



**WETLAND SECTION 24G ASSESSMENT FOR THE
PROPOSED CLOVER ALLOYS RUSTENBURG
CHROME MINE RIETFontein BENEFICIATION
PLANT PROJECT**

**Rustenburg Municipality, Bojanala Platinum
District Municipality, North West Province, South
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9/4/2025

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Report Name	WETLAND SECTION 24G ASSESSMENT FOR THE PROPOSED CLOVER ALLOYS RUSTENBURG CHROME MINE RIETFontein BENEFICIATION PLANT PROJECT	
Specialist Theme	Freshwater Theme	
Project Reference	Clover Alloys RCM Rietfontein 24G	
Report Version	Draft 2 / 9/4/2025	
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Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>	

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1 Introduction

1.1 Background

The Biodiversity Company was commissioned to conduct a wetland baseline and impact assessment to form part of a compliance statement for the proposed Environmental Authorisation rectification as per Section 24G of NEMA (National Environmental Management Act, 1998 (Act No. 107 of 1998)), for the Rustenburg Chrome Mine (RCM) Rietfontein Beneficiation Plant near Rustenburg, North West Province. The project site is located approximately 10 km east of Rustenburg in the North West Province. The site is located within the Rustenburg Local Municipality and the Bojanala Platinum District Municipality (Figure 1-1). A 500 m area has been demarcated for the project to facilitate the identification of wetlands within the regulatory zone, this area is referred to as the Project Area of Influence (PAOI).

This assessment has been completed in accordance with the requirements of the published General Notice (GN) 4167 by the Department of Water and Sanitation (DWS) (previously GN 509 of 2016 and GN 3139 of 2023). The said notice was published in the Government Gazette (no. 49833) under Section 39 of the National Water Act (Act no. 36 of 1998) in December 2023, for a Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses. The GN 4167 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a General Authorisation (GA), as opposed to a full Water Use Licence Application (WULA). A water use (or potential) qualifies for a GA under GN 4167 when the proposed water use/activity is subjected to analysis using the DWS Risk Assessment Matrix (RAM), provided the identified risks are all considered a low risk and the applicant is listed under Appendix D1 or Appendix D2 of the same notice. This assessment will implement the RAM and provide a specialist opinion on the appropriate water use authorisation.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations (2014) (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" (Reporting Criteria).

The purpose of the specialist study is to provide relevant input into the Section 24G Application process. This report, after taking into consideration the findings and recommendation provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making with regards to the ecological viability of the proposed development and related activities.

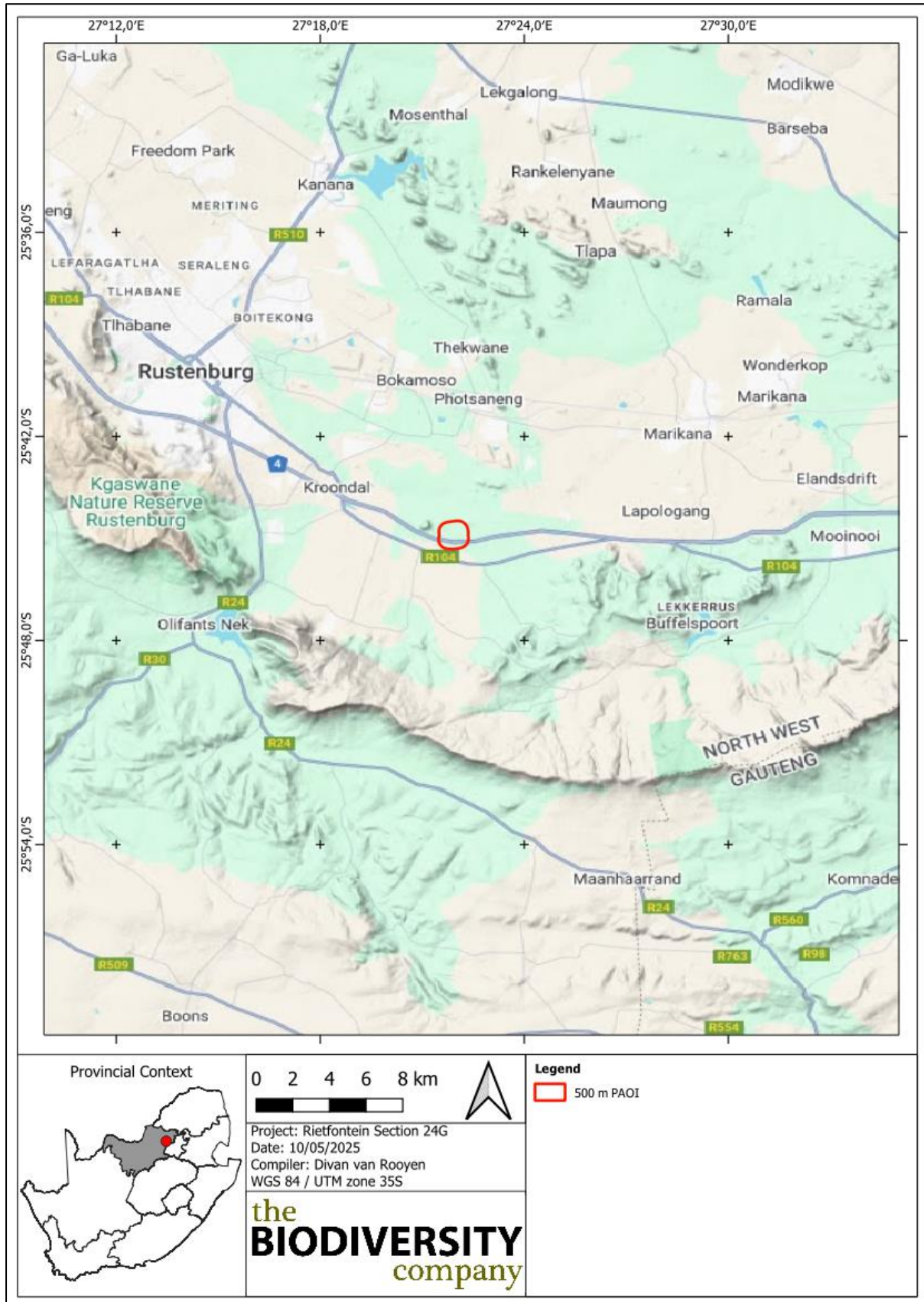


Figure 1-1 Location of the proposed project

1.2 Scope of Work

The following tasks were completed in fulfilment of the terms of reference for this assessment:

- A desktop assessment of available and related datasets to provide context of the freshwater biodiversity of the project area and to indicate potential wetland areas;
- The delineation, classification and assessment of wetlands within 500 m of the project area;
- Identification of any freshwater systems that may have been impacted by the development;
- An assessment of the related impacts through the use of the Risk Assessment (DWS, 2023);
- The provision of recommendations relevant to associated impacts; and
- Report compilation detailing the baseline findings.

1.3 Project Description

Rustenburg Chrome Mining (Pty) Ltd (the applicant) operates a chrome processing facility in the North West Province. Rustenburg Chrome Mining is undertaking steps to ensure compliance with environmental legislation following the development of infrastructure without prior environmental authorisation.

The existing infrastructure at the Rietfontein plant includes two stockpile areas, a chrome wash plant, drying pads, weighbridges, a sump, as well as site offices and staff accommodation. These facilities support the processing, storage, and operational activities associated with chrome beneficiation (Figure 1-2).

In an effort to regularise its operations and address past non-compliance, the applicant is submitting an application in terms of Section 24G of the National Environmental Management Act, 1998 (Act No. 107 of 1998). This application seeks to obtain retrospective environmental authorisation for existing infrastructure and approval for planned developments.

The proposed infrastructure includes:

- The expansion of one of the existing stockpile areas;
- The construction of dirty water channels and culverts to manage contaminated surface runoff;
- The installation of a clean water channel to divert uncontaminated stormwater away from operational areas;
- A Pollution Control Dam (PCD) with a design capacity of 8 000 m³, which will receive all dirty water collected on site; and
- A proposed pipeline approximately 2.5 km in length, to be constructed between the Rietfontein plant and the main mine, facilitating the transfer of materials or water as part of integrated operations.

This Section 24G application is being submitted in response to a compliance notice issued by the North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT) in October 2024, under reference number 18/2024ER. The applicant wishes to rectify unauthorised activities and obtain the necessary environmental approvals for both current and future infrastructure components.

Through this application, the applicant seeks to achieve full environmental compliance, strengthen site water management practices, and continue operating the Rietfontein plant in a sustainable and responsible manner as part of its broader chrome mining operations.

The proposed project is located on Portion 23 and Portion 24 of the farm Rietfontein 338 JQ, within the Rustenburg Local Municipality, North West Province. The site is approximately 15km southeast of Rustenburg, along the N4. The centre point of the site is 25°44'54.40"S 27°21'52.69"E. Please refer to attached project locality map. A detailed layout for the proposed project is provided in Figure 1-3.

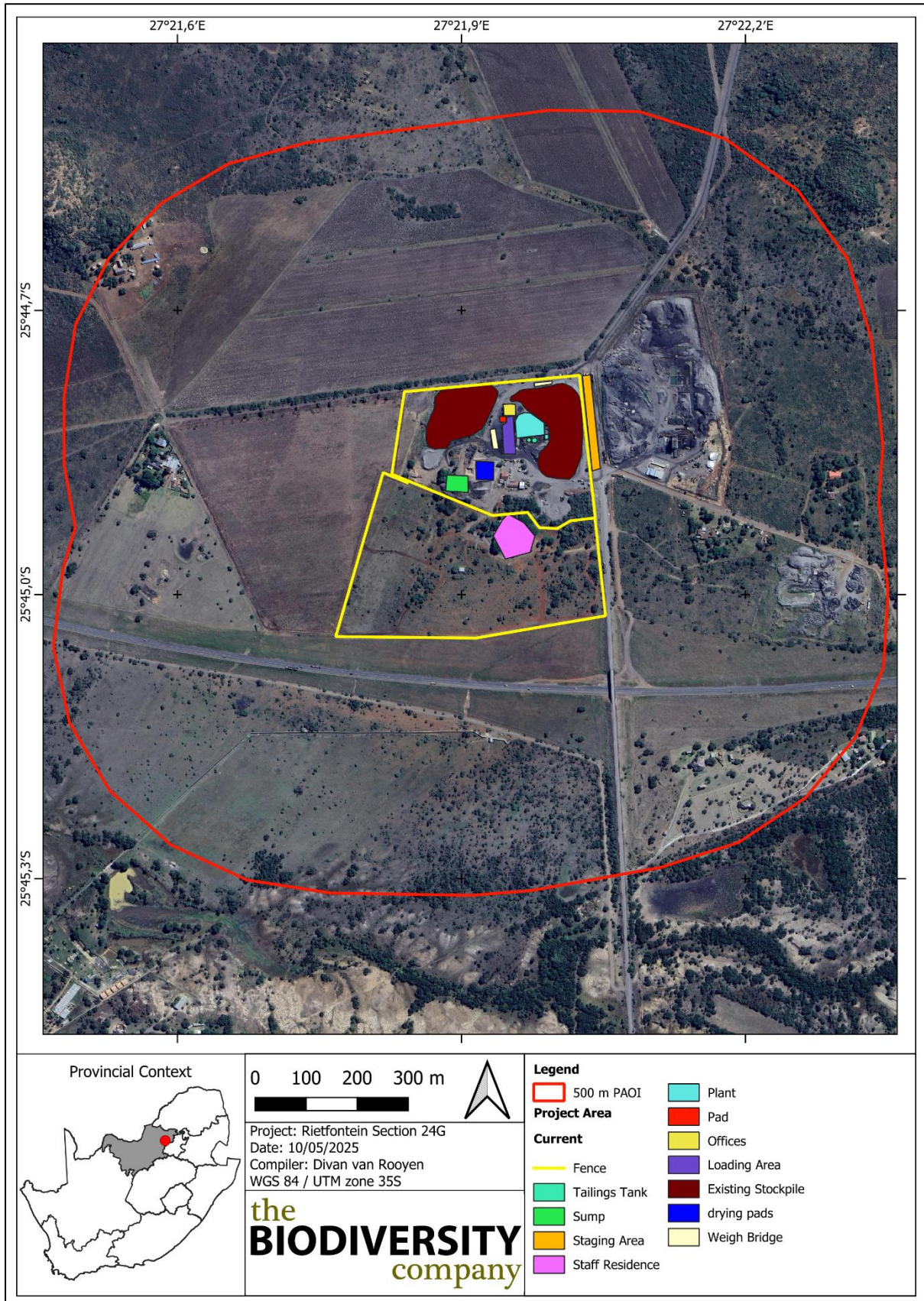


Figure 1-2 Current project layout components and Project Area of Influence

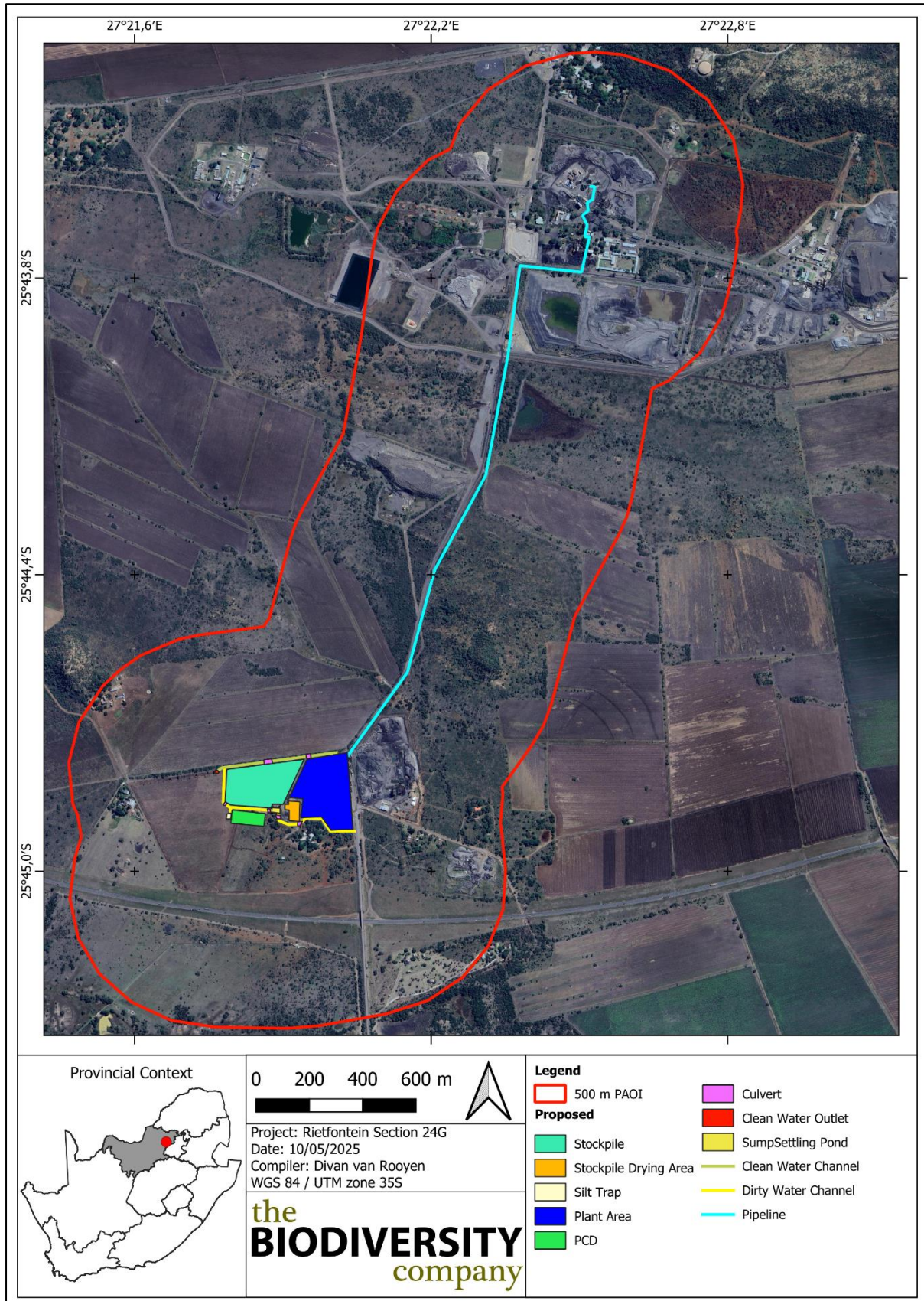


Figure 1-3 Proposed project layout components and Project Area of Influence

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It has been assumed that all information provided to the specialist is accurate;
- The Project Area 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 Project Area;
- Where inaccessible, freshwater features within the larger 500m PAOI were delineated and assessed via desktop;
- Areas characterised by external wetland attributes were the focus for this assessment;
- Only natural features were considered for the delineation and ecological components of this assessment; and
- The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by a maximum of five meters to either side.

1.5 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	NEMA	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), Threatened or Protected Species Regulations	The protection of species and ecosystems that warrant protection
	Assessment Protocol (March 2020)	The minimum criteria for reporting.
	Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	NEMWA;	The regulation of waste management to protect the environment.
	NWA	The regulation of water uses.
	GN 1003 of GG 43726 of 18 Sept 2020	The regulation and management of alien invasive species.
Provincial	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	To provide for control over the utilisation of the natural agricultural resources, including the vegetation and the combating of weeds and invader plants.
	North West Biodiversity Sector Plan (2015)	A spatial tool comprising of set of maps of biodiversity priority areas accompanied by contextual information and land-use guidelines for use in land-use and development planning, environmental assessment and regulation, and natural resource management.
	North West Biodiversity Management Act, 2016 (Act No. 4 of 2016) in conjunction with the North West Biodiversity Amendment Bill, 2017 (Provincial Gazette No. 7801)	To provide for the management and conservation of the Northwest Province's biophysical environment and protected areas.

1.6 National Water Act (NWA, 1998)

The DWS is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998) (NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource; and
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- 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 NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment Report (BAR) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

1.8 Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on freshwater biodiversity, as per Government Notice 320 published in terms of NEMA, dated 20 March 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" – the following has been assumed:

- An applicant intending to undertake an activity identified in the scope of this protocol on a site identified on the screening tool as being of:
- "very high sensitivity" for aquatic biodiversity, must submit an Aquatic Biodiversity Specialist Assessment;

- “low sensitivity” for aquatic biodiversity, must submit an Aquatic Biodiversity Compliance Statement;
- Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” aquatic biodiversity sensitivity, and it is found to be of a “low” sensitivity, an Aquatic Biodiversity Compliance Statement must be submitted;
- Similarly, where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” aquatic biodiversity sensitivity, and it is found to be of a “very high” sensitivity, an Aquatic Biodiversity Specialist Assessment must be submitted.

As there were freshwater features identified on site (i.e. wetland features were observed during the field assessment), a Freshwater Biodiversity Report was conducted for the proposed project.

An Aquatic / Freshwater Biodiversity Specialist Assessment Report must contain the information as presented in Table 1-2 below.

Table 1-2 Aquatic Biodiversity Specialist Assessment information requirements as per the relevant protocol, including the location of the information within this report

Information to be Included (as per GN 320, 20 March 2020)	Report Section
The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of aquatic sciences	7.3
Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	7.4
A signed statement of independence by the specialist(s)	7.3
The assessment must be undertaken on the preferred site and within the proposed development footprint	4.2
A baseline description of the aquatic biodiversity and ecosystems on the site, including: aquatic ecosystem types; presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns.	3.1.4
The threat status of the ecosystem and species as identified by the screening tool	3.6.1
An indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, a priority estuary, whether or not they are free-flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area)	3.1.4 & 3.4.3
A description of the ecological importance and sensitivity of the aquatic ecosystem including: (a) the description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g., movement of surface and subsurface water, recharge, discharge, sediment transport, etc.); and (b) the historic ecological condition (reference) as well as present ecological state of rivers (in- stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater)	3.3
The assessment must identify alternative development footprints within the preferred site which would be of a “low” sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate	-
Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the following questions: Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal? Is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present? How will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:	4.3

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(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	
(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub-catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);	
(c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary / seasonal / permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and	
(d) to what extent will the risks associated with water uses and related activities change.	
How will the proposed development impact on the functioning of the aquatic feature? This must include:	
(a) base flows (e.g., too little or too much water in terms of characteristics and requirements of the system);	
(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g., seasonal to temporary or permanent; impact of over-abstraction or instream or off stream impoundment of a wetland or river);	
(c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g., change from an unchanneled valley-bottom wetland to a channelled valley-bottom wetland);	4.3
(d) quality of water (e.g., due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);	
(e) fragmentation (e.g., road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and	
(f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g., waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.)	
How will the proposed development impact on key ecosystems regulating and supporting services especially:	
(a) flood attenuation;	
(b) streamflow regulation;	
(c) sediment trapping;	
(d) phosphate assimilation;	4.3
(e) nitrate assimilation;	
(f) toxicant assimilation;	
(g) erosion control; and	
(h) carbon storage?	
How will the proposed development impact community composition (numbers and density of species) and integrity (condition, viability, predator-prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site?	-
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment	2.1
The methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant	7.1
A description of the assumptions made, any uncertainties or gaps in knowledge or data	1.4
The location of areas not suitable for development, which are to be avoided during construction and operation, where relevant	3.5
Additional environmental impacts expected from the proposed development	-
Any direct, indirect and cumulative impacts of the proposed development on site	4.3.1
The degree to which impacts and risks can be mitigated	0 & 4.6
The degree to which the impacts and risks can be reversed	0 & 4.6
The degree to which the impacts and risks can cause loss of irreplaceable resources	0 & 4.6
A suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	3.5
Proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	0 & 4.6
A motivation must be provided if there were development footprints identified as having a "low" aquatic biodiversity sensitivity and that were not considered appropriate	1.8
A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not; and	5.2
Any conditions to which this statement is subjected	5.2

A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

2 Fieldwork

2.1 Freshwater Biodiversity Field Assessment

A field survey for the area was undertaken on 14 – 16 of April 2025 (autumn), which constitutes a late-wet season survey, to identify the presence of freshwater features (wetlands) and to delineate their spatial extents. The seasonality is not considered to be a limiting factor to the assessment and the results of this assessment are conclusive.

3 Results & Discussion

3.1 Desktop Dataset Assessment

3.1.1 Climate

The climate for the PAOI were derived from the dominant vegetation types within the PAOI. The PAOI primarily overlaps with the Marikana Thornveld.

The climate for the Marikana Thornveld is characterised by a summer rainfall with a mean annual precipitation of 654 mm (Figure 3-1). These areas are known to have warm-temperate conditions with dry winters. The likelihood of frost is greater in the western parts with the incidence of frost ranging from 30 to 40 days, compared to the east which has a frost incidence of 10 to 35 days (Mucina & Rutherford, 2006).

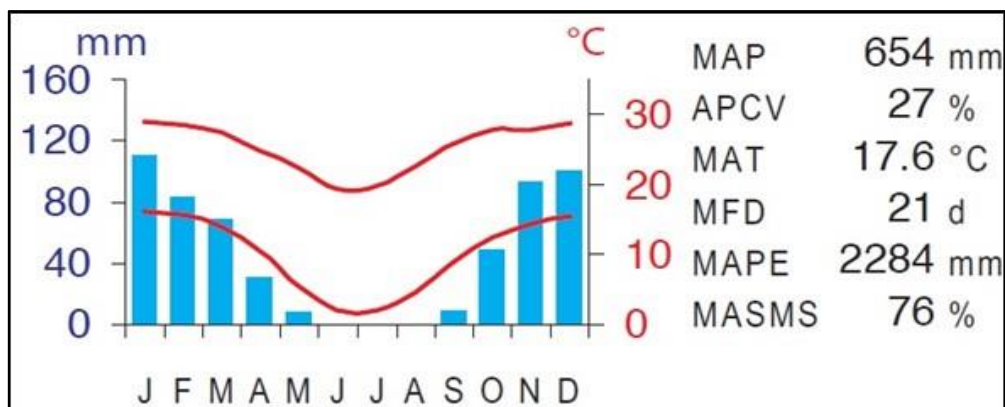


Figure 3-1 Climate for the Project Area of Influence based on the Marikana Thornveld Vegetation Type (Mucina & Rutherford, 2006)

3.1.2 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the PAOI is characterised by the Ea 3 land type.

According to the land type database (Land Type Survey Staff, 1972 - 2006), the Ea land type consists of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated.

This region (Marikana Thornveld) is characterised by norite and gabbro with anorthosite interlayered. Small patches of the Rashedoop Granophyre Suite can also be noted in this area (all from the Bushveld Igneous Complex). Large boulders and lithic horizons are distributed throughout with very well-drained Glenrosa and Mispah soil forms. Vertic and melanic soils are also abundant with the main land types being Ib and Ea (Mucina and Rutherford, 2006).

3.1.3 Hydrological Characteristics

The PAOI falls within the Bushveld Basin Ecoregion, within the Limpopo_Olifants Water Management Area (WMA). At a finer scale, within the A22H quaternary catchment. The fine scale hydrological features are presented in the following section.

3.1.3.1 Topographical River Lines and Inland Water Areas

The topographical inland and river line data for the “2527” dataset indicated no inland water areas within the project area (Figure 3-2). Additionally, no perennial or non-perennial drainage features were identified according to the dataset (Figure 3-2).

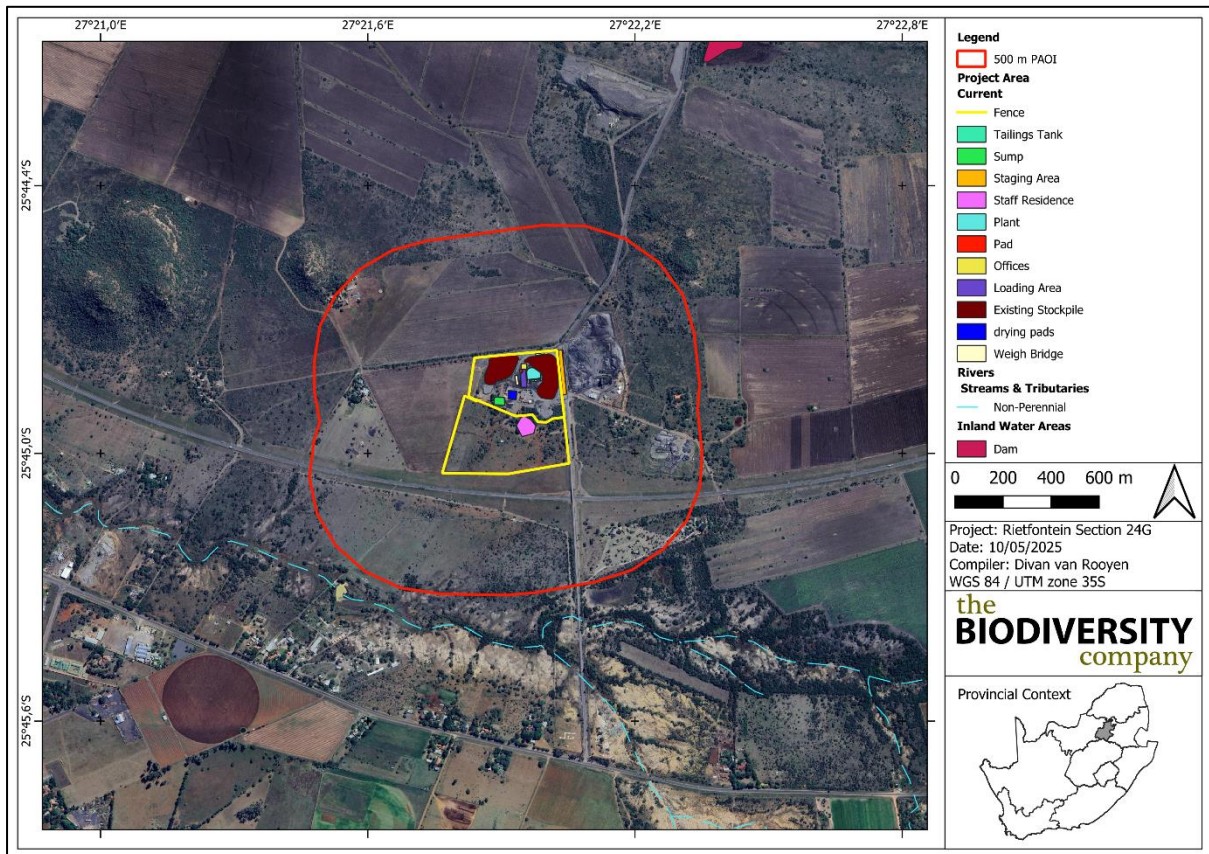


Figure 3-2 Topographical Inland Water Areas and Drainage Lines that intersect the Project Area of Influence

3.1.4 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 3-1. Only features that were identified to be relevant to the proposed project were further discussed.

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

Desktop Information Considered	Relevant/Irrelevant	Section
Strategic Water Source Areas	PAOI overlaps with a groundwater SWSA.	3.1.4.1
Provincial Conservation Plan	Relevant – PAOI overlaps with Aquatic Ecological Support Areas of the North West Biodiversity Sector Plan.	3.1.4.2
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Irrelevant – PAOI does not overlap with SAIIAE wetlands.	-

National Freshwater Priority Area Irrelevant – PAOI does not overlap with NFEPA wetlands. -

3.1.4.1 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 $\geq 50\%$ 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 3-3; Lotter and Le Maitre, 2021).

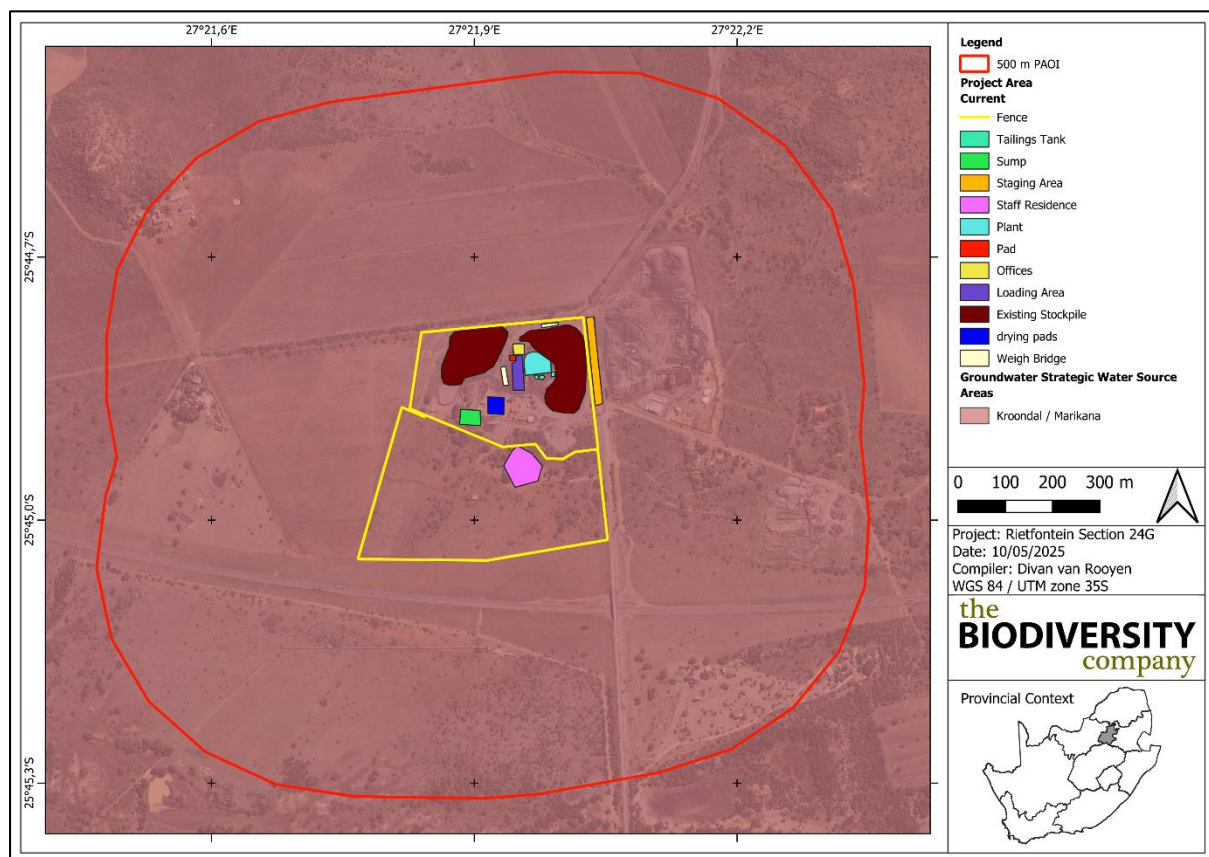


Figure 3-3 Strategic Water Source Areas in relation to the Project Area of Influence

3.1.4.2 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 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.

The PAOI partially overlaps with the North West Biodiversity Spatial Plan in southern boundary. These areas were identified as Ecological Support Areas 1 and 2. Importantly, none of the current mining infrastructure overlaps with any of the Ecological Support Areas (Figure 3-4).

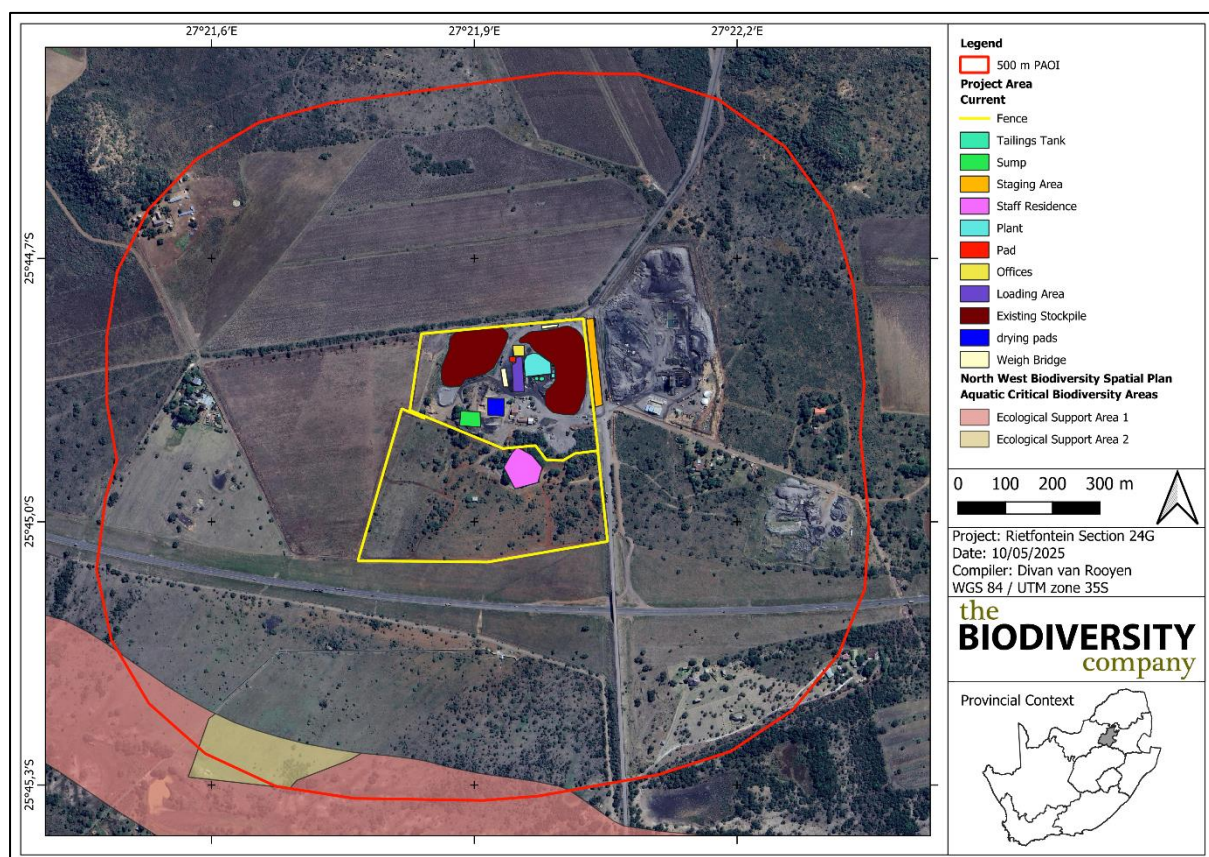


Figure 3-4 North West Biodiversity Spatial Plan in relation to the Project Area of Influence

3.2 Wetland Field Survey

3.2.1 Delineation

Four Hydrogeomorphic units (HGM) were identified during the site assessment and these four HGM units were classified as two unchannelled valley-bottoms and two hillslope seep wetlands (Figure 3-5 & Figure 3-6). Additionally, several artificial resources were identified and classified as artificial channel, artificial seep, collection dam, dams (in-stream and off-channel), pollution control dam and stormwater runoff. Furthermore, one drainage feature was identified within the PAOI.

Preferential flow paths were identified within the PAOI and were particularly noted to be present within cultivated areas. These preferential flow paths consist of grassed flow areas and sandy eroded channels that are orientated drain the crop fields after rainfall. These features are not considered to be natural drainage lines and have no ecological functionality; therefore, they are not eligible for buffers.

A summary of the identified watercourses is shown in the table below.

Table 3-2 Summary of the identified watercourses

Wetland Type	Wetland Name
Unchannelled valley-bottom	HGM 1
	HGM 2
Hillslope Seeps	HGM 3
	HGM 4
Drainage	Drainage Features
	Stormwater Runoff
Dams	Dam (In-stream)
	Dam (Off-channel)
	Collection Dam
Artificial	Pollution Control Dam
	Artificial Seep
Flow Paths	Artificial Channel
	Preferential Flow Paths

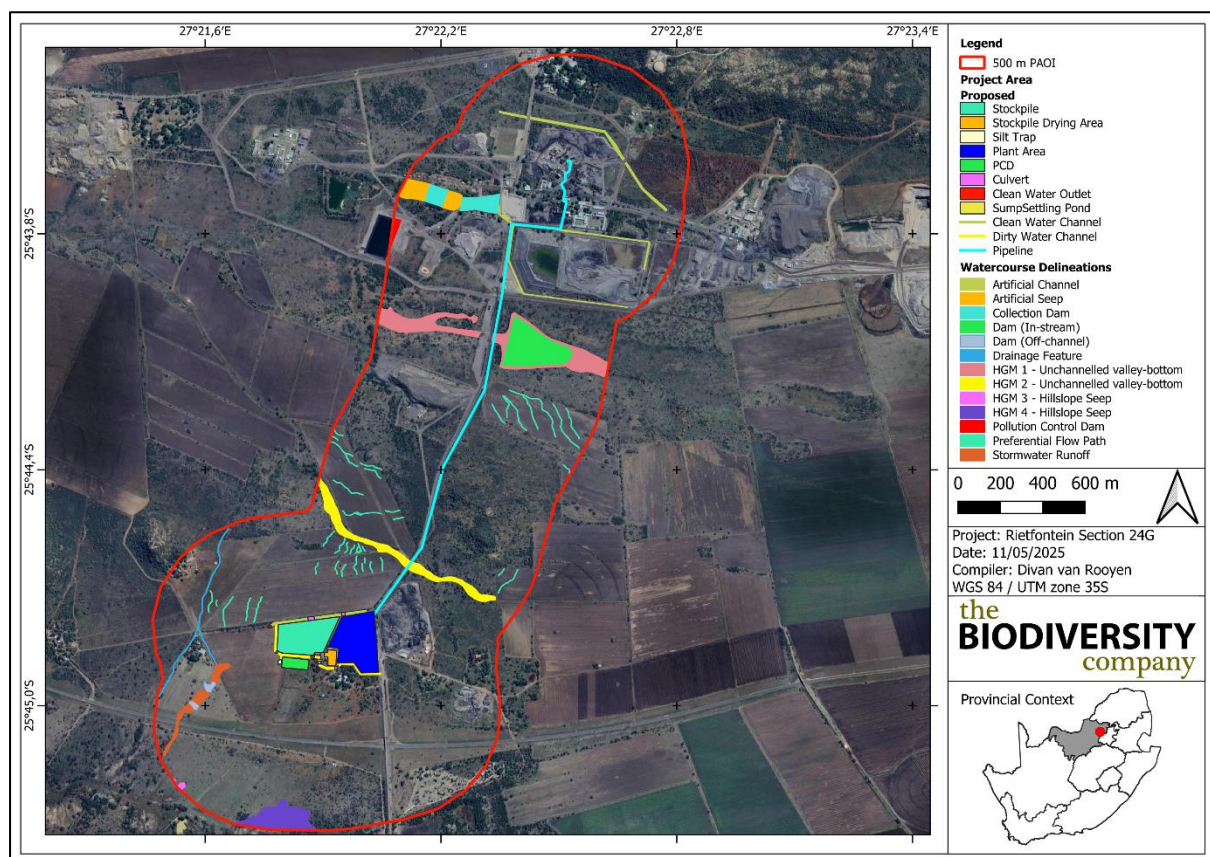


Figure 3-5 Delineated watercourses within the Project Area of Influence

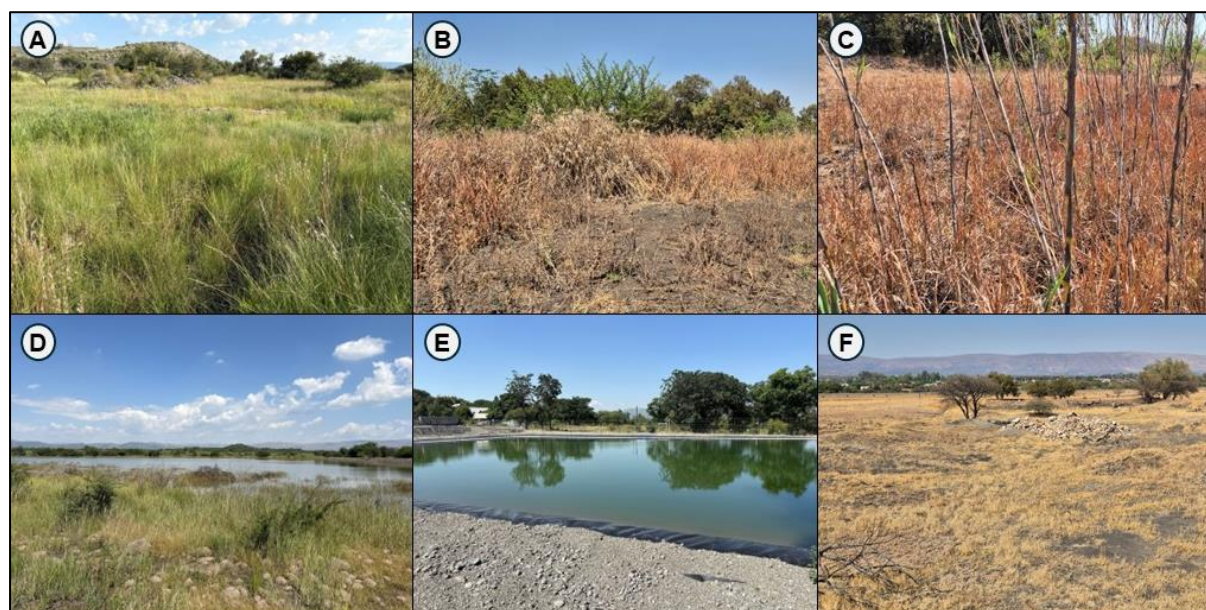


Figure 3-6 Examples of a few of the different features identified and delineated. A) Unchannelled valley-bottom, B) Hillslope Seep, C) Drainage Feature, D) In-stream Dam, E) Pollution Control Dam and F) Stormwater Runoff

3.2.2 Extent of Wetlands

The table below summarises the individual wetland areas and the percentage that each HGM unit comprises of the total wetland area within the PAOI, which amounts to 10.47 ha (Table 3-3).

Table 3-3 Summary of wetland area within the project area of influence

HGM Units	Area (Ha)	Size (%)
HGM 1	4.88	46.61
HGM 2	2.80	26.74
HGM 3	0.09	0.86
HGM 4	2.70	25.79
Total	10.47	100

3.2.3 Classification and Description

The wetland classification of the unchannelled valley-bottoms and seep wetlands as per SANBI guidelines (Ollis et al., 2013) is presented in Table 3-4.

Table 3-4 Wetland 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	
HGM 2				Slope	Seep	With Channelled outflow	N/A	
HGM 3								
HGM 4								

Unchannelled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Figure 3-7 presents a diagram of a typical unchannelled valley bottom wetland, showing the dominant movement of water into, through and out of the system.

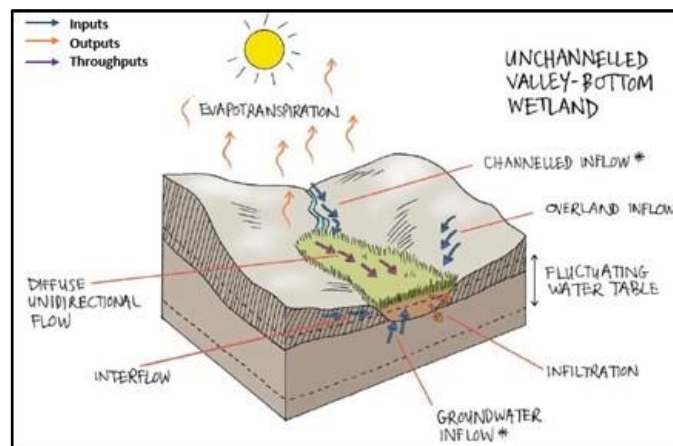


Figure 3-7 Amalgamated diagram of a typical channelled valley-bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al., 2013)

A typical hillslope seep is located on the slope terrain unit. Isolated hillslope seeps are characterised by colluvial movement of material. These systems are fed by very diffuse sub-surface flows which seep out at very slow rates, ultimately ensuring that no direct surface water connects this wetland with other water courses within the valleys. Figure 3-8 illustrates a diagram of the hillslope seeps, showing the dominant movement of water into, through and out of the system.

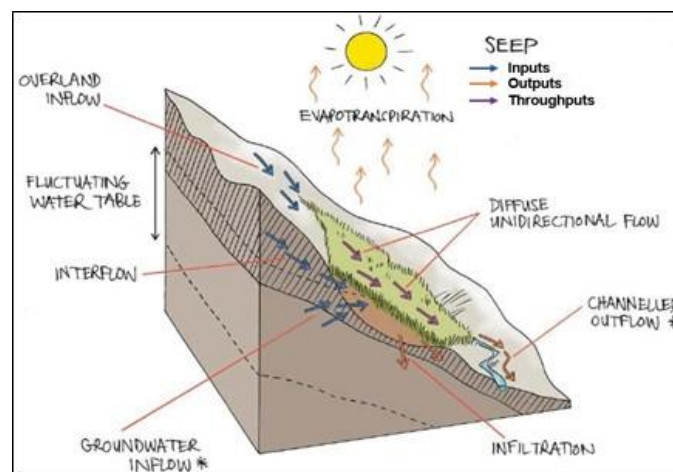


Figure 3-8 Amalgamated diagram of a seep wetland, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al., 2013)

The DWAF (2005) manual separates the classification of watercourses into three (3) separate types of channels or sections defined by their position relative to the zone of saturation in the riparian area. The classification system separates channels into:

- those that do not have baseflow ('A' Sections);
- those that sometimes have baseflow ('B' Sections) or non-perennial; or
- those that always have baseflow ('C' Sections) or perennial.

The drainage features can be classified as 'A' Section channels.

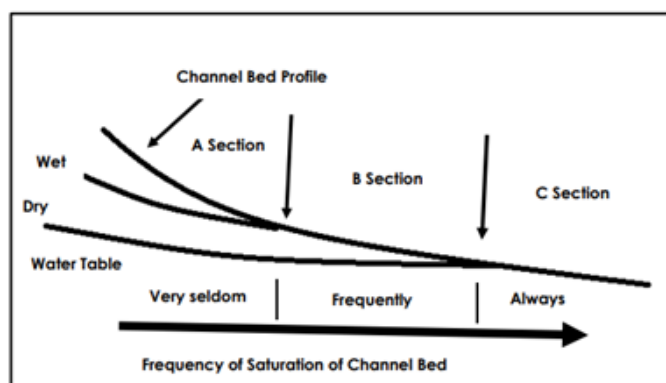


Figure 3-9 The watercourse classifications (DWAF, 2005)

3.3 Risk Screening

Table 3-5 provides the results of risk screening for the natural wetlands and provides motivation for each of the determined categories.

Table 3-5 Risk status of the delineated wetlands

HGM unit / Feature	Risk Status	Reasoning
HGM 2	At Risk	The proposed pipeline traverses HGM 2. Direct and indirect impact to this wetland is therefore expected and has been classified as "At Risk".
HGM 1 HGM 3 HGM 4 Artificial watercourses Preferential flow paths	Not at Risk	These features have been assessed as not being at risk, as they are situated outside the boundaries of any proposed infrastructure and open cast mining areas. Additionally, their distance from the proposed infrastructure and mining sites further ensures that they are classified as "Not at Risk" for the proposed project.

3.4 Wetland Functional and Ecological Assessment

Only natural systems and those that are at any perceivable risk were considered for further assessments, therefore the dams, preferential flow paths and stormwater runoff together with the drainage features has not been assessed.

3.4.1 Functional Assessment

3.4.1.1 General Functional Description

Unchanneled valley-bottoms are characterised by sediment deposition, a gentle gradient with streamflow generally being spread diffusely across the wetland, ultimately ensuring prolonged saturation levels and high levels of organic matter. The assimilation of toxicants, nitrates and phosphates are usually high for unchanneled valley-bottom wetlands, especially in cases where the valley is fed by sub-surface interflow from slopes. The shallow depths of surface water within this system adds to the degradation of toxic contaminants by means of sunlight penetration (Kotze *et al.*, 2009).

Hillslope seeps are well documented by Kotze *et al.* (2009) to be associated with sub-surface ground water flows. These systems tend to contribute to flood attenuation given their diffuse nature. This attenuation only occurs while the soil within the wetland is not yet fully saturated. The accumulation of organic material and sediment contributes to prolonged levels of saturation due to this deposition slowing down the sub-surface movement of water. Water typically accumulates in the upper slope (above the seep). Additionally, organic matter accumulation is essential in the denitrification process involved with nitrate assimilation. Seeps generally also improve the quality of water by removing excess nutrient and inorganic pollutants originating from agriculture, industrial or mine activities. The diffuse nature of flows ensures the assimilation of nitrates, toxicants and phosphates with erosion control being

one of the ecosystem services provided in a limited capacity given the nature of a typical seep's position in the landscape.

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.

3.4.1.2 Ecosystem Services

The ecosystem services provided by the relevant wetland units on site were assessed and rated using the WET-EcoServices method (Kotze *et al.*, 2008). The results of the assessment are presented in Table 3-6. The ecosystem services scores of the delineated wetlands ranges between "Intermediate" and "Moderately High". Ecosystem services contributing to these scores include sediment trapping, phosphate assimilation, nitrate assimilation, toxicant assimilation, erosion control, and the maintenance of biodiversity.

Table 3-6 Summary of the average ecosystem scores of the assessed wetland units

Moderately-High	Intermediate	Moderately-Low
HGM 4	HGM 1	HGM 2
-	HGM 3	-
-	-	-

3.4.2 Present Ecological State

The wetland has exhibited some degree of modification resulting from natural physical changes as well as anthropogenically induced impacts at both the local and catchment level. Resultingly, the watercourses scored average Present Ecological State (PES) scores range between the "D – Largely Modified" and "E – Seriously Modified" PES classes. These impacts are further discussed in Section 4.1. The results of the wetland health and integrity assessment is provided in Table 3-7.

Table 3-7 Average Present Ecological State scores for the assessed wetlands

D – Largely Modified	E – Seriously Modified
HGM 1	HGM 2
HGM 4	HGM 3

3.4.3 Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) assessment was applied to HGM unit 1 in conjunction with the ecosystem service scores in the preceding sections, to assess the levels of sensitivity and ecological importance of the wetland. Various components pertaining to the protection status of a wetland is considered for the EIS, including Strategic Water Source Areas (SWSA), the NFEPA wet veg protection status and the protection status of the wetland itself considering the NBA wetland dataset. The results of the assessment are shown in Table 3-8. The results indicate that wetlands range between the "Moderate" and "High" EIS classes.

Table 3-8 Aspects considered in the Ecological Importance and Sensitivity assessment

HGM Type	NFEPA Wet Veg			NBA Wetlands			SWSA (Y/N)	CBA / ESA (Y/N)	EIS
	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

HGM 2			E Seriously Modified (Field Visit)					C – Moderate
HGM 3	Least Threatened	Well Protected	E Seriously Modified (Field Visit)	Critically Endangered	Not Protected	Y	Y - ESA	C – Moderate
HGM 4			D Largely Modified (Field Visit)			Y		C – Moderate

3.4.4 Recommended Ecological Category and Recommended Management Objective

The REC and RMO for the wetland areas was determined from the results of the PES and EIS assessments. These assessments indicated that all wetland features within the site, had to an extent, underwent transformation as a result of historical and current impacts. Nevertheless, despite the altered ecological integrity of these systems, they are considered to provide important ecological services. The appropriate REC and RMO estimated for the wetland areas is presented in Table 3-9 below.

Table 3-9 Summary of the REC and RMO categories assigned to the relevant wetlands

HGM Unit	REC – RMO
HGM 1	C/D – Improve
HGM 2	E/F – Maintain
HGM 3	E/F – Maintain
HGM 4	D – Maintain

3.5 Buffer Requirements

The buffer requirements for the wetlands were calculated using the Site-Based Tool: Determination of buffer zone requirements for wetland ecosystems (Macfarlane *et al.*, 2014). The soil type and erodibility within the wetlands and drainage features was also considered in this assessment and contributed to the calculated buffer widths.

The pre-mitigation buffers for the wetlands and drainage features were calculated to be 25 m and 20 m, respectively. With the implementation of mitigation measure these buffer widths may be reduced to 20 m for the HGM 1 & 4, 15 m for HGM 2 & 3 as well as the drainage features. The recommended buffer zones are presented in Table 3-10 and Figure 3-10.

Table 3-10 Buffer requirements for the relevant wetland features

Feature	Pre-Mitigation	Post-Mitigation
HGM 1 & 4	25 m	20 m
HGM 2 & 3		15 m
Drainage Lines	20 m	15 m

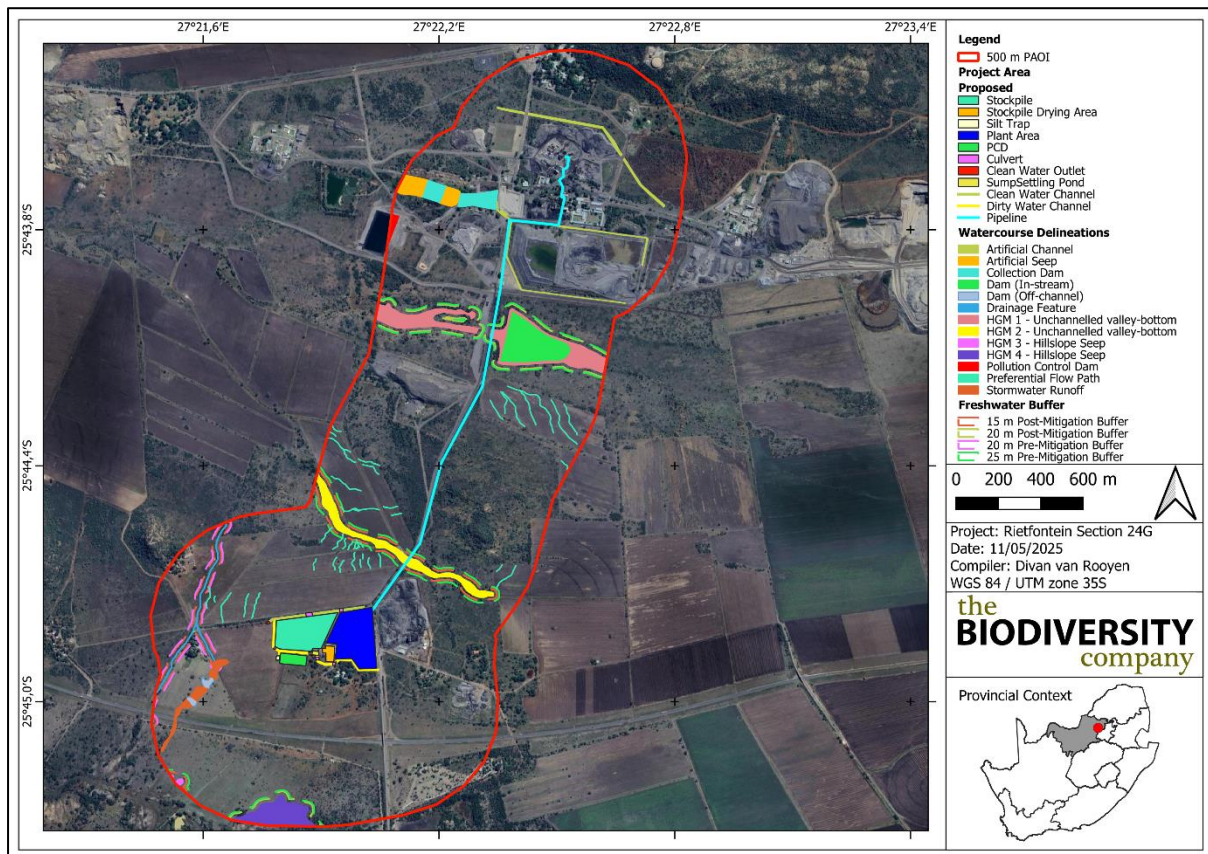


Figure 3-10 Recommended Buffers for the identified wetlands in relation to the proposed development

3.5.1 Regulation Zones

Table 3-11 presents the legislated zones of regulation that would be applicable to the wetland areas and drainage lines.

In accordance with General Notice (GN) 509 of 2016 as it relates to the NWA (1998), a regulated area of a watercourse for Section 21 (c) and 21 (i) of the NWA, 1998 means the outer edge of the 1 in 100 year flood or where no flood line has been determined it means 100 m from the edge of a watercourse or a 500 m radius from the delineated boundary (extent) of any wetland or pan.

Listed activities in terms of the NEMA (1998), (Act 107 of 1998) EIA Regulations as amended in April 2017 must be taken into consideration if any infrastructure is to be placed within the applicable zone of regulation.

Table 3-11 **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). Department of Water and Sanitation (DWS)	Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998). In accordance with GN509 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 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.
Listed activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA Regulations (2014), as amended.	Activity 12 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No.107 of 1998) 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. Excluding – ... (dd) where such development occurs within an urban area.. Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states “The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.”

3.6 Site Sensitivity Verification

3.6.1 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 entire site and PAOI (Figure 3-11).

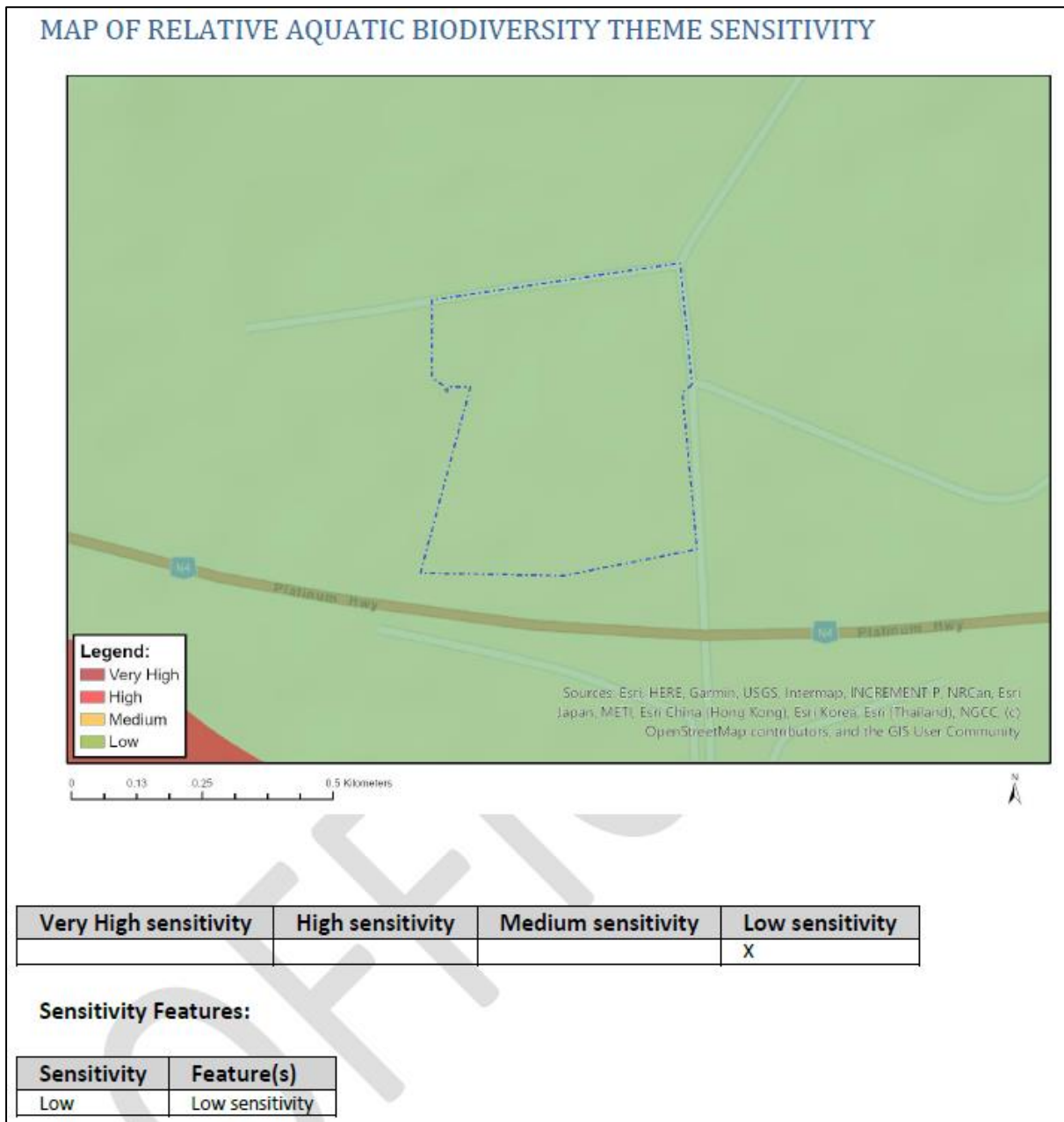


Figure 3-11 Aquatic Biodiversity Theme Sensitivity

3.6.2 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas in Table 3-12 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the PES and EIS assessment processes followed in the previous section, and consideration is given to any observed or likely presence of sensitive fauna and flora.

Table 3-12 Summary of the screening tool vs specialist assigned sensitivities

Features	Screening Tool Theme	Environmental Screening Tool Sensitivity	Specialist Sensitivity	Tool Validated or Disputed by Specialist - Reasoning
HGM 1 (UVB)	Aquatic Biodiversity Theme	Very High	Very High	Screening Tool Sensitivity Validated. Rational for the specialist assigned 'Very High' rating: This wetland system has experienced historical impact related to agriculture (crop fields) and impoundments. Even though largely modified the wetland still has functionality and this has contributed towards determining the sensitivity rating. The wetland has therefore been assigned a 'Very High' sensitivity rating.
HGM 2 (UVB)	Aquatic Biodiversity Theme	Low	Very High	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Very High' rating: This wetland system has experienced historical impact related to agriculture (crop fields) and impoundments. Even though largely modified the wetland still has functionality and this has contributed towards determining the sensitivity rating. The wetland has therefore been assigned a 'Very High' sensitivity rating.
HGM 3 & 4	Aquatic Biodiversity Theme	Low	Very High	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Very High' rating: Seep wetlands and the respective 15 m buffers present. The Ecological Importance and Sensitivity is moderate to high. Seeps wetlands are critically endangered according to the NBA 2018 dataset.
Drainage Features	Aquatic Biodiversity Theme	Low	Medium	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Medium' rating: Drainage features and the respective buffers present. The drainage features are important as they feed into the wetland, they do however not have the functionality of a wetland and will thus be less sensitive than the natural wetlands.
Remaining Area	Aquatic Biodiversity Theme	Low	Low	Screening Tool Sensitivity Validated. Rational for the specialist assigned 'Low' rating: Much of the area has been historically modified through agricultural and mining activity. The proposed activities are not anticipated to significantly modify the hydrological characteristics of the entire area; therefore a 'Low' sensitivity has been assigned for these areas in relation to freshwater biodiversity.

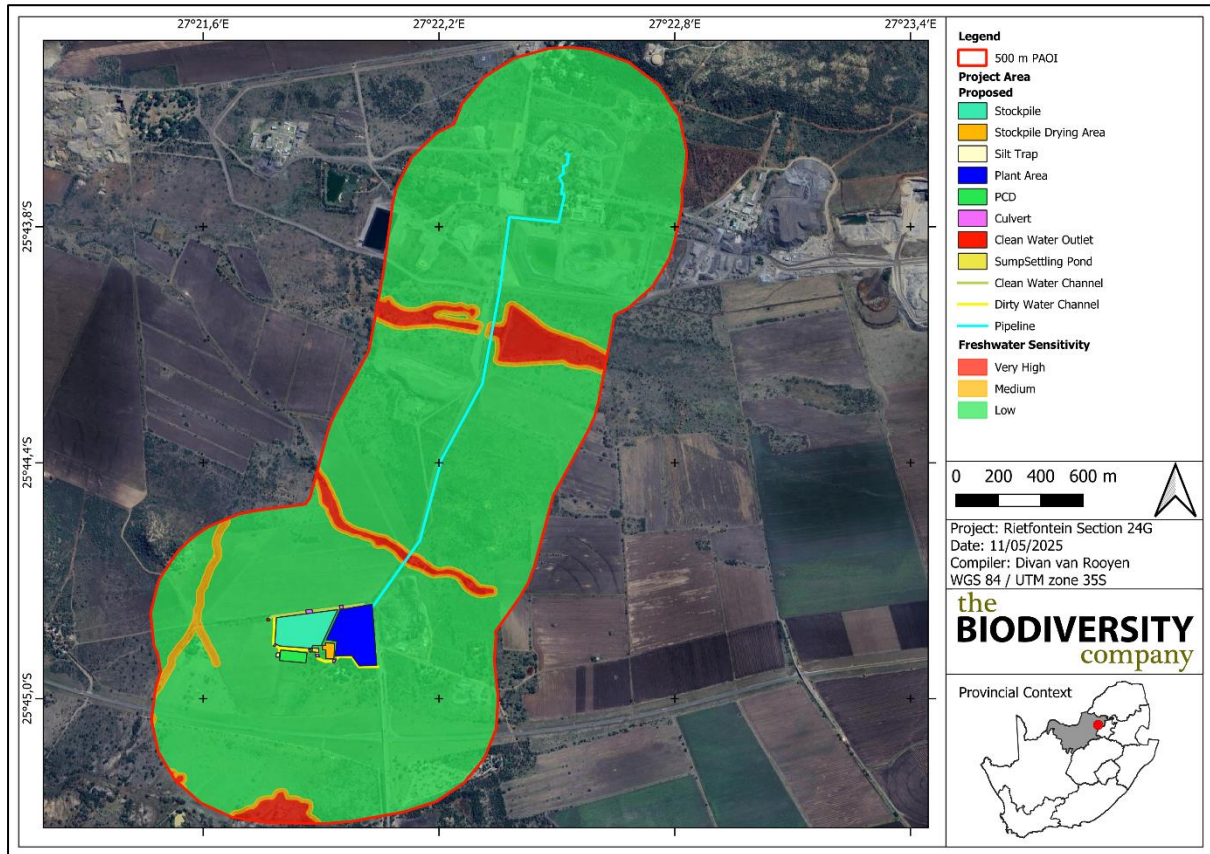


Figure 3-12 Sensitivity Map for the Project Area of Interest

4 Risk and Impact Assessment

4.1 Current Impacts to Freshwater Biodiversity

The assessed wetlands exhibit impacts at local scale. These impacts result from present and historical land use relating to agricultural practice, impoundments, access roads and to a large degree, mining activities which have transformed the wetland habitats and have altered their natural hydrological regime and vegetation composition. The list below refers to the present-day local impacts observed within the assessed wetland areas:

- Wetland disturbance from other mining and agricultural practises, development of dams and foot traffic;
- Altered hydrological inputs resulting from changes to the surrounding landscape;
- Erosion induced from altered hydrodynamics in combination with the loss of wetland vegetation;
- Altered geomorphology from historical mining practises and agricultural practices and development of dams in close proximity to wetlands;
- Loss of wetland vegetation from continual disturbances, historical land use and the establishment of alien invasive flora species in some approaches of the wetlands; and
- Wetland degradation from mining and agricultural activities and development of dams.

4.2 Alternatives Considered

No site alternatives were provided for the proposed project, and the assessed area is considered to be the preferred option for development and has been used to determine potential impacts to the identified wetlands.

4.3 Quantitative Risk and Impact Assessment

The Risk / Impact Assessment considered the direct and indirect impacts, to the wetland systems. The mitigation hierarchy as discussed by the Department of Environmental Affairs (2013) will be considered for this component of the assessment (Figure 4-1). In accordance with the mitigation hierarchy, the preferred mitigatory measure is to avoid impacts by considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts.

The freshwater report is being prepared in support of a Section 24 G Environmental Authorisation process, which infers that the construction phase has already occurred for the existing activities. Furthermore, proposed construction activities will be undertaken for the proposed project as indicated in the project description. The risk assessments presented herein considers the proposed activities and the retrospective impacts for the existing infrastructure. The same activities were considered for both the prospective and retrospective assessments.

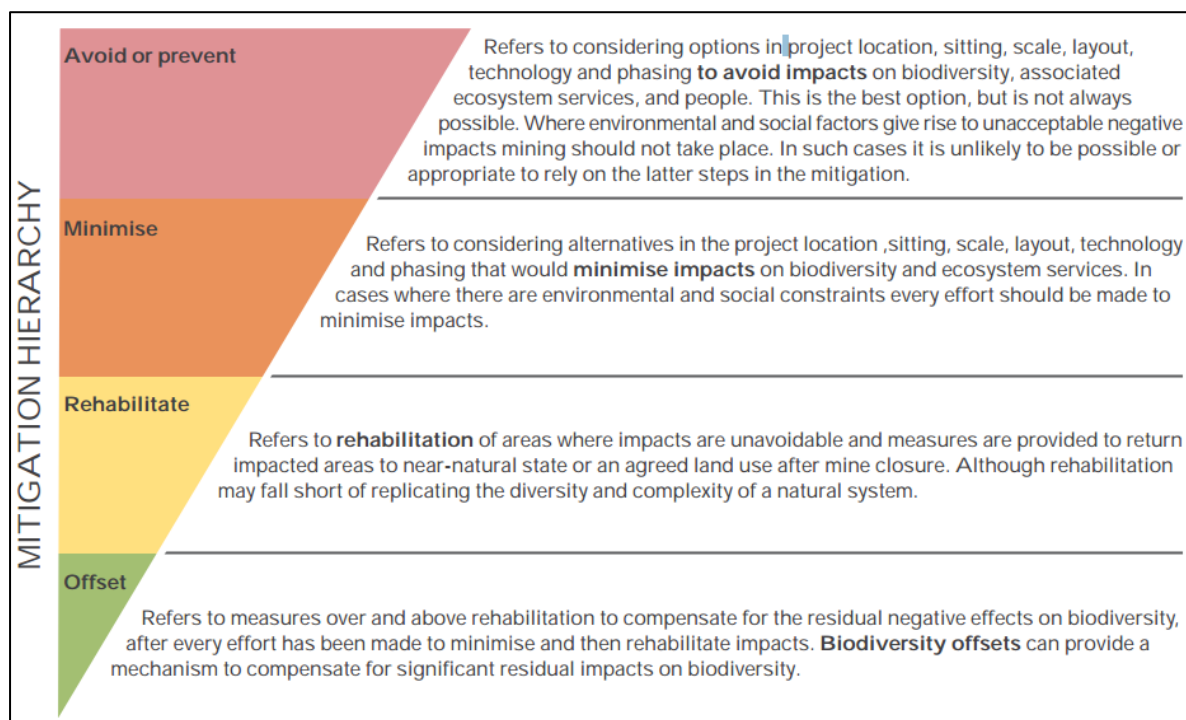


Figure 4-1 The mitigation hierarchy as described by the DEA (2013)

4.3.1 Potential Anticipated Impacts

Table 4-1 illustrates the potential aspects expected to threaten the integrity of sensitive receptors during the proposed activities. The pre- and post- mitigation significance ratings have been calculated considering various parameters, these results are presented in the subsequent tables.

Table 4-1 Aspects and impacts relevant to the proposed activity

Activity	Aspects and Impacts
Vegetation Clearing and Site Preparation; Excavation; Storage of chemicals, mixes, and fuels with associated accident spills; Indiscriminate dumping of waste products or construction materials; Soil stockpiling and building material stockpiles; Operation of vehicles, equipment, and machinery.	Construction Phase
	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the infrastructure and open cast mine.
	Altering surface flow patterns
	Erosion of surrounding landscape and subsequently the watercourses
	Sedimentation and siltation of watercourses
	Proliferation of invasive alien plants
	Impaired water quality from spills and leaks
	Temporary alteration of hydrology within watercourse
	Erosion of watercourses from concentrated flows
	Use of machinery and equipment within or in proximity to wetlands / Vehicle Traffic
Vehicles and machinery driving in and through wetlands. Storage of chemicals, mixes and fuel (Leak and spill hazard). Clearing of vegetation. Discharge of solvents, chemicals and hydrocarbons. Discharge of sewage. Decanting.	Operational Phase
	Altering surface and subsurface flow patterns
	Sedimentation and siltation of watercourses
	Impaired water quality from residual materials entering the system
	Impaired water quality from spills and leaks
	Impaired water quality from residual contaminants entering the system from dust precipitation
Wetland degradation	
	Decommissioning Phase

Excavating and reshaping Removal of drainage systems Rehabilitation of reworked area	Altering surface and subsurface flow patterns
	Erosion of surrounding landscape and subsequently the watercourses
	Sedimentation and siltation of watercourses
	Impaired water quality from residual tailings materials entering the system
	Proliferation of invasive alien plants

Direct and indirect impacts are potential to HGM 2 due to the pipeline construction. Emphasis was therefore placed on minimising impacts by means of mitigation. Due to their proximity to any of the proposed developments, the other natural wetlands (HGM 1, HGM 3 & 4) were not assessed during the risk assessment.

Based on the findings of the prospective risk assessment, which indicate that the anticipated risks of the proposed activities are low once mitigation is applied. It is reasonable to infer that the retrospective risks associated with the existing infrastructure have similarly been low in relation to HGM 2 during its construction and operational phases (Table 4-3). This assumption is further supported by the fact that the natural watercourses are situated a considerable distance from the area of activity and are buffered from direct impact by intervening land uses, such as cultivated crop fields, which provide an additional layer of separation between the watercourse and the activities. A 100% probability of impact was used in the assessment.

It should be noted that the project presents an opportunity to rehabilitate the watercourses which would result in a positive impact.

Table 4-2 Summative results of the Risk Assessment conducted for the proposed project

Phase	Activity	Impact	Potentially affected watercourses	Significance (max = 100)	Risk Rating	Confidence level
			Name/s			
CONSTRUCTION	Clearing of vegetation and site preparation to facilitate the development of the infrastructure	Loss of wetland area	HGM 2	27	L	High
		Altering surface flow patterns	HGM 2	27	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	16,8	L	High
		Sedimentation and siltation of watercourses	HGM 2	21,6	L	High
		Proliferation of invasive alien plants	HGM 2	16,8	L	High
	Excavating and reshaping for the infrastructure	Altering surface and subsurface flow patterns	HGM 2	5,4	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	4,2	L	High
		Sedimentation and siltation of watercourses	HGM 2	4,2	L	High

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	Soil stockpiling	Altering surface and subsurface flow patterns	HGM 2	16,2	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	12,6	L	High
		Sedimentation and siltation of watercourses	HGM 2	12,6	L	High
	Storage of chemicals, mixes and fuel	Impaired water quality from spills and leaks	HGM 2	8,4	L	High
	Operation of heavy machinery and equipment within and in proximity to wetlands	Altering surface flow patterns through hardened surfaces	HGM 2	21,6	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	16,8	L	High
		Sedimentation and siltation of watercourses	HGM 2	12,6	L	High
		Wetland vegetation disturbance and proliferation of invasive alien plants	HGM 2	12,6	L	High
		Impaired water quality from spills and leaks	HGM 2	8,4	L	High
	Installation and assembly of drainage systems	Altering surface and subsurface flow patterns	HGM 2	27	L	High
	Backfilling of residual excavated areas	Altering surface and subsurface flow patterns	HGM 2	21,6	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	16,8	L	High
		Sedimentation and siltation of watercourses	HGM 2	12,6	L	High
	Domestic and industrial waste	Wetland degradation	HGM 2	8,4	L	High
		Impaired water quality	HGM 2	8,4	L	High
	Ablution facilities	Impaired water quality from spills and leaks	HGM 2	12,6	L	High
OPERATIONAL	Operation of Beneficiation Plant	Altering surface and subsurface flow patterns	HGM 2	16,2	L	High
		Sedimentation and siltation of watercourses	HGM 2	16,2	L	High
		Impaired water quality from residual materials entering the system	HGM 2	16,2	L	High
	Storage of chemicals, mixes and fuel (Leak and spill hazard).	Impaired water quality from spills and leaks	HGM 2	21,6	L	High

	Wate management.	Impaired water quality	HGM 2	21,6	L	High
		Wetland degradation	HGM 2	16,8	L	High
	Operation of drainage systems	Altering surface and subsurface flow patterns	HGM 2	26,4	L	High
		Sedimentation and siltation of watercourses	HGM 2	21,6	L	High
		Impaired water quality from residual contaminants entering the system	HGM 2	27	L	High
Decommissioning	Excavating and reshaping.	Altering surface and subsurface flow patterns	HGM 2	21	L	High
		Erosion of surrounding landscape and subsequently the watercourses	HGM 2	16,8	L	High
		Sedimentation and siltation of watercourses	HGM 2	16,8	L	High
	Removal of drainage systems.	Altering surface and subsurface flow patterns	HGM 2	27	L	High
		Sedimentation and siltation of watercourses	HGM 2	16,8	L	High
		Impaired water quality from residual tailings materials entering the system	HGM 2	16,8	L	High
	Rehabilitation of reworked area.	Altering surface and subsurface flow patterns	HGM 2	27	L	High
		Sedimentation and siltation of watercourses	HGM 2	12,6	L	High
		Impaired water quality from residual tailings materials entering the system	HGM 2	21	L	High
		Proliferation of invasive alien plants	HGM 2	16,8	L	High

Table 4-3 *Summative results of the Risk Assessment conducted for the existing impacts*

Phase	Activity	Impact	Significance (max = 100)	Risk Rating
CONSTRUCTION	Clearing of vegetation and site preparation to facilitate the development of the infrastructure	Altering surface flow patterns	27	L
		Erosion of surrounding landscape and subsequently the watercourses	21	L
		Sedimentation and siltation of watercourses	27	L
		Proliferation of invasive alien plants	21	L

	Excavating and reshaping for the infrastructure	Altering surface and subsurface flow patterns	27	L
		Erosion of surrounding landscape and subsequently the watercourses	21	L
		Sedimentation and siltation of watercourses	21	L
	Soil stockpiling	Altering surface and subsurface flow patterns	27	L
		Erosion of surrounding landscape and subsequently the watercourses	21	L
		Sedimentation and siltation of watercourses	21	L
	Storage of chemicals, mixes and fuel	Impaired water quality from spills and leaks	21	L
	Operation of heavy machinery and equipment within and in proximity to wetlands	Altering surface flow patterns through hardened surfaces	27	L
		Erosion of surrounding landscape and subsequently the watercourses	21	L
		Sedimentation and siltation of watercourses	21	L
		Wetland vegetation disturbance and proliferation of invasive alien plants	21	L
		Impaired water quality from spills and leaks	21	L
	Installation and assembly of drainage systems	Altering surface and subsurface flow patterns	27	L
	Backfilling of residual excavated areas	Altering surface and subsurface flow patterns	27	L
		Erosion of surrounding landscape and subsequently the watercourses	21	L
		Sedimentation and siltation of watercourses	21	L
	Domestic and industrial waste	Wetland degradation	21	L
		Impaired water quality	21	L
Ablution facilities	Impaired water quality from spills and leaks	21	L	
OPERATIONAL	Operation of Beneficiation Plant	Altering surface and subsurface flow patterns	27	L
		Sedimentation and siltation of watercourses	27	L
		Impaired water quality from residual materials entering the system	27	L
	Storage of chemicals, mixes and fuel (Leak and spill hazard).	Impaired water quality from spills and leaks	27	L
	Waste management.	Impaired water quality	27	L
		Wetland degradation	21	L
	Operation of drainage systems	Altering surface and subsurface flow patterns	27	L
		Sedimentation and siltation of watercourses	27	L
		Impaired water quality from residual contaminants entering the system	27	L
		Impaired water quality from residual tailings materials entering the system	21	L
		Proliferation of invasive alien plants	21	L

4.4 Impact Assessment

The development of the project will result in the modification of watercourse habitats where infrastructure traverses or is placed inside of the wetland. The clearing of topsoil and vegetation will be required for the installation and placement of infrastructure. The development across and/or within wetlands can also cause a disruption to the biotic community structure due to the fragmentation and deterioration of habitat. Thus, the loss, fragmentation and/or deterioration of wetland habitat will reduce the level of ecosystem service benefit provided by the affected systems. The development of the area in proximity of the watercourses would also create erosion hotspots which could contribute to the sedimentation of any receiving watercourses. Infrastructure in proximity to watercourses and located

on a suitable slope could create preferential flow paths, causing increased surface run-off volumes and velocities causing erosion to the area.

The impacts associated with the proposed activities, was assessed in the impact matrix provided by EIMS and the results are given in Table 4-4. The impact assessments presented herein considers the proposed activities and the retrospective impacts for the existing infrastructure. The results obtained indicate that the retrospective impacts for the construction and operational phases were of low consequence and significance. The mitigation measures proposed for retrospective assessment are primarily aimed at the continuation of operations, as the activities have already commenced and it is not possible to fully mitigate against impacts that have already occurred.

Table 4-4 Summative results of the Impact Assessment conducted for the proposed project

Impact	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Indirect loss, disturbance and degradation of wetlands	Construction	4,5	-3	-3,75
Mitigation <ul style="list-style-type: none"> Minimise the construction footprint and restrict vegetation clearing to the designated construction area. Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation. Limit vehicle and machinery movement near the wetland to designated routes. Limit all other activities in watercourse areas to those explicitly authorised. Install the pipeline above ground when crossing the watercourse, ensuring supports span the entire width wherever feasible. 				
Increased bare surfaces, runoff and potential for erosion	Construction	-6,75	-4	-5
Mitigation <ul style="list-style-type: none"> Maintain access roads to prevent erosion and sedimentation. If supports must be constructed within the watercourse, remove and replace soil in the order it was excavated, with topsoil and subsoil stockpiled separately. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion. Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge. 				
Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Construction	-6,75	-3,5	-4,375
Mitigation <ul style="list-style-type: none"> Monitor and manage invasive species in disturbed areas. Minimise the construction footprint and restrict vegetation clearing to the designated construction area. Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation. 				
Increased sediment loads to downstream reaches	Construction	-6,75	-3,5	-4,375
Mitigation <ul style="list-style-type: none"> Maintain access roads to prevent erosion and sedimentation. If supports must be constructed within the watercourse, remove and replace soil in the order it was excavated, with topsoil and subsoil stockpiled separately. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion. 				
Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste	Construction	-6,75	-3,5	-4,375
Mitigation <ul style="list-style-type: none"> Prohibit mixing of chemicals or concrete within the watercourse. Store all fuels and chemical mixtures in a bunded area, away from the watercourse. Regularly inspect and maintain bunded areas around fuel, chemical, and waste storage. Ensure all solid and hazardous waste is stored in designated, impermeable areas and regularly removed to licensed facilities. Prevent any waste dumping or littering near the wetland. Ensure all dirty water reports to a PCD (Pollution Control Dam). Develop and implement emergency response protocols for potential pipeline leaks. 				
Alteration of hydrological regime	Construction	-6	-3	-3,75
Mitigation <ul style="list-style-type: none"> Install the pipeline above ground when crossing the watercourse, ensuring supports span the entire width wherever feasible. Limit all other activities in watercourse areas to those explicitly authorised. 				
Increased water inputs (clean) to downstream wetlands	Operation	-6,75	-4	-5

Mitigation				
<ul style="list-style-type: none"> Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge. Perform regular maintenance and inspections of the pipeline to ensure its integrity and prevent increased volumes of water (with potential contaminants) from entering the watercourse. Develop and implement emergency response protocols for potential pipeline leaks. 				
Degradation of wetland vegetation and proliferation of alien and invasive species	Decommissioning	-6,75	-3,5	-4,375
Mitigation				
<ul style="list-style-type: none"> Monitor and manage invasive species in disturbed areas. Minimise the construction footprint and restrict vegetation clearing to the designated construction area. Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation. 				
Disruption of wetland soil profile, hydrological regime and increased sediment loads	Decommissioning	-6,75	-3,5	-4,375
Mitigation				
<ul style="list-style-type: none"> If supports must be constructed within the watercourse, remove and replace soil in the order it was excavated, with topsoil and subsoil stockpiled separately. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion. Limit vehicle and machinery movement near the wetland to designated routes. Maintain access roads to prevent erosion and sedimentation. 				

Table 4-5 Summative results of the Impact Assessment conducted for the existing impacts

Impact	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Indirect loss, disturbance and degradation of wetlands	Construction	-5.25	-3.5	-4.38
Mitigation				
<ul style="list-style-type: none"> Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation. Limit vehicle and machinery movement near the wetland to designated routes. Limit all other activities in watercourse areas to those explicitly authorised. 				
Increased bare surfaces, runoff and potential for erosion	Construction	-7.5	-4	-5.00
Mitigation				
<ul style="list-style-type: none"> Maintain access roads to prevent erosion and sedimentation. Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion. 				
Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Construction	-7.5	-3.5	-4.38
Mitigation				
<ul style="list-style-type: none"> Monitor and manage invasive species in disturbed areas. Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation. 				
Increased sediment loads to downstream reaches	Construction	-7.5	-3.5	-4.38
Mitigation				
<ul style="list-style-type: none"> Maintain access roads to prevent erosion and sedimentation. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion. 				
Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste	Construction	-7.5	-3.5	-4.38
Mitigation				
<ul style="list-style-type: none"> Regularly inspect and maintain bunded areas around fuel, chemical, and waste storage. Ensure all solid and hazardous waste is stored in designated, impermeable areas and regularly removed to licensed facilities. Prevent any waste dumping or littering near the wetland. Ensure all dirty water reports to a PCD (Pollution Control Dam). 				
Alteration of hydrological regime	Construction	-6.75	-3	-3.75

Mitigation				
<ul style="list-style-type: none"> Limit all other activities in watercourse areas to those explicitly authorised. Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge. 				
Increased water inputs (clean) to downstream wetlands	Operation	-7.5	-4	-5.00
Mitigation				
<ul style="list-style-type: none"> Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge. 				

4.5 Section 24G Impact Assessment

In accordance with the requirements for Environmental Authorisation rectification as per NEMA Section 24G, a retrospective ecological biodiversity assessment must take place 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.

Read in conjunction with the assigned sensitivities and impacts, this section of the report utilises historical imagery analyses to assess pre-development environmental conditions to compare them with current conditions. The earliest historical satellite imagery available for the PAOI is from August 2004 (Figure 4-2). The habitat within the PAOI has been modified, since August 2004 and has changed considerably as a result of the land uses. Figure 4-3 presents the last available satellite imagery for the Project Area.



Figure 4-2 Historical satellite imagery of the Project Area during August 2004 (Google Earth)



Figure 4-3 Historical satellite imagery of the Project Area in March 2022 (Google Earth)

4.5.1 Current Impacts

No watercourses were identified within the boundaries of the plant and existing infrastructure footprint. Although stockpiles and a beneficiation plant have been established within 500 m of the delineated wetlands, the current condition of the watercourses cannot be attributed solely to this development. The wetland lies over 200 m away from the infrastructure and is part of a broader catchment that is already subject to a variety of anthropogenic pressures. Other land uses and activities within the catchment, such as agriculture, existing access roads, grazing, and historical disturbance, may also be contributing to the present state of the system. In theory, the beneficiation plant and stockpiles could have introduced impacts including increased sediment loads from surface runoff and erosion, changes to natural stormwater pathways through compaction and altered drainage, and potential contamination from hydrocarbons, dust fallout, or processing residues. These stressors, if uncontrolled, could affect the wetland indirectly by reducing water quality, smothering aquatic vegetation, encouraging the establishment of alien or pioneer species, and altering the frequency or magnitude of hydrological inflows. However, given the separation distance to the wetland and the cumulative influence of other activities within the catchment, it is not possible to isolate and directly ascribe the current wetland condition to the development in question.

4.5.2 Way Forward

Given that there were no watercourses within the plant and infrastructure footprint, the general mitigation measures as set out in this report should be implemented as precautionary measure to prevent impact to the downstream watercourse (HGM 2).

4.6 Mitigation Measures

In light of the expected indirect impacts from proposed activities the following mitigation measures and management outcomes (Table 4-6) have been proposed to lower the intensity of the impacts on the ecological integrity of the wetlands.

The focus of mitigation measures should be to reduce the significance of potential environmental impacts associated with the proposed development and thereby to:

- Prevent the unnecessary destruction and fragmentation of the vegetation community of the wetland areas; and
- Limit the construction area to the defined project areas and only impact those areas where it is unavoidable to do so otherwise.

Table 4-6 Mitigation Measures and Monitoring and Management Outcomes

No	Mitigation Measure	Phase	Intended Management Outcome	Timeframe	Monitoring Frequency	Target	Monitoring Tool	Responsible Parties
A	Install the pipeline above ground when crossing the watercourse, ensuring supports span the entire width wherever feasible. Limit all other activities in watercourse areas to those explicitly authorised.	Construction	Minimise direct disturbance to the watercourse and maintain natural flow and habitat integrity.	During watercourse crossing	Weekly	100% of watercourse crossings use above-ground supports where feasible; no unauthorised activities in watercourse	Photographic records of crossings	Contractor & ECO
B	If supports must be constructed within the watercourse, remove and replace soil in the order it was excavated, with topsoil and subsoil stockpiled separately. Store stockpiles on a flat surface outside the watercourse, protected from rain and erosion.	Construction	Preserve soil structure and fertility, prevent sedimentation, and reduce erosion risk within the watercourse.	During excavation and backfilling	Daily	Soil horizons reinstated in correct order; no evidence of sedimentation or erosion	Soil profile photographs, soil stockpile checks for erosion and photographic record of any backfilled areas	Contractor & ECO
C	Minimise the construction footprint and restrict vegetation clearing to the designated construction area. Rehabilitate any disturbances within the watercourse by manually tilling the soil and replanting with native vegetation.	Construction Operation	Limit habitat loss and promote rapid recovery of native vegetation and ecosystem function.	During and after construction	Monthly – Construction Quarterly (1 year) - Operation	No clearing outside demarcated area; 100% of disturbed areas rehabilitated with native species	Vegetation clearance maps; rehabilitation progress reports; native species survival survey data	Contractor & ECO
D	Monitor and manage invasive species in disturbed areas.	Construction Operation Decommissioning	Prevent the establishment and spread of invasive species, supporting native biodiversity.	Throughout all phases	Monthly	No new invasive species established; all detected invasives removed within 2 weeks	Survey and removal records; ECO verification	Contractor & ECO

Clover Alloys RCM Rietfontein 24G

E	Prohibit mixing of chemicals or concrete within the watercourse. Store all fuels and chemical mixtures in a bunded area, away from the watercourse.	Construction	Prevent contamination of the watercourse and protect water quality.	Throughout construction	Weekly	Zero incidents of chemical/concrete mixing in watercourse; all storage areas bunded and compliant	Incident log reviews; Storage area inspection, ECO spot checks	Contractor & ECO
F	Perform regular maintenance and inspections of the pipeline to ensure its integrity and prevent increased volumes of water (with potential contaminants) from entering the watercourse.	Operation	Reduce the risk of leaks or failures, protecting the watercourse and surrounding environment.	As per maintenance schedule	As per maintenance schedule	100% of scheduled inspections completed; no unreported leaks or failures	Maintenance and inspection records	Contractor & ECO
G	Develop and implement emergency response protocols for potential pipeline leaks.	Operation	Ensure rapid and effective response to incidents, minimising environmental harm.	Annual drills; as needed	Annual drills; as needed	Emergency response plan in place and tested; response time within 2 hours of incident	Drill and incident records; ECO review	Contractor & ECO
H	Implement and maintain a stormwater management system that diverts clean runoff away from contaminated areas and directs potentially contaminated water to treatment facilities before discharge.	Operation	Prevent pollution of the watercourse and wetland from stormwater runoff.	Throughout all phases	Monthly	No evidence of contaminated runoff entering watercourse; system operational at all times	Stormwater system inspection logs; water quality analysis reports (turbidity, hydrocarbons, nutrients) at discharge points	Contractor & ECO
I	Ensure all dirty water reports to a PCD (Pollution Control Dam).	Construction Operation	Contain and treat contaminated water, preventing its release into the environment.	Throughout all phases	Daily	100% of dirty water directed to PCD; no overflow or bypass events	Capacity and discharge logs	Contractor & Environmental Officer / ECO
J	Regularly inspect and maintain bunded areas around fuel, chemical, and waste storage.	Construction Operation	Prevent leaks and spills from contaminating soil and water resources.	Throughout all phases	Weekly	All bunded areas intact and functional; no leaks or spills detected	Bund inspection checklists; spill incident logs; audit reports	Contractor & ECO
K	Ensure all solid and hazardous waste is stored in designated, impermeable areas and regularly removed to licensed facilities.	Construction Operation	Prevent pollution and ensure responsible waste management.	Throughout all phases	Monthly	No waste stored outside designated areas; all waste removed to licensed facilities within 7 days	Waste storage inspection and audit reports	Contractor & ECO

L	Prevent any waste dumping or littering near the wetland.	Construction Operation	Maintain wetland health and prevent contamination.	Throughout all phases	Daily	Zero incidents of illegal dumping or littering	Waste storage inspection and audit reports	Contractor & ECO
M	Limit vehicle and machinery movement near the wetland to designated routes.	Construction Operation	Minimise soil compaction, vegetation damage, and disturbance to wetland habitats.	Throughout all phases	Daily	No evidence of off-route vehicle/machinery movement	Access route inspection and audit reports	Contractor & ECO
N	Maintain access roads to prevent erosion and sedimentation.	Construction Operation	Reduce sediment input into the wetland, protecting water quality and habitat structure.	Throughout all phases	Monthly	No visible erosion or sedimentation from access roads	Road condition inspection logs; post-rainfall erosion checklists; maintenance activity logs	Contractor & ECO

5 Conclusion

Four Hydrogeomorphic units (HGM) were identified during the site assessment and these four HGM units were classified as two unchannelled valley-bottoms and two hillslope seep wetlands. Additionally, several artificial resources were identified and classified as artificial channel, artificial seep, collection dam, dams (in-stream and off-channel), pollution control dam and stormwater runoff. Furthermore, one drainage feature was identified within the PAOI.

Preferential flow paths were identified within the PAOI and were particularly noted to be present within cultivated areas. These preferential flow paths consist of grassed flow areas and sandy eroded channels that are orientated drain the crop fields after rainfall. These features are not considered to be natural drainage lines and have no ecological functionality; therefore, they are not eligible for buffers.

The ecological characteristics of the identified natural watercourses are summarised below. HGM 2 was identified to be at risk and were included in the DWS impact assessment.

Table 5-1 Ecological characteristics and buffer requirements of the freshwater features

Aspect	Present Ecological State	Ecological Importance and Sensitivity (EIS)	Buffer Requirement
Unchannelled valley-Bottom (HGM 1)	D – Largely Modified	High	20 m
Unchannelled valley-bottom (HGM 2)	E – Seriously Modified	Moderate	15 m
Hillslope Seep (HGM 3)	E – Seriously Modified	Moderate	15 m
Hillslope Seep (HGM 4)	D – Largely Modified	Moderate	20 m
Drainage Features		N/A	15 m

5.1 Risk and Impact Statement

The overall post-mitigation residual risk of the proposed development was calculated to be “Low” given that the proposed areas for development intersect with a unchannelled valley-bottom of Low sensitivity. The impacts are deemed acceptable as a small portion of the unchannelled valley-bottom wetland will be affected by the pipeline development and the post-construction rehabilitation of the watercourse may result in an overall positive effect.

The findings of the prospective risk assessment indicate that the anticipated risks of the proposed activities are low once mitigation is applied. Furthermore, it is reasonable to infer that the retrospective risks associated with the existing infrastructure have similarly been low. This assumption is further supported by the fact that the natural watercourses are situated a considerable distance from the area of activity and are buffered from direct impact by intervening land uses, such as cultivated crop fields, which provide an additional layer of separation between the watercourse and the activities.

5.2 Specialist Opinion

Considering the assessment findings, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project can be considered for authorisation by the Competent Authority.

6 References

Department of Water Affairs and Forestry (DWAF). 2005a. A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas.

Department of Water and Sanitation (DWS). 2005b. River Ecoclassification: Manual for Ecostatus Determination. First Draft for Training Purposes. Department of Water Affairs and Forestry.

Department of Water and Sanitation (DWS). 2023. General Authorisation in Terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in Section 21(c) or section 21(i). Government Gazette Notice: 4167 in Government Gazette 49833 of 08 December 2023.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C., and Collins, N.B. 2009. A Technique for rapidly assessing ecosystem services supplied by wetlands, Mondi Wetland Project.

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

Macfarlane, D.M., Bredin, I.P., Adams, J.B., Zungu, M.M., Bate, G.C. and Dickens, C.W.S. 2014. Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries. Final Consolidated Report. WRC Report No TT 610/14, Water Research Commission, Pretoria.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. and Goge, C. 2007. A technique for rapidly assessing wetland health: WET-Health. WRC Report TT 340/08.

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

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Ollis DJ, Snaddon CD, Job NM, and Mbona N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African Biodiversity Institute, Pretoria.

Van Deventer, H.; Smith-Adao, L.; Mbona, N.; Petersen, C.; Skowno, A.; Collins, N.B.; Grenfell, M.; Job, N.; Lötter, M.; Ollis, D.; Scherman, P.; Sieben, E.; Snaddon, K. 2018. South African Inventory of Inland Aquatic Ecosystems. South African National Biodiversity Institute, Pretoria. Report Number: CSIR report number CSIR/NRE/ECOS/IR/2018/0001/A; SANBI report number <http://hdl.handle.net/20.500.12143/5847>.

7 Appendix Items

7.1 Appendix A – Methodology

7.1.1 Desktop Dataset Assessment

The desktop assessment was undertaken using Geographic Information System (GIS) to access, view and overlay the latest available related datasets with the project area. The information represented within the datasets was used to develop the relevant digital maps used to identify potentially environmentally sensitive areas. These datasets and their respective dates of publishing are provided below:

- Vegetation Types - Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018 & Mucina and Rutherford 2006);
- Soils and Geology - Land Types Database (Land Type Survey Staff, 1972 - 2006); and
- Topographical Inland Water Areas and River Lines (based on the 1994 1:500 000 topographic maps as per the Chief Directorate of the National Geo-spatial Information).

7.1.1.1 Vegetation Types - Vegetation Map of South Africa, Lesotho and Swaziland

The Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) is the latest and updated version of the maps published in earlier time such as those presented by Mucina and Rutherford (2006) and those presented in the National Biodiversity Assessment (2011). The map provides spatial details on the representative vegetation of South Africa and is complemented in this report using information from Strelitzia (Mucina & Rutherford, 2006) to provide insight on the landscape features, biogeography, climate, geology, and soils of the project area.

7.1.1.2 Soils and Geology - Land Type Database

The Land Type Survey provides information on the soils, terrain, climate, and geology of areas within South Africa. The data includes the pedological classification of soils and is used in this report to provide insight on the common soil forms associated with aquatic or freshwater systems of a particular area.

7.1.1.3 Topographical River Lines and Inland Water Areas

Topographical Inland Water Areas and River Lines for South Africa are based on the topographic maps dated 1994 as per the National Geo-spatial Information. These datasets are used in this report to provide insight on potential wetland areas and serves to highlight the location and extent of drainage features, dams, wetlands, reservoirs and other relevant inland waterbodies.

7.1.1.4 Ecologically Important Landscape Features

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

- South African Inventory of Inland Aquatic Ecosystems (SAIIAE), NBA 2018 Rivers and Wetlands (Van Deventer *et al.*, 2019);
- National Freshwater Priority Areas, Rivers and Wetlands, 2011 (Nel *et al.*, 2011);
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021); and
- The Free State Biodiversity Plan of 2016 (Collins, 2016).

7.1.1.4.1 The South African Inventory of Inland Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the 2018 NBA, the SAIIAE is a collection of spatial data layers that represent the extent of river and inland wetland ecosystem types as well as the pressures on these systems. The same two headline indicators, and their associated categorisations, are applied as with the terrestrial ecosystem NBA, namely Ecosystem Threat Status and Ecosystem Protection Level. The Ecosystem Threat Status of river and wetland ecosystem types are based on the extent to which each ecosystem type had been altered from its natural condition.

7.1.1.4.2 National Freshwater Ecosystem Priority Areas, Rivers and Wetlands

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its inland aquatic 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). The FEPAs are intended to be conservation support tools and it is envisioned that they will guide the effective implementation of measures to achieve the National Environment Management: Biodiversity Act's biodiversity conservation goals (Nel *et al.*, 2011).

7.1.1.4.3 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.

7.1.2 Wetland Field Survey

7.1.2.1 Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 7-1. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
- The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

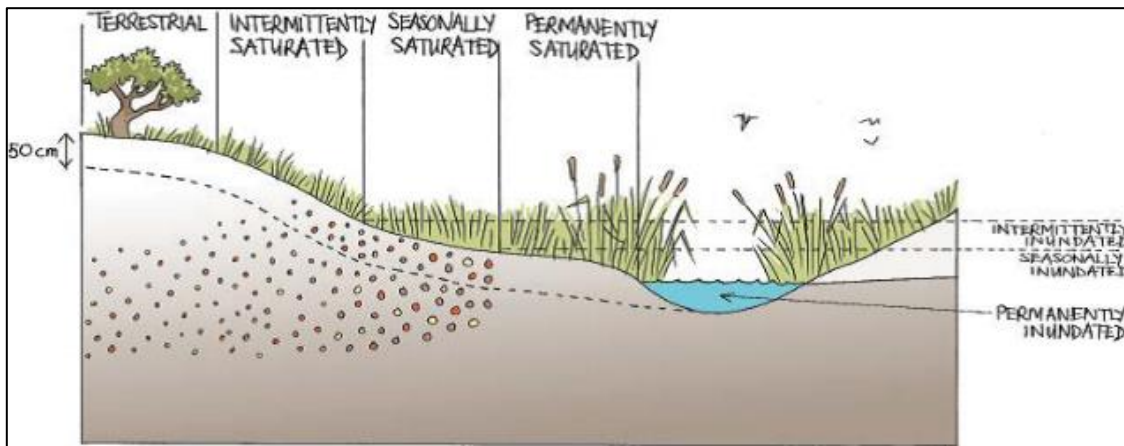


Figure 7-1 Cross section of a wetland, indicating how the soil wetness and vegetation indicators respond to changes in topography (Ollis et al. 2013)

7.1.2.2 Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

7.1.2.3 Classification and Description

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this study. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and then also includes structural features at the lower levels of classification (Ollis et al., 2013).

7.1.3 Wetland Functional and Ecological Assessment

7.1.3.1 Functional Assessment

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands as well as humans. Eco Services serve as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze et al., 2009). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 7-1).

Table 7-1 Classes for determining the likely extent to which a benefit is being supplied

Score	Rating of likely extent to which a benefit is being supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate
2.1 - 3.0	Moderately High
> 3.0	High

7.1.3.2 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in Table 7-2.

Table 7-2 The Present Ecological Status categories (Macfarlane et al., 2007)

Impact Category	Description	Impact Score Range	PES
None	Unmodified, natural	0 to 0.9	A
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

7.1.3.3 Ecological Importance and Sensitivity

The importance and sensitivity of water resources is determined in order establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Ecological Importance and Sensitivity (EIS) category as listed in Table 7-3.

Table 7-3 Description of Ecological Importance and Sensitivity categories

EIS Category	Range of Mean	Recommended Ecological Management Class
Very High	3.1 to 4.0	A
High	2.1 to 3.0	B
Moderate	1.1 to 2.0	C
Low Marginal	< 1.0	D

7.1.3.4 Recommended Ecological Category and Recommended Management Objective

The Recommended Ecological Category (REC) and Recommended Management Objective (RMO) (Table 7-4) was determined based on the results obtained from the PES and EIS of the assessed wetlands, with the objective of recommending how a water resource should be managed. This is achieved by either maintaining or improving the ecological integrity of the wetland in order to ensure continued ecological functionality (DWA, 1999).

Table 7-4 Recommended Ecological Category and Recommended Management Objectives for water resources based on Present Ecological State and Ecological Importance and Sensitivity scores

PES		Ecological Importance and Sensitivity			
		Very High	High	Moderate	Low
	A (Pristine)	A Maintain	A Maintain	A Maintain	A Maintain
	B (Natural)	A Improve	A/B Improve	B Maintain	B Maintain
	C (Good)	A Improve	B/C Improve	C Maintain	C Maintain
	D (Fair)	C Improve	C/D Improve	D Maintain	D Maintain
	E/F (Poor)	D Improve	E/F Improve	E/F Maintain	E/F Maintain

7.1.4 Buffer Requirements

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane *et al.*, 2014) was used to determine the appropriate buffer zone for the proposed activity.

7.1.5 Site Sensitivity Verification

The baseline aquatic / freshwater sensitivity of the project area was obtained using the National Web-based Environmental Screening Tool (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended). The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas based on the specialist assigned Ecological Importance and Sensitivity of the different systems (where applicable), with consideration been given to the presence of observed or likely sensitive fauna and flora.

7.2 Appendix B – Risk Assessment

7.2.1 Risk Assessment

The Department of Water and Sanitation (DWS) risk matrix assesses impacts in terms of consequence and likelihood. The significance of the impact is rated according to the classes presented in Table 7-5.

Table 7-5 Significance ratings matrix

Rating	Class	Management Description
1 – 29	(L) Low Risk	Acceptable as is or with proposed mitigation measures. Impact to watercourses and resource quality small and easily mitigated, or positive.
30 – 60	(M) Moderate Risk	Risk and impact on watercourses are notable and require mitigation measures on a higher level, which costs more and require specialist input. Licence required.
61 – 100	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

7.3 Appendix C – Specialist Declaration of Independence

I, Divan van Rooyen, declare that:

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



Divan van Rooyen

Freshwater Ecologist

The Biodiversity Company

May 2025

I, Andrew Husted, declare that:

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



Andrew Husted

Ecologist

The Biodiversity Company

May 2025

7.4 Appendix D – Specialist CVs

Divan van Rooyen

Ph.D. Environmental Science

Pri Sci Nat (151272)

Cell: +27 83 265 8776

Email: divan@thebiodiversitycompany.com

Identity Number: 9312205072085

Date of birth: 20 December 1993



Profile Summary

Working experience throughout Southern Africa

Specialist experience with mining, WWTW's and construction.

Specialist expertise include wetlands resources, aquatic ecology and ecotoxicology.

Areas of Interest

Mining, Seismic Surveys, Renewable Energy, Bulk Services Infrastructure Development & WWTW's.

Key Experience

- Environmental Impact Assessments (EIA)
- Environmental Management Programmes (EMP)
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Aquatic biomonitoring

Country Experience

South Africa

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- PhD (North-West University of Potchefstroom) – Environmental Science with Aquatic Ecosystem Health
- MSc (North-West University of Potchefstroom) – Environmental Science (Ecological Remediation and Sustainable Management)
- BSc Honours (North-West University of Potchefstroom) – Environmental Science with Ecological Remediation and Sustainable Management
- BSc Environmental sciences
- Pri Sci Nat (151272)

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979



Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia & Serbia.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Experience with project management for national and international multi-disciplinary projects.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, Freshwater Ecology, Terrestrial Ecology and also Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Instream Flow and Ecological Water Requirements.

Publication of scientific journals and articles.

Key Experience

- World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality.
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Angola, Botswana, Cameroon
Democratic Republic of Congo
Ghana, Ivory Coast, Lesotho
Liberia, Mali, Mauritius, Mozambique
Nigeria, Republic of Armenia,
Senegal, Serbia, Sierra Leone, South Africa
Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Signed:

Andrew Husted

7.5 EIMS Impact Assessment

Table 7-6 EIMS Impact Assessment for the proposed activities

Impact	Phase	Pre-Mitigation									Post-Mitigation									Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance
		Nature	Extent	Duration	Magnitude	Reversibility	Consequence	Probability	Pre-Mitigation Significance Score	Pre-Mitigation Significance	Nature	Extent	Duration	Magnitude	Reversibility	Consequence	Probability	Post-mitigation Significance Score	Post-mitigation Significance						
Indirect loss, disturbance and degradation of wetlands	Construction	-1	1	1	2	2	-1,5	3	-4,5	Medium to low -	-1	1	1	2	2	-1,5	2	-3	Low -	High	2	2	1,25	-3,75	Low -
Increased bare surfaces, runoff and potential for erosion	Construction	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	3	1	2	2	-2	2	-4	Low -	High	2	2	1,25	-5,00	Medium to low -
Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Construction	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -
Increased sediment loads to downstream reaches	Construction	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -

Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste.	Construction	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -
Alteration of hydrological regime	Construction	-1	3	1	2	2	-2	3	-6	Medium to low -	-1	1	1	2	2	-1,5	2	-3	Low -	High	2	2	1,25	-3,75	Low -
Increased water inputs (clean) to downstream wetlands	Operation	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	2	2	2	-2	2	-4	Low -	High	2	2	1,25	-5,00	Medium to low -
Degradation of wetland vegetation and proliferation of alien and invasive species	Decommissioning	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -
Disruption of wetland soil profile, hydrological regime and increased sediment loads	Decommissioning	-1	3	2	2	2	-2,25	3	-6,75	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -

Table 7-7 EIMS Impact Assessment for the retrospective activities

Impact	Phase	Pre-Mitigation									Post-Mitigation						Post-mitigation Significance Score	Post-mitigation Significance	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score	Final Significance	
		Nature	Extent	Duration	Magnitude	Reversibility	Consequence	Probability	Pre-Mitigation Significance Score	Pre-Mitigation Significance	Nature	Extent	Duration	Magnitude	Reversibility	Consequence									Probability
Indirect loss, disturbance and degradation of wetlands	Construction	-1	1	1	3	2	-1,75	3	-5,25	Medium to low	-1	1	1	3	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low
Increased bare surfaces, runoff and potential for erosion	Construction	-1	3	2	3	2	-2,5	3	-7,5	Medium to low	-1	3	1	2	2	-2	2	-4	Low -	High	2	2	1,25	-5,00	Medium to low
Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Construction	-1	3	2	3	2	-2,5	3	-7,5	Medium to low	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low
Increased sediment loads to downstream reaches	Construction	-1	3	2	3	2	-2,5	3	-7,5	Medium to low	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low
Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste.	Construction	-1	3	2	3	2	-2,5	3	-7,5	Medium to low -	-1	2	1	2	2	-1,75	2	-3,5	Low -	High	2	2	1,25	-4,38	Medium to low -

Alteration of hydrological regime	Construction	-1	3	1	3	2	-2,25	3	-6,75	Medium to low	-1	1	1	2	2	-1,5	2	-3	Low -	High	2	2	1,25	-3,75	Low -
	Operation	-1	3	2	3	2	-2,5	3	-7,5	Medium to low	-1	2	2	2	2	-2	2	-4	Low -	High	2	2	1,25	-5,00	Medium to low