APPENDIX 8

WETLAND DELINEATION AND IMPACT ASSESSMENT

Desktop Wetland Delineation and Impact Assessment for the Proposed Prospecting Right Application on the Farm Gappepin Reserve 670

Tsantsabane Local Municipality, Kathu, Northern Cape Province, South Africa

20/03/2024

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Report Name	**Desktop Wetland Delineation and Impact Assessment for the Proposed Prospecting Right Application on the Farm Gappepin Reserve 670**
Specialist Theme	Aquatic Biodiversity Theme
Project Reference	Gappepin Prospecting Right Application
Report Version	Draft 1 / 20/03/2024
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Report Writer	Divan van Rooyen 
Reviewer	Rowan Buhrmann (SACNASP Pr Sci Nat 136853) 
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. 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 Desktop Wetland Delineation and Impact Assessment for the prospecting right application near Kathu, within the Tsantsabane Local Municipality, Northern Cape Province. The proposed project is for the planned prospecting activities located on Portion 0 of the Farm Gappepin Reserve 670. A map presenting the regional context of the Project Site can be seen in Figure 1-1 and a map presenting the Project Footprint can be seen in Figure 1-2.

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

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

This report, after taking into consideration the findings and recommendation provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making with regards to the ecological viability of the proposed development and related activities.

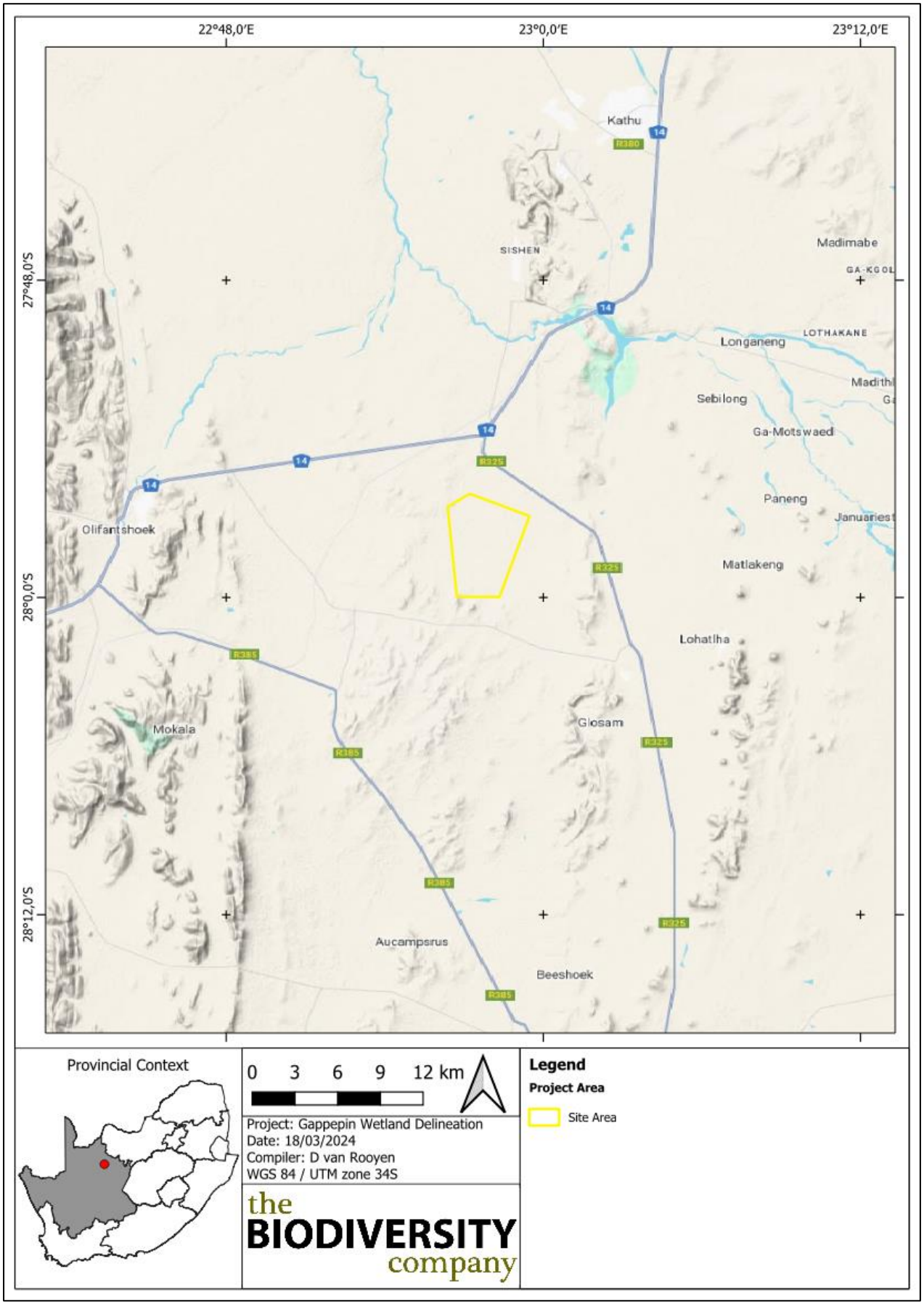


Figure 1-1 Location of the proposed project

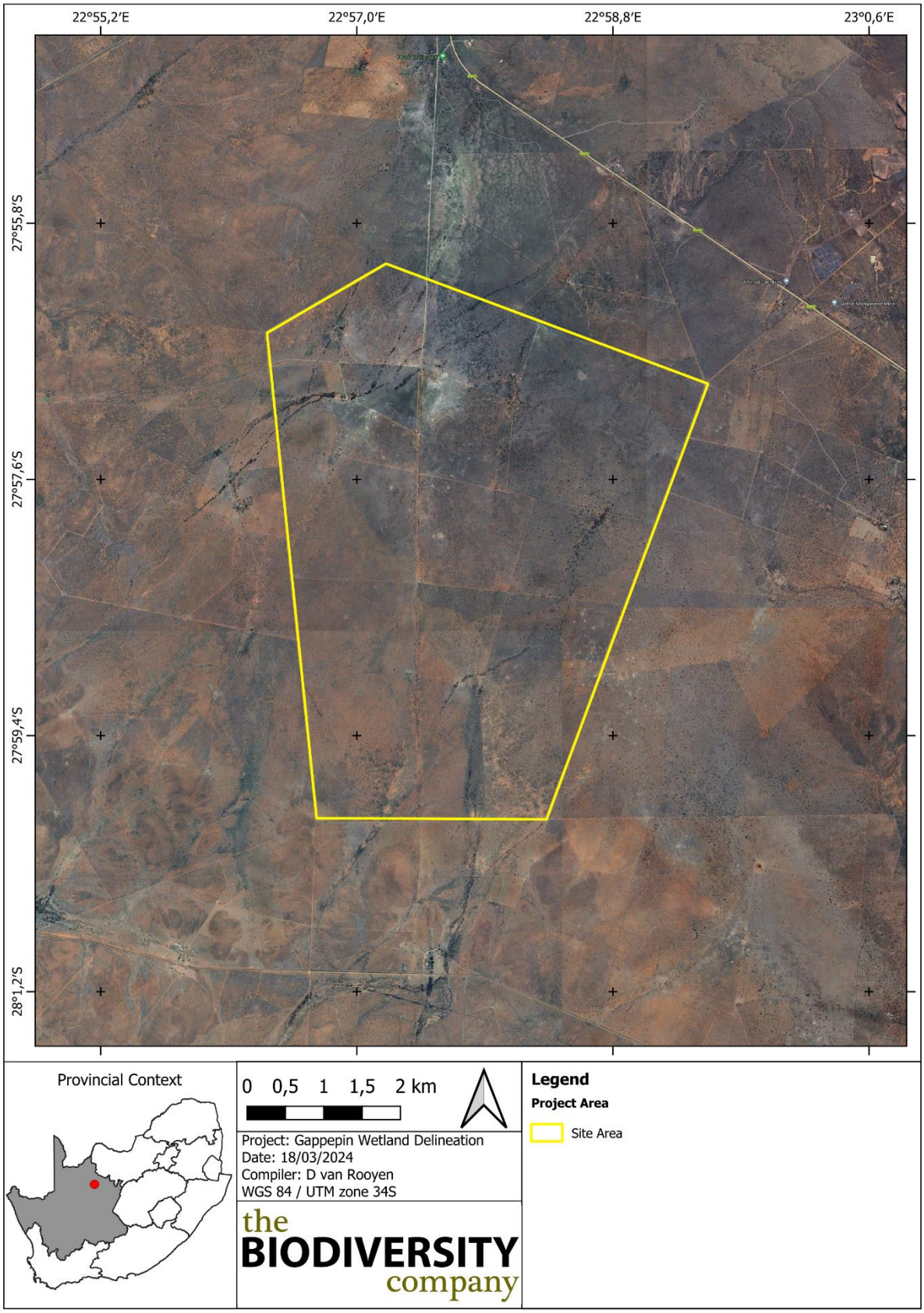


Figure 1-2 Map illustrating the project layout

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;
- Desktop assessment to identify the relevant ecologically important geographical features within the Project Area;
- Desktop assessment to identify the relevant ecologically important hydrological features within the Project Area;
- Completion of an initial impact assessment based on based on the desktop findings; and
- The prescription of mitigation measures and recommendations for identified risks.

1.3 Project Description

According to Prime Resources (2024), the prospecting right application includes non-invasive and invasive activities. Furthermore, the prospecting activities are expected to be undertaken over a period of three years.

The prospecting activities proposed include:

- Desktop research and literature reviews;
- Surface geological mapping;
- Geophysical surveys (ground magnetic and ground gravity techniques);
- Development of geological models; and
- Diamond drilled exploration boreholes.

In addition, further considerations for the invasive activities (exploration boreholes) include:

- If the outcomes of the above validation studies reveal the need for additional exploration drilling, up to 20 boreholes may be drilled across the site. Boreholes will likely be drilled to a depth of 50 – 100 m.
- The positions of exploration boreholes (i.e., the drilling grid) will be confirmed once the initial, non-invasive desktop studies (geological mapping) and geophysical surveys have been completed. In addition to the underlying geology, drillhole locations will take into account any environmental features (such as the presence of pans/wetlands) and proximity to existing access tracks. Areas identified as no-go areas include the 500 m regulated areas around the pans, pending confirmation of presence by specialist.
- Access tracks to the drill sites will be determined in consultation with the landowner. Where possible available access roads and tracks will be used. Potentially new access tracks may be required. Any new access roads developed must be less than 4 m wide and less than 1 km long.

- A 10 m x 10 m drill pad will be required per drill site for the drilling rig and sump. Drill pads will be cordoned off with danger tape or fences if required.
- Small volumes of consumables required for drilling will be stored at the drill pad. This may include biodegradable drilling fluid, portable diesel bowser and any required lubricants. Storage and handling of dangerous goods with a combined capacity of less than 30 m3 i.e. hydrocarbon storage (including diesel storage).
- Water and diesel required for borehole drilling activities will be sourced off-site.
- Cores will be taken to a temporary storage yard for logging, sampling and storage.
- Portable chemical toilets will be used for the management of sewage waste generated on site.
- Drill pads will be rehabilitated following the completion of exploration drilling at that position.

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 is accurate;
- No preliminary on-site inspection was carried out;
- For this desktop report, only the Project Footprint was considered and a wider Project Area of Influence (PAOI) will be considered for the field survey and subsequent impact assessment;
- The wetland delineations have been completed at a desktop level only, and must be followed by a field survey to verify the findings of the desktop assessment;
- The impact assessment was based only on the desktop information available;
- Planned drilling descriptions were provided, however, greater detail to prospecting activities is provided in the Basic Assessment Report (BAR); and
- Apart from the project site polygon, no spatial information was provided in relation to the layout of the proposed drill pads at the time of report preparation, therefore the impacts and their significance ratings should be revisited upon finalisation of a full project layout.

1.5 Key Legislative Requirements

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

Table 1-1 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	NEMA	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), Threatened or Protected Species Regulations	The protection of species and ecosystems that warrant protection
	Assessment Protocol (March 2020)	The minimum criteria for reporting.

	Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	NEMWA;	The regulation of waste management to protect the environment.
	NWA	The regulation of water uses.
	GN 1003 of GG 43726 of 18 Sept 2020	The regulation and management of alien invasive species.
	Conservation of Agricultural Resources Act (Act No. 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	Northern Cape Planning and Development Act (Act No. 7 of 1998)	To provide for the management and conservation of the Province's biophysical environment and protected areas.
	Northern Cape Critical Biodiversity Areas (NCDENC, 2016)	To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management,

1.6 National Water Act (NWA, 1998)

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

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

A watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

1.7 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the 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	6.4
Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae	6.4
A signed statement of independence by the specialist(s)	6.4
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.	2.1.6
The threat status of the ecosystem and species as identified by the screening tool	2.7.1
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)	2.1.6
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)	-
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:	3.1

(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes); (b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub-catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns); (c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary / seasonal / permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and (d) to what extent will the risks associated with water uses and related activities change.	
How will the proposed development impact on the functioning of the aquatic feature? This must include: (a) base flows (e.g., too little or too much water in terms of characteristics and requirements of the system); (b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g., seasonal to temporary or permanent; impact of over -abstraction or instream or off stream impoundment of a wetland or river); (c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g., change from an unchanneled valley-bottom wetland to a channelled valley -bottom wetland); (d) quality of water (e.g., due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication); (e) fragmentation (e.g., road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and (f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g., waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.)	3.1
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?	3.1
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	-
The methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant	6.1
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	2.5
Additional environmental impacts expected from the proposed development	-
Any direct, indirect and cumulative impacts of the proposed development on site	3
The degree to which impacts and risks can be mitigated	3.1.4
The degree to which the impacts and risks can be reversed	3.1.4
The degree to which the impacts and risks can cause loss of irreplaceable resources	3
A suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies	6.1.5
Proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	3.1.4
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	4.2
Any conditions to which this statement is subjected	4.2

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

2 Results & Discussion

2.1 Desktop Dataset Assessment

The desktop assessment was principally undertaken using a Geographic Information System (GIS) to access the latest available spatial datasets in order to develop digital cartographs. These datasets and their date of publishing are provided below.

2.1.1 Vegetation Types

The Project Footprint 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 Project Footprint overlaps predominantly with the Kathu Bushveld and Olifantshoek Plains Thornveld vegetation types. Furthermore, a small portion (southwest corner) of the footprint traverse the Kuruman Thornveld vegetation type (Figure 2-1). The following information pertaining to the Kathu Bushveld, Olifantshoek Plains Thornveld and Kuruman Thornveld is noted as per Mucina and Rutherford (2006):

The Project Footprint is predominantly located within the Kathu Bushveld (SVk 12) vegetation type. This vegetation type is located in the Northern Cape Province, specifically throughout the plains of Kathu and Dibeng in the south, the vicinity of the Frylinckspan, through Hotazel and towards the Botswana border (Mucina and Rutherford, 2006). This vegetation type is characterised by a medium tall tree layer with *Acacia erioloba* in places and predominantly includes the *Boscia albitrunca* as tree species. The dominant shrubs within this vegetation type are *A. mellifera*, *Lycium hirsutum* and *Diospyros lycioides* (Mucina and Rutherford, 2006).

The conservation status of the SVk 12 vegetation type is least threatened with a target percentage of 16. This vegetation type is not conserved in any conservation areas and is characterised by a loss of 1% due to mining activities (Mucina and Rutherford, 2006).

The Project Footprint also is predominantly located within the Olifantshoek Plains Thornveld (SVk 13) vegetation type. This vegetation type is located in the Northern Cape Province, specifically through the pediment areas of Korannaberg, Langeberg and Asbestos Mountains as well as some of those ridges to the west of the Langeberg. In addition, from the vicinity of Sonstraal in the north past Olifantshoek to the areas north of Niekerkshoop between Volop and Griekwastad in the south. Furthermore, from Griekwastad, this vegetation type stretches northwards to the flats west of the Lime Acres area (Mucina & Rutherford, 2006).

This vegetation type is characterised as a very wide and diverse unit on plains with usually open tree and shrub layers with, for example, *Acacia luederitzii*, *Boscia albitrunca* and *Rhus tenuinervis* and with a usually sparse grass layer (Mucina & Rutherford, 2006).

The conservation status of the SVk 13 vegetation type is least threatened with a target percentage of 16. Only 0.3% is conserved in the Witsand Nature Reserve while only approximately 1% of the area has been transformed and erosion is very low (Mucina & Rutherford, 2006).

Only a small portion (southwest corner) of the Project Footprint is located within the Kuruman Thornveld (SVk 9) vegetation type. This vegetation type is located in the North-West and Northern Cape Provinces, specifically on the flats in the vicinity of Postmasburg and Danielskuil (here west of the Kuruman Hills) in the south extending via Kuruman to Tsineng and Dewar in the north (Mucina & Rutherford, 2006).

This vegetation type is characterised with flat rocky plains and some sloping hills with a very well-developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba* (Mucina & Rutherford, 2006).

The conservation status of the SVk 9 is least threatened with a target percentage of 16. Furthermore, none is conserved in statutory conservation areas and only 2% is already transformed. The erosion within this vegetation type is very low (Mucina & Rutherford, 2006).

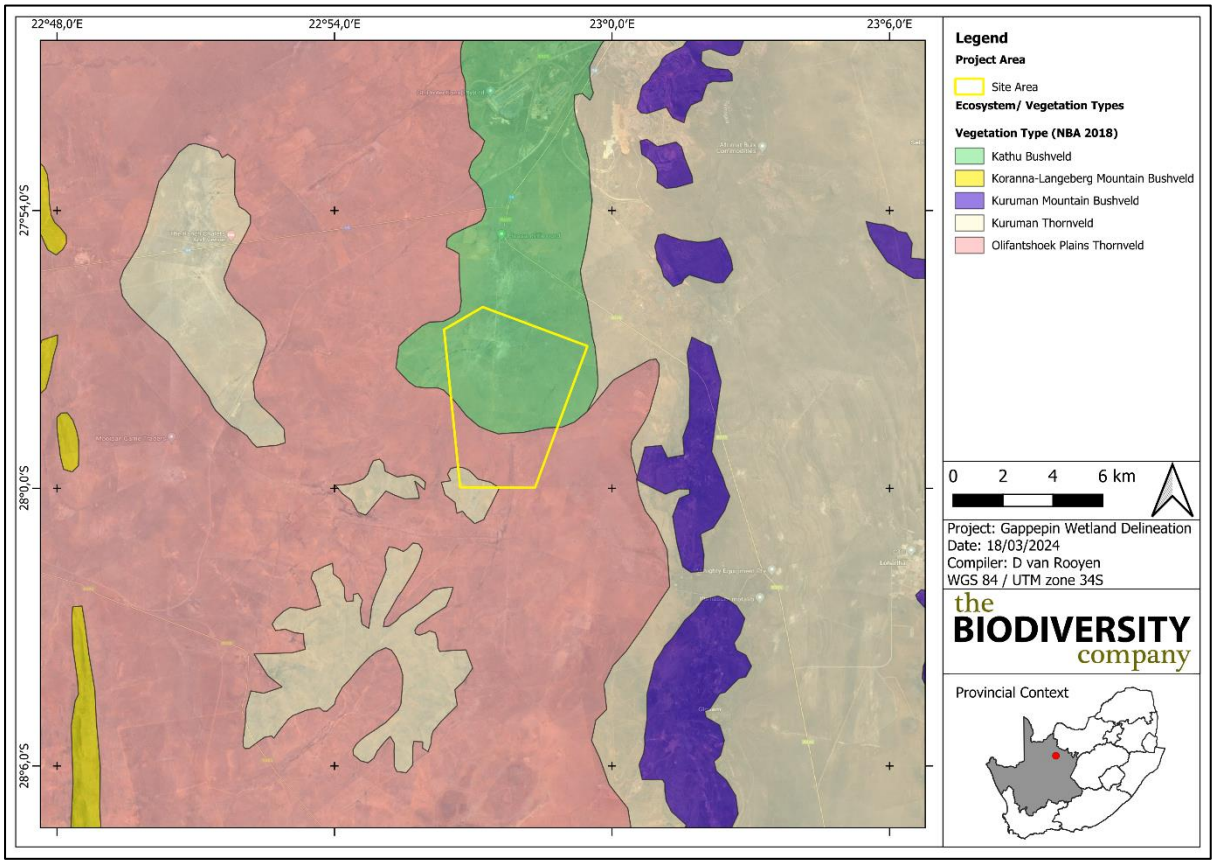


Figure 2-1 Vegetation type associated with the Project Area

2.1.2 Climate

This region is characterised by summer and autumn rainfall with very dry winters. The mean annual precipitation is approximately 220 to 380 mm with frost frequently occurring during winter months (Figure 2-2). The mean minimum and maximum temperatures for Sishen is 2.2℃ and 37℃ for July and December respectively. (Mucina & Rutherford, 2006).

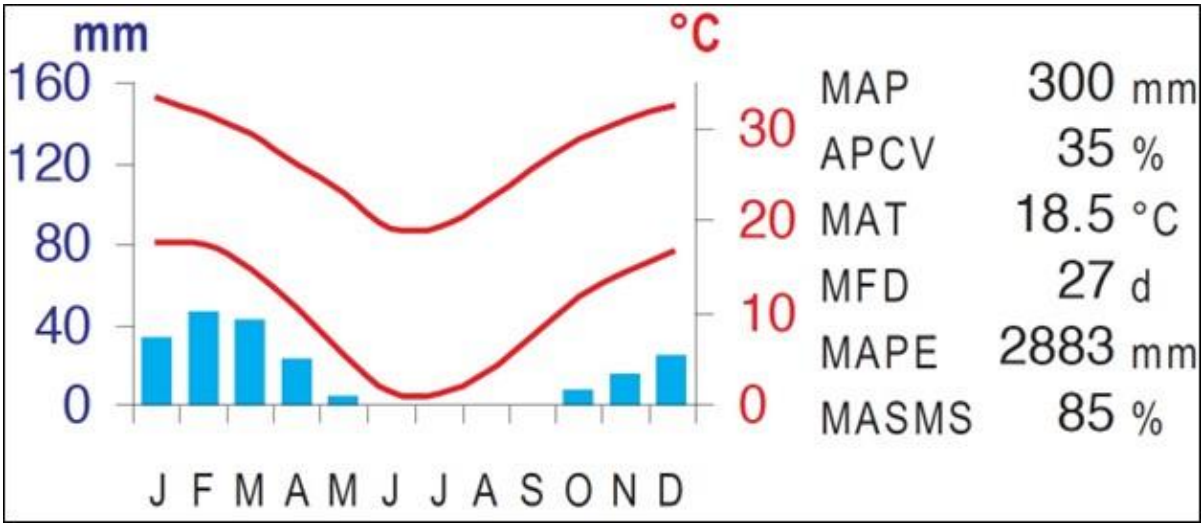


Figure 2-2 Climate for the Project Area based on the Kathu Bushveld (Mucina & Rutherford, 2006)

This region (Olifantshoek Plains Thornveld) is characterised by summer and autumn rainfall with very dry winters. The mean annual precipitation is approximately 200 to 350 mm with frost frequently occurring during winter months. The mean annual temperature for the region is recorded at 17.1℃ (Figure 2-3).

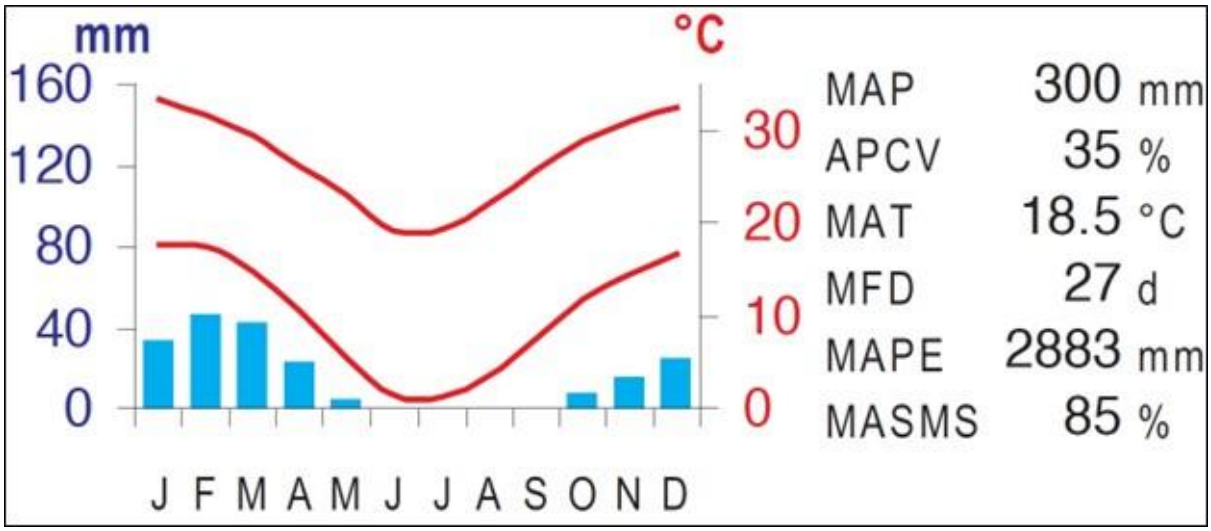


Figure 2-3 Climate for the Project Area based on the Olifantshoek Plains Thornveld (Mucina and Rutherford, 2006)

The region (Kuruman Thornveld) is characterised by summer and autumn rainfall with very dry winters. The mean annual precipitation is approximately 300 to 450 mm with frost occurring frequently in the winter months. The mean monthly maximum and minimum temperatures for Kuruman 35℃ and –3.3℃ for January and June, respectively (Figure 2-4).

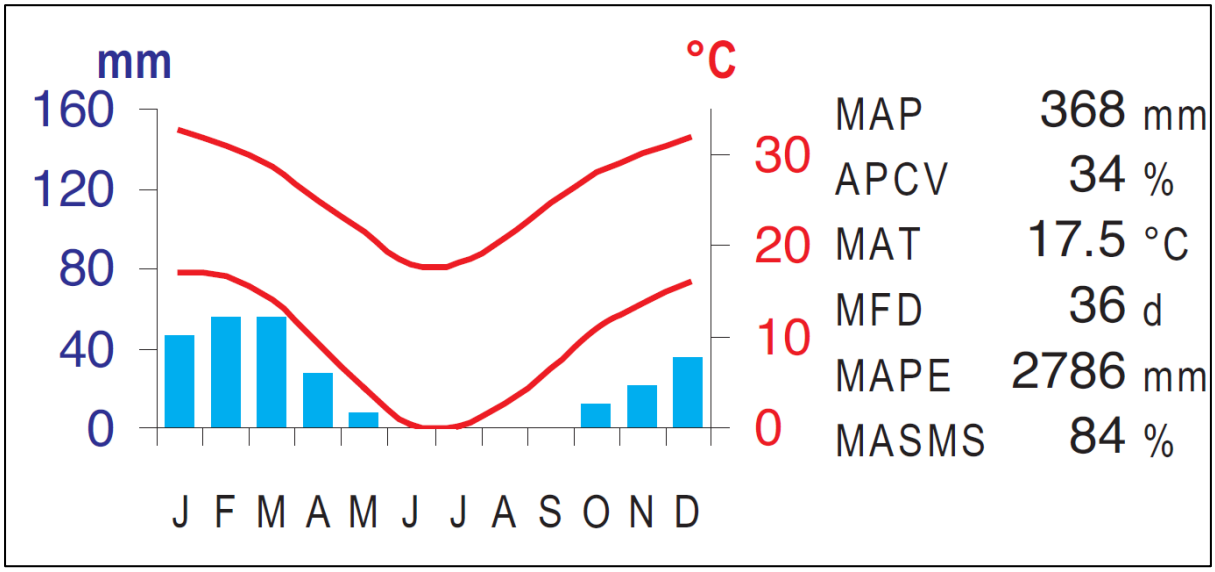


Figure 2-4: Climate for the Project Area based on the Kuruman Thornveld (Mucina and Rutherford, 2006)

2.1.3 Soils and Geology

According to the land type database (Land Type Survey Staff, 1972 - 2006), the Project Footprint is predominantly characterised by the Ag110 and Ae12 land types. In addition, a small portion (southwest corner) of the Project Footprint traverse the Ae7 and Ag109 land types. According to the land type database (Land Type Survey Staff, 1972 - 2006), the Ag land type consists of freely drained Red or Yellow-Brown Apedal soils with red soils being dominant. These soils are characterised by a high base status and is likely to be less than 300 mm deep. The Ae land type consists of red-yellow apedal soils which are freely drained. The soils tend to have a high base status and is deeper than 300 mm.

This region is predominantly characterised by aeolian red sand and surface calcrete, deep (>1.2 m) sandy soils of Hutton and Clovelly soils forms. Red aeolian sand of Tertiary to Recent age (Kalahari Group) with silcrete and calcrete and some andesitic and basaltic lava of the Griqualand West Supergroup also occurs predominantly within the Project Footprint. In addition, some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediments, with red wind-blown (0.3 – 1.2 m deep) sand also occurs in a small portion (southwestern corner) of the Project Footprint. Locally, rocky pavements are formed in places (Mucina and Rutherford, 2006).

2.1.4 Hydrological Characteristics

The Project Footprint falls within the Southern Kalahari Ecoregion, within the Vaal Water Management Area (WMA). At a finer scale, within the D41J quaternary catchment. The fine scale hydrological features are presented in the following section.

2.1.4.1 Topographical River Lines and Inland Water Areas

A few inland water areas have been identified within the proposed project site by means of the “2722” quarter degree square topographical river line data set (Figure 2-5). Within the proposed Project Footprint, the inland water areas have been identified dry pans. One non-perennial feature enters the Project Footprint to the south. In addition, a few non-perennial features are located in close proximity of the Project Footprint. Furthermore, no perennial features were identified within the Project Footprint.

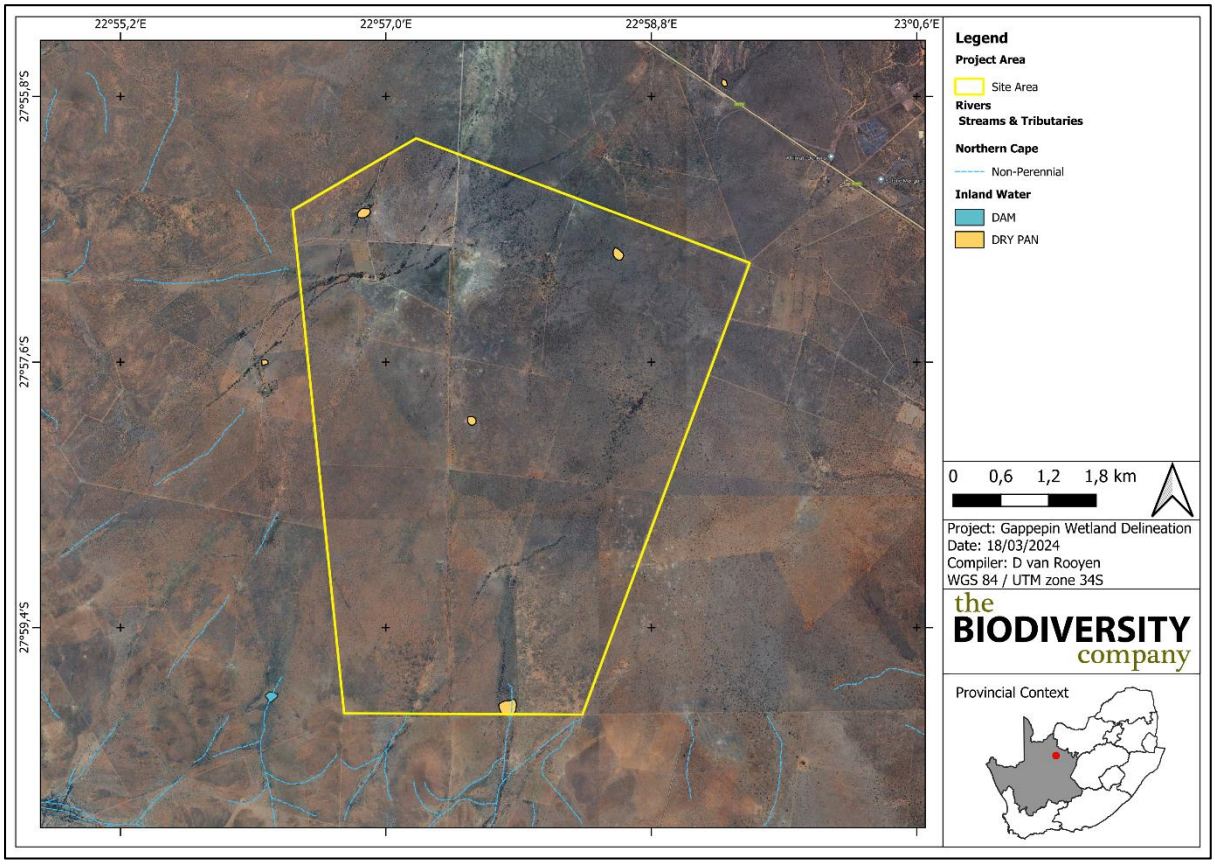


Figure 2-5 Topographical Drainage and Inland Water Areas relevant to the project

2.1.5 Terrain

The terrain of the Project Footprint has been analysed to determine potential areas where water is more likely to accumulate (due to convex topographical features, preferential pathways, or more gentle slopes).

A Digital Elevation Model (DEM) has been created to identify lower laying regions as well as potential convex topographical features which could point towards preferential flow paths. The Project Footprint ranges from 1 231 to 1 333 MASL. The lower lying areas (generally represented in dark blue) represent the area that will have the highest potential to be characterised as wetlands (Figure 2-6).

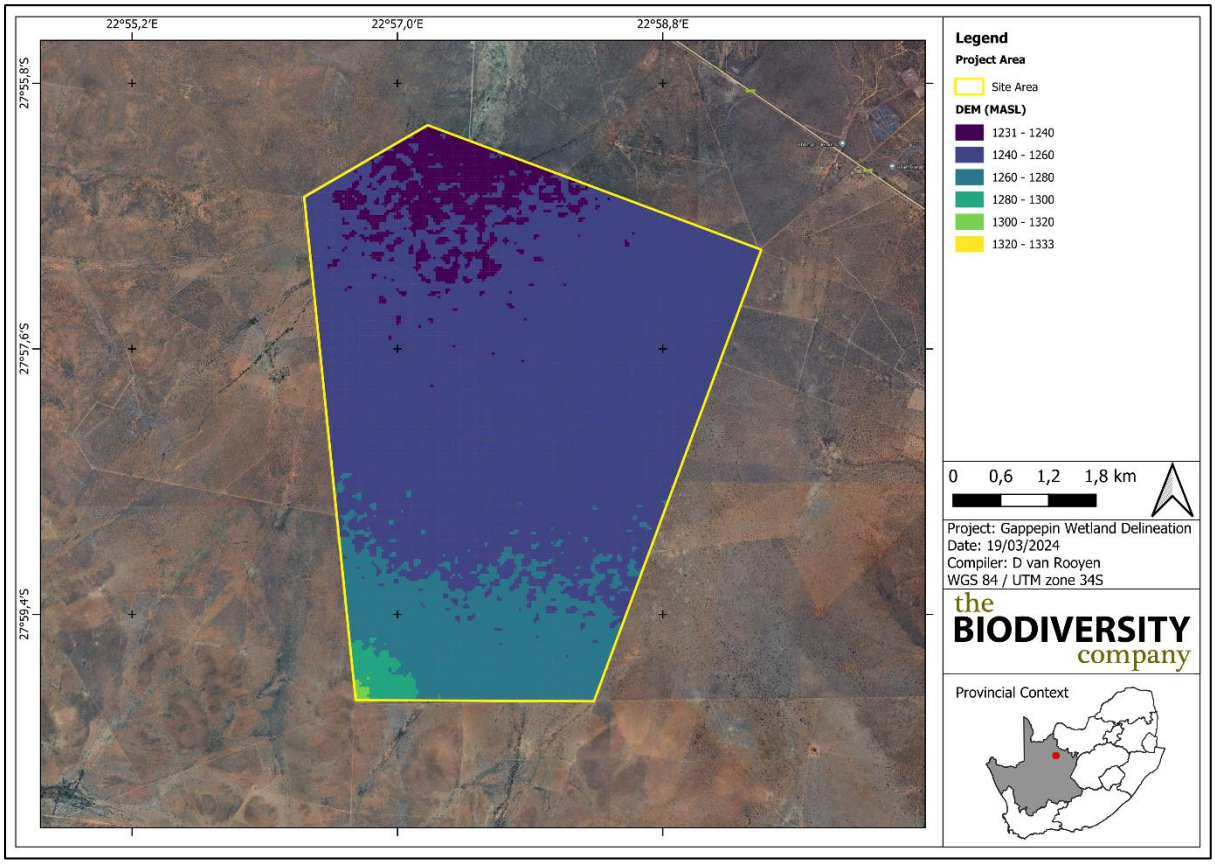


Figure 2-6 Digital Elevation Model for the Project Area of Influence

2.1.6 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 2-1.

Table 2-1 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 does overlap with NBA water resources (Wetlands).	2.1.6.1
National Freshwater Priority Area	Relevant – PAOI overlaps with NFEPA wetlands.	2.1.6.2
Strategic Water Source Areas	Relevant – PAOI overlaps with SWSA (Groundwater).	2.1.6.3
Provincial Conservation Plan	Relevant – POAI overlaps with Ecological Support Areas.	2.1.6.4

2.1.6.1 South African Inventory of Inland Aqautic Ecosystems

No river was identified by means of this dataset; however, four wetlands (depression) were identified within the Project Site (Figure 2-7).

The depression wetlands do not typically possess more than one of the key indicators typically associated with wetlands in South Africa, specifically, hydrophytic vegetation, they are nevertheless deemed to be potentially ecologically important and may play a significant role in the ecology of the area. The soils of temporary wetlands in arid regions, such as the project area, are often too temporarily inundated to exhibit typical wetland indicators. These temporary wetlands cannot reliably be identified or delineated using the wetland indicators.

There has been minimal research on wetland systems within arid areas, and little is known about the biodiversity associated with such systems. These temporary wetlands support plants and animals that are highly seasonal, most of which that are not visible outside of periods of inundation. These temporary waters may support an abundance of organisms ranging from bacteria to vertebrates. However, when there is water within the system, the most common inhabitants are usually invertebrates, particularly crustaceans and insects (mostly Branchiopods, but also Phyllopods). These invertebrates are considered keystone species of ephemeral pans globally, playing a pivotal role in the food web as prey (Henschel; unknown date of publication).

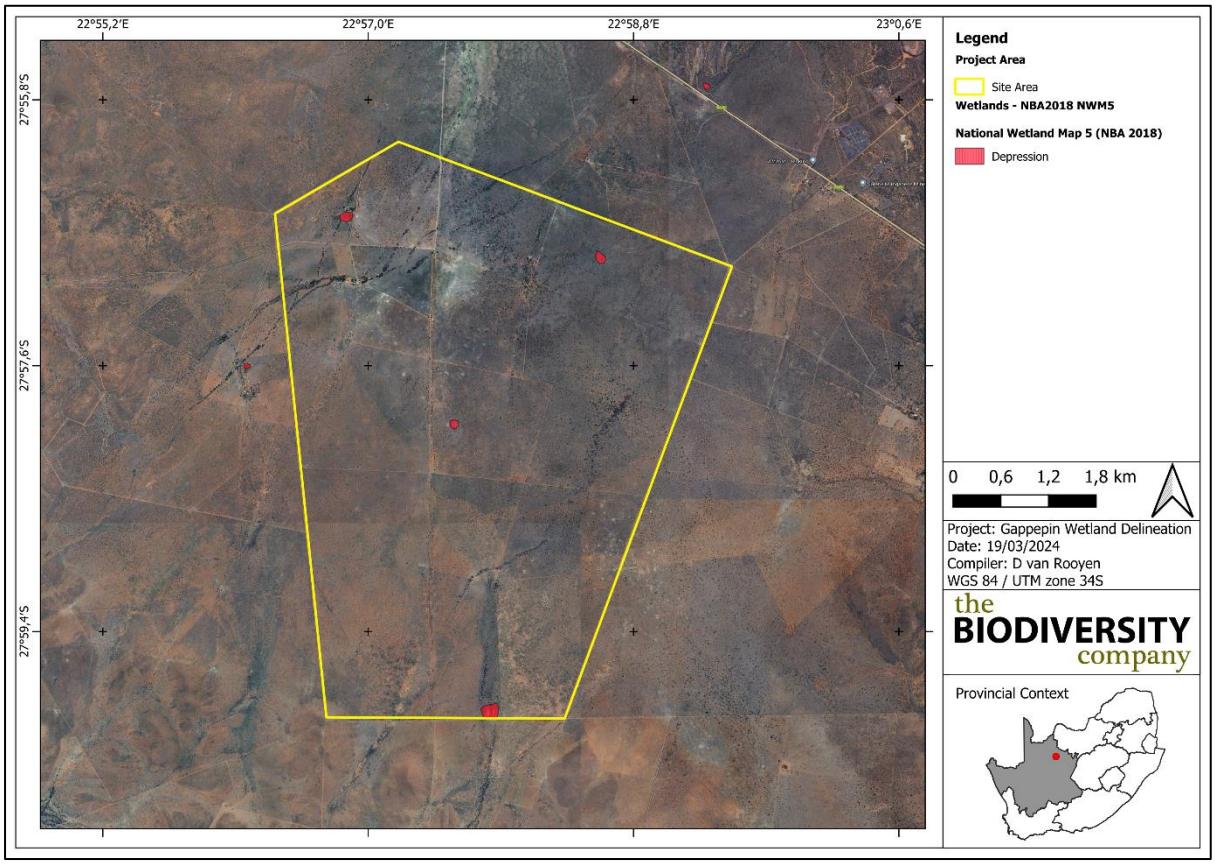


Figure 2-7 South African Inventory of Inland Aquatic Ecosystems in relevant to the project

2.1.6.2 National Freshwater Ecosystem Priority Areas

One NFEPA wetland type was identified within the project footprint, namely a depression wetland (Figure 2-8). Wetlands were classified to be natural, unclassified wetlands. All natural wetlands were classified within the “AB – more than or equal to 75% of natural land cover remaining” category, as per the dataset.

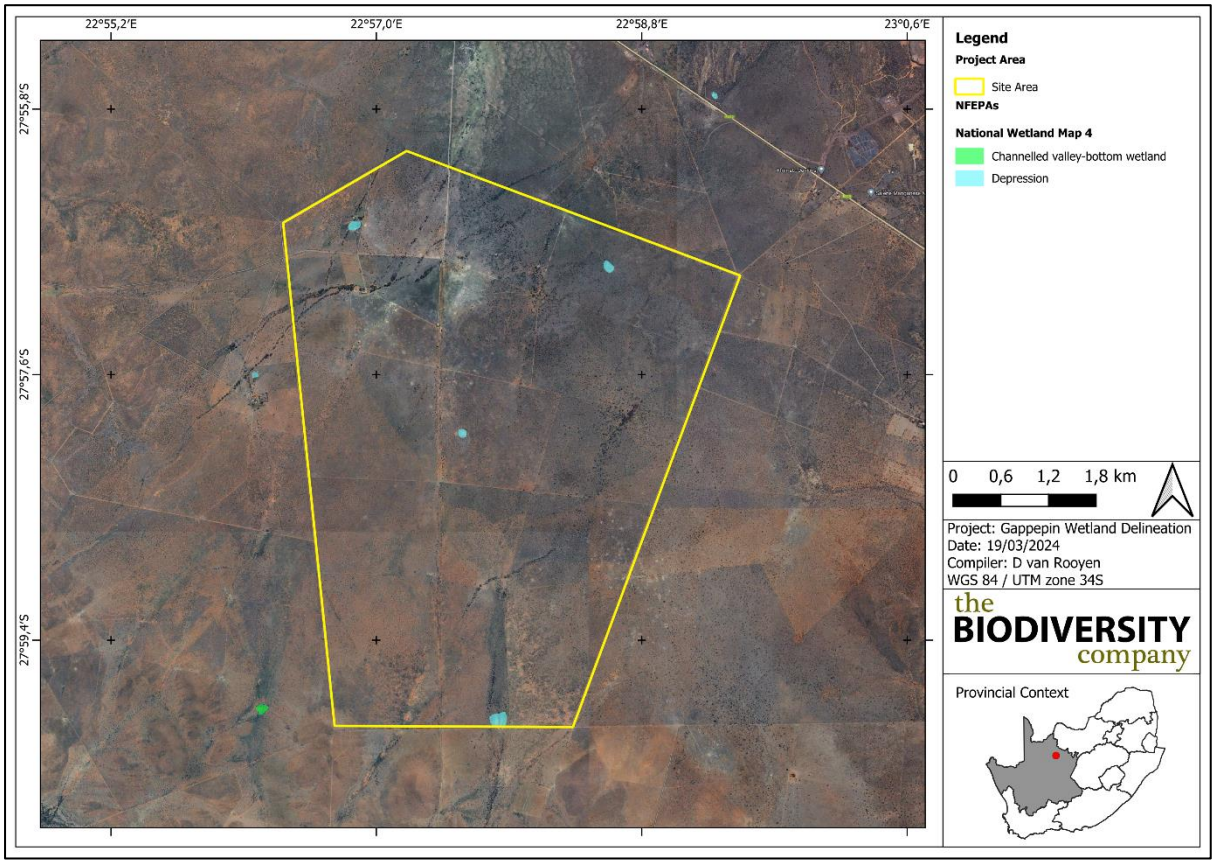


Figure 2-8 NFEPA Wetlands in relevant to the project

2.1.6.3 Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) are areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. The areas supplying ≥ 50% of South Africa's water supply (which were represented by areas with a mean annual runoff of ≥ 135 mm/year) represent national Strategic Water Source Areas (SANBI, 2013). Groundwater and interflow play a key role in sustaining surface water flows during the dry season and account for up to 42% of river baseflow, thereby sustaining aquatic and water-dependent biota. Therefore, the protection and management of these areas are imperative (Le Maitre *et al*., 2018). According to the SWSAs of South Africa, Lesotho and Swaziland, the Project Footprint is not located within the SWSAs for surface water (Lotter and Le Maitre, 2021), however, the Project Footprint is located within the SWSA for groundwater (Sishen/Kathu; Le Maitre *et al*., 2018)

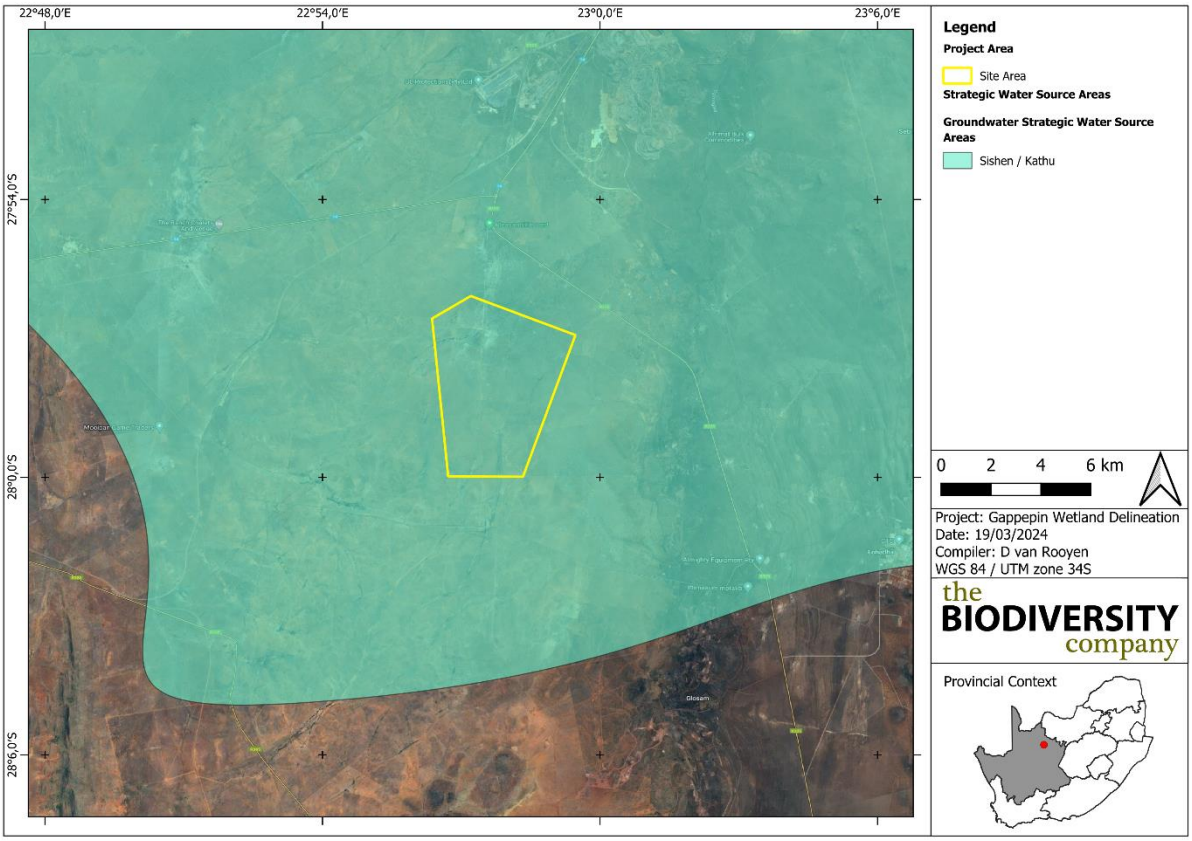


Figure 2-9 Strategic Water Source Areas in relevant to the project

2.1.6.4 Northern Cape Biodiversity Spatial Plan

The Northern Cape Biodiversity Spatial Plan (NCBSP) Map for freshwater biodiversity (SANBI, 2016) was considered for the project area. It was drafted by the Northern Cape Department of Environment and Nature Conservation to identify the Critical Biodiversity Areas (CBAs) which were undertaken using a Systematic Conservation Planning approach. The Project Site is mainly comprised of areas classified as "Other Natural Areas" (ONAs) with the footprint overlapping with areas classified as "Ecological Support Areas" (ESAs; Figure 2-10). These ESAs are associated with wetlands (depressions).

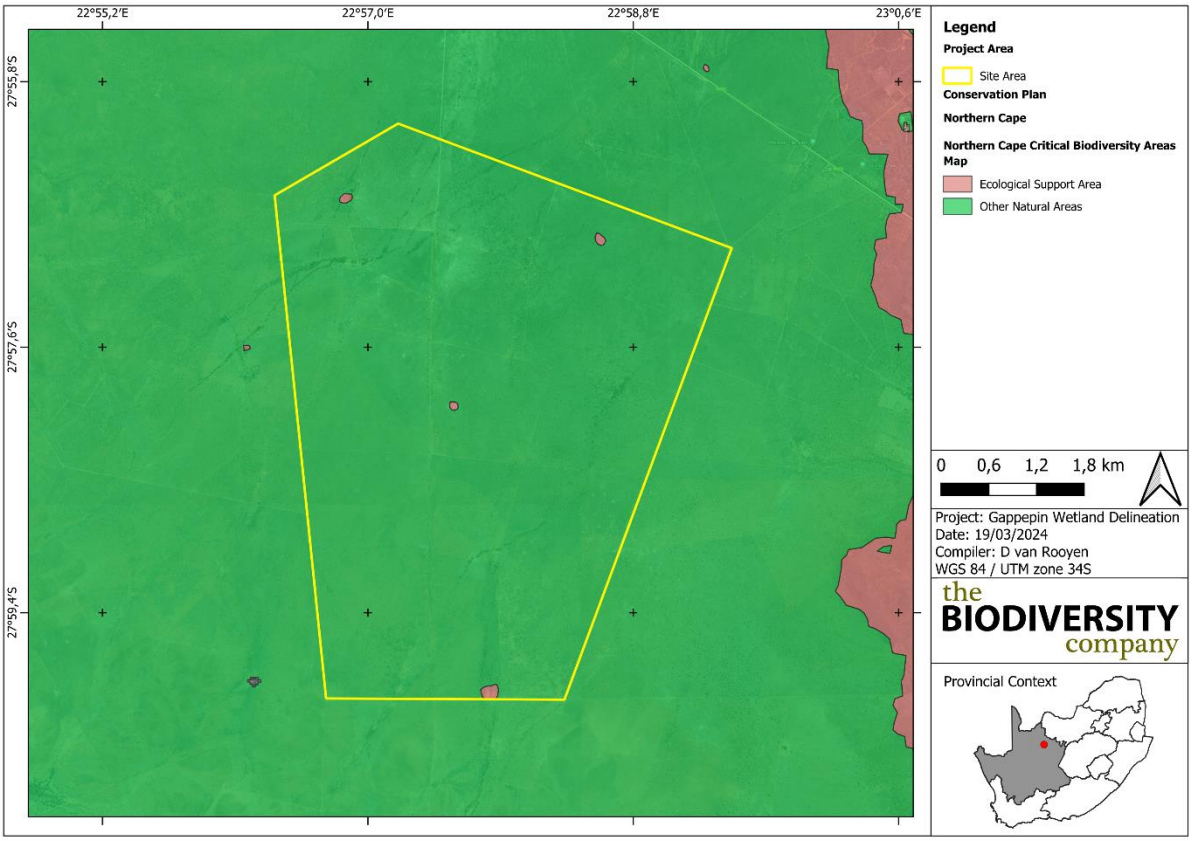


Figure 2-10 Northern Cape Biodiversity Spatial Plan in relevant to the project

2.2 Historical Imagery of Watercourses

2.2.1 HGM 1 – Depression (northwest portion)

Historical Google Earth Imagery was utilised as a tool to corroborate the findings of the Desktop spatial data. Imagery was used to identify areas of with potential signs of "wetness" within the Project Site. According to latest Google Earth Imagery, a potential wetland unit is located in the northwestern portion of the Project Site (Figure 2-11). Imagery has indicated the signs of wetness through water within the depression during 07/02/2016, 05/05/2018 and 04/2022. Furthermore, areas within and around the unit were also 'greener' during the higher rainfall seasons. This coincides with the NBA 2018 NWM5 spatial data. Please refer to Figure 2-15 for location of HGM 1 within the project footprint.

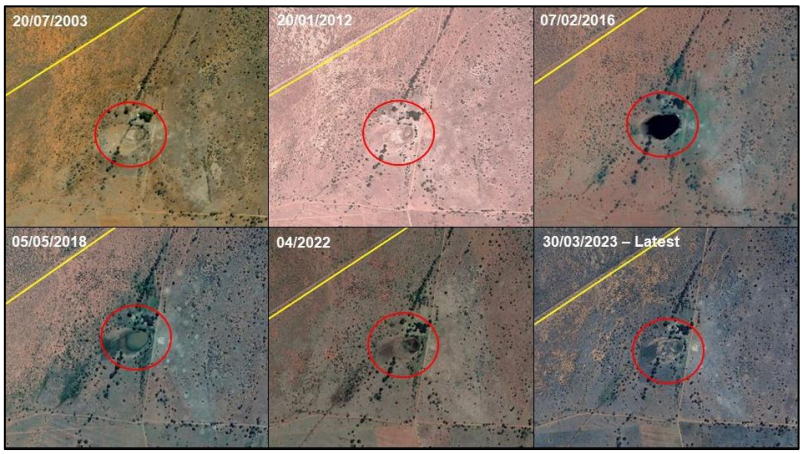


Figure 2-11 Historical imagery of HGM 1 (highlighted by a red circle) located in the northwestern portion of the Project Site (yellow line)

2.2.2 HGM 2 – Depression (northeastern portion)

Google Earth Imagery did indicate signs of wetness in the northeastern portion of the Project Site (Figure 2-12). During April 2022, the rainy season, a small pool can be seen on Google Earth Imagery. Furthermore, during the rainy season, areas within and around the depression are 'greener' than the surrounding areas. This coincides with the NBA NWM 5 dataset. Please refer to Figure 2-15 for location of HGM 2 within the project footprint.

Figure 2-12 Historical imagery of HGM 2 (highlighted by a red circle) located in the northeastern portion of the Project Site (yellow line)

2.2.3 HGM 3 – Depression (Central)

Google Earth Imagery indicated signs of wetness through 'greener' areas within the depression unit (Figure 2-13). This was especially evident during the high rainy season (02/07/2016 and 05/05/2028). This coincides with the NBA 2018 NWM 5 spatial dataset. Please refer to Figure 2-15 for location of HGM 3 within the project footprint.

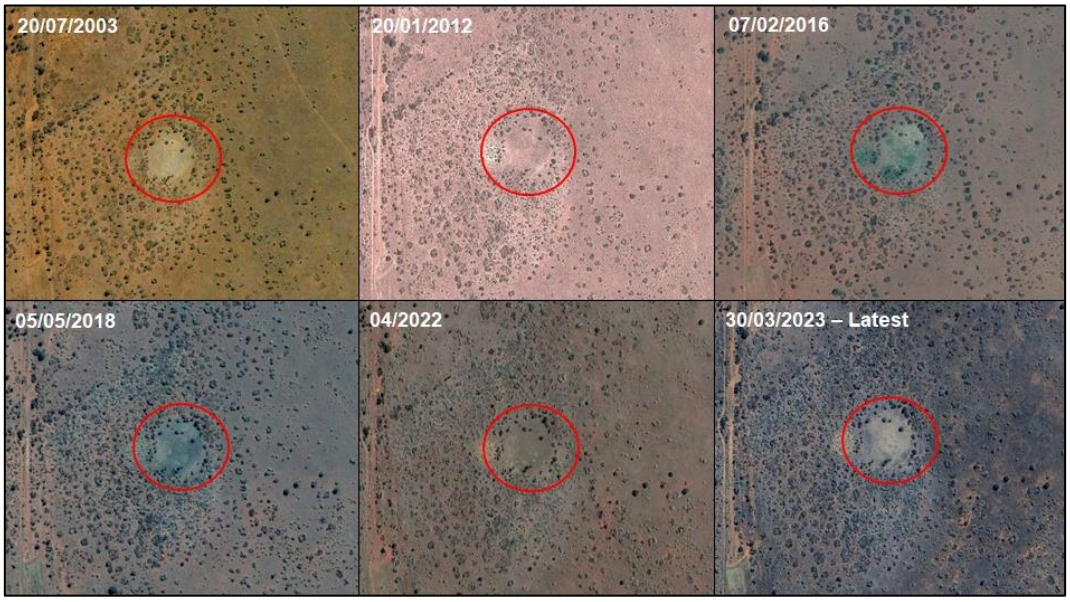


Figure 2-13 Historical imagery of HGM 3 (highlighted by a red circle) located in the central portion of the Project Site

2.2.4 HGM 4 – Depression (southeastern portion)

According to the NBA NWM5 datasets, another depression is located in the southeastern portion of the Project Site and Google Earth Imagery confirms the possibility of a depression (see Figure 2-14 below). During the summer, high rainfall periods (07/02/2016, 05/05/2018 and 04/2022), areas around highlighted area are 'greener' than the surrounding areas. Please refer to Figure 2-15 for location of HGM 4 within the project footprint.

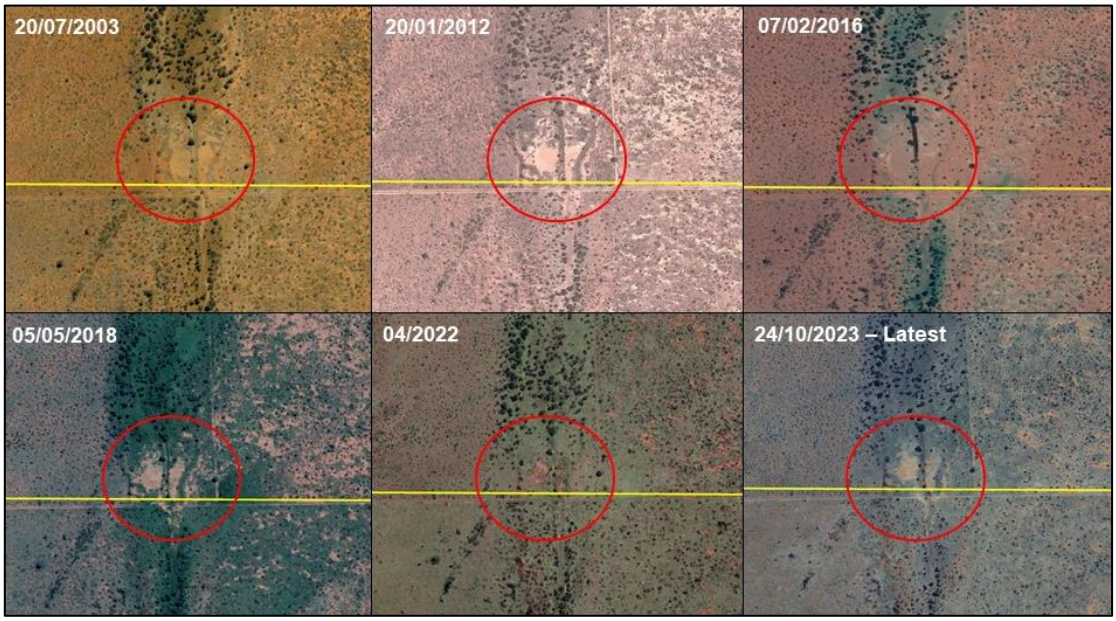


Figure 2-14 Historical imagery of HGM 4 (highlighted by a red circle) located in the southeastern portion of the Project Site

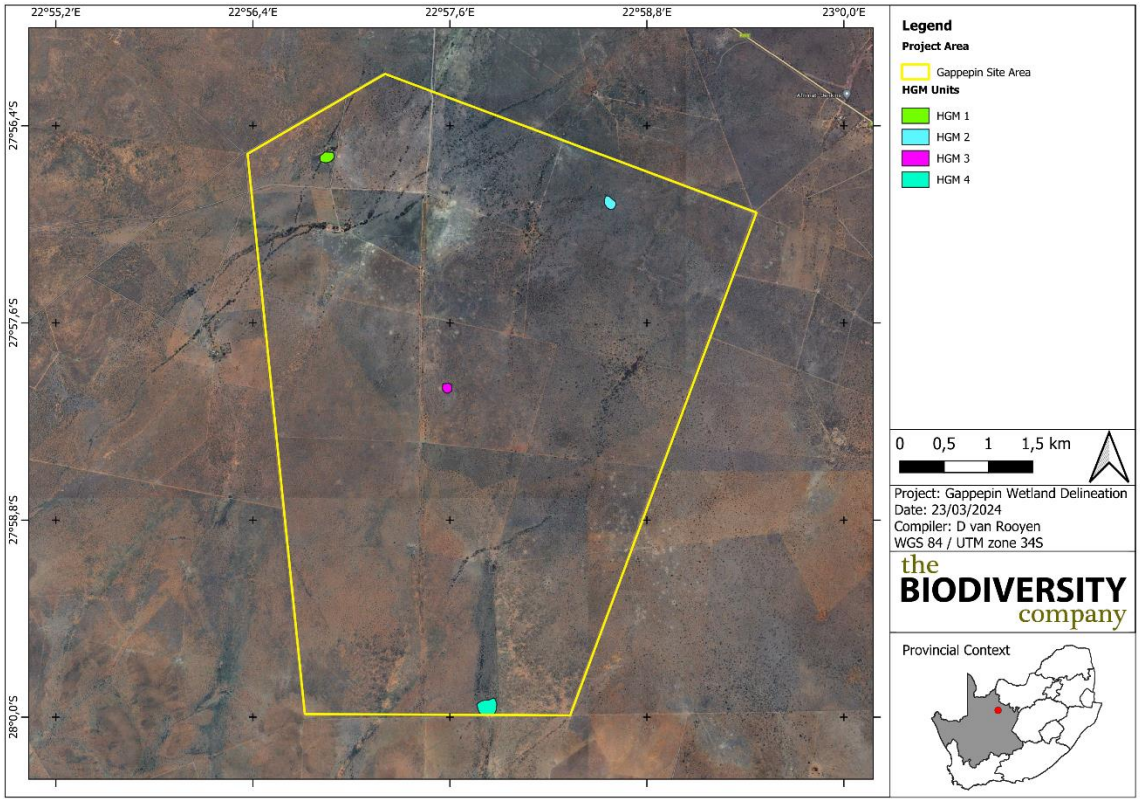


Figure 2-15 Location of HGM units in relevant to the project

2.3 Other Potentially Wet Areas

In terms of the remaining Project Footprint, historical imagery has shown potential signs of wetness that was not highlight by the spatial datasets (Figure 2-16). These areas may be episodic drainage lines or potential wetlands. These historic images were taken on 05/05/2018. Figure 2-17 highlights the location of these other potentially wet areas in relevant to the project.

Figure 2-16 Other potentially wet areas in relevant of the project

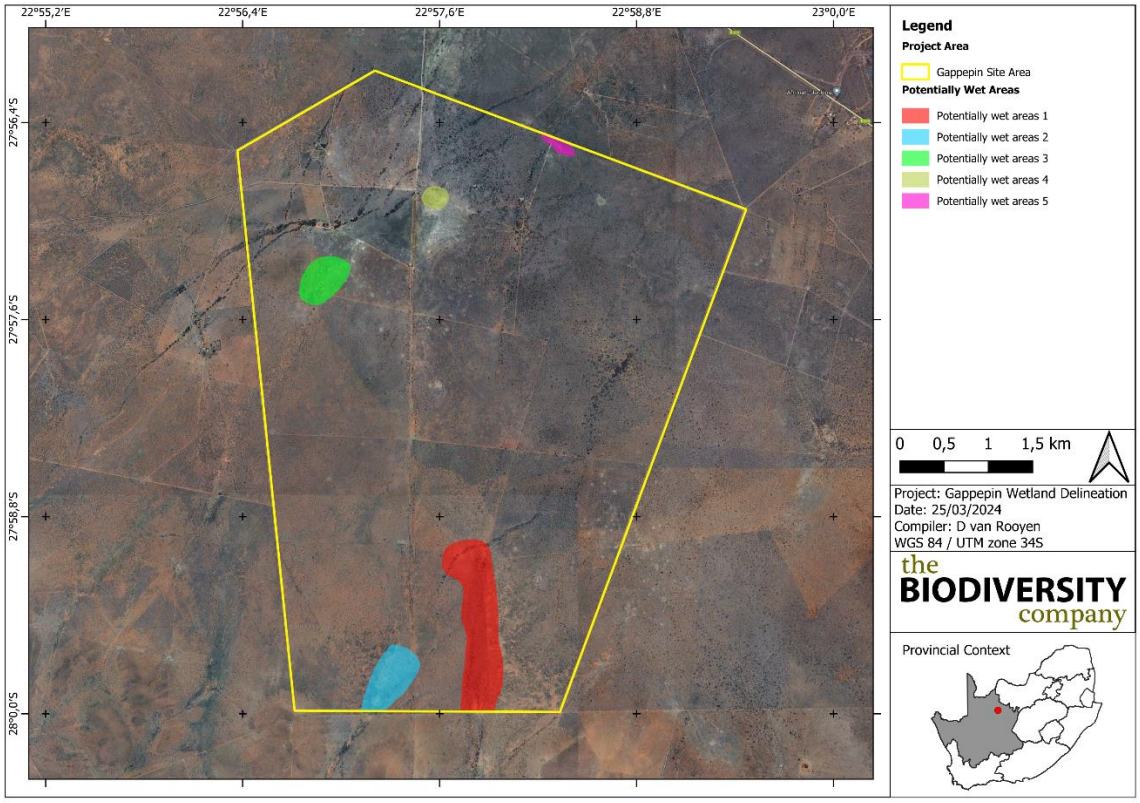


Figure 2-17 Other potentially wet areas in relevant to the project

2.4 Risk Screening

Table 2-2 and Figure 2-18 provides the results of risk screening for the desktop delineated wetlands and provides motivation for each of the determined categories. This does not include other unverified areas within the footprint.

Table 2-2 Risk status of the desktop delineated wetlands

HGM unit	Risk Status	Rationale
HGM 1 HGM 2 HGM 3 HGM 4	At Risk	These HGM units were identified to wholly or partially overlap with the proposed development area and, has therefore been determined as "At Risk". If the proposed development layout cannot be amended to avoid the wetland and its calculated buffers, it is anticipated that direct impacts to the wetland and consequent modifications to system will occur.
HGM 5	Not at Risk	This system is located out of the proposed development area and a considerable distance away; therefore, they are considered to be "Not at Risk".

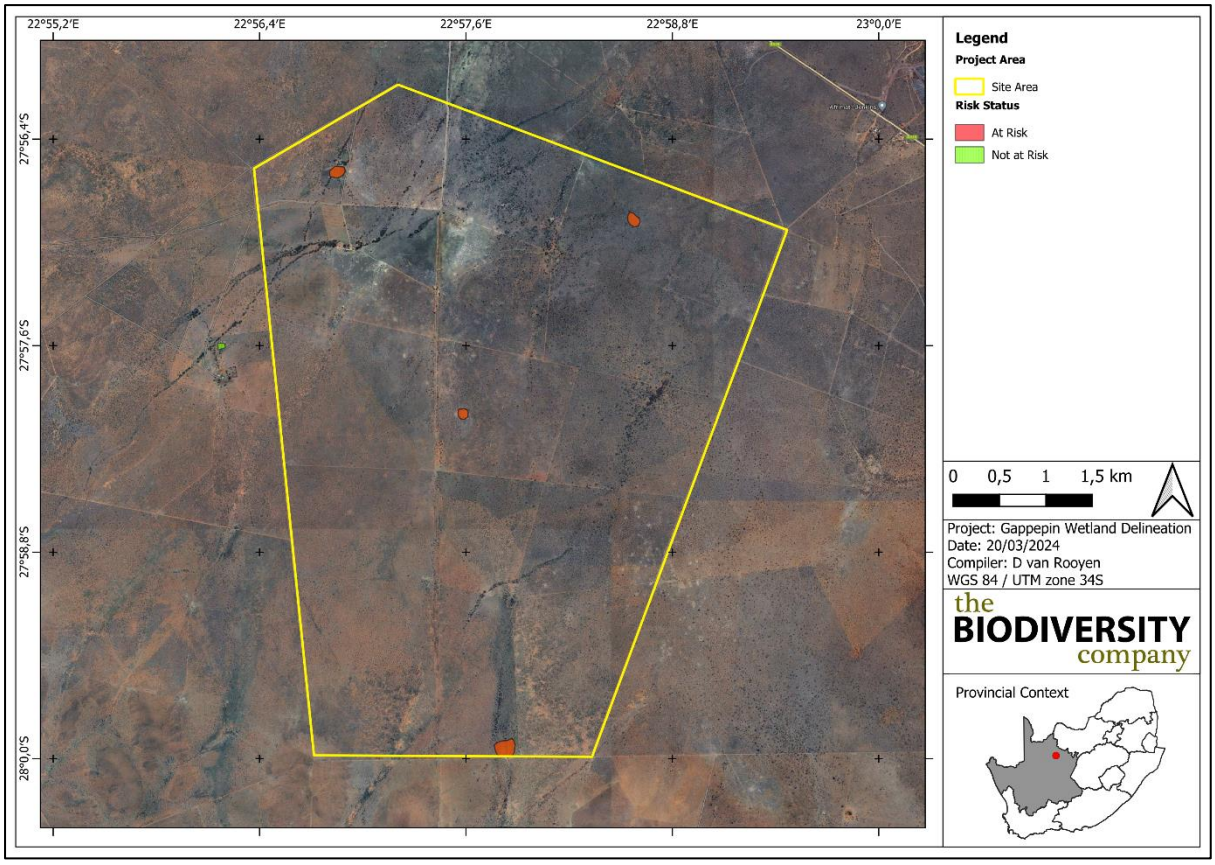


Figure 2-18 Risk status of the desktop delineated wetlands

2.5 Buffer Requirements

The buffer requirements (Figure 2-19) 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 were calculated and are presented in Table 2-3 below. The soil type and erodibility within the wetlands was also considered in this assessment and contributed to the calculated buffer widths. The Desktop buffer for the wetlands were calculated to be 500 m and a 32 m buffer was

determined using the Determination of buffer zone tool. In addition, a 32 m buffer was determined for the potentially "wet" areas.

Table 2-3 Buffer requirements for the relevant wetland features

Aspect	Desktop Buffer	Sensitivity Buffer
Prospecting Rights Footprint	500 m	32 m

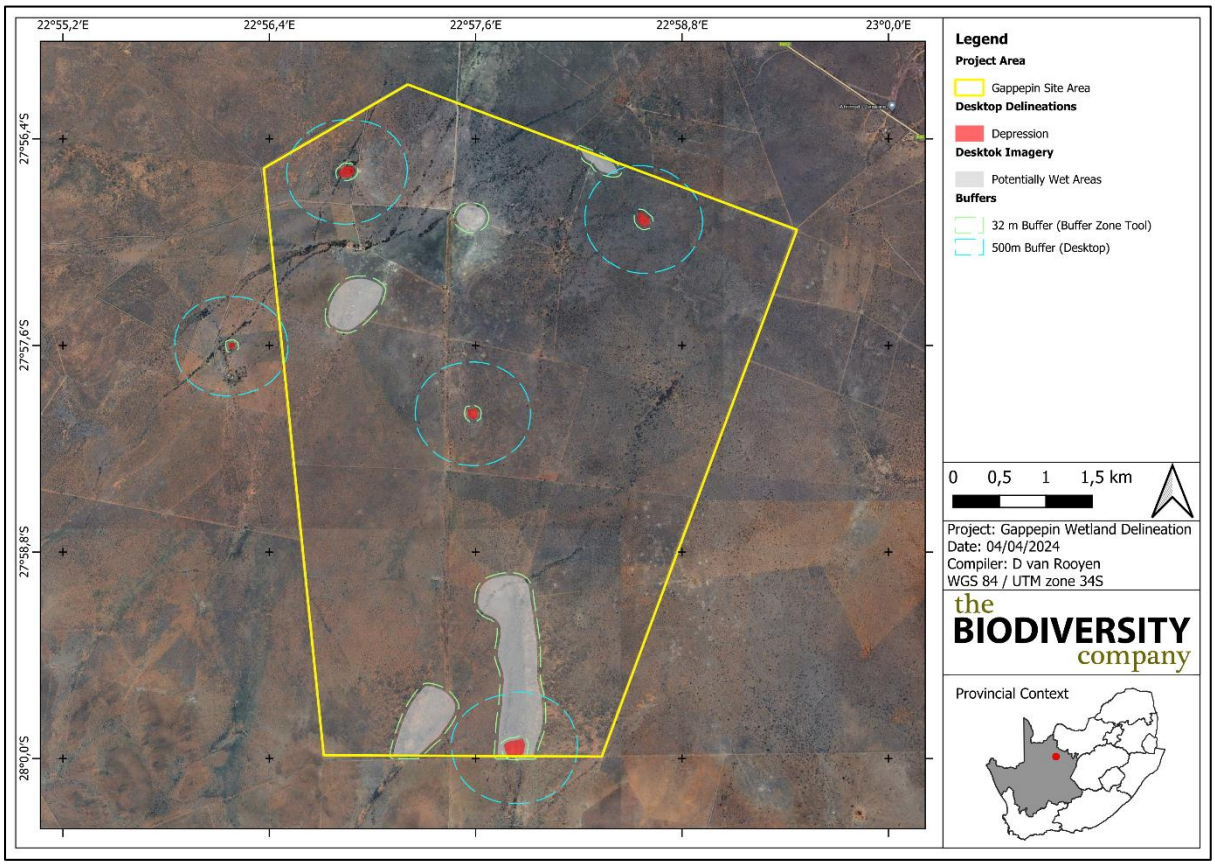


Figure 2-19 Recommended Buffers for the identified wetlands and potentially "wet" areas in relation to the proposed development

Regulation Zones

Table 2-4 presents the legislated zones of regulation that would be applicable to the wetland areas.

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

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

Table 2-4 Legislated zones of regulation

Regulatory authorisation required	Zone of applicability
Water Use License Application in terms of the	Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998).

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. Excluding – … (dd) where such development occurs within an urban area… Activity 19 of Listing Notice 1 (GN 327) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) EIA regulations, 2014 (as amended) states “The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.”

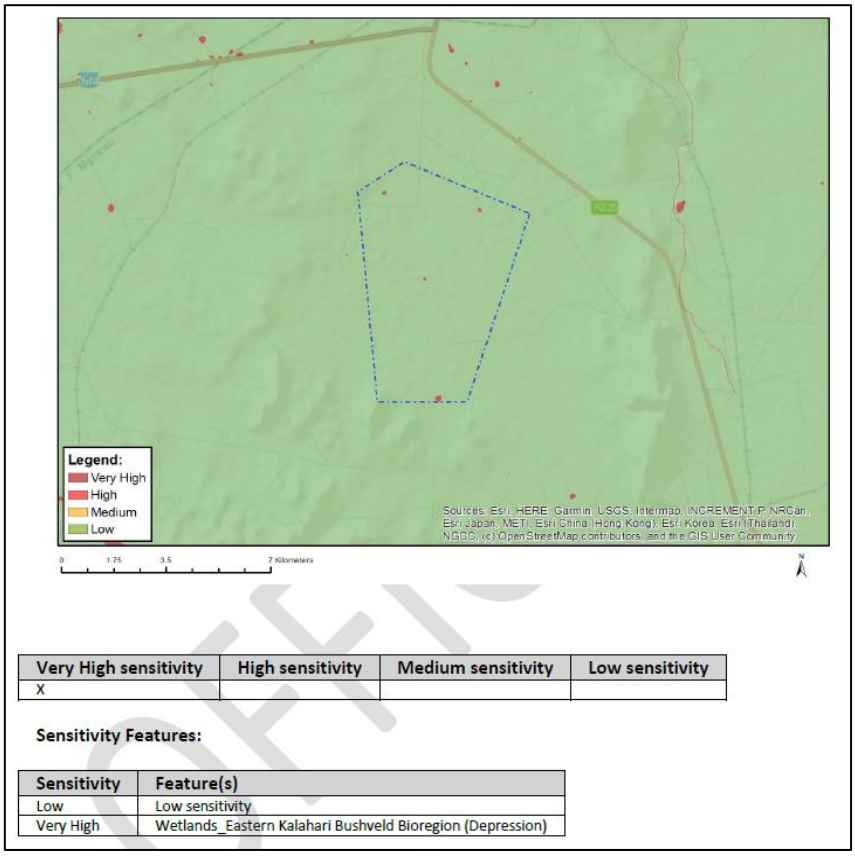
2.6 Site Sensitivity Verification

2.6.1 Desktop Ecological Senstivity

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

- Aquatic Biodiversity Theme sensitivity as “Very High” for small portions of the Proposed Site, assigned for the presence of Depressions, with the remainder of the site classed as “Low” if the Proposed Site do not avoid the “Very High” sensitivities (Figure 2-20).

- Aquatic Biodiversity Theme sensitivity as “Low sensitivity” for the entire Project Site when the site avoids “Very High” sensitivities, the assigned “Very High sensitivity” is attributed to the depressions located within 500 m of the Project Site (Figure 2-21).

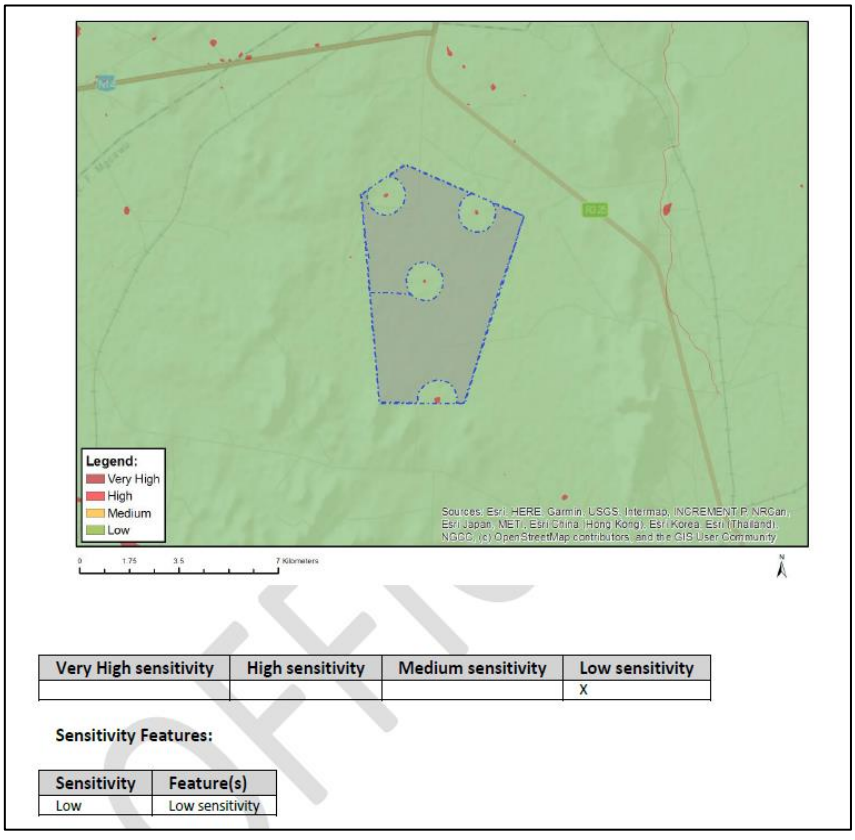


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Wetlands_Eastern Kalahari Bushveld Bioregion (Depression)

Figure 2-20 Aquatic Biodiversity Theme Sensitivity



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

Figure 2-21 Aquatic Biodiversity Theme Sensitivity

2.6.2 Screening Tool Validation

The allocated sensitivities for each of the Aquatic Biodiversity Theme as present in Figure 2-20 and Figure 2-21 are validated for the overall Project Site as the desktop assessment revealed the presence of depressions. These depressions were assigned a “Very High” sensitivity within the Aquatic Biodiversity Theme. If the Project Site cannot avoid the “Very High” sensitivities, the Aquatic Biodiversity Theme is therefore validated (Figure 2-20). However, Figure 2-21 highlights that when the Project Site avoids these “Very High” sensitivities, the “Low” Aquatic Biodiversity Theme sensitivity for the overall Project Site is validated.

The proposed project is for the Prospecting Right Application for mineral resources. Development-related activities can have significant impacts on biodiversity and ecosystem services, often causing irreversible and large-scale habitat loss across large areas or areas important for the provision of important ecosystem services. Wetlands within arid regions are regarded as highly sensitive watercourses as they are potentially ecologically important and may play a significant role in the ecology of the area. Furthermore, these temporary wetlands support plants and animals that are highly seasonal, most of which that are not visible outside of periods of inundation. In addition, they may further support an abundance of organisms ranging from bacteria to vertebrates. Within these systems, invertebrates are most commonly found and are considered keystone species of ephemeral pans globally, playing a pivotal role in the food web as prey (Henschel; unknown date of publication).

The project must take cognisance of this and avoid any unnecessary disturbance of the watercourses and adjacent habitat as these serve as intact ecological corridors while offering foraging, nesting and refuge areas for terrestrial biota and serve to filter baseflows below ground recharging downstream areas.

3 Desktop Risk and Impact Assessment

The section below and associated tables serve to indicate and summarise the significance of perceived project related impacts on the freshwater resources of the project area. Potential impacts were evaluated against the data captured during the desktop assessment to identify relevance to the project area. The relevant impacts associated with the proposed project related activities were then subjected to the DWS risk assessment methodology to determine the impact significance with and without mitigation (Table 3-2). Importantly, a risk and impact assessment were only conducted for the desktop identified watercourses and does not include areas that may potentially be “wet” and should be verified with a detailed field assessment.

Alternatives Considered

No alternative sites were provided for the proposed development and this assessment at this stage of the project.

3.1 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 3-1). 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.

Three levels of risk have been identified and considered for the overall risk assessment, these include high, medium, and low risks. High risk refers to where impacts will occur inside the wetlands while medium risk refers to wetland areas where the impacts will only occur inside the wetlands buffer and not on the wetlands themselves. Low risks are wetland systems where both the wetlands and their buffers are avoided by the proposed activities.

For this assessment, the specialist was provided only with the development boundary for the prospecting right application. Due to being a Desktop Assessment, the specialist focussed on the wetlands within the Proposed Site. It is assumed that the proposed development (prospecting right application) will avoid the desktop delineated wetlands.

A Risk / Impact Assessment was undertaken for the entire Project Site.

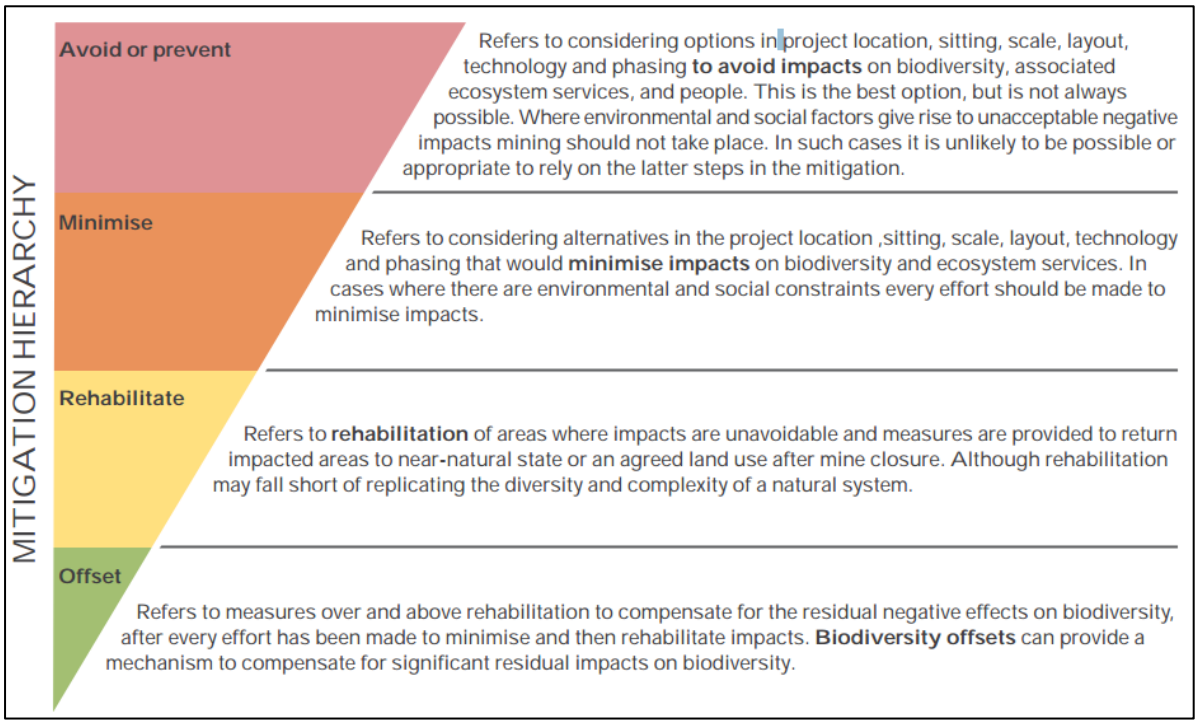


Figure 3-1 The mitigation hierarchy as described by the DEA (2013)

3.1.1 Potential Aniticipated Impacts

Table 3-1 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 3-1 Aspects and impacts relevant to the proposed activity

Activity	Aspect	Impact
Construction and Operation Phase	Clearing of vegetation for project infrastructure	Direct or indirect loss of wetlands; Increased bare surfaces, runoff and potential for erosion; Introduction of alien and invasive vegetation; Increased sediment loads in wetlands; Decrease in wetland functionality; Degradation of ecological integrity and ecosystem services; Contamination of wetlands with hydrocarbons due to leaks of machinery; Disruption of wetland soil profile and alteration of hydrological regime.
	Storage of chemicals, mixes, and fuels	
	Stripping and stockpiling of topsoil	
	Establish working area	
	Core drilling and sampling	
	Digging of sump (lining), if applicable	
	Vehicle access (gravel roads and crossings)	
	Leakages and spillages from machinery, equipment & vehicles	
	Solid waste disposal	
	Human sanitation & ablution facilities	
	Re-fueling of machinery and vehicles	

	Laying core samples	
	Backfill of material	
Decommissioning Phase	Removal of structures, machinery, and equipment	Impeding hydrodynamics; Siltation of water resources; Additional water quality impairment
	Backfilling of holes	
	Final landscaping and concurrent rehabilitation	

Locations of the prospecting borehole drill sites have not been provided hence it is assumed that drill sites may be located within the regulated areas of the identified wetlands, and therefore a “worst case scenario” was assumed when determining the impact assessment, in line with the precautionary principle. Ensuring that no exploration activities occur directly within the watercourse, and/or the 500 m buffer, as well as the implementation of suitable mitigation measures would minimise the perceived impact significance of possible impacts. When applying the impact assessment in a ‘with mitigation scenario’, it was assumed that no exploration would occur within these desktop delineated areas, hence avoidance of sensitive areas.

From a wetland perspective, land clearing destroys local habitat and alters the topography and associated hydrology which can lead to the degradation and/or loss of local watercourses (wetlands), or other locally important biological features. The removal of natural vegetation surrounding wetland features is known to reduce the buffering capacity of the watercourses to impacts from adjacent land use activities such as mining, notably with a lowered resilience against erosion and water quality impacts. This in turn is likely to reduce aquatic fauna and flora populations and species compositions within the local area depending on the scale of prospecting activities and level of mitigation employed. Impacts include changes to the hydrological regime such as alteration of surface and subsurface run-off patterns, runoff velocities, vegetation clearing, earthworks, levelling, topsoil and overburden stockpiling (rocks, gravel and sand), concurrent rehabilitation, and the establishment of infrastructure and the associated road network. Altered surface run-off patterns and runoff velocities are expected to cause damage to the bed and banks of these freshwater resources through erosion, scouring and bank collapse with associated sedimentation of instream habitat. Due to the local arid climate and limited rainfall within the project area these impacts will be limited to times of precipitation events and despite the low frequency of precipitation these impacts should be considered due to the location and extent of the activity.

Any infrastructure associated with the prospecting activity within the watercourses will ultimately result in direct loss or the disturbance of watercourse habitat with associated alteration of hydrology. In turn, habitat disturbance may degrade habitat quality and create watercourse and habitat fragmentation. A negative shift in the biotic integrity and PES of the watercourses may be expected based on the severity of alterations or losses. Drilling rigs, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Additionally, leaks from ablution facilities, and indiscriminate dumping of hazardous waste could also result in the contamination of these watercourses, transporting (in addition to sediment) diesel, hydrocarbons and soil from the operational areas. Contaminated water resources are likely to influence the associated biota and vegetation communities.

Therefore, based on the desktop assessment information, it can be said that the majority of the project area will have a low aquatic sensitivity rating, except for the wetlands, which are rated as Highly sensitive due to their role that they play in the ecology of the area. In addition, these dry pans are home to a variety of invertebrates such as crustaceans and insects (mostly Branchiopods, but also Phyllopods) which produces millions of eggs during inundation which then get deposited in the sediment where it dries up to form an egg-bank. Furthermore, these invertebrates play a vital role in the food web as prey, thereby facilitating stepping-stone corridors for predatory birds, like flamingos, in an arid landscape.

It is anticipated that the project will pose “Moderate” pre-mitigation risks to the wetlands (if wetlands are not avoided), which can be reduced to “Low” post-mitigation risks, provided that the suggested mitigations are implemented. Should the wetland areas and their respective buffer be avoided by the proposed prospecting activities, the risks posed to these wetlands are anticipated to be low. Furthermore, impacts to these wetlands can be further mitigated by demarcating all wetland areas and avoid any placement of materials or movement within the wetland areas.

A decommissioning phase for the proposed prospecting activities were considered and impacts during this phase includes the removal of structures, machinery, and equipment, the backfilling of holes and then the final landscaping and concurrent rehabilitation. All of these associated impacts during the decommissioning will have a low impact while the latter will have a positive impact on the landscape.

In line with the anticipated impacts for the entire project, it is imperative that a competent Environmental Control Officer (ECO) must oversee the construction, operation and associated concurrent rehabilitation phases of the project, with watercourse areas as a priority.

Table 3-2 Summative results of the Risk Assessment conducted for the proposed project

Aspect	Severity	Consequence	Likelihood	Sig.	Significance Class	
					Pre-Mitigation	Post-Mitigation
Construction and Operational Phase						
Clearing of vegetation for project infrastructure	14	56	60%	33.6	Moderate	Low
Stripping and stockpiling of topsoil	11	44	80%	35.2	Moderate	Low
Storage of chemicals, mixes, and fuels	9	36	60%	21.6	Low	Low
Establish working area	11	44	80%	35.2	Moderate	Low
Core drilling and sampling	12	48	80%	38.4	Moderate	Low
Digging of sump (lining), if applicable	12	48	80%	38.4	Moderate	Low
Vehicle access (gravel roads and crossings)	11	44	80%	35.2	Moderate	Low
Leakages and spillages from machinery, equipment & vehicles	9	36	80%	14.4	Low	Low
Human sanitation & ablution facilities	8	32	40%	12.8	Low	Low
Solid waste disposal	9	36	40%	14.4	Low	Low
Re-fueling of machinery and vehicles	8	32	40%	12.8	Low	Low
Laying core samples	6	24	40%	9.6	Low	Low
Backfill of material	6	24	60%	14.4	Low	Low
Decommissioning Phase						
Removal of structures, machinery, and equipment	7	28	80%	22.4	Low	Low
Backfilling of holes	7	28	60%	16.8	Low	Low
Final landscaping and concurrent rehabilitation	-6	-24	100%	-24	Positive	Positive

The proposed prospecting activities consists of a construction, operational and decommissioning phase. The presence and operation of the prospecting activity has a low spatial impact if avoidance is implemented. The project will entail the clearing of and levelling areas, establishment of roads, operation of heavy machinery adjacent to the freshwater resources, soil and building material stockpiling, establishment of additional prospecting related infrastructure and hazardous material handling and storage. The construction related activities which will pose risks (directly and indirectly) to the freshwater resources, with the level of risk determined as moderate, with few low risks present during the construction phase (if watercourses are not avoided). The constructional impacts are short in duration and following the implementation of mitigation and rehabilitation in these disturbed areas, the areas will recover. Following the implementation of appropriate mitigation, the construction phase impacts are predominantly lowered to a low-risk significance rating and have a high reversibility rating.

The activities either within or in close proximity to the freshwater resources present moderate risk significance ratings and medium reversibility ratings due to the sensitivity of these systems to disturbance.

It is apparent from the risk assessment that some aspects considered for the drilling programme pose a Moderate Risk (pre-mitigation) due to the assumption of drill sites located within regulated and/or sensitive areas. However, if watercourses are avoided, then the drilling programme will pose a Low Risk (pre-mitigation). All recommendations and mitigation measures are to be implemented for the project to maintain this Low-risk rating.

3.1.2 Cumulative Impacts

The cumulative impacts take into consideration the impact the proposed prospecting activities will have alongside the activities taking place at present and possibly into the future along the Project Area.

The cumulative impacts include the loss or alteration of water resources system, loss of interflow and the resulting deterioration of the systems to provide necessary ecological services. Following the implementation of appropriate mitigation, the cumulative impacts will remain as a low-risk significance rating.

3.1.3 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need mitigation, management and pre-allocated funding for emergency situations.

Table 3-3 is a summary of the findings of an unplanned event assessment from a freshwater resource perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases of the project according to recorded events. This table presents events for proposed prospecting rights application.

Table 3-3 Summary of unplanned events for freshwater resources and their management measures

Unplanned Event	Potential Impact	Mitigation
Spills into the surrounding environment and watercourses	Contamination of habitat as well as water resources associated with a spillage (at hazardous chemical and hydrocarbons storage areas and across Project Area).	A spill response kit must be available at all times. The incident must be reported on and if necessary, an experienced ecologist must investigate the extent of the impact and provide rehabilitation recommendations.
Uncontrolled erosion	Erosion on the side of the access roads. Sedimentation of watercourses	Storm water management plan must be compiled by a suitably qualified engineer and implemented throughout the life of the activity. Erosion control measures must be put in place. Measures must include monthly inspections across the project footprint and should be adaptive based on site-conditions.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural areas which includes the watercourses.	Appropriate/Adequate fire management plan needs to be implemented to protect the watercourse areas from potential loss.

3.1.4 Mitigation Measures

In light of the expected impacts from the proposed activities, the following mitigation measures have been prescribed to lower the intensity of the impacts on the ecological integrity of the watercourse catchment.

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

- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community of wetland areas;
- Prevent the loss of the biodiversity associated with the wetland habitat; and
- Drilling outside of regulated areas and limiting the construction area to the defined project areas and only impacting those areas.

3.1.4.1 Development of Specific Mitigation

The following prospecting specific mitigation measures are provided:

- Adherence to the buffer areas. These should be visibly demarcated to avoid encroachment into these areas;
- Restrict all drilling related activities to within the designated footprint area;
- Retain as much vegetation cover as possible for all selected routes and working areas to limit future erosion potential;
- Removed vegetation should be preserved and replaced for rehabilitation of the drill sites. Rehabilitation should be concurrent for the during of the project, and be completed for the closure of each hole, and not at the end of the drilling programme;
- Promptly remove all alien and invasive plant species that may emerge during drilling (i.e. weedy annuals and other alien forbs) must be removed;
- The use of herbicides is not recommended in or near aquatic systems (opt for mechanical removal);
- Appropriately stockpile topsoil cleared from the project area. This can be used for rehabilitation of the drill sites;
- Clearly demarcate drill site footprint areas, and limit all activities to within this area;
- Minimise unnecessary clearing of vegetation;
- Landscape and re-vegetate all denuded areas as soon as possible;
- Re-instate topsoil and lightly till disturbance footprint;
- Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent leaks;
- Provide appropriate sanitation facilities outside of the regulated areas and service them regularly;
- Site establishment must be undertaken in an orderly manner and all amenities must be installed before the onset of drilling;

- All contractors and labour must undergo environmental awareness training, and be encouraged to maintain a “clean” working area, and report any (potential) risks to the environment as a result of the drilling programme;

- All structures must be temporary and should preferably be pre-fabricated or constructed of re-usable/recyclable materials;

- A method statement is required from the Contractor(s) that includes the layout of the drilling site, amenities and wastewater / water management during drilling;

- Ablution facilities with chemical toilets must be provided for all labour. The labour must be encouraged to make use of the ablution and under no circumstances shall indiscriminate excretion and urinating be permitted other than in supplied facilities;

- The locations of domestic waste areas, contractors camp and placement of ablution facilities must be demarcated on an approved site plan. The temporary storage of domestic waste shall be in covered bins, but these must be emptied on a weekly basis;

- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected must be disposed of at a licensed disposal facility;

- The Contractor must be in possession of emergency spill kits that must be complete and available at all times on site;

- Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. Any contaminated soil must be treated in situ or be placed in containers and removed from the site for disposal in a licensed facility;

- Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use;

- No storage of vehicles or equipment will be allowed outside of the designated drilling site or contractor’s camp area. Make use of existing tracks and routes as much as possible before new routes are constructed;

- No servicing of equipment on site unless absolutely necessary. Leaking equipment must be repaired immediately or be removed from site to facilitate repair;

- All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages;

- All disturbed and compacted footprint areas must be rehabilitated and landscaped after drilling is complete. These areas must either be rehabilitated to the original land use or an agreed upon land use;

- Loose soils are particularly prone to loss due to wind or water. It is therefore preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces;

- Practice good soil management across the construction footprint, notably around the topsoil berms and road reserves;

- Avoid the creation of concentrated flow paths wherever possible, especially along the road reserves;
- Devise and implement a suitable stormwater management plan for the construction and operation phases;
- In addition to this, basic stormwater structures such as berms must be designed and implemented prior to and throughout the duration of the construction activities;
- Construction activities must take place during the low flow period/ dry season (as much as possible) to reduce the erosion potential of the exposed surfaces;
- The freshwater and associated riparian areas outside of the Project Area must be avoided and treated as No-go areas;
- The nonessential project infrastructure should be relocated to outside of the freshwater buffer zones, which would significantly reduce potential impacts to the watercourses;
- Laydown yards, camps and storage areas must be beyond the freshwater and riparian areas. Where possible, the construction of the road and crossings must take place from the existing footpath and not from within the freshwater systems;
- Prevent uncontrolled access of vehicles through the watercourses that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas;
- All chemicals and toxicants to be used for the construction must be stored outside the watercourses and in a bunded area;
- Ensure all contractors and staff are familiarised with the method statement and have undergone an induction / training on the location of sensitive “No-Go” areas and basic environmental awareness using the mitigation provided in this report;
- Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the freshwater resources;
- In the event the freshwater resources are contaminated by means of an unforeseen spill/ leak, relevant specialists should be consulted for suitable mitigation or rehabilitation measures;
- All contractors must have suitable spill clean material for smaller spills. Larger spills that cannot be cleaned field must be immediately reported to the regulatory authority;
- All removed soil and material must not be stockpiled within the freshwater resources. Stockpiling should take place outside of the watercourses. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Mixing of concrete must under no circumstances take place within or near to the freshwater resources;
- No dumping of construction material field may take place;
- All waste generated field during construction must be adequately managed. Separation and recycling of different waste materials should be supported; and

- An alien invasive plant (AIP) management plan needs to be compiled and implemented post construction to control current invaded areas and prevent the growth of AIPs on cleared areas.

4 Conclusion

Based on the desktop data, five desktop HGM units have been identified in relation to the proposed project, which have been classified as; five Depressions (HGM 1, 2, 3, 4 & 5). HGM 5 was located in a position in the landscape that is situated outside of the proposed footprint. The project site was screened for areas of “wetness” using historic Google Earth Imagery and as such, these five desktop HGM units coincide with the historical imagery as potential wetland (depression) areas. Majority of the project site was identified to be terrestrial, however, additional areas of potential “wetness” were identified. These areas need to be verified with a detailed field assessment to confirm their status.

Based on the historical imagery, the identified desktop wetlands showcase little to no existing degradation within the systems. These areas are also classed as ESA’s. In terms of the DFFE Screening Tool, when the project site does not take into account the wetlands, the areas is classified as ‘Very High’ sensitivity (Figure 4-1). When the project site avoids these wetlands, the area is classified as ‘Low’ sensitivity. These wetlands were assigned a A/B condition status meaning that ≥75% of the natural vegetation remains within the wetlands. Pans occurring within arid regions are highly sensitive watercourses due to the role they play in the ecology of the area and furthermore due to the occurrence of invertebrates such as crustaceans and insects (mostly Branchiopods, but also Phyllopods).

A very conservative desktop buffer of 500 m was assigned to these dry pans while a 32 m sensitivity buffer was assigned using the Determination of buffer zones tool. In addition, a 32 m buffer was added to the potentially “wet” areas.

4.1 Risk and Impact Statement

The overall residual risk of the proposed development was calculated to be “Low”.

4.2 Specialist Opinion

Considering the assessment findings, no fatal flaws have been identified for the proposed activities on a desktop level, and authorisation of the proposed prospecting activities must be carefully considered. It is the opinion of the specialists that the project may be favourably considered for authorisation, on condition that all prescribed mitigation measures are implemented. This includes the avoidance of sensitive freshwater habitats and, the minimisation of prospecting activities within these areas.

4.3 Recommendations

It is recommended that Very High sensitive areas as well as regulated areas be avoided and only after field work has been conducted can it be determined if prospecting in these High sensitive areas are acceptable. In addition, the potentially ”wet” areas identified should be avoided (Figure 4-1). Going forward, it is imperative that a field assessment be undertaken prior to any invasive prospecting activities taking place, in order to verify the results of the desktop assessment and confirm the status of the potentially “wet” areas. The above conclusions are made with low-medium confidence due to the absence of ground truthing efforts.

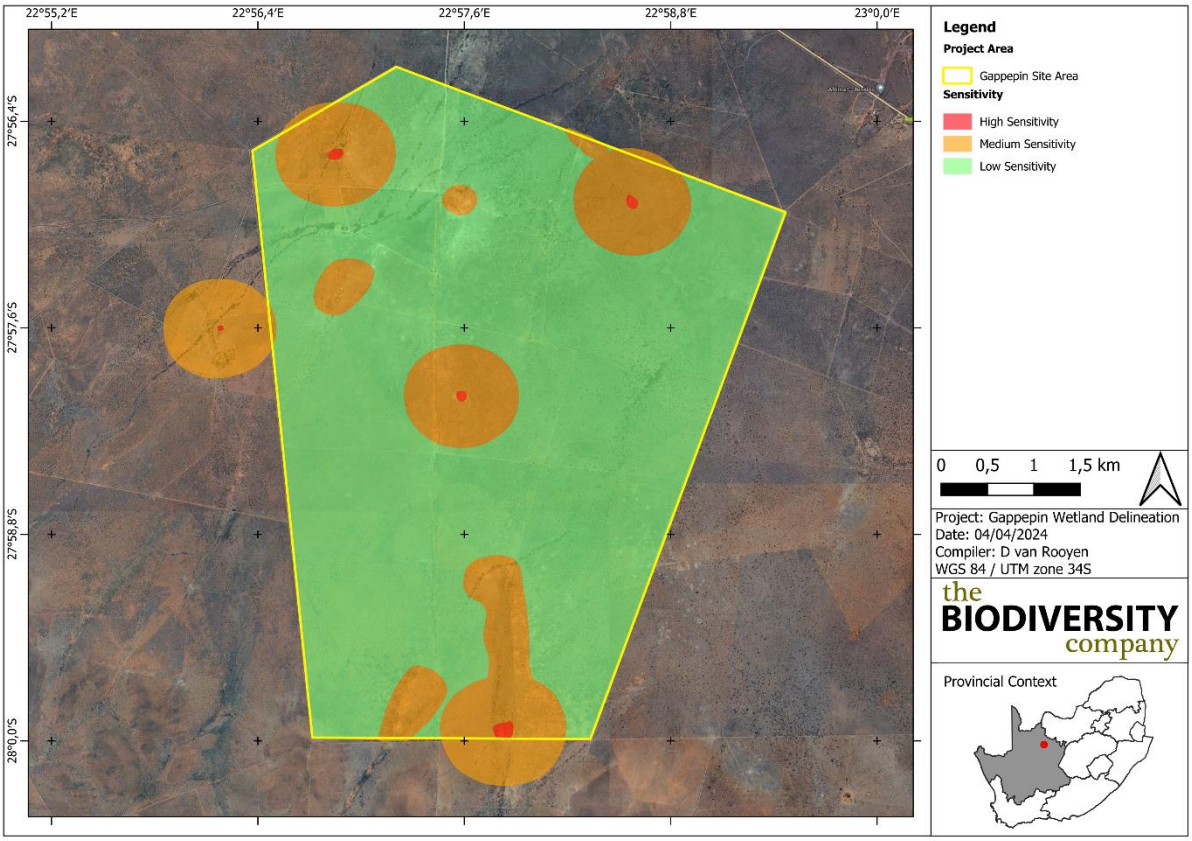


Figure 4-1 Summary of freshwater sensitivities in relevant to the project

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6 Appendix Items

6.1 Appendix A: Methodology

6.1.1 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).

6.1.1.1 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.

6.1.1.2 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.

6.1.1.3 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.

6.1.1.4 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); and
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021).

6.1.1.4.1 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.

6.1.1.4.2 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).

6.1.2 Wetland Field Survey

6.1.2.1 Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 6-1. 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.

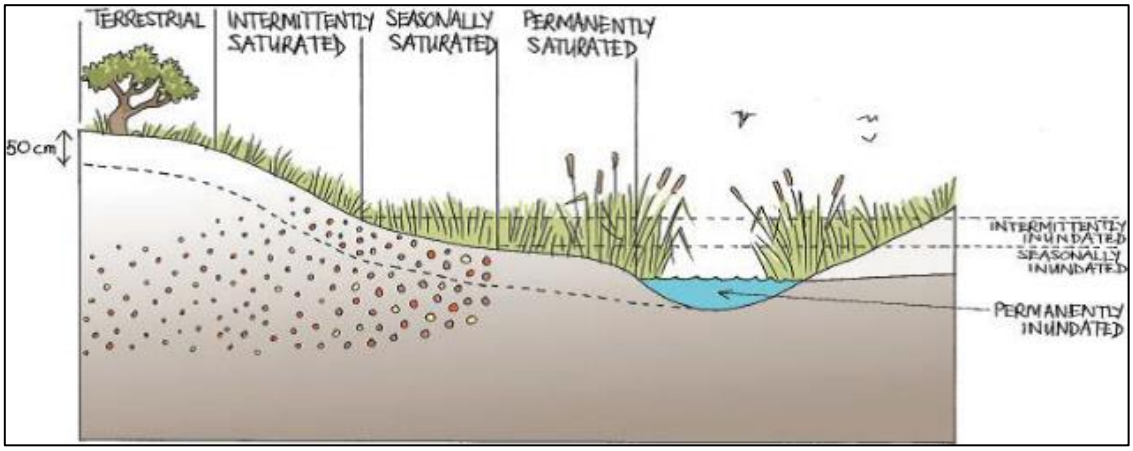

Figure 6-1 Cross section of a wetland, indicating how the soil wetness and vegetation indicators respond to changes in topography (Ollis et al. 2013)

6.1.2.2 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.

6.1.2.3 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).

6.1.3 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'.

6.1.4 Wetland Functional and Ecological Assessment

6.1.4.1 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. Eco Services serve as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze *et al.,* 2009). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 6-1).

Table 6-1 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

6.1.4.2 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 6-2.

Table 6-2 The Present Ecological Status categories (Macfarlane et al., 2007)

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

6.1.4.3 Ecological Importance and Sensitivity

The importance and sensitivity of water resources is determined in order establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Ecological Importance and Sensitivity (EIS) category as listed in Table 6-3.

Table 6-3 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

6.1.4.4 Recommended Ecological Category and Recommended Management Objective

The Recommended Ecological Category (REC) and Recommended Management Objective (RMO) (Table 6-4) 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 6-4 Recommended Ecological Category and Recommended Management Objectives for water resources based on Present Ecological State and Ecological Importance and Sensitivity scores

PES	Ecological Importance and Sensitivity

	Very High	*High*	*Moderate*	*Low*
A (Pristine)	A Maintain	A Maintain	A Maintain	A Maintain
B (Natural)	A Improve	A/B Improve	B Maintain	B Maintain
C (Good)	A Improve	B/C Improve	C Maintain	C Maintain
D (Fair)	C Improve	C/D Improve	D Maintain	D Maintain
E/F (Poor)	D Improve	E/F Improve	E/F Maintain	E/F Maintain

6.1.5 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.

6.1.6 Site Sensitivty 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.

6.2 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 6-5.

Table 6-5 Significance ratings matrix

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s)impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

6.3 Appendix C: Cumulative Impact Assessment

The following aspects as presented in were considered in the cumulative impact assessment which refer to quantifying the significance (Table 6-6) of impacts in relation to the proposed development.

Table 6-6 Aspects and ratings considered in the cumulative impact assessment

Duration of Impact	**Rating**
One day to one month: Temporary	1
One month to one year: Short Term	2
One year to five years: Medium Term	3
Life of operation or less than 20 years: Long Term	4
Permanent	5
Spatial scope of Impact	**Rating**
Activity specific/ < 5 ha impacted / Linear features affected < 100m	1
Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	2
Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	3

Regional within 5 km of the site boundary / < 2000ha impacted / Linear features affected < 3000m	4
Entire habitat unit / Entire system/ > 2000ha impacted / Linear features affected > 3000m	5
Severity of Impact	**Rating**
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Sensitivity of Receiving Environment	**Rating**
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/ /important	3
Ecology highly sensitive /important	4
Ecology critically sensitive /important	5
Probability of impact	**Rating**
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
Consequence (Severity+Spatial Scope+Duration)	
Likelihood (Sensitivity of Receiving Environment X Probability of Impact)	
Significance (Consequence X Likelihood)	

Table 6-7 Significance ratings for the cumulative impact assessment

Significance	Class
0 - 15	Absent
16 -30	Low
31 - 45	
46 - 60	Moderate
61 - 75	
76 - 90	Moderately High
91 - 105	High
106 - 120	
120 - 135	Critical
136 - 150	

6.4 Appendix D – 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

March 2024

I, Rowan Buhrmann, 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.

Rowan Buhrmann

Ecologist

The Biodiversity Company

March 2024

6.5 Appendix E – 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)

Rowan Buhrmann

MSc Biology (Plant Ecophysiology)

Pr Sci Nat (136853)

Cell: +27 78 558 1124

Email: rowan@thebiodiversitycompany.com

Identity Number: 9111085091086

Date of birth: 08 November 1991

Profile Summary

Working experience throughout KwaZulu-Natal (South Africa).

Experience in Environmental Consulting as an EAP (EIAs and WULA).

Environmental Control Officer (ECO).

Specialist expertise in Climate Change (elevated temperatures) and Botany.

Areas of Interest

Aquatic Ecology and Water Resource Management.

Renewable Energy.

Sustainability and Conservation.

Landscape rehabilitation.

Geographic Information Systems.

Experimental Design.

Key Experience

- Environmental Impact Assessments and Water Use Licence Applications
- Vegetation Assessments
- Wetland delineations and ecological assessments
- Rehabilitation Plans and Monitoring

Countries worked in

South Africa

Nationality

South African

Languages

English – Proficient

Qualifications

- MSc (University of KwaZulu-Natal) – Plant EcoPhysiology.
- BSc Honours (University of KwaZulu-Natal) – Biology
- BSc (University of KwaZulu-Natal) – Biology
- Certificate of Competence: Wetland WET-Health (V2)
- Pr Sci Nat (136853)

APPENDIX 9

HERITAGE COMPLIANCE STATEMENT

Archaetnos

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13 March 2024

Report no.: 02413V

HERITAGE COMPLIANT STATEMENT: PROSPECTING RIGHT APPLICATION FOR MONNAPULA MINING ON THE FARM GAPPEPIN RESERVE 670, NORTHERN CAPE PROVINCE

1. Introduction and location

Monnapula Mining is applying for a prospecting right on the Farm Gappepin Reserve 670 (Figure 1-3). The application includes non-invasive and invasive activities. The prospecting activities are expected to be undertaken over a period of three years.

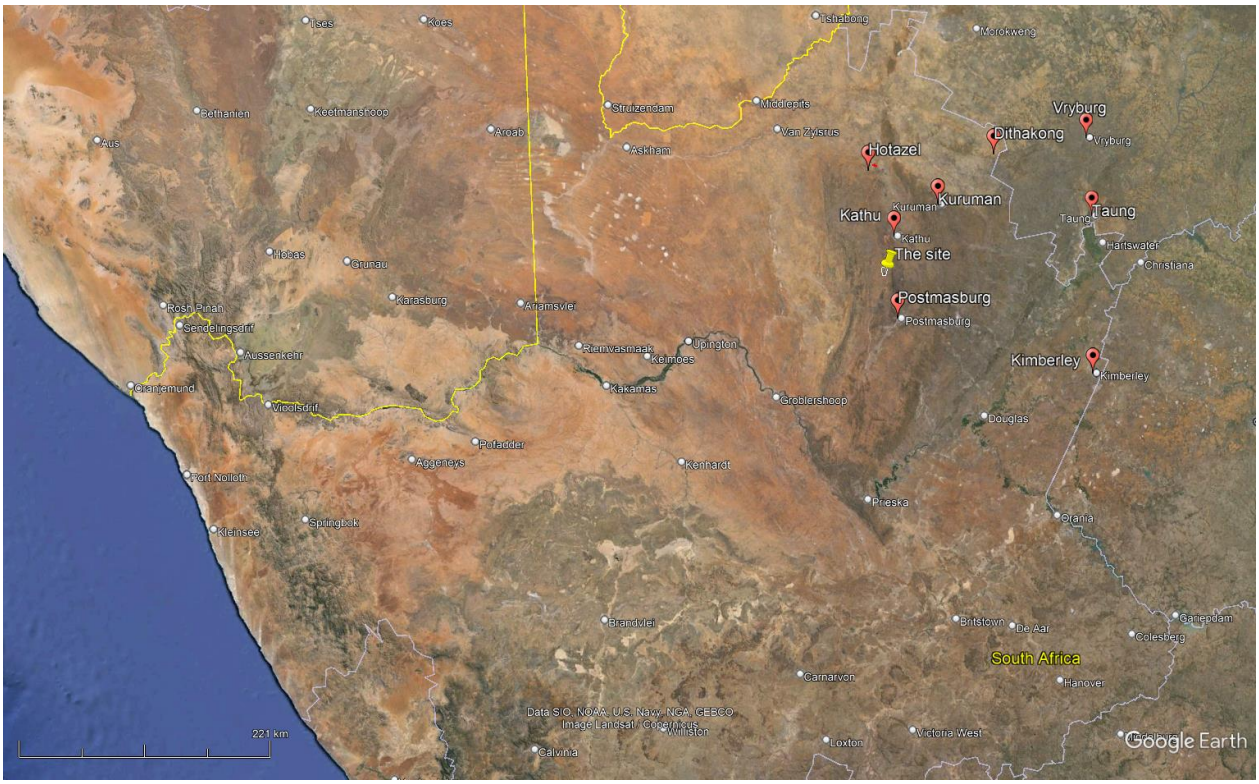

Figure 1: Regional setting of the project site

Figure 2: Location of the site in relation to neighbouring towns

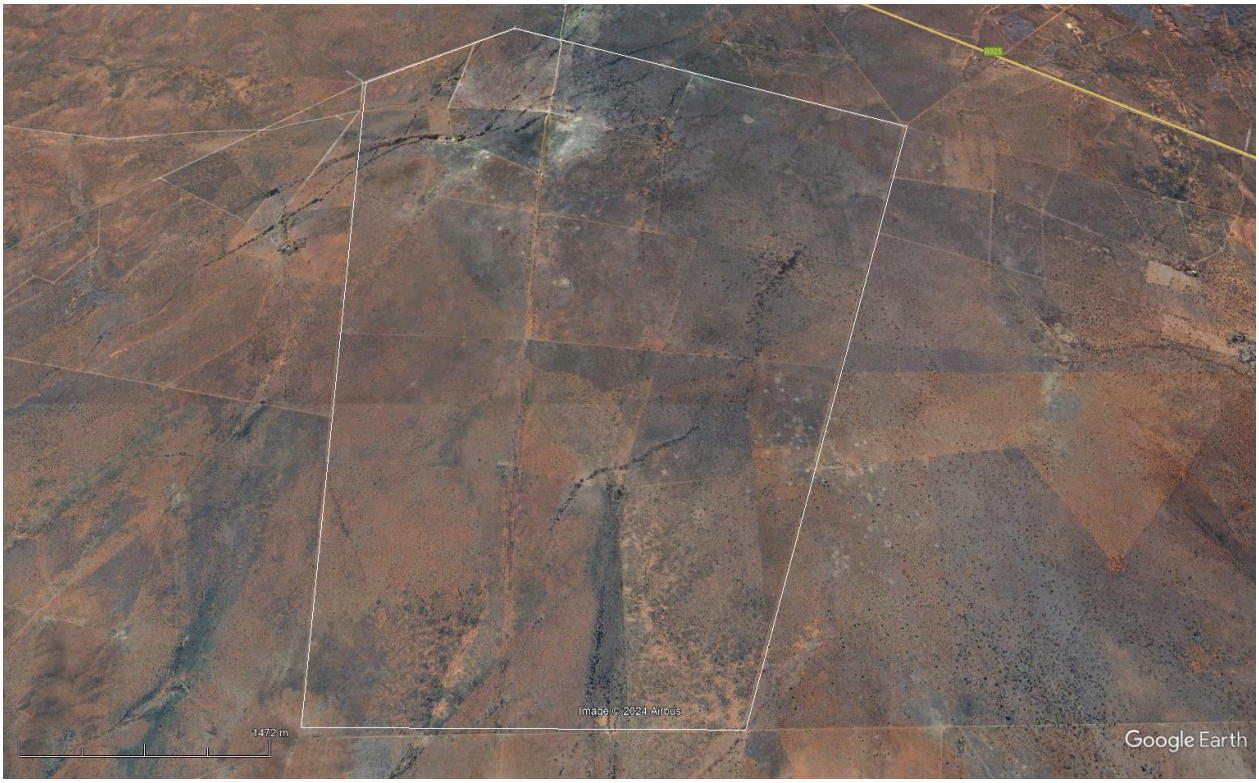

Figure 3: Detailed view of the site boundary

Prospecting activities proposed include:

- Desktop research and literature reviews
- Surface geological mapping
- Geophysical surveys (ground magnetic and ground gravity techniques)
- Development of geological models
- Diamond drilled exploration boreholes; 20 sites are proposed. Boreholes will likely be 50 - 100 m deep. The grid for this drilling will be confirmed once the non-invasive validation studies are complete.

2. Project Details

Below are all applicable details of the project:

PROJECT DETAILS		
ITEM	**DESCRIPTION**	**RESPONSE**
Project name	This is the name to be referred to throughout the report.	Gappepin Reserve 670 Prospecting Right Application
Project schedule	The due date for the respective project deliverable/s.	Report by end of March for review. Finalisation within first week of April please.
Project description	The details for the project / background information document	Monnapula Mining (Pty) Ltd is applying for a Prospecting Right (PR) on the Farm Gappepin Reserve 670. The PR application includes non-invasive and invasive activities. The prospecting activities are expected to be undertaken over a period of three years. Prospecting activities proposed include: • Desktop research and literature reviews • Surface geological mapping • Geophysical surveys (ground magnetic and ground gravity techniques) • Development of geological models • Diamond drilled exploration boreholes. Further considerations for the invasive activities (exploration boreholes) include: • If the outcomes of the above validation studies reveal the need for additional exploration drilling, up to 20 boreholes may be drilled across the site. Boreholes will likely be drilled to a depth of 50 -100m. • The positions of exploration boreholes (i.e., the drilling grid) will be confirmed once the initial, non-invasive desktop studies (geological mapping) and geophysical surveys have been completed. In addition to the underlying geology, drillhole locations will take into account any environmental features (such as the presence of pans/ wetlands) and proximity to existing access tracks. Areas identified as no-go areas include

		the 500m regulated areas around the pans, pending confirmation of presence by specialist- see attached map. • Access tracks to the drill sites will be determined in consultation with the landowner. Where possible available access roads and tracks will be used. Potentially new access tracks may be required. Any new access roads developed must be less than 4 m wide and less than 1 km long. • A 10 m x 10 m drill pad will be required per drill site for the drilling rig and sump. Drill pads will be cordoned off with danger tape or fences if required. • Small volumes of consumables required for drilling will be stored at the drill pad. This may include biodegradable drilling fluid, portable diesel bowser and any required lubricants. Storage and handling of dangerous goods with a combined capacity of less than 30 m3 i.e. hydrocarbon storage (including diesel storage). • Water and diesel required for borehole drilling activities will be sourced off-site. • Cores will be taken to a temporary storage yard for logging, sampling and storage. • Portable chemical toilets will be used for the management of sewage waste generated on site. Drill pads will be rehabilitated following the completion of exploration drilling at that position. A NEMA Basic Assessment process will be followed and all documentation will be submitted to the Department of Mineral Resources and Energy (DMRE) for consideration following a 30-day Public Participation process.
Authorisation/s	For example, are you applying for a WUA, NEMA or both?	NEMA Environmental Authorisation.
PROJECT INFORMATION		
ITEM	**DESCRIPTION**	**RESPONSE**
GIS	Shapefiles or KMZs for the project area and components	See attached.
Landowners	Contact details for the relevant landowners	Mr Gerrit Maritz

3. Historical context

The heritage screening tool (Figure 4) indicates the project area as being a low risk area for containing heritage and archaeological sites. However, this likely is due to the fact that no

heritage studies was done here before. The main shortcoming of the screening tool is that heritage and archaeological data is incomplete. Thus, the tool is based on available data which is constantly updated by performing heritage surveys all over South Africa.

In fact the same tool indicates several areas of high and very high risk related to heritage. Therefore the chances of finding similar sites are indeed highly possible.

Background information given below also indicated that many heritage sites have been identified in nearby areas. This includes Stone Age sites, graves and some historical buildings and features (SAHRA's SAHRIS database; Archaetnos' database).

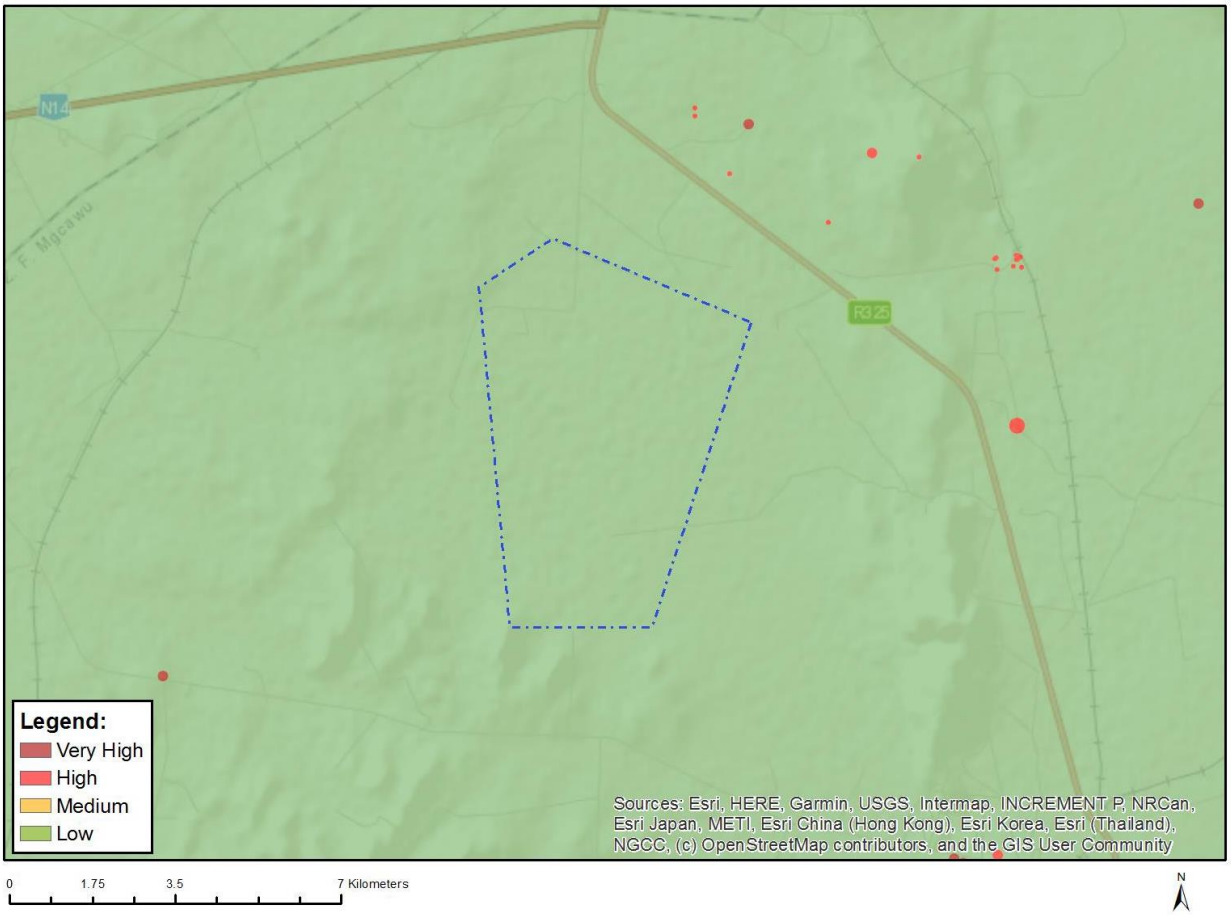

Figure 4: Heritage screening tool map.

3.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:

Early Stone Age (ESA) 2 million – 150 000 years ago
Middle Stone Age (MSA) 150 000 – 30 000 years ago
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

Stone Age sites are known to occur in the larger geographical area, including the well-known Wonderwerk Cave in the Kuruman Hills to the east, Tsantsabane, an ancient specularite working on the eastern side of Postmasburg, Doornfontein, another specularite working north of Beeshoek and a cluster of important Stone Age sites near Kathu. Additional specularite workings with associated Ceramic Later Stone Age material and older Fauresmith sites (early Middle Stone Age) are known from Lylyfeld, Demaneng, Mashwening, King, Rust & Vrede, Paling, Gloucester and Mount Huxley to the north (Morris 2005: 3).

The onset of the Middle Stone (Figure 5) Age coincided with a widespread demand for coloured or glittering minerals that arose at the time for still unknown reasons. The intensive collection of such substances soon exhausted surface exposures and led to the quest being extended underground and thus to the birth of mining practice. Specularite was commonly mined in the Postmasburg area. In 1968 AK Boshier, working in collaboration with P Beaumont, found a number of underground specularite mines on Paling (De Jong 2010: 35; Beaumont 1973). Stone and Iron Age communities mined specularite associated with iron ores for cosmetic purposes at Blinkklipkop, Paling, Gloucester and other farms (De Jong 2010: 41; Snyman 2000: 3).

A number of Stone Age sites and scattered finds of Stone Age material were identified on the nearby farm Paling during an earlier survey (Pelser and Van Vollenhoven 2010: 12-17). Rock engraving (rock pecking) sites are known from Beeshoek (examples - Figure 6-7) and Bruce (Morris 2005: 3; Snyman 2000: 3). The latter are associated with the Late Stone Age (Figure 8).

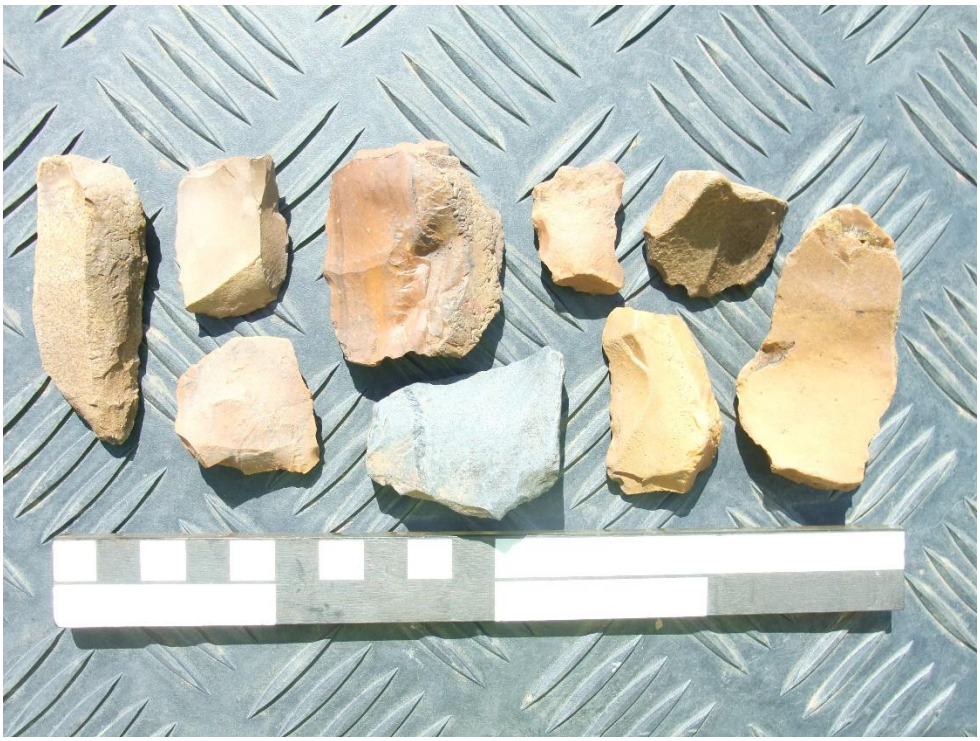

Figure 5: Middle Stone Age artefacts from the Northern Cape.

Figure 6: Rock pecking of an oryx and a sun.

Figure 7: Rock pecking of a baboon.

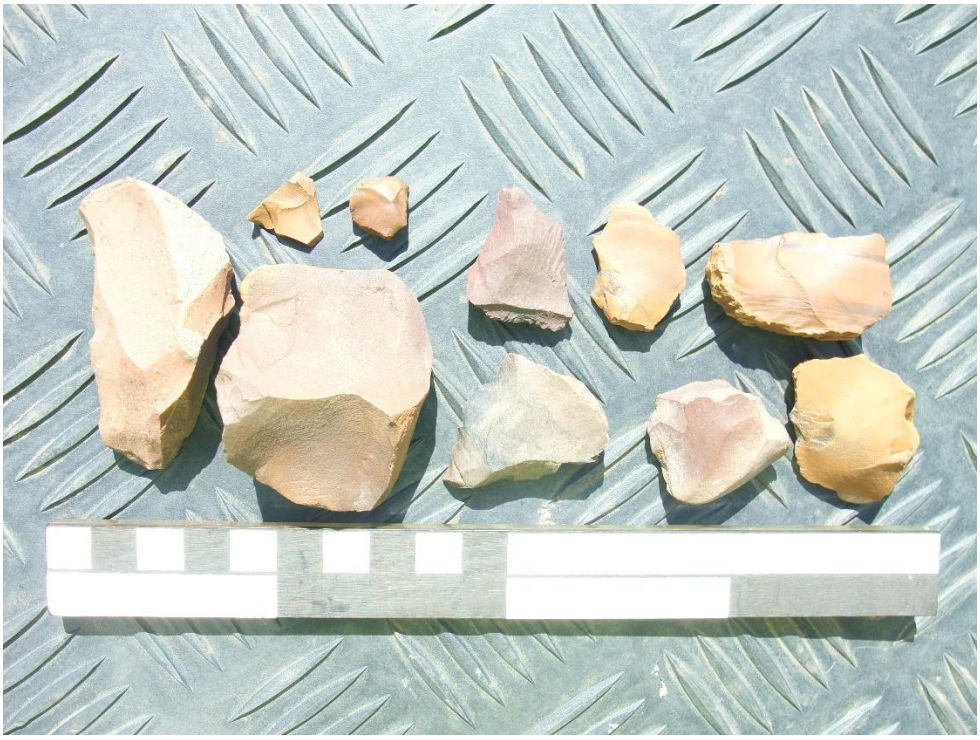

Figure 8: Late Stone Age artefacts from the Northern Cape.

3.2 Iron Age

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

This later phase, termed the Late Iron Age (LIA), was accompanied by extensive stonewalled settlements, such as the Thlaping capital Dithakong, 40 km north of Kuruman. Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is sometimes known as the Ceramic Late Stone Age and is represented by the Blinkklipkop specularite mine near Postmasburg and finds at the Kathu Pan (De Jong 2010: 36).

3.3 Historical Age

The Historical Age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. Factors such as population expansion, increasing pressure on natural resources, the emergence of power blocs, attempts to control trade and penetration by Griquas, Korana and white communities from the south-west resulted in a period of instability in Southern Africa that began in the late 18th century and effectively ended with the settlement of white farmers in the interior. This period, known as the *difaqane* or *Mfecane*, also affected the Northern Cape Province, although at a relatively late stage compared to the rest of Southern Africa. Here, the period of instability, beginning in the mid-1820s, was triggered by the incursion of displaced refugees associated with the Tlokwa, Fokeng, Hlakwana and Phuting tribal groups (De Jong 2010: 36).

The *difaqane* coincided with the penetration of the interior of South Africa by white traders, hunters, explorers and missionaries. The first traders in the Northern Cape were PJ Truter's and William Somerville's journey of 1801, which reached Dithakong at Kuruman. They were again followed by Cowan, Donovan, Burchell and Campbell and resulted in the establishment of a London Mission Society station near Kuruman in 1817 by James Read (De Jong 2010: 36). During the 1870's William Sanderson, John Ryan and John Ludwig passed through the area close to Postmasburg (Snyman 2000: 3).

The Great Trek of the Boers from the Cape in 1836 brought large numbers of Voortrekkers up to the borders of large regions known as Bechuanaland and Griqualand West, thereby coming into conflict with many Tswana groups and also the missionaries of the London Mission Society. The conflict between Boer and Tswana communities escalated in the 1860s and 1870s when the Korana and Griqua communities became involved and later also the British government. The conflict mainly centered on land claims by various communities. For decades the western border of the Transvaal Boer republic was not fixed. Only through arbitration (the Keate Arbitration), triggered by the discovery of gold at Tati (1866) and diamonds at Hopetown (1867) was part of the western border finally determined in 1871. Ten years later, the Pretoria Convention fixed the entire western border, thereby finally excluding Bechuanaland and Griqualand West from Boer domination (De Jong 2010: 36).

Geographically, the study area is part of a region known as Griqualand West. At the end of the 18th century and the beginning of the 19th century Griqua tribes coming from the south settled in the region in order to escape encroachment of Afrikaner Trekboere who was active along the Orange River. They established the town of Klaarwater, renamed Griquatown in 1813. After the discovery of diamonds in 1867 a serious dispute over the ownership of the diamond fields ensued, involving the Transvaal and Orange Free State Boer republics, Griqua, Korana and Thlaping communities and the Cape colonial government. In October 1871 the diamond fields were proclaimed British territory under the name Griqualand West. In 1879 it was annexed to the Cape Colony (De Jong 2010: 36).

The incorporation of Griqualand West into the Cape Colony promoted colonial settlement in the area from the 1880s. Government-owned land was surveyed and divided into farms, which were transferred to farmers. Surveyors were given the task of surveying and naming some of the many

farms in this region. These farms were allocated to prospective farmers, but permanent settlement only started in the late 1920s and the first farmsteads were possibly built during this period (De Jong 2010: 36). The Griqua town of Blinkklip (established in 1882), originally a mission station, was renamed Postmasburg in 1892 and became the centre of a magisterial district (Snyman 2000: 6). Another town, Olifantshoek, was established in the 1880s. The region remained sparsely populated until the advent of the 20th century, when cattle farming became popular (De Jong 2010: 36).

Prospecting started in the Postmasburg area during 1882 and manganese was discovered here during 1886 (Snyman 2000: 6, 13). Henry George Brown, who was commissioned in 1888 by the government of British Bechuanaland to erect the first government buildings in Kuruman, became interested in the iron ores that were known from the Klipfontein Hills. While prospecting there in the late 19th century, he became the first person to identify manganese in what is today known as the Eastern Belt of the Postmasburg Manganese Field. Captain Thomas Shone, who arrived in Postmasburg in 1919 to join the diggers following the discovery of diamonds at the town, discovered the manganese ores in the Western Belt during 1922-1924 (De Jong 2010: 38).

In 1925 Shone and partners founded the Union Manganese Mines and Minerals Limited in order to secure mineral rights and exploit the ores. Prior to the discoveries by Brown and Shone, manganese was only mined in South Africa on a very small-scale west of the present town of Magaliesburg and in the Western Cape. In 1926, Guido the farm and formed The Gloucester Manganese Mines (Postmasburg) Limited. The land was held for future development, as reasonable transportation facilities were not available at that time (De Jong 2010: 38; Snyman 2000: 22).

Following the founding of their manganese mining company, Shone and his partners attempted to entice overseas investments but met with little success, because too little was known about the economic viability of the deposits. The government then sent Dr. AL Hall of the Geological Survey to conduct a detailed geological survey of the Postmasburg manganese deposits. He was the first person to map them along the entire length of the Gamagara Hills and to classify them scientifically as ferruginous manganese ores that were suited for the production of low-grade ferromanganese. His report (1926) was optimistic about the viability of the deposits but stated that lack of proper transport facilities would be a concern (De Jong 2010:39).

Shone's company established small prospect workings all along the Gamagara Hills on farms such as Beeshoek, Paling, Doornfontein and Magoloring. In 1926 a Postmasburg attorney, AJ Bester, started taking up options on the farms in the Klipfontein Hills and established a second mining company, South African Manganese Limited, the forerunner of SAMANCOR. Two years later Guido Sacco formed a third company, Gloucester Manganese Mines (Postmasburg) Limited. The land was held for future development, as reasonable transportation facilities were not available at that time (De Jong 2010: 39).

The presence of manganese deposits in the Klipfontein Hills and observations made from prospecting trenches showed that the manganese ore bodies in the Western Belt were perhaps more irregular in shape than predicted by Hall. This resulted in the Geological Survey commissioning Dr. Louis Nel to undertake a second survey in 1927-1929 to map the entire

manganese field in detail. His results, published in 1929, laid the foundation for much of the present-day knowledge of the geology of the Postmasburg manganese field (De Jong 2010: 39).

Mining by Union Manganese and South African Manganese started in earnest in 1927 in the Postmasburg field. Lack of proper transport facilities and the application of obsolete mining methods (everything was done by hand on a small scale) hampered progress. Manganese ores were collected from the open pits through a system of coco-pans and loaded on wagons (later trucks) that went to the Koopmansfontein railway station, about 100 km away (De Jong 2010:40).

The situation showed promises of being improves when the British Swiss International Corporation Limited provided capital for the construction of a railway line from Koopmansfontein to Postmasburg and Beeshoek in return for certain manganese mineral rights. A new joint company, The Manganese Corporation Limited, was formed and an agreement reached with the Minister of Railways and Harbours. The extended line to Beeshoek was opened in June 1930 and development of the ore bodies at Beeshoek, Doornfontein and Paling could take place. For this purpose, a narrow-gauge railway line was laid (De Jong 2010: 40).

However, the September 1929 crash on the New York Stock Exchange, followed by the Great Depression, brought all manganese mining operations to a halt, rendering the newly constructed Koopmansfontein / Beeshoek railway line dormant (De Jong 2010: 41).

May 1930 saw the launch of Ore & Metal Company Limited to import and export mineral concentrates, including manganese. The African Mining and Trust Company Limited were formed in December 1931 to acquire mineral rights and explore mineral deposits. In exchange for shares in African Mining and Trust, the founders transferred their entire Ore & Metal shareholding to the new company, while Guido Sacco transferred his Gloucester Manganese Mines shares. Thus, Ore & Metal and Gloucester Manganese Mines became subsidiaries of African Mining and Trust, now a wholly owned subsidiary of Assore Limited (previously The Associated Ore & Metal Corporation Limited), which was formed in 1950 (De Jong 2010: 41).

During 1934 the South African Railways re-opened the railway line and extended it to Gloucester. In 1935 The Associated Manganese Mines of South Africa Limited ("Assmang") was formed. Anglovaal acquired all the mineral leases of the Manganese Corporation, and these were ceded to Assmang, as were the shares of the Gloucester Manganese Mines Limited held by African Mining and Trust in exchange for shares in Assmang. The first shipment of manganese ore left Durban harbour in March 1936 and other shipments continued uninterruptedly (De Jong 2010: 41).

The post office at Glosam was started in 1937 and in 1954 a mining village was established here. Originally it consisted of twelve houses (Snyman 2000: 54, 98). The Associated Manganese Mines of South Africa Limited changed its name to Assmang on 30 May 2001, and was reorganised into three divisions: Manganese, Chrome and Iron Ore (De Jong 2010: 41). Typical historical sites to be found in the Northern Cape include graves (Figure 9-10), farm buildings (Figure 11) and mining infrastructure (Figure 12).

Figure 9: Typical farmers graves.

Figure 10: Typical workers graves.

Figure 11: Typical farmers dwelling older than 60 years of age.

Figure 12: Remains of a miners box in the Northern Cape.

3.4 Historical context: conclusion

From the above it is clear that there is a reasonably high risk of finding Stone Age sites or material on the property. This likely will consist of stone tools, which may or may not be disturbed and one might even encounter rock engravings.

It is less likely to find any Iron Age remains simply due to the site being on the fringe of Iron Age activities. Historical sites may include farm buildings and infrastructure, mining buildings and infrastructure as well as graves.

4. Conclusion and Recommendations

In accordance with the National Heritage Resources Act (25 of 1999), a Heritage Impact Assessment (HIA) must be done under the following circumstances:

a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length.
b. The construction of a bridge or similar structure exceeding 50m in length
c. Any development or other activity that will change the character of a site and exceed 5 000m^2 or involve three or more existing erven or subdivisions thereof.
d. Re-zoning of a site exceeding 10 000 $m^{2.}$
e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority.

It is therefore clear that an HIA would be needed here before any development may be undertaken. It is therefore recommended that:

- For now, a high level site visit be undertaken to identify historical and archaeological sites, buildings or structures.

- The mapping of any of the above will enable to project team to prevent the disturbance of any of these during prospecting activities. This will likely prevent any unnecessary delays in future.

- An HIA would be needed eventually but only before any mining can be done. The HIA will also benefit from data collected during the high level site visit indicated above.

- It would be possible to only view the identified sites for drilling to determine whether there is archaeological or historical material located there. The disadvantage is that one would not know what alternative sites can be used as these will then also have to be viewed. The advantage is that it is likely to be a more cost-effective exercise than surveying the entire project area.

- The project team should however note that due to the nature of archaeological material, such sites, objects or features, as well as graves and burials may be uncovered during construction activities on site. In such a case work should cease immediately and an archaeologist should be contacted as a matter of urgency to assess such occurrences.

- In this regard the following ‘Chance find Procedure’ should be followed:

    - Upon finding any archaeological or historical material all work at the affected area

must cease.

- The area should be demarcated to prevent any further work there until an investigation has been completed.
- An archaeologist should be contacted immediately to provide advice on the matter.
- Should it be a minor issue, the archaeologist will decide on future action. Depending on the nature of the find, it may include a site visit.
- SAHRA's APM Unit may also be notified.
- If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
- The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
- Work on site will only continue after the archaeologist/ SAHRA has agreed to such a matter.

5. References

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APPENDIX 10

IMPACT ASSESSMENT REPORT


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environmental
consultants

MONNAPULA MINING (PTY) LTD

IMPACT ASSESSMENT FOR THE PROSPECTING RIGHT APPLICATION OVER THE FARM GAPPEPIN RESERVE 670, NORTHERN CAPE PROVINCE

DMRE REF NO. NC 30/5/1/1/2/13728 PR

Prepared for:

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2129

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TABLES

1 INTRODUCTION AND BACKGROUND

The Department of Mineral Resources and Energy (DMRE) has accepted an application for a Prospecting Right (PR) made by Monnapula Mining (Pty) Ltd (MM) in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA). The PR application area is 2614.53 hectares and is located on Portion 0 of the farm Gappepin Reserve 670 within the Tstantsabane Municipality and the ZF Mgcawu District Municipality, Northern Cape Province. The PR application area is located approximately 19 km east of Olifantshoek, 26 km south-west of Kathu and 35 km north-west of Postmasburg.

The listed activities, in terms of the National Environmental Management Act, No. 107 of 1998 (NEMA) and the 2014 Environmental Impact Assessment (EIA) Regulations (*as amended*), that are triggered by the proposed project, require that a Basic Assessment process is conducted.

This document serves to inform the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) and describes the potential impacts that the proposed prospecting activities, as described in the Prospecting Work Programme, could have on the receiving biophysical and socio-economic environment. The impacts will be rated using a standardised impact rating methodology (outlined in Section 2.1 below).

1.1 Applicant

Company	Monnapula Mining (Pty) Ltd (MM)
Contact person	Mr Tebogo Louw
Physical address	11 Beyers Naude Drive, Roosevelt Park, 2129
Postal address	P.O. Box 48183, Roosevelt Park, 2129
Telephone number	+27 11 782 4322

1.2 Environmental Assessment Practitioner (EAP)

Company	Prime Resources (Pty) Ltd
Physical address	70 – 7th Avenue, Parktown North, Johannesburg
Postal address	Postnet Suite #002, Private Bag X1, Woodhill, 0076
Telephone number	011 447 4888
Fax number	086 604 2219
Email	prime@resources.co.za
Professional affiliations	PrEng | PrSciNat | SAIMM | EAPASA |IAIAsa

Prime Resources (Pty) Ltd is a specialist environmental consulting firm providing environmental, social, and related services, which was established in 2003. Prime Resources was founded by Peter Theron (PrEng 950329), the Managing Director and Principal Environmental Consultant of the firm. Peter has a GDE Environmental Engineering from the University of Witwatersrand and over 35 years' experience in the field of environmental science and engineering.

Louise Jones (EAPASA registered 2019/1367) is a Principal Environmental Scientist with 11 years of experience in the field of environmental science. Her expertise includes environmental impact assessments

and management planning, financial liability assessments associated with mine closure and rehabilitation as well as environmental compliance auditing.

Dr Bronwyn Grover (Pr. Sci. Nat) is a Senior Environmental Scientist with a specialisation in mine water chemistry. She has a PhD (Environmental and Analytical Chemistry) from the University of the Witwatersrand and 7 years of experience in mine water and waste related projects.

1.3 Disclaimer

Prime Resources has expressed due and diligent care to comprehensively evaluate all potential environmental and social impacts of the project. The potential impacts were identified with the aid of specialists' findings and the EAP's experience.

1.4 Declaration of independence

As the independent Environmental Assessment Practitioner, Prime Resources (Pty) Ltd has no other beneficial interest in Monnapula Mining (Pty) Ltd as pertains to the undertaking of this assignment other than fair remuneration in accordance with normal professional environmental consulting practice. The conclusions and opinions expressed in this report are entirely those of Prime Resources and are based wholly upon the information described throughout this report.

The environmental consultants, scientists and engineers under the employ of Prime Resources, insofar as the undertaking of this assignment:

- Act as independent consultants as defined in GN982 of 2014 (*as amended*)
- Do not have any financial interest in the undertaking of the activity, other than fair remuneration for the work performed
- Have not, and will not, engage in conflicting interests in the undertaking of the activity
- Undertake to disclose to the Competent Authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document
- Will provide the competent authority with access to all information at our disposal, whether such information is favourable to the licence holder or not
- Based on information provided to us by the project proponent and in addition to information obtained during this assignment, have presented the results and conclusion within the associated document to the best of our professional ability
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field
- Undertake to have our work peer reviewed on a regular basis.

Compiled by	
Bronwyn Grover Senior Environmental Scientist prime | resources environmental consultants	Louise Jones Principal Environmental Scientist *EAPASA Reg: 2019/1367* prime | resources environmental consultants

2 DESCRIPTION AND ASSESSMENT OF POTENTIAL IMPACTS

2.1 Impact rating methodology

The Prime Resources (Pty) Ltd Impact Assessment Methodology and Rationale will be used to assess the significance of the potential impacts of the preferred initial layout on the surrounding biophysical and socio-economic environment.

The objective of the Impact Assessment is to rate the significance of potential impacts of the project prior to and after the implementation of mitigation measures. The methodology encompasses an assessment of the nature, consequence (magnitude, extent, duration) and probability (likelihood) of the identified potential environmental and social impacts of the project. The reversibility of the impact as well as the cumulative impact are also considered. The impact is assessed prior to and after implementation of potential mitigation measures.

The following risk assessment model has been used for determination of the significance of impacts.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

The maximum potential value for significance of an impact is 100 points. Environmental impacts can therefore be rated as high, medium or low significance on the following basis:

High environmental significance	60 – 100 points
Medium environmental significance	30 – 59 points
Low environmental significance	0 – 29 points

The significance of a particular impact which is reduced through the application of the recommended mitigation measures is indicated within square brackets.

The potential impacts are described per receptor. The significance of these impacts is determined according to the above methodology. Where mitigation measures are recommended in order to reduce the significance of a potential impact, these have been indicated. The tabulated impact assessments are further elaborated upon per receptor below.

Table 1. Impacts ratings grid

Magnitude (M)	
Minor (2)	Change not measurable; or threshold never exceeded There is no need for people to adapt and will not notice changes to livelihoods and lifestyles
Low (4)	Low disturbance of degraded areas, which have little conservation value Minor change in species occurrence or variety Minor deterioration (nuisance or minor deterioration) or harm to receptors Change to receiving environment not measurable; or identified threshold never exceeded People are able to adapt and maintain pre-impact livelihoods and lifestyles
Moderate (6)	Moderate/measurable deterioration or harm to receptors Receiving environment moderately sensitive Identified threshold occasionally exceeded People are able to adapt with difficulty (with no resettlement). Pre-impact livelihoods and lifestyles can be maintained with difficulty or with support or intervention. Disturbance of areas that have potential conservation value or are of use as resources Complete change in species occurrence or variety.
High (8)	High, measurable deterioration or harm to receptors Receiving environment highly sensitive Identified threshold often exceeded Pre-impact livelihoods and lifestyles cannot be maintained or resettlement is required
Very High / Unknown (10)	Loss of ecosystem function Loss of an irreplaceable natural resource (including cultural and heritage resources) Disturbance of pristine areas that have important conservation value Human health and or safety is compromised Receptors of impact are of conservation importance; or identified threshold (such as SANS limits, Resource Quality Objectives, etc.) consistently exceeded Unknown
Scale (S)	
Footprint (0)	Occurs only within the footprint of the activity
Site (1)	Occurs only within the site of the project
Local (2)	Occurs within approximately 2.5 km of the activity
Regional (3)	A regional scale as determined by administrative boundaries, habitat type/ecosystem or regional loss of a species population
National (4)	Nationally important or macro-economic consequences
International (5)	Internationally important agreements and resources are affected such as areas protected by international conventions, international waters etc. Unknown
Duration (D)	
Immediate (1)	Completely reversible without management Impact is instantaneous and ceases imminently
Short (2)	Naturally reversible or reversible with minimal management Ceases when the activity ceases
Medium (3)	Can be reversed with sufficient management Ceases when project ends
Long (4)	Potentially irreversible even with management
Permanent (5)	Remains after the life of the project Continues indefinitely / ad infinitum Unknown
Probability (P)	
Improbable (1)	Improbable, almost impossible
Unlikely (2)	Low probability, unlikely to occur
Likely (3)	Medium probability, likely to occur
Expected (4)	High probability, expected to occur
Definite (5)	Definite (certain) or unknown

2.2 Potential Impacts

2.2.1 Air Quality

Clearing of land and vegetation will take place at each of the 20 potential 10 m x 10 m borehole drill pad sites during surface preparations and site establishment. While additional temporary access tracks may be required to reach these sites, priority will be given to utilizing existing access tracks where possible. Clearing vegetation from both the drill pad areas and access tracks may lead to the generation of dust from the exposed surfaces. This dust creation could cause temporary nuisances and aesthetic impacts, such as reduced visibility and increased dust settlement, particularly during periods of heightened activity or high wind speeds.

- The potential impact will reduce when earth moving activities cease and vehicles are removed from site however, the impact will only cease once the soil within the disturbed areas is stabilised through successful revegetation.
- The potential impact can be mitigated by limiting areas to be cleared to the smallest extent possible and only clearing areas immediately before the area is to be developed to limit the period of erosion.
- Nuisance dust must be avoided and additional wet suppression must be implemented if necessary where dust plumes are noted.
- Cleared sites to be revegetated during rehabilitation.
- A speed limit of 20 km/h must be applied on the roads.

Given the limited extent of the areas to be cleared, the short duration of the invasive drilling activities and the implementation of the recommended mitigation measures, the significance of the impact is anticipated to be **Low** both before and after mitigation measures are put in place.

2.2.2 Noise

The use of vehicles and machines on-site, as well as operation of the drilling rig will represent a point source of nuisance noise wherever invasive prospecting activities are being undertaken.

- The noise generated is expected to be limited in extent and ceasing upon completion of drilling activities.
- The potential impact can be mitigated by limiting idling and switching off equipment when not in use and by implementing systematic (offsite) maintenance of all forms of equipment and vehicles to minimise noise.
- Activities must not be undertaken at night.

The homesteads on the property would likely be the only directly affected persons. Operations will only take place during the day and will be for a short duration, so the significance of the impact of noise is anticipated to be **Low** prior to and after the implementation of the recommended mitigation measures.

2.2.3 Cultural Heritage and Archaeology

According to the available databases, including the South African Heritage Resources Information System (SAHRIS) database, no known heritage sites or sites of archaeological significance are recorded to occur within the PR application area. The landowner has indicated the presence of grave sites on the property and these have been demarcated as no-go areas for the prospecting activities with a 100m no-go buffer area around them.

However, there are sites within the larger proximity of the PR application area that are considered Heritage Resources. According to the heritage specialist (refer to Appendix 9), there is a reasonably high risk of finding Stone Age sites or material in the PR application area. Potential Stone Age sites or material would likely consist of stone tools, which may or may not be disturbed and rock engravings. It is less likely that any Iron Age remains would be found as the site is located on the fringe of Iron Age activities. Historical sites may include farm buildings and infrastructure, mining buildings and infrastructure as well as graves.

- As recommended by the heritage specialist, a high-level site visit must be undertaken to identify potential historical and archaeological sites, buildings or structures prior to invasive prospecting activities commencing.
- The mapping of any of the above sites will enable the project team to prevent the disturbance of any of these during prospecting activities. This will likely prevent any unnecessary delays in future.
- The identified sites for drilling should be surveyed prior to commencing drilling to determine whether there is archaeological or historical material located there` and the drill site repositioned if required.. The disadvantage is that one would not know what alternative sites can be used as these will then also have to be viewed. The advantage is that it is likely to be a more cost-effective exercise than surveying the entire project area.
- The project team should however note that due to the nature of archaeological material, such sites, objects or features, as well as graves and burials may be uncovered during construction activities on site. If any sites, objects or features, as well as graves and burials are uncovered during construction activities on site, work should cease immediately and an archaeologist should be contacted as a matter of urgency.
- Known grave sites, as indicated by the landowner, have been demarcated in the prospecting footprint activities as no-go areas and are respected with a 100m no-go buffer area.
- As requested by the landowner, no permanent renovations of any kind may take place on the property and no prospecting operations within a radius of 100 m of an existing building or permanent structure are to be undertaken.
- In this regard the following Chance Find Procedure should be followed and will be added to the EMPr:
    - Upon finding any archaeological or historical material all work at the affected area must cease.
    - The area should be demarcated to prevent any further work there until an investigation has been completed.
    - An archaeologist should be contacted immediately to provide advice on the matter.
    - Should it be a minor issue, the archaeologist will decide on future action. Depending on the nature of the find, it may include a site visit.
    - South African Heritage Resources Agency (SAHRA) Archaeology, Palaeontology and Meteorites (APM) Unit may also be notified.
    - If needed, the necessary permit will be applied for from SAHRA. This will be done in conjunction with the appointed archaeologist.
    - The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
    - Work on site can only continue after the archaeologist/ SAHRA has communicated that it may proceed.

In the event that a previously unknown grave site it discovered, the grave should not be disturbed in any

way. The grave should be geo-referenced, the Northern Cape Provincial Heritage Resources Authority notified and under their authority in co-operations with SAPS, the grave will be inspected and its potential heritage protection advised.

The significance of potential damage to heritage resources of significance is **Medium** prior to mitigation and **Low** after the implementation of the recommended mitigation measures.

2.2.4 Palaeontology

The site for prospecting is covered by Quaternary sands and limestone but the target rocks for prospecting are the deeper buried iron and or manganese ores. According to the palaeontology specialist (refer to Appendix 5), although banded iron was formed by the seasonal oxidation of iron in solution by the oxygen released by the ancient algal colonies, converting ferrous iron to haematite, there are no fossil microbes preserved in the banded iron. Therefore, it is not considered to contain any trace fossils or fossils.

According to the specialist, it is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the surficial limestone, or the iron or manganese ores below ground that will be drilled. A Fossil Chance Find Protocol has been added to the EMPr in the case that fossils are discovered.

- Should fossils be unearthed and not appropriately managed, there is a risk that the fossils may not be assessed or destroyed.
- The potential impact is applicable during vegetation clearing activities, earth-moving activities and borehole drilling.
- The following Fossil Chance Find Protocol should be followed and will be added to the EMPr:
    - When drilling commences and cores are logged, the rocks must be inspected by the Environmental Control Officer (ECO) or designated person and if fossils are seen in the drill core then photographs must be provided to a palaeontologist for a preliminary assessment .
    - Photographs of similar fossils must be provided to the person to assist in recognizing the trace fossils such as stromatolites in the dolomites or the Quaternary bones, rhizoliths and traces.
    - Put any fossiliferous material (plants, insects, bone, coal) aside in a suitably protected place and send photographs of the putative fossils to the palaeontologist for a preliminary assessment and to determine if a site inspection is required.
    - If there is any possible fossil material found by the ECO then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the cores.
    - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
    - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
    - If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
    - If no fossils are found and the drilling or excavations have finished then no further monitoring is required.

- Any mitigation or management measures recommended by the specialist, after assessment of the find, must be implemented.

The significance of potential damage to paleontological resources of significance is **Medium** prior to mitigation and **Low** after the implementation of the recommended mitigation measures.

2.2.5 Surface Water Hydrology, Wetlands and Aquatic Biodiversity

A tributary of the Ga-Mogara River is situated approximately 5 km to the east of the PR application area. A few inland water areas (dry pans) have been identified by the specialist (refer to Appendix 8) within the proposed PR application area. One non-perennial, drainage line feature enters the area to the south. In addition, a few non-perennial features are located in close proximity of the PR application area. No perennial features were identified within the PR application area.

Land clearing destroys local habitat and alters the topography and associated hydrology which can lead to the degradation and/or loss of local wetlands. The removal of natural vegetation surrounding wetland features reduces the buffering capacity of the watercourses to impacts from adjacent land use activities, notably with a lowered resilience against erosion and water quality impacts. This in turn is likely to reduce aquatic fauna and flora populations and species compositions within the local area depending on the scale of prospecting activities and level of mitigation employed. Impacts include changes to the hydrological regime such as alteration of surface and subsurface run-off patterns, runoff velocities, vegetation clearing, earthworks, levelling, topsoil, and the establishment of infrastructure and roads. Altered surface run-off patterns and runoff velocities are expected to cause damage to the bed and banks of these freshwater resources through erosion, scouring and bank collapse with associated sedimentation of instream habitat. Due to the local arid climate and limited rainfall within the project area these impacts will be limited to times of precipitation events and despite the low frequency of precipitation these impacts should be considered due to the location and extent of the activity.

Any infrastructure associated with the prospecting activity, within the watercourses, will ultimately result in direct loss or the disturbance of watercourse habitat with associated alteration of hydrology. In turn, habitat disturbance may degrade habitat quality and create watercourse and habitat fragmentation. A negative shift in the biotic integrity and PES of the watercourses may be expected based on the severity of alterations or losses. Drilling rigs, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources. Additionally, leaks from ablution facilities, and indiscriminate dumping of hazardous waste could also result in the contamination of these watercourses, transporting (in addition to sediment) diesel, hydrocarbons and soil from the operational areas. Contaminated water resources are likely to influence the associated biota and vegetation communities.

The specialist identified that the majority of the project area has a low aquatic sensitivity rating, except for the dry pan wetlands, which are highly sensitive. In addition, these dry pans are likely home to a variety of invertebrates such as crustaceans and insects (mostly Branchiopods, but also Phyllopods).

A 500 m buffer around the wetland areas has been implemented as no-go areas for prospecting activities. A 32 m buffer of the drainage lines to the south will also be demarcated as a no-go area.

Mitigation measures include:

- Clearly mark buffer areas to prevent encroachment and relocate nonessential infrastructure away from freshwater zones.
- Conduct drilling activities only within designated footprints.
- Preserve vegetation cover in working areas to mitigate erosion. It is therefore preferable that construction takes place during the dry season to reduce the erosion by water and wind of the exposed surfaces.
- Remove and replace vegetation as needed during drilling, ensuring concurrent rehabilitation.
- Promptly remove alien and invasive plant (AIP) species (such as weedy annuals and other alien forbs) in line with an AIP management plan. Removal of AIP should be without herbicide use near water systems and mechanical removal used instead.
- Stockpile topsoil for site rehabilitation.
- Prevent and manage potential spills from generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete).
- Provide sanitation facilities, install amenities before drilling. Under no circumstances shall indiscriminate excretion and urinating be permitted other than in supplied facilities.
- Train contractors on environmental awareness and maintain clean work areas. Ensure all contractors and staff have undergone an induction / training on the location of sensitive "No-Go" areas and basic environmental awareness using the mitigation provided in this report.
- Use temporary structures made of materials that can be easily removed from site, and recycled or used elsewhere.
- Provide a method statement for drilling site management that includes the layout of the drilling site, amenities and wastewater / water management during drilling.
- Implement proper waste management. The temporary storage of domestic waste shall be in covered bins that must be emptied on a weekly basis. All solid waste collected must be disposed of at a licensed disposal facility.
- Implement spill response plans and prevent contamination of freshwater resources.
- No servicing of equipment on site unless absolutely necessary. Leaking equipment must be repaired immediately or be removed from site to facilitate repairs.
- All disturbed and compacted footprint areas must be rehabilitated and landscaped after drilling is complete. These areas must either be rehabilitated to the original land use or an agreed upon land use.
- Existing roads should be used where possible. Avoid the creation of concentrated flow paths wherever possible, especially along the road reserves.

It is anticipated that the project will pose risks of **Medium** significance pre-mitigation to the wetlands (if wetlands are not avoided), which can be reduced to **Low** post-mitigation and implementation of the 500 m no-go/ buffer area around the wetlands.

2.2.6 Groundwater

The northern and western part of the Lower Vaal WMA is mainly underlain by sedimentary formations and covered by Kalahari sands. Three aquifer types are present in the WMA: Intergranular and fractured, karstic and fractured. The fractured rock aquifers are not high yielding, but the dolomitic karst aquifer is well known for its high potential. The PR application area is located within the Sishen/Kathu Strategic Water Source Area for groundwater.

Water will not be abstracted for the prospecting activities and therefore there is no impact in terms of quantity of groundwater. However, drilling prospecting activities may pose point source pollutant pathways to groundwater, with hydrocarbons from the drilling process being the primary contaminants of concern.

- Should hydrocarbons be inadequately managed on-site, a local deterioration in groundwater quality with long-term implications may occur.
- This impact is mitigated by plastic lining the sump to restrict seepage to groundwater, implementation of spill prevention measures such as handling and storing hydrocarbons on impermeable surfaces.

The exposure of groundwater resources to potential impacts arising from activities required to exercise the PR is expected to be of **Low** significance prior to and after the implementation of the recommended mitigation measures.

2.2.7 Soil, agricultural potential and land capability

The land use associated with the proposed PR application area, as well as the surrounding area, is characterised by its natural, unpopulated and largely undeveloped state. Two homestead / building structures were noted within the PR application area. The PR application area is not situated within a Northern Cape Protected Agricultural Area. There are no field crop boundaries present on data observed by the specialists (DSA, 2024).

The climate capability of the area was classified as low to moderate due to the very low mean annual rainfall and arid environment. The soil capability of the area is higher in the southern portion and the area has a high terrain capability. Overall, according to the specialist the area has a low land capability and a moderate grazing capacity (DSA, 2024).

Soil in the vicinity of drilling sites may become contaminated by spills from drilling consumables, such as hydrocarbons, while erosion or improper handling and storage could impact the physical and chemical structure of topsoil. Additionally, soil integrity and fertility may suffer due to compaction from heavy machinery and inadequate topsoil management.

Unplanned events such as spills into the surrounding environment and watercourses pose significant risks, potentially contaminating habitat and water resources with hazardous chemicals and hydrocarbons. The threat of uncontrolled fire spreading to surrounding natural areas, including wetland areas and drainage lines, would lead to a loss of sensitive environments. The deterioration of these environmental aspects results in a decreasing land capability.

The potential impacts can be mitigated by:

- Planning activities, where possible, to occur on previously disturbed soil.
- Minimising areas to be disturbed by vehicles and machinery.
- Implementing an appropriate topsoil and subsoil stripping and stockpiling procedure where undisturbed soil present.
- Storing sub-soil and topsoil separately during ground clearance .
- Boreholes are to be sealed once drilling is completed.
- Rip and profile any areas of compacted soil.

- Revegetation with indigenous flora species is necessary to prevent erosion from occurring, to restore habitats to their natural state as soon as possible, and in the long term will prevent the project impacts from causing nearly irreversible desertification.
- Monitor the entire site for signs of erosion and immediately implement prevention and maintenance measures.
- A spill response kit should be available at all times.
- Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.
- Any incidents must be reported promptly. Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. Any contaminated soil must be treated in situ or be placed in containers and removed from the site for disposal in a licensed facility.
- An effective fire management plan is required to protect sensitive environments from potential loss.

The significance of the impacts of soil loss due to erosion and contamination as well as the impact of the loss of soil capability due to compaction and contamination is **Low** prior to and post the implementation of the recommended mitigation measures.

2.2.8 Terrestrial Ecology

According to the specialist assessment (refer to Appendix 7), the PR application has a low sensitivity location from a terrestrial perspective with a low likelihood of species of conservation concern occurring, however the databases had identified the potential presence of white backed vulture and Cape Sand Snake. The presence of these species has not been confirmed as access to the area was not permitted by the landowner. The dominant land use type in the project area was low shrubland (64.6%), followed by natural grassland (34.1%). From a freshwater perspective, Dry and Natural pans collectively make up 0.238% of the landcover. The assumption can be made that the vegetation in the PR application area may be in a relatively 'natural' state. Although the Ecosystem Threat Status is classified as least threatened, the project area overlaps with ecosystems that are either poorly or not protected.

The highest impacts to terrestrial biodiversity take place during the land clearing and setting up of the drilling rigs. Potential impacts include destruction and fragmentation of habitats and associated vegetation communities, introduction of alien plant species, displacement of the fauna community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching), and destruction of protected plant species. Operation of the drilling rig can lead to dust emissions and sensory disturbances to fauna as well as direct mortalities due to collisions.

Ecosystem-related impacts (including those to fauna and flora species and habitats) will cease once prospecting activities have been completed and the disturbed areas are successfully revegetated. Although the impact may be reversed naturally, rehabilitation efforts will considerably reduce the period required.

A field assessment must be undertaken prior to any drilling activities to provide site-specific mitigation measures, especially regarding the potential presence of protected vulture and snake species.

Mitigation measures include:

- A specialist to survey the drilling sites prior to establishment. The specialist is required to undertake the faunal, floral and habitat surveys as recommended by the specialist (TBC, 2024). The specialist is to identify the presence of floral and faunal species of conservation concern (SCC) and to advise

on managing alien invasive species. The specialist should also advise the revegetation measures required for rehabilitation.

- The appropriate permits are required for SCC and eradication measures for alien invasive plants.
- Vegetation clearing must be limited to the smallest extent possible.
- Where possible existing access tracks must be used.
- Avoid the introduction of AIPs and implement an AIP monitoring and eradication programme.
- No trapping or hunting of any faunal species must be allowed.
- Uncontrolled fires must not be allowed.

Where drill sites have been denuded, the surface shall be ripped or ploughed. Access tracks shall be ripped or ploughed. According to the specialist, revegetation with indigenous flora species is necessary to prevent erosion from occurring, to restore habitats to their natural state as soon as possible, and in the long term will prevent the project impacts from causing nearly irreversible desertification.

Given that the proposed activities are not deemed excessively transformative to the land, the anticipated impacts on the receiving environment are expected to be **Medium** (with a conservative indication, employing the precautionary principle that SCC features are present) and **Low** following the implementation of recommended mitigation measures.

2.2.9 Social

The project is not anticipated to extensively impact communities or individuals beyond the boundaries of the PR application area. Moreover, it is unlikely that there are individuals who rely on the ecological goods and services from the area to be disturbed. Any potential nuisance impacts such as dust and noise are addressed in Sections 2.2.1 and 2.2.2.

To mitigate safety risks associated with the proposed invasive prospecting activities for people and domestic animals, the following measures can be implemented:

- Clearly demarcate drilling sites and restrict access for safety purposes.
- Backfill any excavations (such as sumps and the borehole) upon completion of prospecting activities.
- Ensure no temporary infrastructure remains on-site.
- Remove all waste generated during the activities.
- Ensure that a landowner agreement is in place and aspects such as insurance and compensation are agreed upon therein.

The potential impact has a **Low** significance prior to and post the implementation of the recommended mitigation measures.

2.2.10 Visual Aesthetics

Given the small extent of areas intended for clearance for drilling activities and the temporary nature of infrastructure and activities, it is anticipated that no significant visual impacts will occur.

2.3 Impact Assessment Ratings

The significance rating of the impacts has been provided in Table 2.

Table 2. Impact ratings of invasive prospecting activities (borehole drilling activities)

Process	Impact	Magnitude (M)	Scale (S)	Duration (D)	Probability (P)	Significance	
						Rating [Mitigated rating]	Value
▪ Clearing and use of vehicles on access / haul roads ▪ Clearing of land, surface preparations and site establishment	Dust emissions causing temporary nuisance to nearest sensitive receptors, including nearby homesteads	4 [2]	2 [2]	2 [2]	3 [1]	Low [Low]	24 [6]
	Damage to or loss of archaeological and historic resources of significance	10 [10]	1 [1]	3 [1]	2 [1]	Medium [Low]	28 [12]
	Damage to or loss of paleontological resources of significance	10 [10]	1 [1]	3 [1]	2 [1]	Medium [Low]	28 [12]
	Direct loss or the disturbance of wetland habitat, including habitat destruction, alteration of hydrology, and potential contamination of water resources from infrastructure and operational activities	6 [4]	2 [1]	3 [1]	3 [2]	Medium [Low]	33 [12]
	Disruption in the ecological significance and serving as vital habitats for various invertebrates such as crustaceans and insects as well as bird species	8 [6]	2 [1]	3 [1]	3 [2]	Medium [Low]	39 [16]
	Direct and indirect disturbance of plants and animals: introduction of AIPs and displacement of fauna due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching)	8 [6]	2 [1]	3 [2]	4 [2]	Medium [Low]	52 [18]
	Impacts to soil chemical and physical structure due to water and wind erosion, compaction and improper topsoil management	4 [4]	1 [0]	2 [2]	3 [2]	Low [Low]	21 [12]
▪ Borehole drilling activities ▪ Operation of machinery ▪ Heavy vehicles on site ▪ Consumables and chemical handling ▪ Ablutions ▪ Waste management ▪ Rehabilitation	Borehole drilling may damage buried palaeontological or archaeological resources of significance	10 [10]	1 [1]	3 [1]	2 [1]	Medium [Low]	28 [12]
	Direct loss or the disturbance of wetland habitat, including habitat destruction, alteration of hydrology, and potential contamination of water resources from infrastructure and operational activities	6 [4]	2 [1]	3 [1]	3 [2]	Medium [Low]	33 [12]
	Disruption in the ecological significance and serving as vital habitats for various invertebrates such as crustaceans and insects as well as bird species	8 [6]	2 [1]	3 [1]	3 [2]	Medium [Low]	39 [16]
	Loss of ground water quality due to spills, in particular hydrocarbon spills, or foreign material entering the boreholes contaminating the groundwater system	6 [4]	2 [2]	4 [3]	2 [2]	Low [Low]	24 [18]
	Generation of nuisance noise during operation of drilling rig	4 [2]	1 [1]	2 [2]	3 [3]	Low [Low]	21 [15]
	Contamination of soil resources with drilling consumable fluids and hydrocarbons, as well as impacts to soil chemical and physical structure due to water and wind erosion, compaction and improper topsoil management	4 [4]	1 [1]	4 [2]	3 [2]	Low [Low]	27 [14]

Process	Impact	Magnitude (M)	Scale (S)	Duration (D)	Probability (P)	Significance	
						Rating [Mitigated rating]	Value
	Safety risks of the proposed invasive prospecting activities to people and animals	4 [2]	1 [1]	3 [3]	3 [2]	Low [Low]	24 [12]
▪ Unplanned events such as spills, fire and theft	Deterioration of sensitive wetland areas, soil quality and terrestrial ecology. Reduction in land capability.	8 [6]	2 [2]	3 [3]	2 [1]	Low [Low]	26 [11]

2.4 Post closure and decommissioning

The potential environmental and social risks during the post-closure and decommissioning phase of prospecting activities include:

- Continued loss of wetland habitat due to habitat destruction, alterations in hydrology, and the potential contamination of water resources from infrastructure and operational activities.
- Persistent disruption to the ecological significance of wetlands, affecting their role in serving as habitats for various species, including crustaceans, insects, and birds.
- Deterioration of air quality resulting from wind-blown dust originating from exposed bare soil and stockpiles.
- Soil loss resulting from changes in its physical and chemical structure due to factors such as improper handling, erosion, and contamination.
- Potential impacts on surface water and groundwater quality from hydrocarbon and silt contamination.
- Local ecosystem degradation resulting from inadequate revegetation and rehabilitation efforts, leading to a loss of biodiversity.

Since the only risks associated with the decommissioning of the proposed prospecting activities relate to the invasive borehole drilling, the prospecting activities have not been broken down into construction, operation and decommissioning phases. The significance of the risks identified was determined using the Prime Resources Risk Assessment methodology (Section 2.1). Refer to Table 3 for the post closure risk assessment.

Table 3. Assessment of potential post closure related risks associated with prospecting activities

Process	Risk	Magnitude (M)	Scale (S)	Duration (D)	Probability (P)	Significance	
						Rating	Value
Insufficient rehabilitation of drilling pads in close proximity to the buffer zones of the wetland areas	Continued loss of wetland habitat Persistent disruption to the ecological significance of wetlands	6 [4]	3 [2]	3 [2]	3 [2]	Medium [Low]	36 [16]
Unsuccessful natural revegetation Wind erosion of exposed, bare soil and denuded areas	Nuisance to nearest sensitive receptors, including the landowners' farmstead	4 [2]	1 [1]	3 [2]	3 [2]	Low [Low]	24 [10]
Pollution to the environment	Impacted ground water quality due to spills or foreign material entering the boreholes contaminating the groundwater system or entering the rivers through surface water runoff	6 [4]	3 [2]	3 [2]	3 [1]	Medium [Low]	36 [8]
Soil compaction and contamination	Local reduction in land capability and restoration of desired end land-use	6 [4]	1 [0]	3 [2]	3 [2]	Low [Low]	30 [12]
Uncapped boreholes and infrastructure remaining on site	Safety hazard to people and animals	6 [2]	0 [0]	3 [3]	3 [2]	Low [Low]	27 [10]
Unsuccessful natural revegetation	Biodiversity loss, Habitat transformation/ loss	6 [4]	1 [0]	3 [2]	3 [2]	Low [Low]	30 [12]

2.5 Cumulative Impacts

This section details the qualitative assessment of cumulative impacts, defined as the potential contribution of the project to the overall existing impacts in the surrounding area.

2.5.1 Air Quality

The Northern Cape is generally hot and dry. The main sources of air pollution in the Northern Cape are biomass burning and mining, followed by industry and motor vehicles. The prospecting activities will be temporary in nature, and no cumulative impacts on air quality are expected.

2.5.2 Aquatic Ecology, Surface Water and Wetlands

No prospecting activities are to take place within 500 m of the wetland systems and within 32 m of the drainage lines; combined with the additional mitigation measures during operation and with adequate rehabilitation of the cleared footprints, no cumulative impacts associated with proposed prospecting activities on the surrounding natural freshwater ecosystem are anticipated.

2.5.3 Groundwater

The natural occurring water quality in the WMA is generally good in the dolomitic/karstic and fractured/crystalline aquifers. In the western portion of the WMA in the Kalahari group primary (sand/gravel) aquifers and clay formations, the quality is often naturally poor with TDS values ranging from 1500 mg/l and higher. Water will not be abstracted from the boreholes drilled during prospecting and boreholes will be closed during rehabilitation. Provided the mitigation measures described in the EMPr are implemented with respect to hydrocarbon management and pollution of groundwater is avoided, no cumulative impacts are expected.

2.5.4 Noise

The typical noise rating in the area is expected to be that for rural districts with little road traffic and the temporary operation of machines during prospecting will not have a cumulative impact on noise levels.

2.5.5 Social

The prospecting works are expected to be a very small operation of a relatively short duration (3 years) and are not expected to affect the community in the surrounding area (positively or negatively). Cumulative negative social impacts are not expected.

2.5.6 Soil and Terrestrial Ecology

Prospecting activities (especially clearing of vegetation) are expected to exert an impact on the terrestrial ecology and soil resources. However, the areas to be disturbed will be relatively small in extent and impacts can be effectively managed through the implementation of the mitigation measures and rehabilitation of the site upon completion of activities. Regardless, any disturbance to natural vegetation would constitute a cumulative impact on the overall remaining extent of terrestrial ecosystems.

2.5.7 Visual Aesthetics

The prospecting operations will not alter the visual aesthetics of the area therefore no cumulative impacts are expected.

APPENDIX 11

LETTER REGARDING LAND CLAIMS

COMMISSION ON RESTITUTION OF LAND RIGHTS

OFFICE OF THE REGIONAL LAND CLAIMS COMMISSIONER: NORTHERN CAPE
1-7 D'Archy street, Crescent Building, Kimberley, 8300 | PO Box 2458, Kimberley, 8300
Tel: (053) 807 5700 | Fax: (053) 831 6501

Enquiries: **Pabalelo Mokale**

Prime Resources
7th avenue
Parktown north
Johannesburg
2193

Dear Mr / Ms B Grover

LAND CLAIMS ENQUIRY

- **Farm Gappepin Reserve 670 Portion 0 / Remaining Extent situated in the Tsantsabane Local Municipality, ZF Mgcawu District Municipality in the Northern Cape Province.**

We refer to your letter received: **11 April 2024.**

We confirm that as at the date of this letter that no land claim appears on our database in respect of the Property this includes the database for claims lodged by 31 December 1998; and those lodged between 1 July 2014 and 27 July 2016 in terms of the Restitution of Land Rights Amendment Act, 2014.

Whilst the Commission takes reasonable care to ensure the accuracy of the information it provides, there are various factors that are beyond the Commission's control, particularly relating to claims that have lodged but not yet been gazetted such as:

- Some Claimants referred to properties they claim dispossession of rights in land against using historical property descriptions which may not match the current property description; and

- Some Claimants provided the geographic descriptions of the land they claim without mentioning the particular actual property description they claim dispossession of rights in land against.

The Commission therefore does not accept any liability whatsoever if through the process of further investigation of claims it is found that there is in fact a land claim in respect of the above property.

If you are aware of any change in the description of the above property after 19 June 1913 kindly supply us with such description so as to enable us to do a further search.

Yours faithfully

pp. L Cronje
Dr. M. Du Toit
Chief Director: Land Restitution Support-Northern Cape
Date: 12.04.2024