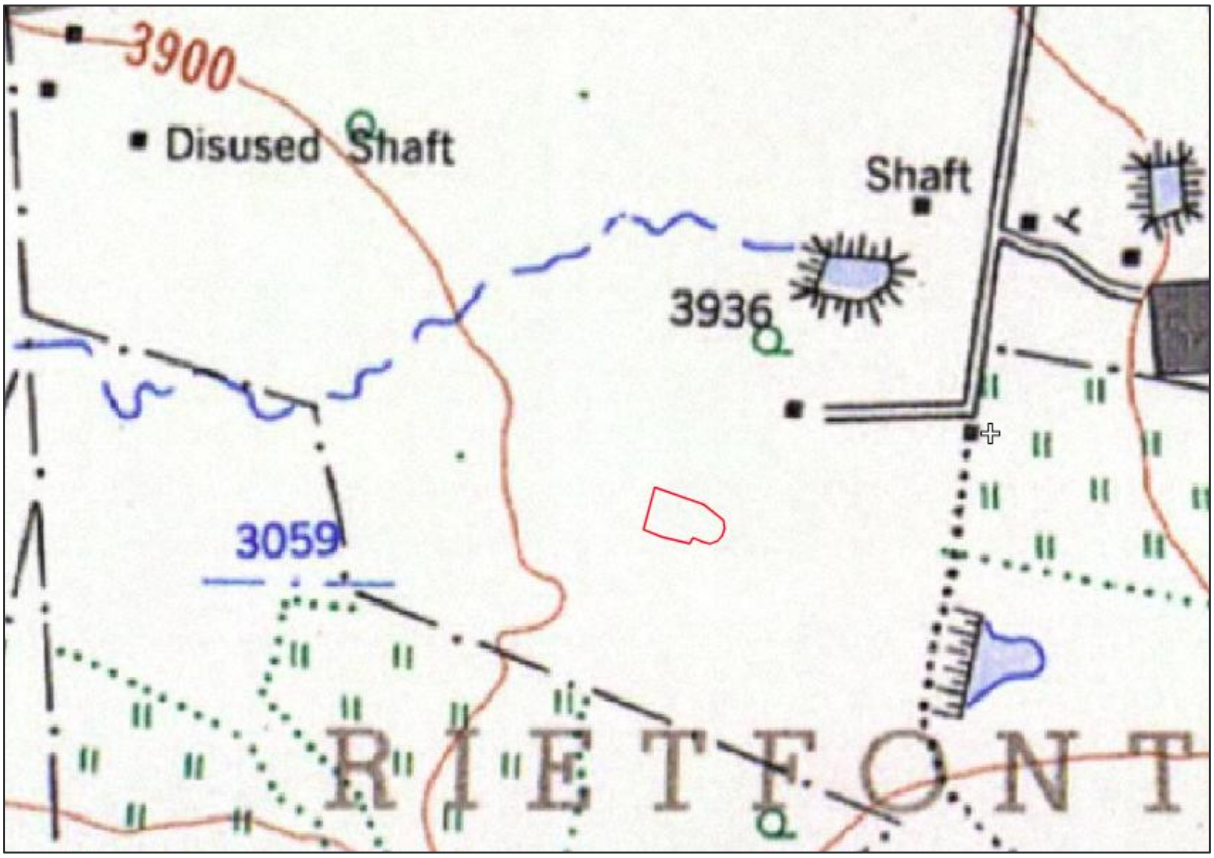


Figure 81: Extract of the First Edition Topographic map 2527CB dated 1968. Development footprint bordered in red.

The area was further studied through aerial photography dating as far back as 1955. The only observation that can be made from early aerial photography is the presence of dense vegetation within, and to the north of the development footprint. Figure 82 is an extract of the photograph indicating the development footprint in relation to the surroundings and landscape of the time.

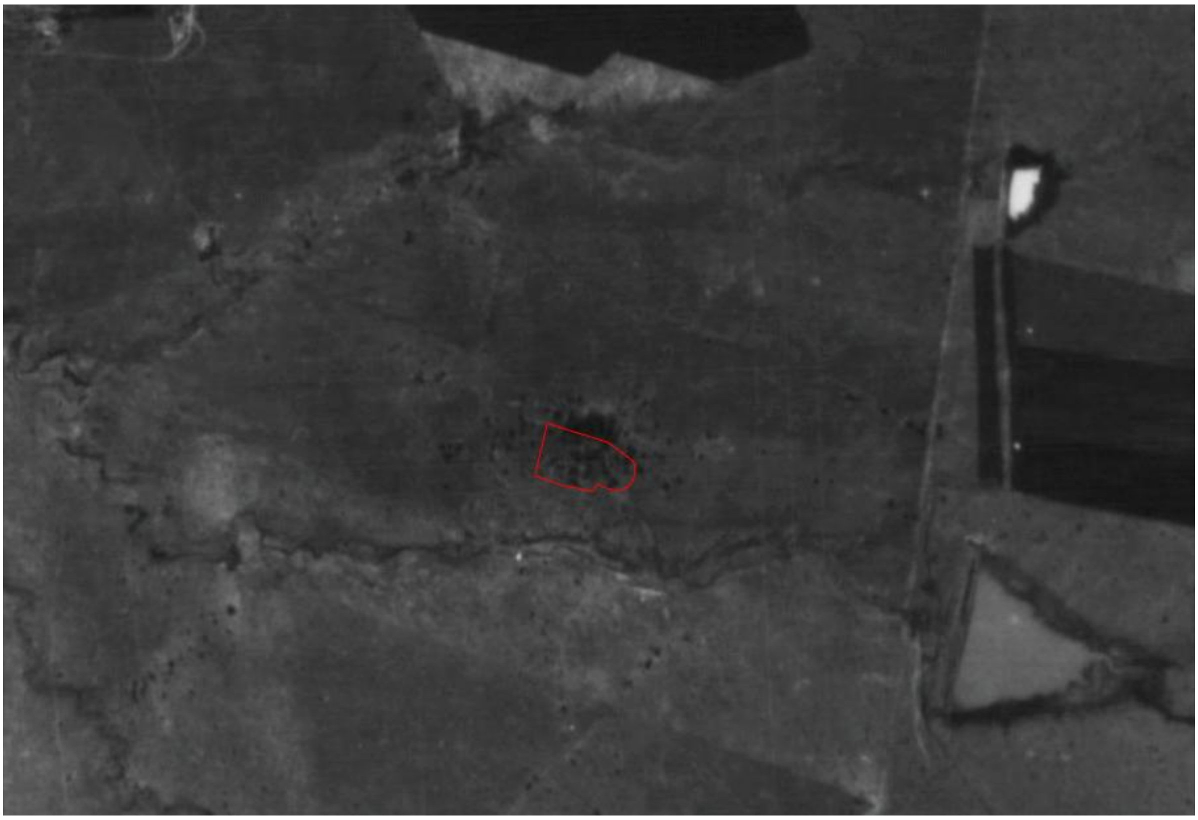


Figure 82: Aerial photograph dated 1955 of the site and surrounding areas. Site bordered in red. Note the patch of dense vegetation north of the site.

7.3.8.6 FIELD ASSESSMENT RESULTS

The appointed Archaeologist surveyed the development footprint and immediate surroundings. The survey covered the extent of the area to be developed with the intention to identify sensitivities in terms of heritage significance. Figure 83 is a map of all the areas surveyed, specifically including the paths tracked out by the Archaeologist. The field survey was conducted on two separate days during Winter.

7.3.8.6.1 GENERAL OBSERVATIONS

The area of the proposed development includes highly disturbed by different land-uses, including mining and agriculture. The development itself is part of mining operations of the broader area. In general, the surrounding area and its overall heritage value has been highly disturbed and altered. As pointed out, the area has been studied previously, and heritage features, particularly Iron Age settlements, have been noted to be present across the landscape.

7.3.8.6.2 ARCHAEOLOGICAL FINDS

Two key sites were noted during the field assessment, mainly evidence of a potential below-ground MSA site (RBP001), and the remains of a LIA occupational site (RBP002). Several other singular finds were noted relating mainly to the LIA occupational site.

Figure 83: Map of areas surveyed and tracked.

7.3.8.6.3 STONE AGE FIND

During the site survey, it was noted that a pit was dug for the purposes of a Geotechnical assessment to the southwest of the overall site footprint. A single MSA tool (RBP001) (Figure 84) was identified in a soil deposit of removed earth. The tool was considered evidence to suggest that there may be a below-ground MSA site at the same location which had now been disturbed (Figure 85). The excavated pit is here considered to have potentially disturbed *in-situ* heritage remains. It is uncertain to what extent the below-ground context has been disturbed and if additional features may be discoverable. For this reason, mitigations have been proposed to prevent further destruction of a potential site.

The feature has been graded as a Grade IV B, advising for the recording of the feature as it is, with caution taken as construction continues.

Figure 84: MSA stone tool identified on a soil deposit near the excavated pit.

Figure 85: RBP001 – Potential MSA Site discovered through excavation as part of proposed activities.

7.3.8.6.4 IRON AGE SITE

As the most significant discovery made during field observations, a LIA site was identified which was impacted on by the development. Corroborating observations made through the desktop assessment, the remains of a SWS were identified among the dense vegetation still present to the north of the site (Figure 86). The SWS included examples of small enclosures similar to examples noted in previous assessments done in the area. A large density of potsherds was identified near the site which appeared to be removed from their original context through the activities of the development (Figure 88). Smaller potsherd scatters were noted along the parameters of the development footprint, as well as near soil or earth deposits (Figure 89). A single stone tool was also identified, also potentially related to the site (Figure 85).

The locations of the potsherd scatters were mapped out separately as individual sites. However, it is considered that all the identified pottery remains originate from the same site which has been since disturbed.

Despite being disturbed to the extent it has been, this site has been graded as a Grade IIIA feature. The impacts of the development on the site have been severe, and proposed mitigations aim to salvage what is left of the value of the site.

Figure 86: RBP002 – Disturbed Stone Wall Structure located to the immediate north of the development footprint.

Figure 87: Large scatter of potsherds among debris associated with the development – this find was located between the SWS and the development footprint.

Figure 88: Smaller densities of potsherds can be noted in other areas around the site.

Figure 89: Another potsherd scatter including a stone tool (left).

7.3.8.7 SUMMARY OF FINDINGS

Following a desktop assessment, potential heritage features were identified within and outside of the development footprint. This mainly included the densely vegetated LIA site which was already disturbed or destroyed by the development itself.

The activities carried out have had an impact on heritage features of the Stone Age and Iron Age. The field survey revealed that excavations to the south of the development have potentially disturbed a below-ground MSA site (RBP001). While only one example of an MSA stone tool was identified, the occurrence of this tool in the soil deposits removed from the pit or excavation is an indicator of the potential for more archaeological material to have been removed out of context, or which may yet be in context.

The field survey further corroborated the presence and extent of the features identified through the desktop assessment, particularly the SWS (RBP002) which would have been situated directly under the development footprint, extending northward. Potsherds or ceramic remains as well as stone tools are some of the material evidence which can be associated with the RBP002.

Although several finds were noted across the development, particularly along its boundaries, the finds are considered to be part of the same occupational site, that is, RBP002. Through site clearance and the moving of earth, the original LIA site, including the SWS, would have been destroyed, and material associated with the occupation would have been displaced.

Figure 90 presents a visual summary of the different findings and their locations. Table 36 provides a summary of the different features identified, a description of the feature, as well as the coordinates of where the feature are located or associated relative central points.

Table 36: Summary of different finds and sites identified.

Feature No.	Description	Rating and Significance	Coordinate
RBP001	MSA stone tool and excavation into original context – Potential in situ MSA Site	Grade IV B Medium	25°43'57.43"S 27°22'1.79"E

Feature No.	Description	Rating and Significance	Coordinate
RBP002	LIA Site inclusive of potsherd scatters and SWS – Site extends across current development	Grade III A High	25°43'54.30"S 27°22'4.08"E

Figure 90: Map of the different finds and sites of interest identified during the field survey.

7.3.9 PALAEONTOLOGICAL

The study area in the North West Province is depicted on the 1: 250 000 Rustenburg 2526 (1981) Geological Map (Figure 91). The proposed study area near Rustenburg, in North-West Province is underlain by Mathlagame Norite -anorthosite (Vcm) of the Rustenburg Layered Suite (Bushveld Complex) (Figure 91 and Table 37). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Rustenburg Layered Suite (Bushveld Complex) is Zero (grey) (Almond and Pether, 2009; Almond *et al*., 2013, Groenewald et al 2014) (Figure 92). The suggested location is classified as having a Medium (orange) Palaeontology Theme Sensitivity in the DFFE (Department of Forestry Fisheries and the Environment)

The Bushveld Complex, one of the world's biggest layered mafic-ultramafic intrusions, contains the Mathlagame Norite-anorthosite unit that consists predominantly of anorthosite interlayered with noritic phases, representing later-stage crystallisation within the Bushveld Complex intrusion (Kruger, 2005). The Bushveld Complex, about 2.06 billion years old, is distinguished for its well-preserved stratigraphy and extensive stocks of platinum group elements (PGEs), chromite, and vanadium (Cawthorn et al., 2002; Mungall et al., 2016).

The Rustenburg Layered Suite exhibits a systematic stratigraphy that is largely igneous in origin. The cyclic layering of gabbro, norite, and anorthosite indicates repeated episodes of magma injection, cooling, and fractional crystallisation. Such processes have resulted in the formation of economically significant PGM reefs and chromitite layers. The Mathlagame Norite-anorthosite reflect magmatic processes and form part of the thicker sequences in the central and western portions of the Bushveld Complex (Cawthorn, 2015; Kruger, 2005).

The Rustenburg Layered Suite of the Bushveld Complex is regarded as unfossiliferous from a palaeontological standpoint due to its igneous origin, as biological material cannot be preserved by high-temperature crystallisation of magmas. This aligns with the designation of Zero Palaeontological Sensitivity on the SAHRIS Palaeomap (Almond *et al*., 2013).

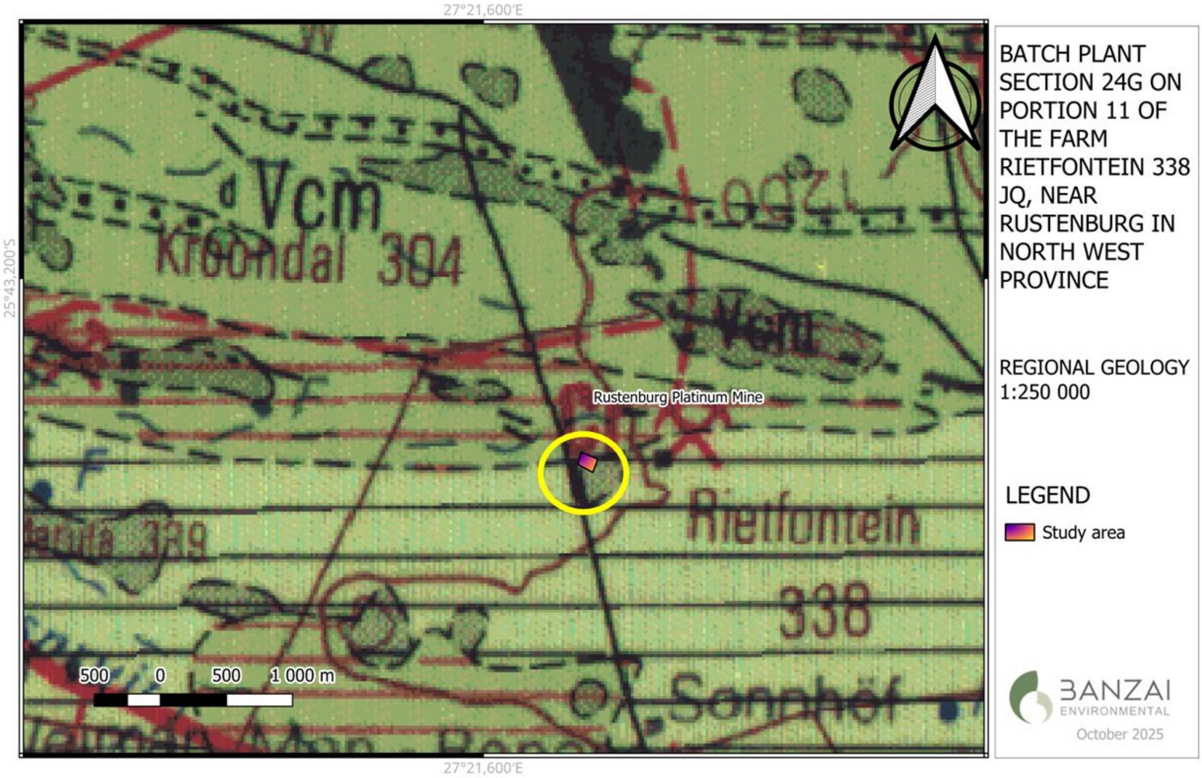
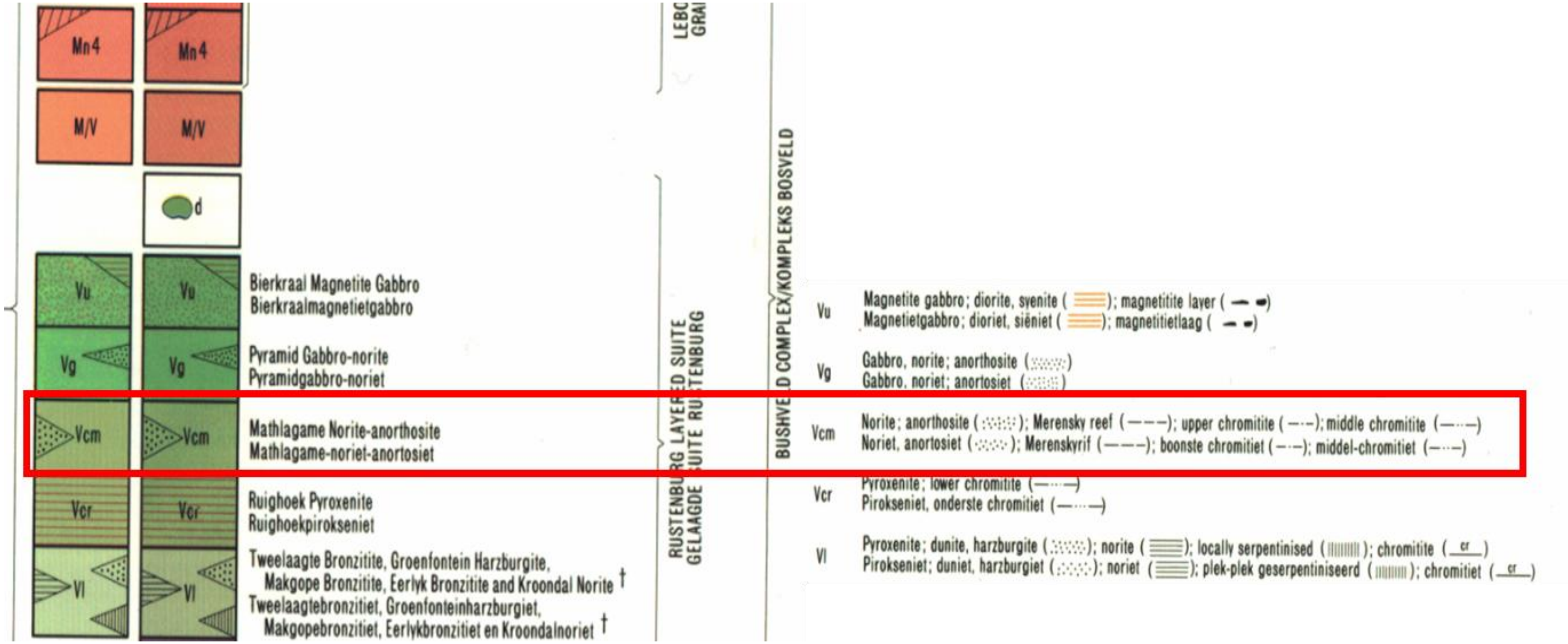


Figure 91: Extract of the 1:250 000 Rustenburg 2526 (1981) Geological Map (Council for Geosciences, Pretoria) indicating that the proposed study area near Rustenburg, in North-West Province is underlain by Mathlagame Norite -anorthosite (Vcm) of the Rustenburg Layered Suite (Bushveld Complex).

Table 37:Legend of the 2824 Kimberly (1993) Geological Map (Council for Geosciences, Pretoria).



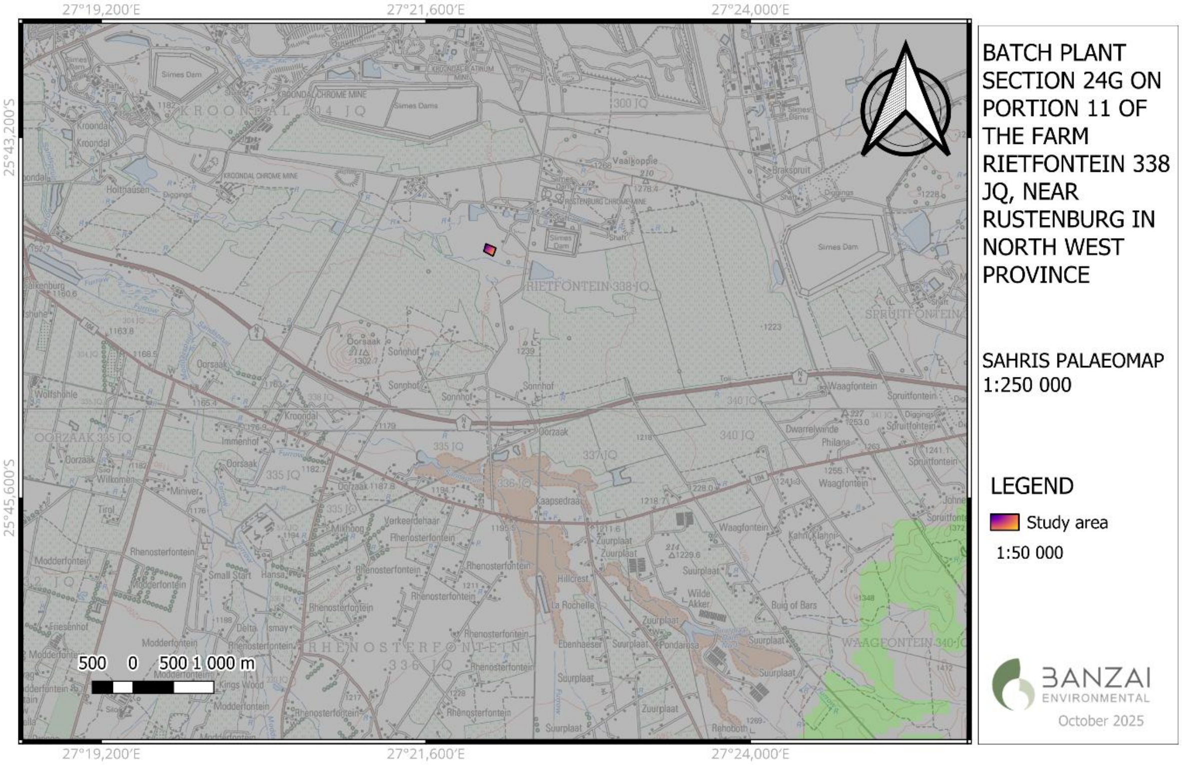


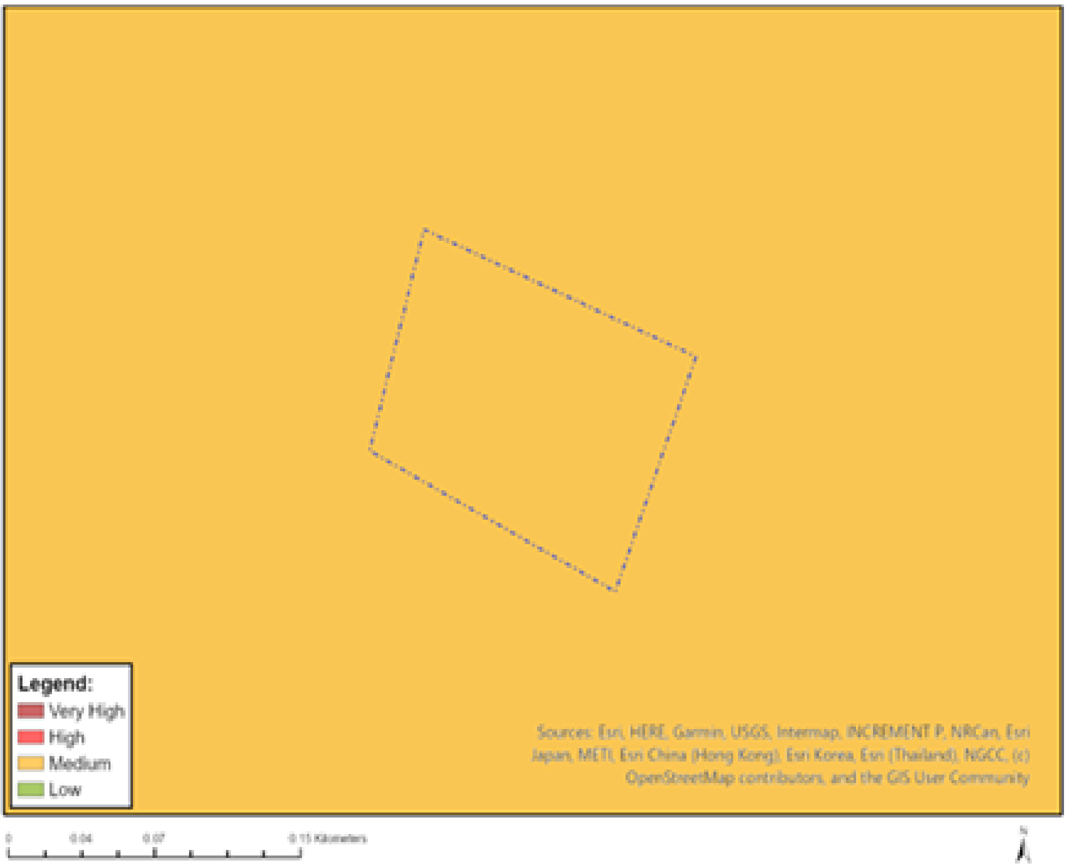
Figure 92: Extract of the SAHRIS PalaeoMap (Council of Geosciences) indicating the Zero (grey) Palaeontological Sensitivity of the study area.

Table 38: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (Almond et al, 2013; SAHRIS website).

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The SAHRIS Palaeosensitivity map (Figure 92) indicates that the proposed development is underlain by sediments with a Zero (grey) Palaeontological Sensitivity, while the DFFE Screening tool indicates a Medium (orange) Palaeontological Sensitivity (Figure 5). The above-mentioned Palaeontological Sensitivities required a desktop assessment being conducted and thus the Palaeontological Sensitivity was not verified by a site investigation. However, desktop research has indicated that the Palaeontological Sensitivity of the area is LOW.

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Features with a Medium paleontological sensitivity

Figure 93: Palaeontological Sensitivity generated by the DFFE National Environmental Web-Based Screening indicating a Medium (orange) Palaeontological Sensitivity of the proposed development.

The Bushveld Complex comprise of the largest mafic intrusion in the world and underlie an area of almost 65 000 km^2. The maximum thickness of these rocks is almost 8 km while individual layers can be followed for about

150 km. This intrusion is world renowned for the ore reserves of platinum-group elements namely chromium and vanadium. The Bushveld Complex is divided in 4 groups namely the Lebowa Granite Suite, Rashoop Granophyre Suite, Rustenburg Layered Suite and Rooiberg Group (Table 39). The latter Group of felsic and minor volcanic rocks may be genetically closer related to the Bushveld event as to the Transvaal Supergroup (Hutton and Schweitzer, 1995). The Rustenburg Layered Suite reveals a complete differentiation sequence of magma and is made up of various rock layers ranging from dunite, gabbro, norite, and pyroxenite, and anorthosite to magnetite and apatite- rich diorite.

Table 39: Currently accepted nomenclature and subdivisions of the Bushveld Complex (Cawthorn et al, 2006). relevant lithology is indicated in a red polygon.

	Standard zonal subdivision (informal)		Nomenclature recommended by SACS (1980), including subsequent additions					
	All areas		Eastern limb		Western limb		Northern limb	
RUSTENBURG LAYERED SUITE	Upper Zone	Subzone C	Roossenekal Subsuite[1]	Luipershoek Olivine Diorite		Bierkraal Magnetite Gabbro		Molendraai Magnetite Gabbro[1]
		Subzone B		Ironstone Magnetite Gabbro				
		Subzone A		Magnet Heights Gabbronorite				
	Main Zone	Upper Subzone[4]	Dsjate Subsuite[1]	Mapoch Gabbronorite		Pyramid Gabbronorite		Mapela Gabbronorite[1]
		Lower Subzone		Leolo Mountain Gabbronorite				
				Winnaarshoek Norite-Anorthosite				
	Critical Zone	Upper Subzone	Dwars River Subsuite[1]	Winterveld Norite-Anorthosite	Schilpadnest Subsuite[1]	Mathlagame Norite-Anorthosite		Grasvally Norite-Anorthosite[1]
		Lower Subzone		Mooihoek Pyroxenite		Ruighoek Bronzitite		
	Lower Zone[3]	Upper Pyroxenite Subzone	Croydon Subsuite[1]	Serokolo Bronzitite	Vlakfontein Subsuite[1]	Tweelaagte Bronzitite	Zoetveld Subsuite[1]	Moorddrift Harzburgite-Pyroxenite[2]
		Harzburgite Subzone		Jagdlust Harzburgite		Groenfontein Harzburgite		Drummondlea Harzburgite[2]
		Lower Pyroxenite Subzone		Rostock Bronzitite		Makgope Bronzitite		Volspruit Pyroxenite[2]
				Clapham Bronzitite		Eerlyk Bronzitite		
	Marginal Zone			Shelter Norite		Kroondal Norite Kolobeng Norite		

[1]Walraven (1986)
[2]Hulbert and Von Gruenewaldt (1982)
[3]Teigler and Eales (1996) suggested that the top of the Lower Zone be taken at the top of the Harzburgite Subzone
[4]Kruger (1994) proposed, on the basis of initial Sr isotopic ratios, that the Upper Subzone of the Main Zone should be included in the Upper Zone

The Bushveld Complex is thus igneous in origin and thus fossiliferous.

7.3.9.1 FINDINGS FROM DESKTOP ASSESSMENT

The proposed Section 24G Application is underlain by Mathlagame Norite -anorthosite of the Rustenburg Layered Suite (Bushveld Complex). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Rustenburg Layered Suite (Bushveld Complex) is Zero (Almond and Pether, 2009; Almond *et al*., 2013, Groenewald et al 2014). The suggested location is classified as having a Medium Palaeontologic Theme Sensitivity in the DFFE (Department of Forestry Fisheries and the Environment) Screening Report. Desktop research (National Database and published data) concluded that fossil heritage of scientific and conservational interest in the development area is rare. A low significance has thus been allocated to the development footprint. This is in agreement with the Zero Palaeontological Sensitivity allocated to the development area by the SAHRIS Palaeontological Sensitivity Map.

A Low Palaeontological Significance has been allocated for impacts associated with the construction phase of the development pre-mitigation and post-mitigation. The construction phase will be the only development phase with the potential of impacting Palaeontological Heritage, and no significant impacts are expected to impact the Operational and Decommissioning phase. As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development are considered to be Low (as the area is not highly fossiliferous), and falls within the acceptable limits for the project. It is therefore considered that the study Project will not lead to damaging impacts on the palaeontological resources of the area. The development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, pending the discovery of newly discovered fossils.

8 ENVIRONMENTAL IMPACT ASSESSMENT

8.1 IMPACTS IDENTIFIED

This Section presents the impacts that have been identified and assessed for the BA. Potential environmental impacts were identified by the EAP, the appointed specialists (where applicable), as well as the preliminary input from the public. The impacts are included in Table 40 below.

When considering cumulative impacts, it is important to bear in mind the scale at which different impacts occur. The identification of impacts is an objective iterative process of considering the project components and activities and how these may interact with the different environmental components. An activity/ environmental component matrix is presented in Table 40 below. The matrix represents which environmental components are likely to be impacted upon by the project activities. Table 41 provides a list of the identified impacts associated with each environmental component.

Table 40: Impact identification matrix.

Phase	Activity	Climate and Air Quality (AQ)	Geology and soils (G)	Groundwater (GW)	Surface water/ wetlands (W)	Noise (N)	Topography (T)	Visual/ Landscape (V)	Flora (FL)	Fauna (FA)	Ecosystems/ habitats (EH)	Social (S)	Cultural Heritage (C)	Economic (E)
		Environmental Component												
Construction (incl. pre construction and post construction rehab)	Site preparation	-	-		-	-			-	-	-		-	
	Vegetation clearance	-	-		-	-	-		-	-	-		-	
	Excavation activities	-	-	-	-	-	-		-	-	-			
Normal Operations	Vehicle movement	-				-								
	Aggregate storage and handling, concrete mixing													
	Job creation											+		
	Vehicle movement													
Abnormal Operations	Hydrocarbon spills		-	-	-				-	-	-	-		-
Decommissioning, Rehabilitation and Closure	Demolition of batching plant infrastructure	-	-		-	-	-						-	

Table 41: Impacts Identified and Assessed during the assessment.

Heading	Impact	Phase(s)	Applicable Infrastructure	Related Activity
Geology and Soils	Soil compaction reducing infiltration and soil health	Construction, Operation	Access roads, batching plant	Site clearing, heavy vehicle movement
Geology and Soils	Increased erosion from exposed surfaces and hardened areas	Construction, Operation	Stormwater channels, concrete pads	Earthworks, surface sealing
Geology and Soils	Soil contamination from hydrocarbons and cementitious materials	Construction, Operation	Bunded diesel storage, batching area	Refueling, concrete mixing
Hydropedology	Increased overland flow due to surface sealing	Construction, Operation	Concrete pads, stormwater channels	Surface sealing, traffic
Hydropedology	Reduced subsurface lateral and return flow	Construction, Operation	Roads, batching plant	Earthworks, compaction
Wetlands	Wetland degradation and loss of ecological function	Construction, Operation	Pollution Control Dam, batching plant	Clearing, runoff diversion
Wetlands	Contamination of wetland from cement and hydrocarbons	Construction, Operation	Stormwater system, bunded storage	Spills, stormwater discharge
Wetlands	Altered hydrology and reduced infiltration	Construction, Operation	Roads, concrete pads	Surface hardening
Terrestrial Biodiversity	Loss of indigenous vegetation within footprint	Construction	Batching plant footprint	Clearing indigenous vegetation
Terrestrial Biodiversity	Habitat fragmentation and disturbance of fauna	Operation	Roads, lighting	Continuous disturbance
Terrestrial Biodiversity	Spread of alien and invasive plant species	Construction, Operation	Disturbed margins	Stockpile management

Heading	Impact	Phase(s)	Applicable Infrastructure	Related Activity
Cultural Heritage	Disturbance or destruction of Late Iron Age stone-walled structures	Construction	Excavation zones	Earthworks, site clearing
Cultural Heritage	Chance finds of Middle Stone Age archaeological material	Construction	Batching plant footprint	Excavation
Paleontology	Disturbance of fossil material (low likelihood)	Construction	Excavation zones	Ground disturbance
Social	Job creation and local economic benefits	Operation	Entire plant	Plant operation
Social	Stakeholder fatigue and cumulative social impacts	All phases	Entire footprint	Engagement activities
Unplanned Events	Spills causing soil and water contamination	All phases	Fuel storage, batching area	Accidental discharge
Unplanned Events	Fire causing vegetation loss and safety risks	All phases	Entire site	Emergency incidents
Cumulative Impacts	Combined degradation of soils, wetlands, and biodiversity	All phases	Entire project footprint	All activities

8.2 IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence I of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives. Where possible, mitigation measures will be recommended for impacts identified.

The impact assessment matrix (including pre- and post-mitigation assessment) is included in APPENDIX E. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested and have been updated during the investigation.

8.2.1 DETERMINATION OF ENVIRONMENTAL RISK

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence I of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent I, Duration (D), Magnitude (M), and reversibility I applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 42 below.

Table 42: Criteria for Determining Impact Consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or

Aspect	Score	Definition
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 43.

Table 43: Probability Scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

Table 44: Determination of Environmental Risk.

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in **Table 45**.

Table 45: Significance Classes.

Risk Score	Description
< 10	Low (i.e. where this impact is unlikely to be a significant environmental risk).
≥ 10; < 20	Medium (i.e. where the impact could have a significant environmental risk),
≥ 20	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

8.2.2 IMPACT PRIORITISATION

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 46: Criteria for Determining Prioritisation.

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in **Table 46**. The impact priority is therefore determined as follows:

Priority = CI + LR

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to **Table 47**).

Table 47: Determination of Prioritisation Factor.

Priority	Ranking	Prioritisation Factor
2	Low	**1**
3	Medium	**1.125**
4	Medium	**1.25**
5	Medium	**1.375**
6	High	**1.5**

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 48: Environmental Significance Rating.

Value	Description
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

8.3 DESCRIPTION AND ASSESSMENT OF IMPACTS

This section describes each identified environmental impact in the context of the activity and associated aspect and provides reasons why specific ranking/ rating of the component attributes of the impact assessment are given.

8.3.1 GEOLOGY AND SOILS

8.3.1.1 SOILS AND AGRICULTURE

In accordance with the requirements for Environmental Authorisation for a Rectification as per NEMA Section 24G, a retrospective assessment was undertaken to determine the potential state of the environment prior to development taking place as well as the likely impacts that the development has had on the area. The following list provides the identified retrospective impacts which contributed to the loss of land capability:

Soil erosion: Bare soil surfaces within the proposed project area contributed to increased susceptibility to wind and water erosion, leading to loss of topsoil;

Soil compaction from vehicle traffic: The movement and operation of vehicles within the project footprint, resulted in increased soil compaction, which adversely affected soil structure and permeability;

Soil contamination: Surface flow from septic tank and bunded diesel storage can lead to soil contamination, impacting soil health and productivity, and

Soil compaction and degradation from the construction of existing infrastructure: The presence of existing infrastructure such as offices, firebreak, bunded diesel storages, to mention the few caused further soil compaction and land degradation, disturbing soil structure and reducing overall soil quality.

The following table provides the framework for the prospective impacts, albeit limited, for the proposed activities which includes the PCD and its associated silt trap and the various stormwater channels which will be utilised to capture runoff on site (Table 49).

Table 49: Summative results of the Impact Assessment conducted for the proposed project.

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
Soil compaction, Soil erosion, Land degradation and Soil contamination	Construction	Medium to low -	Low -	Low -
Mitigation Measures				
• Avoidance of all high agricultural production land and other actively cultivated areas, where avoidance is not feasible stakeholder engagement should occur to compensate affected landowners; • Minimise project footprint as far as possible. Manage location of topsoil stripping stockpiling, demarcation of topsoil stockpiles and prevention of stockpile erosion and contamination. This can protect the topsoil stockpiles to keep it viable for rehabilitation purposes. • Make use of existing roads or upgrades tracks before new roads are constructed. The number and width of internal access routes must be kept to a minimum. Usually, areas with sandy soils are avoided as far as possible for heavy vehicles, areas dominated with sandy soils, dust suppressions methods should be implemented to reduce wind erosion during this phase;				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
• Implementation of embedded controls such as geotextiles, gabion baskets can effective control soil erosion on-site; • Associated infrastructure foundations must be (preferably) located in already disturbed areas where possible; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. • Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface (with "dirty water") and putting up signs to enforce speed limits to enforce reduced speeds. • No non-environmentally friendly suppressants may be used as this could result in pollution of water sources. • A stormwater management plan must be implemented for the development. The plan must provide input into the road network and management measures; • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Operation	Medium to low -	Low -	Low -
Mitigation Measures				
• Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. • No non-environmentally friendly suppressants or cleaning agents may be used as this could result in pollution of water sources. • A stormwater management plan must be implemented for the development. The plan must provide input into the road network and management measures; • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Decommissioning	Low -	Low -	Medium to low -
Mitigation Measures				
• Install erosion and sediment control measures (silt fences, sediment basins, straw bales). • Remove infrastructure, like racking, inverters, and electrical infrastructure. Remove all above-ground and below-ground cabling, foundations, and concrete pads. • Remove hazardous materials (batteries, oils, chemicals) for proper disposal.				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
• Remove all construction debris and waste from the site. • Decompact soils in areas affected by heavy machinery (use subsoiling or deep ripping). • Replace and evenly spread any stockpiled topsoil. • Reseed or replant with native or pre-existing vegetation suited to the soil capability. • Maintain erosion and sediment controls until vegetation is re-established • Conduct post-restoration soil assessments (compaction, fertility, structure). • Document and report restoration outcomes to relevant authorities.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Rehab and Closure	Low -	Low -	Low -
Mitigation Measure				
• Install erosion and sediment control measures (silt fences, sediment basins, straw bales). • Remove all construction debris and waste from the site. • Decompact soils in areas affected by heavy machinery (use subsoiling or deep ripping). • Replace and evenly spread any stockpiled topsoil. • Reseed or replant with native or pre-existing vegetation suited to the soil capability. • Maintain erosion and sediment controls until vegetation is re-established • Conduct post-restoration soil assessments (compaction, fertility, structure). • Document and report restoration outcomes to relevant authorities. • Conduct a final site inspection with stakeholders and authorities.				

Table 50 below indicates the impact assessment of the existing activities on site as they relate to the Batching plant. The assessment accounts for both the construction, operation and decommissioning activities on site. The impact assessment as it relates to construction phase was retrospectively undertaken since the infrastructure had already been constructed and commenced operation.

Table 50: Summative results of the Impact Assessment conducted for the existing project

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
Soil compaction, Soil erosion, Land degradation and Soil contamination	Construction	Medium to low -	Low -	Low -
Mitigation Measures				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
• Avoidance of all high agricultural production land and other actively cultivated areas, where avoidance is not feasible stakeholder engagement should occur to compensate affected landowners; • Minimise project footprint as far as possible. Manage location of topsoil stripping stockpiling, demarcation of topsoil stockpiles and prevention of stockpile erosion and contamination. This can protect the topsoil stockpiles to keep it viable for rehabilitation purposes. • Make use of existing roads or upgrades tracks before new roads are constructed. The number and width of internal access routes must be kept to a minimum. Usually, areas with sandy soils are avoided as far as possible for heavy vehicles, areas dominated with sandy soils, dust suppressions methods should be implemented to reduce wind erosion during this phase; • Implementation of embedded controls such as geotextiles, gabion baskets can effective control soil erosion on-site; • Associated infrastructure foundations must be (preferably) located in already disturbed areas where possible; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. • Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface (with "dirty water") and putting up signs to enforce speed limits to enforce reduced speeds. • No non-environmentally friendly suppressants may be used as this could result in pollution of water sources. • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Operation	Medium to low -	Low -	Medium to low -
Mitigation Measures				
• Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. • No non-environmentally friendly suppressants or cleaning agents may be used as this could result in pollution of water sources. • Rehabilitation of the area must be initiated from the onset of the project. Soil stripped from infrastructure placement can be used for rehabilitation efforts; and • An alien invasive plant species and control programme must be implemented from the onset of the project.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Decommissioning	Low -	Low -	Low -

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
Mitigation Measures				
• Install erosion and sediment control measures (silt fences, sediment basins, straw bales). • Remove infrastructure, like racking, inverters, and electrical infrastructure. Remove all above-ground and below-ground cabling, foundations, and concrete pads. • Remove hazardous materials (batteries, oils, chemicals) for proper disposal. • Remove all construction debris and waste from the site. • Decompact soils in areas affected by heavy machinery (use subsoiling or deep ripping). • Replace and evenly spread any stockpiled topsoil. • Reseed or replant with native or pre-existing vegetation suited to the soil capability. • Maintain erosion and sediment controls until vegetation is re-established • Conduct post-restoration soil assessments (compaction, fertility, structure). • Document and report restoration outcomes to relevant authorities.				
Soil compaction, Soil erosion, Land degradation and Soil contamination	Rehab and Closure	Low -	Low -	Low -
Mitigation Measure				
• Install erosion and sediment control measures (silt fences, sediment basins, straw bales). • Remove all construction debris and waste from the site. • Decompact soils in areas affected by heavy machinery (use subsoiling or deep ripping). • Replace and evenly spread any stockpiled topsoil. • Reseed or replant with native or pre-existing vegetation suited to the soil capability. • Maintain erosion and sediment controls until vegetation is re-established • Conduct post-restoration soil assessments (compaction, fertility, structure). • Document and report restoration outcomes to relevant authorities. • Conduct a final site inspection with stakeholders and authorities.				

8.3.1.1.1 CUMULATIVE IMPACTS

The quantitative impact of the proposed project in isolation on agriculture is anticipated to be “Low” due to the presences of low agricultural potential soils. The cumulative impact of the proposed project is anticipated to be “Medium”. The project area has undergone historic and current modification, like the developmental disturbances associated to the mining activities that the local area has currently.

After implementation of the mitigation measures such as implementation of erosion control methods, preventing soil contamination and rehabilitating disturbed and bare surfaces as stipulated above the agricultural productivity of the area is not expected to deteriorate further because of the proposed development and no irreplaceable loss of resources is anticipated.

Table 51*:* Cumulative Impacts associated with the proposed project

Status	Post mitigation ER	Can impact be mitigated?	Is the impact acceptable?
Impact in isolation	Low	Yes	Yes
Cumulative impact	Medium		

8.3.1.2 HYDROPEDOLOGY

8.3.1.2.1 CONSTRUCTION AND OPERATION PHASE

The following existing infrastructure includes access road; offices with a septic tank; firebreak with road acting as a berm; bunded diesel storage; bunded Water storage tank, aggregate storage, cement silos; concrete mixer and the proposed infrastructure expansion for the concrete base working area and stormwater channels and a stormwater dam. Soil erosion, sedimentation or overland flows can occur due to increased traffic on the surface during the construction phase which can also result in compaction and surface sealing. Overland flow and potential erosion of terrestrial and wetlands soils can occur which can lead to loss of fertile topsoil. Soil erosion can also contribute to water pollution and siltation of rivers. Surface sealing will also promote head cutting instreams and loss of fertile topsoil. Existing sealed areas can intercept lateral flow paths and remove connectivity between recharge zones and lateral flow zones. Alteration of this flow path will likely change the water regimes negatively, even though the impact should be acceptable. The draw-down effect on the water flows can also occur impacting the water regimes as well where trenches are excavated for pipelines or drainage. These effects are manageable as the post mitigation for the existing infrastructure has been scored low to medium and also low to medium post mitigation for the proposed infrastructure expansions(Table 51).

8.3.1.2.2 DECOMMISSIONING AND CLOSURE PHASE

The phase will include closure and ceasing of the batching plant and associated infrastructure processing activities. Some of the infrastructure will be removed from the site for decommissioning, this will be done with specialist on the site. Increased traffic will occur on-site, though the effects are expected to be minimal and manageable and mitigation measures will already be implemented. These effects are manageable as the post mitigation has been scored low(Table 52).

Table 52: Impact assessment of erosion due to increased overland flow and potential decrease in subsurface lateral flow and return flow on the environment for the proposed infrastructure.

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
Soil erosion due to increased overland flow	Construction	Medium to low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Construction	Medium to low -	Low -	Medium to Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Soil erosion due to increased overland flow	Operation	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Operation	Medium to low -	Low -	Medium to Low -
Mitigation Measures				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Soil erosion due to increased overland flow	Decommissioning and Closure	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Decommissioning and Closure	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				

Table 53: Impact assessment of potential decrease in subsurface lateral flow and return flow and potential decrease in subsurface lateral flow and return flow on the environment for the existing infrastructure.

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
Soil erosion due to increased overland flow	Construction	Medium to low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Construction	Medium to low -	Low -	Medium to Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Soil erosion due to increased overland flow	Operation	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Operation	Medium to low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Soil erosion due to increased overland flow	Decommissioning and Closure	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover;				

Impact	Phase	Pre-Mitigation Impact	Post-mitigation Impact	Final Significance
• Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				
Potential decrease in subsurface lateral flow and return flow	Decommissioning and Closure	Low -	Low -	Low -
Mitigation Measures				
• Minimise soil compaction and keep the soil covered with mulching residue (plant or gravel) and vegetative cover; • Infiltration basin or trench only where necessary can minimise surface overflows or runoffs and allow water that runs off from roofs to settle and re-infiltrate; • Installation of pre-treatment stormwater practices which remove large sediment and other solids upstream of infiltration practice; and • Adhering to the recommended footprint buffers and wetland buffers (15 m minimal) or wetland rehabilitation measures if encroaching within this buffer as proposed with the wetland specialist for the proposed project area should be sufficient to reduce the deductible water losses in the catchment. Also prevent any discharge of untreated potential wastewater into the catchment as responsive saturated soils (mostly associated with the valley bottoms or along water channels) have a high tendency to promote contaminant (i.e., Bacteria and inorganic elements) migrations towards water resources.				

8.3.2 WETLANDS

The EIMS impact assessment was used to score the retrospective impacts associated with the unlawful activities (Table 54) as well as to score the prospective activities associated with the construction of the stormwater channels and dam (Table 55). A similar approach was used as was undertaken for the DWS risk assessment where the retrospective assessment includes the operational phase for the existing activities and the prospective assessment includes the decommissioning phase for the development in its entirety.

The retrospective assessment shows that the risks from the Batch Plant are generally of "medium to low" significance before mitigation. With the application of mitigation measures, all impacts are reduced to "low" significance, indicating effective management. Rehabilitation and closure activities are expected to improve infiltration and support natural recovery, with some short-term disturbance but overall positive outcomes. The results confirm that, with proper controls, the long-term impacts on wetland health and function are minimal. The mitigation measures proposed are primarily aimed at the continuation of operations, while remediation recommendations precedence for the construction phase, as the activities have already commenced and it is not possible to fully mitigate impacts that have already occurred.

Table 54: EIMS Impact Assessment for the unlawful activities in the retrospective scenario.

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
Loss of native wetland vegetation and shift in vegetation composition.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Prioritize rehabilitation of disturbed areas with indigenous species. • Minimise the footprint of construction activities and clear only necessary areas. • Adhere to wetland buffer zones to protect undisturbed vegetation.				
Possible changes in water movement and infiltration due to compaction.	Construction	Medium to low -	Low-	Low-
Mitigation Measures:				
• Restrict heavy machinery to designated routes. • Use low-impact construction techniques within and near watercourse when required. • Loosen compacted soils and revegetate post-construction.				
Reduced soil permeability leading to concentrated flows and increased erosion.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Rehabilitate compacted areas by tilling and planting native vegetation. • Maintain vegetative cover on all open spaces and slopes.				
Wetland degradation and reduced habitat quality.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Restore habitat structure during rehabilitation. • Ensure adherence to the wetland buffer and application of all other mitigation measures to prevent cumulative wetland degradation.				
Wetland contamination, especially from hydrocarbons and cementitious materials from spills and leaks of diesel tanks and construction machinery.	Construction	Medium to high-	Medium to low-	Medium to low-
Mitigation Measures:				
• Store fuels and chemicals in bunded, secure areas.				

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
• Implement spill prevention and response plans. • Regularly inspect and maintain machinery to prevent leaks. • Train staff involved in handling of chemicals and mixes in spill response procedures.				
Potential contamination of soil and water if septic systems fail or leak.	Construction	Low-	Medium to low-	Medium to low-
Mitigation Measures:				
• Regularly inspect and maintain septic systems. • Monitor for leaks and repair immediately. • Contain spills to prevent discharge of untreated effluent into watercourses.				
Improvement of infiltration and reduction in runoff/erosion potential.	Rehab	Low -	Low-	Medium to low-
Mitigation Measures:				
• Undertake rehabilitation from existing access points and roads.				
Elimination of ongoing disturbance, allowing natural recovery; may cause short-term soil disturbance during removal.	Rehab	Medium to low-	Low-	Low-
Mitigation Measures:				
• Undertake rehabilitation from existing access points and roads. • Phase removal activities, where applicable, to minimise disturbance. • Monitor recovery and intervene if natural regeneration is insufficient.				
Ongoing vegetation suppression around the Batch Plant increasing risk of the establishment of alien or weed species.	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Implement a regular monitoring and removal program for alien and invasive plant species. • Restore and maintain indigenous vegetation buffers around the Batch Plant. • Minimise unnecessary clearing and disturbance of vegetation. • Use only certified weed-free materials for landscaping and rehabilitation.				
Hardened surfaces leading to increased flows.	Operation	Medium to low-	Low-	Low-

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
Mitigation Measures:				
• Maintain and regularly inspect stormwater infrastructure to ensure proper functioning. • Incorporate green infrastructure (e.g., rain gardens, bioswales) in landscaping to enhance infiltration and reduce runoff. Maintain vegetative cover on all open spaces and slopes. • Hardened ground must be lightly tilled and revegetated to promote infiltration wherever possible. • Direct runoff from hardened surfaces to vegetated areas for natural filtration.				
Soil compaction and alteration of overland flows leading to erosion.	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Ensure machinery and vehicle traffic is restricted to designated routes. • Maintain vegetative cover on all open spaces and slopes. • Hardened ground must be lightly tilled and revegetated to promote infiltration. • Monitor for signs of erosion and repair affected areas promptly by backfilling and revegetating with indigenous vegetation. • Ensure stormwater outlets are energy-dissipated and do not discharge directly into wetlands.				
Impaired water quality from contaminated runoff entering the wetland.	Operation	Medium to low-	Low-	Medium to low-
Mitigation Measures:				
• Regularly inspect and maintain sewer and stormwater systems to prevent leaks and overflows. • Maintain storage of diesel and chemicals in bunded areas. • Conduct regular inspections of bunded areas and septic tank infrastructure to ensure no leaks and ensure adequate maintenance of this infrastructure. • Have a spill response plan for the site in the incidence of a contamination event to ensure immediate response. • Prohibit the discharge of untreated effluent or greywater into watercourses.				
Wetland degradation and reduced habitat quality.	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Ensure adherence to the wetland buffer and application of all other mitigation measures to prevent cumulative wetland degradation. • Provide adequate waste bins and collection points.				

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
• Segregate and properly dispose of domestic and industrial waste. • Conduct regular site clean-ups. • Educate workers on proper waste management.				

For the prospective assessment, before mitigation, most impacts are rated as "medium to low" significance, with some water quality risks slightly higher during abnormal events. However, with the implementation of recommended mitigation measures, all impacts are reduced to "low" significance, reflecting effective risk management. The assessment shows high confidence in these findings, with no irreplaceable loss expected, and the final significance scores confirm that residual risks to the wetland and surrounding environment are minimal.

Table 55: EIMS Impact Assessment for the Batch Plant prospective scenario.

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
Altered hydrology due to hardened surfaces and stormwater channelling.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Restrict vehicle movement to designated routes. • Design stormwater infrastructure to mimic natural drainage patterns and incorporate energy dissipation and erosion control structures. • Lightly till and revegetate compacted areas. • Avoid direct discharge into wetlands during construction, use interceptor trenches and ditches.				
Increased erosion and sedimentation.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Stabilise exposed soils promptly with vegetation or mulch. • Schedule earthworks during dry periods where possible. • Regularly inspect and maintain erosion control measures.				
Impaired water quality from contaminated runoff (machine oils, fuels and mixes) leading into wetlands.	Construction	Medium to low-	Medium to low-	Medium to low-
Mitigation Measures:				
• Store fuels and chemicals in bunded, secure areas away from watercourses. • Refuel and maintain machinery in designated areas with spill containment.				

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
• Implement a spill response plan and train staff involved in the handling of chemicals, fuels and mixes. • Regularly inspect machinery for leaks and service in a designated bunded area.				
Pollution and littering through inappropriate management of domestic and industrial waste.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Provide adequate waste bins and collection points. • Segregate and properly dispose of domestic and industrial waste. • Conduct regular site clean-ups. • Educate workers on proper waste management.				
Proliferation of alien invasive species due to surrounding disturbances.	Construction	Medium to low-	Low-	Low-
Mitigation Measures:				
• Monitor for invasive species and remove promptly in line with an alien invasive management plan. • Use indigenous species for landscaping and rehabilitation. • Restore disturbed areas rapidly with native vegetation.				
Altered hydrology due to hardened surfaces and stormwater channelling	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Maintain and regularly inspect stormwater infrastructure. • Retrofit with green infrastructure (e.g., bioswales, rain gardens) where feasible. • Direct runoff to vegetated areas for infiltration.				
Increased erosion and sedimentation	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Maintain vegetative cover on all open spaces and slopes. • Monitor for signs of erosion and repair promptly. • Ensure stormwater outlets are energy-dissipated.				
Potential contamination of wetlands from contaminated runoff and effluent discharge / overflows.	Operation	Medium to low-	Medium to low-	Medium to low-

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
Mitigation Measures:				
• Regularly inspect and maintain sewer and stormwater systems. • Store chemicals and fuels in bunded areas. • Prohibit discharge of untreated effluent. • Implement a spill response plan.				
Pollution and littering through inappropriate management of waste	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Continue regular waste collection and site clean-ups. • Educate staff and contractors on waste management. • Monitor for illegal dumping and littering.				
Continued proliferation of alien invasive species	Operation	Medium to low-	Low-	Low-
Mitigation Measures:				
• Implement ongoing monitoring and removal programs. • Maintain indigenous vegetation buffers around the plant boundary.				
Altered hydrology due to hardened surfaces and stormwater channelling.	Decommissioning	Medium to low-	Low-	Low-
Mitigation Measures:				
• Remove unnecessary hard surfaces and restore natural drainage. • Re-contour land to original or improved hydrological function. • Rehabilitate with native vegetation to promote infiltration.				
Increased erosion and sedimentation.	Decommissioning	Medium to low-	Low-	Low-
Mitigation Measures:				
• Stabilise soils immediately after decommissioning activities. • Use erosion control blankets, mulching, and rapid revegetation. • Monitor and repair any erosion promptly.				

Impact	Phase	Pre-mitigation Significance	Post-mitigation Significance	Final score
Impaired water quality from contaminated runoff (machine oils, fuels and mixes) leading into wetlands.	Decommissioning	Medium to low-	Medium to low-	Medium to low-
Mitigation Measures:				
• Remove and properly dispose of all hazardous materials. • Clean up any spills or contaminated soils. • Decommission fuel and chemical storage areas safely. • Prohibit discharge of effluent into watercourse, all remanent effluent must be collected and disposed of at a licensed facility. • Refuel and maintain machinery in designated areas with spill containment.				
Pollution and littering through inappropriate management of domestic and industrial waste.	Decommissioning	Medium to low-	Low-	Low-
Mitigation Measures:				
• Continue regular waste collection and site clean-ups. • Remove all waste and debris from the site. • Conduct a final site clean-up and inspection. • Dispose of all materials at licensed facilities.				
Proliferation of alien invasive species due to surrounding disturbances.	Decommissioning	Medium to low-	Low-	Low-
Mitigation Measures:				
• Conduct a final sweep for invasive species and remove. • Restore site with indigenous vegetation. • Monitor post-decommissioning for regrowth of invasives in line with an alien invasive management plan.				

8.3.3 TERRESTRIAL BIODIVERSITY

Table 56 shows a summary of the significance of potential impacts associated with the proposed infrastructure on biodiversity before and after the implementation of mitigation measures, as well as cumulative and irreplaceable loss.

Table 57 shows the significance of potential impacts associated with the existing infrastructure on biodiversity before and after the implementation of mitigation measures, as well as cumulative and irreplaceable loss.

The precautionary principal has been applied here as an impact assessment was not performed prior to the unlawful vegetation clearing and the site has already undergone impacts associated with the construction phase and the plant is currently in operation.

Table 56: Summary assessment of significance of potential impacts on terrestrial biodiversity associated with the project for the proposed infrastructure.

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
Destruction, loss and fragmentation of the vegetation community	Construction	High -	Medium to high -	Medium to high -
Mitigation Measures				
- The clearing of vegetation must be minimised where possible. All activities must be restricted to within the authorised areas. - Areas to be developed/disturbed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon. - Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. - Laydown and construction preparation activities (such as cement mixing, temporary toilets, etc.) must be limited to already modified areas and should take up the smallest footprint possible. - Offsets may be required for the CBA 2 areas, and at the required ratio for the EN ecosystem, pending discussions with the provincial authorities. Offsets are at the discretion of the department. - A habitat rehabilitation plan must be compiled and implemented for all areas that must be rehabilitated back to Thornveld. - Areas that have been disturbed but will not undergo development must be revegetated with indigenous vegetation. - A site walk through must be performed by a suitably qualified ecologist prior to any activities taking place and any SCC or protected species should be noted. In situations where these species are observed and must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development and implementation of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated. - A dust management plan must be compiled and implemented.				
Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching).	Construction	Medium to high -	Medium to high -	Medium to high -
Mitigation Measures				
- Clearing and disturbance activities must be conducted in a progressive linear manner, always outwards and away from the centre of the PAOI and over several days, so as to provide an easy escape route for all small mammals and herpetofauna. - The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this.				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• The duration of the activities should be minimised to as short a term as possible, to reduce the period of disturbance on fauna. • Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals. • No trapping, killing, or poisoning of any wildlife is to be permitted and must be made a punishable offense. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons. In this case, activities should take place during the day. • Any holes/deep excavations must be dug in a progressive manner and should not be left open overnight. Should any holes remain open overnight they must be properly covered temporarily to ensure that no small fauna species fall in. Holes must be subsequently inspected for fauna prior to backfilling. • If fencing is required: wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.				
Clearing of vegetation leading to soil erosion and loss of topsoil.	Construction	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• A habitat rehabilitation and revegetation plan must be developed and implemented to reduce the occurrence of bare soil areas and the associated damage due excessive erosion. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds where relevant. • Only existing access routes and walking paths may be made use of.				
Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials.	Construction	High-	Medium to high -	Medium to high -
Mitigation Measures				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. The water resources must to be protected and all activities that could result in a spill should occur away from them. • Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. • No servicing of equipment on site unless necessary. • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. • All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the PAOI. • All construction waste must be removed from site at the closure of the construction phase. • Cement mixing may not be performed on the ground. It is recommended that only closed side drum or pan type concrete mixers be utilised. Any spills must be immediately contained and isolated from the natural environment, before being removed from site. • A dust management plan and dust suppression system must be implemented.				
Introduction of alien species, especially plants	Construction	Medium to high -	Low -	Low -
Mitigation Measures				
• An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changed in AIP composition. • It must be made an offence for any staff member to remove any indigenous plant species from the PAOI or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. • A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests.				
Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.	Operational	Medium to high -	Medium to low -	Medium to high -
Mitigation Measures				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction or bare ground. This includes wetting of exposed soft soil surfaces. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.				
Increased human-wildlife conflicts due to habitat fragmentation (litter, pollution, road mortalities, poaching, etc.).	Operational	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• No trapping, killing, or poisoning of any wildlife is to be permitted and must be made a punishable offense. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Waste management must be a priority and a Solid Waste Management Plan must be developed and implemented. All waste must be collected and stored effectively. All solid waste collected shall be disposed of at a licensed disposal facility. • Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan.				
Environmental pollution due to water/ plant drainage runoff and increased dustfall	Operational	Medium to high -	Medium to low -	Medium to high -
Mitigation Measures				
• A stormwater management plan must be compiled and implemented. • Wastewater treatment must be implemented. • A dust suppression system must be implemented and dust monitoring must be conducted.				
Continued encroachment by alien and invasive plant species	Operational	High -	Low -	Low -
Mitigation Measures				
• An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual change in AIP composition.				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. • It must be made an offence for any staff member to remove any indigenous plant species from the PAOI or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants.				
Increased risk of soil erosion and instability due to removal of infrastructure.	Decommissioning	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• A habitat rehabilitation and revegetation plan must be developed and implemented to reduce the occurrence of bare soil areas and the associated damage due excessive erosion. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds where relevant.				
Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.	Decommissioning	Medium to low -	Low -	Low -
Mitigation Measures				
• Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction or bare ground. This includes wetting of exposed soft soil surfaces. • A dust management plan must be compiled and implemented.				
Slow regrowth of natural vegetation and potential further spread of alien and invasive species.	Rehab and Closure	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. • This will also reduce the likelihood of encroachment by alien invasive plant species. • An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changed in AIP composition. • A habitat rehabilitation plan must be compiled and implemented for all areas that must be rehabilitated back to Thornveld.				

Table 57: Summary assessment of significance of potential impacts on terrestrial biodiversity associated with the project for the existing infrastructure.

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
Destruction, loss and fragmentation of the vegetation community	Construction	High -	Medium to high -	High -
Mitigation Measures				
• Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. • Offsets may be required for the CBA 2 areas, and at the required ratio for the EN ecosystem, pending discussions with the provincial authorities. Offsets are at the discretion of the department. • A habitat rehabilitation plan must be compiled and implemented for all areas that must be rehabilitated back to Thornveld. • Areas that have been disturbed but will not undergo development must be revegetated with indigenous vegetation. • A dust management plan must be compiled and implemented.				
Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching).	Construction	High -	Medium to high -	Medium to high -
Mitigation Measures				
• The duration of the activities should be minimised to as short a term as possible, to reduce the period of disturbance on fauna. • Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals.				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• No trapping, killing, or poisoning of any wildlife is to be permitted and must be made a punishable offense. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • Schedule activities and operations during least sensitive periods, to avoid migration, nesting, and breeding seasons. In this case, activities should take place during the day. • Any holes/deep excavations must be dug in a progressive manner and should not be left open overnight. Should any holes remain open overnight they must be properly covered temporarily to ensure that no small fauna species fall in. Holes must be subsequently inspected for fauna prior to backfilling. • If fencing is required: wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.				
Clearing of vegetation leading to soil erosion and loss of topsoil.	Construction	High -	Medium to high -	Medium to high -
Mitigation Measures				
• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. • A habitat rehabilitation and revegetation plan must be developed and implemented to reduce the occurrence of bare soil areas and the associated damage due excessive erosion. • Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds where relevant. • Only existing access routes and walking paths may be made use of.				
Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials.	Construction	High -	Medium to high -	Medium to high -
Mitigation Measures				
• A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. The water resources must to be protected and all activities that could result in a spill should occur away from them.				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. • No servicing of equipment on site unless necessary. • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. • All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the PAOI. • All construction waste must be removed from site at the closure of the construction phase. • Cement mixing may not be performed on the ground. It is recommended that only closed side drum or pan type concrete mixers be utilised. Any spills must be immediately contained and isolated from the natural environment, before being removed from site. • A dust management plan and dust suppression system must be implemented.				
Introduction of alien species, especially plants	Construction	Medium to high -	Low -	Medium to low -
• Mitigation Measures				
• An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changed in AIP composition. • It must be made an offence for any staff member to remove any indigenous plant species from the PAOI or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. All grazing mammals must be kept out of the areas that have recently been re-planted. • Assess the state of rehabilitation and encroachment of alien vegetation quarterly for up to two years after the closure.				
Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.	Operational	High -	Medium to high -	Medium to high -
Mitigation Measures				
• Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
• Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction or bare ground. This includes wetting of exposed soft soil surfaces. • A dust management plan must be compiled and implemented.				
Increased human-wildlife conflicts due to habitat fragmentation (litter, pollution, road mortalities, poaching, etc.)	Operational	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. • No trapping, killing, or poisoning of any wildlife is to be permitted and must be made a punishable offense. • Waste management must be a priority and a Solid Waste Management Plan must be developed and implemented. All waste must be collected and stored effectively. All solid waste collected shall be disposed of at a licensed disposal facility. • Litter, spills, fuels, chemical and human waste in and around the PAOI must be minimised and controlled according to the waste management plan. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.				
Environmental pollution due to water/ plant drainage runoff and increased dustfall	Operational	High -	Medium to high -	High -
Mitigation Measures				
• A stormwater management plan must be compiled and implemented. • Wastewater treatment must be implemented. • A dust suppression system must be implemented and dust monitoring must be conducted.				
Continued encroachment by alien and invasive plant species	Operational	High -	Low -	Low -
Mitigation Measures				
• An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changed in AIP composition. • Assess the state of rehabilitation and encroachment of alien vegetation twice a year. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment				

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
by alien invasive plant species. All grazing mammals must be kept out of the areas that have recently been re-planted.				
Increased risk of soil erosion and instability due to removal of infrastructure.	Decommissioning	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• Habitat rehabilitation and revegetation plan must be developed and implemented to reduce the occurrence of bare soil areas and the associated damage due excessive erosion. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat.				
Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.	Decommissioning	Medium to low -	Low -	Medium to low -
Mitigation Measures				
• Noise must be kept to an absolute minimum during the evenings and at night to minimise all possible disturbances to amphibian species and nocturnal mammals. • Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible. • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction or bare ground. This includes wetting of exposed soft soil surfaces. • A dust management plan must be compiled and implemented.				
Slow regrowth of natural vegetation and potential further spread of alien and invasive species.	Rehab and Closure	Medium to high -	Medium to low -	Medium to low -
Mitigation Measures				
• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by alien invasive plant species. All grazing mammals must be kept out of the areas that have recently been re-planted. • Assess the state of rehabilitation and encroachment of alien vegetation quarterly for up to two years after the closure. • An Alien Invasive Plant Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changed in AIP composition.				

8.3.3.1.1 UNPLANNED EVENTS

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 58 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

Table 58: Summary of unplanned events for terrestrial biodiversity.

Unplanned Event	Potential Impact	Mitigation
Spills into the surrounding environment	Contamination of habitat as well as water resources associated with a spillage.	A spill response kit must be always available. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural vegetation.	An appropriate/adequate fire management plan needs to be implemented.

8.3.4 CULTURAL HERITAGE

Table 59 lists all impacts, as well as pre-, post- and Final Significance impact ratings together with proposed mitigations. Table 59 provides a breakdown of recommendations and mitigations to be considered for inclusion in the EMPr related to this project. These mitigations are associated with construction and operation phase which may involve clearing of land for additional infrastructure, as well as prior disturbance and destruction of heritage features. Firstly, mitigation measures here advise for the avoidance of the remains of the disturbed heritage features identified. This includes a search-and-rescue effort to salvage the remains of the disturbed LIA site. In this regard, a Phase 2 mitigation is advised following the SAHRA Minimum Standards (2007). The Phase 2 search-and-rescue should involve the appointment of an Archaeologist for the mapping, recording or documenting, the collection of identified artefacts, as well as excavations, where deemed necessary. As a guideline to how these activities should take place, the ASAPA Constitution is here referenced which includes minimum standards of practice.

To address the MSA Stone tool and its related potential to be a marker of below-ground, in-situ finds, Archaeological monitoring is recommended during the construction of the PCD proposed. This will ensure that no unintentional damage to unidentified below-ground artefacts and contexts occurs during the construction process. The archaeologist must be present when the site is excavated for the PCD, and report on observations.

Further, the mitigation measures recommended serves to address the potential of further discoveries advising for the implementation or recognition of a heritage protocol and chance find procedure.

Table 59: Summary assessment of significance of potential impacts on heritage associated with the project for the existing infrastructure.

Impact	Phase	Pre-mitigation Impact	Post-mitigation impact	Final Significance
The disturbance of below-ground heritage features through excavation of a pit - evident through the discovery	Construction and Operation	High -	Low -	Low -

Impact	Phase	Pre-mitigation Impact	Post-mitigation impact	Final Significance
of a MSA stone tool among soil deposits.				
Mitigation Measures				
No specific mitigation required for the already-disturbed features, i.e., MSA stone tool.				
The disturbance of a potential below-ground site through the construction of a PCD.	Construction	Medium to high -	Low -	Low -
Mitigation Measures				
• Archaeological monitoring is recommended during the construction of the PCD proposed. The archaeologist must be present when the site is excavated for the PCD, and report on observations.				
The disturbance of an existing Late Iron Age site including the destruction of a Stone Wall Structure as well as material evidence including stone tools and ceramics.	Construction and Operation	High -	Medium to low -	Medium to high -
Mitigation Measures				
• The developer must appoint a heritage practitioner to undertake a Phase 2 mitigation of the remaining section of the site (RBP002). • The site must then be fenced and avoided to prevent any further disturbance.				
Destruction or disturbance of undiscovered below-ground heritage features.	Construction	Medium to low -	Low -	Low -
Mitigation Measures				
• A Heritage Procedure is advised to be followed should additional heritage finds or sites be encountered.				

8.3.5 PALAEONTOLOGY

The excavations and clearing of vegetation during the construction phase will consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly destroy or even permanently close-in fossils at or below the ground surface. These fossils will then be lost for research.

The SAHRIS PalaeoMap indicates that the general Palaeontological Sensitivity, in a radius of 30 km of the development is Zero to Moderate. However, it is important to note that the quality of preservation of fossils at different sites will most probably vary, and it is thus difficult to allocate a Cumulative Sensitivity to the project.

Table 60: Summary assessment of significance of potential impacts on Palaeontology associated with the project for the existing infrastructure.

Impact	Phase	Pre-Mitigation Significance	Post-Mitigation Significance	Final Significance
Loss of fossil Heritage	Construction	Low -	Low -	Low -
Mitigation Measures				
• Mitigation involves the collection and documentation of fossils, together with recording data on the surrounding sedimentary matrix within the proposed development footprint by a qualified palaeontologist. • In the unlikely event that, Palaeontological Heritage is uncovered during surface clearing and mining excavations, the ECO/site manager must report the find to the South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out. • Before any fossil material can be collected from the development site, the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012).				

9 CONCLUSIONS AND RECOMMENDATIONS

The Environmental Assessment process identified potential issues and impacts associated with the proposed project. The Environmental Assessment Report (EAR) addresses those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with applicable phases and activities of the project, and recommends appropriate mitigation measures for potentially significant environmental impacts. The report provides sufficient information regarding the potential impacts and the acceptability of these impacts in order for the Competent Authority (CA) to make an informed decision regarding the project. The release of the EAR for public review and comment provides stakeholders with an opportunity to verify that the issues they have raised throughout the process to date has been captured and adequately considered. All issues raised throughout the public participation process will be captured and responded to as far as possible and will be included in the Final EAR to be submitted to the CA for decision-making.

The EAR aims to achieve the following:

- Provide an overall assessment of the social and biophysical environments affected by the project. (Section 7);
- Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed project (Section 8);
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts (Section 8 and Appendix G); and
- Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded (Section 4 and APPENDIX C).

9.1 CONCLUSIONS FROM SPECIALIST STUDIES

The conclusions and recommendations of this EAR are the result of the assessment of identified impacts by specialists where applicable, and the parallel process of public participation. The main conclusions from each of the specialist studies are presented below.

9.1.1 HERITAGE

The heritage report was prepared as part of a Retrospective Phase 1 Heritage Impact Assessment for the existing Rietfontein Civil Works (Pty) Ltd Concrete Batching Plant and associated proposed infrastructure. As part of this assessment, a desktop as well as an on-site evaluation of heritage impacts was conducted.

Following a desktop assessment, potential heritage features were identified within and outside of the development footprint. This mainly included the densely vegetated LIA site which was already disturbed or destroyed by the development itself.

The activities carried out have had an impact on heritage features of the Stone Age and Iron Age. The field survey revealed that excavations to the south of the development have potentially disturbed a below-ground MSA site (RBP001). While only one example of an MSA stone tool was identified, the occurrence of this tool in the soil deposits removed from the pit or excavation is an indicator of the potential for more archaeological material to have been removed out of context, or which may yet be in context. The field survey further corroborated the presence and extent of the features identified through the desktop assessment, particularly the SWS (RBP002) which would have been situated directly under the development footprint, extending northward. Potsherds or ceramic remains as well as stone tools are some of the material evidence which can be associated with the RBP002.

Although several finds were noted across the development, particularly along its boundaries, the finds are considered to be part of the same occupational site, that is, RBP002. Through site clearance and the moving of earth, the original LIA site, including the SWS, would have been destroyed, and material associated with the occupation would have been displaced.

Figure 90 presents a visual summary of the different findings and their locations. Table 36 provides a summary of the different features identified, a description of the feature, as well as the coordinates of where the feature are located or associated relative central points.

Through the methodology adopted as part of this assessment, heritage features were identified which can all be avoided during the implementation of the proposed activities. Apart from unassessed chance finds, a Low impact on heritage features can be expected should the proposed mitigation measures be followed. Therefore, from an Archaeological perspective, the development will not have any significant foreseeable impacts and can proceed as long as the recommended mitigation measures are incorporated into the Environmental Management Programme (EMPr) for the Section 24G Concrete batching Plan and implemented.

9.1.2 PALAEONTOLOGY

The proposed Section 24G Application is underlain by Mathlagame Norite -anorthosite of the Rustenburg Layered Suite (Bushveld Complex). According to the PalaeoMap of the South African Heritage Resources Information System (SAHRIS) the Palaeontological Sensitivity of the Rustenburg Layered Suite (Bushveld Complex) is Zero (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014). The suggested location is classified as having a Medium Palaeontology Theme Sensitivity in the DFFE (Department of Forestry Fisheries and the Environment) Screening Report. Desktop research (National Database and published data) concluded that fossil heritage of scientific and conservational interest in the development area is rare. A low significance has thus been allocated to the development footprint. This is in agreement with the Zero Palaeontological Sensitivity allocated to the development area by the SAHRIS Palaeontological Sensitivity Map.

A Low Palaeontological Significance has been allocated for impacts associated with the construction phase of the development pre-mitigation and post-mitigation. The construction phase will be the only development phase with the potential of impacting Palaeontological Heritage, and no significant impacts are expected to impact the Operational and Decommissioning phase. As the No-Go Alternative considers the option of ‘do nothing’ and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development are considered to be Low (as the area is not highly fossiliferous), and falls within the acceptable limits for the project. It is therefore considered that the study Project will not lead to damaging impacts on the palaeontological resources of the area. The development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, pending the discovery of newly discovered fossils.

These recommendations should be incorporated into the Environmental Management Programme (EMPr) for the Section 24G Concrete batching Plant near Rustenburg in the North-West Province.

9.1.3 SOILS AND AGRICULTURE

The existing Concrete Batching Plant area is dominated by low and very low potential soils including Mispah, and Grabouw and Johannesburg soil forms, respectively.

The land capability sensitivity (DAFF, 2017) is dominated by “Low-Moderate” sensitivity. Furthermore, no highly sensitive crop field boundaries were identified using the DFFE Screening Tool Report. The verified baseline findings, current land uses and the calculated land capability dispute the agricultural theme in all areas associated with “Low-Moderate” due to the presence of low to very low potential soils. Furthermore, no active cropping and no irrigation infrastructure was found in the project area for cropping practices such as centre pivot, drip irrigation or canals for flood irrigation.

The current existing infrastructure within the Concrete Batching Plant under the section 24G application post development has an overall low impact on the available soil resources. The impact assessment for the existing infrastructure (section 24G), can only be based on the post-developed conditions and available soil resources components as presented in Appendix B: Impact Assessment of the TBC report.

The proposed development infrastructure within the Concrete Batching Plant still to be constructed, will have an overall low residual impact on the agricultural production capability of the area. The proposed development can be favourably considered for authorisation.

The following serves to substantiate this statement:

- The site verified land capability of the proposed project area is low;
- The agricultural potential of the area ranges is low;
- No active crop farming was identified within the project area; and
- The overall agricultural sensitivity for the project area is categorised as low.

The project may be favourably considered for authorisation and is not subject to any conditions. However, the mitigation measures recommended should be incorporated into the EMPr and implemented.

9.1.4 HYDROPEDOLOGY

Four (4) hillslope pattern types which were identified, includes the presence of recharge (shallow and slow) and responsive (shallow , Hortonian, and wet) hydropedological types. The transects align with the Ea 3 land types, commonly characterized with shallow or vertic soils with some rocky areas in the crest to the lower midslope or valley bottoms areas. The observed upper hillslope crest areas have vertical flows due to the presence of recharge (shallow) with some responsive (shallow and hortonian) hydropedological types. The midslope sections are characterized by recharge (slow) and responsive (shallow) hydropedological types with vertical or overland flows. Surface runoffs or water stagnation can also promote the occurrence of evaporation effects as water will be lost from the topsoil horizons or surface runoffs. During the rainy season surface overland flow behaviour will occur towards the lower landscape areas. The lower midslope towards the valley bottom areas have recharge (slow) and responsive (wet) hydropedological types in some areas, with most areas with wetlands or watercourses characterized by responsive (wet) types dominated with surface overland flows recharging wetlands and watercourses in the catchment.

Some of the hillslopes with recharge soils dominating as well as the size of the greater catchment have acceptable impacts. Overland flows or some lateral flow from responsive (shallow or hortonian)or recharge (slow) changes can occur in the hillslopes which may increase surface run-offs, surface return flows and overland flows. However, their effects will have acceptable impacts on the total streamflow or total deductible water regime losses of watercourses in the larger catchment as both lateral and vertical flow paths will occur in response to the flow impediment.

The Concrete Batching Plant project and associated infrastructure (existing and proposed expansions) will require mitigation measures being implemented due to impacts expected on some of the identified hillslopes in the assessment area. Changes in water regime stores will occur due to the batching plant expansion, which requires good water regime management to avoid significant water regime losses. Measures which can promote infiltration, reduce surface overland flows, and ensure flow discharges downstream continues will result in the addition of the potential water regime losses back in the catchment. Flow impediment can be managed well to minimise saturation conditions and surface return flows to promote subsurface groundwater recharge and storage. Valley bottom soils are responsive hydromorphic soils due to long periods of saturation. Usually, development should avoid areas with responsive (wet) hydropedological soil types mostly associated to and found in areas like wetlands which act as water regime receptors for the water balance in the hillslopes` catchment. Changes in water regime stores will occur, which can require mitigations. Measures which can promote infiltration will result in the addition of the water regimes back in the catchment. Measures can also be set on soils which will experience some changes in flow paths following the development and associated infrastructure. Flow impediment can be managed well to minimise saturation conditions and surface return flows to promote subsurface groundwater recharge and storage.

9.1.4.1 HYDROPEDOLOGY IMPACT STATEMENT

The project has an overall low to medium residual impact on hydropedology, and this is acceptable. The following aspects must be considered for the development to reduce overland flows and surface return flows:

- Prevent flood damage or concentration of run-off;

- Divert stormwater and surface run-off from buildings, roads and parking areas into an attenuation pond;
- Preserve the natural and beneficial functions of the natural drainage system downstream;
- Preserve and enhance stormwater quality;
- Attenuate the difference between pre- and post-development flows; and
- Prevent disposal of untreated wastewater into the catchment system or surrounding areas.
- Leakage monitoring plan along the infrastructure pipeline should be implemented.

Such measures for these systems will ensure that adequate water deducted from the catchment as run-off will be re-applied into the system which can minimise losses from the total deductible regimes as most of the hillslopes have recharge soils. Application of good quality water will promote lateral flows associated with these hydropedological groups. Improved water quality in the area is important to minimise pollutant migrations. From a hydropedological perspective, the proposed monitoring will be sufficient for water flows and groundwater recharge receptors.

From a hydropedological perspective, the impact of the development on hydropedological flow paths would be acceptable and the impacts can be managed sustainably. However, the mitigation measures recommended should be incorporated into the EMPr and implemented.

9.1.5 TERRESTRIAL BIODIVERSITY

An impact statement is required as per the NEMA regulations with regard to the proposed development.

The main impact of the unauthorised clearing of vegetation and ongoing project activities include:

- Habitat loss and fragmentation as well as degradation of surrounding habitat, including CBA 2, an Endangered ecosystem and NPAES;
- Disturbance and displacement caused during the construction and operational phases where mitigations were not applied due to the lack of an EMPr;
- Direct mortality during the construction phase; and
- Potential loss of protected flora, including the potential loss of Nationally Protected Tree species.

As project activities went ahead without authorisation, and subsequently the impacts associated with the project potentially incur a listed (and notable) change to:

- Biodiversity of major potential concern:
    - CBA 2; and
    - Endangered ecosystem.
- Biodiversity of potential concern:
    - Strategic Water Source Areas;
    - Areas evaluated as to be of Medium SEI; and
    - Priority Focus Areas in the NPAES.

In accordance with the Biodiversity Offset Guidelines (2023), offsets are required at a ratio agreed upon with the provincial authorities. In the case of the CBA 2 areas, like-for-like or better habitat has to be secured and managed for conservation in perpetuity. Any remaining areas of EN ecosystem must also be offset, at ratios up to 25:1. However, due to the levels of degradation of the habitats in the surrounding area owing to the long-term, ongoing mining and associated activities in the region, these habitats can be considered to be degraded in nature.

In addition, it must be noted that the current state of degradation of the habitats within the PAOI was likely exacerbated by the plant activities that have been occurring since the initial clearing in March 2025.

It is the opinion of the specialist that the Competent Authority considers the appropriate response in light of the information above. While an offset may be one option, other measures may also be explored at the department's discretion. The habitats on site were expected to have been of a low to medium sensitivity prior to vegetation clearing and in fair to poor condition. The following course of action is recommended by the specialist, along with the mitigation measures listed in the report:

- The potential for offsets must be discussed with the provincial authorities for the unauthorised clearing of vegetation. Should the provincial authorities deem them unnecessary under the circumstances, offsets may not be required;

- A rehabilitation plan must be compiled and implemented for all areas affected by construction and project activities;

- A dust suppression system and wastewater management system must be implemented for the plant; and

- An AIP management plan must be compiled and implemented throughout the PAOI with immediate effect.

9.1.6 WETLANDS

One (1) Hydrogeomorphic (HGM) unit was identified within the encompassing 500 m PAOI. This unit was classified as an unchannelled valley-bottom wetland. Additionally, several artificial features were identified and classified as an artificial channel, artificial seeps, a collection dam, an in-stream dam and a pollution control dam. Not of the features occur directly within the Batching Plant boundary however, HGM 1 is located less than 55 m downslope of the Batching Plant.

The Present Ecological State (PES) assessment indicate that the wetland is "Largely Modified" (Category D). The Ecological Importance and Sensitivity (EIS) assessment rates the wetland as "High". The Functional assessments shows that HGM 1 provides "Intermediate" ecosystem services. The field results underscore the need rehabilitation of disturbed areas, and strict adherence to recommended 20 m buffer zone to maintain wetland function and integrity.

Based on the results of the DWS Risk Assessment Matrix, all identified risks associated with both the retrospective and proposed activities have been calculated as "Low" and manageable, provided that the recommended mitigation and rehabilitation measures are fully implemented.

It is the opinion of the specialist that the project can be considered for authorisation, and the Competent Authority must consider the recommendations, including the rehabilitation of the disturbed wetland area

9.2 SENSITIVITY MAP

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets in a region. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is refined by specialists' input within each respective specialist field based on aerial or ground-surveys. Therefore, the sensitivity mapping exercise assists in the identification of sensitive areas within and surrounding the proposed application area

Figure 94 superimposes the proposed activity and its associated structures and infrastructure on the combined environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.

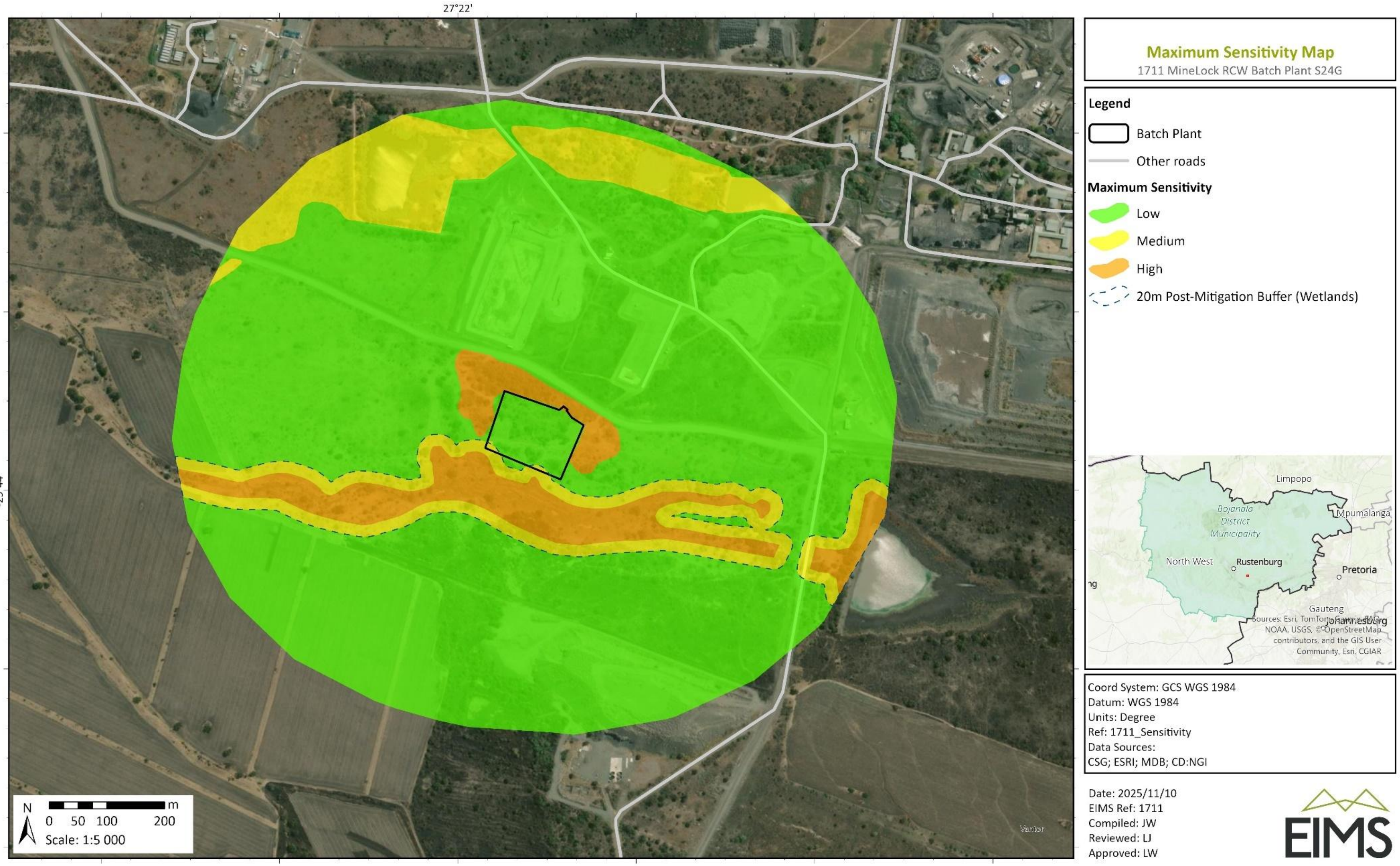


Figure 94: Composite sensitivity map.

9.3 ASSESSMENT OF ALTERNATIVES

Owing to the nature of the proposed stormwater infrastructure there are limited reasonable or feasible alternatives that can be considered as per the motivation provided in Section 5. The Section 24G process being undertaken includes the assessment of potential impacts and the identification of environmental sensitivities within and in the vicinity of the project area, thereby allowing for the recommendation of mitigation measures towards the avoidance, minimisation and / or management of the anticipated impacts. The layout and design were planned to avoid any no-go areas identified from the various specialist studies, if required, and the design, will cater for the entire stormwater catchment for the batching plant required. The only feasible design alternative for the proposed stormwater management infrastructure i.e. stormwater channels and PCD is to line it appropriately to prevent further pollution of the sensitive environment. An unlined system was assessed, but was considered not feasible. The no-go alternative for the proposed infrastructure was assessed, but found to be not preferred. Apart from the design requirements no additional alternatives are considered applicable to this application.

9.4 ENVIRONMENTAL IMPACT STATEMENT

The findings of the assessment and associated specialist studies conclude that there are no environmental fatal flaws that should prevent the project from being retrospectively authorised, provided that the recommended mitigation and management measures are implemented. Based on the nature and extent of the project, the local level of disturbance predicted as a result of the concrete batching activities, the findings of the specialist studies, and the understanding of the significance level of potential environmental impacts, it is the opinion of the project team and the EAP that the significance score of the majority of identified negative impacts can generally be reduced to an acceptable level by implementing the recommended mitigation measures and the project should be authorized. The only impact where mitigation cannot specifically reduce the significance score is the loss of fossil heritage. This impact is scored as low due to the low sensitivity and the unlikelihood of fossil material being discovered on site.

The following impacts were determined to have a potentially medium to high negative significance after mitigation:

Impacts on terrestrial biodiversity:

- Destruction, loss and fragmentation of the vegetation community for the proposed infrastructure during the construction phase.
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching) for the proposed infrastructure during the construction phase.
- Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials for the proposed infrastructure during the construction phase.
- Destruction, loss and fragmentation of the vegetation community
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, light, dust, vibration and poaching) for the existing infrastructure during the construction phase.
- Clearing of vegetation leading to soil erosion and loss of topsoil for the existing infrastructure during the construction phase.
- Increased risk of contamination (soil and water resource) from fuel spills, construction waste, increased dustfall and hazardous materials for the existing infrastructure during the construction phase for the existing infrastructure during the operational phase.
- Ongoing habitat destruction and disturbance to fauna from noise, dust, and artificial lighting.

- Environmental pollution due to water/ mine drainage runoff and increased dustfall for the existing infrastructure during the operational phase.

9.5 RECOMMENDATIONS FOR INCLUSION IN ENVIRONMENTAL AUTHORIZATION

This section contains recommendations from the EAP and various specialist's for inclusion in the EA.

9.5.1 HERITAGE

As a key overall recommendation, identified heritage features are located adjacent to the development site and would have also been affected by the current infrastructure. As heritage features have been disturbed, a search-and-rescue effort is recommended through the appointment of a heritage specialist to undertake a Phase 2 mitigation. Following the Phase 2 mitigation, the partial remains of the LIA site (RBP002) must be avoided. It is advised that the SWS be fenced to protect the site from any further disturbance. Archaeological monitoring during the construction of the PCD will allow for any potential below-ground material to be identified at RBP001. While a buffer to avoid the site would have been proposed, as the developer has not considered alternatives, archaeological monitoring during construction would be the best approach to decreasing the probability of further damage to heritage features. The developer is further reminded to remain cognizant of the potential to discover unidentified above-ground and below-ground finds and sites. Upon discovery of any additional heritage finds of high significance, for example, graves or high density of small finds, a Heritage Finds or Chance Find Procedure should be followed.

10 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations relating to this assessment should be considered in evaluating and decision-making on this assessment:

- Unless specifically noted, the environmental attributes for the receiving environment have been obtained from best available spatial and scientific data sources. Whilst reasonable effort has been taken to obtain the most recent and relevant data, there may be gaps in baseline data, leading to uncertainties in impact predictions. Where uncertainty exists efforts are made to indicate this in the assessment.
- This study is based on activity information provided by the applicant (including engineering designs, specifications, services reports, etc). The accuracy of this information has not been verified, and it is assumed that no significant changes or deviations to the final designs will occur. Should such occur the significance of the potential impacts may require reassessment and where relevant formal amendment processes.
- The information presented in this report is based on the information available at the time of compilation of the report.
- Whilst reasonable effort has been made to identify all potential environmental impacts, some impacts may not be reasonably foreseeable or may emerge only after project implementation.
- In determining the significance of impacts, with mitigation, it is assumed that mitigation measures proposed in the report are correctly and effectively implemented and managed throughout the life of the project.

The remaining sub-sections present the assumptions and limitations applicable to the respective specialist assessments.

10.1 HERITAGE

This section details the different limitations associated with the implemented methodology of this assessment. Approaches to mitigate these limitations are therefore presented.

10.1.1 GENERAL LIMITATIONS

Several limitations were expected and encountered while implementing the above-described methodology. Some of these limitations relate to the project itself, while some are more general, relating to the implementation of the methodology itself.

Firstly, such investigations are limited to desktop and field surveys from which findings are drawn. In this regard, the findings presented here are limited to surface observations. Below-ground archaeological contexts would only apply in cases where the methodology includes components involving excavations and test pits. To mitigate this limitation, this report advises the application of heritage procedures considering what has been noted or already disturbed on site.

The field survey conducted for this report does not account for any finds further than immediate surrounding areas which have been affected by the development. To mitigate this, the initial desktop assessment considers surrounding pre-identified heritage resources and prior heritage studies done in the area.

Although an extensive methodology was adopted to address the desktop assessment and field survey, one must remain cognisant of the fact that this assessment may not identify all heritage features possibly existing. For this reason, mitigation measures have been proposed to accommodate for chance finds as well as features that may not have been encountered and identified through the implementation of this study’s methodology.

10.2 PALEAEONTOLOGY

The geology of the area is the focal point of geological maps, and the sheet explanations of the Geological Maps were not intended to focus on palaeontological heritage. Many inaccessible areas of South Africa have never been examined by palaeontologists, and data is typically dependent solely on aerial pictures. Locality and geological information in museums and university databases is out of date, and data acquired in the past is not always adequately documented.

Comparable Assemblage Zones in other places are also used to provide information on the existence of fossils in areas that have not before been recorded. When similar Assemblage Zones and geological formations are used for Desktop studies, it is commonly assumed that exposed fossil exists within the footprint.

10.3 SOILS AND AGRICULTURE

The following aspects were considered as limitations:

- Only the slopes affected by the proposed development have been assessed;
- It has been assumed that the extent of the development area provided by the responsible party is accurate;
- The GPS used for ground truthing is accurate to within five meters. Therefore, the soil and the observation site's delineation plotted digitally may be offset by up to five meters to either side; and
- No heavy metals have been assessed, nor fertility been analysed for the relevant classified soils.

10.4 HYDROPEDOLOGY

The following aspects were considered as limitations;

- Only the slopes affected by the proposed development have been assessed;
- It has been assumed that the extent of the development area provided by the responsible party is accurate; and
- The GPS used for ground truthing is accurate to within five meters. Therefore, the wetland and the observation site's delineation plotted digitally may be offset by at up to five meters to either side.

10.5 TERRESTRIAL BIODIVERSITY

The following assumptions and limitations are applicable for this assessment:

- The Global Positioning System (GPS) used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m;
- Information relating to project activities, spatial data and infrastructure locations for the proposed development was obtained from information provided by the client. The potential impacts and recommendations described in this report apply specifically to the provided information;
- The PAOI has been modified from its original state due to the nature of the development. Field data collected is thus considered to be distorted and the specialist may only make educated assumptions as to the pre-developmental ecological conditions;
- Assumptions were guided in part by the current habitat surrounding the PAOI;
- Although considerable time has been spent to ensure that information utilised in this report is verified. It is assumed that all third-party information utilised in the compilation of this report is correct at the time of compilation (e.g., spatial data, online databases, and species lists);

- This assessment was conducted from a terrestrial perspective only and must be considered in conjunction with the accompanying freshwater and soil reports (TBC, 2025); and
- The TBC fieldwork component of the assessment comprised a one-day survey in the early dry season (14th and 15th of April 2025), which is considered sufficient under the circumstances.

10.6 WETLANDS

The following aspects were considered as limitations:

- It has been assumed that the spatial files provided to the specialist are accurate;
- Apart from the Batching Plant indicated in Figure 1 3, no other spatial information was provided in relation to the layout of the proposed structures at the time of survey and report preparation;
- Freshwater features within the larger 500 m PAOI that were not considered to be an immediate surrounding of the proposed development were delineated and assessed via desktop wherever inaccessible;
- Representative sampling was conducted within the Project Site and PAOI and by its nature infers that not all areas were covered on foot. However, efforts were made to cover as much of the site as possible with the limitations of time and access and the results obtained are considered sufficient to derive a meaningful baseline for the Project Site;
- The results presented herein are an outcome of a rapid survey where areas characterised by external wetland attributes were the focus for assessment, where wetlands were therefore confirmed by soil form indicators; and
- The GPS used for water resource delineations is accurate to within five metres. Therefore, the wetland delineation plotted digitally may be offset by a maximum of five metres to either side.

11 AFFIRMATION REGARDING CORRECTNESS OF INFORMATION

11.1 EAP

I, Monica Niehof, declare that:

General declaration:

- I act as the independent environmental practitioner 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 environmental impact assessments, 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 will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;
- 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;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not all the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.

Signature of the EAP

Environmental Impact Management Services (Pty) Ltd

Name of company:

2026/03/03

Date:

11.2 CANDIDATE EAP

I, Andre van Rooyen, declare that:

General declaration:

- I act as the independent environmental practitioner 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 environmental impact assessments, 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 will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;
- 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;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not all the particulars furnished by me in this form are true and correct;

- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.

Signature of the Candidate EAP

Environmental Impact Management Services (Pty) Ltd

Name of company:

2026/03/03

Date:

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13 APPENDICES

APPENDIX A: EAP CVs

APPENDIX B: Screening Tool Report and SSVR

APPENDIX C: Public Participation

APPENDIX E: Impact Assessment Matrix

APPENDIX G: Stormwater Management Design