WETLAND ASSESSMENT REPORT VERIFICATION REPORT

For the proposed Processing Plant of Universal Chrome Minerals (Pty) Ltd under Madibeng Local Municipality in Northwest Province.

Prepared By:

Segope Water & Environmental Services

—

Date: March 2025

—

WULA REF: WU41699

DOCUMENT TRACKING

Project Name	Wetland Assessment Report for the proposed proposed Chrome Processing Plant situated under Madibeng Local Municipality in Northwest Province	
WULA Ref	WU41699	
Client Details	Universal Chrome Minerals (Pty) Ltd Moreleta Park, Pretoria, Gauteng	
		Signature
Prepared by	**Dineo Makhubela** • Environmental Assessment Practitioner/Junior Specialist at Segope Water and Environmental Services • Candidate Natural Scientist, SACNASP Reg No: 158858	
Reviewed by	**Tshimangadzo Rasifudi** • Water Resource Scientist (SACNASP) • MSc in Hydrology (candidate), BSc Hons in Hydrology, BSc Chemistry and Hydrology	
Reviewed and Approved by	**Letladi Maisela (Pr. Nat. Sci.)**	

This report should be cited as 'Segope Water and Environmental Services, 2024. Wetland Assessment Report. Prepared for Universal Chrome Minerals.'

Disclaimer

This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Segope Water and Environmental Services and Universal Chrome Minerals. The scope of services was defined in consultation with Universal Chrome Minerals, by time and budgetary constraints imposed by the client, and the availability of reports and other data on the subject area. Changes to available information, legislation, and schedules are made continuously, and readers should obtain up-to-date information. Segope Water and Environmental Services accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report and its supporting material by any third party. The information provided is not intended to be a substitute for site-specific assessment or legal advice concerning any matter. Unauthorized use of this report in any form is prohibited

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Universal Chrome Minerals (Pty) Ltd (henceforth called UCM) formally appointed Segope Water and Environmental Services (also referred to as Segope Consulting) to undertake the Wetland Assessment Study for the proposed chrome processing plant development on portion 50 of the farm Boschfontein 458 JQ under Madibeng Local Municipality in Northwest Province. The proposed Chrome Processing Plant is a new application, and it has been lodged on the EWULAAS with the WULA Reference: WU41699.

UCM plans to establish a chrome processing plant within portion 50 of the farm Boschfontein 458 JQ under Madibeng Local Municipality, focusing exclusively on mineral processing rather than mining activities. The facility will process low-grade chrome minerals sourced from other operating mines, utilizing a combination of mechanized processing equipment and manual hand-picking techniques to ensure efficiency and quality control.

The planned operations will encompass several key activities, including stockpiling, screening, washing, and loading of chrome minerals for further use or distribution. Given the nature of these activities, UCM's operations trigger the requirement for a Water Use Licence (WUL) under the National Water Act. Specifically, the project activates water uses under sections 21(a) (taking water from a resource), 21(b) (storing water), and 21(g) (disposing of waste that may affect water resources). To ensure compliance, Segope Consulting conducted an enviro-legal assessment, which confirmed that UCM’s activities fall under three water use categories, making the WUL application essential for the project's approval and operation.

According to the site layout plan, the additional South 3 Opencast Project will follow the conventional open-cast methods, which include stripping of 40 to 60 thousand tons per month (tpm) with concurrent backfill. The ore from the open pit will be extracted by a combination of excavation, crushing, washing, and concentration, then be transported by truck to the primary crusher stockpile, and waste will be disposed of at waste dumps on the surface. The project area will be comprised of the following infrastructures (see **Figure 1**):

- Wash Plant
- Screening, Crushing, and Washing machines
- Waste Water Treatment plants (Raw water and process water dam)
- Energy Centre (Generator)
- Administration buildings
- Stockyard (Unprocessed and Processed Material)
- Workshop

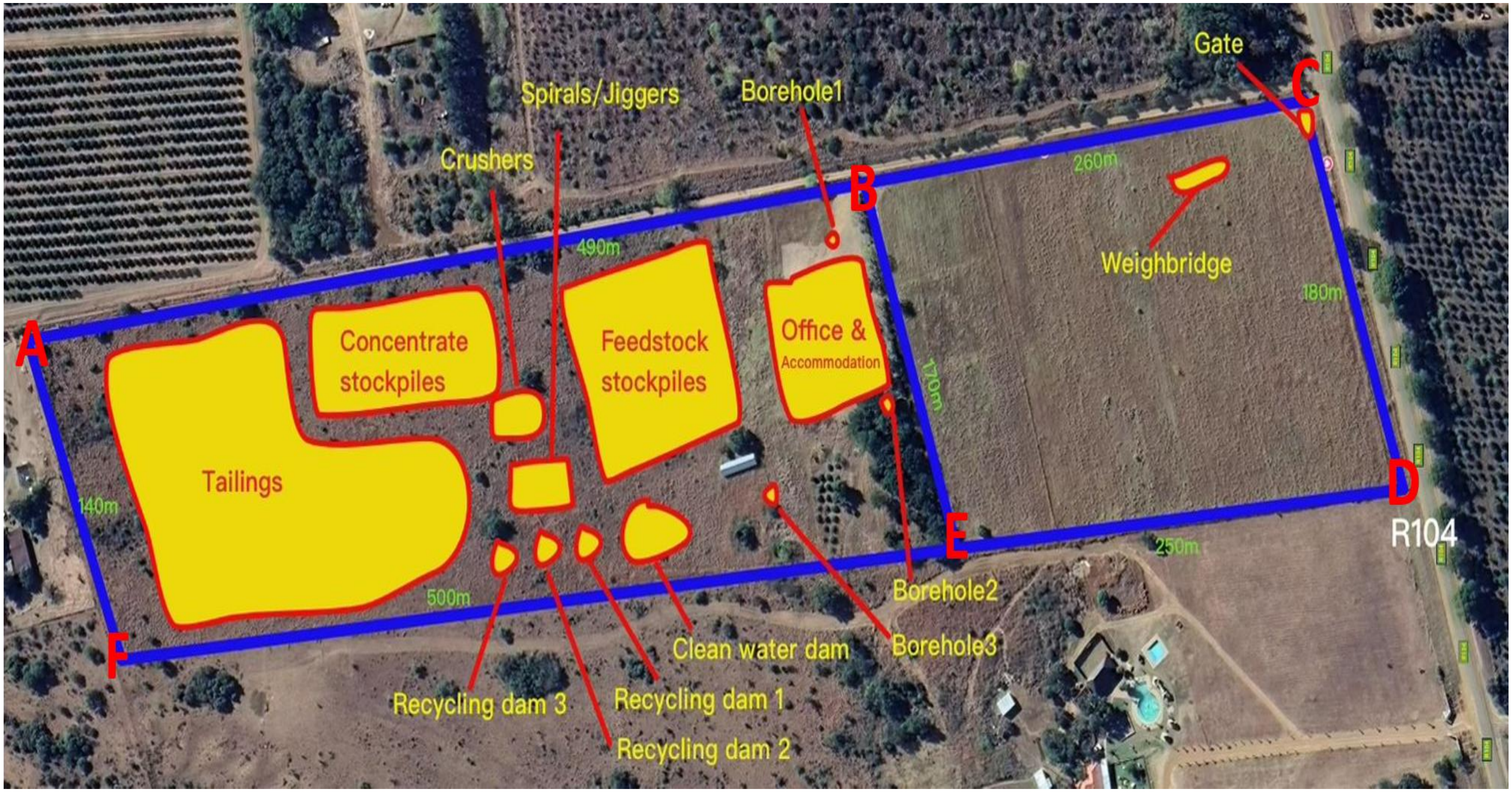


Figure 1: Proposed Chrome Plant layout plan (Universal Chrome Minerals, 2025)

1.1. Purpose of the report

In accordance with the Water Use License Application (WULA) regulations, it is standard practice to conduct a wetland study as part of the specialist assessments required for the application. The necessity of a particular specialist study is determined by the environmental sensitivities of the site, as identified using the Department of Forestry, Fisheries, and the Environment's (DFFE's) national web-based environmental screening tool. For this project, the screening tool classified the Aquatic Biodiversity sensitivity of the project area as low.

As per Section 1 of the Aquatic Biodiversity Protocol (2020), an applicant intending to undertake an activity within an area identified as having "very high sensitivity" for aquatic biodiversity must submit an Aquatic Biodiversity Specialist Assessment. If any part of the proposed development footprint falls within an area of very high sensitivity, the assessment and reporting requirements for the very high sensitivity classification apply to the entire footprint. In this context, the development footprint includes all areas of proposed disturbance related to the project. However, in this case, the screening tool has not flagged the site for high aquatic biodiversity sensitivity.

The primary purpose of this report is to verify and confirm the absence of wetlands in the proposed project area, as indicated by the national environmental screening tool. This verification process was conducted through both desktop and site assessments to ensure accuracy in the findings. The verification process followed a two-step approach. A desktop assessment was conducted using the National Freshwater Ecosystem Priority Areas (NFEPA) wetlands database and the DFFE Protected Areas Portal. Both datasets indicated that the proposed project site is located approximately 500 meters away from the nearest mapped wetland. No wetlands were identified within the actual development footprint based on the desktop analysis. To validate the desktop findings, field assessments were conducted on 15 November 2024 and 18 March 2025.

1.2. Project Area Description

UCM is located within portion 50 of the farm Boschfontein 458 JQ under Madibeng Local Municipality in Northwest Province. The project area is situated approximately 4.47 km east of Majakaneng town, about 113 m east of Edrange Luxury Lodge, and can be accessed using the regional road R104. The geographic location where the water will take place: 25°43'14.19"S,27°43'2.53"E, refer to **Figure 2**.

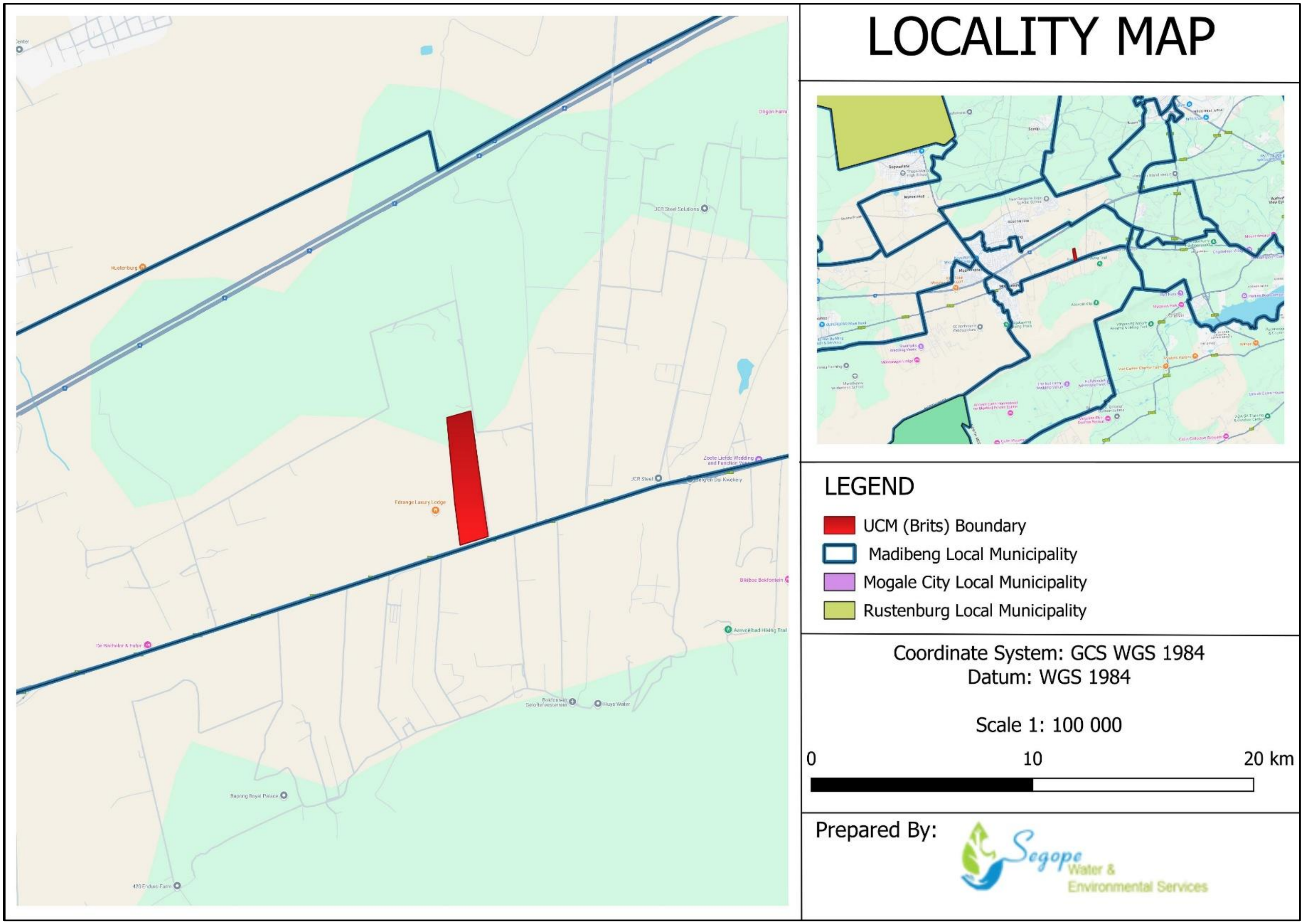


Figure 2: Locality Map for the proposed development *(Segope Consulting, 2025)*

2. DESCRIPTION OF THE BIOPHYSICAL ENVIRONMENT

2.1. Climate

Climate plays a significant role in the formation, characteristics, and maintenance of wetlands, and it is an important factor in wetland assessment. Wetlands are transitional areas between terrestrial and aquatic ecosystems, and they are particularly sensitive to changes in climate. The proposed project area falls under Brits, where the summers are long, warm, and partly cloudy, and the winters are short, cool, dry, and clear. Over the course of the year, the temperature typically varies from 5°C to 30°C and is rarely below 2°C or above 33°C.

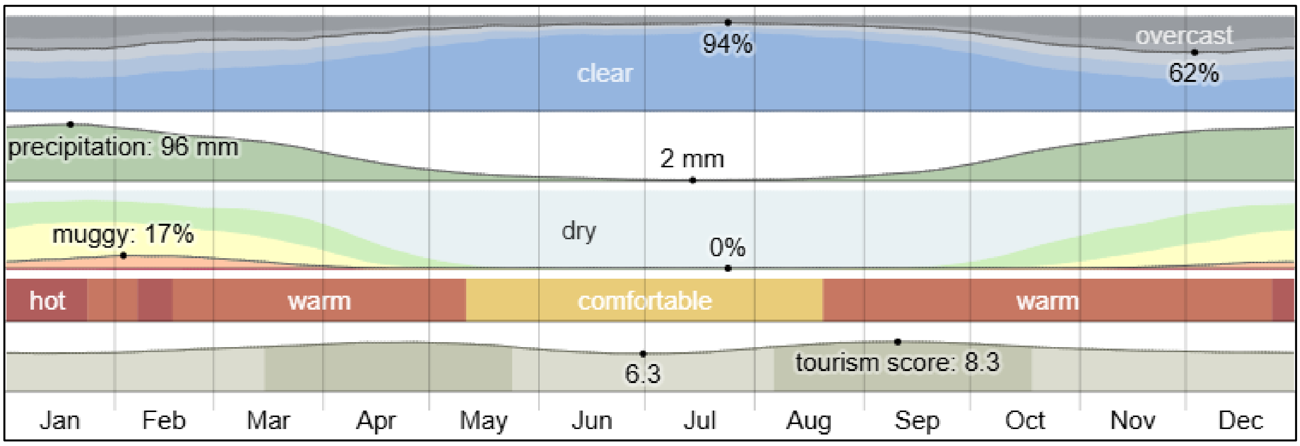


Figure 3: Brits weather by month *(weatherspark.com)*

Precipitation

The chance of wet days in Brits varies very significantly throughout the year. The wetter season lasts 5.5 months, from October 18 to April 2, with a greater than 26% chance of a given day being a wet day. The month with the most wet days in Brits is December, with an average of 15.4 days with at least 1 millimetre of precipitation. The drier season lasts 6.5 months, from April 2 to October 18. The month with the fewest wet days in Brits is July, with an average of 0.3 days with at least 1 millimeter of precipitation.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Brits is December, with an average of 15.4 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 51% on December 18, Refer to **Figure 4**.

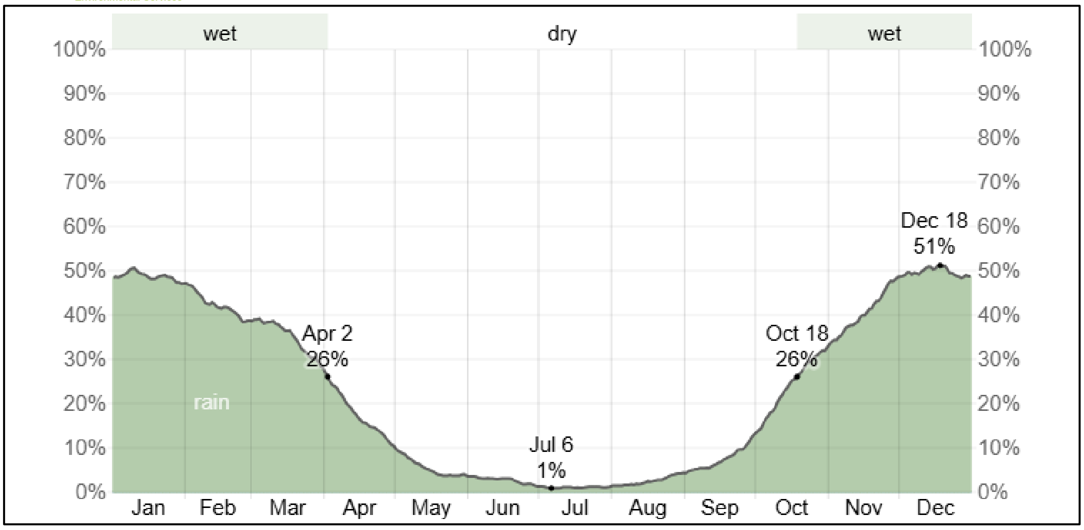


Figure 4: Daily Chance of Precipitation in Brits *(weatherspark.com)*

2.2. Regional vegetation

The proposed project area is located in the SVcb 8 Moot Plains Bushveld (Low & Rebelo, 1996) (see **Figure 5**). The vegetation unit is mostly found in North-West and Gauteng Provinces. The Main belt occurs immediately south of the Magaliesberg from the Selons River Valley in the west through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartebeestpoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria. It also occurs as a narrow belt immediately north of the Magaliesberg from Rustenburg in the west to just east of the Crocodile River in the east, also south of the Swartruggens–Zeerust line on an altitude that ranges between 1 050–1 450 m.

Vegetation & Landscape Features: Open to closed, low, often thorny savanna dominated by various species of Acacia in the bottomlands and plains, as well as woodlands of varying height and density on the lower hillsides. The herbaceous layer is dominated by grasses.

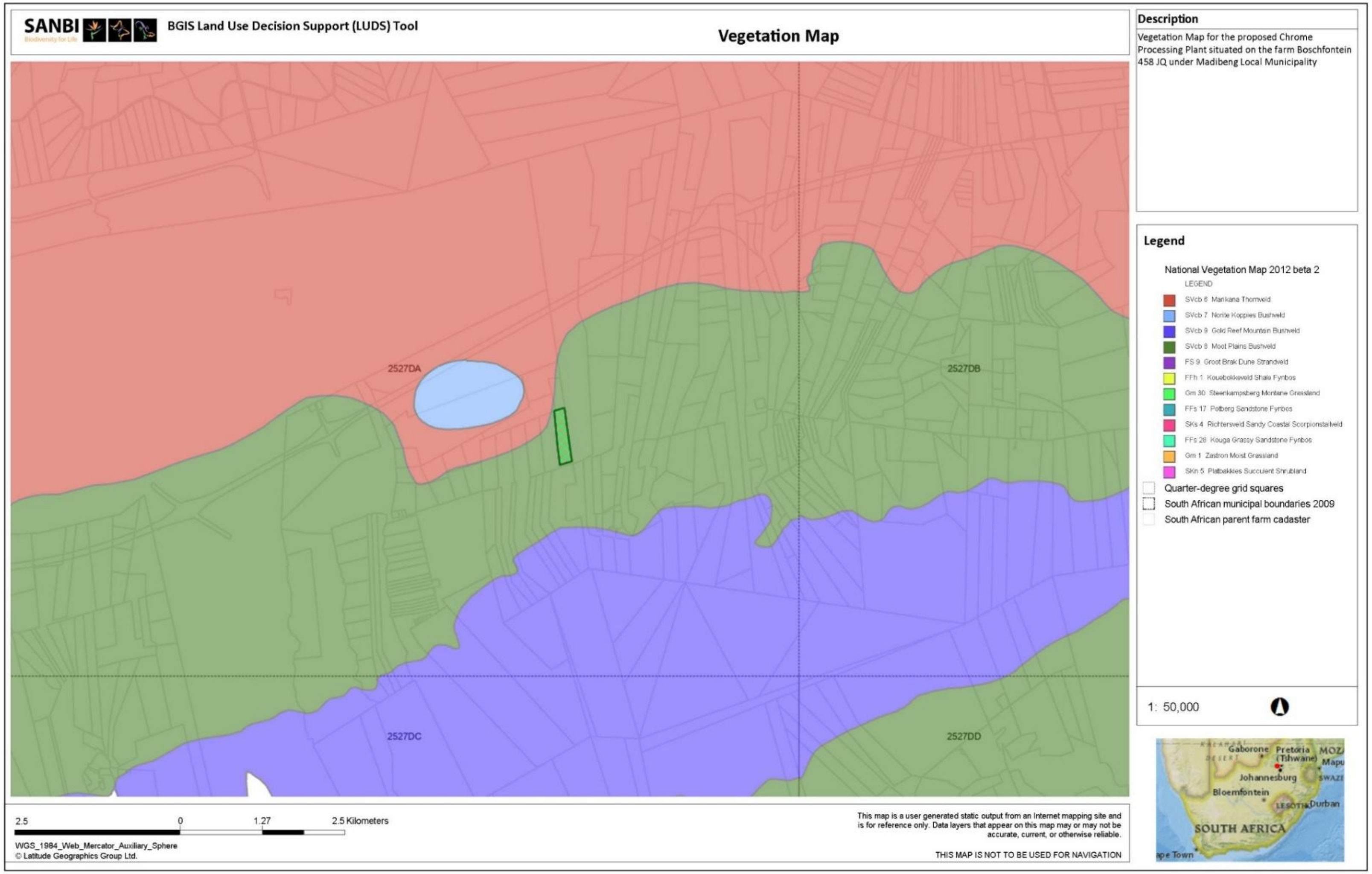


***Figure 5: Vegetation type for the proposed project area** (Segope Consulting, 2025).*

2.3. Topography

The topography of the project area is characterized by a broad, relatively flat land with an altitude of between 750-800 metres above mean sea level (mamsl). The topography of the project site is highly influenced and, in most cases, is directly related to the underlying geology and the past and present climatic/drainage conditions. The topography of the project site is shown in Error! Reference source not found. below.

The proposed chrome processing activity is situated in the Crocodile (West) and Marico (WMA), in quaternary catchment A21J. The A21J catchment is drained by the main Crocodile River. The hydrology of the project site is indicated in **Figure 8** below.

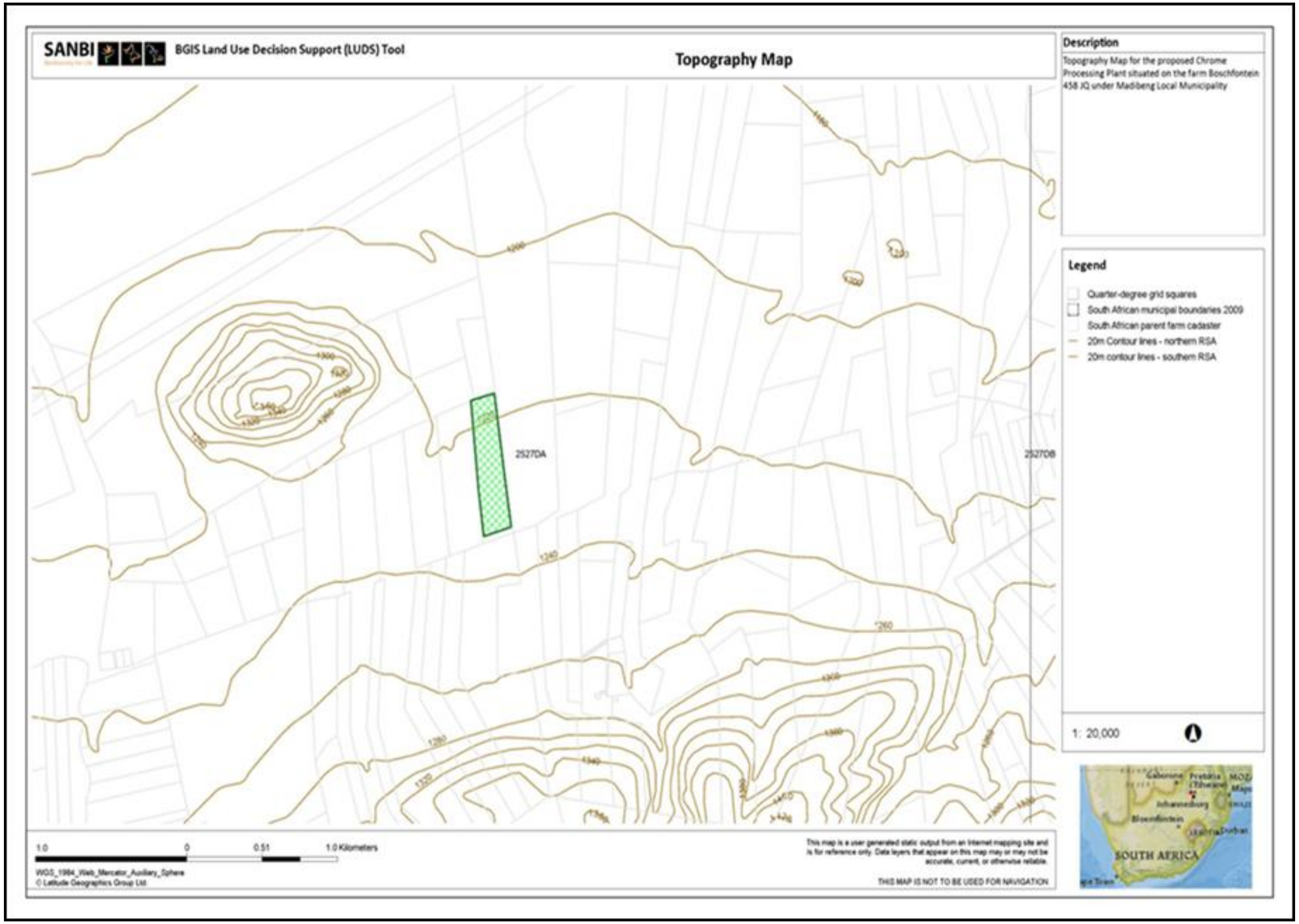


Figure 6:Topographic Setting of the project site (Segope Consulting, 2025)

2.4. Soil

Soils can vary widely in their color and base status (pH) due to different factors such as parent material, climate, vegetation, and human activities. Undifferentiated clays, red, yellow, and greyish soils with low to medium base status can be found in various parts of the world, and they each have specific characteristics and properties.

Geology & Soils Clastic: Sediments and minor carbonates and volcanics of the Pretoria Group (including the Silverton Formation) and some Malmani dolomites in the west, all of the Transvaal Supergroup (Vaalian). There is also some contribution from the mafic Bushveld intrusive. Soils are often stony with colluvial clay-loam but varied, including red-yellow apedal freely drained, dystrophic and eutrophic plinthic catenas, vertic and melanic clays, and some less typical Glenrosa and Mispah forms. Land types Ae, Ba, Ea, Bc, Ac, and, less typically, Fb.

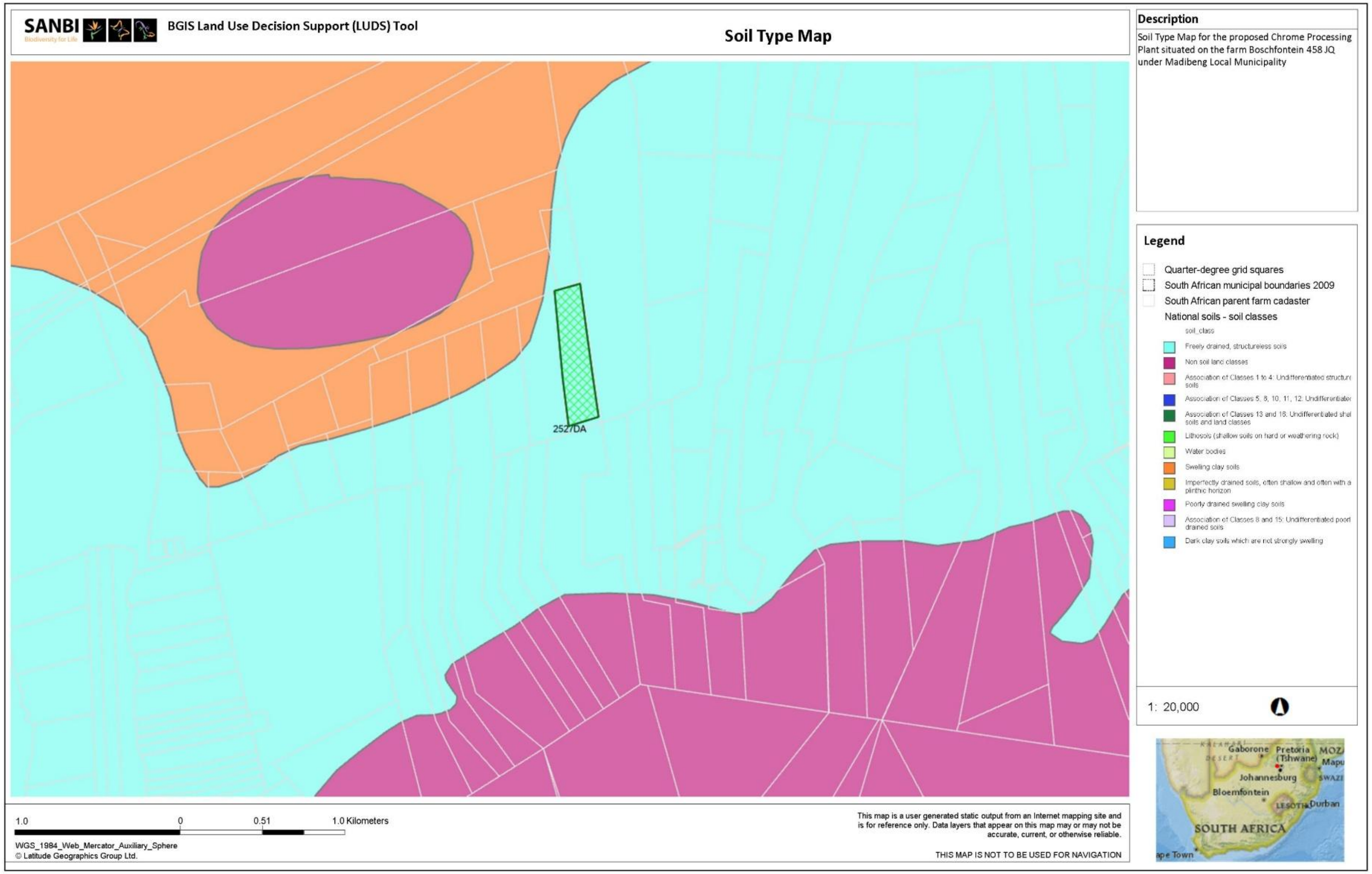


Figure 7: *The soil types of the proposed project area* *(Segope Consulting, 2025)*

2.5. Aquatic Biodiversity Indicators

The Hydrology Map indicates that the project area does not contain any wetlands within 500 m of the study boundary however, the is a non-perennial river about 100 m from the project boundary (refer to **Figure 8**). The project area falls within the A21J Quaternary Catchment, which forms part of South Africa's hydrological classification system developed by the Department of Water and Sanitation (DWS).

The A21J Quaternary Catchment is a sub-catchment of the A21 Primary Catchment, which is situated within the Crocodile (West) and Marico Water Management Areas (WMA). The A21J catchment is drained by the main Crocodile River.
).

- **Location and Drainage:** The A21J catchment is primarily drained by tributaries that eventually feed into the larger Crocodile River system (**Figure 8**), which is one of South Africa’s most economically significant river systems.
- **Hydrological Significance:** The A21J quaternary catchment plays a role in local groundwater recharge, surface runoff, and water resource management. Despite the absence of wetlands and major waterbodies within the project area, the broader catchment influences hydrological processes such as infiltration, groundwater movement, and seasonal water availability (Schulze et al., 2005).
- **Environmental and Regulatory Considerations:** Projects within the A21J catchment must comply with water-use regulations under the National Water Act (Act No. 36 of 1998), particularly concerning groundwater abstraction, stormwater management, and potential downstream impacts. The 500 m buffer regulation for wetlands and watercourses (DWS, 2014) is an important consideration during environmental assessments, even if no direct water features exist within the project boundary.

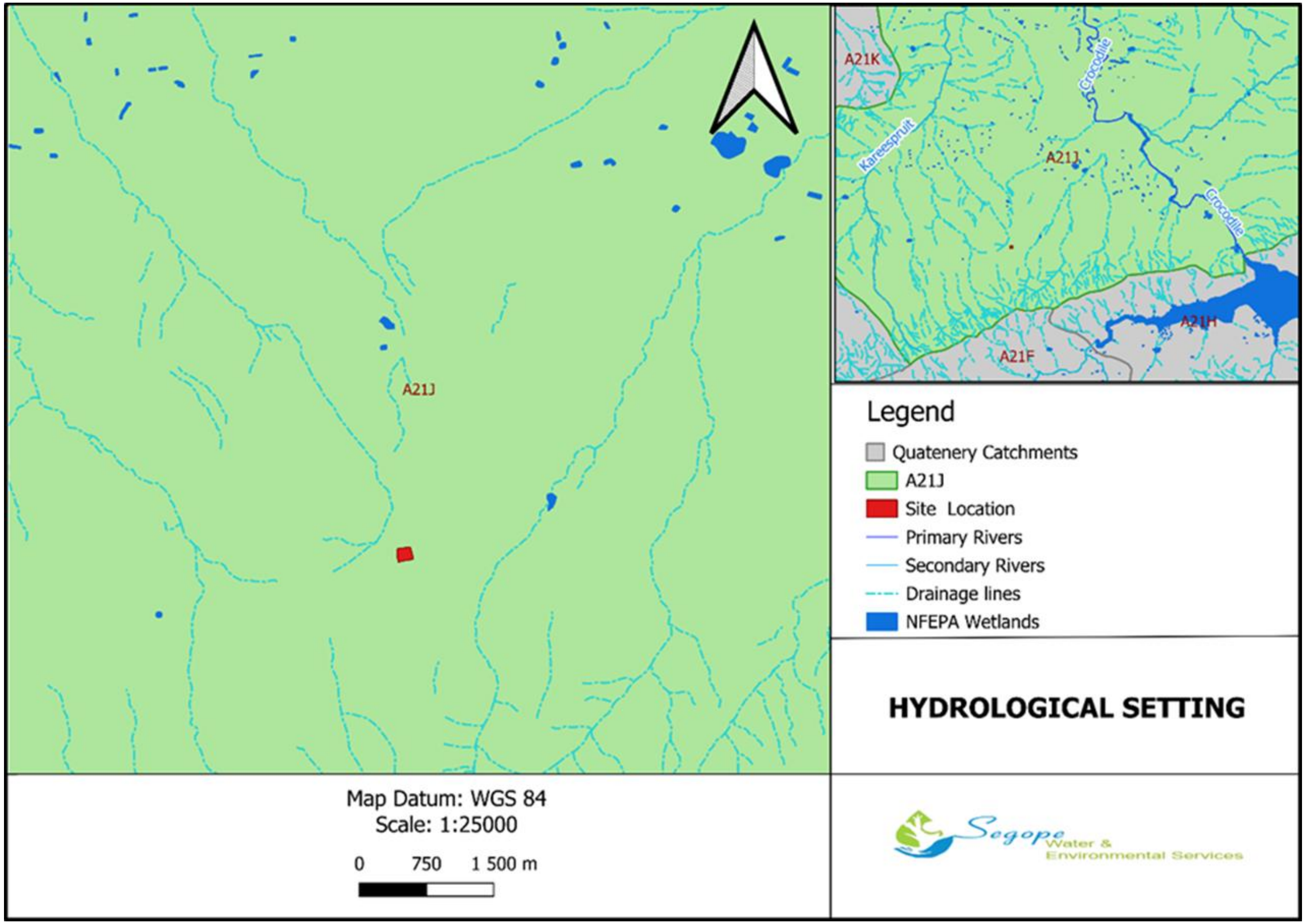


Figure 8: A Hydrological map for the proposed project area *(Segope Consulting, 2025)*

3. METHODOLOGIES

The aim of the study was to identify and delineate all aquatic and wetland ecosystems within 500m of the project site that are going to be measurably impacted by the project activities, evaluate these in terms of their present functionality and health, and assess the potential impacts and risks associated with the proposed development. The following datasets and resources were utilized for the desktop assessment.

3.1. Delineation

The wetland areas are delineated in accordance with the Department of Water Affairs and Forestry (DWAF,2005) guidelines, a cross-section is presented in **Figure 9** below.

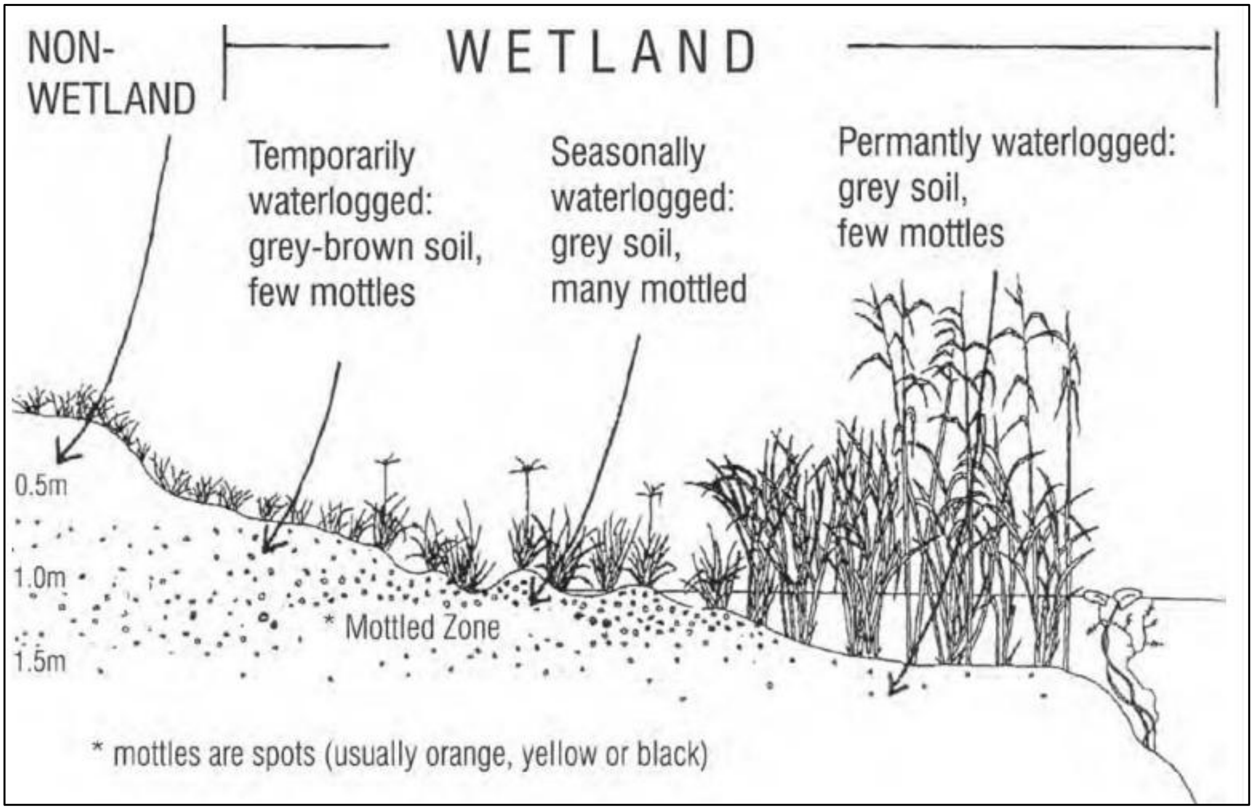


Figure 9: Cross section through a wetland, indicating how the soil wetness and vegetation indicators change as one moves along a gradient of decreasing wetness, from the middle to the edge of the wetland. *(Donovan Kotze, University of KwaZulu-Natal.)*

The outer edges of the wetland's areas were identified by considering the following four specific indicators:

3.1.1. Terrain Unit indicator

The indicator helps to identify those parts of the landscape where wetlands are more likely to occur. It should be noted that the terrain unit indicator is an important practical index for identifying those parts of the landscape where wetlands are likely to occur. Some wetlands occur on steep to mild slopes higher up in the catchment, where groundwater discharge is taking place through seeps, which may not be recognizable as depression areas.

A wetland usually qualifies as a valley bottom unit (see **Figure 10**) as defined by (McVicar et al , 1977). However, Unit 5 may also occur as a depression on a crest (1), midslope (3), or foot slope (4), as depicted in Figure below, and can then be described as 1(5), 3(5), or 4(5) respectively.

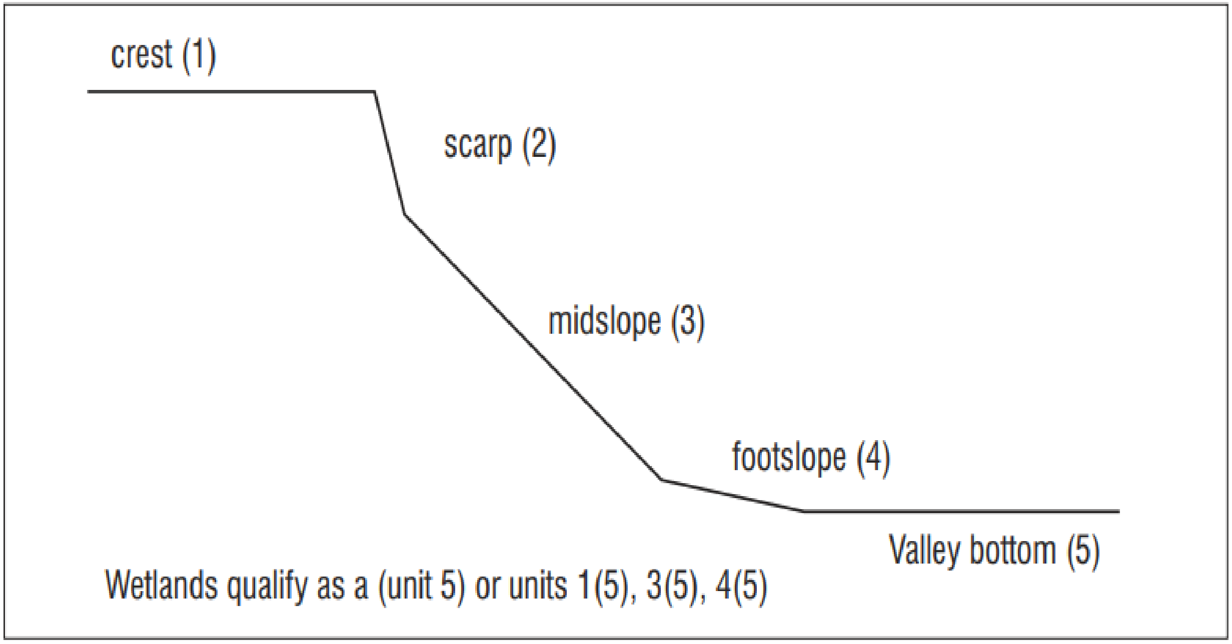


Figure 10: terrain Units *(Forestry, 2005)*

3.1.2. Soil Form Indicator

The soil form indicator identifies the soil forms, as defined by the (Soil Classification working , 1991) which are associated with prolonged and frequent saturation. Soil Forms are a particular level of a soil classification system that was developed to describe South African soils xi. The classification system uses the types and associations of soil and sub-soil layers (horizons) to classify different soil forms. Although primarily developed to assess agricultural potential, soil forms are useful indicators of possible wetland presence since there are **four soil forms** only associated with wetlands, and several that can be present in seasonal or temporary wetland areas.

The **permanent zone** will always have **Champagne, Katspruit, Willowbrook,** and **Rensburg** soil forms as they ALWAYS denote wetlands as defined by the (Soil Classification working , 1991). These soil forms are diagnostic of wetlands and are associated with permanently or seasonally saturated wetlands. However, the **seasonal and temporary zones** will have one or more of the following soil forms present:

Table 1: Soil Forms found within the seasonal and temporary zones.

Signs of wetness incorporated at the form level	Kroonstad, Longlands, Wasbank, Lamotte, Estcourt, Klapmuts, Vilafontes, Kinkelbos, Cartref, Fernwood, Westleigh, Dresden, Avalon, Glencoe, Pinedene, Bainsvlei, Bloemdal, Witfontein, Sepane, Tukulu, Montagu
Signs of wetness incorporated at the family level	Inhoek, Tsitsikamma, Houwhoek, Molopo, Kimberley, Jonkersberg, Groenkop, Etosha, Addo, Brandvlei, Glenrosa, Dundee.

3.1.3. Soil Wetness Indicators

Soil Wetness Indicators identify the morphological signatures developed in the soil profile as a result of prolonged and frequent saturation. Wetland soils can be permanently, seasonally, or temporarily saturated. The colors of various soil components are often the most diagnostic indicator of hydromorphic soils. The colors of these components are strongly influenced by the frequency and duration of soil saturation. Generally, the higher the duration and frequency of saturation in a soil profile, the more prominent grey colors become in the soil matrix.

Where the soil is only saturated on a seasonal basis (at least 3 months per year); the greying may not be extensive. Instead, due to alternating periods of iron being dissolved and then oxidized, a mottled appearance develops in the soil. Consequently, it is possible to identify wetland areas based on soil color, while mottle hue and chroma initially increase and then decrease the more saturated the soils become (see **Table 2** below)

Table 2: Relationship between degree of wetness (wetland zone) and vegetation *(Kotze et al, 1994)*

Temporary Zone	• Soil Depth (0-50 cm) : Few / no mottles, Non-sulphuric • Vegetation: Predominantly grass species
Seasonal Zone	• Soil Depth (0-50 cm) :Many mottles, Seldom sulphuric • Vegetation: Predominantly sedges and grasses
Permanent Zone	• Soil Depth (0-50 cm) :Few / no mottles Often sulphuric • Vegetation: Predominantly reeds and sedges

3.1.4. Vegetation Indicator

Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils. When using vegetation indicators for delineation, emphasis is placed on the group of species that dominate the plant community, rather than on individual indicator species. Thus, the presence of scattered individuals of an upland plant species in a community dominated by hydrophilic species is not sufficient to conclude that the area is not a wetland. Likewise, the presence of a few individuals of a hydrophilic species in a community dominated by upland species is not a sufficient basis for concluding that the area is a wetland. A more precise method for employing vegetation as an indicator of wetland conditions uses a broad classification prepared by (Kotze and Marneweck, 1999) see **Table 3** below.

Table 3: Relationship between wetness zones and vegetation types *(Forestry, 2005)*

Vegetation Types	Zones		
	Temporary	**Seasonal**	**Permanent/Semi-permanent**
If herbaceous	Predominantly grass species; a mixture of species that occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas	Hydrophilic sedge and grass species are restricted to wetland areas.	Dominated by: ❖ emergent plants, including reeds (Phragmites australis), a mixture of sedges and bulrushes (Typha capensis), usually >1m tall; or ❖ (2) floating or submerged aquatic plants
If woody	A mixture of woody species which occur extensively in non-wetland areas, and hydrophilic plant species which are restricted largely to wetland areas.	Hydrophilic woody species, which are restricted to wetland areas	❖ Hydrophilic woody species, which are restricted to wetland areas. ❖ Morphological adaptations to prolonged wetness (e.g. prop roots)

3.2. Present Ecological Status (PES)

The overall approach is to quantify the impacts of human activity or visible impacts on wetland health, and then convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of the impact of individual activities/occurrences and then separately assessing the intensity of the 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 4** below.

Table 4: The PES categories *(Macfarlane et. al.,, 2009)*

Impact Category	Present State Category	Description	Impact Score Range
None	A	Unmodified, natural	0 to 0.9
Small	B	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
Moderate	C	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
Large	D	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9
Serious	E	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
Critical	F	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

3.3. Ecosystem Services

The assessment of the ecosystem services supplied by the identified wetlands was conducted as 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 in **Table 5.**

Table 5: 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

3.4. Ecological Importance and Sensitivity (EIS)

The method used for the EIS determination was adapted from the method provided by DWS (1999) for floodplains. The method takes into consideration PES scores obtained for WET-Health as well as function and service provision to enable the assessor to determine the most representative EIS category for the wetland feature or group being assessed. A series of determinants for EIS are assessed on a scale of 0 to 4, where 0 indicates no importance and 4 indicates very high importance. The mean of the determinants is used to assign the EIS category as listed in **Table 6**.

Table 6: Description of EIS Categories.

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

3.5. Buffer Zone Determination

A buffer zone is defined as “A strip of land with a use, function or zoning specifically designed to protect one area of land against impacts from another.” (Macfarlane, et al.,, 2014). Buffer zones protect water resources in a variety of ways, such as;

- Maintenance of basic aquatic processes;
- The reduction of impacts on water resources from activities and adjoining land uses;
- The provision of habitat for aquatic and semi-aquatic species;
- The provision of habitat for terrestrial species; and
- The provision of societal benefits.

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.

3.6. Field survey

A field survey was conducted to assess the project area, and soil samples were evaluated in hand for soil composition, color, number, size, and chroma of mottles as well as wetness, after which they were discarded. The following equipment was used:

The equipment used included:

- Auger
- Measuring Tape,
- GPS
- Telephone (Plant Net, Google Maps and SW Maps)

Table 7: Site pictures and description

Description	Site pictures and equipment
The soil auger was used to extract the cores to a depth of 50cm	Auger 
The depth of the hole is measured using the measuring tape after identifying the different layers of soil.	Measuring Tape 
Some of the vegetation species were identified using the Plant Net website, and a Google KML was also used to find the project area.	Plant Net and Google Maps Website

4. LIMITATIONS

It is important to note that this assessment was undertaken in a short period, with limited field verification. The following limitations were encountered during this study:

- Wetland boundaries are estimated primarily using desktop data and limited field verification.
- The assessment of impacts and potential rehabilitation outcomes is guided by a structured process, but it is based on opinion rather than exact science.

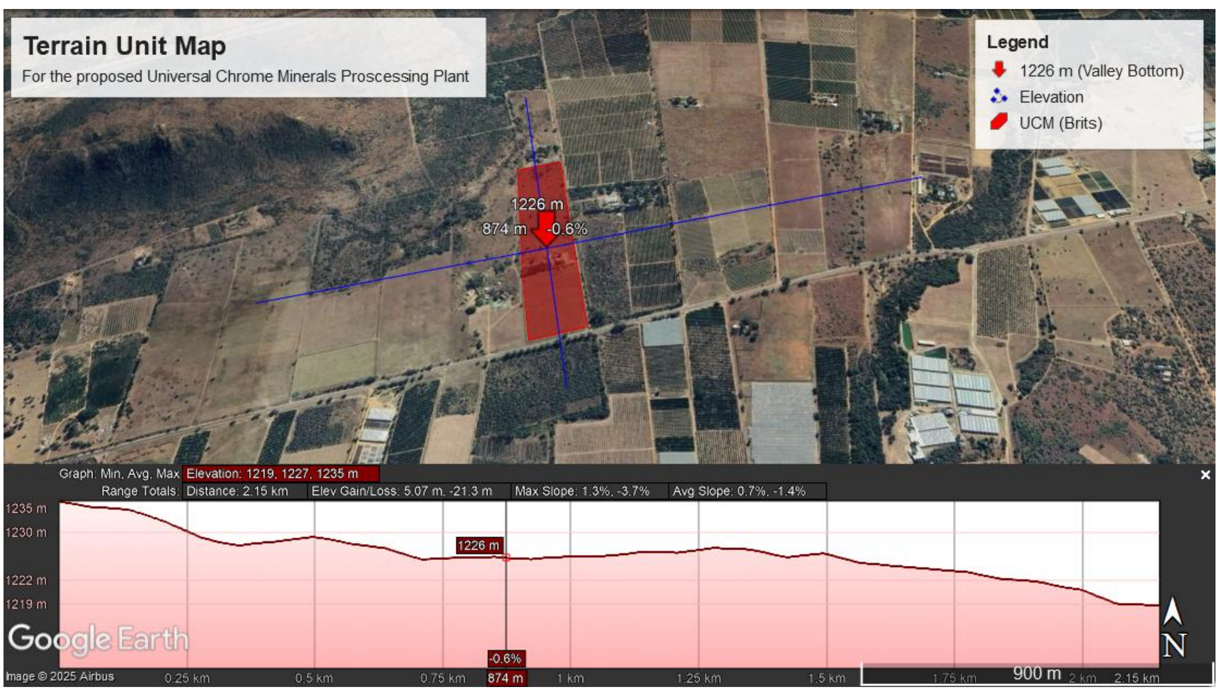
5. SITE ASSESSMENT AND RESULTS

4.1. Wetland delineation

The wetland delineation was completed with the aid of aerial imagery, as well as verification in the field. The project area covers approximately 11.7 hectares, and no wetlands were spotted or observed onsite. The delineation was conducted using the four specific indicators as mentioned in Section 3, namely Terrain Unit, Soil form, Vegetation, and Hydrology indicators.

4.1.1. Terrain Unit Indicator

The project area consists of two terrain units, namely midslope and valley bottom, and as shown under section 3.1.1 above, the mentioned terrain unit alone does not qualify for the wetland to be formed. It should be noted that the terrain unit indicator is an important practical index for identifying those parts of the landscape where wetlands are likely to occur.



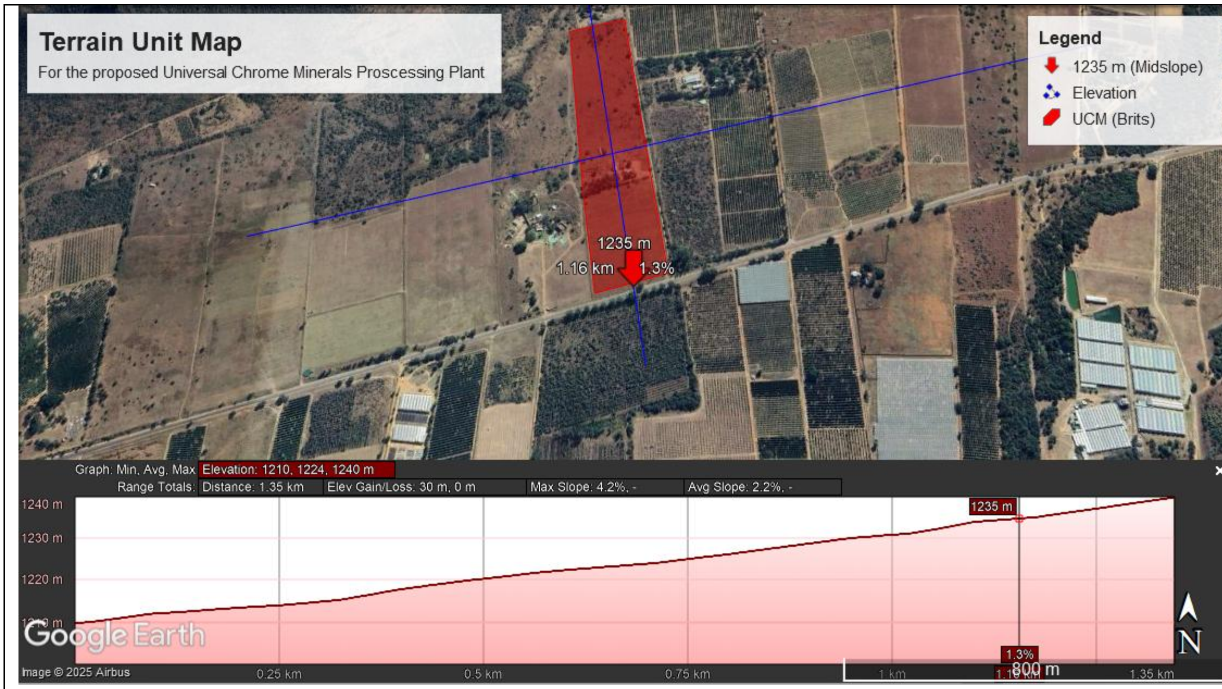


Figure 11: Terrain Unit Map for the proposed mining project *(Segope Consulting, 2025)*

4.1.2. Wetland plants (Hydrophytes)

The proposed project area is situated within the Moot Plains Bushveld vegetation ecosystem, which is considered Least Concern according to the South African National Biodiversity Institute (SANBI) 2022 Ecosystem Red list. The ecosystem consists of predominantly open to closed, low, often thorny savanna dominated by various species of Acacia in the bottomlands and plains, as well as woodlands of varying height and density on the lower hillsides. The herbaceous layer is dominated by grasses.

This ecosystem has a broad range of pressures. Agriculture is a key pressure on this ecosystem type, with 185.78 km2 of the ecosystem consisting of croplands and a further 307.46 km2 of old fields. Urban development has also been a pressure, with 169.29 km2 of built-up areas. Mining impacted 11.53 km2 of the ecosystem. Artificial water bodies cover 34.72 km2. Additionally, the ecosystem is degraded by alien invasion by Cereus jamacaru, Eucalyptus species, Jacaranda mimosifolia, Lantana camara, Melia azedarach, and Schinus species, as well as erosion, which has degraded 0.93 km2 of the ecosystem (Rutherford et al. 2006).

However, the conservation efforts are considered important because this vegetation type has been classified as “vulnerable.” Approximately 13% of it has officially been conserved within the Magaliesberg

Protected Environment. However, there is a growing threat by the increase in built-up areas accompanied by the intensification of cultivation, with 28% already being transformed (Ecology Study by Segope Consulting, 2025).

Following the site visit, we noted that no hydrophytes were present at the location. The species identified during the assessment are detailed in the tables below for your review.

Table 8: Tree species found on site

Scientific Name	Common Name	Conservation Status	Ecology
Afrocarpus falcatus	Outeniqua yellowwood	Least Concern	Indigenous
Faidherbia albida (Delilw) A. Chev	Ana Tree	Least Concern	Indigenous
Ledebouria revolute (L.F) Jessop	Common African hyacinth	Least Concern	Indigenous
Aloe greatheadii Schonland	Spotted Aloe	Least Concern	Indigenous
Vachellia Karoo (Hayne) Banfi & Galasso	Sweet Thorn	Least Concern	Indigenous
Ziziphus mucronata wild.	Buffalo thorn	Least Concern	Indigenous
Senecio purpureus	Tall marsh senecio	Least Concern	Endemic to South Africa
Erythrina lysislemon Hutch.	Common coral tree	Least Concern	Indigenous

Table 9: Grasses found on site

Scientific Name	Common Name	Conservation Status	Ecology
Microchloa kunthii	Kunth's small grass	Least Concern	Indigenous

Table 10: Invasive species found on site

Scientific Name	Common Name	Rating
Veronica peregrina L	Purslane speedwell	Not rated
Lantana viburnoides Forsak. Vahl	Common Lantana	Category 1b- NEMBA
Albizia Lebbeck (L) Benth. Biris Tree	Lebbeckboom	Category 1b- NEMBA

4.1.3. Wetland Soils (Hydromorphic)

Soils can vary widely in their colour and base status (pH) due to different factors such as parent material, climate, vegetation, and human activities. Undifferentiated clays, red, yellow, and greyish soils with low to medium base status can be found in various parts of the world, and they each have specific characteristics and properties.

The soil in the project area falls within the land type Bc8, which is typically characterized by shallow to moderately deep soils often underlain by hard rock or weathered material. The dominant potential soil forms in this area include Mispah, Hutton, Avalon, and Kroonstad, which are commonly associated with diverse soil properties and land uses.

These soil forms are part of a plinthic catena, indicating a sequence of soils that occur along a slope and are influenced by drainage patterns and water movement. The presence of plinthic horizons—often hardened layers rich in iron and aluminium—suggests seasonal waterlogging and redox processes, which may influence land use capability and vegetation patterns.
The area also features red apedal soils, which are typically well-drained and structureless (lacking in distinct soil aggregates), making them moderately suitable for various agricultural and development activities depending on the depth and fertility. These red soils are indicative of oxidized conditions, often found on well-drained slopes or plateaus.

Overall, the soil conditions present in the proposed project area should be carefully considered for their implications on construction suitability, erosion potential, and environmental sensitivity, particularly in the context of the proposed Chrome Processing Plant development under the Madibeng Local Municipality.

Figure 12: View of soil forms within the study area *(Segope Consulting, 2025).*

4.1.4. Hydrology

The hydrology is primary driving force behind all wetlands is water. However, due to its dynamic nature varying daily, seasonally, and annually, it is not a very useful parameter for accurately identifying the outer boundary of a wetland. Although for the proposed project area water was also used as one of the indicators for delineation, as the is a non-perennial river observed onsite approximately 100 m away from the project's boundary, Refer to **Figure 8** above

6. CONCLUSION AND RECOMMENDATIONS

This study aims to provide sufficient transparent and technically robust information on the impacts of processing to enable informed decision-making by the authorities. The proposed project encompasses an area of approximately 11.7 hectares, located within the least concern ecosystem vegetation biome known as SVcb 8 Moot Plains Bushveld. The project area is situated within the A21J catchment, which is primarily drained by tributaries that eventually flow into the larger Crocodile River system.

During the ground truthing process, the non-perennial river was observed about 100m from the study area boundary, and no wetlands were observed within 500m from the study area. The findings of the Wetland Assessment must be included in the Environmental Impact Assessment Report, along with the identified mitigation and monitoring measures that are to be included in the Environmental Management Plan (EMPr).

The identified river showed a largely natural level of importance in terms of sensitivity. It is recommended to establish a scientific buffer zone along the stream. The operation and infrastructure layout plan must continue to exclude areas up to the proposed scientific buffer around the river to alleviate pressure on the river and buffer zone. All the mitigation measures provided below are to be implemented in the operation and decommissioning phase of the project activity. The following recommendations apply to this project:

- The dirty water trenches should be lined to avoid contamination of soil, surface, and underground water. No dirty water should be channeled to the river area to avoid contaminating the river.
- Adhere to stormwater management design measures to be provided during the issuance of a water use license.
- Stormwater infrastructure must be developed, maintained, and monitored for effectiveness in controlling and minimizing erosion and sedimentation of watercourses.
- Diversion berms and the placement of sediment traps in obvious low points should be conducted to contain the extent of erosion and deposition, reducing the scale of the impacts to the site itself.
- Stockpiles should be protected from erosion, stored in flat areas to minimize runoff, and surrounded by bunds.
- All contaminated materials should be disposed of at permitted waste disposal facilities.
- A rehabilitation plan must be created and executed to prevent further degradation of the buffer zone

7. BIBLIOGRAPHY

Department of Water Affairs and Forestry. 2011. Groundwater Dictionary (2nd edition). Accessed http://www.dwaf.gov.za/Groundwater/GroundwaterDictionary.aspx. Accessed on: 2014-06-02.

Donovan Kotze, University of KwaZulu-Natal. (n.d.).

Ecology Study by Segope Consulting. (2024).

Enviro-Solum Consulting. (2024

Environmental Authorisation for the Klipspruit Extension. Digby Wells Environmental (Digby Wells, 2017).

Forestry, D. O. (2005). A practical field procedure for identification and delineation of wetlands and riparian areas. In *A practical field procedure for identification and delineation of wetlands and riparian areas Edition 1* (p. 7).

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.S. and Collins, N.B. (2005). Wet-Ecoservices: A technique for rapidly assessing ecosystem services supplied by wetlands.

Kotze, D.C.., 2007. Assessing the effect of rehabilitation on wetland health and the delivery of ecosystem services by the wetland.

Hydropedology Study by Enviro-Solum Consulting. (2024).

Macfarlane DM, Kotze DC, Ellery WN, Walters D, Koopman V, Goodman P and Goge C. 2007. WET-Health: A technique for rapidly assessing wetland health. WRC Report No TT 340/08, Water Research Commission, Pretoria.

Macfarlane, D. (2013). *WETLAND ASSESSMENT REPORT: ZAALKLAPSPRUIT WETLAND (B20G-01).*

SANBI. 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI)

Schulze, R.E., Pike, A., & Horan, M. (2005). *SA Atlas of Climatology and Agrohydrology*. Water Research Commission Report No. 1489/1/05. Pretoria: WRC.

Soil Classification working. (1991)

StatsSA. (2010).

weatherspark.com. (n.d.).