WETLAND FUNCTIONAL AND IMPACT ASSESSMENT FOR THE PROPOSED GLENCORE KROONDAL MINE INFRASTRUCTURE ON PORTION 11 OF THE FARM RIETFONTEIN 338 JQ (WESTERN CHROME MINES)

Rustenburg Municipality, Bojanala Platinum District Municipality, North West Province, South Africa

10/06/2025

Updated December 2024 & June 2025

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Report Name	**WETLAND FUNCTIONAL AND IMPACT ASSESSMENT FOR THE PROPOSED GLENCORE KROONDAL MINE INFRASTRUCTURE ON PORTION 11 OF THE FARM RIETFONTEIN 338 JQ (WESTERN CHROME MINES)**	
Specialist Theme	Aquatic Biodiversity Theme	
Project Reference	Glencore Kroondal Mine Infrastructure	
Report Version	10/06/2025	
Environmental Assessment Practitioner	EIMS ENVIRONMENTAL IMPACT MANAGEMENT SERVICES	
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017 (as amended). We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no 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.	

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a wetland functional and impact assessment for the proposed Glencore Kroondal Mine Infrastructure on Portion 11 of the Farm Rietfontein 338 JQ (Western Chrome Mines) 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. A map presenting the regional context of the Project Area of Influence (PAOI) can be seen in Figure 1-1.

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 favourability for 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).

After considering the findings and recommendation provided by the specialist herein, this report should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making regarding the ecological viability of the proposed development and related activities.

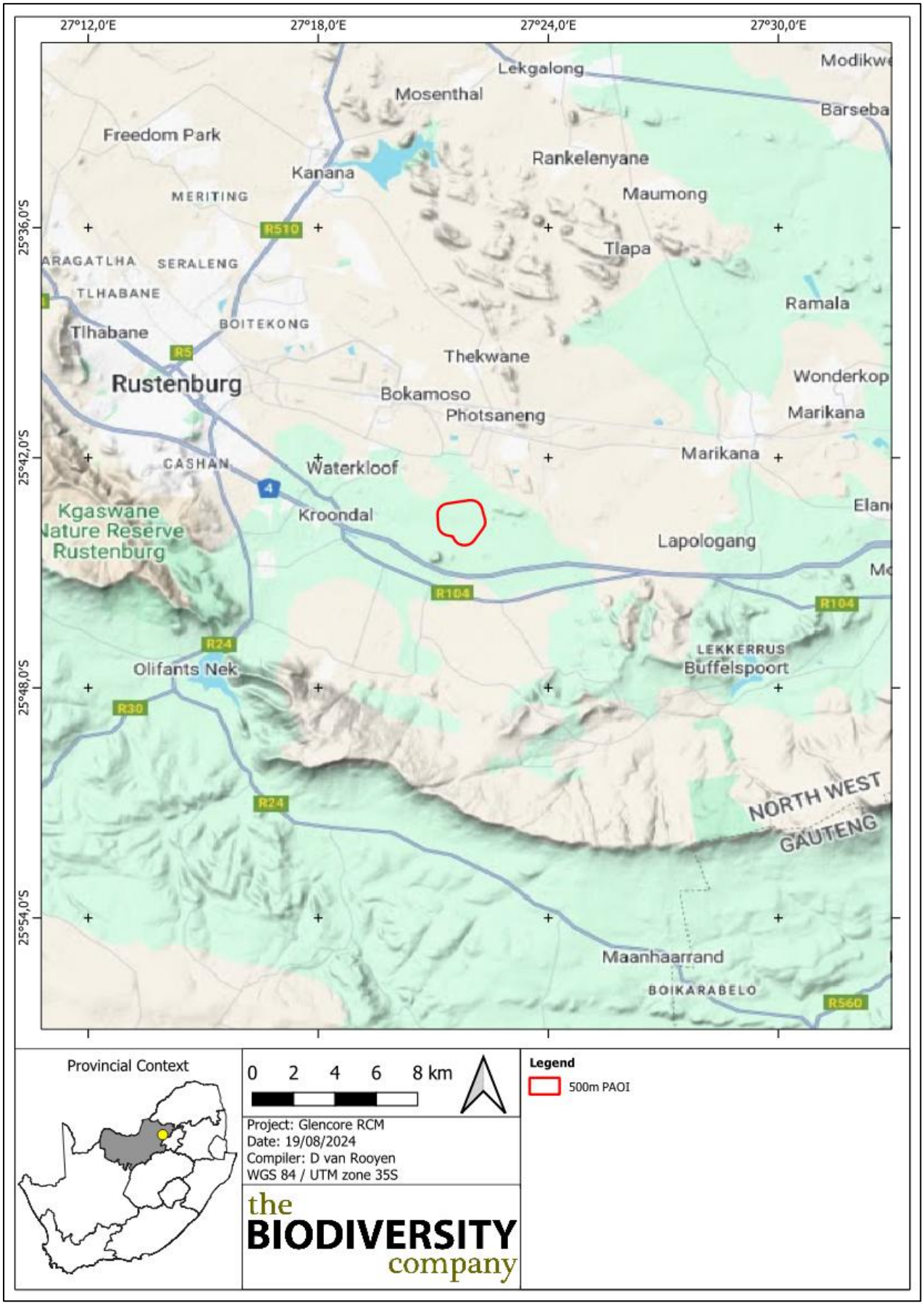


Figure 1-1 Location of the proposed project

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;
- 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

The following information pertaining to the overview and description of the project has been extracted from the Background Information Document (BID) for the Glencore WCM Kroondal Mine Infrastructure.

Location

The proposed project and related activities will be undertaken at the following location:

- Property Description - Portion 11 of the farm Rietfontein 338 JQ;
- Central Co-ordinates - approximately 25°43'33.74"S, 27°21'41.65"E;
- Regional Description:
    - District Municipality: Bojanala Platinum District Municipality;
    - Local Municipality: Rustenburg Local Municipality;
    - Province: North West Province; and
- Closest town or point of interest: the site is located approximately 5.3 km east of Kroondal.

Glencore Western Chrome Mines (WCM) is in the process of acquiring a portion of the mining and surface rights from the Clover Alloys Rustenburg Chrome Mine (RCM) to reduce the time taken to travel to the face at its Kroondal Mine and increase the mining facetime which will in turn increase productivity. In addition to utilizing the existing infrastructure at Clover Alloys RCM, the applicant wishes to develop additional facilities to use in the life of mine. The proposed new developments as well as existing infrastructure include (but are not limited to):

- A parking area for permanent employees;
- A parking area for visitors and contractors;
- Employee drop-off/pick-up zone;
- Salvage yard;
- Sewage plant;

- Shaft Laydown Area / Explosives Delivery Bay;
- Surface laydown area;
- Meeting venue hall (Lekgotla Hall);
- Access and escape roads;
- Two water storage dams;
- Compressor house;
- One 11kV Powerline;
- Administration Offices;
- Change houses;
- Engineering workshop;
- Stores; and
- Temporary laydown area (historic LanXess Chrome Mining village area).

Kroondal mining operations is situated approximately 10 km east of Rustenburg, North-West Province. Mining at Kroondal has historically consisted of both opencast and underground mining. Currently only underground mining is undertaken, and the old opencast areas have been closed and rehabilitated. The current underground mining is taking place in close proximity to the Clover Alloys RCM mining rights areas. Miners' underground travel time will be reduced by approximately 50% through Glencore WCM acquiring the surface rights on Portion 11 of the farm Rietfontein 338 JQ and mining right (MR336), which will in turn increase production and ensure the long-term survival of the business.

A detailed layout for the proposed project is provided in Figure 1-2 and a simplified layout with the PAOI is provided in Figure 1-3.

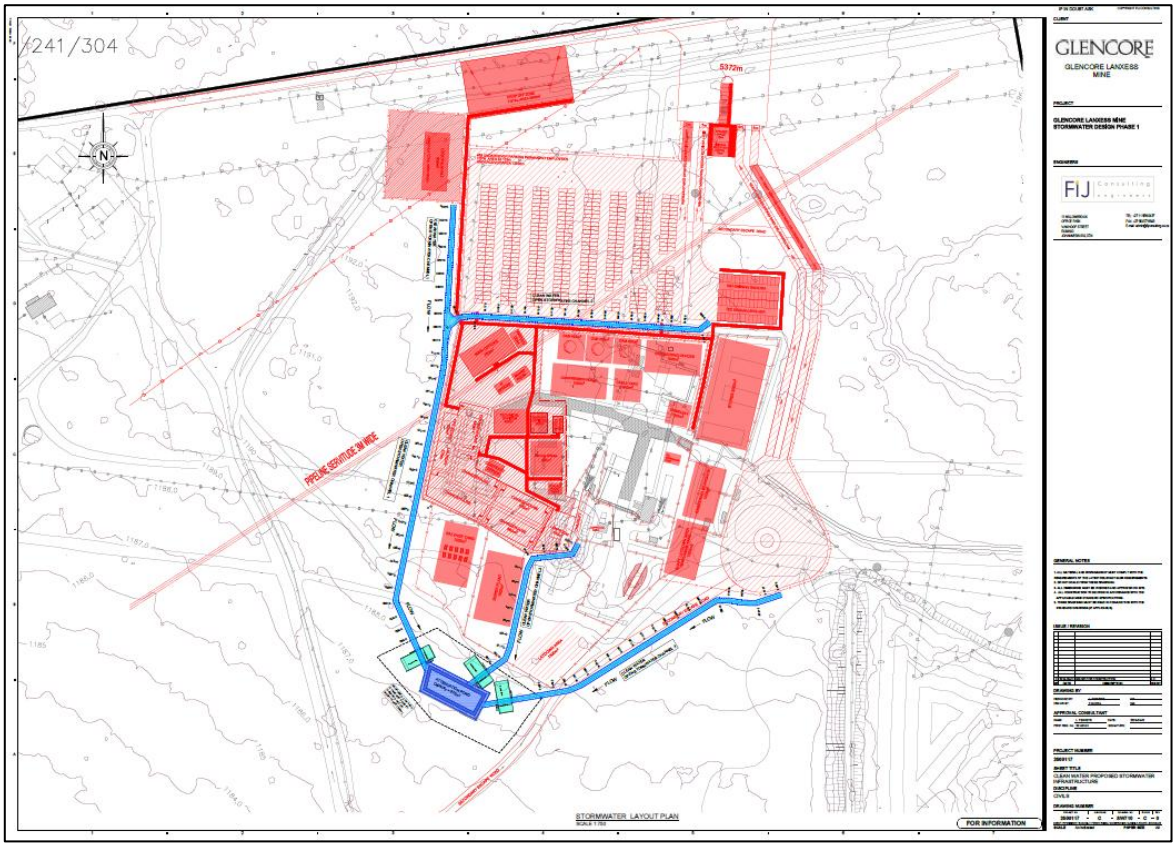


Figure 1-2 Detailed layout for the proposed project (EIMS BID, 2024)

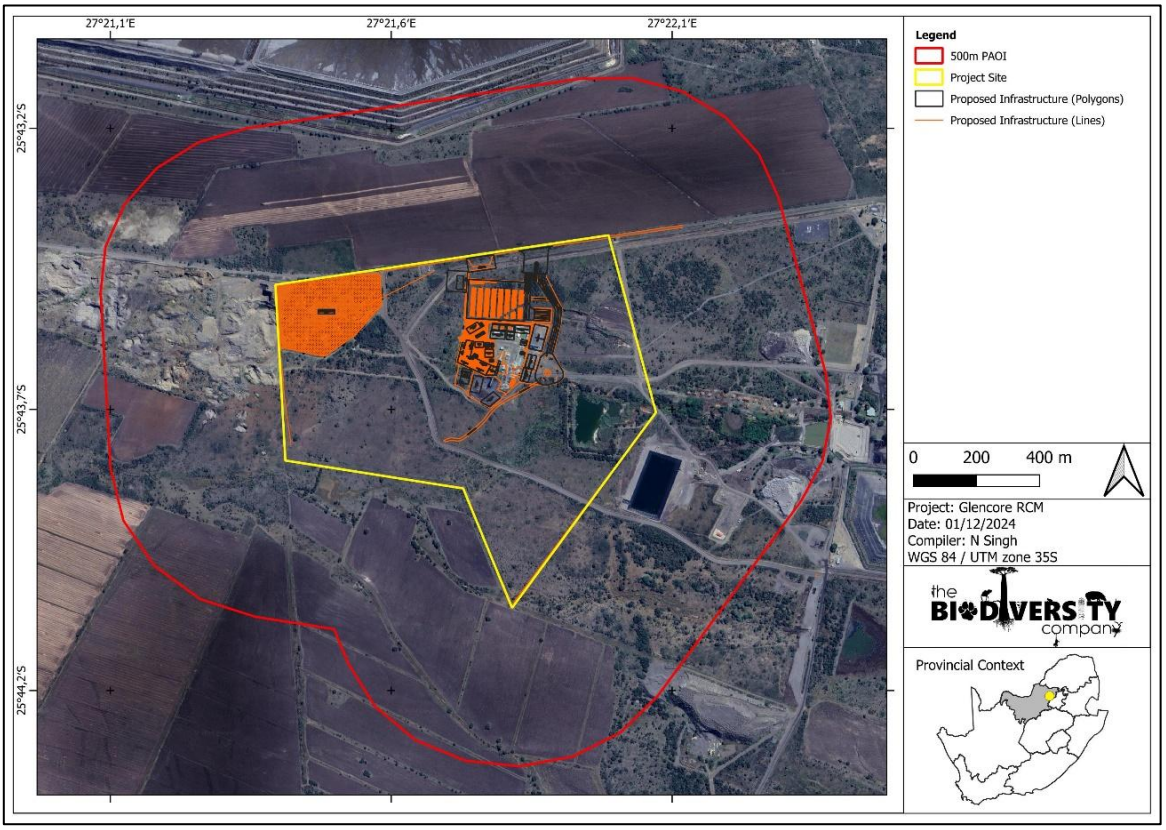


Figure 1-3 Map illustrating a simplified layout of the project and the Project Area of Influence

1.4 Assumptions and Limitations

The following aspects were considered as limitations:

- It has been assumed that the extent of the project area provided to the specialist are accurate;
- Areas characterised by external wetland indicators have been the focus for this assessment. Areas lacking these characteristics have not been focussed on;
- Representative sampling for the different wetland areas was conducted and is considered to be sufficient for the purpose of this report;
- 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; and
- Majority of the area was burnt during the field assessment, which could have resulted in some wetland vegetation species being omitted from the findings.

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	National Environmental Management Act (Act No. 107 of 1998) (NEMA)	To provide for the effective protection and controlled utilisation of the environment and for matters incidental thereto.
	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
	NEMA: Environmental Impact Assessment Regulations (2014), as amended, with cognisance of Appendix 6 requirements in GNR 326 (7 April 2017, as amended).	The minimum criteria for reporting.
	NEMA: Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	National Environmental Management: Waste Act (Act No. 59 of 2008)	The regulation of waste management to protect the environment.
	NWA: Government Notice (GN) 4167 (previously GN 509 of 2016 and GN 3139 of 2023)	Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses and the provision to apply for a General Authorisation subject to usage and outcome of the Risk Assessment Matrix.
	NEMBA: Alien and Invasive Species Lists (2020) (GN 1003, September 2020)	The regulation and management of alien invasive species.
	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.
Provincial	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 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.

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	7.3
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	1.3
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.	3.1.5
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)	3.1.5
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)	3.4.1
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: (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.	4.3
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); (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	4.3

(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; (e) nitrate assimilation; (f) toxicant assimilation; (g) erosion control; and (h) carbon storage?	4.3
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
The degree to which impacts and risks can be mitigated	4.5
The degree to which the impacts and risks can be reversed	4.5
The degree to which the impacts and risks can cause loss of irreplaceable resources	4
A suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	7.1.5
Proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	4.5
A motivation must be provided if there were development footprints identified as having a “low” aquatic biodiversity sensitivity and that were not considered appropriate	-
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 the 2nd of August 2024 (autumn), which constitutes a dry season survey, to identify the presence of freshwater features (wetlands) and to delineate their spatial extents. A second survey was conducted on the 11th of November 2024 to investigate the area required for the proposed powerline. The seasonality is not considered to be a limiting factor to the assessment of which the results are conclusive.

3 Results & Discussion

3.1 Desktop Dataset Assessment

3.1.1 Vegetation Types

The PAOI is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006).

On a fine-scale vegetation type, the PAOI overlaps with the Marikana Thornveld (SVcb 6) vegetation type (Figure 3-1). The following information pertaining to the above-mentioned vegetation types is noted as per Mucina and Rutherford (2006):

- This vegetation type is distributed throughout the Gauteng and North-West provinces and occurs on the Rustenburg plains in the west, through Marikana to Brits in the east;
- The altitude of this vegetation type ranges from 1 050 to 1 450 Meters Above Sea Level (MASL);
- This vegetation type is characterised by shrublands, which are denser in drainage features and rocky outcrops. The valleys and undulating plains are dominate by *Acacia karroo* woodlands; and
- This vegetation type is endangered, with a target percentage of 19. Less than 1% of this vegetation type is statutorily conserved in conservation areas like the Magaliesberg Nature Area. This vegetation type has been significantly transformed (approximately 48%), mainly by urban sprawl and cultivation.

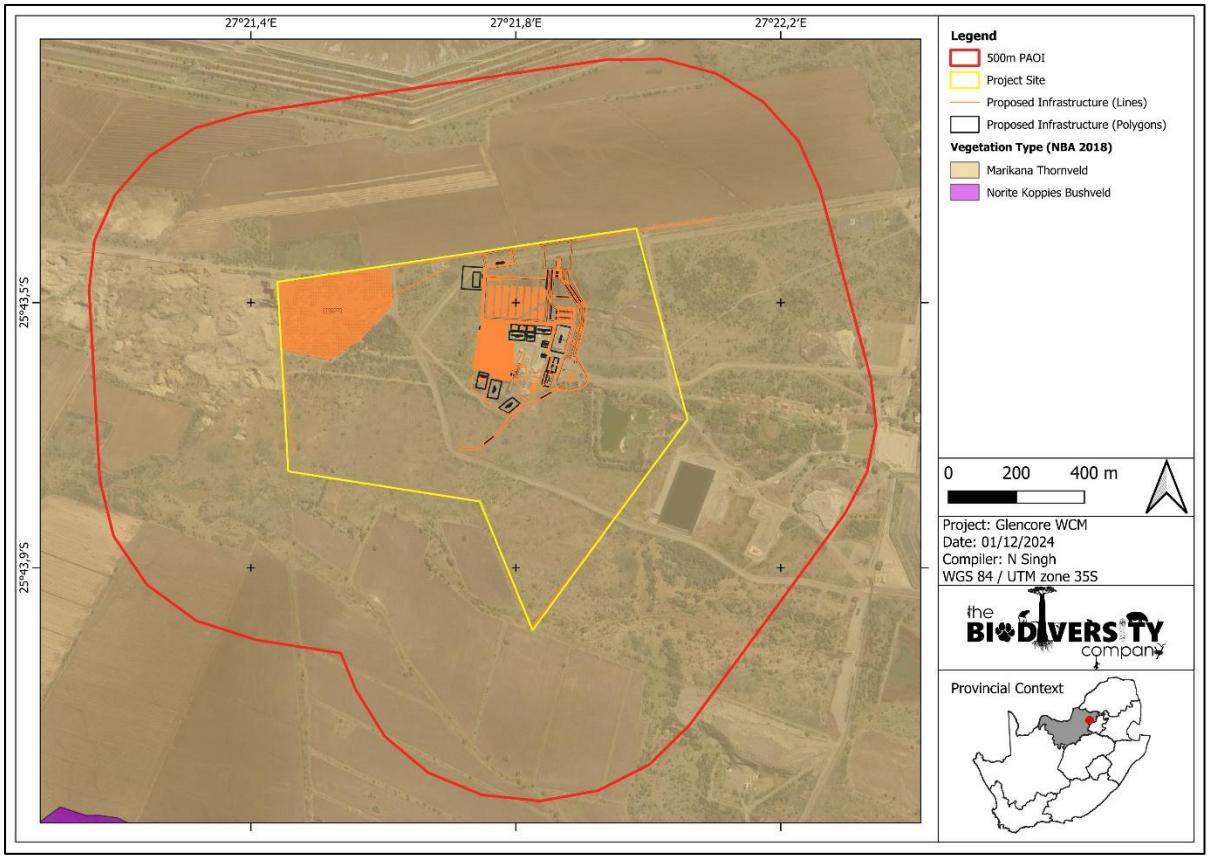


Figure 3-1 Vegetation type associated with the Project Area of Influence

3.1.2 Climate

The climate for the Marikana Thornveld is characterised by a summer rainfall with a mean annual precipitation of 654 mm (Figure 3-2). 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).

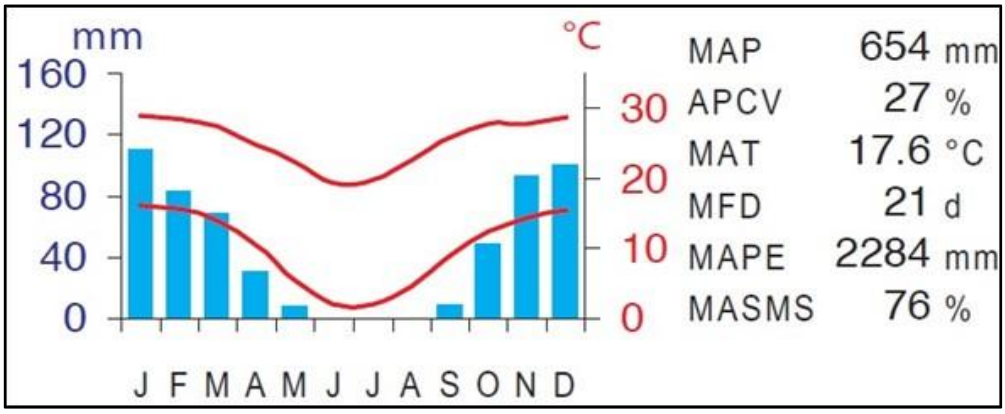


Figure 3-2 Climate for the Project Area of Influence based on the Marikana Thornveld (Mucina & Rutherford, 2006)

3.1.3 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the PAOI is characterised by the Ea 3 and Ib 116 land types.

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. The Ib land type consists of miscellaneous land classes including rocky areas with mixed soils.

This region is characterised by norite and gabbro with anorthosite interlayered. Small patches of the Rashoop 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).

3.1.4 Hydrological Characteristics

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

3.1.4.1 Topographical River Lines and Inland Water Areas

Two inland water areas, classified as dams have been identified within the PAOI by means of the “2527” quarter degree square topographical river line data set (Figure 3-3). Additionally, two non-perennial features were identified within PAOI, one of which traverses the southern portions of the Project Site.

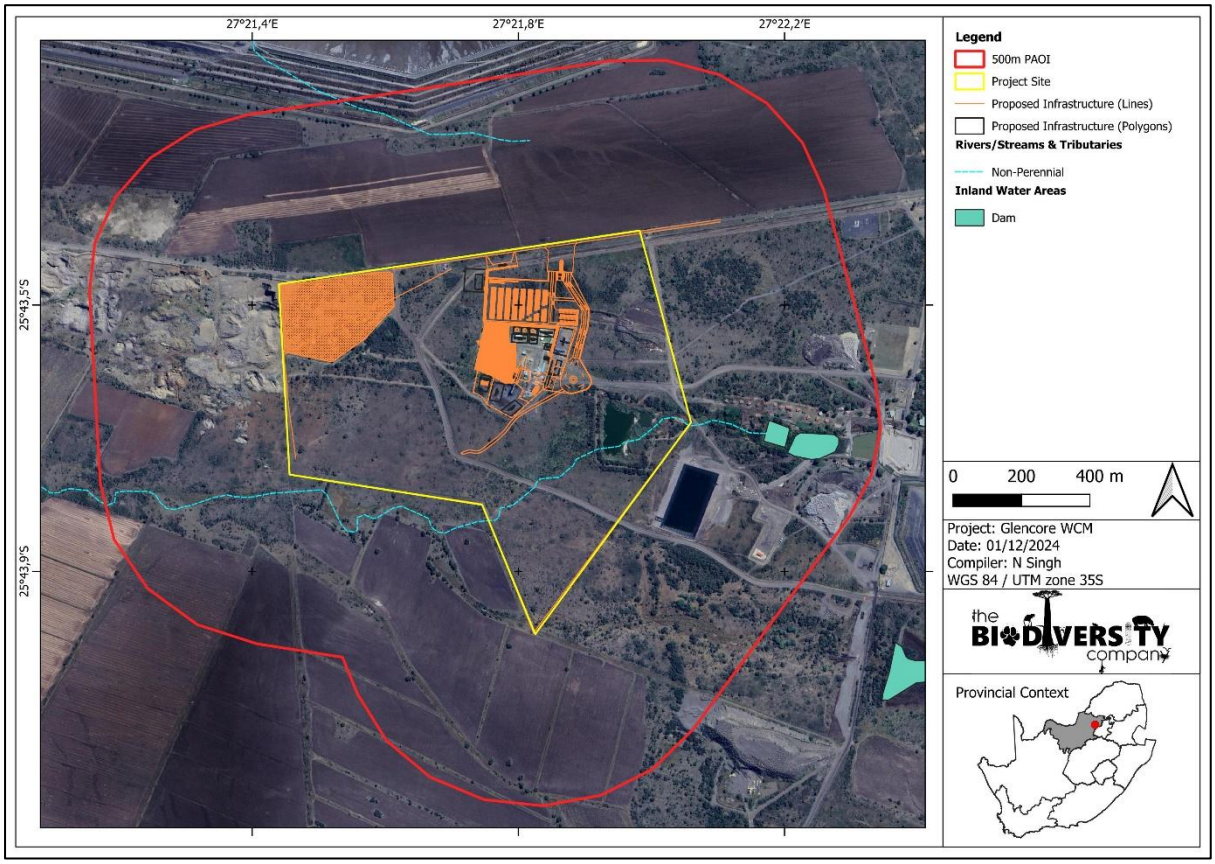


Figure 3-3 Topographical Drainage and Inland Water Areas relevant to the project

3.1.5 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.

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

Desktop Information Considered	Relevant/Irrelevant	Section
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant – PAOI overlaps with NBA wetlands.	3.1.5.1
National Freshwater Priority Area	Relevant – PAOI overlaps with NFEPA wetlands.	3.1.5.2
Strategic Water Source Areas	Relevant – PAOI overlaps with a groundwater SWSA.	3.1.5.3
Provincial Conservation Plan	Relevant – POAI overlaps with Aquatic Ecological Support Areas of the North West Biodiversity Sector Plan.	3.1.5.4

3.1.5.1 South African Inventory of Inland Aquatic Ecosystems

One wetland type by means of the SAIIAE was identified within the southeastern PAOI. This wetland was identified as a depression (Figure 3-4). The site visit confirmed that this feature

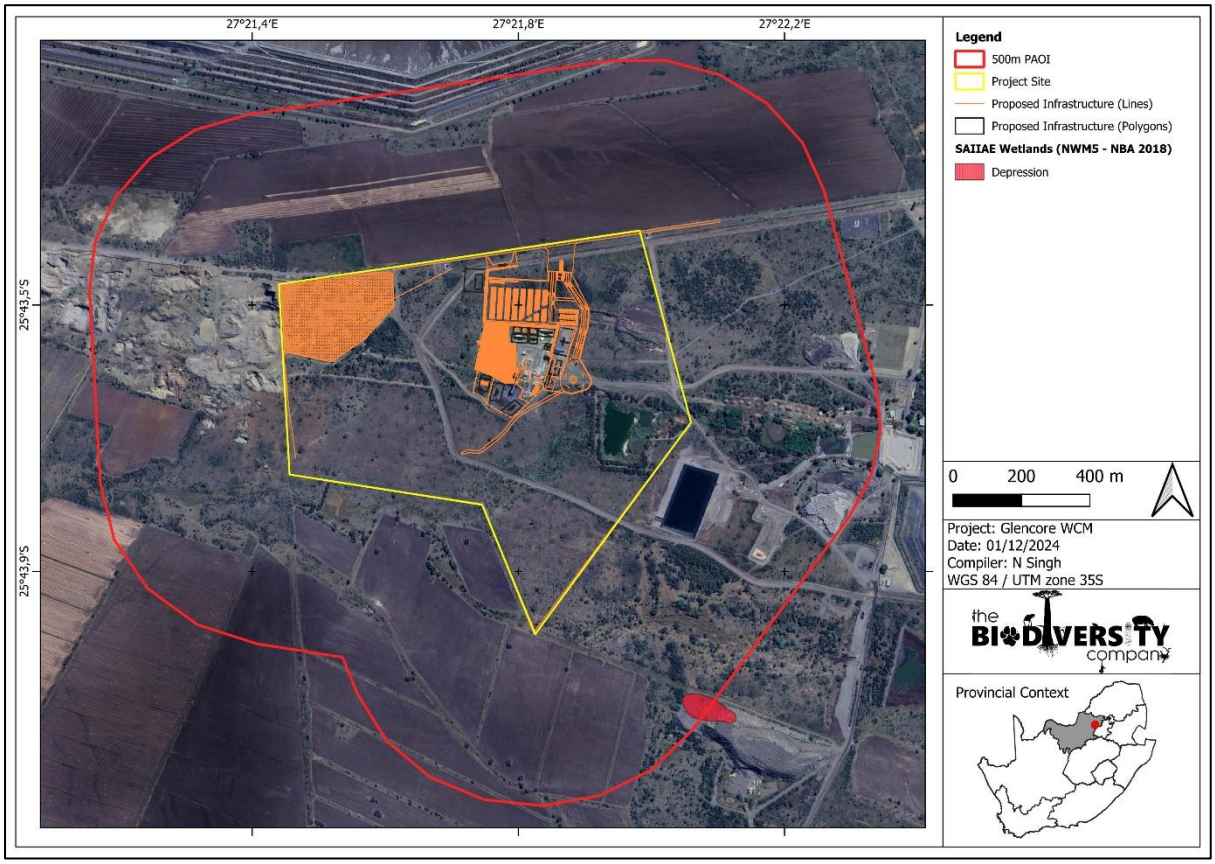


Figure 3-4 South African Inventory of Inland Aquatic Ecosystems with relevance to the project

3.1.5.2 National Freshwater Ecosystem Priority Areas

Two NFEPA wetland types were identified within the PAOI, namely a channelled valley-bottom (CVB) and a unchannelled valley-bottom (UVB) wetland by means of the NFEPA dataset (Figure 3-5). From these two wetland types, one wetland is classified as a CVB while two wetlands are classified as UVB wetlands. In addition, only one wetland (CVB) is located within the proposed project site. The CVB wetland is classified to be a natural, non-priority wetland. The CVB was classified within the "C – Moderately Modified" condition category which refers to systems with "25-75% of natural land cover remaining" category, as per the dataset. The UVB wetlands were classified to be artificial, non-priority wetlands. The artificial wetlands were classified with a condition within the "Z3 – Heavily to Critically Modified" category which refers to systems with "Less than 25% natural land cover remaining".

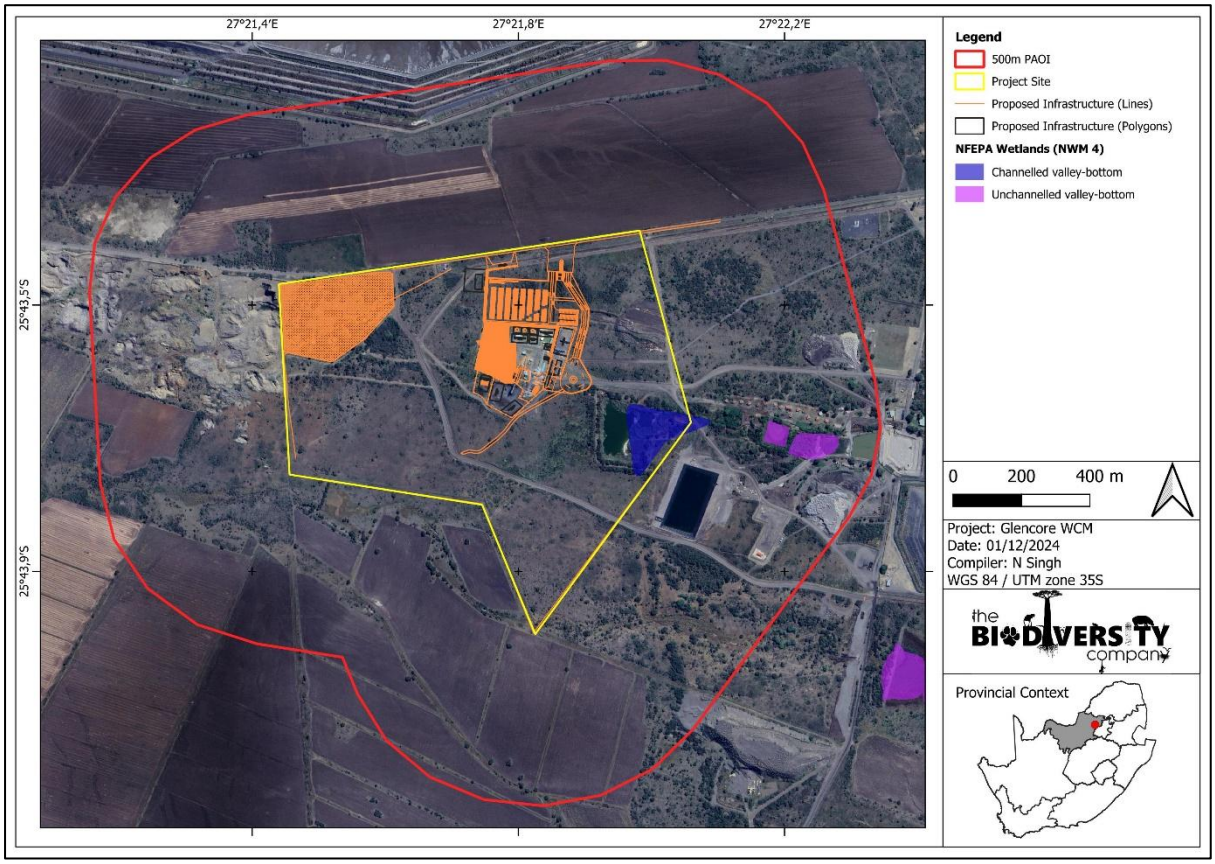


Figure 3-5 NFEPA Wetlands with relevance to the project

3.1.5.3 National Strategic Water Source Areas

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

According to the SWSAs of South Africa, Lesotho and Swaziland, the proposed site PAOI is overlapping with the Kroondal / Marikana groundwater SWSA (Figure 3-6; Lotter and Le Maitre, 2021).

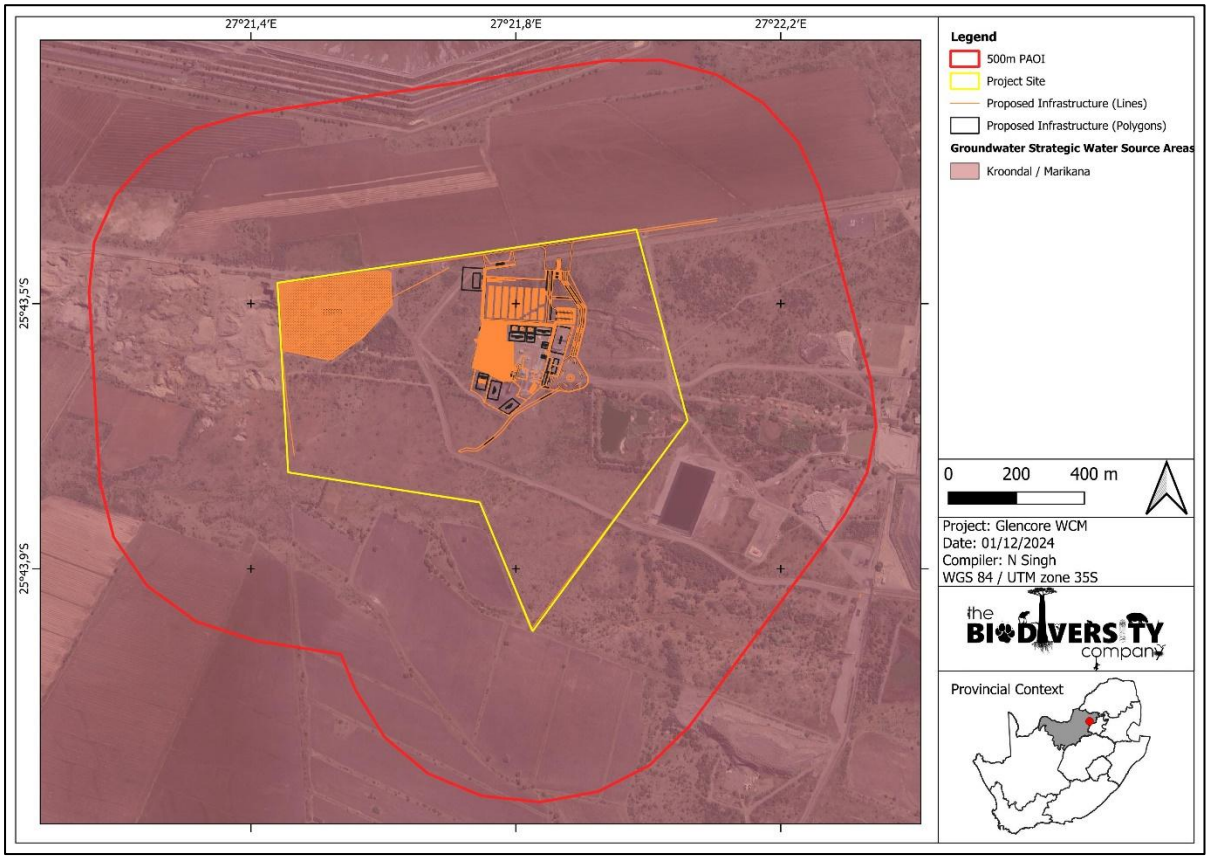


Figure 3-6 Strategic Water Source Areas with relevance to the project

3.1.5.4 North West Biodiversity Sector Plan

The middle to southern portions of the proposed Project Site is classified as an Ecological Support Area 1 (Figure 3-7). Linear infrastructure such as a small portion of the powerline route and a proposed road traverses a minor part of the Ecological Support Area 1. The remainder of the proposed infrastructure is situated outside of any of the North West Biodiversity Sector Plan features.

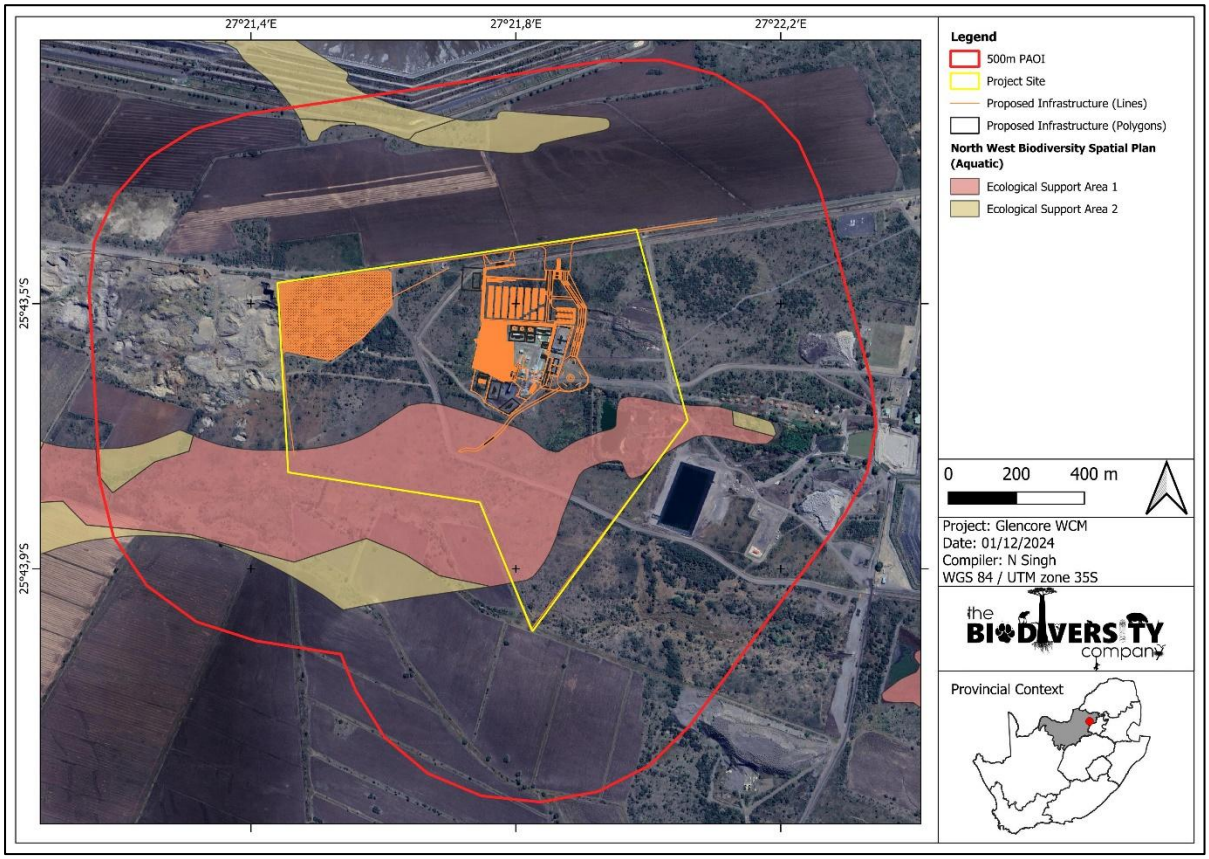


Figure 3-7 The North West Biodiversity Sector Plan overlain on the project area

3.2 Wetland Field Survey

3.2.1 Identification and Mapping

Topography and external wetland characteristics such as the presence of hydrophytes was used to identify wetland areas. Commonly encountered hydrophytes within wetland areas of the PAOI included sedges, rushes, grasses and reed grasses (Figure 3-8). Some common genus encountered were Phragmites, Cyperus, Juncus, Imperata and Eragrostis.

Figure 3-8 Examples of the hydrophytic vegetation encountered within the Project Area of Influence. A) Hydrophytic grass, B, C & D) Hydrophytic rush and sedge

3.2.2 Delineation

Two wetland types, consisting of two HGM units, have been identified in relation to the proposed project site and its respective PAOI (Figure 3-9 and Figure 3-10). These two wetland types have been classified as; one depression (HGM 1) and one unchannelled valley-bottom (HGM 2). The wetland functional assessment has only been conducted for natural wetlands.

HGM 1 is located in the northwestern section of the proposed site and its respective PAOI and is traversed by the Project Site. HGM 2 is located on the southern border of the proposed Project Site and a small portion of this wetland is traversed by the southernmost portion of Project Site. HGM 2 has been previously impacted by crop fields as well as the development of impoundments within the HGM unit.

In addition to these two HGM units, several artificial watercourses were identified within the PAOI. These artificial watercourses include wetlands (depression, seep) and dams (collection dam, farm dam and pollution control dam). Apart from these features, one non-perennial drainage was identified within the southern PAOI.

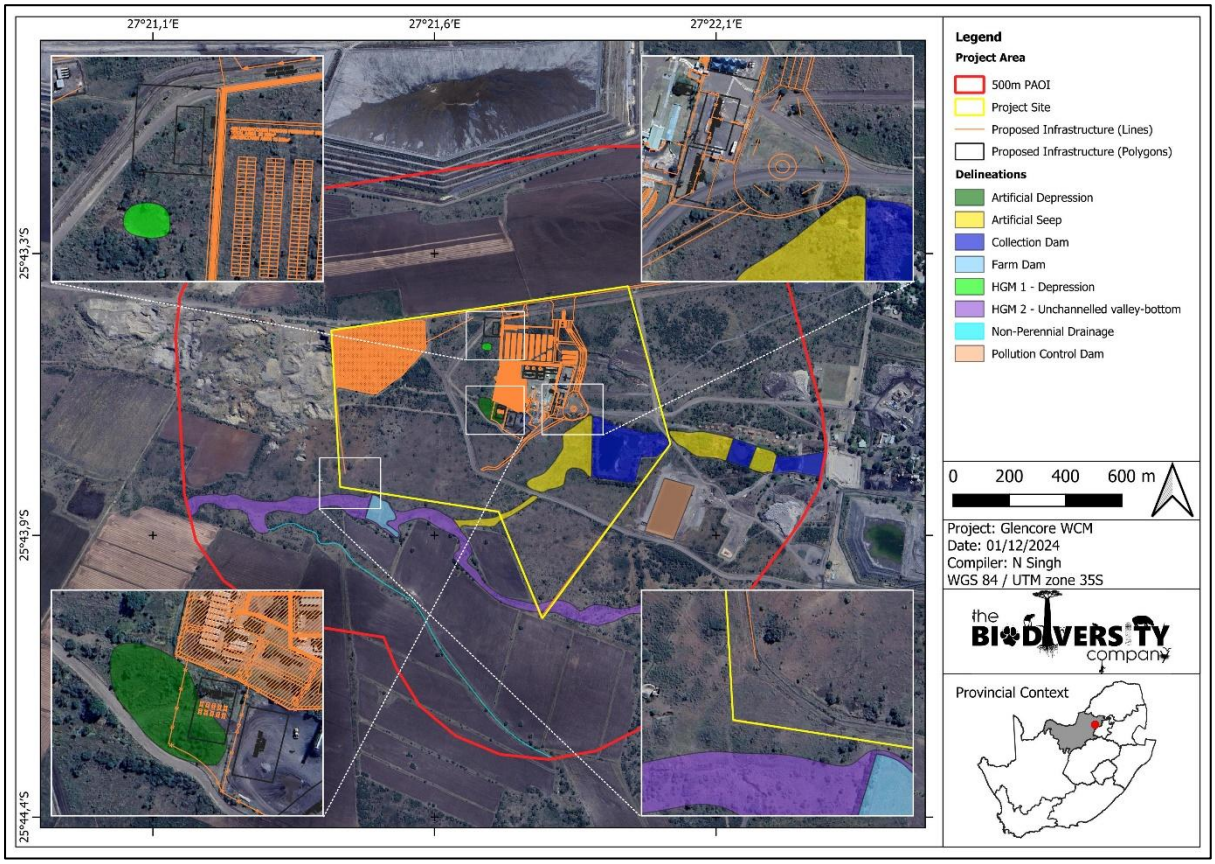


Figure 3-9 Delineation of wetland features within the Proposed Site and Project Area of Influence

Figure 3-10 Examples of the watercourses delineated within the project area. A) HGM 1 - Depression, B) HGM 2 - UVB, C) Pollution Control Dam, D) Collection Dam, E) Artificial Depression, F) Farm Dam, G) Earth Channel in artificial seep and H) Culvert in upstream approach of HGM 2

3.2.3 Classification and Description

The wetland classification as per SANBI guidelines (Ollis *et al*., 2013) for the proposed site is presented in Table 3-2. Several different wetland types were identified within the project area, consisting of a unchannelled valley-bottom, and a depression wetland.

Table 3-2 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	Bench/Flat/Plain	Depression	Endorheic	Without channelled inflow
HGM 2				Valley floor	Unchannelled Valley-bottom	N/A	N/A

Unchannelled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Figure 3-11 presents a diagram of a typical unchannelled valley bottom wetland, showing the dominant movement of water into, through and out of the system.

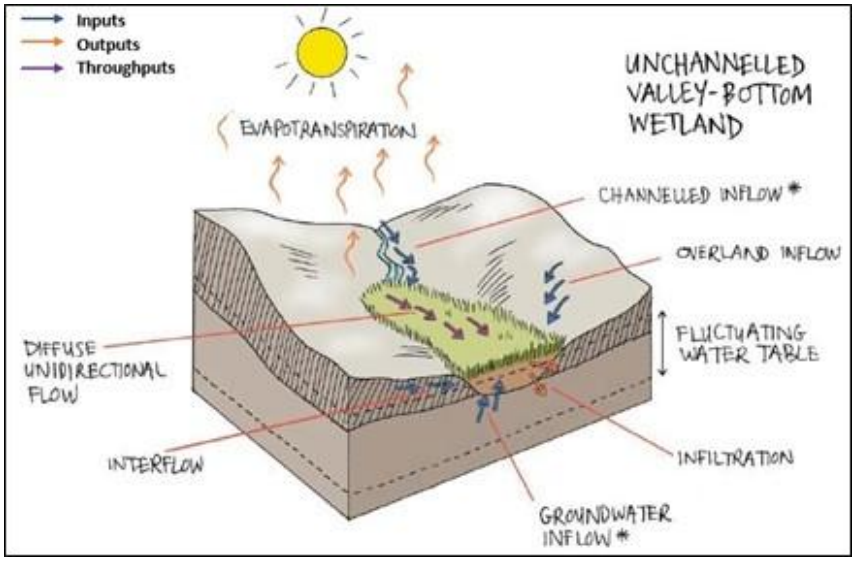


Figure 3-11 Amalgamated diagram of an unchannelled valley-bottom wetland, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al., 2013)

Depression wetlands are usually located on the plain and bench landscape units. Depressions are inward draining basins with an enclosing topography which allows for water to accumulate within the system. Depressions, in some cases, are also fed by lateral sub-surface flows in cases where the dominant geology allows for these types of flows. Figure 3-12 presents a diagram of a typical depression wetland, showing the dominant movement of water into, through and out of the system.

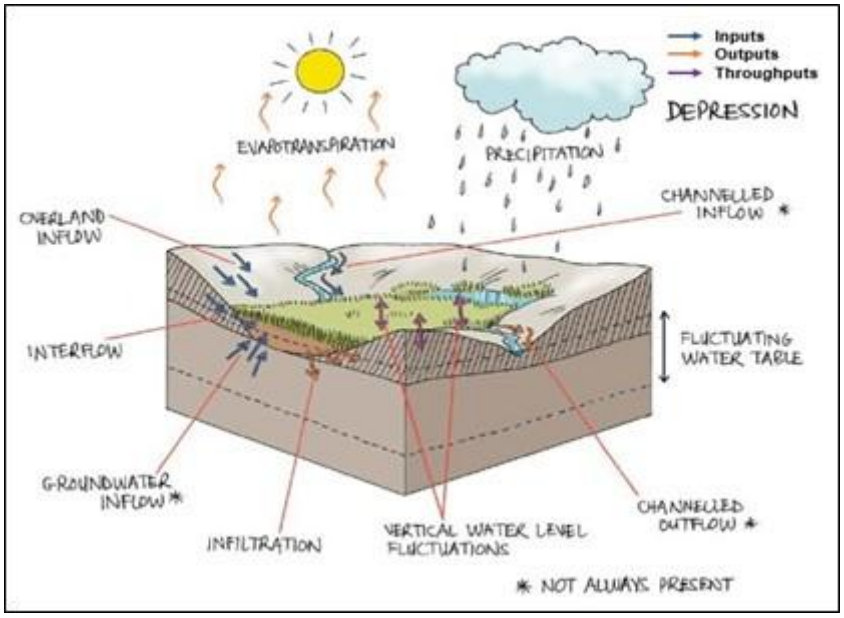


Figure 3-12 Amalgamated diagram of a typical depression wetland, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)

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 (Figure 3-13). 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 feature on site can be described as "A Section" channels.

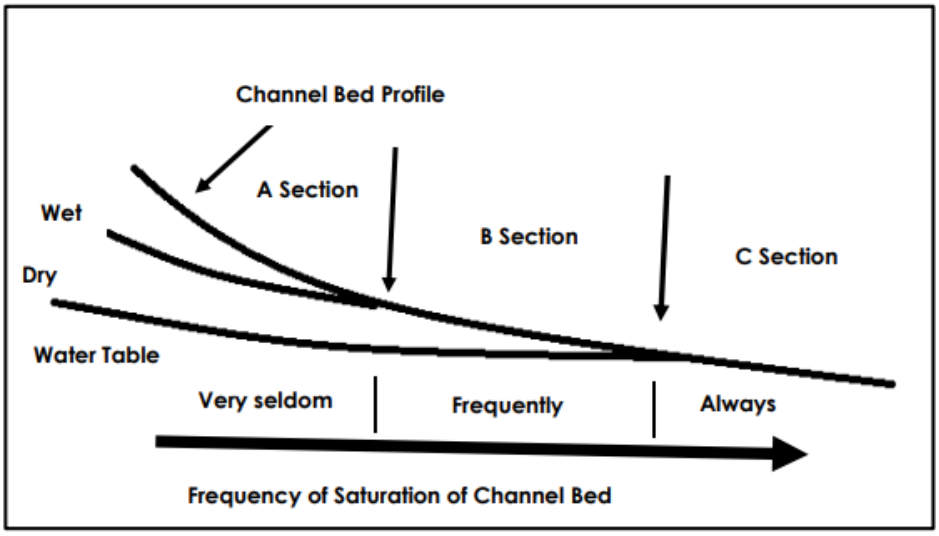


Figure 3-13 Watercourse classifications (DWAF, 2005)

3.3 Risk Screening

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

Table 3-3 Risk status of the delineated wetlands

HGM unit / Feature	Risk Status	Reasoning
HGM 1 & 2 (Inclusive of Instream farm dams within HGM 2)	At Risk	The proposed activities are located in proximity to HGM 1 and upslope of HGM 2. Impacts to HGM 2 can largely be buffered against attributed to the presence of an existing road. However, due to the proximity of the activities to the artificial seep wetland which has connectivity to HGM 2 and the proposed powerline route being located within 100 m from the HGM unit, indirect and minor impact to the system is expected.
Artificial Depression and Seep	At Risk	The proposed development of a salvage yard, fence and a road occur within the artificial depression and adjacent to the artificial seep, respectively. Direct and indirect impacts to these features are therefore expected.
Non-Perennial Drainage	Not at Risk	The non-perennial drainage feature is not located in a position of the landscape which will be subject to impact from the proposed activities. No impact to the feature is therefore anticipated.

3.4 Functional and Ecological Assessment

Only wetlands at an appreciable level of risk in relation to the proposed project and related activities were considered for the Functional and Ecological Assessments. Instream dams were assessed as part of the HGM unit they occur within. Artificial features may provide ecosystem services however, they do not represent natural ecological settings and do not have reference states for ecosystem health assessments.

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).

The generally impermeable nature of depressions and their inward draining features are the main reasons why the streamflow regulation ability of these systems is mediocre. Regardless of the nature of depressions with regard to trapping sediments entering the system, this service is not deemed an essential benefit. Although, the level of provision may vary between wetlands and their specific on-site conditions. This can be attributed to winds picking up sediments within pans during dry seasons which ultimately leads to the removal of these sediments and the deposition thereof elsewhere. The assimilation of nitrates, toxicants and sulphates are some of the higher rated ecosystem-services for depressions. This latter statement can be explained by the processes of precipitation and the dissolution of minerals and other contaminants during dry and wet seasons, respectively (Kotze *et al*., 2009).

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

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.,* 2009). The results of the assessment are presented in

Table 3-4. Ecosystem services contributing to these scores include flood attenuation, stream flow regulation, nutrient and toxicant assimilation and the maintenance of biodiversity.

HGM 1 was scored within the “Low” ecosystem service score range. Some functions such as the assimilation of nutrients and toxicants, erosion control and streamflow regulation are supplied in a limited capacity attributed to the soil type in the area and relatively small size of the wetland. The wetland is expected to support biodiversity in a very limited capacity, particularly in the wetter months, attributed to the provisioning of water.

The unchanneled valley-bottom wetland naturally has a higher benefit provision than the depression due to the wetlands size and its connectivity (or potential) with other wetlands located downstream. The wetland has therefore been scored within the “Intermediate” ecosystem service score range. Flood attenuation is supported due to the topography of the wetland and the presence of dams within the wetlands path which increases its storage limits. Furthermore, valley-bottoms usually host more robust vegetation due to frequent saturation from surrounding hillslopes which enhances their ability to provide water quality benefits. The wetland also serves an ecological corridor and therefore makes a notable contribution to the maintenance of biodiversity in an overall disturbed landscape.

The potential for all wetlands to be used for tourism and recreation is unlikely. Furthermore, the direct benefits such as the provisioning of harvestable resources and cultivated foods is also unlikely due to the type of vegetation present. The provisioning of water by HGM 2 is likely, given that the wetland does have dams within its path which support the storage of water and the use thereof by people. The use of the wetlands for cultural benefits and education and research is not supported.

Table 3-4 Summary of the average ecosystem scores of the assessed wetland units

Wetland Unit					HGM 1	HGM 2
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits		Flood attenuation	0.5	2.5
				Streamflow regulation	0.0	1.5
			Water Quality enhancement benefits	Sediment trapping	0.2	2.5
				Phosphate assimilation	0.2	2.0
				Nitrate assimilation	0.2	2.0
				Toxicant assimilation	0.2	1.5
				Erosion control	0.2	2.5
				Carbon storage	0.5	2.0
	Direct Benefits	Biodiversity maintenance			1.0	3.0
		Provisioning benefits		Provisioning of water for human use	0.0	2.0
				Provisioning of harvestable resources	0.0	0.0
				Provisioning of cultivated foods	0.0	0.0
		Cultural benefits		Cultural heritage	0.0	0.0
				Tourism and recreation	0.0	0.0
				Education and research	0.0	0.5
Overall					**3.0**	**22.0**
Average					**0.2**	**1.5**
Class					**Low**	**Intermediate**

3.4.2 Present Ecological State

The wetlands have exhibited some degree of modification, greater for HGM 2 than HGM 1, resulting from natural physical changes as well as anthropogenically induced impacts at both the local and catchment level. Resultingly, the wetlands have scored an average Present Ecological State (PES) score within the "C – Moderately Modified" and "D – Largely Modified" PES classes. The results of the wetland health and integrity assessment is provided in Table 3-5.

The delineated wetlands were not identified through the use of the available and relevant national wetland datasets. Therefore, changes from their original state were assessed through examining historical imagery to indicate changes in land use and consequently changes to the functioning of the wetland from its assumed natural state.

HGM 1 has exhibited some change to its natural hydrology due to alterations of the surrounding landscape which is considered to be the wetlands catchment. Changes to the hydrological patterns of the wetland are assumed to have resulted in the vegetation composition of the wetland being limited to fewer sedge and rush species. The geomorphic structure of the wetland is not perceived to have been altered significantly as no physical earth-moving changes within the wetland were evident and no erosional surfaces were noted in the immediate surrounds of the wetland.

HGM 2 has been subject to more disturbance than HGM 1 as the wetland contains geomorphic structural changes from impoundments and is presently intersected by roads. The impoundments and road crossing points have resulted in changes to the hydrology of the system by limiting natural flows and creating concentrated flows during wet seasons. The wetlands catchment is dominated by agricultural use which is assumed to have resulted in the loss of wetland vegetation in some approaches and, which play a role in changing the flow and sediment dynamics of the system. Since disturbance has occurred in the catchment and on the periphery of the wetland, the removal of natural vegetation has created opportunity for the proliferation of alien vegetation such as *Bidens Pilosa*, *Cirsium vulgare* and *Verbena bonariensis*. Furthermore, changes to the hydrology of the wetland have resulted in favourable conditions for sedges, rushes and grasses as opposed to reeds and reed grasses which are usually prevalent in valley-bottom wetlands.

Table 3-5 Summary of the scores for the wetland PES

	Area (ha)	Hydrology		Geomorphology		Vegetation	
		Rating	Score	Rating	Score	Rating	Score
HGM 1	0.07	C: Moderately Modified	2.5	B: Largely Natural	1.4	C: Moderately Modified	2.3
	Overall PES	**2.1**		**Overall PES Class**		**C: Moderately Modified**	
HGM 2	12.29	D: Largely Modified	4.3	D: Largely Modified	3.1	D: Largely Modified	5.7
	Overall PES	**4.3**		**Overall PES Class**		**D: Largely Modified**	

3.4.3 Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) assessment was applied to the HGM units 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 are considered for the EIS, including the overlap with Strategic Water Source Areas (SWSAs), the NFEPA and NBA 2018 wetland type threat and the protection status and, the wetlands condition as displayed in Table 3-6. It should be noted that the delineated wetlands were not identified by the NBA 2018 dataset, hence the protection and threat status of the nearest wetlands of the same type within the catchment were used as a baseline for the assessment. The average EIS ratings were calculated to be "Low" for HGM 1 and "High" for HGM 2 (Figure 3-14).

Table 3-6 Aspects considered in the Ecological Importance and Sensitivity assessment

HGM Type	NFEPA Wet Type			NBA Wetlands			SWSA (Y/N)	CBA/ESA (Y/N)	EIS Rating
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018	Ecosystem Protection Level			
Depression (HGM 1)	Central Bushveld Group 2	Least Threatened	Poorly Protected	C Moderately Modified (Field Visit)	Least Concern	Poorly Protected	Y	N	D - Low
Unchannelled Valley-Bottom (HGM 2)		Vulnerable	Moderately Protected	D Largely Modified (Field Visit)	Critically Endangered	Not Protected	Y	Y	B - High

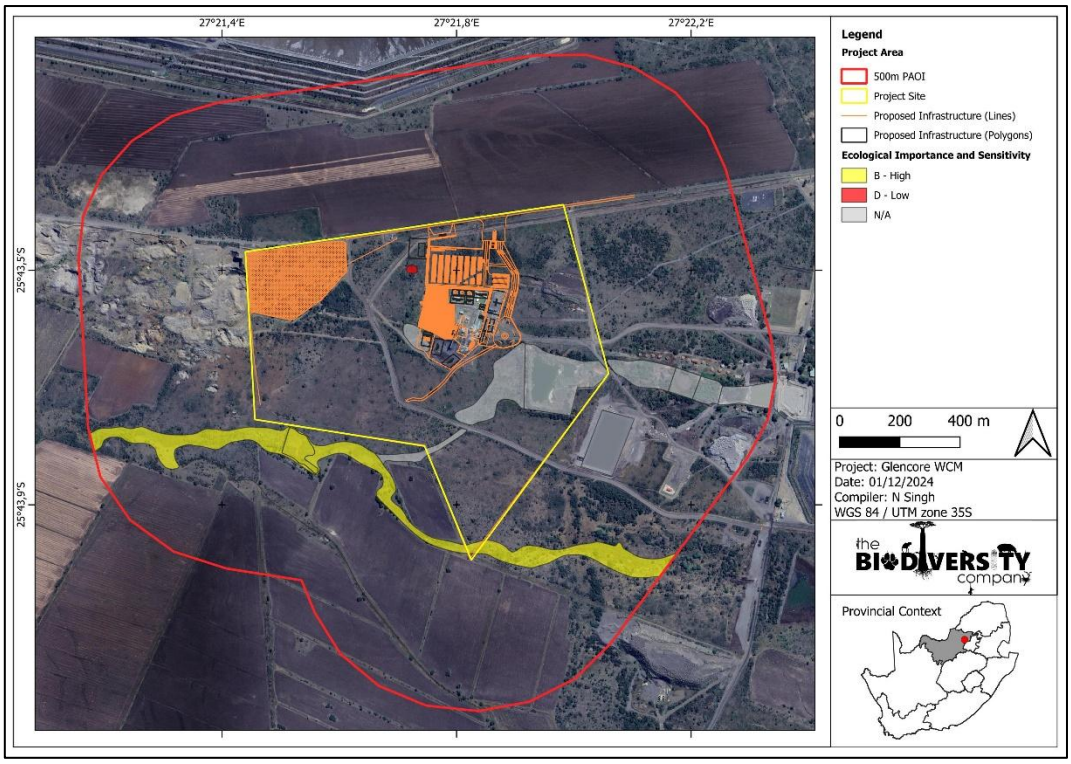


Figure 3-14 Average Ecological Importance and Sensitivity of the assessed wetlands

3.4.4 Recommended Ecological Category and Recommended Management Objective

The Recommended Ecological Category (REC) and Recommended Management Objective (RMO) for the wetland area was determined from the results of the PES and EIS assessments. These assessments indicated that all wetland features within the site, had to an extent, underwent transformation as a result of historical and current impacts. Despite the altered ecological integrity of these systems, they do provide services, greater in supply for HGM 2 than HGM 1. The appropriate REC and RMO estimated for the wetland areas are presented in Table 3-7 below.

Table 3-7 Summary of the REC and RMO categories assigned to the relevant wetlands

HGM Unit	REC – RMO
HGM 1	C - Maintain
HGM 2	C/D - Improve

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 recommended buffer zones are presented in Table 3-8 below. The soil type and topography within the wetland and the catchment was considered in this assessment and contributed to the calculated buffer widths.

The pre- and post-mitigation buffers for the wetlands were calculated as 25 m and 15 m, respectively (Figure 3-15).

The following infrastructure components are noted to occur within the delineated wetlands:

- Salvage Yard and fence – within artificial depression; and
- Fence and road – within 10 m of artificial seep.

The construction of the above-mentioned infrastructure within the watercourses is deemed acceptable given the artificial nature of the watercourses. The artificial depression will be modified by the development of the salvage yard however, this is not anticipated to result in a significant loss to freshwater biodiversity as the wetland is isolated and dependent on stormwater runoff which has created the ideal conditions for wetland vegetation to establish. The activities in proximity to the artificial seep are deemed acceptable as the potential impacts can largely be mitigated against.

It is however advised that any disturbance to the systems be remedied through post-construction rehabilitation of the watercourses which aims to remove alien vegetation, revegetate disturbed and denuded areas within the watercourse and improve the hydrological functioning of the system in terms of the artificial seep.

Table 3-8 Buffer requirements for the relevant wetland features

Aspect	Pre-Mitigation	Post-Mitigation
Construction infrastructure and operation of facility	25 m	15 m

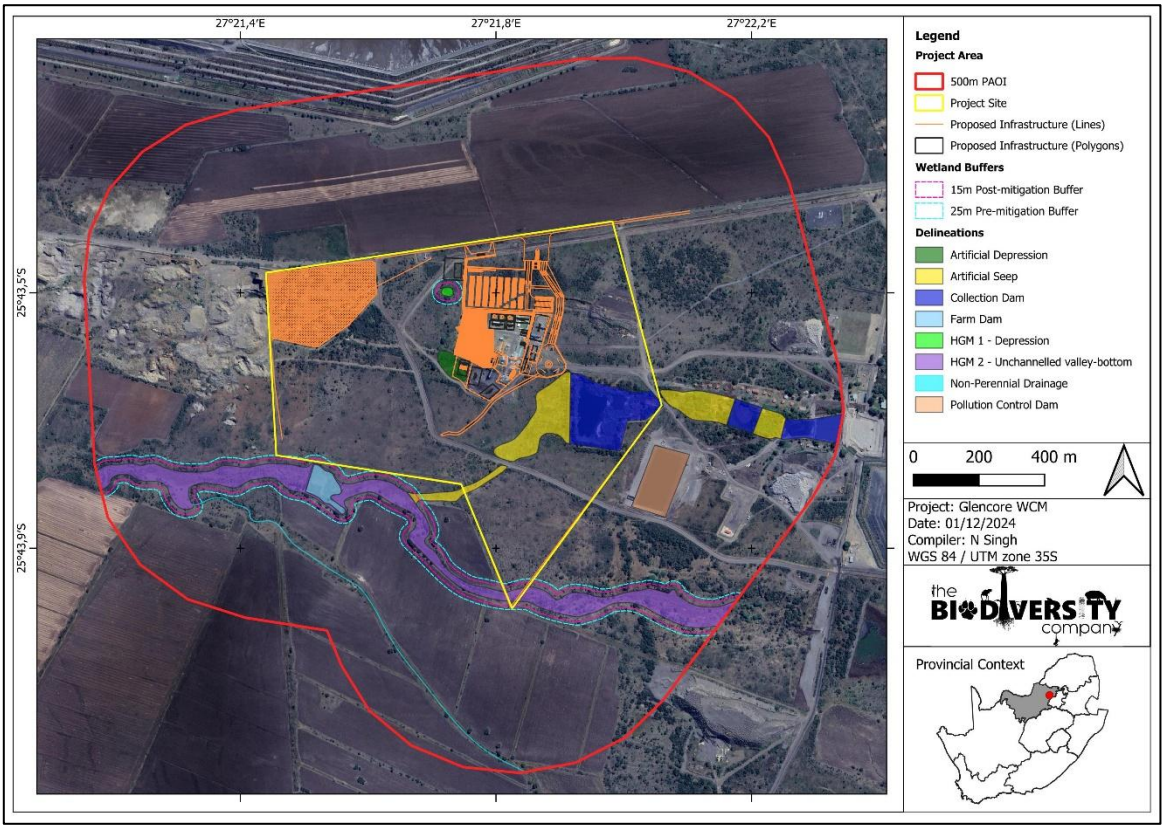


Figure 3-15 Recommended buffers for the identified wetlands

3.5.1 Regulation Zones

Table 3-9 presents the legislated zones of regulation that would be applicable to the wetland areas.

The regulated areas of a watercourse in terms of GN 509 as it relates the NWA (1998) must be considered for infrastructure located within these areas.

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.

Given that the proposed development occurs within 32 m and 500 m of a watercourse, both authorisations are applicable for the project.

Table 3-9 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)	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.

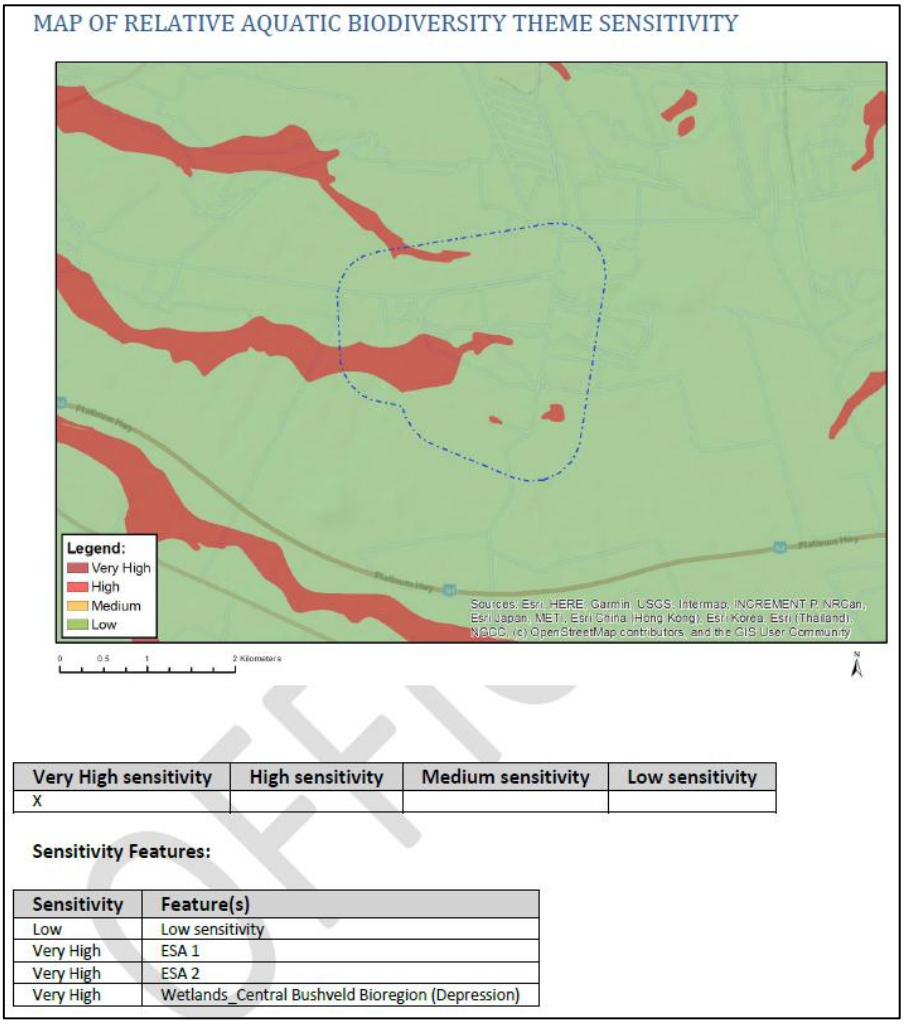
3.6 Site Sensitivity Verification

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):

- The National Web-based Environmental Screening Tool has characterised the Aquatic Biodiversity Theme sensitivity as “Low” for majority of the Project Site and PAOI (Figure 3-16); and

- The National Web-based Environmental Screening Tool has characterised the Aquatic Biodiversity Theme sensitivity as “Very High” for sections within the Project Site and PAOI, assigned for the presence of a depression and Ecological Support Areas 1 and 2 (Figure 3-16).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	ESA 1
Very High	ESA 2
Very High	Wetlands_Central Bushveld Bioregion (Depression)

Figure 3-16 The Aquatic Biodiversity Theme Sensitivity for the proposed project (National Environmental Web-based Screening Tool (DEA, 2024)

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 3-10 below. A summative explanation for each result is provided as relevant. It should be noted that the National Web-based Environmental Screening Tool allocates sensitivities to freshwater resources identified through the available national freshwater datasets based on their presence (very high) or absence (low). The specialist-assigned sensitivity ratings presented herein for the natural and assessed wetlands have considered the PES and EIS assessment processes followed in the previous section, and consideration has been given to any observed or likely presence of sensitive fauna and flora. A map highlighting the Freshwater Sensitivity for the PAOI is depicted in Figure 3-17.

Table 3-10 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 (Depression)	Aquatic Biodiversity Theme	Low	Low	Screening Tool Sensitivity Validated. Rational for the specialist assigned 'Low' rating: The wetland system has experienced moderate impacts from natural processes and anthropogenic sources. The wetland is perceived to be seasonal as no surface water was observed. Wetland vegetation within the system was present but was dominated by only a few species. The wetland presently has low service provision and a low EIS rating. The wetland has therefore been assigned a 'Low' sensitivity rating.
HGM 2 (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.
Non-perennial Drainage	Aquatic Biodiversity Theme	Low	Moderate	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Moderate' rating: This watercourse has experienced historical impact related to agriculture (crop fields). The connectivity of the feature to downstream watercourses increases its importance in maintaining the hydrological functioning of these systems and providing a corridor to the larger watercourse. This has contributed towards determining the sensitivity rating. The watercourse has therefore been assigned a 'Moderate' sensitivity rating.
Farm Dam	Aquatic Biodiversity Theme	Low	Very High	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Very High' rating: This is an instream feature and will adopt the sensitivity of the watercourse it occurs within and has therefore been assigned a 'Very High' sensitivity rating.
Artificial watercourses (Artificial seep and Collection Dam)	Aquatic Biodiversity Theme	Very High	Moderate	Screening Tool Sensitivity Disputed. Rational for the specialist assigned 'Moderate' rating: These watercourses are artificial, and no functional assessments have been included for them. However, the wetlands are perceived to have some functionality as wetland vegetation was present and, seasonal saturation of the seeps is likely. The assigned sensitivity considers that the artificial features were identified through the North West Biodiversity Sector Plan as being an ecological corridor. The wetlands have been assigned a 'Moderate' sensitivity rating.

Artificial watercourses (PCD & Artificial depression)	Aquatic Biodiversity Theme	Low	Low	Screening Tool Sensitivity Validated. Rational for the specialist assigned 'Low' rating: These watercourses are artificial, and no functional assessments have been included for them. The hydrological components of the depression are dependent on human intervention (stormwater runoff) and wetland conditions would cease without this intervention. The wetlands do have some functionality as wetland vegetation was present. The wetlands have been assigned a 'Low' sensitivity rating.
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.

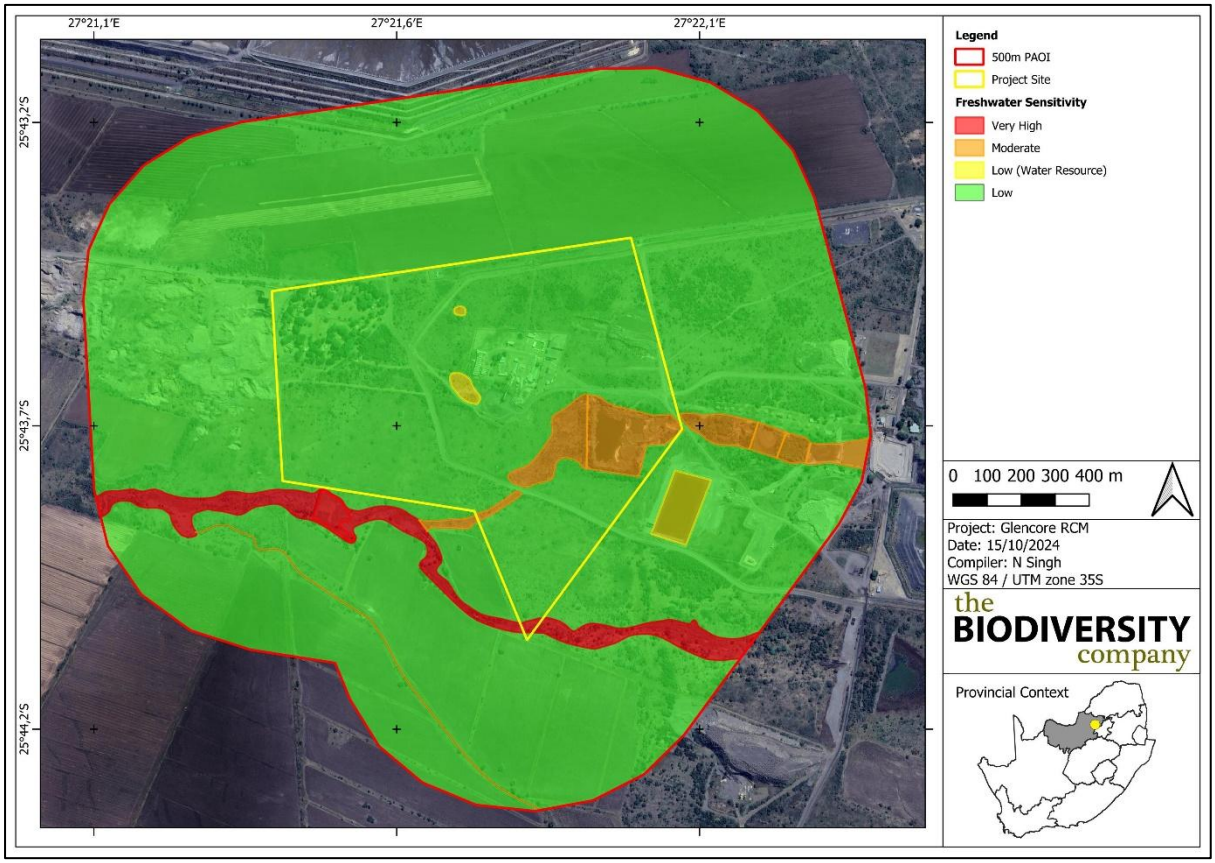


Figure 3-17 Sensitivity Map for the Project Area of Interest

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 little degree, mining activities which have transformed the wetland habitats and has 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 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 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 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 indirect impacts, to the wetland systems and drainage line. 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.

A Risk / Impact Assessment was undertaken for the various project components and is presented below.

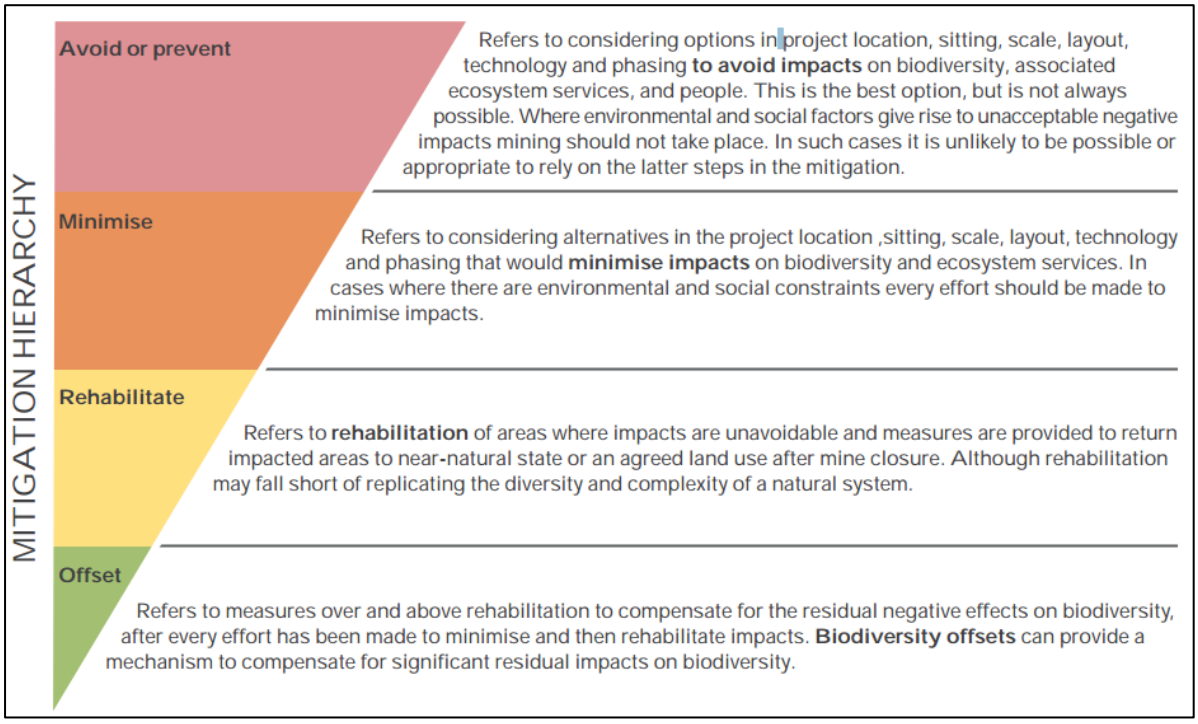


Figure 4-1 The mitigation hierarchy as described by the DEA (2013)

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 Activities and impacts relevant to the proposed activity

Phase	Activity	Impact
Construction	Construction of Salvage Yard (Within Artificial Depression)	Minor wetland loss and disturbance of wetland habitat. Altered surface hydrology and potential sedimentation. Proliferation of alien vegetation. Induced erosion and sedimentation from altered hydrology. Contamination of wetland through inappropriate waste management and stochastic spills and leaks. Positive Impacts: Improved saturation conditions. Improved service provision.
	Construction of Fence (Within Artificial Depression)	
	Construction of fence and road (Adjacent (within 10m) Artificial Seep)	
	Construction of project infrastructure including buildings, roads, sewer plant, parking areas, lined dams, diesel bays, laydowns and yards and powerlines. Additionally, the storage of hazardous materials and operation of equipment and machinery. (Within 500m of HGM 1 and artificial depression and seep)	
	Construction of project infrastructure including buildings, roads, sewer plant, parking areas, lined dams, diesel bays, laydowns and yards and powerlines. Additionally, the storage of hazardous materials and operation of equipment and machinery. (Within 500m of HGM 2)	
	Post-construction rehabilitation of wetlands including removal of alien vegetation, revegetation and reshaping. (Within Artificial Seep and Depression)	
Operation	Operation of facility, roads and stormwater management systems. (Within watercourse and within 500m of watercourses)	

Decommissioning	Removal of project infrastructure. (Within Artificial Depression)	
	Removal of project infrastructure. (Within 500m of watercourses)	
	Final rehabilitation of site and watercourses. (within watercourse and within 500m of watercourse)	

Indirect impacts are potential to the natural watercourses, whereas direct impacts are expected for the artificial seep and depression wetlands. Emphasis was therefore placed on minimising impacts by means of mitigation.

HGM 1 is at an indirect and "Low" risk from the proposed development of the Hall which has the potential to affect the vegetation and hydrological functioning of the wetland.

HGM 2 is at indirect risk from the proposed activities as the wetland is located at a lower elevation than the proposed activities which are intended to occur upslope and a considerable distance away. While the proposed site itself is of relatively flat topography, it should be noted that the overall and general topography of the area slopes towards HGM 2. The main impacts to the system will result from potential altered hydrological inputs and consequent potential erosion and sedimentation. The risk rating for these impacts present within the "Low" category and considers that there is an existing road between the wetland and the site which would act as a physical barrier and alleviate majority of the potential impact.

Additionally, whilst no functional and buffer assessments were conducted for the artificial watercourses. These are anticipated to be impacted and have been included in the DWS Risk Assessment due to the establishment of infrastructure (salvage yard) within the artificial depression and the development of a road and fence in proximity to the artificial seep. The risks for these activities have also been determined to present within the "Low" category given the artificial nature of the watercourses and their reliance on stormwater input in the case of the artificial depression, which if stopped, would cease the wetland conditions. Furthermore, the artificial depression has already been disturbed by clearing for an informal access route to the southern portions of the existing operations.

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	Consequence	Significance	Risk Rating
Construction	Construction of Salvage Yard (Within Artificial Depression)	Loss and disturbance of artificial wetland habitat. Altered surface hydrology and potential sedimentation. Proliferation of alien vegetation. Contamination of artificial wetland through inappropriate waste management and stochastic spills and leaks.	28	28	L
	Construction of Fence (Within Artificial Depression)	Wetland vegetation and soil disturbance. Proliferation of alien vegetation.	18	14,4	L
	Construction of fence and road (Adjacent (within 10m) Artificial Seep)	Altered surface hydrology. Induced erosion and sedimentation from altered hydrology. Proliferation of alien vegetation.	24	19,2	L

	Construction of project infrastructure including buildings, roads, sewer plant, parking areas, lined dams, diesel bays, laydowns and yards and powerlines. Additionally, the storage of hazardous materials and operation of equipment and machinery. (Within 500m of HGM 1 and artificial depression and seep)	Altered surface hydrology. Induced erosion and sedimentation from altered hydrology. Proliferation of alien vegetation. Impaired water quality from contaminated runoff entering the system.	27	21,6	L
	Construction of project infrastructure including buildings, roads, sewer plant, parking areas, lined dams, diesel bays, laydowns and yards and powerlines. Additionally, the storage of hazardous materials and operation of equipment and machinery. (Within 500m of HGM 2)	Altered surface hydrology. Induced erosion and sedimentation from altered hydrology. Proliferation of alien vegetation. Impaired water quality from contaminated runoff entering the system.	36	21,6	L
	Post-construction rehabilitation of wetlands including removal of alien vegetation, revegetation and reshaping. (Within Artificial Seep and Depression)	Improved saturation conditions. Improved service provision.	-27	-16,2	+
Operation	Operation of facility, roads and stormwater management systems. (Within artificial watercourse and within 500m of watercourses)	Altered flows and increased erosion and sedimentation. Proliferation of alien vegetation. Impaired water quality from contaminated overland flows.	40	24	L
Decommissioning	Removal of project infrastructure. (Within Artificial Depression and Seep)	Loss and disturbance of wetland habitat. Altered surface hydrology and potential sedimentation. Proliferation of alien vegetation. Contamination of wetland through inappropriate waste management and stochastic spills and leaks.	30	24	L
	Removal of project infrastructure. (Within 500m of watercourses)	Altered flows and increased erosion and sedimentation. Proliferation of alien vegetation. Impaired water quality from contaminated overland flows.	40	24	L
	Final rehabilitation of site and watercourses. (within artificial watercourse and within 500m of natural watercourse)	Improved saturation conditions. Improved service provision.	-44	-26,4	+

4.4 Impact Assessment

The development of the project will result in the loss 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 provide 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 4-3

Table 4-3 Summative results of the Impact Assessment conducted for the proposed project

Impact	Phase	Pre-mitigation ER	Post-mitigation ER	Confidence	Cumulative Impact	Irreplaceable loss	Final score
Indirect loss, disturbance and degradation of wetlands	Construction	-8	-4,5	High	2	2	-5,625
Increased bare surfaces, runoff and potential for erosion	Construction	-8.25	-6	High	2	2	-7,5
Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Construction	-8,25	-3,5	High	2	2	-4,375
Increased sediment loads to downstream reaches	Operation	-8,25	-3,5	High	2	2	-4,375
Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste	Construction	-9	-4,5	High	2	2	-5,625
Alteration of hydrological regime	Construction	-7,5	-3	High	2	2	-3,75
Increased water inputs (clean) to downstream wetlands	Operation	-13	-6,75	High	2	2	-8,4375
Improved ecosystem services, notably water quality enhancement	Operation	+ 8.25	+ 11	High	2	2	+12.375
Degradation of wetland vegetation	Decommissioning	-9	-3,5	High	2	2	-4,375

and proliferation of alien and invasive species							
Disruption of wetland soil profile, hydrological regime and increased sediment loads	Decommissioning	-8,25	-4	High	2	2	-5

4.5 Mitigation Measures

In light of the expected impacts from proposed activities the following mitigation measures 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.

4.5.1 Road construction specific mitigation measures

The following road construction specific mitigation measures are provided:

- The road should incorporate stormwater management that aims to divert water into the downstream of adjacent watercourse in a manner that does not lead to erosion and sedimentation;
    - A combination of step like grassed berms or perforated bricks and silt traps must be incorporated into the stormwater management plan to prevent scouring of the road margins and subsequent sedimentation of the downslope watercourse (particularly the artificial seep); and
- Contamination of the watercourses with unset cement or bitumen should be negated as it is detrimental to aquatic biota. Mixing of materials should not take place within any of the delineated watercourses and spillage of unset materials into watercourse areas must immediately be remedied in an appropriate manner.

4.5.2 Rehabilitation and Revegetation of Aquatic Resources

The below measures are applicable to the disturbed wetlands (particularly the artificial depression and seeps):

- The rehabilitation and revegetation should be conducted in accordance with the approved Rehabilitation Plan (including Plant Species Plan) under supervision of a suitably qualified ECO and/or Ecologist;
- No heavy machinery shall be permitted within unauthorised water resource areas for any purpose, without the prior approval of the ECO (except emergency procedures). Clearing of vegetation shall be conducted by hand. All cleared and trimmed vegetation shall be removed from any watercourse;

- Re-vegetation of disturbed areas must be undertaken with site-specific indigenous species in accordance with biome-specific vegetation types. Rehabilitation of the vegetation component should also include resident, indigenous hydrophilic plant species that have established in the local area. This, to ensure survival and proliferation of site-specific vegetation that have already adapted to the current conditions and provide ecosystem services for other terrestrial and aquatic biota;

- Dry seeding or hydro-seeding may be used for aquatic resources. If dry seeding is used it must be done at the end of the dry season and/or beginning of the wet season. This will ensure the seeds germinate and will not be washed away during high rainfall events;

- All present alien and invasive plant species must be eradicated if the project is approved. Therefore, as part of the rehabilitation plan, regular removal of alien and invasive plant species should take place;

- Dedicated implementation of the Environmental Management Programme (EMPr), including compliance monitoring and auditing by an ECO.

4.5.3 Impact Specific Mitigation Measures

4.5.3.1 Direct and indirect loss of wetlands

Any activities within proximity to wetland systems have the potential to degrade these systems directly or indirectly either by improper conduct, negligence, or stochastic / uncontrolled / accidental events. The following measures have therefore been suggested to alleviate the potential for these impacts to occur on the delineated systems.

Mitigation:

- Restrict unauthorised and unnecessary activities within the wetlands and their respective buffers. No laydown areas or storage of equipment and material should be allowed within the wetlands and only activities necessary for construction of the relevant infrastructure (within watercourses) must be permitted. Authorised activities within the watercourse must be overseen by an ECO;

- Minimise the disturbance footprint of the development or the proposed infrastructure areas and avoid land clearing outside of these areas to prevent indirect impact to the wetlands;

- Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area;

    - The construction servitude must be identified and be clearly demarcated prior to the commencement of any construction activities on site and before the arrival of construction machinery. Vehicles must use a single route to enter and exit the construction site. This will ensure that the compacting of the soils of these areas is kept to a minimum. The compacting of the soil can lead to an increase in runoff that in return will lead to sedimentation of the aquatic ecosystems;

- Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the making them aware of the overall site plan which should indicate sensitive areas, waste disposal areas and any other relevant project specifics.

4.5.3.2 Altering overland flow characteristics

During the construction and operational phase, alterations to the topography of the land will alter the surface flow patterns and in turn affect the hydrological dynamics of the wetland systems. Similarly, increased hardened surfaces, will drastically increase the overland flow in the local area of the infrastructure which will subsequently increase the water input to the wetlands.

Mitigation:

- Design and implement an effective stormwater management plan;
- Include green spaces in the development and minimise the extent of paved and concreted areas wherever possible;
- Re-vegetate denuded areas as soon as possible to increase surface roughness and promote infiltration; and
- Regularly clear drains to prevent uncalled for accumulation of surface water and the establishment of concentrated flow paths out of the accumulation areas.

4.5.3.3 Erosion and sedimentation of catchment and downstream watercourses

The alteration of surface topography and hydrology for the project infrastructure will inevitably be accompanied by an increase in erosion and sedimentation as rainwater erodes and washes exposed soils (active working and exposed areas) into the downslope watercourse.

Mitigation:

- Loose soils are particularly prone to loss due to wind or water. It is therefore preferable that construction takes place during the dry season, where possible, to reduce the erosion potential of the exposed surfaces;
- Practice good soil management across the construction footprint;
- Avoid the creation of concentrated flow paths wherever possible;
- Devise and implement a suitable stormwater management plan for the construction and operation phases;
- Install sandbags as a temporary measure around key areas of soil loss (active working areas and soil stockpiles) to prevent soils washing into the local watercourse (siltation);
- Signs of erosion must be addressed immediately to prevent further erosion of the area to prevent head cut erosion from forming;
- Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;
- Relandscape to gentler gradients and re-vegetate all cleared areas, which includes the areas adjacent to the proposed infrastructure, as soon as possible to limit erosion potential. Sandbags

and geotextiles should be used to assist until vegetation has established in these reworked areas; and

- The rehabilitation of watercourse banks must take place following construction. Key areas where erosion has occurred should be rehabilitated through bank reprofiling to gentler gradients and the revegetation of the marginal and riparian areas.

4.5.3.4 Spread of alien invasive vegetation

Alien invasive vegetation is particularly opportunistic and has the potential to spread rapidly, especially in disturbed settings. These plants outcompete the natural vegetation and in turn alter the abiotic and biotic components of freshwater ecosystems. The control of such species is considered imperative in consideration of the proposed development and in maintaining the ecological integrity and functioning of such systems.

Mitigation:

- Revegetate bare or denuded areas as soon as possible;
- Once and if detected, control the spread of any existing colonies;
- Avoid working in areas with alien vegetation as dispersal into unaffected areas may be aided through vehicular movement; and
- Should alien vegetation infestation be considered a contributing factor to ecosystem degradation on the site, the preparation and implementation of an alien invasive management plan should be considered.

4.5.3.5 Impaired water quality and pollution

Impaired water quality can be detrimental to freshwater ecosystems and can be a result of several factors or activities, most commonly related to the use of harmful or hazardous substances such as fuels, oils, pesticides and herbicides. This impact has the potential to adversely affect the biotic component of the freshwater resources and will ultimately result in a degraded ecosystem with reduced functionality.

Mitigation:

- All chemicals and toxicants to be used for the construction must be stored outside the watercourse areas and their respective buffers, preferably on flat terrain and in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be out of watercourses and in a designated area that is flat and bunded;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”;
- Adequate sanitary facilities and ablutions must be provided for all personnel within the project area. These facilities must be regularly maintained to promote their use;
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems;

- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;

- No dumping should be permitted on site and within the watercourses. All waste generated on-site during construction must be adequately managed (not remain on site for more than two weeks). Separation and recycling of different waste materials should be supported; and

- The stormwater management plan must aim to release only clean water in the environment.

4.5.4 Passive Wetland Design Consideration

This design consideration outlines the approach to establishing a passive constructed wetland system associated with the clean water dam, intended to enhance water quality, biodiversity, and ecological function.

The wetland will be a **subsurface-flow, passive treatment system** situated downslope of the clean water dam. The system will consist of shallow, vegetated basins, filled with appropriate substrate (sand and gravel) to promote filtration and microbial activity. Flow will be gravity-fed, with retention time maximised to enhance treatment efficiency.

Construction Steps:

1. **Site Preparation**: Topsoil will be stripped and stockpiled for later use in wetland planting. Earthworks will be limited to shaping shallow depressions and berms to direct and retain water.
2. **Lining and Substrate**: If required to control infiltration, a clay or HDPE liner will be installed, followed by graded gravel/sand substrate.
3. **Inflow/Outflow Structures**: Low-flow channels and silt traps will be installed at inlets, with controlled outflows to prevent erosion.
4. **Vegetation**: Indigenous wetland species (e.g., *Phragmites australis*, *Cyperus* spp., *Typha capensis*) will be planted to establish functionality, biodiversity support, and habitat structure.
5. **Buffer Zones**: A 15–20 m vegetated buffer will be maintained around the wetland in line with GN 509 and GN 267.

A monitoring plan will be implemented to track vegetation establishment, flow conditions, and water quality improvements. Maintenance will include invasive species control and periodic sediment removal from inflow areas.

A constructed passive wetland system delivers notable ecosystem service improvements, particularly enhanced water quality through natural filtration and improved soil saturation that supports wetland vegetation and hydrological function. These conditions promote nutrient cycling, habitat provision, and biodiversity support. The prescribed already mitigation measures enable the system to be effectively constructed and maintained, resulting in a long-term positive operational impact on the local environment.

5 Conclusion

During the site assessment, two HGM types were identified within the PAOI, which were classified as depression (HGM 1) and unchannelled valley-bottom (HGM 2) wetlands. Several artificial watercourses (artificial wetlands and dams) were identified within the footprint and PAOI. In addition to these features, a non-perennial drainage feature was identified within the PAOI.

The ecological characteristics of the identified natural watercourses are described in Table 5-1. The artificial features were identified to be at risk and were included in the DWS impact assessment however, no functional assessments were conducted for these features due to their nature and dependence on human induced hydrological inputs which if stopped will prevent wetland conditions in these features from persisting.

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

Aspect	Present Ecological State	Ecological Importance and Sensitivity (EIS)	Buffer Requirement
Depression (HGM 1)	C – Moderately Modified	Low	15 m
Unchannelled Valley-Bottom	D – Largely Modified	High	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 artificial features of low sensitivity. The impacts are deemed acceptable as small portions of the watercourse will be affected and as the post-construction rehabilitation of the watercourse may result in an overall positive effect.

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. Any affected watercourse should be rehabilitated post-construction. Post-construction rehabilitation of the watercourses is perceived to result in positive impacts and will be an effort to compensate for the minor loss and disturbance of the artificial wetlands as result of the salvage yard, fence and road.

The constructed passive wetland will enhance water quality and saturation conditions, supporting ecosystem functions such as nutrient cycling and habitat provision. With mitigation in place, the system can be effectively built and operated, resulting in a long-term positive environmental impact.

5.3 Layout Approval

Following refinement and further specialist input a SWMP was developed after the completion of the specialist report and therefore this section aims to provide consideration by the specialist of the new clean water dam infrastructure in the context of the overall study. The remaining clean water dam will now incorporate a constructed wetland system, designed to enhance passive treatment, water quality improvement, and ecological function. Figure 5-1 presents the updated layout.

The siting, design, and scale of this dam have been informed by specialist findings, ecological sensitivities, and site conditions. This change does not represent a significant deviation from the original project scope; rather, it results in a net improvement in environmental outcomes introducing a multifunctional, ecologically beneficial wetland system.

These updates are detailed in the stormwater management plan drawing (Drawing No. P2501017-SW-ST2-710). Minor adjustments to infrastructure layout, are considered acceptable and do not affect the conclusions of the original specialist assessment. The revised design is supported by the specialist and is regarded as favourable for environmental authorisation.

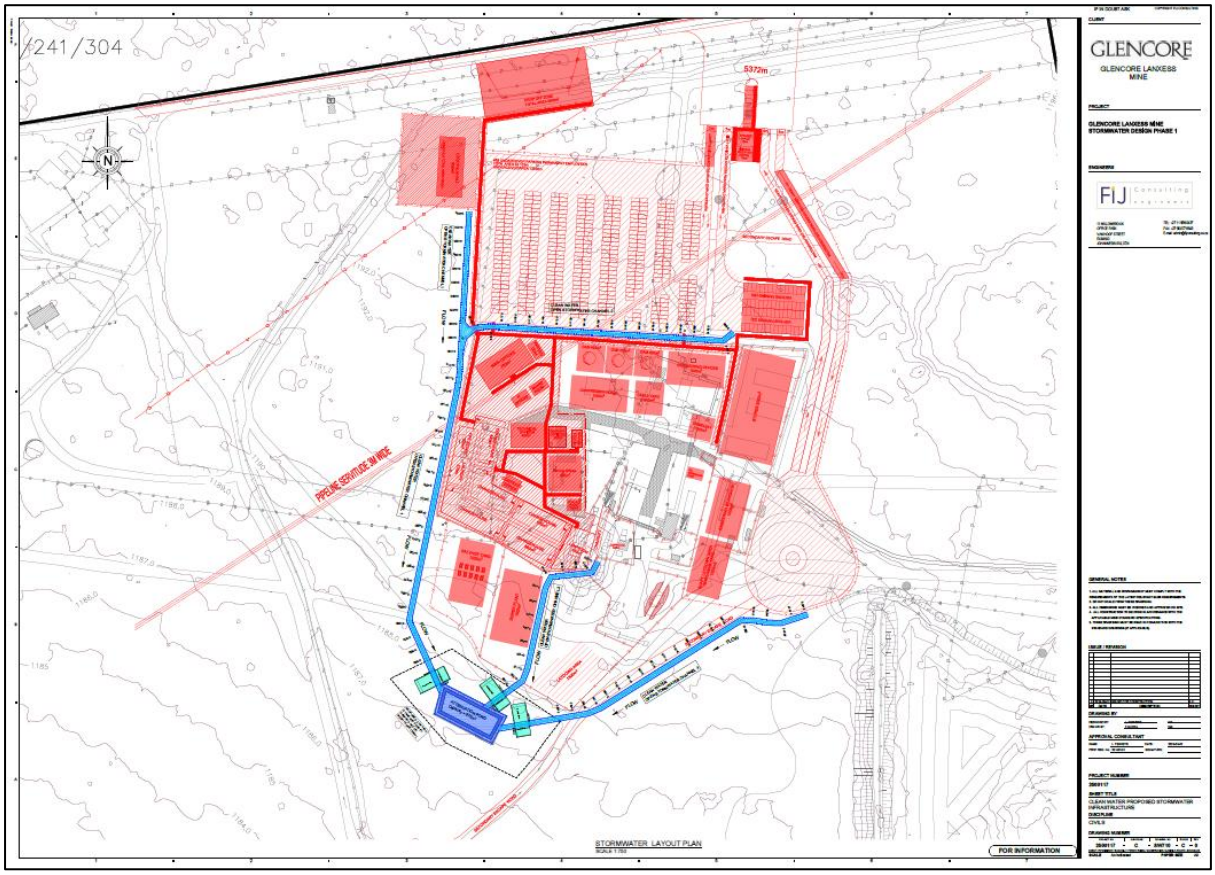


Figure 5-1 The updated layout

The updated layout that integrates a passive wetland system is deemed acceptable and beneficial from a wetland ecological perspective. This update reduces the risk of pollution, improves the potential for water quality enhancement, and introduces a more ecologically functional and hydrologically compatible feature. The constructed wetland system supports passive treatment, enhances biodiversity, and maintains interflow pathways, aligning with the low-risk classification under the General Authorisation (GN4167) and improving the overall ecological resilience of the site.

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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);
- North West Biodiversity Sector Plan (READ, 2015); and
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021).

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 North West Biodiversity Sector Plan

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

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

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

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.

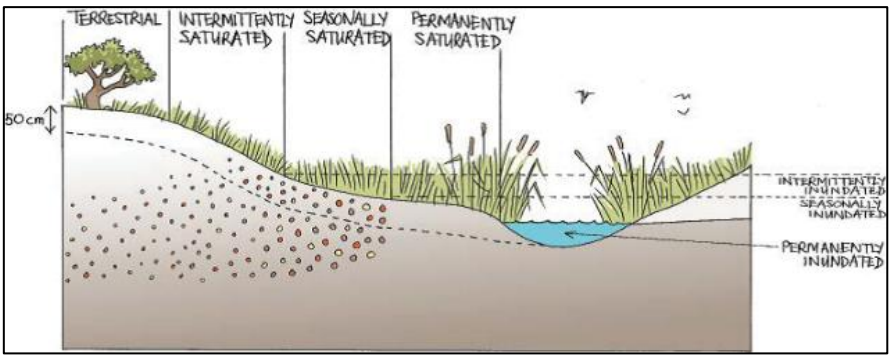

Figure 7-1 Cross section of a wetland, indicating how the soil wetness and vegetation indicators respond to changes in topography (Ollis et al. 2013)

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 Risk Screening

A risk screening procedure which considers the general topography of the proposed area in conjunction with the spatial proximity of the natural wetlands to the proposed areas of development was used to determine the 'Risk Status' of the delineated wetlands. Two broad categories are included in the screening process which classify wetlands to be 'At Risk' or 'Not at Risk'.

7.1.4 Wetland Functional and Ecological Assessment

7.1.4.1 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. Ecosystem 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

7.1.4.2 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., 2009)

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

7.1.4.3 Ecological Importance and Sensitivity

The importance and sensitivity of water resources is determined in order establish resources that provide higher than average ecosystem service and biodiversity support functions with consideration given to their sensitivity to impacts in relation to their typology and functionality. 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

7.1.4.4 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

		Ecological Importance and Sensitivity			
		Very High	***High***	***Moderate***	***Low***
PES	***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

7.1.5 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.

7.1.6 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 and Impact 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

June 2025

I, Namitha Singh, 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.

Namitha Singh

Ecologist

The Biodiversity Company

June 2025

7.4 Appendix D – Specialist CVs

Divan van Rooyen

Ph.D. Environmental Science

Can 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
- Can Sci Nat (151272)

Namitha Singh

BSc. (Hons) Environmental Science (*Cum Laude*) (*Pr Sci Nat*)

Cell: +27 63 684 1752
Email: namitha@thebiodiversitycompany.com
Identity Number: 9509260335089
Date of birth: 26 September 1995

Profile Summary

Working experience in 7 provinces of South Africa.

Specialist experience within construction and development (residential/commercial/mixed-use/solar), wastewater infrastructure and agriculture.

Specialist expertise includes wetland resource management and rehabilitation, estuary and coastal management and, hydropedology.

Areas of Interest

Water Resource Management, Mining, Renewable Energy, Infrastructure Development, Agriculture, Land contamination, Sustainability and Conservation.

Key Experience

- Wetland Delineation and Functional Assessments
- Hydropedology Assessments
- Wetland Rehabilitation
- Coastal and Estuarine Assessments

Country Experience

South Africa

Nationality

South African

Languages

English – Proficient

Afrikaans – Basic

Qualifications

- BSc. Honours – Environmental Science (*Cum Laude*)
- BSc. Environmental Science and Life Science