BTE Renewables

AQUATIC BIODIVERISTY COMPLIANCE STATEMENT BESS AND 132 KV GRID CONNECTION INFRASTRUCTURE

REPORT

41103968 AQUATIC BIODIVERSITY
APRIL 2023

PUBLIC

BTE Renewables

AQUATIC BIODIVERISTY COMPLIANCE STATEMENT BESS AND 132 KV GRID CONNECTION INFRASTRUCTURE

REPORT

PUBLIC

PROJECT NO. 41103968

OUR REF. NO. 41103968 AQUATIC BIODIVERSITY

DATE: APRIL 2023

BTE Renewables

AQUATIC BIODIVERISTY COMPLIANCE STATEMENT BESS AND 132 KV GRID CONNECTION INFRASTRUCTURE

REPORT

WSP

Building 1, Maxwell Office Park
Magwa Crescent West, Waterfall City
Midrand, 1685
South Africa

Phone: +27 11 254 4800

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Final
Remarks	Draft Wetland Report	Final Wetland Report
Date	April 2023	April 2023
Prepared by	Tebogo Khoza	Lufuno Nemakhavhani
Signature		
Checked by	Aisling Dower	Aisling Dower
Signature		
Authorised by	Aisling Dower	Aisling Dower
Signature		
Project number	41103968	41103968
File reference	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41103968 - Biotherm BESS and 132 kV OHPL\41 ES\01-Reports\5. Specialists	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41103968 - Biotherm BESS and 132 kV OHPL\41 ES\01-Reports\5. Specialists

CONTENTS

TABLES

FIGURES

EXECUTIVE SUMMARY

WSP Group Africa (Pty) (Ltd) (WSP) was appointed by Biotherm Energy to undertake the necessary ecological baseline surveys and impact assessment reports, in support of the environmental regulatory process required to authorise the Sendawo Battery Energy Storage System (BESS) and over-head power line (OHPL) development near Vryburg, North-West Province.

This report describes the outcomes of the site sensitivity verification of the potential environmental sensitivity of the site under consideration for proposed development and describes the baseline aquatic biodiversity of the study area. The proposed project is located within the Dr Ruth Segomotsi Mompati District Municipality under the jurisdiction of the Naledi Local Municipality.

The aquatic biodiversity compliance statement took cognisance of Government Notice No. 320, published in Government Gazette 43110 (20 March 2020) under the National Environmental Management Act (1998) concerning the *'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity'*.

In line with the assessment and reporting requirements set out in the protocol, this aquatic biodiversity compliance statement includes a description of the findings of a desktop review of available literature for the area, and field surveys undertaken on the 17th to 18th April 2023.

Based on the National Web-based Environmental Screening Tool, the footprint of the proposed BESS (including the substations) and the OHPL (Alternative 2) infrastructure is identified as 'low' sensitivity for the Aquatic Biodiversity Theme and that of the OHPL (Alternative 1) is identified as 'very high' sensitivity due to the presence of watercourses labelled as CBAs; however, these were found to be ephemeral channels which unlikely support rare or sensitive species adapted for aquatic life. In addition, the N18 road will likely act as a barrier between the watercourses and the proposed project. A 'low sensitivity rating' for aquatic biodiversity in the study area is therefore motivated, in line with the protocol.

Notwithstanding the fact that the study area is considered to be of low sensitivity for aquatic biodiversity, and no significant impacts on aquatic biodiversity as a result of the proposed development are predicted, impact mitigation and management measures are recommended to avoid/minimise potential impacts on nearby wetlands/watercourses arising from the proposed project.

Contact name Lufuno Nemakhavhani

Contact details +27 11 313-1121 | lufuno.nemakhavhani@wsp.com

1 INTRODUCTION

WSP Group Africa (Pty) (Ltd) (WSP) was appointed by BTE Renewables to undertake the necessary ecological baseline surveys and impact assessment reports, in support of the environmental regulatory process required to authorise the Sendawo BESS and OHPL development (the Project) near Vryburg, North-West province.

1.1 PURPOSE OF THE REPORT

This report describes the outcomes of the site sensitivity verification of the potential environmental sensitivity of the site under consideration for proposed development and describes the baseline aquatic biodiversity (including both wetland and riparian ecosystems) of the study area in accordance with the gazetted requirements for an Aquatic Biodiversity Compliance statement (Notice No.320 Government Gazette 43110 of March 2020). This report will be submitted together as part of the application for Environmental Authorisation, in accordance with the requirements of the Environmental Impact Assessment Regulations.

1.2 PROJECT LOCATION AND EXTENT

The Project is located within the North-West Province under the jurisdiction of the Naledi Local Municipality, which is in the Dr Ruth Segomotsi Mompati District Municipality (Figure 1-1). East of the project site is the N18 road which leads to the Vryburg town approximately 10 km north of the project footprint.

The Project study area includes the area on which the proposed development will take place, plus any watercourses situated within 500 m of that development, i.e. the ‘regulated zone’ of a watercourse as defined by the National Water Act and is depicted on Figure 1-2.

The proposed infrastructure that are the subject of the current application process are illustrated in Figure 1-3, and consist of the following key components:

- BESS Alternative 1; including Laydown Area Alternative 1, and linked to the Mookodi substation via 132 KV OHPL Option 1, which will be situated within Grid Corridor Option 1;
- BESS Alternative 2; including Laydown Area Alternative 2, and linked to the Mookodi substation via 132 KV OHPL Option 2, which will be situated within Grid Corridor Option 2.

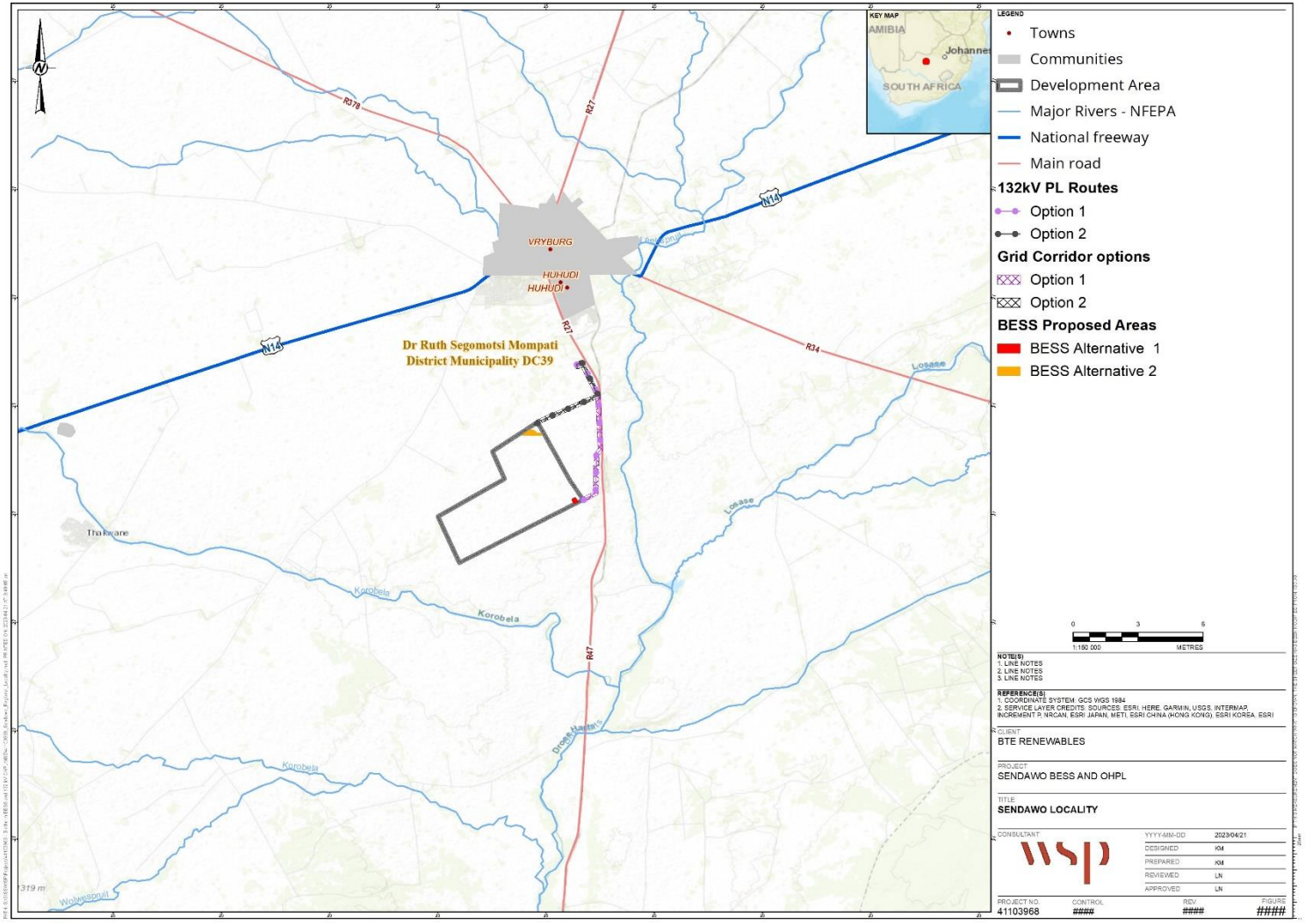

Figure 1-1 - Project locality and solar development area

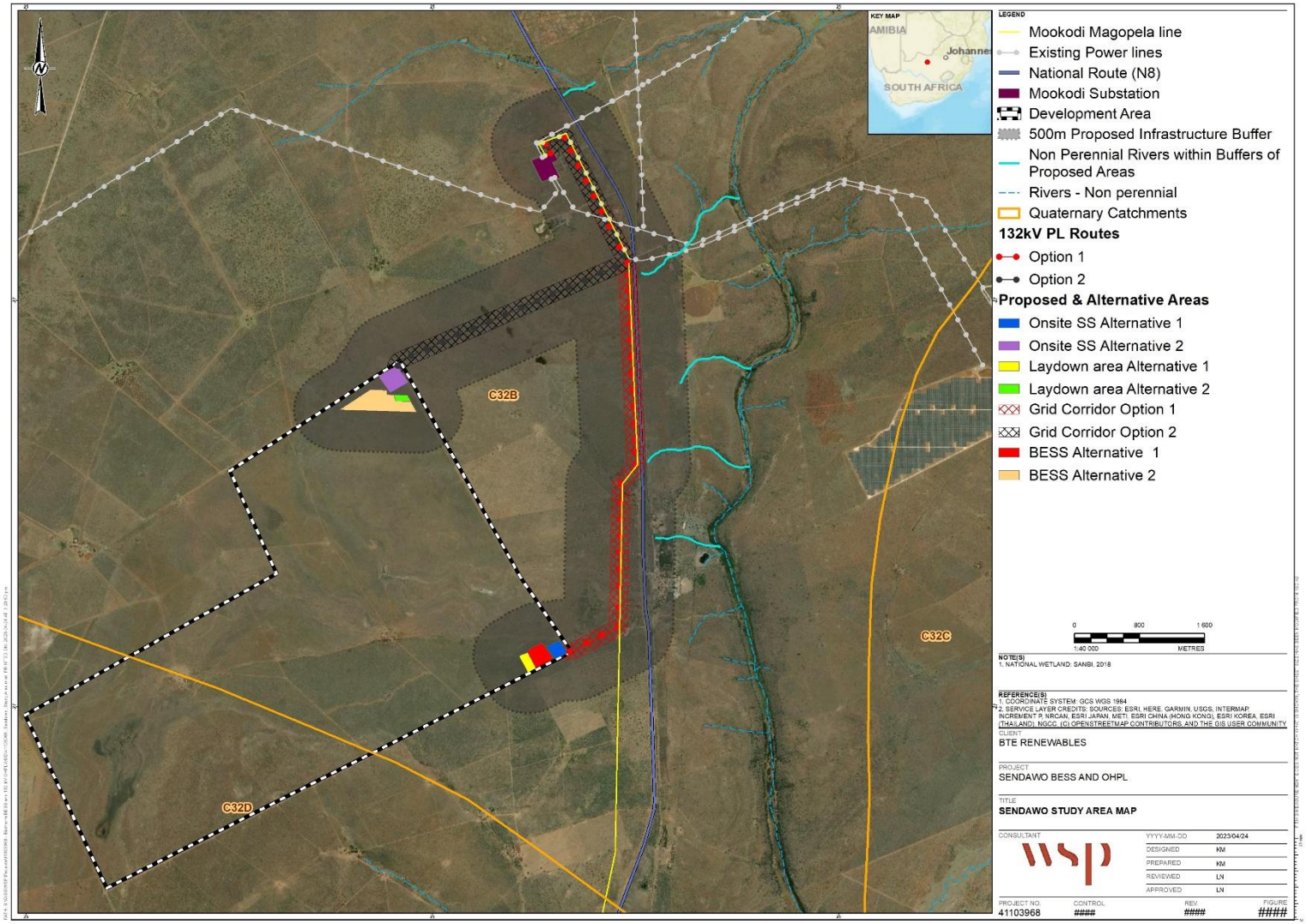

Figure 1-2 – Regulated zone (500 m buffer) for watercourses associated with the Project

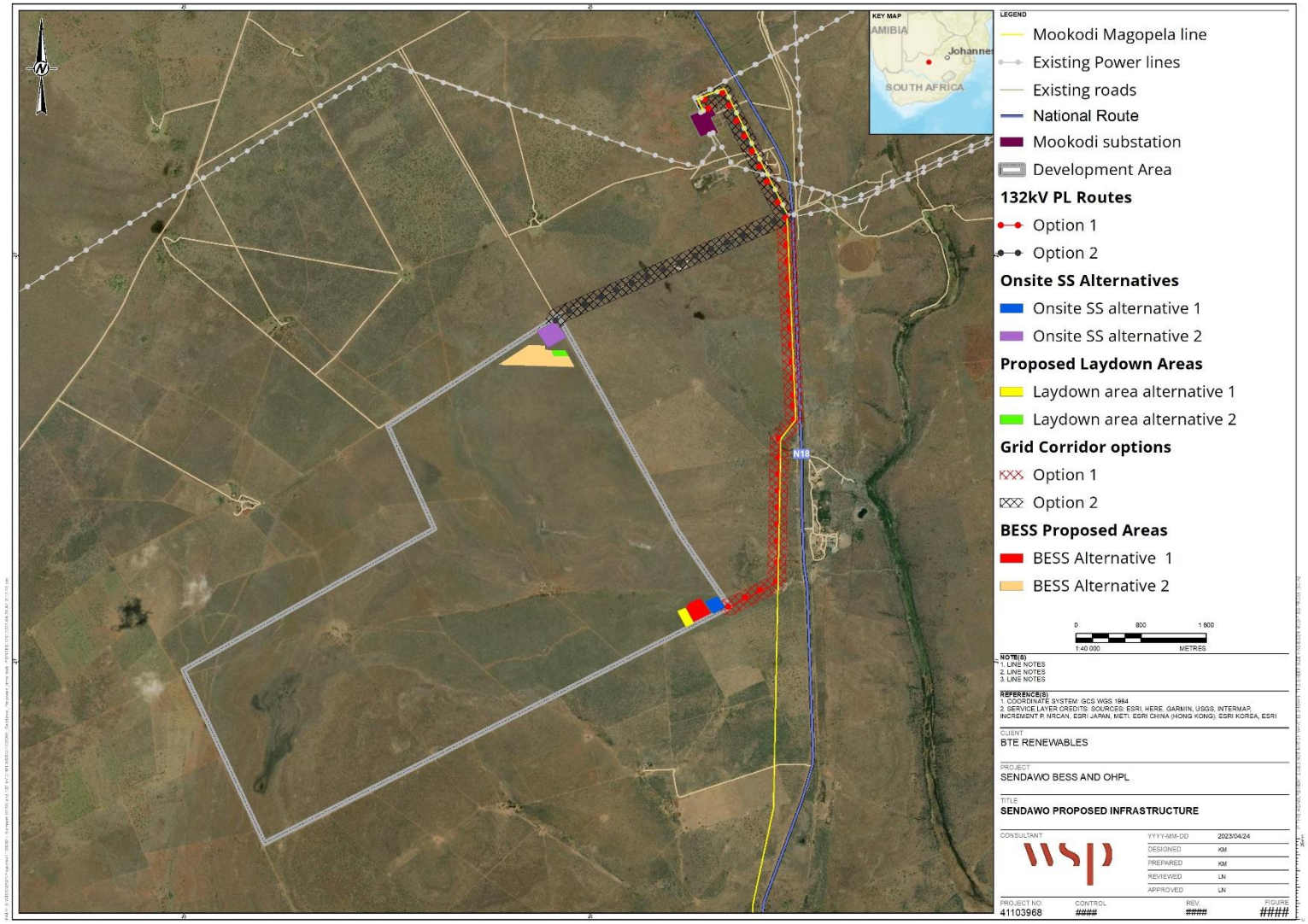

Figure 1-3 – Proposed project layout plan including alternatives

2 METHODOLOGY

The aquatic biodiversity compliance statement took cognisance of Government Notice No. 320, published in Government Gazette 43110 (20 March 2020) under the National Environmental Management Act (1998) concerning the 'Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity'.

In line with the assessment and reporting requirements set out in the protocol, this aquatic biodiversity compliance statement included a desktop literature review of available literature and a field survey of wetlands and riparian systems within the study area, undertaken on the 17th to 18th April 2022.

2.1 LITERATURE REVIEW

The aim of the desktop literature review was to collate and review the extensive available ecological information related to important biodiversity and conservation features in the project area, key ecological processes and function, and the likely composition and structure of local fauna communities.

2.2 FIELD SURVEY

A field survey to assess riparian systems and identify and delineate the wetlands within 500 m of the proposed Project infrastructure footprint was conducted on 17th to 18th April 2022. The methods used in the identification, delineation, classification, and assessment of wetlands in the study area are described in the sections that follow.

WETLAND DELINEATION

The delineation procedure originally set out in "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas", DWAF (2005) and updated by DWAF (2008), describes the following four indicators of wetland presence that can be used to define the boundary of a wetland:

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

These indicators were used in the field to delineate the boundary of the temporary zone (outer boundary) as well as the seasonal and permanent zonal characteristics of the wetland systems encountered within the study area.

WETLAND CLASSIFICATION

To allow for the differentiation between wetland systems and the prioritisation of systems either for conservation or management purposes, the wetlands were classified in accordance with each hydrogeomorphic (HGM) unit for assessment purposes according to (Kotze *et al.*, 2008). Six major

inland HGM types are recognised for the purposes of wetland classification (Table 2-1), and these criteria were applied to the current assessment.

Table 2-1 - Wetland Hydrogeomorphic Units (after Kotze *et al*., 2008)

Wetland Hydro-geomorphic type	Description	Source of water maintaining the wetland1	
		Surface	Sub-surface
Floodplain	Valley bottom areas with a well-defined stream channel, gently sloped and characterised by floodplain features such as oxbow depressions and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.	***	*
Channelled valley bottom	Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterised by the net accumulation of alluvial deposits or may have steeper slopes and be characterized by the net loss of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.	***	*/***
Unchannelled valley bottom	Valley bottom areas with no clearly defined stream channel, usually gently sloped and characterised by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and from adjacent slopes.	***	*/***
Hillslope seepage with channelled outflow	Slopes on hillsides, which are characterized by the colluvial (transported by gravity) movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.	*	***
Hillslope seepage without channelled outflow	Slopes on hillsides, which are characterized by the colluvial movement of materials. Water inputs mainly from sub-surface flow and outflow either very limited or through diffuse sub-surface and/or surface flow but with no direct surface water connection to a stream channel.	*	***
Depression (includes pans)	A basin shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e., it is inward draining). It may also receive sub-surface water. An outlet is usually absent, and therefore this type is usually isolated from the stream channel network.	*/***	*/***

1 Precipitation is an important water source and evapotranspiration an important output in all the above settings.
*Water source: * Contribution usually small; *** Contribution usually large; **** Contribution may be small or important depending on the local circumstances*

WETLAND ECOSYSTEM SERVICES

Wetlands are specialised systems that perform ecological functions vital for human welfare and environmental sustainability. The WET – Ecoservices tool (Kotze *et al*., 2020), a technique for

rapidly assessing ecosystem services supplied by wetlands, was used to determine the key ecological services provided by each wetland in the study area. The rapid field assessment (version 2) approach was applied, and the following services were examined and rated:

- Flood attenuation;
- Stream flow regulation;
- Sediment trapping;
- Erosion control;
- Phosphate assimilation;
- Nitrate assimilation;
- Toxicant assimilation;
- Carbon storage;
- Biodiversity maintenance;
- Water supply for human use;
- Harvestable resources;
- Food for livestock;
- Cultivated foods;
- Tourism and recreation;
- Education and research; and
- Cultural & spiritual significance.

Each of the above-listed services was scored according to the following general level of service provided (Table 2-2)

Table 2-2 - Ecosystem services classes and descriptions (Kotze *et al*., 2020).

Importance Category		Description
Very Low	0-0.79	The importance of services supplied is very low relative to that supplied by other wetlands.
Low	0.8 – 1.29	The importance of services supplied is low relative to that supplied by other wetlands.
Moderately Low	1.3 – 1.69	The importance of services supplied is moderately-low relative to that supplied by other wetlands.
Moderate	1.7 – 2.29	The importance of services supplied is moderate relative to that supplied by other wetlands.
Moderately High	2.3 – 2.69	The importance of services supplied is moderately-high relative to that supplied by other wetlands.
High	2.7 – 3.19	The importance of services supplied is high relative to that supplied by other wetlands.
Very High	3.2 - 4.0	The importance of services supplied is very high relative to that supplied by other wetlands.

ECOLOGICAL IMPORTANCE AND SENSITIVITY

The EIS was determined using the methodology developed by Rountree *et al.* (2013). It is a rapid scoring system to evaluate:

- Ecological Importance and Sensitivity
- Hydrological Functions; and
- Direct Human Benefits.

The scoring assessment incorporates

- EIS score derived using aspects of the original Ecological Importance and Sensitivity assessments developed for riverine assessments (DWAF, 1999);
- Hydro-function importance score derived from the WET-EcoServices tool for the assessment of wetland ecosystem services Kotze *et al.* (2020); and
- Direct human benefits score derived from the WET-EcoServices tool for the assessment of wetland ecosystem services Kotze *et al.* (2020).

The highest score of the three derived scores (each with range 0 – 4) was then used to indicate the overall importance category of the wetland (Table 2-3).

Table 2-3 - Ecological importance and sensitivity categories

Ecological Importance and Sensitivity Category Description	Range of EIS score
Very high: Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these systems is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers	> 3 and ≤ 4
High: Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these systems may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	> 2 and ≤ 3
Moderate: Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these systems is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers	> 1 and ≤ 2
Low/marginal: Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these systems is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	> 0 and ≤ 1

PRESENT ECOLOGICAL STATE

WET-Health (Macfarlane *et al*., 2020) provides an appropriate framework for undertaking an assessment to indicate the ecological integrity of each of the wetland systems being assessed. The outcome of the assessment also highlights specific impacts, therefore highlighting issues that should be addressed through mitigation and rehabilitation interventions. A level 2 Wet-Health approach was applied for this study, which assesses wetlands using four characteristics, namely hydrology, geomorphology, vegetation, and water quality. Each of these modules follows a broadly similar approach and is used to evaluate the extent to which anthropogenic changes have an impact on wetland functioning or condition.

The purpose of WET-Health is to aid users in understanding the ecological condition of the wetland and to identify the causes of degradation. The four drivers are assessed by considering the extent, intensity and magnitude of an impact which then produces a health score. Evaluation scores within each driver are then combined to produce an overall impact of activities on the wetland system which corresponds to a Present State health category that provides an impact score scale of 0-10 and associated health category (ecological state) from A-F (Table 2-4).

Table 2-4 - Impact scores and categories of Present Ecological State used by WET-Health for describing the integrity of wetlands (Macfarlane *et al.,* 2020)

Impact Category	Description	Impact Score Range	Present Ecological State Category
None	Unmodified, or approximates natural condition	0 – 0.9	A
Small	Largely natural with few modifications, but with some loss of natural habitats	1 – 1.9	B
Moderate	Moderately modified, but with some loss of natural habitats	2 – 3.9	C
Large	Largely modified. A large loss of natural habitat and basic ecosystem function has occurred	4 – 5.9	D
Serious	Seriously modified. The losses of natural habitat and ecosystem functions are extensive	6 – 7.9	E
Critical	Critically modified. Modification has reached a critical level and the system has been modified completely with almost complete loss of natural habitat	8 – 10.0	F

2.3 SITE SENSITIVITY VERIFICATION

The proposed Project footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. Based on the screening tool, the aquatic biodiversity sensitivity theme relative to the proposed infrastructure footprint is shown in Table 2-5.

The infrastructure footprints occur within 'Low' and 'Very High' sensitivities. These sensitivity ratings are based on the proximity of the watercourses (the Droe Harts and associated drainage system) labeled as Critical Biodiversity Area (CBA; Figure 2-4). CBAs are aquatic areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services (READ, 2015).

Table 2-5 - Aquatic biodiversity sensitivity theme relative to the proposed infrastructure footprint (National Web-based Environmental Screening Tool)

Infrastructure	Sensitivity	Map
BESS (including the substations)	Low	Figure 2-1
OHPL Alternative 1	Very high	Figure 2-2
OHPL Alternative 2	Low	Figure 2-3
BESS = Battery Energy Storage System; OHPL = Over Head Power Line		

A desktop analysis of available information (Terblanche, 2018) and nationally available datasets was conducted to confirm the indicated sensitivity of the site under consideration (i.e., the proposed development footprint) and assist in determining the need for a full Aquatic Biodiversity Specialist Assessment, or Aquatic Biodiversity Compliance Statement.

2.4 STUDY ASSUMPTIONS AND LIMITATIONS

The following assumption and limitations are noted as part of the current report:

- The Aquatic Biodiversity Compliance statement was prepared on the basis of the site sensitivity verification process undertaken in response to the national web-based screening report. The site sensitivity verification was completed via desktop analysis of the available existing baseline wetland and riparian data and literature for the study area, supplemented by the findings of a field survey to confirm the site sensitivity conducted on 17-18 April 2023. Thus the baseline description is qualitative.
- The field assessment for riparian systems consisted of an inspection of accessible areas of the Droe Harts River and associated drainage lines that occurred within the study area.
- The field assessment of wetland systems included those that occurred within 500 m of the proposed development only. Some limitations were experienced in terms of landowner access permission.
- The recommended mitigation/management measures focus on the mitigation of potential impacts on wetland and riparian ecosystem/species receptors that occur within 500 m of the proposed project infrastructure (Figure 1-2)

Figure 2-1 - Aquatic Biodiversity Theme sensitivity associated with the proposed BTE Sendawo BESS footprint

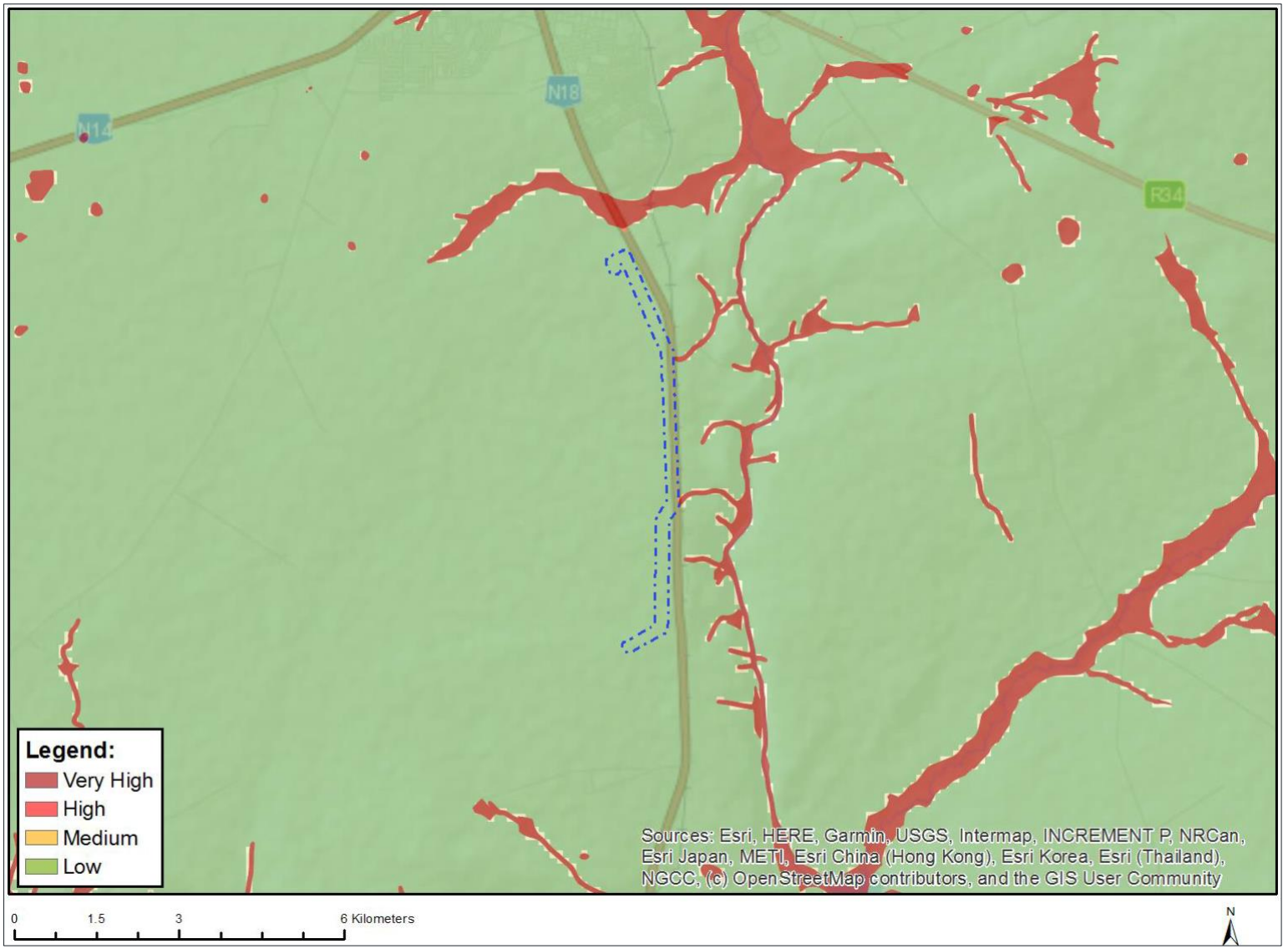

Figure 2-2 - Aquatic Biodiversity Theme sensitivity associated with the proposed Sendawo OHPL Alt 1 footprint

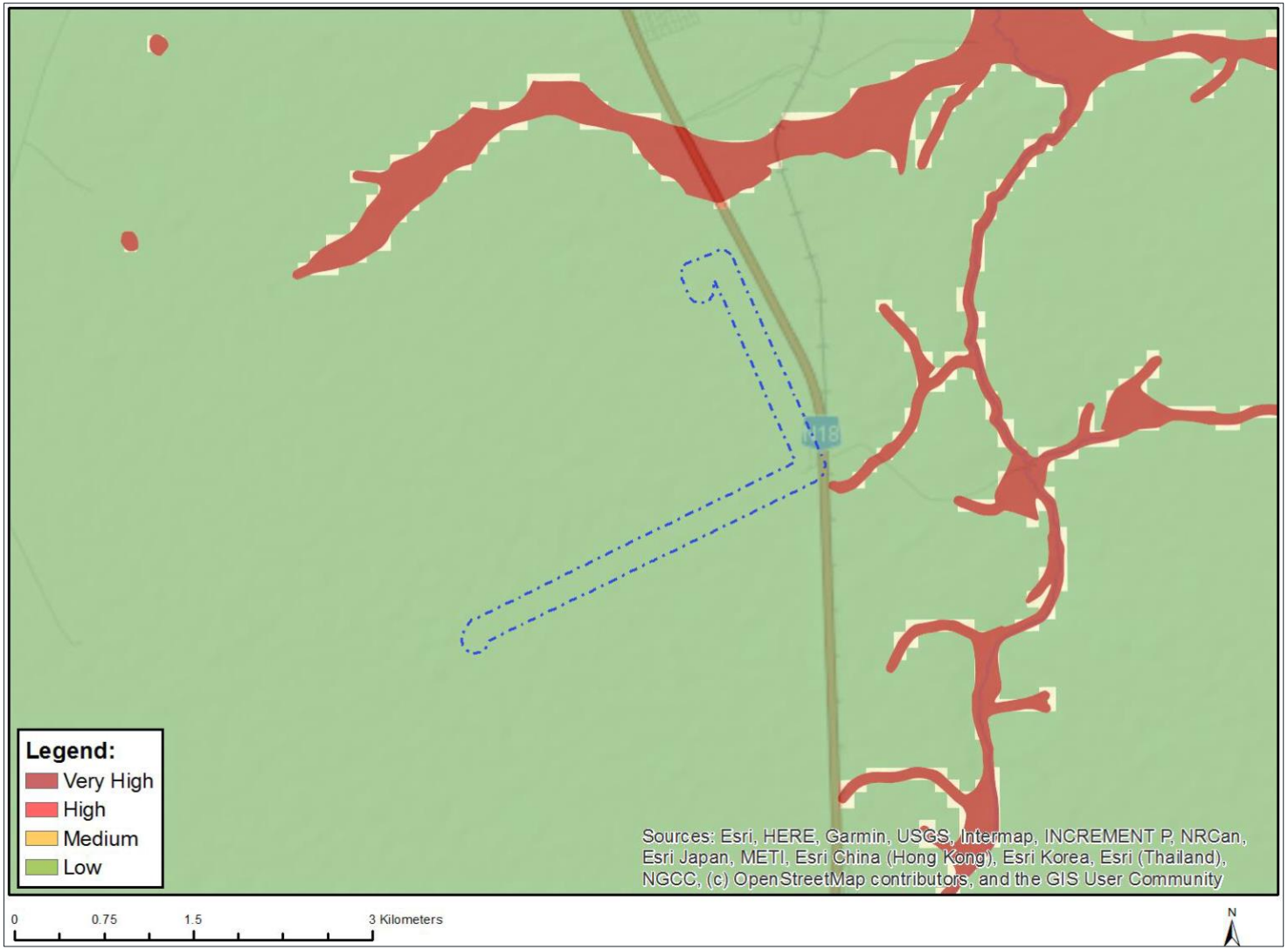

Figure 2-3 - Aquatic Biodiversity Theme sensitivity associated with the proposed Sendawo OHPL Alt 2 footprint

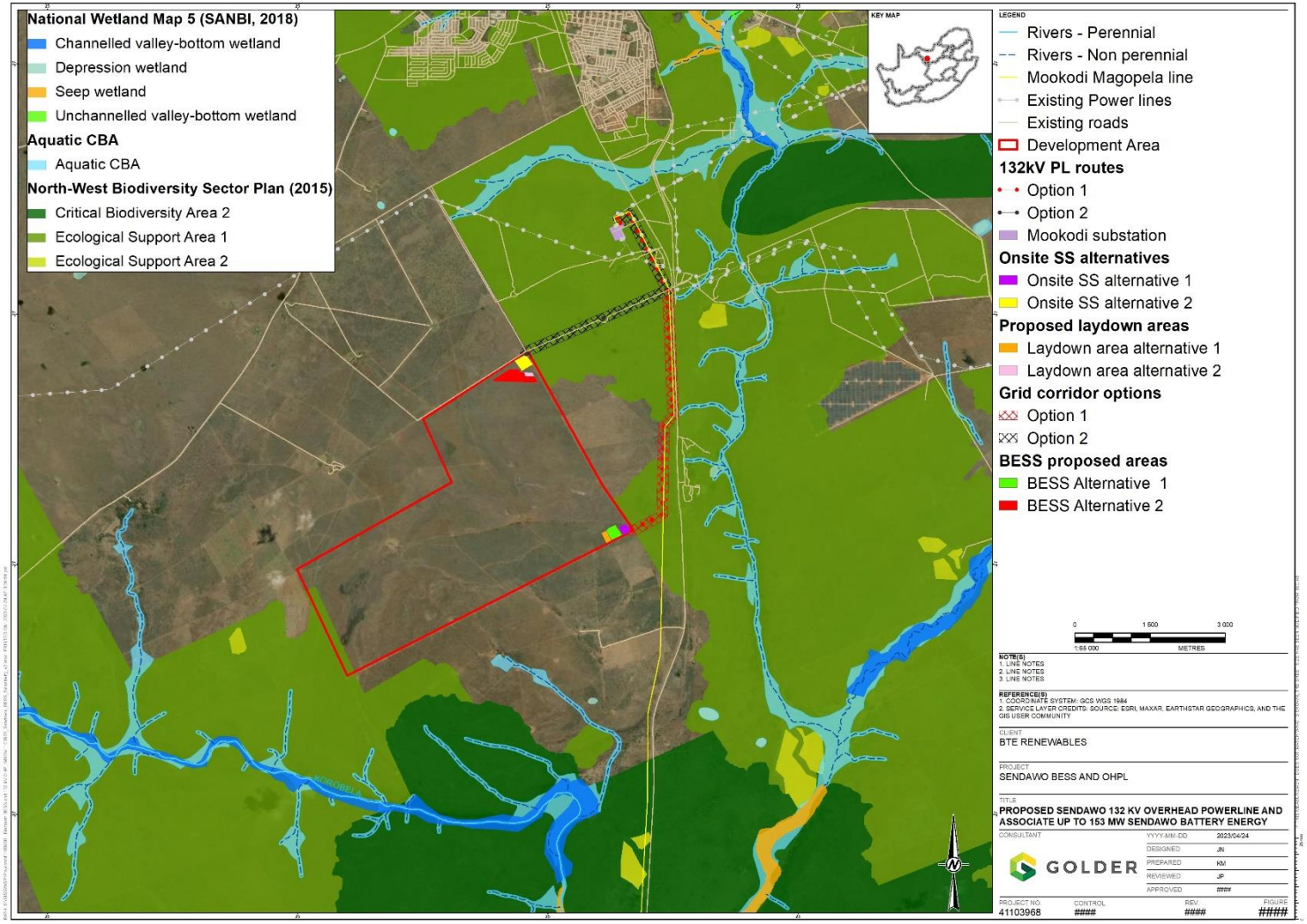

Figure 2-4 - Map showing sensitivities based on the National Wetland Map 5 and the North-West Biodiversity Sector Plan (2015)

3 AQUATIC BIODIVERSITY BASELINE DESCRIPTION

The following sections describe the physical and biological characteristics for the region within which the proposed Project is located.

3.1 FRESHWATER ECOREGIONS

The Project is located within the Southern Temperate Highveld freshwater ecoregion situated in the interior of South Africa, with the western boundary formed by the Magaliesberg, Pilanesberg and Waterberg mountain ranges, the northern boundary formed by the Soutpansberg, and the eastern boundary formed by the Drakensberg Mountains (Abell *et al.*, 2008). This ecoregion combines headwaters of coastal basins that drain to the Indian Ocean with those of the Atlantic-draining Orange basin (Abell *et al*., 2008; Darwall *et al.,* 2009).

ASSOCIATED WATERCOURSES

The Project lies within the primary drainage region C of the Vaal Water Management Area (WMA) and the C32B and C32D quaternary catchments draining the eastern and southern portions respectively. Three Sub-Quaternary Reaches (SQRs) are associated with the proposed Project:

- The Droe Harts River SQRs C32B-01953 and C32D-02059; and
- The Korobela River SQR C32D-01747.

The C32B-01953 SQR flows for approximately 16 km before draining into the C32D-02059 which flows for approximately 5 km before joining the C32D-01747 SQR at a confluence. The two former SQRs are part of the Droe Harts River – a third order stream which flows southward. The latter SQR (Korobela River) is a first order stream which flows for approximately 74 km eastward.

Since only the Droe Harts River system falls within the 500 m buffer of the Project, this was the only system inspected during the field survey.

PRESENT ECOLOGICAL STATE, IMPORTANCE AND SENSITIVITY

According to the DWS (2016) desktop data, the Present Ecological State (PES) for SQRs C32B-01953 and C32D-02059 along the Droe Harts River are *Moderately Modified* and *Largely Natural* respectively, and that for the Korobela SQR C32D-01747 is *Largely Natural.* The Ecological Importance and Sensitivity (EIS) for each of the SQRs is moderate. The EIS category is based on the low diversity of fish and aquatic macroinvertebrate taxa expected to occur within these systems and their low to moderate sensitivity to water quality modifications (Table 3-1).

Table 3-1 - Desktop Present Ecological State, Importance and Sensitivity for the focus Sub-Quaternary Reaches

River	Droe Harts		Korobela
SQR Code	C32B-01953	C32D-02059	C32D-01747
Ecological Category	**C**	**B**	**B**
Category Description	Moderately Modified	Largely Natural	Largely Natural
Ecological Importance (EI)	Moderate	Moderate	Moderate
Ecological Sensitivity (ES)	Moderate	Moderate	Moderate

River	Droe Harts		Korobela
No. of fish species	3	2	2
No. of aquatic invert taxa	13	13	13

EXPECTED FISH SPECIES AND AQUATIC MACROINVERTEBRATE TAXA

The expected fish species and aquatic macroinvertebrate taxa for the SQR associated with the proposed project are presented in Table 3-2 and Table 3-3 respectively. Only three fish species are expected, all of which are moderately tolerant to modified water quality, two of which are moderately intolerant of no-flow conditions (*Labeobarbus aeneus* and *Labeo capensis*), whilst *Enteromius anoplus* is moderately tolerant of no-flow conditions (DWS, 2014). Based on the IUCN Red List of Threatened Species, the conservation status of each of the species is Least Concern (LC).

Thirteen aquatic macroinvertebrate taxa are expected within the study area. The community assemblage is predominantly comprised of taxa with a high preference for slow flows, and with very low sensitivities toward water quality modifications.

Table 3-2 - Expected fish species, respective tolerance/intolerance to water quality modifications and no-flow conditions and IUCN conservation status

SQR			Fish Species	Tolerance		Conservation Status
				Modified Water Quality	No-Flow	
C32B-01953	C32D-02059	C32D-01747	*Labeobarbus aeneus*	Moderately Tolerant	Moderately Intolerant	LC
			Labeo capensis	Moderately Tolerant	Moderately Intolerant	LC
			Enteromius anoplus	Moderately Tolerant	Moderately Tolerant	LC

Table 3-3 – Expected aquatic macroinvertebrates and preferred velocity and water quality sensitivity

Taxa	Velocity Metric (m/s)	Water Quality Sensitivity
Oligochaeta	<0.1	VERY LOW
Potamonautidae	<0.1 - >0.6	VERY LOW
Baetidae 1 sp.	0.3 - >0.6	LOW
Corixidae	<0.1	VERY LOW
Gerridae	<0.1	LOW
Notonectidae	<0.1	VERY LOW
Pleidae	<0.1	LOW
Veliidae	<0.1	LOW
Gyrinidae	<0.1 - >0.6	LOW
Ceratopogonidae	<0.1 and >0.6	LOW
Chironomidae	<0.1 - >0.6	VERY LOW
Culicidae	<0.1	VERY LOW
Muscidae	<0.1	VERY LOW

NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS

The National Freshwater Ecosystem Priority Areas (NFEPA) project (Driver et al., 2011) represents a collaboration of multiple organisations including the South African National Biodiversity Institute (SANBI), Council for Scientific and Industrial Research (CSIR), Water Research Commission (WRC), Department of Environmental Affairs (DEA), Department of Water Affairs (DWA), Worldwide Fund for Nature (WWF), South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks). The project is aimed to "*provide guidance on how many rivers, wetlands and estuaries, and which ones should remain in a natural or near-natural condition to support the water resource protection goals of the National Water Act (Act 36 of 1998), the National Environmental Management: Biodiversity Act (Act 10 of 2004) and the National Environmental Management: Protected Areas Act (Act 57 of 2003)*" (Water Research Commision, 2011).

Based on the outputs of the NFEPA project, the sub-quaternary catchments associated with the Project are unclassified and not regarded as areas of potential concern in terms of freshwater biodiversity planning (Figure 3-2).

NATIONAL WETLAND MAP VERSION 5

The South African National Wetland Map version 5 (NWM5) portrays the spatial extent and ecosystem types of two of the three broad aquatic ecosystems, namely, estuarine and inland aquatic (freshwater) ecosystems. The NWM5 is aimed at improving the representation of spatial extent and type of inland wetland and estuarine ecosystem types of South Africa (Van Deventer et al., 2019). The NWM5 is the most up-to-date and accurate representation of spatial extent and type of inland wetland ecosystem types at desktop level in South Africa.

The NWM5 database indicates the presence of a small depression wetland within a 500m buffer of the proposed OHPL infrastructure (Figure 3-2); however, based on the findings of the field survey, it was confirmed that the area mapped as a depression wetland is a dam (old quarry) within the Tiger Kloof property (Figure 3-1).

Figure 3-1 - Dam mapped as depression wetland on NWM5

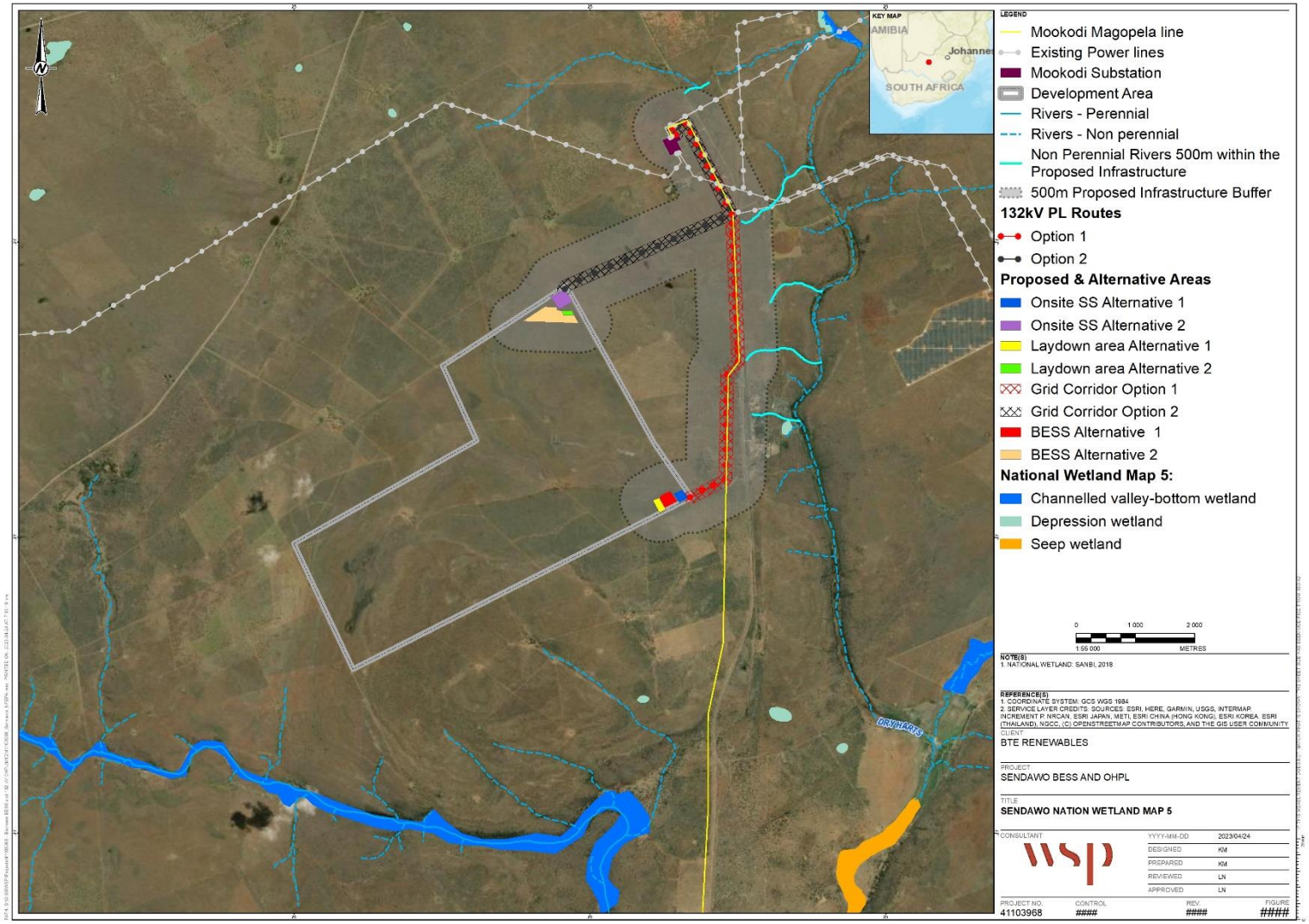

Figure 3-2 – NWM5 map in relation to the proposed project area

3.2 FIELD SURVEY OBSERVATIONS

RIPARIAN SYSTEMS

A survey was conducted along the Droe Harts River, which is situated approximately 1000 m to the east of the proposed powerline option 1, and associated drainage lines which are situated approximately 200 m to the east. In relation to the proposed powerline option 2, the Droe Harts River, is situated approximately 1600 m and associated drainage lines are situated approximately 250 m to the east. The general characteristics of the habitat – instream and riparian – were noted and photographs taken. All of the drainage lines were dry at the time of the site visit, whilst the main stem Droe Harts River was predominantly characterised by a moderately wide channel (>2 meters) and still-to-slow flows (Figure 3-3). The bank/riparian vegetation was comprised of a mix of grasses and shrubs.

The ephemeral drainage lines were considered unlikely to support rare or sensitive species adapted for aquatic life (e.g. hydrophytic plants, fish, aquatic macroinvertebrates, diatoms) due to the highly temporary presence of water/flow, and as such no assessment of aquatic biodiversity (i.e. macroinvertebrates, fish) was performed in these systems. The main stem Droe Harts River likely supports aquatic biota however aquatic biodiversity assessments were not undertaken as this watercourse occurs outside the study area, and is not expected to be impacted by the proposed project – particularly the powerline option 1. Furthermore, the N18 road occurs in between the proposed project and the watercourses of interest, and is expected to act as a barrier preventing (to an extent) any impacts from reaching the main stem Droe Harts River.

Figure 3-3 - General habitat characteristics of the drainage line (left) and main stem Droe Harts River (right). Photos taken during the field verification.

WETLAND SYSTEMS

A cluster of five small ephemeral depression wetlands are situated within, and to the south of the OHPL option 2. These were numbered one (1) to five (5) and are indicated in figures Figure 3-4 to Figure 3-8 as well as in Figure 3-11.

Depression wetlands are characterised by a basin shaped area with closed elevation that allows for the accumulation of surface water (i.e., it is inward draining), and may also receive sub-surface water. An outlet is usually absent and therefore this type is usually isolated from the stream channel network

(after Kotze *et al*., 2008). Ephemeral wetlands are characterised by brief periods of inundation separated by longer periods of desiccation, and may dry out completely between rainfall events, which was the case during the current survey. Being of an ephemeral nature, the wetlands are characterised by mostly terrestrial vegetation, with a few wetland vegetation species (sedges) including *Juncus punctorius, Juncus sp.,* and *Schoenoplectus sp.* observed *(*Figure 3-10*).* A key feature of all wetlands was the exposed bedrock forming the wetland substrate (Figure 3-9), which explains the concentration of water at these sites due to water ponding on the impermeable rocky surface.

Figure 3-4 - Depression Wetland #1

Figure 3-5 - Depression wetland #2

Figure 3-6 - Depression Wetland #3

Figure 3-7 - Depression wetland #4

Figure 3-8 - Depression wetland #5

Figure 3-9 - Exposed bedrock found at each wetland surface

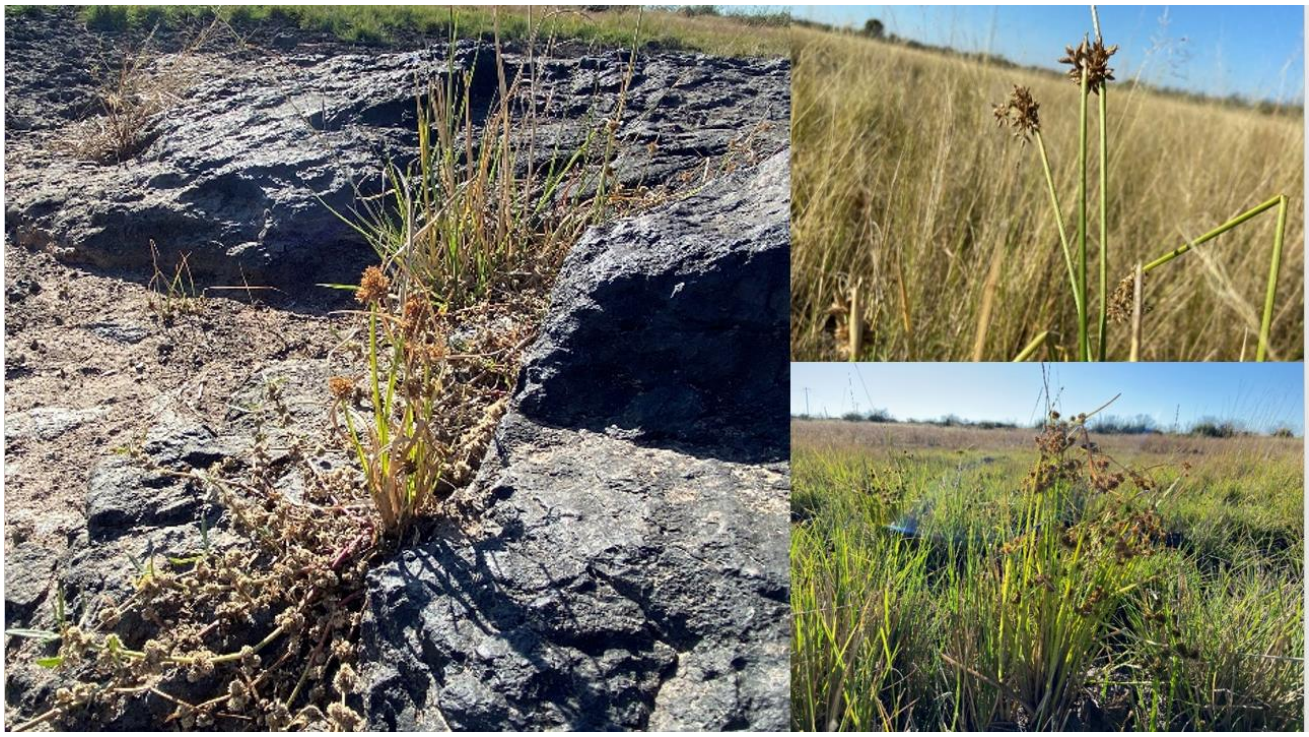

Figure 3-10 – Wetland vegetation observed on site

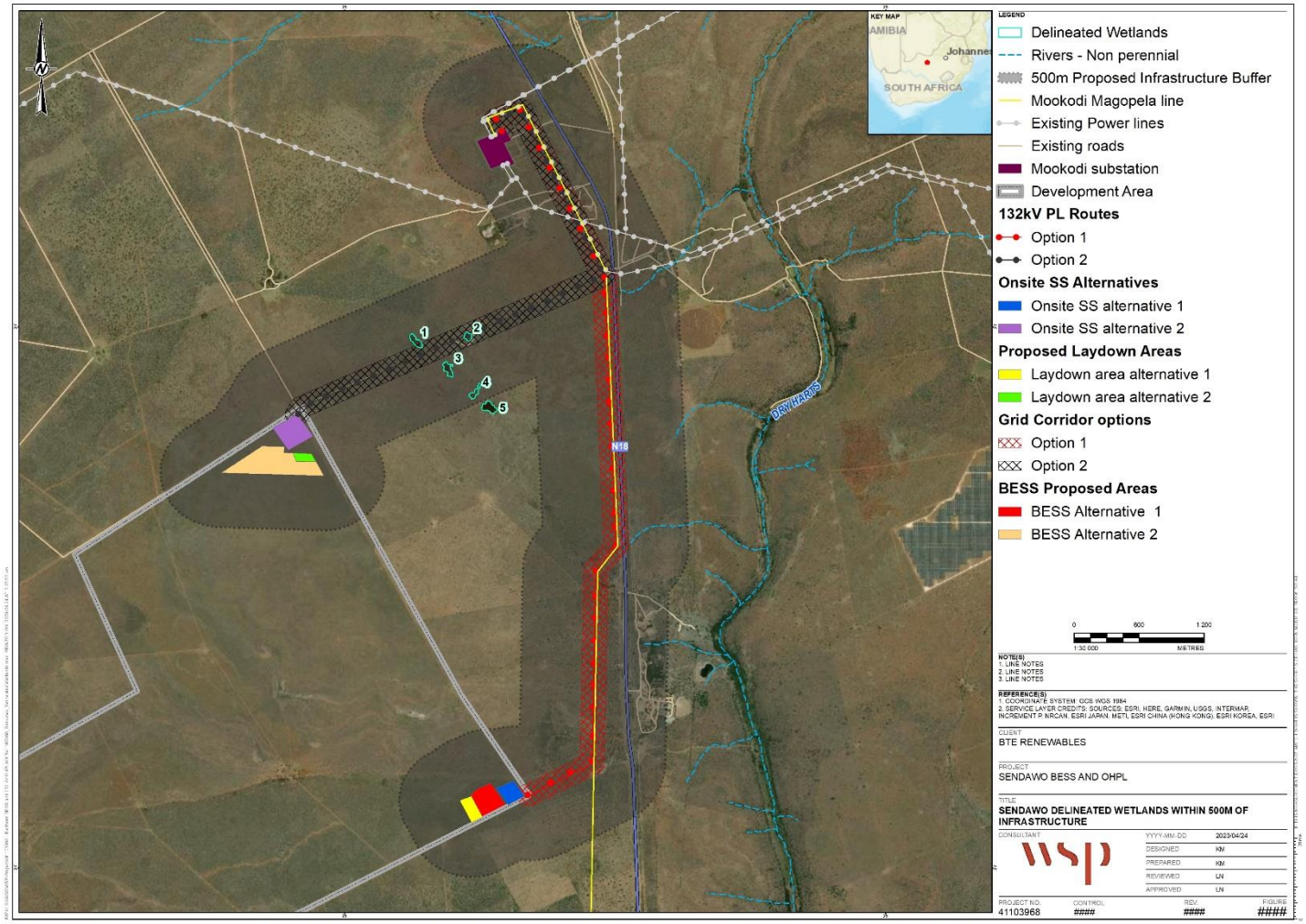

Figure 3-11 - Wetlands delineated and assessed on site

Present Ecological Status

A single PES assessment was performed for the five depression wetlands since they were of a similar size, had the same key characteristics and are located in close proximity to each other, surrounded by the same land uses. The PES category of the depression wetlands was determined to be in a Largely Natural state (**PES B**) with few modifications and some loss of natural habitat. Minor impacts identified that influenced the overall PES score relate to the presence of grazing cattle within the wetlands themselves and their immediate catchment.

Table 3-4 - Summary of overall wetland PES category and scores.

	Hydrology	Geomorphology	Water Quality	Vegetation
Current Impact Scores	**1.9**	**1.7**	**1.8**	**1.1**
PES score (%)	**81%**	**83%**	**82%**	**89%**
Current PES Categories	**B**	**B**	**B**	**B**
Wetland Area	**3.0 ha (combined)**			
Current Overall Impact Score	**1.6**			
Current Overall PES Score (%)	**84%**			
Current Overall PES	**B**			
Functional Hectare Equivalents	**2.5 ha**			

Ecological Importance and Sensitivity

The ecological importance and sensitivity of the wetlands is considered low/marginal, as a function of their small size and ephemeral nature. Wetlands that are rated as low/marginal importance are considered as having low ecological importance and sensitivity at a local scale. Rountree *et al.* (2013) defines the biodiversity of these wetlands as ubiquitous and not sensitive to flow and habitat modifications and that they play an insignificant role in moderating the quantity and quality of water of major rivers. These systems have no direct human benefit, and limited hydrological functions (due to being closed/endorheic systems), while their ecological importance and sensitivity was also found to be low (Table 3-5).

Table 3-5 - Summary of wetland EIS scores and ratings.

Wetland Unit	Ecological Importance and Sensitivity Score	Hydrological Functions Score	Direct Human Benefits Score	Integrated EIS Score	Integrated EIS Rating
Depression wetlands	1.0	0.6	0.0	1.0	Low/Marginal

Ecosystem services (functional) Assessment

The wetlands were assessed as having "*Very Low"* functionality in terms of ecosystem services supply and demand, with *moderate* to *low* functionality for provisioning services provided by the wetland – primarily provision of grazing resources for livestock. The importance score for the ecosystem services provided by the wetland within the study area is illustrated in the spider diagram presented in Figure 3-12.

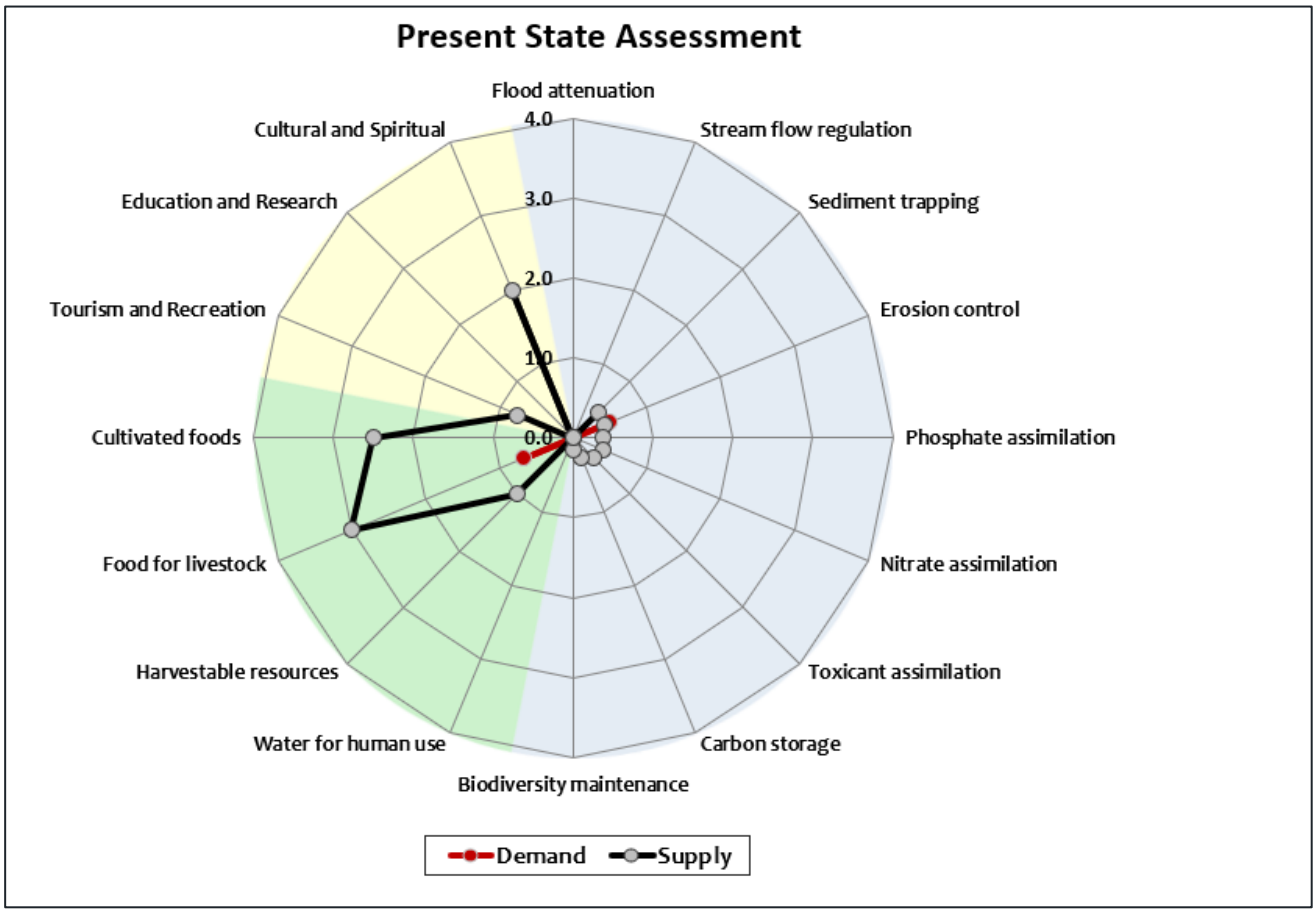

Figure 3-12 - Ecosystem Services supplied by/demanded from wetlands in the study area

4 MOTIVATION FOR SUBMISSION OF A COMPLIANCE STATEMENT

While the National Web-based Environmental Screening Tool identifies the corridor for powerline option 1 as 'very high' sensitivity due to the presence of watercourses labelled as CBAs, the site visit indicated that the relevant drainage lines are not sensitive aquatic ecosystems, being ephemeral drainage lines which unlikely support rare or sensitive species adapted for aquatic life, and, the eventual OHPL route will be micro-sited within the corridor to ensure that these drainage lines are avoided. In addition, the N18 road will likely act as a barrier between the watercourses and the proposed project

The footprint of the proposed BESS (including the substations) and the powerline option 2 infrastructure is identified as 'low' sensitivity for the Aquatic Biodiversity Theme – while largely natural depression wetland do occur within 500 m of the proposed OHPL option 2 corridor, their EIS is considered low given their small size, and ephemeral nature, and their role in ecosystem service provision; and the proposed infrastructure is linear and can be micro-sited within the corridor to ensure that these areas are avoided.

A 'low sensitivity rating' for aquatic biodiversity in the study area is therefore motivated, in line with the protocol.

5 EVALUATION OF OPTIONS

The BESS Alternative 1 – which includes the laydown area Alternative 1 and linked to the Mookodi substation via 132 KV OHPL Option 1 – is the preferred option from an aquatic biodiversity (riparian and wetlands) perspective, since OHPL option 2 is located in close proximity to ephemeral depression wetlands identified in the study area. Although these are considered to have low functionality in terms of its ecosystem services as well as have a low EIS status, it is still important to conserve them and maintain their integrity from a catchment perspective. From a permitting perspective, Option 1 is also more desirable as Option 2 would have implications in terms of the National Water Act (General Authorisation) requirements, due to the proximity of the identified wetland systems. Furthermore, option 1 is located along an existing Eskom Power line and servitude which means that there will be less disturbance during construction.

6 PROPOSED IMPACT MANAGEMENT ACTIONS

Notwithstanding the fact that the study area is considered to be of low sensitivity for aquatic biodiversity, and no significant impacts on aquatic biodiversity as a result of development of the preferred Option 1 are predicted, the following impact mitigation and management measures are recommended to avoid/minimise potential impacts on the watercourse arising from the proposed project:

- Limit vegetation removal to the infrastructure footprint areas only. Where removed or damaged, vegetation areas (riparian or aquatic-related) should be revegetated as soon as possible;

- The construction servitude should be kept to a minimum width to limit vegetation destruction, and must be clearly demarcated in the field. Ideally the construction disturbance footprint should be kept to an area no wider than 10 m. No activities should be allowed outside the construction servitude;
- Should option 2 be selected, the OHPL pylons should be located outside of identified wetland areas and their immediate catchment – these areas to be demarcated in the field so that contractors may avoid them;
- Bare land surfaces downstream of construction activities must be vegetated to limit erosion from the expected increase in surface runoff from infrastructure;
- The formation of drainage paths and erosive processes should be avoided or limited;
- Peak rainfall periods (December to February) should be avoided during construction to possibly avoid increased surface runoff in an attempt to limit erosion and the entering of external material (i.e. contaminants) into associated aquatic systems.
- Water used at construction sites should be utilised in such a manner that it is kept on site and not allowed to run freely into watercourses;
- Concrete and cement should be used in an environmentally safe manner with correct storage, as per each substances' specific storage descriptions;
- All vehicles must be frequently inspected for leaks;
- No material may be dumped or stockpiled within the associated drainage lines in the vicinity of the proposed project;
- All waste must be removed and transported to appropriate waste facilities; and
- All materials stockpiles and construction camps (if any) should be located outside wetland area.

Considering the ephemeral nature of the watercourses in the study area, their ecological importance and sensitivity, and the distance of the Droe Harts River from the proposed development (both options), the proposed development is expected to result in negligible impacts to watercourses, provided that the recommended mitigation measures are implemented sufficiently.

6.1 MONITORING REQUIREMENTS

The implementation of the recommended mitigation measures should be monitored monthly during the construction phase and on an at least annual basis after the construction phase, to audit their efficacy in addressing potential impacts, so that adaptive management actions can be timeously undertaken as necessary, to ensure that potential impacts on the receiving environment are avoided/minimised. Should a spillage of contaminants occur near or within a watercourse, an aquatic assessment incident response survey should be undertaken to determine the extent/significance of impact.

7 REFERENCES

Abell, R., Thieme, M. L., Revenga, C., Bryer, M., Kottelat, M., Bogutskaya, N., Coad, B., Mandrak, N., Balderas, S. C., Bussing, W., Stiassny, M. L. J., Skelton, P., Allen, G. R., Unmack, P., Naseka, A., Ng, R., Sindorf, N., Robertson, J., Armijo, E., … Petry, P. (2008). Freshwater ecoregions of the world: A new map of biogeographic units for freshwater biodiversity conservation. *BioScience*, *58*(5), 403–414. https://doi.org/10.1641/B580507

Darwall, W. R. T., Smith, K. G., Tweddle, D., & Skelton, P. (2009). *The status and distribution of freshwater biodiversity in southern Africa*.

Driver, A., Nel, J., Snaddon, K., Murray, K., Roux, D., Hill, L., Swartz, E., Mauel, J., & Funke, N. (2011). *Implementation Manual for Freshwater Ecosystem Priority Areas: Report to Water Research Commission*.

DWAF (1999). Resource Directed Measures for Protection of Water Resources. Volume 4. Wetland Ecosystems.

DWAF (2008) Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, prepared by M. Rountree, A. L. Batchelor, J. MacKenzie and D. Hoare. Stream Flow Reduction Activities, Department of Water Affairs and Forestry, Pretoria, South Africa

DWS. (2014). *A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx*. Compiled by RQIS-RDM:https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx accessed on. https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx

DWS. (2016). *Present Ecological State, Ecological Importance & Ecological Sensitivity*. https://www.dws.gov.za/iwqs/rhp/eco/peseismodel.aspx

Kotze D.C., Marneweck G.C., Batchelor A.L., Lindley D.S. & Collins N.B. (2020). WET-EcoServices: A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report No TT 339/08, Water Research Commission, Pretoria.

Macfarlane, D.M., Kotze, D.C., Ellery, W. N., Walters, D., Koopman, V., Goodman, P. and Goge, C. (2008). WET-Health: A technique for rapidly assessing wetland health. Water Research Commission. Report No. TT340/09

Macfarlane, D.M., Ollis, D.J., and Kotze, D.C. (2020). WET-Health Version 2.0: A refined suite of tools for assessing the present ecological state of wetland ecosystems- technical guide. Water Research Commission. Report No. TT820/20

Ollis, D.J., Snaddon, C.D., Job, N.M. & Mbona, N. (2013). Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

READ. (2015). *The North West Biodiversity Sector Plan*.

Terblanche, R. (2018). *Ecological Impact Assessment for the proposed development of a*

115 MW Solar Photovoltaic (PV) Facility (Vryburg Solar 1) and associated electrical infrastructure, near Vryburg, in the North-West Province.

van Deventer, H., van Niekerk, L., Adams, J., Dinala, M. K., Gangat, R., Lamberth, S.J., Lotter, M., Mbona, N., MacKay, F., Nel, J.L., Ramjukadh, C-L., Skowno, A. and Weerts, S. P. (2019). National Wetland Map 5 – An improved spatial extent and representation of inland aquatic and estuarine ecosystems in South Africa. bioRxiv preprint first posted online May. 17, 2019; doi: http://dx.doi.org/10.1101/6404.

Water Research Commision. (2011). *Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources* (No. TT 500).

Building 1, Maxwell Office Park
Magwa Crescent West, Waterfall City
Midrand, 1685
South Africa

wsp.com