PROPOSED CONSTRUCTION OF AN OXIDATION POND SYSTEM AND TWO GRAVITY OUTFALL SEWER LINES NEAR SCHWEIZER-RENEKE, NORTHWEST PROVINCE.

Aquatic Biodiversity Theme Compliance Statement and Section (c) and (i) Risk Matrix

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DOCUMENT CONTROL

Quality and revision record

Quality approval

	Capacity	Name	Signature	Date
Author:	Environmental Specialist (MSc Biological Sciences, UCT 2019). SACNASP: 130295 (Pr.Nat.Sci) – Ecological Science	Megan Smith		12/06/2023
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This report has been prepared in accordance with Enviroworks Quality Management System.

Revision record

Revision Number	Objective	Change	Date
1	Client Review	Inclusion of the artificial wetland	12/06/2023

DISCLAIMER

Even though every care is taken to ensure the accuracy of this report, environmental assessment studies are limited in scope, time, and budget. Discussions are to some extent made on reasonable and informed assumptions built on bona fide information sources, as well as deductive reasoning. Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage during the impact assessment phase. The author does not accept responsibility for conclusions made in good faith based on own databases or on the information provided. Although the author exercised due care and diligence in rendering services and preparing documents, he accepts no liability, and the client, by receiving this document, indemnifies the author against all actions, claims, demands, losses, liabilities, costs, damages, and expenses arising from or in connection with services rendered, directly or indirectly by the authors and by the use of this document. This report should therefore be viewed and acted upon with these limitations in mind.

1. PROJECT DESCIRPTION

Moedi Consulting Engineers proposes to construct an oxidation pond system and two gravity outfall sewer lines near Schweizer-Reneke, North West Province. The configuration of the existing sewer system entails that all wastewater generated in Ipelegeng gravitates to five (5) pumping stations. The current pumping system installed on site are not sufficient to convey wastewater to the Waste Water Treatment Plant (WWTP) and this results in spillages occurring due to the overloading of infrastructure. The motivation for the proposed project is twofold. Firstly, it will address the current capacity shortfall by reducing the inflow volume at pumping stations, and secondly, it will optimise the current sewer network to operate more efficiently by decreasing the pumping and repumping of sewage. It is proposed that two "cut-off" gravity outfall lines is installed to reduce the load on the pumping stations and furthermore, it is proposed that an oxidation pond are constructed to decommission Pumping Station A. Please refer to Figure 1 for the layout of the proposed construction of the two gravity outfall sewer lines and oxidation pond system.

The proposed construction of the oxidation pond system will be in the vicinity of Pumping Station A. The establishment of a pond system will ensure that wastewater accumulates in the system regardless of external factors. Thus, the construction of this pond system will eradicate sewer spillages immediately. Due to the fact that the oxidation pond system does not require any electrical or mechanical equipment, the application is considered to be the most suitable cost-effective solution for the Ipelegeng sewer lines.

The proposed development footprint is primarily zoned as Agricultural with the surrounding environment being zoned as residential areas.

The coordinates for the two outfall sewer lines are (Figure 1):

- 27° 12' 55.66" S and 25° 17' 31.14" E (Eastern sewer line)
- 27° 17' 49.75" S and 25° 17' 54.74" E (Western sewer line)

The coordinates for the oxidation pond system are (Figure 1)::

- 27° 13' 4.07" and 25° 17' 47.86" E

In addition to the oxidation ponds and sewage outflow drainage lines, the Department of Water and Sanitation require the addition of an artificial wetland as an additional sewage treatment step. The layout of the artificial wetland is included in Figure 2 and the design description is attached as Appendix C.

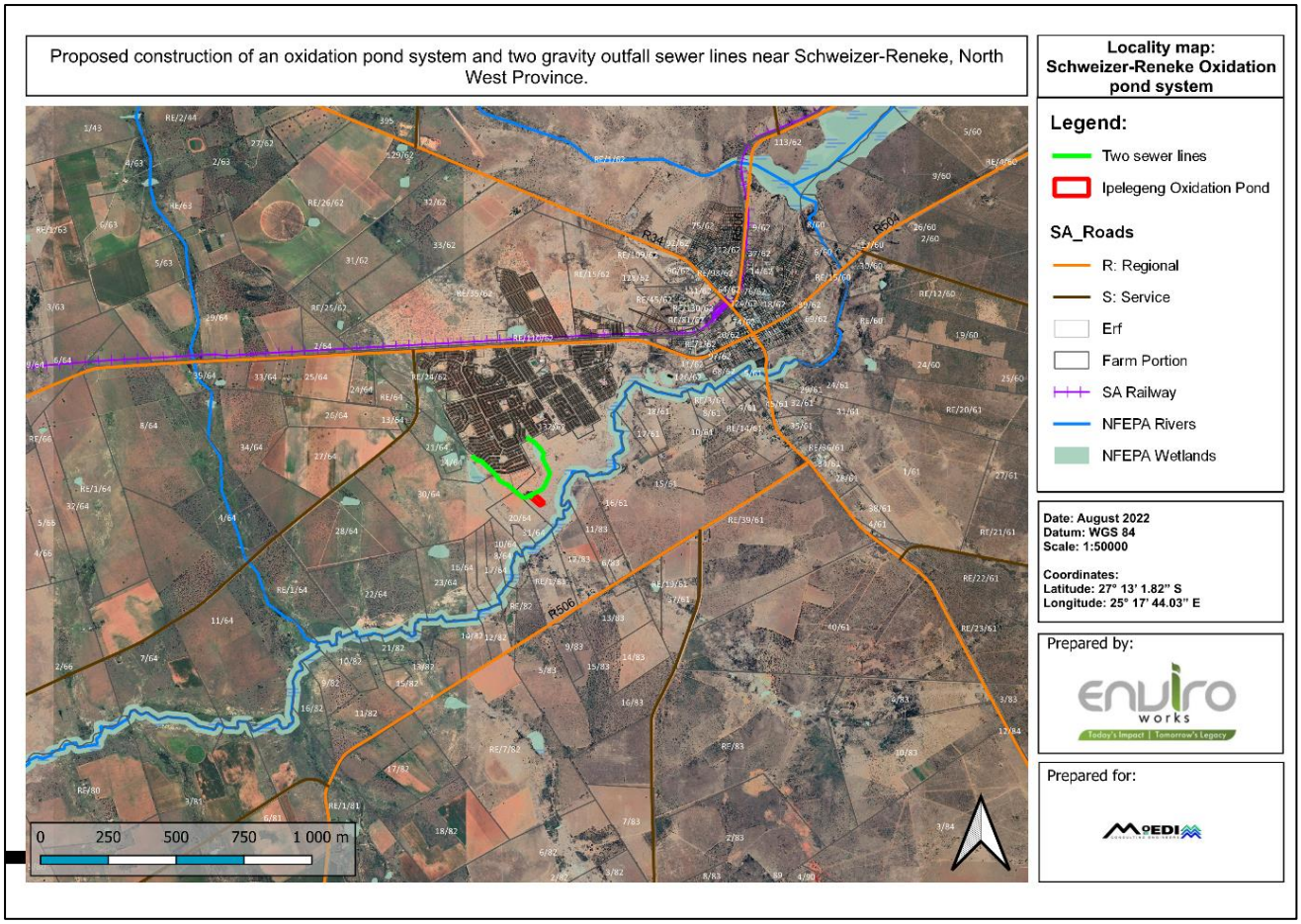

Figure 1: Locality map of the proposed development (demarcated in green and red)

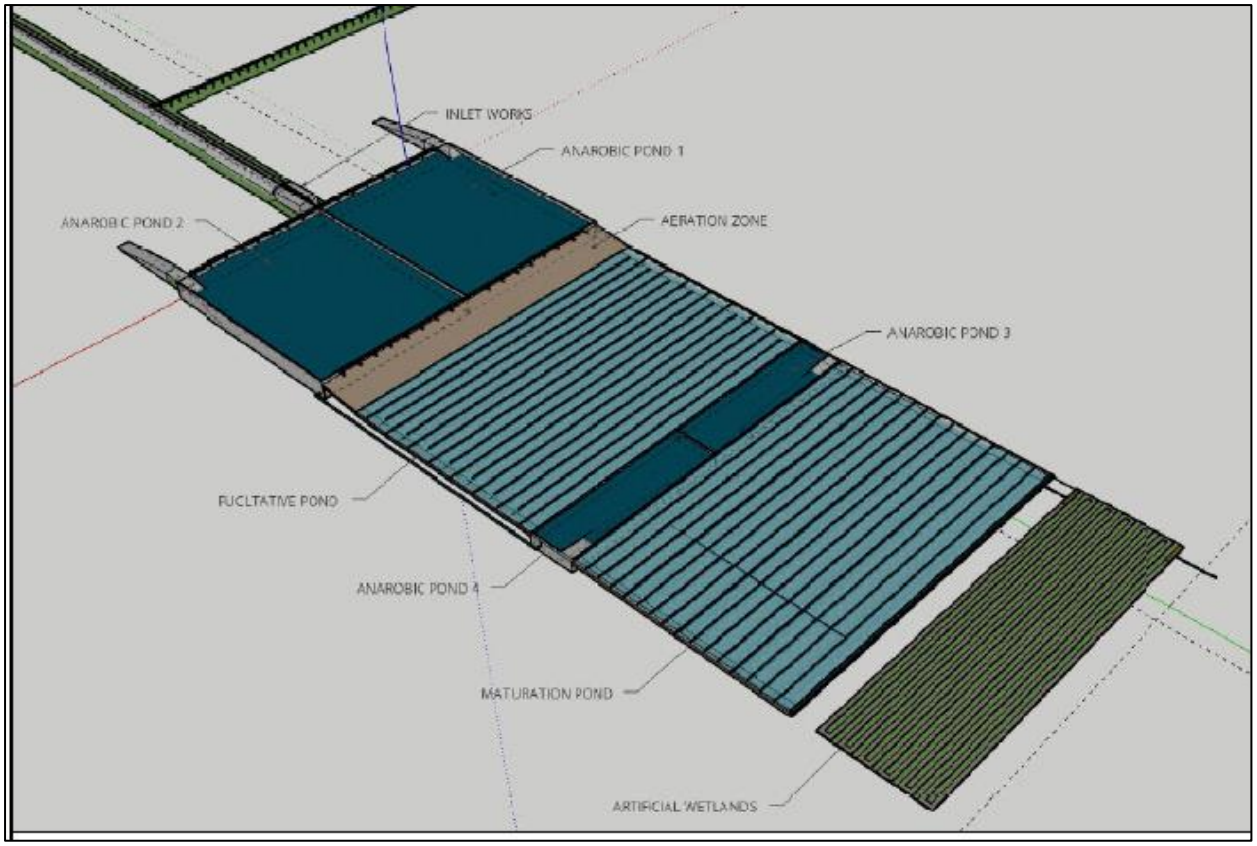

Figure 2 Layout map of the proposed oxidation pond including the artificial wetland.

2. OBJECTIVES

2.1 Watercourse delineation

The protection of watercourses is of utmost importance to the Department of Water and Sanitation (DWS). This report was compiled to inform the WULA under the NWA and the Water Use Licence Application and Appeals Regulations, 2017 (GN R. 267 of 24 March 2017). The watercourse delineation and assessment were done to delineate the watercourses and determine the Present Ecological State (PES) and Environmental Importance and Sensitivity (EIS) of the watercourses to ensure protection thereof.

2.2 Water Use Risk matrix

The objective of the Risk Matrix is to assess the risk associated with a Section 21 (c) – Impeding or diverting the flow of water in a watercourse & (i) – Altering the beds, banks, course or characteristics of a watercourse - Water Use. The proponent proposes to construct a mast, potentially within the regulated area of watercourses. The proximity of the development to the watercourses triggers the need for a Risk Assessment Matrix according to Section 21 (c) & (i) of the NWA.

The Constitution of the Republic of South Africa (1996) promotes sustainability; social, ecological and developmental issues are considered to be equally important. The South African National Water Policy (1997)

and the NWA were promulgated to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in an equitable, efficient and sustainable manner (Department of Water and Sanitation, 2014).

Watercourses are essential for the maintenance of adequate supply of surface and underground water; provide hydrological stability and flooding- and erosion control; as well as sustaining biota. Due to the potential of the proposed infrastructure to impact freshwater courses (proximity to watercourses), the proposed project potentially triggers (c) & (i) water uses according to the NWA. As S21 (c) & (i) water use related activities impact watercourses and thus their functions, the objectives of regulating S21 (c) & (i) water use entail inter alia (taken from Department of Water and Sanitation, 2014):

Protecting watercourses by:

- promoting sustainable utilisation;
- prevention of degradation; and
- ensuring rehabilitation of watercourses.

Preventing pollution of watercourses, i.e. the direct or indirect alteration of the physical, chemical or biological properties of a watercourse so as to make it:

- less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- harmful or potentially harmful-
    - to the welfare, health or safety of human beings;
    - to any aquatic or non-aquatic organisms;
    - to the resource quality; or
    - to property.

According to Government Notice 509 of 2016 - GENERAL AUTHORISATION IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998) FOR WATER USES AS DEFINED IN SECTION 21(C) OR SECTION 21(I), IMPEDING OR DIVERTING THE FLOW OF WATER IN A WATERCOURSE (SECTION 21(C)), OR ALTERING THE BED, BANKS, COURSE OR CHARACTERISTICS OF A WATERCOURSE (SECTION 21(I)) OF THE NATIONAL WATER ACT (ACT NO. 36 OF 1998) a project can be excluded from a General Authorisation according to Section 3 – unless it triggers any of the activities from (a) to (e) of Section 3, and Section 3 states –

A General Authorisation does not apply -

(a) to the use of water in terms of section 21(c) or (i) of the Act for the rehabilitation of a wetland as contemplated in General Authorisation 1198 published in Government Gazette 32805 dated 18 December 2009,
(b) to the use of water in terms of section 21(c) or (i) of the Act within the regulated area of a watercourse where

the Risk Class is Medium or High as determined by the Risk Matrix, (Appendix A of the GA Regulations) completed by a suitably qualified SACNASP professional member;

(c) in instances where an application must be made for a water use license for the authorisation of any other water use as defined in section 21 of the Act that may be associated with a new activity;

(d) where storage of water results from the impeding or diverting of flow or altering the bed, banks, course or characteristics of a watercourse; and

(e) to any water use in terms of section 21(c) or (i) of the Act associated with construction, installation or maintenance of any sewerage pipelines, pipelines carrying hazardous materials and to raw water and wastewater treatment works.

2.3 Aquatic Biodiversity Compliance Statement

- To confirm or dispute the environmental sensitivity as identified by the Screening Tool, such as new developments or infrastructure or the change in vegetation cover.
- Motivate with evidence (e.g., photographs) the verification of the environmental sensitivity.
- Indicate whether or not the proposed development will have an impact on the aquatic features.

3. MINIMUM REQUIREMENTS IN TERMS OF PROTOCOLS

This Compliance Statement is compiled to follow the protocol for specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity as specified in 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 (GN No. 43110 of 20 March 2020). Please see Table 2 for a content cross reference checklist.

Table 1: Content cross-reference checklist for the protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity as per GN R 43110, with corresponding section names in the report.

Requirement	Section of this report
Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Section 10 and 11
A signed statement of independence by the specialist;	Section 10 and 11
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 3
A baseline profile description of biodiversity and ecosystems of the site	Section 5
A description of the methodology used to verify the sensitivities of the aquatic biodiversity features and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 3

Requirement	Section of this report
In the case of a linear activity, confirmation from the aquatic biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;	N/A
Where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	Section 6
A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 9
Any conditions to which the compliance statement is subjected.	Section 8

4. BACKGROUND

4.1 Receiving Environment

4.1.1 Geology and Soil

Based on the Agricultural Compliance Statement (DSA, 2022), the soil was classified as Molopo soil form and had a moderate depth of 800 mm before a restricting layer was found. The Molopo soil consists of orthic horizon overlying a yellow brown apedal, with a soft carbonate underneath. It has a medium dryland capability and a Land capability of 8 (Moderate).

4.1.2. Climate

Schweizer-Reneke experiences rainfall peaking during the summer months. Precipitation is highest in January (± 80,6 mm) and lowest in July (± 2,3 mm). The maximum monthly temperature is approximately 32°C in the summer months (especially in January) while the minimum monthly temperature can be as low as 6°C in July (winter) (https://www.worldweatheronline.com/schweizer-reneke-weather-averages/north-west/za.aspx.

4.1.3 Vegetation type

The proposed development site (demarcated in blue) consists of Schweizer Reneke Bushveld (Figure 3). Schweizer Reneke Bushveld is currently listed as Vulnerable (A3) in Government Notice 2747 (November 2022). National land cover data show that Schweizer-Reneke Bushveld has experienced extensive spatial declines of approximately 51% since 1750.

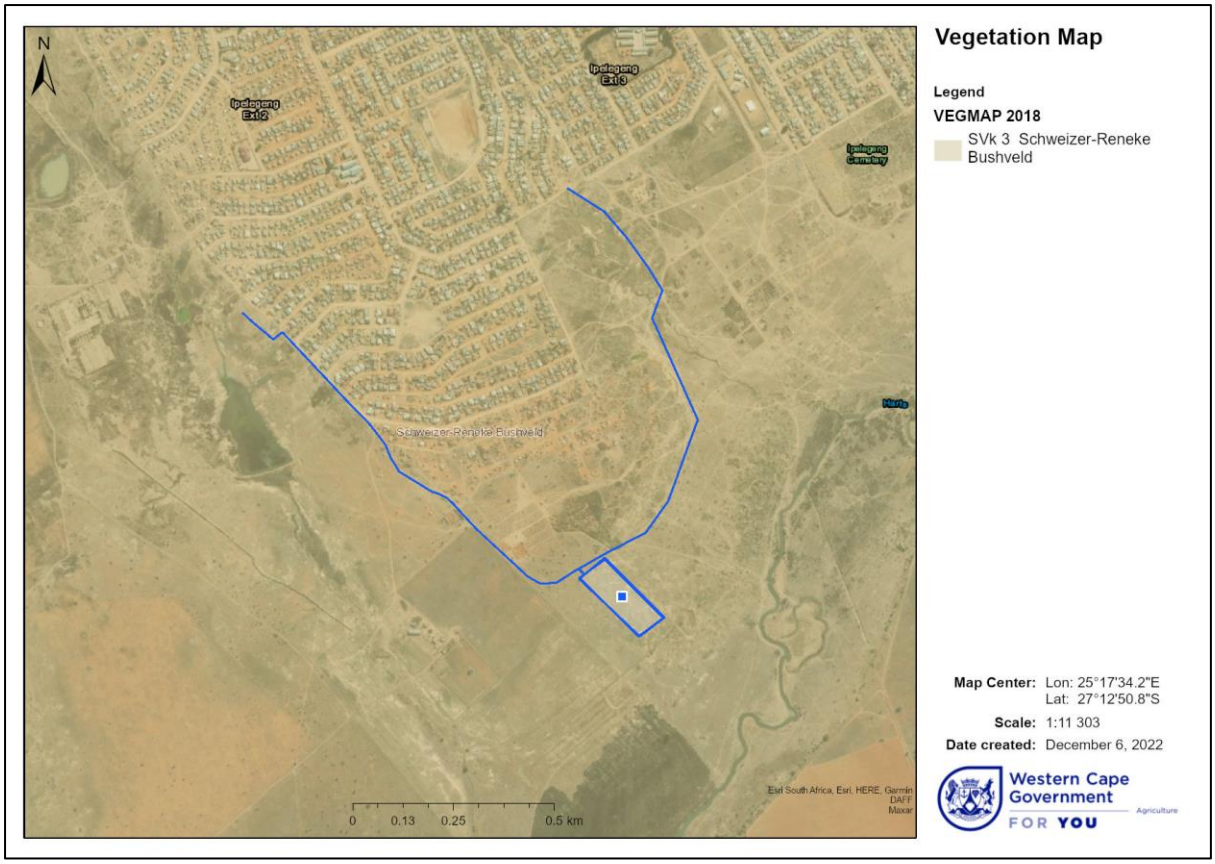

Figure 3 Vegetation map of the proposed development footprint (demarcated in blue) and in 100m and 500m buffers (demarcated in red)

4.2 Study area

4.2.1 Lower Vaal Water Management Area

The study area is situated within the Lower Vaal Water Management Area (WMA) and Quaternary Catchment C33A. The Lower Vaal WMA lies in the North West and Northern Cape Provinces, with the south-eastern corner in the Free State, and borders on Botswana to the north, as well as on the Crocodile (West) and Marico, Middle Vaal, Upper Orange and Lower Orange water management areas. The WMA extends to the headwaters of the Harts, Molopo and Kuruman River in the north and the Vaal River Downstream of Bloemhof Dam in the south. Major rivers in this WMA include the Molopo, Harts, Dry Harts, Kuruman and Vaal River. As a result of the low rainfall, flat topography and sandy soils occur over much of the WMA, and little usable surface runoff is generated in the WMA. It covers a catchment area of 51 543km^2.

The Lower Vaal WMA is dependent on water releases from the Middle Vaal WMA for meeting the bulk of the water requirements by the urban, mining and industrial sectors within its area of jurisdiction, with local resources mainly used for irrigation and smaller towns. Water quality in the Lower Vaal is strongly influenced by usage and management practices in the Upper and Middle Vaal WMA.

Land use within the Lower Vaal WMA is dominated by stock farming. The largest irrigation scheme is the Vaalharts Water Scheme, which is supplied from Bloemhof Dam. The scheduled area of this scheme is 39147 ha with quotas of 9 140 m^3/ha/annum. Including losses, the water use by this scheme is in the order of 500 million m^3 /annum.

The composition of the Lower Vaal WMA economy is listed below. The most important economic activities of the WMA are:

- Mining 23%
- Government 16%
- Trade 15%
- Agriculture 14%

The main agricultural activities identified include livestock and dryland cropping. Livestock includes beef and dairy cattle, goats, non-wooled sheep, pigs and ostriches. Crops grown are mainly maize, but also sunflower, cotton, groundnuts and vegetables.

The mining activities in this WMA include mining for diamonds, iron ore, manganese and other minerals such as limestone, dolomite and amphibole asbestos. Kimberlite diamonds are mined at the Finsch Mine at Lime Acres, one of the most important diamond producing mines of the De Beers Company. Kimberley is also an important diamond mining area, which is known for its high quality diamonds. The Sishen Mine, currently the major supplier of iron ore in the country, is located in the Lower Vaal WMA. This mine has a mineable depth of 30 metres and was opened in 1953 as part of Iscor's expansion strategy. In 1997, it produced approximately 2 400 million ton iron ore per year. An increase in mining and transportation activities can be expected with the construction of the Sishen-Coega railway line that will link Sishen with the Coega initiative near Port Elizabeth. Other important mining areas includes Kudumane (iron, manganese and asbestos etc), Ganyesa (diamonds, mica group clay and salt) and Taung (diamonds, limestone, dolomite and salt).

In terms of socio-economics, the total urban and rural population in this WMA is approximately 1,282,000, of which about 718,000 live in urban centres. The largest concentration of urban population is in Kimberley, with an estimated population of 204,000. There are large rural populations in the Lower Vaal, especially in the areas west of Mafikeng, around Kuruman, Pampierstad and Lichtenberg.

4.2.1.1 Surface Water

According to the Lower Vaal WMA Overview of Water Resources Availability Report, DWAF (2004), "*As a result of the low rainfall, flat topography and sandy soils over much of the water management area, little usable surface runoff is generated in the water management area. The runoff which does occur, is highly variable and intermittent. Although occasional runoff occurs in the upper reaches of the Molopo River, no record exists of flow*

having reached the Orange River. Previous recordings of flow in the lower reaches of the Molopo and/or Kuruman Rivers were in 1933 and again in the 1974/5 and 1975/76 seasons."

The land uses in the WMA are largely agriculture, mining and urban areas with the larger urban centres located in the mining areas. There are several areas under irrigation in the WMA. The sources of supply are both surface and groundwater. The return flow volume and qualities from the irrigation areas are not well quantified. The main challenges for water quality management in the Vaal River System will involve mitigating the impacts of further growth in land use, particularly with respect to urban and industrial activities, as well as managing potential decants from decommissioned diamond mines. In particular, there are extensive diggings in parts of the catchment which impact largely on the river courses. Sections of the Harts River upstream of Taung Dam and Bamboespruit are severely impacted on by digging activities [1].

Salinity levels in the Lower Vaal WMA have been increasing over the years as a result of high salinity inflows from upstream WMAs. This trend is expected to continue to increase in the future. However salinity levels are more acceptable downstream of Bloemhof Dam as a result of inflows from the Rhenoster, Vals, Sand and Vet sub-catchments.

Lastly, many of the sewage works and sanitation systems of the towns in the WMA are inadequate and are in a poor state. The reasons for this are both management and the overloading of the plants and reticulation systems. The overloading is sometimes due to the replacement of pit latrines with water borne sewerage systems without upgrading the sewage works.

According to DWS (Department of Water and Sanitation, 2004), water quality management will have to intensify in future with the aim of protecting the water resource to ensure utilisation under growing urban, industrial and mining land use activity. The impacts of pollutants such as microbiological organisms, nutrients and salinity on the Vaal River System have been quantified and monitored to date. The downstream effects of these pollutants on the Vaal River System are water quality issues to be considered.

4.2.2 Harts River

The Harts River system is in the C3 drainage region of South Africa and its source is near the town of Lichtenburg in the North West Province, although the larger part of the catchment is situated in the Northern Cape Province. The Harts River flows in a southwesterly direction via Barberspan, the Taung and Spitskop dams, after which it flows into the Vaal River near Delportshoop [2].

Water quality in the Harts River is significantly impacted by surrounding land use. The main impacts include water quality related problems related to agricultural return flows and flow regulation for irrigation use.

[1] DWAF, "Internal Strategic Perspective Lower Vaal Water Management Area," 2004.
[2] DWAF.

Urbanisation is also another land use that has contributed to the poor water quality in the downstream reaches of the Harts River.

Water use within the Harts River Catchment is dominated by irrigation, which represents 84% of the local requirements for water. About 4% of the requirements is for urban and industrial use, 3.5% for rural domestic supplies and stock watering, with only 8.3% being transferred out of the catchment[3].

Of particular importance, water in the Harts River downstream of the Vaalharts irrigation scheme is of exceptional high salinity as a result of saline leachate from the irrigation fields (± 1 100 mg/l salinity) and usually needs to be carefully managed through blending with fresher water.

Due to the impacts on the Harts River, the river has been classified as a Category D River by the Freshwater Ecosystem Priority Areas (NFEPA) Dataset [4]. This means that the condition of the river is moderately modified and is not considered to contribute towards river ecosystem biodiversity targets [5].

4. METHODOLOGY

4.1 Desktop study

Watercourses were firstly identified from a desktop study and use was made of topographic maps, geo-referenced Google Earth images, local and national data sets of watercourses[6] . A desktop delineation of suspected wetland areas and watercourses was undertaken by identifying rivers and wetness signatures from the digital base maps. Areas suspected to be wetlands and watercourses were then further investigated in the field.

Sensitivity of the area was also further determined via desktop analysis using:

- The Department of Forestry, Fisheries, and Environment (DFFE) screening tool report for the development footprint
- Satellite imagery (Google Earth, 2021)
- Global Biodiversity Information Facility (GBIF)[7]
- National Wetland Map 5[8]

[3] DWAF.
[4] "Council for Scientific and Industrial Research. NFEPA River FEPAs 2011 [Vector Geospatial Dataset]," 2011.
[5] "Council for Scientific and Industrial Research. NFEPA River FEPAs 2011 [Vector Geospatial Dataset]."
[6] H Van Deventer et al., "South African National Biodiversity Assessment 2018: Technical Report. Volume 2a: South African Inventory of Inland Aquatic Ecosystems (SAIIAE)" (Council for Scientific and Industrial Research (CSIR) and South African National Biodiversity Institute (SANBI): Pretoria, South Africa, 2018).
[7] "Global Biodiversity Information Facility," n.d., https://www.gbif.org/.
[8] Heidi van Deventer et al., "National Wetland Map 5 – An Improved Spatial Extent and Representation of Inland Aquatic and Estuarine Ecosystems in South Africa," *BioRxiv*, May 17, 2019, 640441, https://doi.org/10.1101/640441.

- National Freshwater Ecosystem Priority Areas[9]
- Western Cape Biodiversity Sector Plan
- International Union for Conservation of Nature (IUCN)[10]
- iNaturalist[11]
- Plants of Southern Africa [12]

4.2 Date and season of site visit

A site visit took place on 14 November 2022 to verify the desktop study's results of watercourses on the proposed development footprints and a 100m and 500 m radius. Photographs of the proposed development footprint, potential watercourses and surroundings were taken for record purposes. A visual observation was made of the footprint and surrounding area, taking note of the land use, land cover and specifically the vegetation cover, and topography of the area. The site sensitivity, as identified by the DFFE Screening Tool, was then confirmed, or disputed using the above information.

Please note that observations of species are contingent on the season that the survey took place in. The site was surveyed during early spring/late winter; thus, some species and aquatic features may have not been observed due to their seasonal patterns or life histories.

3.3. Wetland Classification

Hydro-geomorphic form: The hydro-geomorphic types of wetlands represented in Table 1 are based on the landscape and landforms that wetland occur in. The wetlands in this study were subsequently classified according to their hydro-geomorphic determinants to Level 4 [13].

[9] "Council for Scientific and Industrial Research. NFEPA River FEPAs 2011 [Vector Geospatial Dataset]," 2011.
[10] "IUCN 2020," The IUCN Red List of Threatened Species. Version 2019-3., accessed July 29, 2020, https://www.iucnredlist.org.
[11] "INaturalist," n.d., https://www.inaturalist.org.
[12] SANBI, "Plants of Southern Africa," n.d., http://posa.sanbi.org/.
[13] D Ollis et al., "CLASSIFICATION SYSTEM FOR WETLANDS AND OTHER AQUATIC ECOSYSTEMS IN SOUTH AFRICA." (SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE, 2013).

Table 2 Hydrogeomorphic forms of wetland habitat units[14]

LEVEL 4: HYDROGEOMORPHIC (HGM) UNIT		
HGM type	*Longitudinal zonation/Landform/ Outflow drainage*	*Landform/Inflow drainage*
A	**B**	**C**
River	Mountain headwater stream	Active channel
		Riparian zone
	Mountain stream	Active channel
		Riparian zone
	Transitional	Active channel
		Riparian zone
	Upper foothills	Active channel
		Riparian zone
	Lower foothills	Active channel
		Riparian zone
	Lowland river	Active channel
		Riparian zone
	Rejuvenated bedrock fall	Active channel
		Riparian zone
	Rejuvenated foothills	Active channel
		Riparian zone
	Upland floodplain	Active channel
		Riparian zone
Channelled valley-bottom wetland	[not applicable]	[not applicable]
	[not applicable]	[not applicable]
Unchannelled valley-bottom wetland	[not applicable]	[not applicable]
	[not applicable]	[not applicable]
Floodplain wetland	Floodplain depression	[not applicable]
	Floodplain flat	[not applicable]
Depression	Exorheic	With channelled inflow
		Without channelled inflow
	Endorheic	With channelled inflow
		Without channelled inflow
	Dammed	With channelled inflow
		Without channelled inflow
Seep	With channelled outflow	[not applicable]
	Without channelled outflow	[not applicable]
Wetland flat	[not applicable]	[not applicable]

4.3. Watercourse boundary delineation

A number of indicators or site criteria can be assessed to identify likely wetland areas. This approach allows for the identification of indirect indicators of prolonged saturation by water to be assessed, rather than only being able to assess the presence of a high-water table at a site (which would then limit site assessments to the wet season of normal or wet rainfall years). Four indicators have been developed to assist with the identification of wetlands[15]. These are:

1) The position in the landscape, which will help identify those parts of the landscape where wetlands are more likely to occur;

[14] Ollis et al.

[15] Department of Water Affairs and Forestry, "Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas," 2008.

2) The type of soil form (i.e. the type of soil according to a standard soil classification system), since wetlands are associated with certain soil types;

3) The presence of wetland vegetation species, and

4) The presence of redoxymorphic soil features, which are morphological signatures that appear in soils with prolonged periods of saturation (due to the anaerobic conditions which result).

The presence of these distinctive indicators in an area would imply that the frequency and duration of saturation is sufficient to classify the area as a wetland, and the advantage of using these indicators over the examination of water table depth or vegetation alone is that these four indicators can be used at any time of the year (i.e., the indicators, with the possible exception of the vegetation species, are present in the dry season and in dry years).

4.4 Determining the State of a Watercourse

The state of a watercourse is expressed in terms of its bio-physical components (characteristics):

- Drivers (physico-chemical, geomorphology, hydrology) which provide a particular habitat template; and,
- Biological responses (fish, riparian vegetation and aquatic invertebrates).

The **Present Ecological State** (PES) refers to the current state or condition of a watercourse in terms of all its characteristics and reflects the change to the watercourse from its reference condition.

The method used to determine the PES for watercourses was the Index of Habitat Integrity (IHI) which measures the impact of human disturbance on riparian and instream habitats (Kleynhans, 1996). The IHI is a rapid assessment of the severity of impacts affecting habitat integrity within a river reach. It can be applied to both perennial and non-perennial watercourses (Dabrowski, 2019; Kleynhans, 1996). Each impact on the riparian and instream habitat is given a score between 0 – 20 based on the degree of modification (Table 3). An IHI class (i.e. ecological category) is then determined based on the resulting score (Table 4).

Table 3 Scoring of criteria to determine the PES of rivers and drainage lines according to Kleynhans (1996).

Criteria	Score	Comments
Instream Habitat		
Water abstraction		
Flow modification		
Bed modification		
Channel modification		
Physico-chemistry		
Inundation		
Alien macrophages		
Introduced aquatic fauna		
Rubbish dumping		
Riparian habitat		
Vegetation removal		

Criteria	Score	Comments
Exotic vegetation		
Bank erosion		
Channel modification		
Water abstraction		
Inundation		
Flow modification		
Physico-chemistry		

Table 4 Criteria for PES calculations for watercourses.

Ecological Category	Score	Description
A	> 90-100%	**Unmodified**, natural.
B	80-90%	**Largely natural** with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.
C	60-79%	**Moderately modified**. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.
D	40-59%	**Largely modified**. A large loss of natural habitat, biota and basic ecosystem functions has occurred.
E	20-39%	**Seriously modified**. The loss of natural habitat, biota and basic ecosystem functions is extensive.
F	0-19%	**Critically/Extremely modified**. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.

The method used to determine the PES of wetlands is based on a Rapid Assessment version of WET-Health by Kotze *et al.*, (2009). This method is based on assigning a score between 0-10 to simple criteria (Table 5). A PES class is then determined based on the resulting score (Table 4).

Table 5 Criteria used to determine the PES of a wetland.

PES assessment per driver		
Hydrology	**Description**	**Impact score rating (0-10)**
None	No discernible modifications, or the modifications are of such a nature that they have no impact on the hydrological integrity	0-0.9
Small	Although identifiable, the impact of the modifications on the hydrological integrity is small	1-1.9
Moderate	The impact of the modifications on the hydrological integrity is clearly identifiable, but limited	2-3.9
Large	The impact of the modifications is clearly detrimental to the hydrological integrity. Approximately 50% of the hydrological integrity has been lost	4-5.9
Serious	Modifications clearly have an adverse effect on the hydrological integrity. 51% to 79% of the hydrological integrity has been lost.	6-7.9
Critical	Modifications are so great that the hydrological functioning has been drastically altered. 80% or more of the hydrological integrity has been lost	8-10
	Impact score rating (0-10)	
Geomorphology	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural.	0-0.9
Small	Largely natural. A slight change in geomorphic processes is discernable but the system remains largely intact	1-1.9
Moderate	Moderately modified. A moderate change in geomorphic processes has taken place but the system remains predominantly intact	2-3.9

PES assessment per driver		
Large	Largely modified. A large change in geomorphic processes has occurred and the system is appreciably altered	4-5.9
Serious	Greatly modified. The change in geomorphic processes is great but some features are still recognizable	6-7.9
Critical	Modifications have reached a critical level as geomorphic processes have been modified completely	8-10
	Impact score rating (0-10)	
Vegetation	**Description**	**Impact score rating (0-10)**
None	Vegetation composition appears entirely natural.	0-0.9
Small	A very minor change to vegetation composition is evident at the site (e.g. abundance of ruderal, indigenous invasive slightly higher than would be the case naturally).	1-1.9
Moderate	Vegetation composition has been moderately altered but introduced, alien and/ or increased ruderal species are still clearly less abundant than characteristic indigenous wetland species	2-3.9
Large	Vegetation composition has been largely altered and introduced, alien and/ or increased ruderal species occur in approximately equal abundance to the characteristic indigenous wetland species	4-5.9
Serious	Vegetation composition has been substantially altered but some characteristic species remain, although the vegetation consists mainly of introduced, alien and/or ruderal species	6-7.9
Critical	Vegetation composition has been almost totally altered, and in the worst case all indigenous vegetation has been lost (e.g. as a result of a parking lot).	8-10
	Impact score rating (0-10)	
	AVERAGE	
Generalized PES assessment		
PES	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural	0-0.9
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1-1.9
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred	4-5.9
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable	6-7.9
Critical	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10
	Impact score rating (0-10)	

The **Ecological Importance and Sensitivity (EIS)** of a watercourse is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales, and both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred.

For watercourses, the EIS is based on a rapid instream and riparian habitat ecological importance and sensitivity assessment, using a modified version of DWAF EIS tool for rivers, from Nkurenkuru Ecology and Biodiversity (2020). This method is based on assigning a score between 0-4 to simple criteria (Table 6). The level of confidence

in the score is given. The average scoring of these criteria places the watercourse in an EIS Category according to Table 7.

Table 6 Outcome of a rapid instream and riparian habitat ecological importance and sensitivity assessment, using a modified version of DWAF EIS tool for rivers, from Nkurenkuru Ecology and Biodiversity (2020).

Determinant	Score	Confidence	Comments
1. Rare & Endangered Species			
2. Populations of Unique Species			
3. Species/taxon Richness			
4. Diversity of Habitat Types or Features			
5 Migration route/breeding and feeding site for wetland species			
6. Sensitivity to Changes in the Natural Hydrological Regime			
7. Sensitivity to Water Quality Changes			
8. Flood Storage, Energy Dissipation & Particulate/Element Removal			
9. Protected Status			
10. Ecological Integrity			
Total			
Median			
Overall ecological sensitivity & importance			

Table 7 Criteria for EIS calculations for watercourses.

EIS Categories	Score	Description
Low/Marginal	**D**	Not ecologically important and sensitive at any scale. Biodiversity ubiquitous and not sensitive to flow and habitat modifications.
Moderate	**C**	Ecologically important and sensitive on provincial/local scale. Biodiversity not usually sensitive to flow and habitat modifications.
High	**B**	Ecologically important and sensitive. Biodiversity may be sensitive to flow and habitat modifications.
Very High	**A**	Ecologically important and sensitive. On national even international level. Biodiversity usually very sensitive to flow and habitat modifications.

The method used to assess the EIS of wetlands is a refinement of the DWA Resource Directed Measures for Water Resources: Wetland Ecosystems method (Department of Water Affairs and Forestry, 1999) as used by Day (2020). It includes an assessment of ecological (e.g. presence of rare and endangered fauna/flora), functional (e.g. groundwater storage/recharge) and socio-economic criteria (e.g. human use of the wetland). Scoring of these criteria places the wetland in a Wetland Importance Class (A-D) according to Table 8.

Table 8 Wetland Importance Class integrating Ecological Importance and Sensitivity (EIS), and functional and socio-cultural importance modifiers (from Day, 2020).

Importance class (one or more attributes may apply)	Range of Median	Wetland Importance Class
Very high Representative of wetlands that: •support key populations of rare or endangered species; • have a high level of habitat and species richness; • have a high degree of taxonomic uniqueness and/or intolerant taxa; • provide unique habitat (e.g. salt marsh or ephemeral pan; physiognomic features, spawning or nursery environments); • is a crucial avifaunal migratory node (e.g. RAMSAR wetlands); • may provide hydraulic buffering and sediment retention for large to major rivers that originate largely outside of urban conurbations;	>3 <=4	A

Importance class (one or more attributes may apply)	Range of Median	Wetland Importance Class
• have groundwater recharge/discharge comprising a major component of the hydrological regime of the wetland; • are highly sensitive to changes in hydrology, patterns of inundation, discharge rates, water quality and/or disturbance; and • are of extreme importance for conservation, research or education.		
High Representative of wetlands that: • support populations of rare or endangered species, or fragments of such populations that are present in other similar and geographically-adjacent wetlands; • contain areas of habitat and species richness; • contain elements of taxonomic uniqueness and/or intolerant taxa; • contain habitat suitable for specific species (e.g. physiognomic features); • provide unique habitat (e.g. salt marsh or ephemeral pan; spawning or nursery environments, heronries); • may provide hydraulic buffering and sediment retention for rivers that originate largely outside of urban conurbations, or within residential fringes of urban areas; • have groundwater recharge/discharge comprising a component of the hydrological regime of the wetland; • may be sensitive to changes in hydrology, patterns of inundation, discharge rates, water quality and/or human disturbance; and • are important for conservation, research, education or eco-tourism.	> 2 <= 3	B
Moderate Representative of wetlands that: • contain small areas of habitat and species richness; • provide limited elements of habitat that has become fragmented by development (e.g. salt marsh, ephemeral pan; roosting sites and heronries); • provide hydraulic buffering for rivers that originate in urban areas; • are moderately sensitive to changes in hydrology, patterns of inundation, discharge rates and/or human disturbance; • perform a moderate degree of water quality enhancement, but are insensitive to sustained eutrophication and/or pollution; and • are of importance for active and passive recreational activities.	>1 <= 2	C
Low/marginal Representative of wetlands that: • contain large areas of coarse (reeds) wetland vegetation with minimal floral and faunal diversity; • have a high urban watershed: wetland area ratio; • are important for active and passive recreation; • provide moderate to high levels of hydraulic buffering; • may be eutrophic and generally insensitive to further nutrient loading; • are generally insensitive to changes in hydrology, patterns of inundation, discharge rates and/or human disturbance; • have regulated water; and • contain large quantities of accumulated organic and inorganic sediments.	>0 <= 1	D

Rating	Explanation
None, Rating = 0	Rarely sensitive to changes in water quality/hydrological regime
Low, Rating =1	One or a few elements sensitive to changes in water quality/hydrological regime
Moderate, Rating =2	Some elements sensitive to changes in water quality/hydrological regime
High, Rating =3	Many elements sensitive to changes in water quality/ hydrological regime
Very high, Rating =4	Very many elements sensitive to changes in water quality/ hydrological regime

4.5 Impacts and Risk Assessment

Impacts were assessed using a common, defensible method that is based on DWS 2015 publication: Section 21 (c) and (i) Water Use Risk Assessment Protocol, of assessing significance that will enable comparisons to be made

between risks of potential impacts and will enable transparency of the process upon which risks of impacts have been assessed. The first part of the assessment is the identification of environmental activities, aspects and impacts. The impacts are rated according to criteria set out in Appendix B. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity, spatial scope and duration of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity and the frequency of the impact together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix and are used to determine whether mitigation is necessary.

6. RESULTS

6.1. Baseline profile description of biodiversity and ecosystems of the site

6.1.1 Sensitive areas

The proposed development footprint is predominantly situated in a Critical Biodiverse Area 1 (Figure 4). The CBA has been classified as being a Critical Corridor Linkage area (CBA_T8) as well as a Corridor (CBA_T7). Therefore, the primary purpose of the sensitive area is to perform the function of a Biodiversity Corridor.

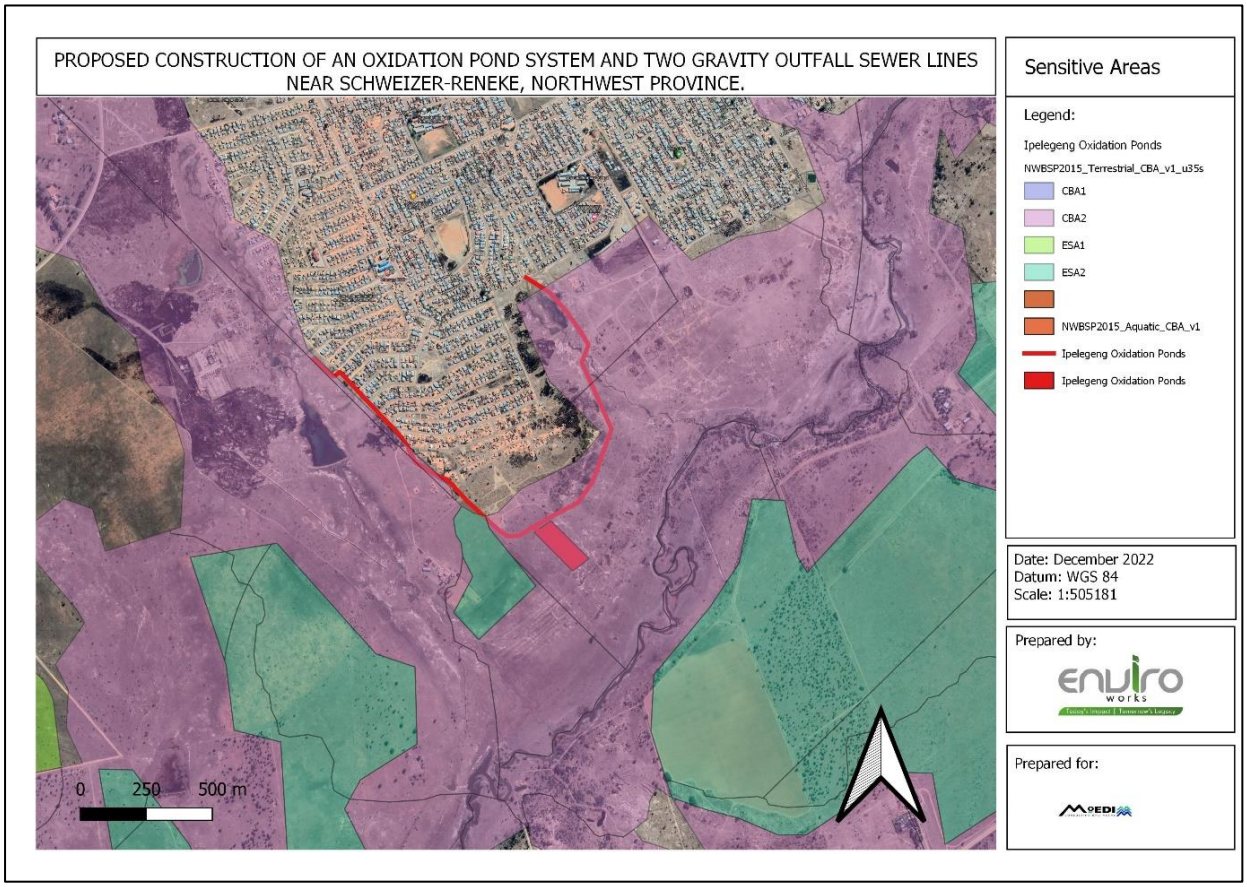

Figure 4: Sensitivity of the proposed development (demarcated by a blue square)

6.1.2 Aquatic Features

Based on the National Wetland Map 5 and the NFEPA data base, there are three natural wetlands or watercourse within 100 and 500 m of the proposed development (see Figure 5). These natural aquatic features include channelled valley bottom wetlands.

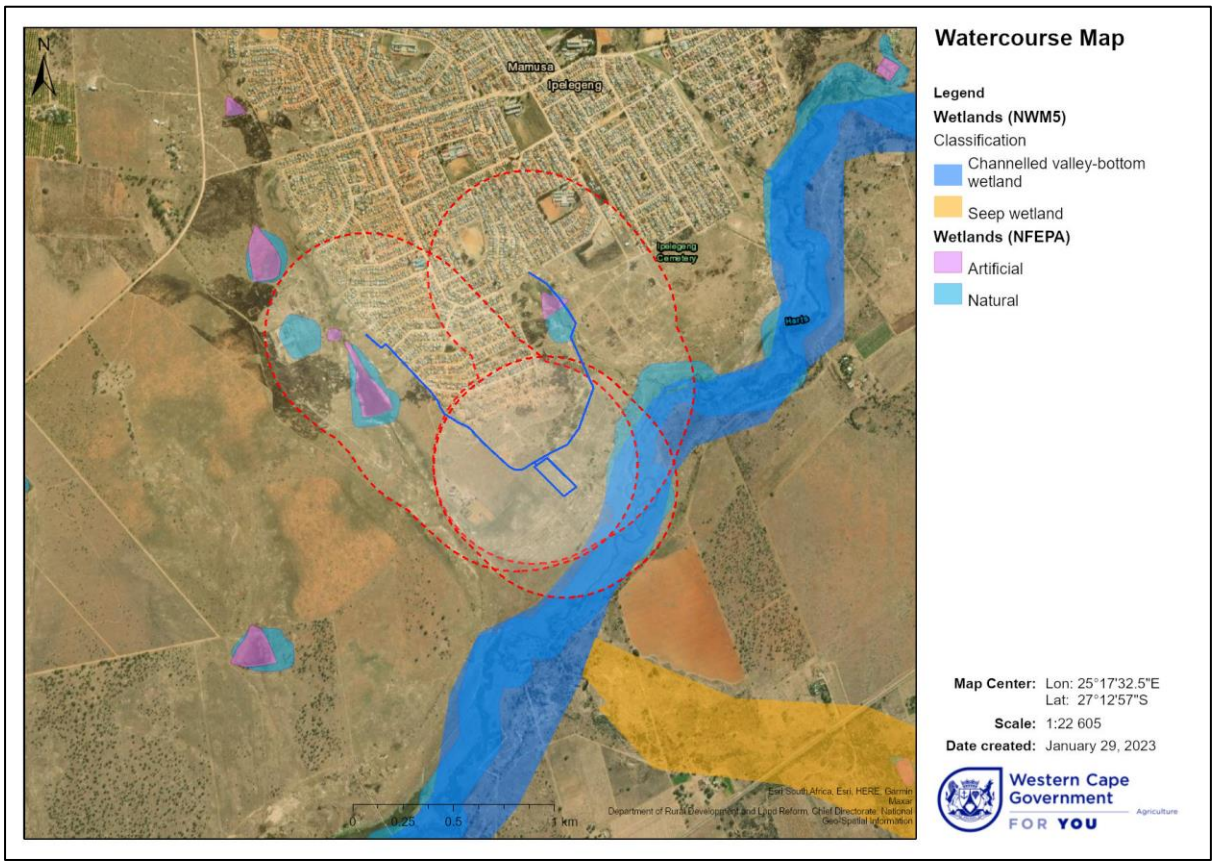

Figure 5: Watercourses and wetland features within the proposed prospecting right site and immediate surrounds (the proposed development is denoted by a blue lines and the buffers are denoted in red).

Channelled-valley bottom wetlands with visible channels are easily identified on the imagery as wetlands with a stream or river passing through it. The wetlands associated with this HGM unit will often appear as wetter, greener vegetation on one or both sides of the stream.

6.2. Results of the Screening Tool Report

The Screening Tool Report identified the project footprint and surrounding area as having a low sensitivity in terms of the Aquatic Biodiversity Theme (Figure 6).

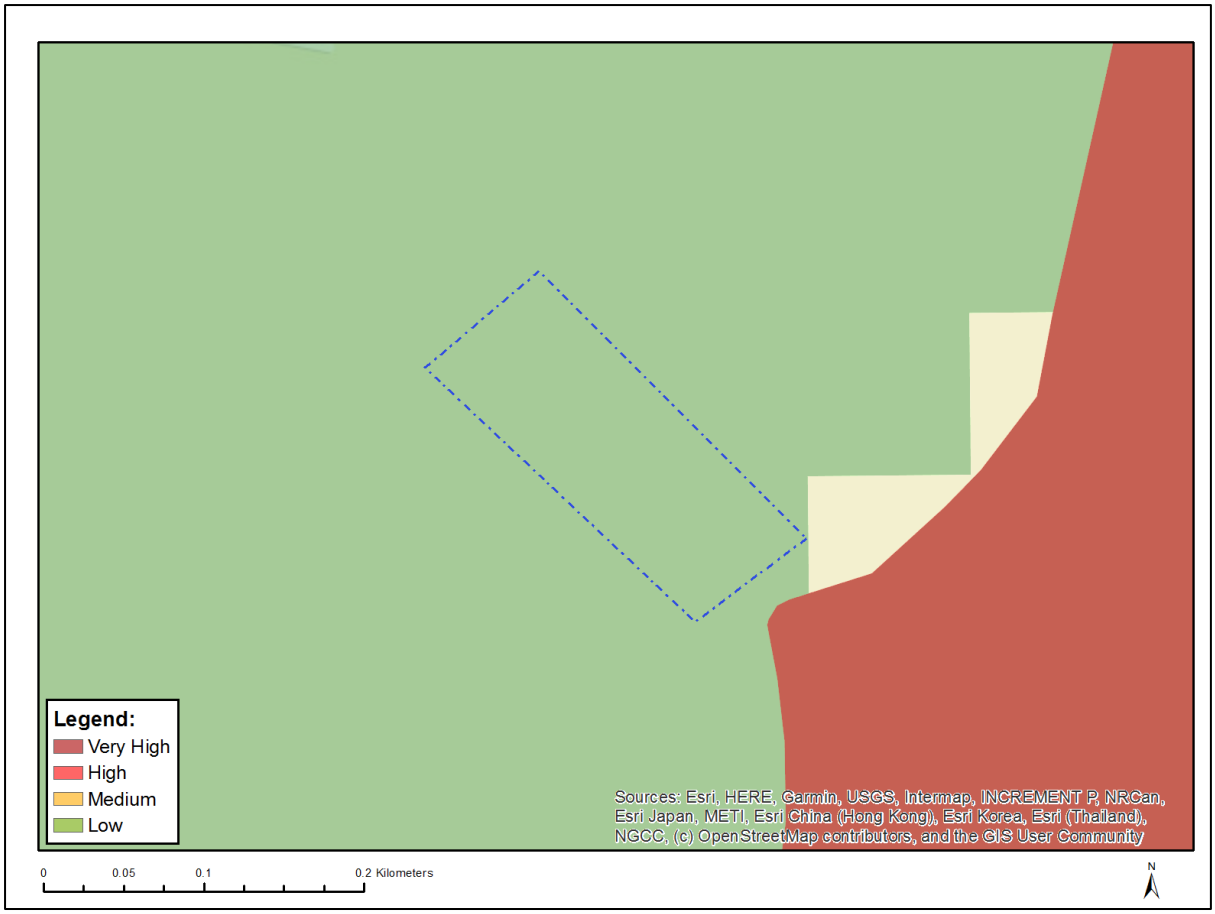

Figure 6: Map of Aquatic Biodiversity theme sensitivity, as taken from the Screening Tool Report compiled for the project.

6.3. Site Assessment

During the site visit, the proposed footprint was confirmed to be a located in transformed habitat. To north and east of the proposed development are informal settlements. To the west and south are open fields which are often used for livestock grazing.

The development footprint is predominantly flat in topography with a slight downward slope to the south of the property. Most of the footprint is dominated by weeds, and aliens such as *Argemone ochroleuca, Cirsium vulgare, Pseudognaphalium* sp. *Cynodon dactylon*, and *Avena fatua*. Because the area is dominated by grass and alien species, it indicates the past and current presences of heavy disturbance. This is likely due to grazing from livestock, general usage by the local residents, and illegal dumping. Most of the area does not represent any conservation value and is unlikely to provide habitat for any Species of Conservation Concern. See Figure 7 for a visual representation of the vegetation on the footprint.

Various aquatic features were identified as part of the project. These features are divided into four main types: floodplain wetland, channelled valley bottom wetland, streams, and artificial drainage lines (Figure 8). These features are discussed in the sections below.


A
14 Nov 2022 13:13:31
27°12'48"S 25°17'17"E

Figure 7 General Ecological Condition of the proposed development footprint where (a) is a representation of the vegetation on the pipeline footprint and (b) is a representation of the vegetation on the oxidation ponds footprint. .

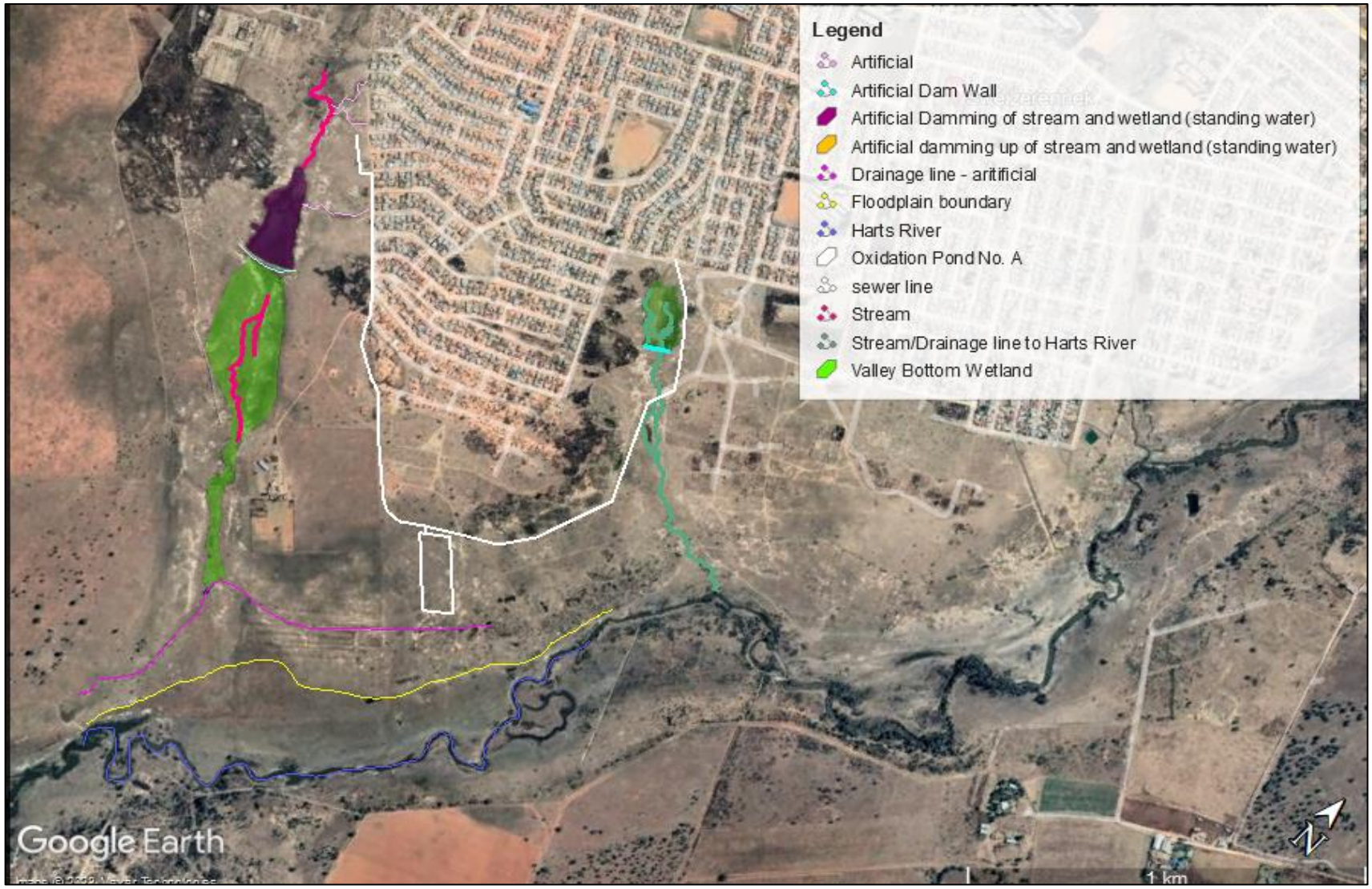

Figure 8 Aquatic features delineated within 100m and 500 m of the proposed development footprint.

Floodplain wetland

A floodplain wetland is likely situated to the south of the proposed development footprint which is associated with the Harts River. The wetland is separated from the proposed development footprint via an artificial drainage line. The wetland was delineated mostly by standing water and dominance of *Juncus effusus* (soft rush) *and Cyperus rupestris* (Red Sedge), obligate wetland species (Figure 9). Soil samples were taken within the delineated area which showcases clay soils that were dark (Figure 10). Soil samples could only be taken to a depth of 20 cm as the soil was saturated from approximately 20 cm and deeper. Soil was moist and was spongy to walk on. Topography was mostly flat with a slight slope towards the river. The wetland is well utilised as for livestock grazing which was represented by the high abundance of *Cynodon dactylon* (Quick Grass).

It must be noted that the proposed development footprint and the floodplain wetland are separated by a trenched drainage line (likely for stormwater drainage) (Figure 11).

Figure 9 General ecological condition of the floodplain wetland where (a) is an overview of the wetland and (b) shows the saturated soil.

Figure 10 Soil sample taken within the floodplain wetland including 0-20 cm in depth.

Figure 11 General ecological condition of the southern drainage line

Channelled Valley Bottom Wetland

The likelihood of the channelled valley bottom wetland was mostly delineated via the sloping topography (in a small valley), the presence of the standing water/channelised stream and dominance of wetland species such as *Cyperus rupestris* (Red Sedge) and *Juncus* sp. (Figure 12). The wetland has been impacted by surrounding land use (grazing, development and general usage) which is represented by the dominance of species associated with disturbance such as *Cynodon dactylon* and *Elionurus muticus* (Wire grass). Surface run-off from the surrounding informal settlement has also impacted the water quality of the wetland. The wetland has also been heavily impacted by the impoundment of water which created a dam (Figure 13). This likely resulted in the significant changes to the hydrology of the wetland and flow of the associated stream channel. Based on historical aerial imagery, the dam has been present since at least 1957 (Figure 13).

Based on Figure 13, the wetland once did flow down to the Harts River, but this has now been prevented via the artificial impoundment of water. This was a result of the development of trenching and creation of a boundary wall.

Figure 12 General ecological condition of the channelled valley bottom wetland

Figure 13 Visual representation of the artificially created dam.

Figure 14 Historical aerial imagery of the proposed footprint and direct surrounds

Stream

The streams delineated to the east of the proposed development is significantly disturbed (figure 15). The banks are dominated mostly by Quick Grass (*Cynodon dactylon*) and some alien species such as Mexican Poppy (*Argemone ochroleuca*). The banks show signs of heavy erosion most likely due to changes to the hydrology from surrounding land use. The water quality within the stream is likely to be of poor quality due to significant run off from the surrounding informal settlement and litter. Although a section of the proposed pipeline will result in trenching in the watercourse, it is not expected to significantly impact the stream given that it is already disturbed.

Figure 15 General ecological condition of the eastern stream.

6.4 Buffers and watercourse avoidance

The proposed development is planned within 500m of delineated wetlands. Buffer/regulated areas around the watercourses have been recommended based on Buffer Zone Guidelines for Wetlands, Rivers, and Estuaries (Macfarlane and Bredin, 2017) . A general 34 m buffer around the floodplain and 37 m around channelled valley bottom wetland has been recommended to mostly reduce the risk of sediment loading and erosion. It is assumed that the proposed development will remain outside of these buffers.

In terms of the eastern stream, trenching is expected within the watercourse and thus, no avoidance buffers have been recommended.

6.5 PES and EIS of watercourses

Present Ecological State (PES) is a measure of aquatic ecosystem condition, compared to that of the system in its natural or "reference" condition. It is applicable only to natural systems, and not to artificial ones, thus the drainage lines and dam that were likely formed from artificial/'non-natural' circumstances were not assessed for PES.

The summary of the PES assessment is given in Table 9, 10 and 11 below. In terms of the floodplain wetland, it has been minimally modified: 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. There has some loss and change of natural habitat and biota, but the *basic* ecosystem

functions are still predominantly unchanged. Factors that have contributed are changes in the catchment hydrology and water quality from changes in land use and land cover that contributes the some changes in flow, biota, and water quality.

In terms of the channelled valley bottom wetland, it has been largely modified: There has been major loss and change of natural habitat and biota, and the *basic* ecosystem functions have been altered. Factors that have contributed are changes in the catchment hydrology and water quality from changes in land use and land cover that contributes the severe changes in flow; and changes to the channel characteristics by the development of the dam.

In terms of the eastern stream, it has been seriously modified (PES Score of E). The loss of natural habitat, biota and basic ecosystem functions is extensive. The aforementioned is a result of water quality changes, bank erosion, sedimentation, water impoundment from surrounding land use.

Table 9 Summary of the PES assessment for the floodplain wetland

PES assessment per driver		
Hydrology	**Description**	**Impact score rating (0-10)**
None	No discernible modifications, or the modifications are of such a nature that they have no impact on the hydrological integrity	0-0.9
Small	Although identifiable, the impact of the modifications on the hydrological integrity is small	1-1.9
Moderate	The impact of the modifications on the hydrological integrity is clearly identifiable, but limited	2-3.9
Large	The impact of the modifications is clearly detrimental to the hydrological integrity. Approximately 50% of the hydrological integrity has been lost	4-5.9
Serious	Modifications clearly have an adverse effect on the hydrological integrity. 51% to 79% of the hydrological integrity has been lost.	6-7.9
Critical	Modifications are so great that the hydrological functioning has been drastically altered. 80% or more of the hydrological integrity has been lost	8-10
	Impact score rating (0-10)	**1.9**
Geomorphology	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural.	0-0.9
Small	Largely natural. A slight change in geomorphic processes is discernable but the system remains largely intact	1-1.9
Moderate	Moderately modified. A moderate change in geomorphic processes has taken place but the system remains predominantly intact	2-3.9
Large	Largely modified. A large change in geomorphic processes has occurred and the system is appreciably altered	4-5.9
Serious	Greatly modified. The change in geomorphic processes is great but some features are still recognizable	6-7.9
Critical	Modifications have reached a critical level as geomorphic processes have been modified completely	8-10
	Impact score rating (0-10)	**1.9**
Vegetation	**Description**	**Impact score rating (0-10)**
None	Vegetation composition appears entirely natural.	0-0.9
Small	A very minor change to vegetation composition is evident at the site (e.g. abundance of ruderal, indigenous invasive slightly higher than would be the case naturally).	1-1.9
Moderate	Vegetation composition has been moderately altered but introduced, alien and/ or increased ruderal species are still clearly less abundant than characteristic indigenous wetland species	2-3.9

PES assessment per driver		
Large	Vegetation composition has been largely altered and introduced, alien and/ or increased ruderal species occur in approximately equal abundance to the characteristic indigenous wetland species	4-5.9
Serious	Vegetation composition has been substantially altered but some characteristic species remain, although the vegetation consists mainly of introduced, alien and/or ruderal species	6-7.9
Critical	Vegetation composition has been almost totally altered, and in the worst case all indigenous vegetation has been lost (e.g. as a result of a parking lot).	8-10
	Impact score rating (0-10)	**1.9**
	AVERAGE	**1.9**
Generalized PES assessment		
PES	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural	0-0.9
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1-1.9
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred	4-5.9
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable	6-7.9
Critical	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10
	Impact score rating (0-10)	**3,9**

Table 10 Summary of the PES assessment for the channelled valley bottom wetland

PES assessment per driver		
Hydrology	**Description**	**Impact score rating (0-10)**
None	No discernible modifications, or the modifications are of such a nature that they have no impact on the hydrological integrity	0-0.9
Small	Although identifiable, the impact of the modifications on the hydrological integrity is small	1-1.9
Moderate	The impact of the modifications on the hydrological integrity is clearly identifiable, but limited	2-3.9
Large	The impact of the modifications is clearly detrimental to the hydrological integrity. Approximately 50% of the hydrological integrity has been lost	4-5.9
Serious	Modifications clearly have an adverse effect on the hydrological integrity. 51% to 79% of the hydrological integrity has been lost.	6-7.9
Critical	Modifications are so great that the hydrological functioning has been drastically altered. 80% or more of the hydrological integrity has been lost	8-10
	Impact score rating (0-10)	**5,9**
Geomorphology	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural.	0-0.9
Small	Largely natural. A slight change in geomorphic processes is discernable but the system remains largely intact	1-1.9
Moderate	Moderately modified. A moderate change in geomorphic processes has taken place but the system remains predominantly intact	2-3.9
Large	Largely modified. A large change in geomorphic processes has occurred and the system is appreciably altered	4-5.9
Serious	Greatly modified. The change in geomorphic processes is great but some features are still recognizable	6-7.9

PES assessment per driver		
Critical	Modifications have reached a critical level as geomorphic processes have been modified completely	8-10
	Impact score rating (0-10)	**5,9**
Vegetation	**Description**	**Impact score rating (0-10)**
None	Vegetation composition appears entirely natural.	0-0.9
Small	A very minor change to vegetation composition is evident at the site (e.g. abundance of ruderal, indigenous invasive slightly higher than would be the case naturally).	1-1.9
Moderate	Vegetation composition has been moderately altered but introduced, alien and/ or increased ruderal species are still clearly less abundant than characteristic indigenous wetland species	2-3.9
Large	Vegetation composition has been largely altered and introduced, alien and/ or increased ruderal species occur in approximately equal abundance to the characteristic indigenous wetland species	4-5.9
Serious	Vegetation composition has been substantially altered but some characteristic species remain, although the vegetation consists mainly of introduced, alien and/or ruderal species	6-7.9
Critical	Vegetation composition has been almost totally altered, and in the worst case all indigenous vegetation has been lost (e.g. as a result of a parking lot).	8-10
	Impact score rating (0-10)	**3,9**
	AVERAGE	**5,2**
Generalized PES assessment		
PES	**Description**	**Impact score rating (0-10)**
None	Unmodified, natural	0-0.9
Small	Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1-1.9
Moderate	Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact.	2-3.9
Large	Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred	4-5.9
Serious	The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable	6-7.9
Critical	Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8-10
	Impact score rating (0-10)	**5,2**

Table 11 Summary of the PES assessment for the streams

Criteria	Score	Comments
Instream Habitat		
Water abstraction	10	No abstraction observed but upstream and downstream in-stream impoundment is evident.
Flow modification	10	Flow modified by changes in hydrology (extra input from stormwater drainage, changes in land use, impoundment by the creation of dams).
Bed modification	15	Bed modified by surrounding land use.
Channel modification	8	Channel modified by surrounding land use.
Physico-chemistry	10	High sediment load from erosion of banks, upstream sources, and stormwater drainage from adjacent informal settlement.
Inundation	2	Increased flow from changes in upstream and surrounding land uses, changes in land cover, stormwater runoff.
Alien macrophages	5	Some alien species observed.
Introduced aquatic fauna	0	None observed
Rubbish dumping	15	Litter and illegal dumping observed.
Score	**75**	

The floodplain wetland can be classified as have an EIS category of C, thus being classified as moderate in that the wetland is ecologically important and sensitive on a local scale. Biodiversity is not usually sensitive to flow and habitat modifications. This wetland is relatively big but impacted by current and past land use, development and stormwater management. It can provide some particulate removal, erosion control and does provide a breeding and feeding ground to various faunal species. Basic functioning of the floodplain wetland in terms of flood attenuation is likely to still remain intact.

The channelled valley bottom wetland and eastern stream has an EIS category of D. This wetland and stream have a low to marginal ecological importance and sensitivity. It must be noted that the wetland and stream may form some, albeit minimal, function is supporting faunal activity. Plant diversity is ubiquitous and not sensitive to flow and habitat modifications. However, plant species composition may change should there be flow modifications. This classification can be attributed to the features having minimal floral diversity; providing low/moderate levels of hydraulic buffering; are likely very nutrient rich and generally insensitive to further nutrient loading; are generally insensitive to changes in hydrology, patterns of inundation, discharge rates and/or human disturbance; have regulated water; and likely contain large quantities of accumulated organic and inorganic sediments.

6.6 Hydrological functioning of wetlands

The wetland types identified on site will likely contribute to the following hydrological function according to the hydro-geomorphic type (DEPARTMENT OF WATER AND SANITATION, 2017) in Table 12 below. All floodplain wetlands will be important for flood attenuation early in the wet season, sediment trapping, phosphate removal and erosion control all year round. The main source of water for a floodplain wetland is surface water flow. In terms of the unchanneled valley bottom wetland, it is important for erosion control as well as removing toxicants all year round. Water source contributions include surface and sub surface flow.

Table 12 Hydrological function according to the hydro-geomorphic type (DEPARTMENT OF WATER AND SANITATION, 2017).

Wetland hydro-geomorphic type	Source of water maintaining the wetland		Hydrological functions potentially performed by the wetland								
			Flood attenuation		Steam flow augmentation		Erosion control	Potential for water quality enhancement			
	Surface	Sub-surface	Early wet season	Late wet season	Early wet season	Late wet season		Sediment trapping	Phosphate removal	Nitrates	Toxicants
Floodplain	I	0	++	+	X	X	++	++	++	+	+
Valley bottom - channelled	I	I	+	X	X	X	++	+	+	+	+
Valley bottom - unchannelled	I	I	+	+	+	+	++	+	+	+	++
Hillslope seepage with a stream channel	0	I	+	X	+	+	++	X	X	++	++
Hillslope seepage without a stream channel	0	I	+	X	+	+	++	X	x	++	++
Pan / Depression	I	I	+	+	x	X	x	x	x	+	+

Key: Water source 0 Contribution usually small

I Important contribution

Rating:

X Function unlikely to be performed to any significant extent

+ Function likely to be present at least to some degree

++ Function very to be present (and often performed to a high level)

6.7 Site Verification

Although the proposed development will impact various watercourses/wetlands, these are already highly impacted and disturbed. Due to the aforementioned and the low probability that the mast will have any impact on surrounding wetlands, the proposed prospecting footprint is expected to be of **low sensitivity** for the Aquatic Biodiversity Theme.

7. IMPACT MANAGEMENT OUTCOMES OR ANY MONITORING REQUIREMENTS FOR INCLUSION IN THE EMPR

7.1 Construction Phase Impacts

Activity: Handling waste, general- and hazardous material on the site during construction

Aspects: Spillage from construction vehicles and waste dumping does not lead to contamination of watercourses and soils of the surrounding environment as wind and surface runoff can carry contaminated/polluted water downstream.

Mitigation:

- All rubble and litter should be cleared from the site and stored in designated waste bins and/or stockpile areas respectively.
- Strict waste management should be implemented during construction.
- Sufficient waste receptacles should be placed around the facility to encourage people to use them.
- The principle of reduce, re-use and recycle should be followed.

- Construction site should be kept clean and tidy.
- Any waste should be disposed in a registered landfill and not be allowed to be dumped in the surrounding landscape.
- No dumping of waste or any other materials is allowed within any stormwater channels, drainage lines or the watercourses.
- Storage of material, waste, spoil and construction equipment on or in stormwater drainage or inside of demarcated protected areas – is strictly prohibited.
- All surfaces used for waste storage should have an impermeable surface.
- Drip trays to be placed beneath stationary vehicles and generators.
- Machinery should be maintained and inspected for leaks. All hazardous chemicals should be handled and stored on impermeable surfaces.
- Hazardous chemicals should be kept on an impermeable bund area.
- Stormwater and run-off should be managed and diverted to not be in contact with waste.
- Regularly inspect all construction vehicles for leaks. Re-fuelling of vehicles must take place on a sealed surface area surrounded by berms to prevent ingress of hydrocarbons into topsoil.
- If any spills occur, they should be immediately cleaned up.
- An emergency response plan should be available for any chemical spill or ecological damage.
- Spill kits and material safety data sheets must be stored on site: In case of accidental spills of oil, petroleum products etc., good oil absorbent materials must be on hand to allow for the quick remediation of the spill. The kits should also be well marked and all personnel should be educated to deal with the spill. Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat. The use of a product such as Sunsorb is advised.
- Proper toilet facilities must be available during constructional. Chemical toilets must be provided which should always be well serviced and spaced as per occupational health and safety laws and placed outside the 1:100 year flood lines.
- No dirty water runoff from the construction and decommissioning site must be permitted to reach the watercourses around the proposed site.

Activity: Construction activities and the spread of Alien Invasive Species.

Aspect: Disturbance of soil that creates opportunity for invasion which may lead to significant alien invasive species establishment and spread.

Mitigation:

- Construction activities should be limited to the smallest possible area.
- Construction vehicles should use existing authorised service roads.
- Implement suitable alien invasive species establishment prevention measures during the construction phase such as proper storage, transport and disposal of plant material and minimising disturbance to the areas surrounding the development footprint.
- Alien invasive vegetation material cleared during construction activities must be adequately contained and disposed of at a suitable, certified 'green waste' disposal site to prevent further spreading.

- Areas around the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- Herbicides must be used in the prescribed quantities and only periods of no rainfall.

Activity: Trenching within a watercourse and within the regulated area of a watercourse.

Aspect: Changes to hydrology, stream channel, water quality, and physico-chemical properties of the affected watercourses due to trenching within the regulated area of watercourses.

- Construction activities should be limited to the smallest possible area.
- Construction vehicles should use existing roads.
- Personnel must remain outside of delineated watercourses; where feasible.
- Method Statements must be compiled for the following activities:
  - Handing of general waste
  - Handling of hazardous waste
  - Trenching within watercourses
- Implement suitable alien invasive species establishment prevention measures during the construction phase such as proper storage, transport and disposal of plant material and minimising disturbance to the areas surrounding the development footprint.
- Alien invasive vegetation material cleared during construction activities must be adequately contained and disposed of at a suitable, certified 'green waste' disposal site to prevent further spreading.
- Areas around the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment.
- All proposed trenches within watercourses and within 100 m of watercourse, must be excavated by hand.
- A rehabilitation method statement must be compiled to rehabilitate the portion of stream that will be trenched.
- An effective stormwater management plan must be compiled to ensure effective stormwater drainage.

Activity: Construction, erosion control & storm water management

Aspects: Development of the oxidation ponds and artificial wetland may result in erosion on site and within 500m of wetlands. Stormwater may be diverted due to the development of the oxidation ponds.

Mitigation:

- Implement suitable erosion prevention measures during the construction phase.
- Soil erosion must be controlled as an ongoing management strategy throughout the various phases of the proposed development activities.
- Make use of surface erosion control measures within disturbed areas to avoid erosion in times of high risk (e.g. rain season and time of high wind speeds).
- Stormwater management along any roadways and paths to reduce gulley erosion formation.

- Stormwater management should prevent excessive sediment to be carried into drainage channels and the natural environment.
- Removal of debris and other obstructing materials from the site must take place and erosion preventing structures must be constructed. This is done to prevent damming of water and increasing flooding danger.
- Disturbed areas, that will not form part of the operational footprint but which were disturbed as part of the construction activities, should be rehabilitated and re-vegetated using site-appropriate vegetation and/or seed mixes, to prevent gulley erosion.
- Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed.
- No materials of any kind are allowed to be stored in the stormwater channels.
- Areas around the proposed project footprint, must be adequately rehabilitated to prevent significant erosion.
- Avoid the use of concrete lined channels for storm water management as this can increase the speed of water. This in turn increases erosion potential that can cause erosion on site and in watercourse banks and increase siltation downstream. If concrete-lined channels are used; they should end in silt traps.
- Soil disturbance must be kept to a minimum within and around the development footprint.
- It is recommended to construct a narrow and relatively shallow trench around the base station footprint, filled with gravel. This gravel will slow down any surface run-off from the mast and promote water infiltration and prevent erosion and sedimentation. Alternative measures that will achieve the same outcome can be considered.

Activity: Construction activities including clearance of vegetation and changes to hydrology due to development within the regulated area of a watercourse.

Aspects: Clearance of vegetation and soil, general construction, and development of infrastructure within 500m of a wetland may result in changes to drainage patterns and siltation in downstream wetlands.

- The development footprint must remain as small as practically possible.
- All buffers as stated in Section 6.4 must be adhered to.
- All bare areas must be rehabilitated via a Revegetation Method Statement
- Vehicles must use already developed roads as far as possible.
- Dust control mechanisms must be implemented during the construction phase.
- All stockpiles must be stored outside of wetland buffers.
- Stockpiles must be covered in periods high wind and rain.
- To ensure that the artificial wetland is functioning properly, it is recommended that the following plant species be planted to assist with filtration:
-

7.2 Operational Phase Impacts

Activity: General operation of oxidation ponds, pipeline and artificial wetland

Aspect: The general operation of the oxidation ponds may result in improper stormwater management and alien invasive species establishment

- Structures must be inspected regularly for the accumulation of debris, blockages, instabilities and erosion with concomitant remedial and maintenance actions.
- Regular inspections will be undertaken of any access roads and stormwater management drains for signs of erosion and sedimentation.
- Ongoing alien vegetation removal should take in and around the development footprint.
- Upstream runoff should be diverted around the mast.
- Operational site should be kept clean and tidy.
- Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities.
- No dumping of waste or any other materials is allowed within the watercourses or their regulated areas.
- If any spills occur, they should be immediately cleaned up.
- Effluent in the artificial wetland is expected to be regularly monitored to ensure that effluent is with the General Authorisation standards.

Activity: Water quality changes due to operations of the oxidation ponds

Aspect: The general operation of the oxidation ponds and pipelines may result in seepage of untreated sewage and effluent into surrounding freshwater systems

- An effective maintenance plan must be compiled and approved by the Department of Water and Sanitation (DWS).
- Any spillage or seepage incidents must be immediately reported. These reports must be submitted to the DEDECT and DWS.
- Regular effluent monitoring must take place to ensure that the treatment system is effective.

7.3 Monitoring

- An Environmental Control Officer (ECO) must be appointed to ensure compliance with the requirements during the construction- and decommission phase.
- The risk of contamination in the environment of chemical spills and oil leaks should be closely monitored during construction and decommissioning phases.
- Preconstruction measures must be in place to ensure sediments are trapped and erosion controlled.
- All affected areas must be rehabilitated in accordance with a rehabilitation plan/method statement.
- Stormwater management should be closely monitored and any water diversions around the construction site and development should be inspected for signs of erosion and sedimentation.
- Regular maintenance of the oxidation ponds and pipeline must be implemented during the operational phase in accordance with a maintenance plan.
- Regular inspection around the oxidation ponds and pipelines is needed and any new erosion gullies must be remediated immediately.

7.4 Risk Ratings of Potential Impacts

Based on Appendix B, the risk of the proposed development on the wetlands, streams and drainage lines is Low. However, this Risk can be further decreased by implementing the proposed mitigation measures in Section 7.1 and 7.2. Provided that the mitigation measures will be measured, it is expected that a General Authorisation will suffice for the proposed development.

8. CONCLUSION

Taking into consideration the sensitivity of the development footprint, sensitive features identified by the Screening Tool, the results from the baseline biodiversity and ecosystem of the site, which was verified by a site visit, it can be concluded that the proposed development footprint is of **low** sensitivity for the Aquatic Biodiversity Theme. Provided that all the management outcomes are adhered to, this Compliance Statement is considered sufficient to meet the requirements for authorisation under the Aquatic Biodiversity Theme Minimum requirements. It is also not expected that a **General Authorisation** will be required for the proposed activities.

9. CONDITIONS TO WHICH THIS STATEMENT IS SUBJECTED

- This signed copy of the compliance statement must be read as an appendix to the Basic Assessment Report (BAR) and General Authorisation (GA) for this project.
- This Compliance Statement is subject to the condition that the information supplied to the specialist regarding the project scope, design, layout, location or any other project specifications will not be significantly deviated from.
- All mitigation measures and requirements as specified in this compliance statement, the BAR, GA and EMPr will adhered to during all project phases.

10. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

- A desktop delineation of the wetland and riparian area was done before the site visit. This is thought to be an acceptable method.
- The watercourse assessment is confined to the proposed project footprint and does not include the neighbouring and adjacent properties, which were only considered as part of the desktop assessment.
- Global Positioning System (GPS) technology is inherently inaccurate and some inaccuracies due to the use of handheld GPS instrumentation may occur. If more accurate assessments are required, the watercourses will need to be surveyed and pegged according to surveying principles.
- The risk assessment was applied on the basis that the stipulated mitigation measures and all specialist recommendations will be implemented, and therefore the results presented demonstrate the impact significance of perceived impacts on the receiving freshwater environment post-mitigation.
- All information provided by the EAP, applicant and engineering design team to the environmental specialist was correct and valid at the time that it was provided.
- The proposed project footprint as provided by the engineering design team is correct and will not be significantly deviated from.

- Significant reliance on visual eco-morphological observations was made to derive an understanding of the state of the habitat within the subject site. This state may change under a different meteorological regime.
- Freshwater resources that fall outside of the affected catchment (but still within the 500 m DWS regulated area) and are not at risk of being impacted (such as upslope water resources) by the specific activity were not delineated nor assessed. Such features were flagged during a baseline desktop assessment prior to the site visit.
- This assessment deals primarily with inland wetlands (i.e. no existing connection to the ocean and these ecosystems are characterised by the complete absence of marine exchange and/or tidal influence) (Ollis et al., 2013).
- Selection of assessment techniques and tools were based on the assessment practitioner's knowledge and experience of these tools and their attributes and shortcomings.
- The assessment techniques and tools are currently the most appropriate available tools and techniques to undertake assessments of freshwater resources; they are rapid assessment tools that rely on qualitative information and expert judgment. While these tools have been subjected to peer review processes, the methodology for these tools are ever evolving and will likely be further refined in the future. For the purposes of this assessment, the assessments were undertaken at rapid levels with somewhat limited field verification: it therefore provides an indication of the PES of the portions of the affected systems rather than providing a definitive measure.
- PES and EIS were only determined for the affected/regulated areas even though upstream and downstream as well as catchment impacts were considered (based on available desktop information).
- The PES and EIS assessments undertaken are largely qualitative assessment tools and thus the results are open to professional opinion and interpretation.
- The EIS assessment did not specifically address the finer-scale biological aspects of the watercourses such as faunal species.
- The initial study was undertaken as a desktop assessment and as such, the information gathered must be considered with caution, as inaccuracies and data capturing errors are often present within these databases.
- The guideline document, "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas" document, as published by DWAF (2005) was followed for the delineation of the wetland and riparian areas.
- This assessment is focussed on surface water.

11 APPENDIX A

11.1 DETAILS OF THE SPECIALIST

Name	Megan Smith
Contact Details	076 965 8002
Qualification	M.Sc (Ecology) – University of Cape Town
EAPASA registration	2020/2855 (Cand. EAP)
Field of expertise	Botany & Ecology

11.1.1. Signed declaration of interest of the specialist

I Megan Smith, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that:

- In terms of the general requirement to be independent:
  - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist (the "Review Specialist") that meets the general requirements set out in Regulation 13 of the NEMA EIA Regulations has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- In terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- I have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any Report, plan or document prepared or to be prepared as part of the application; and
- I am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations.

Signature of the Specialist: Date: 12/06/2023

11.1.2. Curriculum vitae of specialist: Megan Smith

RELEVANT QUALIFICATIONS AND TRAINING

- MSc Biological Sciences (UCT): Specialising in Plant Ecology
- BSc Hons Botany (NMU)
- BSc Environmental Sciences (NMU)
- Scientific writing training led by Dr Pippin Anderson (August 2019)
- Fynbos plant identification training (July 2019)
- CDM calibration training by Renew Technologies (August 2020)
- ISO 14001:2015 Lead auditor training by SACAS (March 2021)
- Hydropedology and wetland delineation course led by WETrust and digital Soils Africa (September 2021)

WORK EXPERIENCE

- March 2015 – September 2016: Research assistant determining sustainable cultivation practices of Honeybush (*Cyclopia* spp.) at NMU
- March 2019 – April 2020: Restoration Ecology and Conservation Planning intern at SANBI
- April 2020 – current: Environmental consultant and legal assistant at Enviroworks

Published popular Science article:

- Smith, M., Rebelo, A.G. 2020. The Amazing Nature Race. Veld and Flora 106: 16-21.
- Smith, M., Rebelo, A., Rebelo, A.G. 2020. Passive restoration of Critically Endangered Cape Flats Sand Fynbos at lower Tokai Park section of Table Mountain National Park, Cape Town. ReStory
- Smith, M., Rebelo, A., Rebelo, A.G. 2020. Saving Critically Endangered Peninsula Granite Fynbos from extinction at Tokai Park, Cape Town. ReStory.
- Smith, M., Rebelo, A.G. 2020. iNaturalist: your portal into nature and becoming a citizen scientist. African Wildlife and Environment 75.

BASIC ASSESSMENT

- The proposed development of a thirty-five metre (35m) telecommunication base station and associated infrastructure on Portion 42 of Farm 428, Plettenberg Bay, Western Cape Province, SBA Towers South Africa.
- The proposed development of a twenty-five metre (25m) telecommunication base station and associated infrastructure on Lorraine Farm, the Remainder of Farm 790, Phillipi Western Cape Province, SBA Towers South Africa.
- The proposed development of a desalination or reverse osmosis plant, Tormin Mine, Western Cape Province (in progress), Mineral Sands Resources
- Proposed expansion of chicken houses from approximately 30 000 to 60 000 chickens, Bulhoek Farm, near Swartruggens, Northwest Province, Quantum Foods (in progress).

ENVIRONMENTAL MANAGEMENT PLANS

- The proposed development of a thirty-five metre (35m) telecommunication base station and associated infrastructure on Portion 42 of Farm 428, Plettenberg Bay, Western Cape Province, SBA Towers South Africa.
- The proposed development of a twenty-five metre (25m) telecommunication base station and associated infrastructure on Lorraine Farm, the Remainder of Farm 790, Phillipi Western Cape Province, SBA Towers South Africa.
- The proposed development of a desalination or reverse osmosis plant, Tormin Mine, Western Cape Province (in progress), Mineral Sands Resources
- Proposed expansion of chicken houses from approximately 30 000 to 60 000 chickens, Bulhoek Farm, near Swartruggens, Northwest Province, Quantum Foods (in progress).
- Proposed development of a protea hotel within the Kruger National Park, Phalaborwa, Limpopo Province, South African National Parks (SANParks) (In progress).
- Proposed development of the Lendlovu Lodge, Addo Elephant Park, Eastern Cape Province, SANParks (in progress).
- Registration of the bulk diesel storage and update to the EMPr for the proposed expansion of the Samrand Data Centre, African Data Centres (in progress).

BOTANICAL AND FAUNAL IMPACT STUDIES

- Botanical Impact Assessment: Rezoning and the development of fifteen (15) resort units on Portion 12 of the Farm Riet Valley no. 452, Hessequa Local Municipality, Western Cape Province (Faunal Compliance Statement and Botanical Impact Assessment), Hessequa Municipality.
- Botanical survey for the proposed development of a six-point three kilometre (6.3km) long pipeline along Macassar Road, Macassar, Cape Town, Western Cape Province, BVi Consulting Engineers Western Cape.
- Botanical and Faunal Compliance Statement; Proposed expansion of chicken houses from approximately 30 000 to 60 000 chickens, Bulhoek Farm, near Swartruggens, Northwest Province, Quantum Foods
- Botanical, Faunal and Terrestrial Biodiversity Compliance Statement: Proposed development of a 25 m Telecommunications Mast, Almenkerk Farm, Western Cape Province
- Protected tree and animal species survey, and compilation of an alien invasion management plan for Ramatlabama Poultry Farm, Mahikeng, Northwest Province, Supreme Poultry (in progress).
- Botanical, Faunal, and Terrestrial Biodiversity Impact Assessment: Proposed Solar Farm, Welkom, Free State Province (in progress).

REHABILIATION PLANS

- Protocols for restoring Critically Endangered Cape Flats Sand Fynbos within lower Tokai Park, Cape Town, South African National Biodiversity Institute)
- Proposed development of a six-point three kilometre (6.3km) long pipeline along Macassar Road, Macassar, Cape Town, Western Cape Province, BVi Consulting Engineers Western Cape.
- Rehabilitation implementation plan and consultation services for Tormin Mine, Western Cape Province, Mineral Sands Resources (in progress)

- Rehabilitation Method Statement for 132 KW and 33 KW transmission lines, transmission substation, cabling line trenches, and access roads on Roggeveld Wind Farm, Western Cape, Raubex Infra.
- Rehabilitation progress report :132 kv and 33 kv tranmission lines, transmission substation, cabling line trenches, and access roads on Roggeveld Wind Farm, Western Cape, Raubex Infra.

ENVIRONMENTAL CONTROL OFFICER (ECO) AND AUDITING

- Environmental Control Officer: The proposed development of a backup energy centre including diesel storage and generators, on Erf 142504, Diep River, Cape Town, Western Cape Province, African Data Centres.
- Environmental Control Officer: The proposed construction of new and rehabilitation of existing non-motorised transport facilities in the Cape Town CBD, Western Cape Province, BVi Consulting Engineers Western Cape.
- Environmental Compliance Audit for Franki Africa Stock Yard, Durban, KwaZulu Natal Province, Franki Africa.
- The proposed development of a twenty-five metre (25m) telecommunication base station and associated infrastructure on Lorraine Farm, the Remainder of Farm 790, Phillipi Western Cape Province, SBA Towers South Africa
- Environmental Control Officer: The proposed maintenance of the Blue Stone Quarry Wall, Robben Island, Robben Island Museum.

MAINTENANCE MANAGEMENT PLANS

- The proposed maintenance of the Blue Stone Quarry Wall, Robben Island, Robben Island Museum.

ENVIRONMENTAL SCREENING

- Proposed upgrading of the Durbanville Public Transport Interchange, Western Cape, BVi Consulting Engineers Western Cape.
- Proposed the upgrade on national road R40 section from Hazyview (km 0.0) to Maviljan (km 32.1), BVi Consulting Engineers Western Cape.

ALIEN INVASIVE SPECIES MANAGEMENT PLANS

- Invasive species monitoring, control and eradication plan, Garden Route District Municipality, Western Cape Province, Garden Route District Municipality.
- Rehabilitation implementation plan and consultation services for Tormin Mine, Western Cape Province, Mineral Sands Resources (in progress)
- Protected tree and animal species survey, and compilation of an alien invasion management plan for Ramatlabama Poultry Farm, Mahikeng, Northwest Province, Supreme Poultry (in progress).

CLEAN DEVELOPMENT MECHANISM

- Calibration and advisory services for the CDM Methane Burning Plant at the Coastal Park and Bellville South Landfill Sites, Promethium Carbon (in progress)

12 APPENDIX B

RISK ASSESSMENT KEY (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

Negative Rating

TABLE 1- SEVERITY

How severe does the aspects impact on the resource quality (flow regime, water quality, geomorphology, biota, habitat) ?

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.	

TABLE 2 – SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighboring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION

How long does the aspect impact on the resource quality?

One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, a E or F	5
PES and EIS (sensitivity) must be considered.	

TABLE 4 – FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3

Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the resource quality?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation (wetlands are legally governed)	5
Located within the regulated areas	

TABLE 7 – DETECTION

How quickly/easily can the impacts/risks of the activity be observed on the resource quality, people and property?

Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

TABLE 8: RATING CLASSES

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.
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. Licence required.

170 – 300	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 9: CALCULATIONS

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance\Risk = Consequence X Likelihood