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DRAFT SCOPING REPORT

EIA REF:

The proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1 within the Jurisdiction of Capricorn and Mopani District Municipalities, Limpopo Province.

MARCH 2022

Prepared by:

Emvelo Quality and Environmental Consultant (PTY) Ltd.

Prepared for:

Sigodi Marah Martin Management Support (Pty) Ltd.

Sigodi Marah Martin
Management Support
Development & Engineering Consultants

On Behalf of:

Lepelle Northen Water (SOC)

LEPELLE NORTHERN WATER
Water is our passion

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Overview: Assessment of impacts related to the proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1, in order to ensure the Client's compliance with all relevant environmental legislation.

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QMS - INFORMATION

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QMS-REVISION HISTORY

Revision	Revision Date	Details	Authorized	Name	Position
1	07-03-2022	DSR	Y	Dumisani Myeni	Study Lead Env. Scientist
2	10-03-2022	DSR	Y	Phumzile Lembede	Principal EAP Env. Scientist

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LIST OF ACRONYMS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
CFP	Chance Finds Procedure
DFFE	Department of Forestry, Fisheries and Environment
DOT	Department of Transport
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
GA	General Authorisation
HGM	Hydrogeomorphic
I&AP	Interested and Affected Parties
LNW	Lepelle Northen Water
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 (Act 107 of 1998)
NEMPAA	National Environmental Management: Protected Areas, 2003 (Act 57 of 2003)
NFEPA	National Freshwater Ecosystem Priority Areas
OCSD	Off-Channel Storage Dam
SCADA	Supervisory Control and Data Acquisition
SCC	Species of Conservation Concern
WSS	Water Supply Schemes
WTW	Water Treatment Works

GLOSSARY

DEVELOPMENT: the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

BIODIVERSITY: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

BASIC ASSESSMENT: The process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of the application, in terms of Listing Notice 1 (GNR 327 and 324 of 2017) of NEMA (as amended).

DEVELOPMENT FOOTPRINT: any evidence of physical alteration because of the undertaking of an activity.

CONTRACTOR: companies and or individual persons appointed on behalf of the client to undertake activities, as well as their sub-contractors and suppliers.

ENVIRONMENTAL CONTROL OFFICER (ECO): an individual nominated through the client to be present on-site to act on behalf of the client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities as prescribed in NEMA.

ENVIRONMENT: in terms of the NEMA (as amended), the "environment" means the surroundings within which humans exist and that are made up of:

- the land, water, and atmosphere of the earth;
- micro-organisms, plant and animal life;
- any part or combination of (i) of (ii) and the interrelationships among and between them;
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

ENVIRONMENTAL IMPACT: the change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

HYDROLOGICAL SYSTEM: water bodies and their connectivity to the welfare of an ecosystem.

MITIGATION: the measures designed to avoid reduce or remedy adverse impacts.

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr): a detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the lifecycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

POLLUTION: NEMA defines pollution to mean any change in the environment caused by the substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people or will have such an effect in the future.

WATER POLLUTION: the National Water Act, 1998 (Act 36 of 1998) defines water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource 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 (a) to the welfare, health or safety of human beings; (b) to any aquatic or non-aquatic organisms; (c) to the resource quality, or (d) to property.

REHABILITATION: rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before the disruption.

WATERCOURSE: can be a) a river or spring; b) a natural channel or depression in which water flows regularly or intermittently; c) a wetland, lake or dam into which, or from which, water flows; and/or d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

WETLAND: the land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and

which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

INDIGENOUS VEGETATION: refers to vegetation consisting of native plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

GENERAL WASTE: waste that does not pose an immediate hazard or threat to health or the environment, and includes domestic waste; building and demolition waste; business waste; and inert waste.

HAZARDOUS WASTE: means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

GENERAL WASTE LANDFILL SITE: a waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

INTERESTED AND AFFECTED PARTY (I&AP): for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, an interested and affected party contemplated in Section 24(4) (a) (v), and which includes (a) any person, group of persons or organization interested in or affected by such operation or activity; and (b) any organ of state that may have jurisdiction over any aspect of the operation or activity.

PURPOSE OF THIS DOCUMENT

Assessment of impacts related to the proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1 within the Jurisdiction of Capricorn and Mopani District Municipalities, Limpopo Province, in order to ensure the Client's compliance with all relevant environmental legislation. These activities are carried out in terms of Section 24(5) and Section 44 of the National Environmental Management Act, 1998 (Act No.107 of 1998) read in conjunction with the Environmental Impact Assessment (EIA) Regulations of 04 December 2014, amended in 7 April 2017.

The purpose of the Scoping Process, as the first phase of the Environmental Impact Assessment (EIA) process includes but not limited to the following:

- Identification of the relevant policies and legislation relevant to the activity.
- Motivation for the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.
- Identification and confirmation of the preferred activity and technology alternative through an impact and risk assessment and ranking process.
- Identification and confirmation of the preferred site, through a detailed site selection process, which includes all the identified alternatives focusing on the geographical, physical, biological, social, economic and cultural aspects of the environment.
- Identification of the key issues to be addressed in the assessment phase.
- Agreement on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration, and probability of the impact to inform the location of the development footprint within the preferred site; and
- Identification of suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

LIMITATIONS AND ASSUMPTIONS

The following assumptions and limitations accompany the scoping exercise:

- In accordance with the purpose of Scoping, the report does not include specialist investigations on the receiving environment, which will only form part of the Environmental Impact Report (EIR). The environment in the project area was primarily assessed in the Scoping phase through site visits and appraisals, desktop screening, incorporating existing information from previous studies, and input received from authorities and I&APs.

EXECUTIVE SUMMARY

Lepelle Northern Water (SOC) intend to undertake the upgrades and refurbishment between Olifantspoort and Ebenezer Schemes' water conveyance and storage infrastructure. The scheme supplies potable water to the Polokwane Municipal area, and surrounding communities. Consequently, the Environmental Impact Assessment (Scoping and EIR) process has commenced, as a result of the proposed upgrades.

Emvelo Quality and Environmental Consultant (PTY) Ltd has been appointed by Sigodi Marah Martin Management Support (Pty) Ltd (the Project Principal Agent) on behalf of Lepelle Northern Water (SOC) Ltd (the Applicant), as the independent Environmental Assessment Practitioner (EAP), to facilitate the Scoping and Environmental Impact Assessment Process required in terms of the National Environmental Management Act ,1998 (Act. No. 107 of 1998) (NEMA) for this application.

The NEMA Environmental Impact Assessment (EIA) Regulations (2014) as amended on 7 April 2017, govern the process of applying for environmental authorization for certain developments. A provision in the EIA Regulations is made for two forms of assessment, namely: Basic Assessment and Scoping & EIA, depending on the scope of the activity. The EIA regulations specify that: Activities identified in Listing Notice 1 and 3 (GNR 327 and 324 of 2017) require a Basic Assessment, while the activities identified in Listing Notice 2 (GNR 325 of 2017) are subject to a Scoping and EIA. The listed activities associated with the proposed development are: ***Listing Notice 1***, Activity 9,12, 19, 27 and 45; ***Listing Notice 3***, Activity12 and 14; ***Listing Notice 2***, Activity 11, 15 and 16. Therefore, this application will follow a Scoping/EIA (S&EIR) process, as activities in Listing Notice 2 has been triggered.

The Public Participation Process (PPP) for both the Scoping and Environmental Impact Assessment will be undertaken in accordance with chapter 6 of GN No. 326 (7 April 2017), as well as the EIA regulations and the Disaster Management Act, 2002 (Act No. 57 of 2002) as published on 29 April 2020 (***Refer to Appendix E***).

The study area within Olifantspoort have the following environmental sensitivities: The Olifantspoort Off-Channel Storage Dam will be constructed within Critical Biodiversity Area 1 (CBA1); The Olifants Weir upgrade will take place within Olifants River (NFEPA) within Critical Biodiversity Area 1 (CBA1)/ CBA: Irreplaceable conservation region. PS1 to Specon main traverse CBA1, CBA2 (CBA: Optimal), Chunies River (NFEPA), and one hydrological body Wetlands

(SAIIAE). PS2 to Witkos and Palmietfontein Reservoirs traverse CBA1, CBA2 Chunies River (NFEPA), and three hydrological body Wetlands (NFEPA). Palmietfontein Reservoirs to OSA164 traverse CBA1, three (3) hydrological body Wetlands (NFEPA) and Protected Area. OSA 164 to Krugersburg reservoirs traverse the Protected Area, CBA1 and one (1) hydrological body Wetlands (NFEPA).

The study area within Ebenezer Water Supply Scheme (WSS) has the following environmental sensitivities: Ebenezer pumpstation to the Rustfontein reservoir complex traverses the Great Letaba River, one (1) hydrological body (wetland, NFEPA), and a vast track of CBA1. This portion is also overlain by Woodbush Granite Grassland which is considered 'Critically Endangered'.

The potential impact as a result of upgrading the Olifantspoort and Ebenezer WSS, will be mitigated by carefully employing the following preferred alternatives: "Alternative A: Routing Alternative, Alternative B: Design Alternative, Alternative C: Technology Alternative, and Alternative D: Location Alternative" that will meet the stated need for and purpose of the project, by providing proper mitigation measures.

The Scoping Report proposes the following studies to be undertaken within the EIR phase: Terrestrial Biodiversity Impact Assessment; Aquatic Biodiversity Impact Assessment; Hydrology Assessment; Paleontological, Archaeological and Cultural Heritage Impact Assessment; Geotechnical Assessment; Wetland Delineation Impact Assessment; and Agricultural Impact Assessment; These studies will be integrated and discussed in the EIR, and mitigation measures will be outlined in the EMPr.

The information contained in this Scoping Report and the documentation attached hereto suffices for I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the environmental authorisation applied for.

1 INTRODUCTION AND BACKGROUND

The Lepelle Northen Water (LNW) is a water service board supplying three regions in Limpopo Province, namely: Capricorn, Mopani, and Sekhukhune Region. For this application, the upgrades will only affect the water schemes within Capricorn and Mopani Regions, namely: Olifantspoort and Ebenezer Water Supply Schemes (WSS). The proposed upgrades of Olifantspoort and Ebenezer WSS has been one of the LNW priority projects, to ensure the sustainable water supply. Therefore, in terms of the environmental legal requirement, LNW will require an Environmental Authorisation (EA) prior to undertaking the water infrastructure upgrades. Consequently, the Environmental Impact Assessment (Scoping and EIR) process has commenced.

Emvelo Quality and Environmental Consultant (PTY) Ltd. has been appointed by appointed by Sigodi Marah Martin Management Support (Pty) Ltd (the Project Principal Agent) on behalf of Lepelle Northern Water (SOC) Ltd (the Applicant), as an independent Environmental Assessment Practitioner (EAP) to undertake an Environmental Impact Assessment (EIA) for the proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1 within the Jurisdiction of Capricorn and Mopani District Municipalities, Limpopo Province.

This report has been prepared in compliance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ["NEMA"] and the Environmental Impact Assessment ("EIA") Regulations contained in Government Notice (GN) No. R982 of 2014 as promulgated in terms of the NEMA ["EIA Regulations"] as amended up to and including GN 326 in GN 40772 of 07 April 2017.

This EIA process will include the facilitation of the Scoping/Environmental Impact Assessment processes required in terms of the NEMA for this application.

2 PROJECT TITTLE

The proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1 within the Jurisdiction of Capricorn and Mopani District Municipalities, Limpopo Province.

3 PROJECT LOCALITY

The project locality is described in terms of geographic locational context and site context.

3.1 Geographic locational context

The study area covers the region where the upgrades for water conveyance and storage infrastructure will take place, namely: Haenertsburg within Greater Tzaneen Local Municipality; Sekhukhune and Lebowakgomo within Lepelle-Nkumpi Local Municipality; Polokwane, Krugersburg and Mankweng within Polokwane Local Municipality, in Limpopo Province.

Figure 1 below provides the project location in relation to geographical context and project coverage. The project footprint covers the Polokwane Local Municipality, Lepelle-Nkumpi Local Municipality, and Greater Tzaneen Local Municipality, within Limpopo Province.

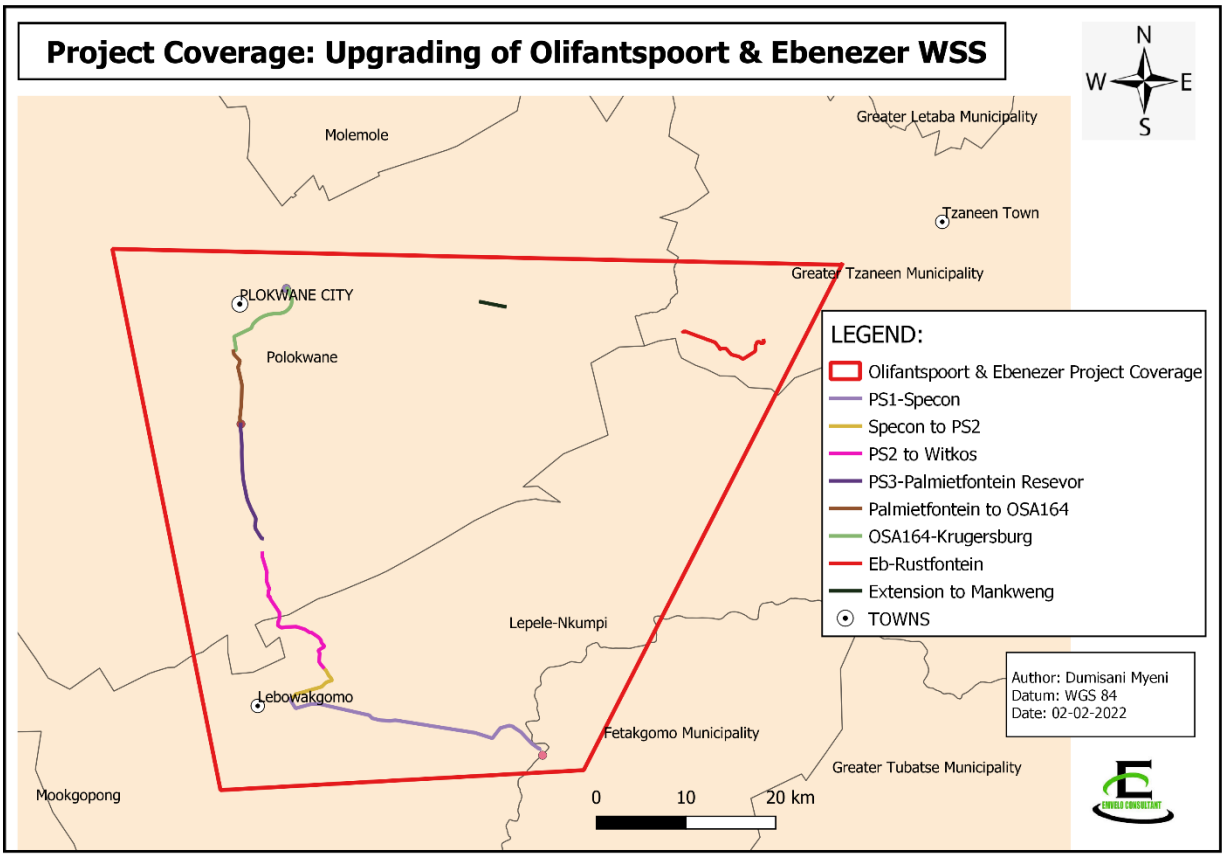

Figure 1: Geographic locational context (Olifantspoort &Ebenezer Project Coverage)

3.2 Site Context

The upgrades and refurbishment of Olifantspoort and Ebenezer Schemes' water conveyance and storage infrastructure will take place along Haenertsburg within Greater Tzaneen Municipality; Sekhukhune, Lebowakgomo and Mankweng within Lepelle-Nkumpi Municipality; Polokwane and surrounding communities along the water conveyance corridor within Polokwane Local Municipality, and will take place and be traversing the following localities: Dal Josaphat Farm, Mphahlele, Lebowakgomo Q, Lebowakgomo S, Syferkuil farm, Driefontein Farm, Bezuidenhout Lust farm, Patent farm, Majebas Kraal, Rustfontein Farm, Bochum Farm, Driekuil farm, Eindelik Farm, Hove Farm, Troutwaters AH, Haenertsburg Town and Townlands, Mankweng, Polokwane Game Reserve, and Krugersburg.

The locality maps in respect to the proposed upgrades of Olifantspoort and Ebenezer WSS water conveyance and storage infrastructure are presented by (***Figure 2, 3 & 4***) below.

3.2.1 Locality of Olifantspoort WSS

The Olifantspoort Off-Channel Storage and Olifants weir represented in ***figure 2*** are situated within Koppieskraal, Portion 0. Farm No. 475, and Dal Josaphat Farm No. 461.

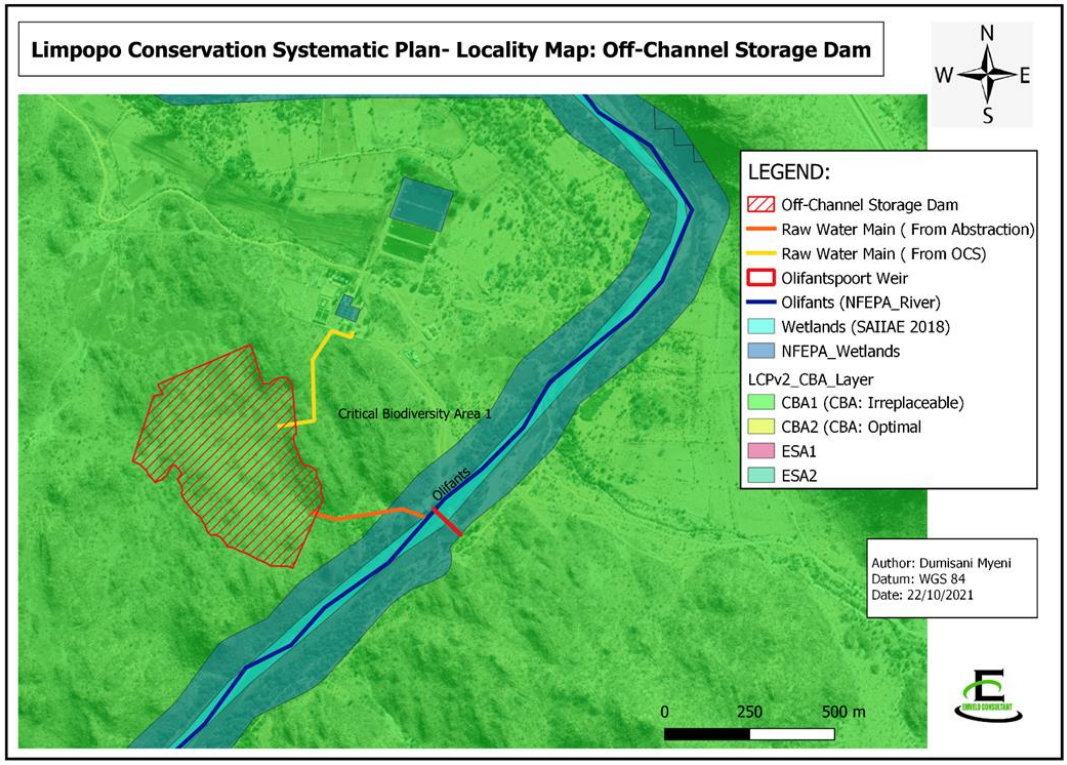

Figure 2:Olifantspoort Off-Channel Storage Dam and Olifantspoort Weir

Approximately 86km of upgrades for Olifantspoort WSS' water conveyance and storage infrastructure from Olifants River (abstraction) to Krugersburg reservoirs (***figure 3***), traverse the following localities: Koppieskraal, Voorspoed, Locatie Van M`Phatlele, Lebowakgomo-S, Lebowakgomo-Q, Uitloop, Schoonheid, Tsjuenispoort Oost, Staanplaats, Langkrans, Morgenzon, Block A, Tsjuenispoort West, Polokwane Metallurgical Complex, Beestekraal, Rietkolk, Palmietfontein, Du Preez Rust, Beestekraal, Weltevreden, Wildebeestkuil, Polokwane Town, Polokwane Game Reserve, Sterkloop, and Krugersburg.

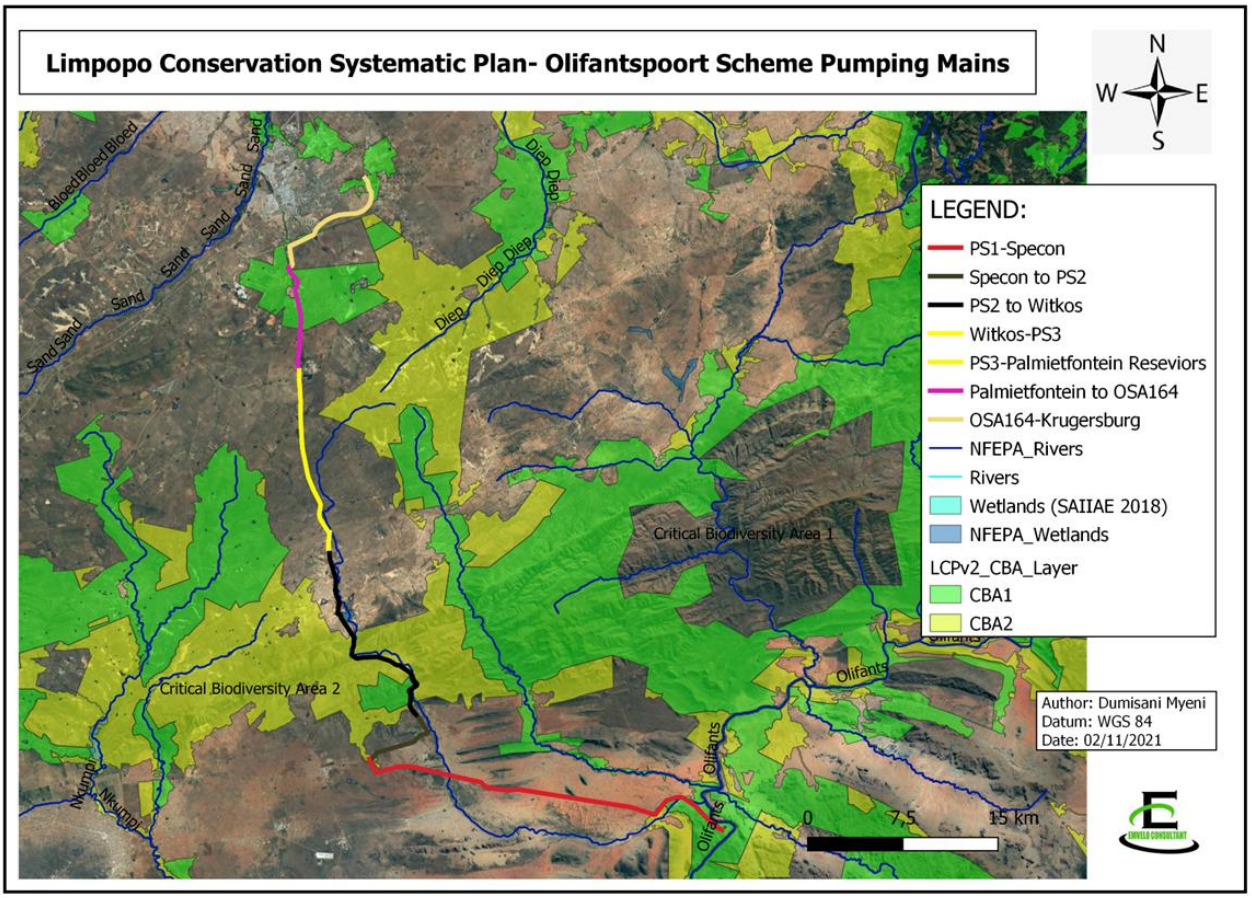

Figure 3: Map Showing Locality of Olifantspoort Supply Scheme Pumping Mains

3.2.2 Locality of Ebenezer WSS

Approximately 13.5km of upgrades for Ebenezer WSS' water conveyance from Ebenezer high lift pumpstation to Rustfontein reservoir complex, and extension from chamber GB73 to the Mankweng reservoir off-take (***figure 4***), traverse the following localities: Misty Crown, Driekuil, Hove, Bali-Will-Will, Rustfontein, Bochum, Eindelik, Rooiwal, Weighton, Stylbult,

Haenertsburg Town and Townlands, Westwood, Allandale, Danallan, Nooitgedacht, Troutwaters AH, Driefontein, Syferkuil, and Bezuidenhout Lust.

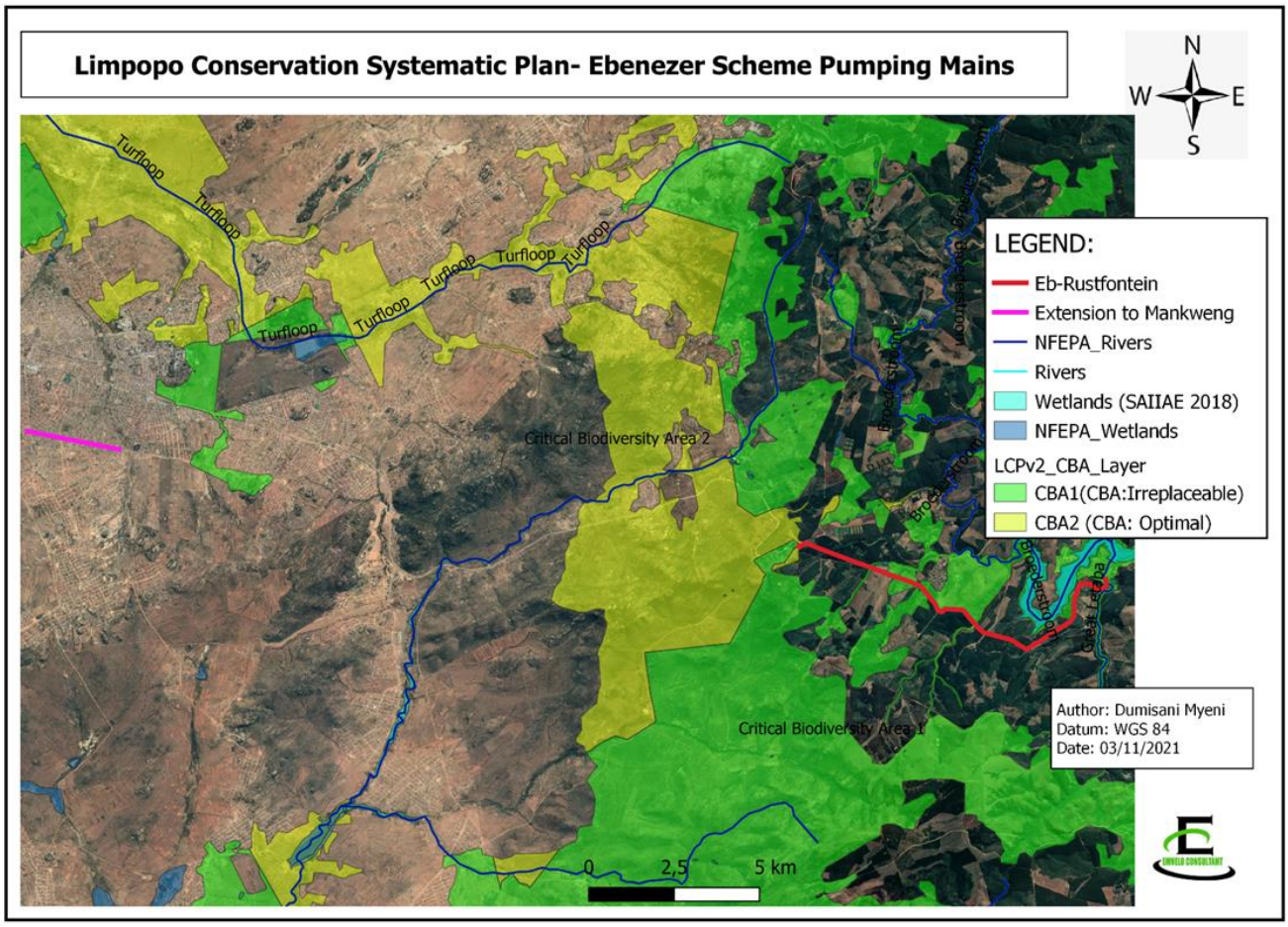

Figure 4: Map Showing Locality of Ebenezer Supply Scheme Pumping Mains

Table 1 and 2 provides the Global Positioning System (GPS) co-ordinates for the proposed development site.

Table 1: Co-ordinates (Olifantspoort WSS Coverage)

Olifants Abstraction	
Co-ordinates	24°21'40.14"S, 29°45'39.60"E
Olifants Weir	
Co-ordinates	24° 21' 40.10"S, 29°45'41,58"E
Raw Water main to Off-stream storage Dam	
Start Co-ordinates	24°21'40.11"S, 29°45'41.60"E
End Co-ordinates	24°21'39.18"S, 29°45'28.72"E

Off- Channel Storage Dam	
Co-ordinates	24°21’38.30”S, 29°45’25.88”E
PS1 – Specon	
Start Co-ordinates	24°21’17.29”S, 29°45’32.10”E
End Co-ordinates	24°18’16.70”S, 29°30’32.31”E
Specon to PS2	
Start Co-ordinates	24°18’15.17”S, 29°30’37.49”E
End Co-ordinates	24°16’32.52”S 29°32’39.35”E
PS2 to Witkos	
Start Co-ordinates	24°16’30.64”S, 29°32’37.59”E
End Co-ordinates	24°09’32.02”S, 29°28’51.09”E
Witkos Reservoir	
Co-ordinates	24°09'33.01"S, 29°28'52.71"E
Witkos-PS3 Pumping Main	
Start Co-ordinates	24°09’29.75”S, 29°28’50.06”E
End Co-ordinates	24°08’39.35”S, 29°28’51.70”E
PS3-Palmietfontein Reservoir Main	
Start Co-ordinates	24°08’39.02”S, 29°28’50.56”E
End Co-ordinates	24°01’47.07”S, 29°27’33.71”E
Palmietfontein Reservoir	
Co-ordinates	24° 1'46.35"S, 29°27'34.32"E
Palmietfontein to OSA164	
Start Co-ordinates	24°01’46.12”S, 29°27’32.14”E
End Co-ordinates	23°57’24.12”S, 29°27’07.00”E
OSA164 Krugersburg	
Start Co-ordinates	23°57’22.86”S, 29°27’09.34”E
End Co-ordinates	23°53’36.82”S, 29°30’24.49”E
Krugersburg Reservoirs	
Co-ordinates	23°53'37.91"S, 29°30'18.16"

Table 2: Co-ordinates (Ebenezer WSS Coverage)

Ebenezer Pumpstation- Rustfontein	
Start Co-ordinates	23°56’45.94”S, 29°58’59.78”E
End Co-ordinates	23°56’14.78”S, 29°54’08.87”E
Extension to Mankweng	
Start Co-ordinates	23°54’48.91”S, 29°42’24.10”E
End Co-ordinates	23°54’25.96”S, 29°41’58.89”E.

Table 3 below provides the 21-digits Surveyor General Code (SGC) along the proposed upgrades of Olifantspoort and Ebenezer Schemes’ water conveyance and storage infrastructure.

Table 3: 21-digits Surveyor General Code

T	0	K	S	0	0	5	4	0	0	0	0	0	4	6	1	0	0	0	0	0
T	0	K	S	0	1	8	0	0	0	0	0	0	0	6	4	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	0	2	2	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	1	1	2	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	1	1	4	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	0	8	3	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	0	1	5	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	1	4	7	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	6	4	2	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	3	6	9	0	0	0	0	0
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T	0	K	S	0	0	1	8	0	0	0	0	0	3	6	6	0	0	0	0	0
T	0	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	1	5
T	0	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	2	3
T	0	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	2	5
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T	0	K	S	0	0	1	8	0	0	0	0	0	2	2	2	0	0	0	0	0
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T	0	K	S	0	0	1	8	0	0	0	0	0	2	2	3	0	0	0	0	0

T	0	K	S	0	0	1	8	0	0	0	0	0	0	9	5	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	1	0	9	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	2	2	5	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	6	8	0	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	0	9	6	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	0	1	1	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	1	7	9	0	0	0	0	0
T	0	K	S	0	0	1	8	0	0	0	0	0	2	2	1	0	0	0	0	0
T	O	K	S	0	0	1	8	0	0	0	0	0	6	4	5	0	0	0	0	4
T	O	K	S	0	0	1	8	0	0	0	0	0	6	4	5	0	0	0	0	0
T	O	K	S	0	0	1	8	0	0	0	0	0	6	4	5	0	0	0	0	2
T	O	K	S	0	0	1	8	0	0	0	0	0	1	6	9	0	0	0	0	0
T	O	K	S	0	0	1	0	0	0	0	0	1	0	3	9	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	0	7
T	O	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	0	9
T	O	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	1	7
T	O	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	9	7	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	9	7	0	0	0	0	1
T	O	K	S	0	0	0	0	0	0	0	0	0	2	6	2	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	2	6	3	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	2	6	3	0	0	0	0	1
T	O	K	S	0	0	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	7	4	0	0	0	0	3
T	O	K	S	0	0	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	6	1	0	0	0	0	0

T	O	K	S	0	0	0	0	0	0	0	0	0	3	6	1	0	0	0	0	1
T	O	K	S	0	0	0	0	0	0	0	0	0	3	6	1	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	5	9	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	6	1	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	5	7	0	0	0	0	5
T	O	K	S	0	0	0	0	0	0	0	0	0	3	5	7	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	6	1	0	0	0	0	4
T	O	K	S	0	0	0	0	0	0	0	0	0	2	6	2	0	0	0	0	4
T	O	K	S	0	0	0	0	0	0	0	0	0	3	5	9	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	5	7	0	0	0	0	2
T	O	K	S	0	0	0	0	0	0	0	0	0	3	7	2	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	7	1	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	4	5	8	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	3	7	1	0	0	0	0	5
T	O	K	S	0	0	0	0	0	0	0	0	0	0	9	7	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0
T	O	K	S	0	0	4	4	0	0	0	0	0	0	0	2	0	0	0	0	0
T	O	K	S	0	0	4	4	0	0	0	0	0	0	0	1	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	8	5
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	5	9
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	2	8
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	1
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	9
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	3	2
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	2	3

T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	1	7
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	7
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	1	2
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	2	5
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	4
T	O	K	S	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	5
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	5
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	8	0	0	0	0	1
T	O	K	S	0	0	0	0	0	0	0	0	0	0	9	7	0	0	0	0	0
T	O	K	S	0	0	4	4	0	0	0	0	0	0	0	1	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0
T	O	K	S	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	5	9
T	O	L	S	0	0	0	0	0	0	0	0	0	7	4	6	0	0	0	0	0
T	O	L	S	0	0	0	0	0	0	0	0	0	6	8	8	0	0	0	0	0
T	O	L	S	0	0	0	0	0	0	0	0	0	9	9	3	0	0	0	0	0
T	O	L	S	0	0	0	0	0	0	0	0	1	2	3	8	0	0	0	0	0
T	O	L	S	0	0	0	0	0	0	0	0	0	9	9	3	0	0	0	0	0
T	O	L	S	0	0	0	0	0	0	0	0	1	2	3	8	0	0	0	0	0
T	O	L	S	0	1	0	2	0	0	0	4	3	2	4	7	0	0	0	0	0
T	O	L	S	0	1	0	2	0	0	0	4	3	1	3	5	0	0	0	0	0
T	O	L	S	0	1	0	2	0	0	0	4	3	2	5	5	0	0	0	0	0

3.3 Site Access

The site directions given below begin from starting point of the Olifantspoort WSS and Ebenezer WSS, assuming that all sites can be accessed from the starting point and moving towards the project ending point, as discussed below.

3.3.1 Site Access: Olifantspoort WSS

The Olifantspoort abstractions works is approximately 60km southeast of Polokwane City (24° 21' 40.10" S, 29°45'41,58"E). The sites can be accessed via the R37 from Polokwane City toward Lebowakgomo. Along R37 at Lebowakgomo take R518 toward the Lebowakgomo Build It Store and heads past Mamaolo. Just after passing Lebowakgomo Traffic Department, the route veers left along the gravel road toward Mphahlele village and passes through Seleteng Taxi Rank, continues towards Maijane Primary School, and turns sharp right about 400m, following the main road toward Olifantspoort Water Treatment Works (WTW). The Olifantspoort abstraction works is approximately 1km from Olifantspoort WTW. The Off-Channel Storage site (24°21'38.30"S, 29°45'25.88"E) is adjacent the Olifants River abstraction, and behind Olifantspoort pump station. To access the remainder of the project's water convenience and storage infrastructure, travel backwards toward Lebowakgomo S and Lebowakgomo Q, then from Specon reservoirs travel back to Polokwane City to access Krugersburg reservoirs (23°53'37.91"S, 29°30'18.16") at Krugersburg (end of project).

3.3.2 Site Access: Ebenezer WSS

The Ebenezer high lift pumpstation is at the Ebenezer Dam. The sites can be accessed via the R71 from Polokwane City towards Haenertsburg which passes through Haenertsburg and on the R528 towards Tzaneen. Thereafter left towards Mist Crown (Ebenezer Dam) to reach to Ebenezer pumpstation. To access the remainder of project's water conveyance infrastructure sites, travel back to Haenertsburg and Rustfontein reservoirs. For the Mokweng pipeline extension, travel toward Turfloop Nature Reserve and turn left at Paledi Mall to Mokweng reservoirs which is across the street.

4 DESCRIPTION OF ACTIVITIES

The proposed upgrading of Olifantspoort Water Supply Scheme, Phase 1 from Olifantspoort WTW to Krugersburg Reservoirs, and Upgrading of Ebenezer Water Supply Scheme, Phase 1 from Ebenezer Pumpstation to Rustfontein, and Mankweng reservoir off-take, will include the following components of the water conveyance and storage infrastructure:

Olifantspoort Wate Supply Scheme:

The proposed upgrades Olifantspoort WSS water conveyance from Olifantspoort abstraction work to Krugersburg reservoirs is approximately 86km. The components of water conveyance and storage infrastructure are outlined below:

- The upgrading of Olifantspoort weir and raw water abstraction works;
- Construction of 200 000m^2 Olifantspoort off-channel storage dam with 5m embarkment height;
- Construction of 1600mmø raw water mains (350m from Olifantspoort abstraction to off-stream storage dam, and 450m from off-stream storage dam to Olifantspoort WTW);
- Refurbishment of the Olifantspoort WTW; Upgrading of the existing Olifantspoort WTW by constructing new 60 Mℓ/d module;
- Refurbishment of Pump Station (PS): PS1, PS2 and PS3; Upgrading of Specon Storage Reservoirs;
- Constructing a new pumpstations at PS1 (Olifantspoort WTW) and PS2 and PS3;
- Duplicate/dualisation of approximately ***28.3km*** (800mmø) existing main by adding another (1500mmø) rising main from Olifantspoort WTW (PS1) to Specon;
- Duplicate/dualisation of approximately ***23.6km*** (790mmø) existing main by adding another (1500mmø) main from Specon to PS2, and from PS2 Witkos Reservoir;
- Duplicate/dualisation of approximately ***14.6km*** (740mmø) existing main by adding another(1200mmø) main from Witkos Reservoir to PS3 and Palmietfontein Reservoir;
- Construction of new reservoirs at Witkos (30Mℓ) and Palmietfontein (50Mℓ);
- Construction of approximately ***8.5km*** (1200mmø) pumping main with pumping rate of (1900 ℓ/s) from Palmietfontein Reservoirs to OSA164;

- Construction of approximately ***11km*** (1200mmø) pumping main with pumping rate of (1900 ℓ/s) from OSA 164 to Krugersburg reservoirs.

Ebenezer Water Supply Scheme:

The proposed upgrades Olifantspoort WSS water conveyance for Ebenezer WSS is approximately ***13.5km***. The components of water conveyance comprise the following:

- The refurbishment of the Ebenezer WTW;
- Refurbishment and modifications to Ebenezer high-lift pump station;
- Construction of approximately***11km*** (900mmø) new pumping main with a pumping rate of (1250ℓ/s), corresponding to 89 Mℓ /day from Ebenezer high-lift pump station to Rustfontein reservoirs complex;
- Extension of approximately ***2.5km*** (600mmø) pumping main (Pipeline B) from Chamber GB73 to the Mankweng reservoir off-take.

Both of the proposed pipeline upgrades and refurbishment between Olifantspoort and Ebenezer Schemes' water conveyance and storage infrastructure merge to supply the Polokwane Municipal Area. This will enable an additional 40Mℓ/day to be supplied to Polokwane City (25Mℓ/day from Olifantspoort and 15Mℓ/day from Ebenezer). The total length of pipeline upgrade for these two schemes is approximately ***99.5km***.

4.1 Design Criteria

The design criteria discussed in this report reflect to the main project activities that triggers the EIA as listed below:

- Upgrading of Olifantspoort weir and raw water abstraction works;
- Construction of 200 000m^2 Olifantspoort off-channel storage; and
- Water conveyance infrastructure (bulk pipeline) from Olifantspoort WTW (PS1) to Krugersburg reservoirs, and Ebenezer high-lift pump station to Rustfontein reservoirs complex; and Extension from Chamber GB73 to the Mankweng reservoir off-take.

4.1.1 Upgrading of Olifantspoort weir and raw water abstraction works

In order to increase the water capacity for the Olifantspoort (WTW, amongst other interventions, the weir situated at the abstraction works on the Olifants River is to be raised by 2.8 meters.

The upgrading of Olifantspoort weir will undergo six (6) steps in the construction sequence:

1) *Construction of sump and temporary delivery pipelines:*

   - A cut-off earth berm will be constructed on the right bank of the river, upstream of the existing side channel, to protect the area in which the temporary pumping sump will be constructed. This will protect the construction area from any floods that may occur during construction of the sump;
   - The temporary pumping sump will be constructed within the existing side channel;
   - The pumping sump will contain four submersible pumps, two duty and two standby which will deliver water through two pipes;
   - Temporary delivery pipes will run over the existing weir wall while being supported on a steel pipe rack.

2) *Divert water over sump and establish flow through temporary system:*

   - The construction of additional earth berms which will direct a portion of the flow over the submersible pumps;
   - A portion of the flow is to be diverted, in order to ensure sufficient water reaches the existing abstraction works to continue supplying the WTW, until the change-over to the temporary system occurs;
   - An area within the diversion channel will likely require excavation work in order to achieve levels that will allow sufficient flow into the channel.

3) *Construction coffer dams, and draining of the construction area:*

   - Construction of the earth coffer dams, one upstream of the new abstraction works and one downstream of the weir;

- The areas immediately upstream and downstream of the weir will be drained and construction work can commence.

4) *Raising the weir between the existing abstraction works, and channelling berm and construct weir extension:*
    - The weir area between the two coffer dams will be raised and the weir extension on the right bank will be constructed;
    - The weir extension will have a dogleg, in order to limit the length of the weir extension, as a result of a slight valley within the vicinity of the weir;
    - The new abstraction works along with the new (1600mmø) rising main will also be constructed.

5) *Initiate flow from new abstraction works:*
    - Demolish the downstream coffer dam and a portion of the upstream coffer dam, to allow some of the flow to reach the new abstraction works;
    - Demolish entire downstream and a portion of the upstream coffer dams. Flow through diversion channel to be sufficient to supply required volumes to the WTW.

6) *Demolish temporary pumping system and raise the final portion of the weir:*
    - The temporary pumping sump and delivery pipes can be demolished to allow for work to be done on the final portion of the weir;
    - A protective berm (coffer dam wall) will be constructed upstream of the diversion channel, to protect the final construction area from minor and major floods that might occur during this portion of the construction work.

4.1.2 The Preferred Design Option- Construction of New Wier

The design has also provided a preferred option which involve the construction of a new weir downstream of existing weir, which will be 100m apart. The proposed new abstraction works has to be placed within 100 m downstream of the existing weir because of the following

reasons: The floodplain opens up wide further downstream, and floods are relatively high near the left bank side at the existing abstraction works and downstream, which is required for self-scour of the intake during extreme floods; The flooded floodplain width is relatively narrow over the first 100 m downstream of the existing weir which will limit the required new weir length.

The construction of a new weir will involve amongst the six (6) steps in the construction sequence discussed above.

The new weir design provides that the upgrade of the abstraction works, to have :

a) Gravel trap

- The of 5 m wide by 13.67 m long to be added at the river intakes, with radial gate (5m wide x 3m high opening) downstream of the gravel trap for flushing sediment at the intake.
- During floods exceeding the 2-year flood when the weir is submerged, the gate remains closed, and the intake becomes self-scouring due to secondary currents.
- The gravel trap can be flushed effectively for river discharges smaller than 200 m3/s, by opening the radial gate.

b) Weir concrete structure

- The weir has to be raised by 1.3 m to elevation 740 mASL at the low notch (weir height above the riverbed 3.5 m), to increase the submergence at the river intakes and trash racks.
- To prevent floating debris from blocking the trash racks and entering the abstraction works the soffit level of the river intakes is 0.3 m below the low notch level of the weir.
- The horizontal floor between the river intakes and the hopper canal is removed and the hopper is made deeper by 1.48 m to make the hopper sides steeper to 2:1 (V:H) for coarse and cohesive sediment removal in the hoppers.
- Upstream of the abstraction works a high curved wall is added to streamline the flood flow patterns

c) Abstraction works

- New submersible pumps should be installed with 4 duty and 2 standby pumps.

4.1.3 Off-Channel Storage Dam (Olifantspoort Scheme)

As an additional measure to mitigate against issues with sediment around the abstraction works, an Off-Channel Storage Dam (OCSD), will act as a sedimentation basin and aim to limit the amount of sediment transported to the WTW in future.

The design criteria for OCSD are described below:

1) Dam type:

- Vaal Augmentation Planning Study (VAPS) (DWAF, 1996) was used for selection of dam type.
- The criteria for selection of Olifantspoort OCSD site are the required capacity, topography, geology, and the need to pass the maximum flood peak. Contours were used to create a stage capacity curve.
- Four dam types discussed hereunder were considered as appropriate at the identified Olifantspoort site, namely: hardfill dam, concrete faced rockfill dam, rockfill dam with geomembrane, and rubble masonry concrete dam.

2) Required storage capacity

- The capacity varies marginally according to dam type.

Table 4: Dam types of storage capacity

Level	Total Storage
RL 755.00 m	227 711 m^3
RL 765.00 m	1 663 785 m^3
RL 767.00 m	2 064 860 m^3

3) Desilting

- The dam will be completely silted in 82 years if no dredging is done during its lifetime. Therefore, using parameters as indicated in ***Table 5*** below, and assuming a horizontal silt level, the following is applicable:

Table 5: Year pumped and horizontal silt level at OCSD

Years	Pumped Sediment
11.5	RL 755.00 m
20	RL 757.00 m
50	RL 761.25 m
82	RL 765.00 m

- With the proposed configuration and LDDL at RL 755.0 m, 11.5-year sediment level, 8.0 days of storage will be available, at 20-year sediment level 5.7 days of storage will be available, and at 50-year sediment level 2.3 days of storage will be available.
- The proposed dam arrangement will include a ramp for the removal of sediment. Furthermore, the proximity of the abstraction works and the water treatment plant to the OCSD is expected to ensure that operations and maintenance personnel will be able to monitor the silt level in the OCSD closely and ensure timeous sediment removal.

4) Spillway:

- The spillway for the Olifantspoort OCSD will comprise a 70 m long uncontrolled crest structure located on the saddle of the western closure wall. The closure wall on this saddle will only be some 2m high above the natural ground line.
- The spillway structure will take the form of a simple broad crested weir founded at appropriate levels according to the geology on the saddle.
- The spillway structure will be a simple rubble masonry gravity section;
- The spillway will be designed for the maximum discharge associated with the 100-year recurrence interval flood (RDF = Q100), while the absolute spillway

capacity must be adequate to carry the Safety Evaluation Flood (SEF). Allowance to accommodate applicable concurrent over pumping from the abstraction works was included in the total capacity of the spillway.

- Energy dissipation will be designed in accordance with the applicable dam safety legislation for the spillway discharge associated with the rapid drawdown (RDD).

5) *Freeboard:*

- Fetch calculations were undertaken for the Eastern 1, Northern and Southern embankments. The same freeboard was accepted for the Eastern 2 wall.

6) *Intake and outlet works:*

- An inlet structure near the southern closure wall will facilitate inflows from the abstraction works, and the offtake structure will be required near the eastern closure wall. This will comprise a multi-level off-take structure to facilitate draw off of the best quality water.
- The intake structure will comprise two separate wet wells, containing fixed trash racks, guides for removable fines screens and the stoplog gate, sealing frames and intake pipe bell mouths. The intake pipes will be staggered on the adjacent pipe stacks to provide abstraction at 3.8 m vertical intervals. This will allow for a 100% redundancy in accordance with common national primary water supply practice.
- Two outlet pipes will be taken underneath the Eastern 1 wall encased in a concrete block, constructed directly in the foundation.
- An outlet to ensure the dam can be emptied in an emergency situation is required.
- Water for domestic and industrial use is to be delivered directly from the OCSD to the Olifantspoort WTW through a dedicated pipeline over the eastern saddle. The design will make provision to abstract water to the toe of the eastern closure wall structure.

7) *Drawdown:*

- To facilitate emergency draw-down, a T-piece will be provided off one of the outlet conduits to utilise the area located between the two ridges on the north-eastern perimeter of the OCSD but discharging into the Olifants River upstream of the abstraction works.
- The dam can be emptied to RL 745 m as opposed to RL 755 m if integrated into the main outlet works.

8) *Capacity:*

- The full demand could be supplied when one pipe stack is out of order. The capacity of the outlet is 3.6 m^3/s at the LDDL of RL 755.0 m using a 1.4m diameter pipe.

9) *Submergence:*

- Will have the lowest drawdown level (LDDL) of RL 755.0 m, and the offtake at just below this level will be provided through both stacks.

4.1.4 Conveyance infrastructure

The Technical Guidelines for the Development of Water and Sanitation Infrastructure –Second Edition (2004): DWS; Steel Pipe- A guide for Design and Installation: AWWA Manual M11; Report MS1429-STY-GEN-003-00 Design Guidelines (2017) MSW; and CWCD (Supplementary Steel Design) Program by the University of Pretoria, have been adopted as design criteria and formed the basis for pipeline strength analysis.

The pumping mains from PS1 to the Krugersburg reservoirs and Ebenezer pumpstation to Rustfontein reservoirs including Mankweng reservoir off-take are to meet the projected demands for 20-year lifespan considering capacity of the existing pipeline, which will be refurbished at a later stage of the project.

Table 6: Conveyance system design criteria

Design parameter	Measurement
AADD (2042)	20 years
Design Capacity	1.5 x 1.1 x AADD
Peak Summer Flows	1.5 x AADD
Losses percentage based on 2042 AADD	10%
Design Capacity PS1, Specon and PS2 (Olifantspoort WSS)	190 Mℓ/d
Design Capacity PS2 to Palmietfontein (Olifantspoort WSS)	150 Mℓ/d
Conveyance system capacity Ebenezer to Rustfontein	90 Mℓ/d
Water Abstraction -Olifantspoort Scheme	120 Mℓ/d
Pumping Cycle -Olifantspoort	20 hr/day
Water Abstraction- Ebenezer Scheme	44.4 Mℓ/d
Pumping cycle-Ebenezer	18hr/day

1) Pipeline Specifications

- Pipe material: Helical Submerged Arc-Welded (HSAW) steel pipes manufactured in accordance with SANS719 and API 5L.
- Pipe Joints: Butt welded joints for bevelled ended pipes or spherical slip joints as alternatives.
- Flanged joints at valve chambers, offtakes, meters etc all flanges drilled to SANS 1123. Self-healing corrosion preventive pipe wrapping.
- Corrosion protection: Cement Mortar Lining / Epoxy lining (internal), and rigid polyurethane (external). Cathodic protection system.
- Bends: 0 to 5º mitred bends; 5º to 30º medium radius two segments; 30º to 90º long radius 3 to 4 segments.
- The isolating valves shall be 1200mmø double offset butterfly valves. These isolating valves will be positioned to facilitate maintenance and repairs to limit the time necessary to drain sections of the pipeline without wasting large volumes of water in the process.
- The air valves for the project were specified as double orifice dual action air release / vacuum break valves with mechanism to prevent slamming and to mitigate hydraulic surge.

- The location of the scour valves shall be governed by the longitudinal pipeline profile to ensure effective drainage of the pipeline. The valves shall be 350mmø wedge gate valves sized to allow for the draining time for the isolated pipeline section to be maximum of 2 hours.

2) *Connection to existing infrastructure:*

- The connection to existing infrastructure will be at PS1, PS2 and PS3; Specon reservoirs, Witkos reservoirs, OSA164, Krugersburg reservoirs, Ebenezer pumpstation,
- Offtakes: The new connection points will incorporate isolating valves, flow meters, check valves and pressure reducing valves required to reduce the pressure delivered to the water supply system.

3) *Alignment and profiles:*

- Pumping main to run parallel to the existing pipeline.
- The proposed diversions will, bypasses two offtakes from the existing pipeline supplying Mphahlele RWS, which will need to be replaced by providing new offtakes and supply pipelines linking to the existing water lines. A 7.1km long diversion before terminating at the Specon reservoir site to avoid intrusion into residential development in Lebowakgomo S, which encroaches over the existing pipeline servitude.

4) *Earthworks and construction:*

- Deep pipeline excavations for securing slope stability, battering and support.
- Minimum cover of 900mm or 1200 mm under roadways or pipe jacking subject to wayleave conditions of relevant roads authorities.
- Blasting to be avoided or use of alternative method to protect existing services when excavating in close proximity to existing services.

5) *Connection to existing infrastructure:*

- The connection to existing infrastructure will be at PS1, PS2 and PS3; Specon reservoirs, Witkos reservoirs, Palmietfontein reservoirs, Rustfontein reservoirs, Chamber GB73, and Mankweng reservoir off-take.
- Offtakes: The new connection points will incorporate isolating valves, flow meters, check valves and pressure reducing valves required to reduce the pressure delivered to the water supply system.
- Reservoirs and pumpstation outlet specifications: Helical Submerged Arc-welded (HSAW) steel pipes manufactured in accordance with SANS719 and API 5L; Steel Grade external pipework: X42 (290 MPa) and internal reservoir pipework cast in Grade 304 stainless steel.
- Pipe Joints: Butt welded joints for bevelled ended pipes or spherical slip joints as alternatives; Flanged joints at valve chambers, offtakes, meters, etc all flanges drilled to SANS 1123.
- Corrosion protection: Epoxy lining (internal) and epoxy eternal coating.
- All buried pipes, flanges and specials shall be wrapped with self-healing corrosion preventive pipe wrapping.

6) *Concrete works:*

- Minimum cover to reinforcement 50 mm.
- Reservoir structure Grade 35/19.
- Valve chambers: Grade 25/19.
- Mass concrete for pipe encasement: Grade 20/19.
- Blinding layer: Grade 15/19.

5 BACKGROUND AND PURPOSE OF THE SCOPING REPORT

This report fulfils the requirement of the EIA Regulations for the documentation in the scoping phase. The structure of this report is based on part 3 of GN R.326, of the EIA Regulations as amended, which clearly specifies the required content of a scoping report.

The purpose of these Regulations is to set procedures and specify criteria, as contemplated in Chapter 5 of the Act, to enable the submission, processing, consideration, and decision-making regarding applications for environmental authorization of listed activities and matters pertaining thereto.

6 DETAILS OF ROLE PLAYERS

6.1 Environmental Assessment Practitioner

In accordance with Appendix 2, Section 2(1)(a) of GN No. 326 (7 April 2017), this section provides an overview of Emvelo Consultant and the company's EIA experience, as well as the details and experience of the EAPs that form part of the Emvelo Consultant project team, as well of the team of specialists, as detailed by (***Table 7 & 8***) below:

Table 7: Project Team

Name	Qualification	Experience (Years)	Duties
Phumzile Lembede	B.Sc. Honours in Environmental Management. EAP (EAPASA) Pr. Sci. Nat. (SACNASP) in the Environmental Science Field of Practice	10	Principal EAP and Environmental Scientist
Dumisani Myeni	B.Sc. Honours in Environmental Management. Cand. Sci. Nat. (SACNASP) in the	8	Study Lead and Environmental Scientist

	Environmental Science Field of Practice		

6.2 Expertise required

The following team of specialists will provide the relevant specialist assessments and reports:

Table 8: Team of Specialists

Name	Qualification	Experience (Years)	Duties
Andrew Husted	MSc. Aquatic Health. BSc. Natural Science Pr. Sci. Nat. (Aquatic Science, Ecological Science, Environmental Science)	13 years	Terrestrial Biodiversity Impact Assessment; Aquatic Biodiversity Impact Assessment
Paulo Kagoda	Master of Science in Engineering [International Association of Hydrological Sciences (IAHS), Water Institute of Southern Africa (WISA)]	11 years	Hydrological Impact Assessment
Nhlakanipho Zondi	BSc (Honours) in Hydrology Pr. Sci. Nat. (SACNASP), Water Resource Field of Practice	10 years	Wetland Delineation Impact Assessment.
Sinethemba Mchunu	Masters Degree in Soil Science (M.Sc. Agric.) Cand. Sci. Nat. (SACNASP), Soil Science Field of Practice, SASSO, SSSSA, and LaRSSA)		Agricultural Impact Assessment
Roy Muroy	Masters in Archaeology Cultural Heritage and Museum Studies	9 Years	Paleontological, Archaeological and Cultural Heritage Impact Assessment

	(Professional Member of Association of Professional Heritage Practitioners; Professional Member of Association of Southern African Professional Archaeologists).		

7 EIA PROCESS AND METHODOLOGY

The EIA process for the proposed upgrading of Olifantspoort and Ebenezer Water Supply Schemes, comprise two main phases, namely, the Scoping phase and the Impact Assessment phase.

The Scoping Phase of an EIA serves to define the scope of the detailed assessment of the potential impacts of a proposed project. The Environmental Scoping phase has been undertaken in accordance with the requirements of sections 24 and 24D of the National Environmental Management Act (NEMA) (Act 107 of 1998), read with Government Notices R 543 (Regulations 26-30), 544, 545 and 546 of the NEMA. The objectives of the Scoping Phase are to:

- Ensure that the process is open and transparent and involves the Authorities, proponent, and stakeholders (***Refer to Section 7.2, 7.3 & 7.4***);
- Ensure compliance with the relevant legislation (***Refer to Section 8***);
- Ensure that feasible and reasonable alternatives are identified and selected for further assessment (***Refer to Section 10***);
- Identify the important characteristics of the baseline environment (***Refer to Section 11***);
- Assess and determine possible impacts of the proposed project on the biophysical and socio-economic environment and associated mitigation measures (***Refer to Section 15***).

7.1 Scoping Process

The process for seeking Environmental Authorization under NEMA is being undertaken in terms of the current EIA Regulations of 2014 as amended in 2017. An outline of the process flow for Scoping and EIA process for the project is presented by ***Figure 5*** below.

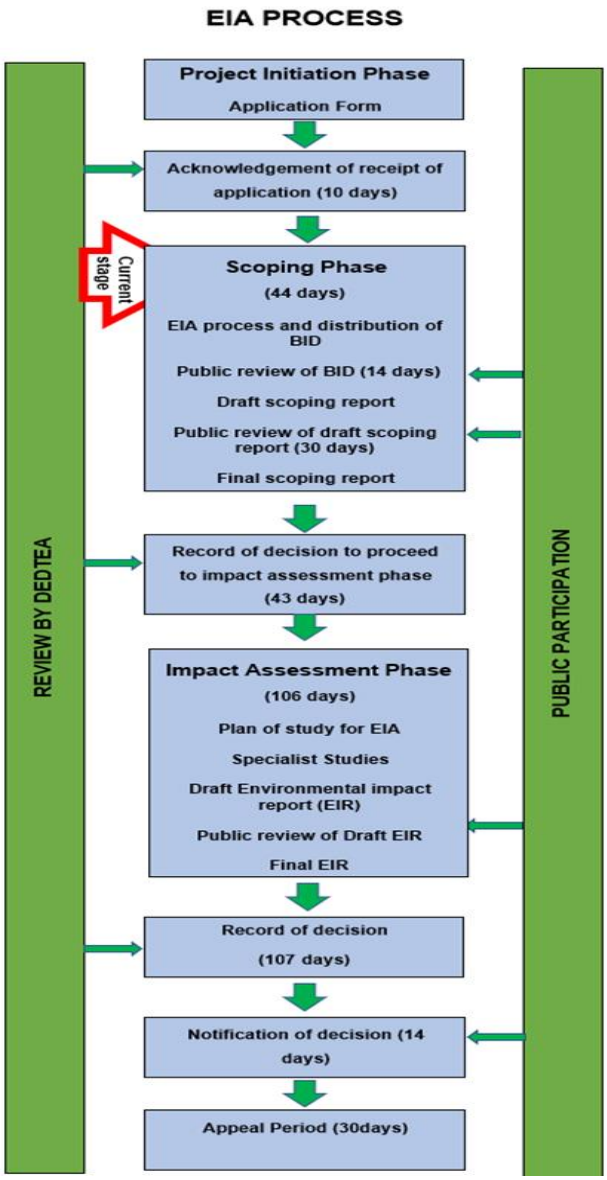

Figure 5: Scoping and EIA Process Flow Diagram

7.2 Landowner

According to Regulation 39(1) of GN No. 326 (7 April 2017), if the applicant is not the owner or person in control of the land on which the activity is to be undertaken, the applicant must, before applying for an Environmental Authorization in respect of such activity, obtain the

written consent of the landowner or person in control of the land to undertake such activity on that land.

The above proposed upgrades of water conveyance constitute the linear activity of approximately 95km running parallel within servitude of the existing water conveyance infrastructure, and some places within the road reserve. The water storage infrastructure upgrades will take place within existing water facilities owned by the applicant.

Therefore, in terms of EIA Regulations, 2014 as amended on 07 April 2017, the Section 39 (2) (a) the land consent does not apply in respect to linear activity. The notification was sent communities and municipalities within jurisdiction of the proposed water conveyance upgrade.

The applicant with the services of Social Facilitators, is currently meeting with affected landowners to set-up a new servitude for water conveyance. This will be detailed during the EIR phase.

7.3 Consultation with Authorities

The relevant authorities required to review the proposed project and to provide an Environmental Authorisation were consulted from the outset of this study and have been engaged throughout the project process. In terms of NEMA Section 24 (C), the lead decision-making authority for this application for Environmental Authorisation is the National Department of Forestry, Fisheries and Environmental (DFFE).

However, other authorities with jurisdiction over elements of the receiving environment or project activities were consulted and listed as I&Aps.

Authority consultation included the following activities:

- Submission of EA Enquiry to DFFE;
- The EA Pre-Application Meeting was convened with DFFE on 13th of October 2021 (***Refer to Appendix E*** for a copy of the minutes).

- An application for authorisation in terms of NEMA (Act 107 of 1998), was submitted to DFFE.

7.4 Consultation with other Relevant Authorities

Background information regarding the proposed project was provided to relevant authorities and agencies, requesting their input into the EIA process. The authorities include *inter alia* as:

- South African Biodiversity Conservation
- Limpopo Province: Dept. of Economic Development, Environmental and Tourism
- Department of Water and Sanitation (DWS);
- South African Heritage Resource Agency;
- Limpopo Province: Dept. of Transport and Community Safety;
- Limpopo Province: Dept. of Agriculture and Rural Development;
- Limpopo Province: Dept. of Rural development and Land reform;
- Limpopo Provincial Heritage Agency;
- Kruger to Canyons Biosphere Region
- Great Tzaneen Local Municipality;
- Polokwane Local Municipality;
- Lepelle-Nkumpi Local Municipality;
- Capricorn District Municipality;
- Mopani District Municipality.

See Appendix E for the full list.

7.5 Overview of the Public Participation Process

The purpose of the Public Participation Process (PPP) which is implemented as part of the Scoping Phase of the EIA, is to:

- Ensure all relevant stakeholders and I&APs have been identified and are engaged in the Scoping process;

- Raise awareness, educate, and increase the understanding of stakeholders and I&APs about the proposed project, the affected environment and the environmental process being undertaken;
- Create open channels of communication between stakeholders and the project team;
- Provide opportunities for stakeholders to identify issues or concerns and suggestions for enhancing potential benefits and to prevent or mitigate negative impacts;
- Accurately document all opinions, concerns and queries raised regarding the project;
- Ensure the identification of significant alternatives and issues related to the project.
- To protect the environmental rights of the local community.
- To optimise the local and indigenous knowledge of the area.

7.6 Scoping Phase Public Participation

Section 24 (4) (a) (v) of NEMA, provides that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment, must ensure, with respect to every application for an Environmental Authorisation, the public information and participation procedures which provide all I&APs, with a reasonable opportunity to participate in those information and participation procedures, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity.

7.6.1 Notification of the Interested and Affected Parties (I&APs)

Section 41 of Chapter 6 of the EIA regulations have listed the different options, to be used when notifying the I&APs. The Public Participation process for this project was conducted, as detailed in ***Table 9*** and indicated by the green blocks.

Table 9: Notification of I&APs

All the Interested and Affected parties were notified of the application by-		
Fixing a notice board at the place conspicuous to and accessible by the public at the boundary, on the fence, or along the corridor of any alternative sites. See Appendix E: Onsite notices positions.	**YES**	~~**NO/NA**~~
Any alternative site also mentioned in the application	~~**YES**~~	**NO/NA**

Has a written notice been given to-		
Landowner or person in control if the applicant is not in control of the land. This is a linear activity. Therefore, in terms of EIA Regulations, 2014 as amended on 07 April 2017, the Section 39 (2) (a) the land consent does not apply in respect to linear activity. The notification was sent communities and municipalities within jurisdiction of the proposed water conveyance upgrade.	~~**YES**~~	**NO/NA**
The municipal councillor of the Ward in which the site and alternative site of the proposed activity. Polokwane Municipality, Lepelle-Nkumpi Municipality, and Tzaneen Municipality.	**YES**	~~**NO**~~
The municipality which has jurisdiction in the area and other organs of state:	**YES**	~~**NO**~~
Placing an advertisement in-		
Regional newspaper (***Daily Sun Newspaper, 21/02/2022***)	**YES**	~~**NO**~~
Any official Gazette that is published specifically for providing public notice of applications	~~**YES**~~	**NO**
One provincial newspaper, any official Gazette that is published with the purpose of providing public notice of applications.	~~**YES**~~	**NO**

Table 10: Scoping Phase Public Participation

Scoping Phase
Interested and Affected Parties (I&APs) have been identified throughout the process. Initial identification of I&APs includes State Departments, Organs and Agencies, Municipality, and Ward Councillors (***Refer to Appendix E: PP Plan***).
Notification BIDs have been circulated to all identified I&APs informing them of the proposed development and the opportunity to comment.
The A3 onsite notices have been placed at boundaries and intersections as well as strategic points (***Refer to Appendix E: Onsite Notices***)
An advertisement was placed on *Daily Sun Newspaper*, published on (21/02/2022), attached on (***Appendix E***).
Due to the COVID-19 lockdown regulations, where the gathering of large groups of people is prohibited, several approaches will be implemented to facilitate an inclusive public participation process for the proposed project, in accordance with the EIA regulations and the Disaster Management Act, 2002 (Act No. 57 of 2002) as published on 29 April 2020. A focus group for community representatives was formed. This focus group was made up of the Ward Councillors and Traditional Councils. The Social Facilitator in association with Emvelo Quality and Environmental Consultant (Pty) Ltd initiated the meetings with the focus group, informing them about the proposed project. The focus group plays an important role for facilitation of information dissemination to the broader community (***Refer to Appendix E: PP Plan***). Draft Scoping Report is forwarded , and Draft

EIR will be forwarded to the Ward Councillor and the focus group as an electronic (CD & email and hardcopy version based on their request.
Copies of the report is delivered and sent via email to relevant State Departments and Organs of State and their inputs and comments were requested.
All comments received during the commenting period will be included in the Final Scoping Report & Final EIR.

7.6.2 Review of Draft Scoping Report

The Draft Scoping report is circulated for 30 days, and this document will be lodged for public review using the public participation methods mentioned in ***Table 10*** above (***Note****: This could change subjected to Covid-19 Regulation. Also, refer to PP Plan*).

7.6.3 Comments from I&APs

Section 43 of Chapter 6 of NEMA (EIA Regulations 2017) indicates that all I&APs are entitled to comment in writing on all reports produced by the applicant during the EIA process. This will bring the concerns raised to the attention of the applicant.

The proof of documents circulated to I&APs is attached as appendix E.

The current comments (***Appendix E***) involve the inputs from the BID, onsite notices, newspaper adverts and the focus groups meeting.

7.7 Screening of Alternatives

Consideration of alternatives is one of the most critical elements of the environmental assessment process. The key criteria for consideration when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “viable” (DEAT,2004). As a result, after assessing the following alternatives: Demand, Scheduling, and Technology Alternative will be feasible to offset the No-Go Alternative (***Refer to Section 10***).

7.8 Prediction of Impacts

The Scoping exercise is aimed at identifying and qualitatively predicting significant environmental issues for further consideration and prioritisation during the EIA stage. It is important to note that the impact “significance” relates to whether the effect (i.e. change to the

environmental feature/attribute) is of sufficient importance that it ought to be considered and have an influence on decision-making.

The potential environmental impacts associated with the proposed project were identified during the Scoping phase (***Refer to Section 15***) through consideration of the following:

- Proposed locations and the extent of the proposed development, which included site investigations (field works) as well as a desktop studies, evaluation with a Geographical Information System (GIS), and inputs from various data sources.
- Activities associated with the project life cycle (i.e. construction, operation, and decommissioning).
- Profile of the receiving environment and the potential sensitive environmental features and attributes;
- Input received during public participation from authorities and I&APs; and
- Legislation framework, and policy context.

The EIA will therefore provide a qualitative and quantified impact assessment methodology, which will be conducted through the contributions of the project team and requisite specialist studies. Subsequently, the suitable mitigation measures will be identified to manage (i.e., prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and will be included in the Environmental Management Programme (EMPr).

The Environmental Scoping Phase has been undertaken in accordance with the requirements of sections 24 and 24D of the National Environmental Management Act (Act 108 of 1998), as read with Government Notices R 543 of the NEMA.

8 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

NEMA is the primary South African legislation governing the requirements for Environmental Impact Assessments. In the context of the proposed upgrading of Olifantspoort and Ebenezer WSS, the provisions of NEMA, and the associated EIA Regulations (regarding Scoping and EIA) are of fundamental relevance.

In terms of the Environmental Regulations promulgated under the NEMA, an EIA must be conducted for any development or activity that requires an Environmental Authorisation.

The applicable legislation and the listed activities in the NEMA, relevant to this project, that triggers the need for an Environmental Authorisation are listed below:

Table 11: Environmental Legislative Context

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	➢ Chapter 2 – Bill of Rights. ➢ Section 24 – Environmental Rights/ Health Or Well-Being / Depletion Of Natural Resources ➢ Section 32: Access to Information ➢ Section 33: Administrative Decisions ➢ Section 38: Locus Standi ➢ Sectin 68: Authority for Provincial Legislation
National Environmental Management Act (NEMA) (No. 107 of 1998)	➢ Section 2: Principles in Environmental Management ➢ Section 24: Environmental Authorisations and/or Norms and Standards (EA) (➢ Section 24G: Rectification Application ➢ Section 24J: Implementation Guidelines ➢ Section 24L: Alignment of Environmental Authorisations, including Integrated Environmental Authorisations) ➢ Section 24N: Environmental Management Programmes, Rehabilitation of Disturbed Areas and Closure Plan ➢ Section 24P: Financial Provision for Remediation of environmental damage ➢ Section 24Q: Monitoring and Performance Assessment (Environmental Audit) on EMPr's ➢ Section 24S: Management of Residue Stockpiles and Residue Deposits ➢ Section 24M: Exemption from Application of Certain Provisions of The Act ➢ Section 28: Duty of Care and Remediation of Environmental Damage ➢ Section 28: Soil Pollution ➢ Section 29: Protection of Workers on Refusal to Undertake Work ➢ Section 30: Emergency Incident Causing Danger to Public or Environment ➢ Section 30A: Emergency Situation - Request for Directive to undertake listed activity without EA ➢ Section 31: Access to Environmental Information and Protection of Workers ➢ Section 32: Enforcement of Environmental Laws ➢ Section 34: Liabilities in Criminal Offences Under Environmental Laws ➢ Section 39: Control over products which could harm the environment ➢ Section 43: Appeals (Ch 9, Sec 43)

<table>
<tr><th>Legislation</th><th colspan="2">Relevance</th></tr>
<tr><td></td><td colspan="2">➢ Section 44 and 47: Regulations
➢ Section 47A: Regulations, Legal Documents and Steps Not In Compliance With Procedural Requirements
➢ Section 47B: Consultation with other Departments
➢ Section 47C: Extension of Time Periods
➢ Section 47D: Delivery of Documents
➢ Section 49A and 49B: Offences and Penalties</td></tr>
<tr><td>GN No. 326 (7 April

2017)</td><td colspan="2">➢ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing, and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to and EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.</td></tr>
<tr><td colspan="3">➢ Purpose – to identify activities that would require environmental authorizations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24C of NEMA.
➢ The investigation, assessment, and communication of the potential impact of activities must follow the procedure as prescribed in regulations 19 and 20 of the EIA Regulations published in terms of section 24(5) of the Act. However, according to Regulation 15(3) of GN No. 327, Scoping and an Environmental Impact Report (S&EIR) must be applied to an application, if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities.
➢ Activity Activities under Listing Notice 1,Listing Notice 2, and Listing Notice 3 that are relevant to this project.</td></tr>
<tr><td>GNR No. 327 (7 April

2017) Listing Notice 1.</td><td colspan="2">Activity under Listing Notice 1 relevant to this application is as follows;</td></tr>
<tr><td></td><td>Listed Activity 9: ‘The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water-

(i) with an internal diameter of 0.36 metres or more;

(ii)with a peak throughput of 120 litres per second or more.’</td><td>Applicability:

The proposed upgrading of Olifantspoort and Ebenezer Schemes pipelines have (1200mmø), and pumping rate of more than (120 ℓ/s)

Olifantspoort Scheme: Construction of approximately 86km between Olifants river/Olifantspoort abstraction and Krugersburg, will require-

The construction of approximately 8.5km (1200mmø) pumping main with pumping rate of (1900 ℓ/s) from Palmietfontein Reservoirs to OSA164;</td></tr>
</table>

Legislation	Relevance	
		Construction of approximately 11km (1200mmø) gravity main with pumping rate of (1900 ℓ/s) from OSA 164 to Krugersburg reservoirs. ***Ebenezer Scheme:*** *Construction of approximately 13.5km between Ebenezer Dam/ Pumpstation to Mokweng/ Mokweng Reservoirs, will require-* *The construction of approximately11km(900mmø) new pumping main with a pumping rate of (1250ℓ/s) from Ebenezer high-lift pump station to Rustfontein reservoirs complex;* *The construction of approximately 2.5km (600mmø) pumping main (Pipeline B) from Chamber GB73 to the Mankweng reservoir off-take.*
GNR No. 327 (7 April 2017) **Listing Notice 1.**	**Listed Activity 12:** 'The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;'	***Applicability:*** ***Olifantspoort Scheme****: Construction of approximately 86km between Olifants River and Krugersburg.* *The upgrading of Olifantspoort weir and raw water abstraction works will take place within riparian zone at Olifants river/ Olifantspoort abstraction* *The first 120m portion of 350m (1500mmø) raw water mains from Olifantspoort abstraction/Olifants river to off-stream storage dam traverse NFEPA wetland.* *.* *The middle section portion of 28.3km (1500mmø) pipeline route from Olifantspoort WTW (PS1) to Specon*

Legislation		Relevance
		traverse the SAIIAE wetland (hydrological body) and Chunies river. *The middle section of 23.6km (1500mmø) pipeline route from Specon to Witkos Reservoir traverse the NFEPA wetlands and SAIIAE wetlands (hydrological bodies)* *The last section portion, of 23.6km (1500mmø) pipeline route from PS3 to Palmietfontein Reservoir traverse the SAIIAE wetland (hydrological body).* *The last section of 8.5km (1200mmø) pipeline route from Palmietfontein Reservoirs to OSA164 traverse NFEPA wetland (hydrological body)* ***Ebenezer Scheme:** Construction of approximately 13.5km between Ebenezer Dam/Pumpstation to Mokweng/Mokweng Reservoirs will involve river crossing.* *The pipeline will have a river crossing next to Ebenezer pumpstation at Greater Letaba River.* *The middle section of 11km(900mmø) pipeline route from Ebenezer high-lift pump station to Rustfontein reservoirs complex traverse NFEPA wetland (hydrological body).* *Therefore, the construction for the purpose of laying the pipeline will involve clearance of 4m wide construction corridors for the entire pipeline route. This will result in clearance of and excavation of wetlands, and river crossings where the pipeline intercepts the wetlands and rivers along the pipeline route.*

Legislation	Relevance	
GNR No. 327 (7 April 2017) **Listing Notice 1.**	**Listed Activity 19:** 'The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 5 cubic metres from- (i)A watercourse, (ii)the seashore; (iii)the littoral active zone, an estuary, or a distance of 100 metres inland of the high-water mark of the sea or an estuary.	***Applicability:*** ***Olifantspoort Scheme:*** *Construction of approximately 86km between Olifants River and Krugersburg, will involve river and stream crossings.* *The Olifantspoort Bulk Water Supply Scheme will require:* *The upgrading of Olifantspoort weir and raw water abstraction works at Olifants river;* *Construction of approximately 28.3km (1500mmø) rising main from Olifantspoort WTW (PS1) to Specon will involve double river crossings at Chunies river;* *Construction of approximately 23.6km (1500mmø) main from Specon to Witkos Reservoir will involve a river crossing at Chunies river.* *These will result in excavation, infilling and deposition within watercourses, as the bulk water supply pipeline will traverse Chunies river.* ***Ebenezer Scheme:*** *Construction of approximately 13.5km between Ebenezer Dam/Pumpstation to Mokweng/Mokweng Reservoirs will involve river crossing.* *The Ebenezer Bulk Water Supply Scheme will require:* *The construction of approximately11km(900mmø) new pumping main with a pumping rate of (1250ℓ/s) from Ebenezer high-lift pump station to Rustfontein reservoirs complex, will involve in river crossing at*

Legislation	Relevance	
		Greater Letaba River next to Ebenezer pumpstation. *This will result in excavation, infilling and deposition within watercourse, as the bulk water supply pipeline will traverse at Greater Letaba*
GNR No. 327 (7 April 2017) **Listing Notice 1.**	**Listed Activity 45:** 'The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure- (i)has an internal diameter of 0.36 metres or more; or (ii)has a peak throughput of 120 litres per second or more.'	***Applicability:*** ***Olifantspoort Scheme:*** *Construction of approximately 86km between Olifants River and Krugersburg, will require:* *Duplicate/dualisation of approximately 28.3km (800mmø) existing main by adding another (1500mmø) rising main from Olifantspoort WTW (PS1) to Specon;* *Duplicate/dualisation of approximately 23.6km (790mmø) existing main by adding another (1500mmø) main from Specon to PS2, and from PS2 Witkos Reservoir;* *Duplicate/dualisation of approximately 14.6km (740mmø) existing main by adding another(1200mmø) main from Witkos Reservoir to PS3 and Palmietfontein Reservoir.*
GNR No. 325 (7 April 2017) **Listing Notice 2**	**Activities under Listing Notice 2 that are relevant to this project are as follows;**	
	Listed Activity 11: 'The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following — (i) water catchments; (ii) water treatment works; or (iii) impoundments; excluding treatment works where water is to be treated for drinking purposes.'	***Applicability:*** ***Olifantspoort Scheme:*** *Construction of 350 (1500mmø) raw water main from Olifants River abstraction to off-stream storage dam, where more than 50 000m^3 /day of raw water will be transferred from Olifantspoort River to*

Legislation	Relevance	
		an off- stream storage dam within Koppieskraal, Portion 0. Farm No. 475
	Listed Activity 15: 'The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.'	***Applicability:*** ***Olifantspoort Scheme:*** *The Construction of 200 000m^2 Olifantspoort off-channel storage dam, will results in clearance of 20ha of indigenous vegetation, within Koppieskraal, Portion 0. Farm No. 475.*
	Listed Activity 16: 'The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the highwater mark of the dam covers an area of 10 hectares or more.'	***Applicability:*** ***Olifantspoort Scheme:*** *Construction of Off-stream dam will involve four earth embankment walls with the highest at 20m above NGL, which therefore exceed 5m in height, and the highwater mark of the dam will covers an area of approximately 200 000m^2, which is more than 10 hectares, within Koppieskraal, Portion 0. Farm No. 475*
GNR No. 324 (7 April 2017) **Listing Notice 3**	Activities under Listing Notice 3 that are relevant to this project are as follows;	
	Listed Activity 12: 'The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. <u>e. Limpopo</u> i.Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in	***Applicability:*** ***Olifantspoort Scheme:*** *The Construction of 200 000m^2 Olifantspoort off-channel storage dam, will results in clearance of more than 1ha of indigenous vegetation within CBA1 at Koppieskraal, Portion 0. Farm No. 475.* *The Olifantspoort Scheme has a total of approximately 25.1km of pipeline route which traverse the CBA. For this scheme, the construction for the purpose of laying the pipeline will involve clearance of 4m wide*

Legislation	Relevance	
	the National Spatial Biodiversity Assessment 2004; i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	*construction corridors for an area extent for pipeline route. This will result in clearance of approximately 100 400m^2 vegetation within the CBAs as a result of construction corridor, as described below.* *The first 3.8km portion of 28.3km (1500mmø) rising main from Olifantspoort WTW (PS1) to Specon traverse CAB1.* *The first 1.6km portion, of 23.6km (1500mmø) main from Specon to Witkos Reservoir traverse CBA1. Whilst the middle portion of 8.2km traverse the CBA2.* *The last 5.2km portion of 8.5km (1200mmø) pumping main from Palmietfontein Reservoirs to OSA164 traverse CBA1.* *The first 4km portion, and last 2.3km portion of 11km (1200mmø) gravity main) from OSA 164 to Krugersburg reservoirs traverse CBA1.* *The first 4km portion of 11km (1200mmø) gravity main) from OSA 164 to Krugersburg reservoirs traverse the Protected Area (Polokwane Nature Reserve)* ***Ebenezer Scheme:*** *The first 200m and further 500m portion, and middle 3.4km portion of 11km (900mmø) pumping main from Ebenezer high-lift pump station to Rustfontein reservoirs complex traverse CBA1.* *The Ebenezer Scheme has a total of approximately 5.4km of pipeline route*

Legislation	Relevance	
		which traverse the CBA. For this scheme, the construction for the purpose of laying the pipeline will involve clearance of 4m wide construction corridors for the entire length of the pipeline route. This will result in clearance of approximately 21600m^2 vegetation within the CBAs as a result of construction activitiesr.
GNR No. 324 (7 April 2017) **Listing Notice 3**	**Listed Activity 14:** 'The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a)within a watercourse; (b)in front of a development setback; or (c)if no development setback has been adopted, within 32metres of a watercourse, measured from the edge of a watercourse; <u>e. Limpopo</u> i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;'	***Applicability:*** ***Olifantspoort Scheme:*** *The upgrading of Olifantspoort weir and raw water abstraction works, will take place within Olifants river which is in CBA1 at Olifantspoort abstraction.*
National Water Act (Act No. 36 of 1998)	➢ Chapter 3 – Protection of water resources. ➢ Section 19 – Prevention and remedying effects of pollution. ➢ Section 20 – Control of emergency incidents. ➢ Chapter 4 – Water use. ➢ Authority – Department of Water and Sanitation (DWS).	
NEMAa, 1998 - GN R982 of 4 December 2014 -	➢ Regulation 1 and 2: Interpretation, Purpose and Commencement of Regulations) ➢ Regulation 3: Timeframes) ➢ Regulation 4: Decision on Applicant and Notification to I&AP's	

Legislation	Relevance
Environmental Impact Assessment Regulations, 2014	➢ Regulation 5 and 6: General Requirements for Applications ➢ Regulation 7, 8 and 9: Consultations between Competent Authority and other relevant State Departments ➢ Regulation 10 and 11: Competent Authority - Right of access to information ➢ Regulation 12, 13 and 14: EAP's and Specialists' Appointments and Conditions ➢ Regulation 15: Assessment Process to be followed ➢ Regulation 16, 17 and 18: Requirements applicable to the EA Application ➢ Regulation 19 and 20: Basic Assessment Report submitted to Competent Authority ➢ Regulation 21, 22, 23 and 24: S&EIR submission to Competent Authority ➢ Regulation 25 and 26: Issue and Content of an Environmental Authorisation ➢ Regulation 31, 32 and 33: Amendment of Environmental Authorisation ➢ Regulation 34: Audits on EA's, EMPr's and Closure Plans ➢ Regulation 36 and 37: Amendments to an EMPr and Closure Plan ➢ Regulation 38: Suspension and Withdrawal of Environmental Authorisation ➢ Regulation 39, 40, 41, 42, 43 and 44: Public Participation ➢ Regulation 45, 46 and 47: General Matters ➢ Regulation 48: Offences
National Environmental Management Air Quality Act (Act No. 39 of 2004)	➢ NEM: AQA (Act No.39 of 2004). ➢ Air quality management ➢ Section 32 – Dust control. ➢ Section 34 – Noise control. ➢ Authority – DFFE
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	➢ Section 43-48: Biodiversity Management Plans (Ecosystems, Indigenous Species or Migratory Species) ➢ Section 51-55: Threatened or Protected Ecosystems and Threatening Processes ➢ Section 56-58: Threatened or Protected Species ➢ Section 64-67 and 69: Alien Species Posing a potential threat to Biodiversity ➢ Section 70 and 77: Invasive Species posing a potential threat to Biodiversity (➢ Section 101 and 102: Offences and Penalties Authority – DFFE.
Occupational Health & Safety Act (Act No. 85 of 1993)	➢ Provisions for Occupational Health & Safety Regulation 9A and 14: Hazardous Chemicals Substances ➢ Regulation 10 and 15: Disposal of HCS Waste ➢ Authority – Department of Labour.
National Heritage	➢ Section 34 – protection of structures older than 60 years. ➢ Section 35 – protection of heritage resources.

Legislation	Relevance
Resources Act (Act No. 25 of 1999)	➢ Section 36 – protection of graves and burial grounds. Section 51: Offences and Penalties ➢ Authority – Provincial Heritage Agency : Limpopo
National Road Traffic Act 1996 (Act No. 96 of 1996)	➢ Section 51: Waste on Or Near National Road ➢ Authority – Limpopo Department of Transport and community safety
Environment Conservation Act (Act 73 Of 1989)	Section 29: Offences and Penalties Section 31A: Damage to Environment
Promotion of Access to Information Act, 2000 (Act No 2 of 2000)	➢ Section 11 and 12: Access to Records of Public Bodies ➢ Section 50: Access to Record of Private Bodies ➢ Section 51: Publication and Availability of Certain Records ➢ Section 70: Mandatory Disclosure by Public/Private Bodies
Water Services Act, 1997 (Act No. 108 of 1997)	➢ Section 3:Right of Access to Basic Water Supply and Sanitation ➢ Section 9: National Standards on Provision or Water Services ➢ Section 11: Duty to Provide Access to Water Services ➢ Section 12-18: Water Services Development Plans ➢ Section 27: Monitoring of Water Services Provided ➢ Section 77: Transferability of Servitudes
Hazardous Substances Act, 1973 (Act No. 15 of 1973)	➢ Section 2-3: Grouped Hazardous Substances ➢ Group I – Hazardous Substances (GN R 452 Of 25 March 1977 and GN 801 Of 31 July 2009) ➢ Group II Hazardous Substances (GN R1382 Of 12 August 1994) ➢ Group III Hazardous Substances (GN R1302 Of 14 June 1991) ➢ Group IV Hazardous Substances (GN R247 of 26 February 1993) ➢ Section 18 and 19: Offences and Penalties
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)	➢ Section 3 and 7: Pest Control Operators, and use of fertilizers, farm feeds, agricultural, stock remedies and sterilising plants ➢ Section 7: Sale of fertilizers, farm feeds, agricultural remedies, and stock remedies ➢ Section 7BIS: Prohibition on acquisition, disposal, sale or use of certain fertilizers, farm feeds, agricultural remedies, and stock remedies ➢ GN R181 of 7 February 2003 - Regulation Relating to the Prohibition of the Sale, Acquisition, Disposal or Use of Agricultural Remedies ➢ Containers And Labels of Agricultural and Stock Remedies
	➢ GN 98 of 11 February 2011 - Pest Control Operator Regulations

Legislation	Relevance
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	➢ Section 7-9: National Norms and Standards, Provincial Norms and Standards and Waste Service Standards ➢ Section 14 and 15: Priority Waste ➢ Section 16: Duty on Waste Holder to Implement Reasonable Measures ➢ Section 17: Reduction, Re-Use, Recycling and Recovery of Waste ➢ Section 43-59: Waste Management Licences for Listed Waste Activities or Compliance to Norms and Standards ➢ Section 21 and 22: Storage of Waste ➢ Section 23 and 24: Waste Collection needs to be Authorised by the Municipality ➢ Section 25: Waste Transportation ➢ Section 26: Unauthorised Disposal of Waste and Protection of Environment ➢ Section 25: Protection of Environment at Private Land ➢ Section 35-41: Contaminated Land ➢ Section 67 and 68: Offences and Penalties ➢ Regulation 4: Waste Classification ➢ Regulation 5: Safety Data Sheets for Hazardous Waste ➢ Regulation 6: General Obligations on Waste Generators, Transporters And Managers ➢ Regulation 7: Waste Treatment ➢ Regulations 8: Waste Assessment - Waste Disposal to Landfill - Obligations on Generators and Managers ➢ Regulation 9:Waste Management Activities that do not require a Waste Management Licence ➢ Regulation 10: Records on Waste Generation and Management
Advertising on Roads and Ribbon Development Act, 1940 (Act No. 21 of 1940)	➢ Section 8: Articles Or Materials On Or Near Public Roads
Health Act, 1977 (Act No. 63 of 1977)	➢ Section 20: Waste Being a Threat to Human Health
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	➢ Section 5: Prohibition on the Spreading of Weeds ➢ Section 8 and 9: Soil Conservation Schemes ➢ Regulation 8: Managing the Flow Pattern of Run-off Water ➢ Regulation 12: Burning of Veld, Prevention and Control of Veld Fires ➢ Regulation 15: Weeds and Invader Plants

Legislation	Relevance
National Forests Act, 1998 (Act No. 84 of 1998)	➢ Section 7: Indigenous trees ➢ Section 12-15: Protected Trees (All Areas) ➢ Section 16: Registration in Title Deeds ➢ Section 61-64: Offences and Penalties
National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)	➢ Section 9 and 10: Fire Danger Rating ➢ Section 17-19 and 34: Firebreaks ➢ Section 24 and 25: Offences and Penalties
National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003)	➢ Section 18 and 19: Special Nature Reserves ➢ Section 23-26: Nature Reserves ➢ Section 28 and 29: Protected Environments ➢ Section 37: Management of Protected Areas ➢ Section 38-42: Management Plans in Protected Areas ➢ Section 43: Monitoring performance of Protected Areas ➢ Section 45-47: Access to Protected Areas ➢ Section 48: Restricted activities in Protected Areas ➢ Regulation 49: Regulation or Restriction of Activities in Protected Areas ➢ Section 89: Offences and Penalties

8.1 Environmental Assessment Triggered

Based on the type of activity involved and the extent and the biophysical environment within which it is set to occur as reflected in ***Table 11*** above, the required environmental assessment for the project is a Scoping and EIR process.

9 ACTIVITY MOTIVATION

The Lepelle Northen Water (SOC) is a water service board supplying three regions in Limpopo Province, namely: Capricorn, Mopani, and Sekhukhune Region. The upgrades will only affect the water schemes within Capricorn and Mopani Regions, namely: Olifantspoort and Ebenezer Water Supply Schemes (WSS).

The Olifantspoort and Ebenezer WSS have become an integrated scheme, as they both supply similar regions and also supply the Greater Polokwane Municipal which is highly populated and a strategic economic hub for Limpopo Province. Therefore, Lepelle Northern Water (LNW) has identified components of the project for advance implementation to secure

Polokwane's current water needs. The proposed upgrading components form phase 1 for this broader scheme upgrade.

9.1 The need

The City of Polokwane and its surrounding towns and neighbouring communities are in the midst of a severe water crisis. Water supplies to Polokwane have been severely constrained for over a decade, affecting the reliability of water services for human consumption and economic development of the area. The water crisis emanates from an apparent aging infrastructure, which requires upgrades at the Olifantspoort and Ebenezer WSS to meet the growing water demand. The damage to infrastructure due aging and lack of maintenance has caused less water yield at the major water reservoirs, which have been at 0% for several days, leaving the residents of the Polokwane Local Municipality and neighbouring communities dependent on water tankers.

9.2 Desirability

As discussed from the previous section, in response to the growing urgency to secure adequate and sustainable bulk water supplies required to address the current water shortages and long-term demands, Lepelle Northern Water's implementation of phase 1 upgrades, will enable an additional 40Mℓ/day to be augmented to Polokwane City (25Mℓ/day from Olifantspoort and 15Mℓ/day from Ebenezer). When these argumentations are integrated with other phases there will be a replenishment of reservoirs, which will then provide the City of Polokwane and surrounding communities with adequate water supply designed for 20-year plan projection, at least up to 2042.

Apart from improved water supply, one of the deliverables for water infrastructure projects are jobs creation and stimulation of the local economy. Therefore, the inclusion of local labour during the construction period will create the much-needed temporary employment opportunities and transfer of skills to local community, as well as support local supply chains and businesses.

10 ALTERNATIVES

The DFFE provides guidelines on the assessment of alternatives, to which the impact assessment must be considered. Regulations indicate that any alternatives considered in an assessment process must be reasonable and feasible. Additionally, I&APs must be afforded an opportunity to provide inputs into the process of formulating alternatives. Once a full range of potential alternatives have been identified, the reasonable and feasible alternatives should be formulated as activity alternatives for further consideration during the basic assessment or scoping and EIA process (DEAT,2004a; DEAT, 2006). These alternatives are: location (site), activity (project), site layout, design, scale, routing, scheduling, process, demand, input, technology, and no-go options.

It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the applicant and the appointed EAP, which in some instances culminates in a single preferred project proposal (DEAT, 2006).

After weighing all project alternatives for this project (Discrete Alternative Approach), the preferred "Alternative A: Routing Alternative, Alternative B: Design Alternative, Alternative C: Technology Alternative, and Alternative D: Location Alternative" were adopted as alternatives that will meet the stated need for and purpose of the project, by providing proper mitigation measures, as discussed below.

10.1 Alternative A (Routing Alternatives)

In the linear project activities, the 'Routing Alternatives' are employed through route investigations, also various corridors are investigated and compared in terms of their impacts (DEAT,2004a). The 'Routing alternatives' for this project, involve looking at the impact likelihood and providing engineering design and suitable routes to mitigate those impacts.

The 'Routing Alternatives' propose that the new pipeline upgrades run parallel to the existing pipeline. This 'Routing Alternative' also proposes a few deviations where the pipeline will intercept with sensitive biophysical environment, existing infrastructure, and heritage resources.

As a result, the proposed diversions for ***Olifantspoort Scheme*** pumping mains will be:

- Bypassing the two offtakes from the existing pipeline supplying Mphahlele RWS. In this 0.0 to 7.0 km section at about 200m downstream of PS1 the new 1500mmø pipeline will branch off from the existing 800mmø pumping main for about 7km, as existing pipeline crosses through a hilly and rocky terrain, thus require establishment of access road for maintenance. Therefore, in order to facilitate pipeline maintenance and repairs this section of the new pipeline will be diverted to enable construction of a service road along the pipeline servitude.
- A 7.1km bypass pipeline forming a diversion at 22.0 to 28.1 km section between PS1 and before terminating at the Specon reservoir. This diversion is meant to avoid intrusion into residential development in Lebowakgomo S, which encroached over the existing pipeline servitude.
- There will also be another diversion along Chuniespoort Dam, as the existing pumping main crosses through the dam's basin. The new pipeline will be placed further to dam's basin along the R37 road reserve.

These diversions will take place on pipeline sections between PS1 to Specon reservoirs.

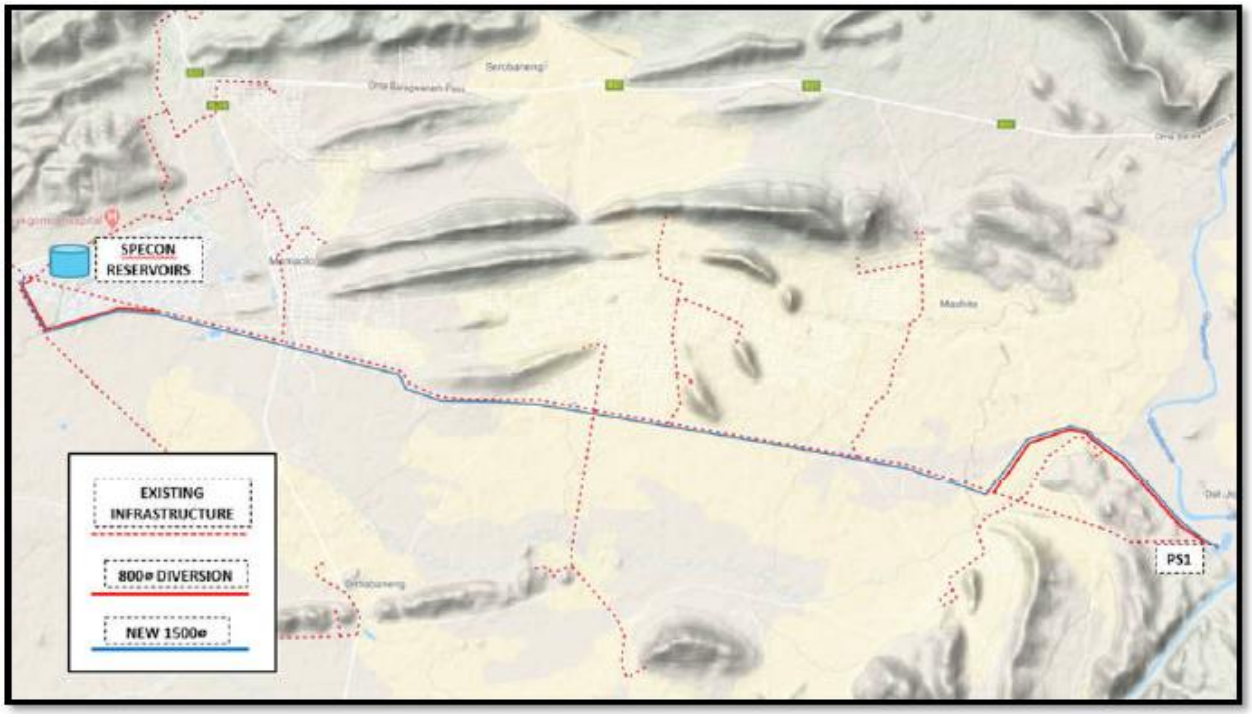

Figure 6: Diversion between PS1 and Specon (Routing Alternative)

Figure 7: Diversion along Lebowakgomo S.

Proposed diversions for ***Ebenezer Scheme*** pumping main will include construction of three new diversions of the existing pipeline:

- The 2.3 km long diversion to bypass the 2.0 to 4.0 km from Ebenezer pumpstation section of the pipeline running in close proximity to the water edge along the dam's basin, whereas the new pipeline will be constructed along the existing road reserve.
- The 2km of existing pipeline, between 4.0 to 6.0 km from Ebenezer pumpstation section of pipeline crosses through the middle of the farmland and near a farm dam, and difficult terrain. Therefore, the diversion for this section of the new pipeline will follow along the existing road reserve.
- The 1.3 km long diversion between 6.0 to 8.0 km section of pipeline, will be necessary to avoid the environmentally sensitive endangered grassland area (Woodbush Granite Grassland), and Haenertsburg cemetery. In this section the new pipeline will run along the road reserve for timber forest servitude.

These deviations will be in sections of pumping main between Ebenezer Pumpstation to Rustfontein reservoirs.

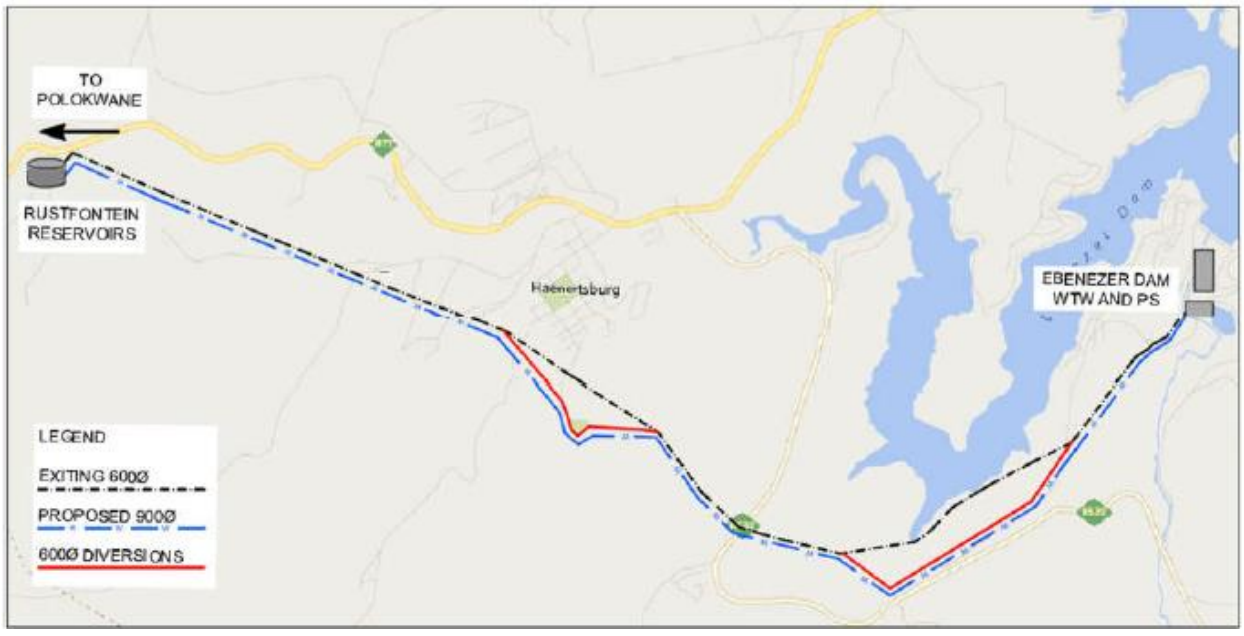

Figure 8: Ebenezer WSS Diversion (Routing Alternative)

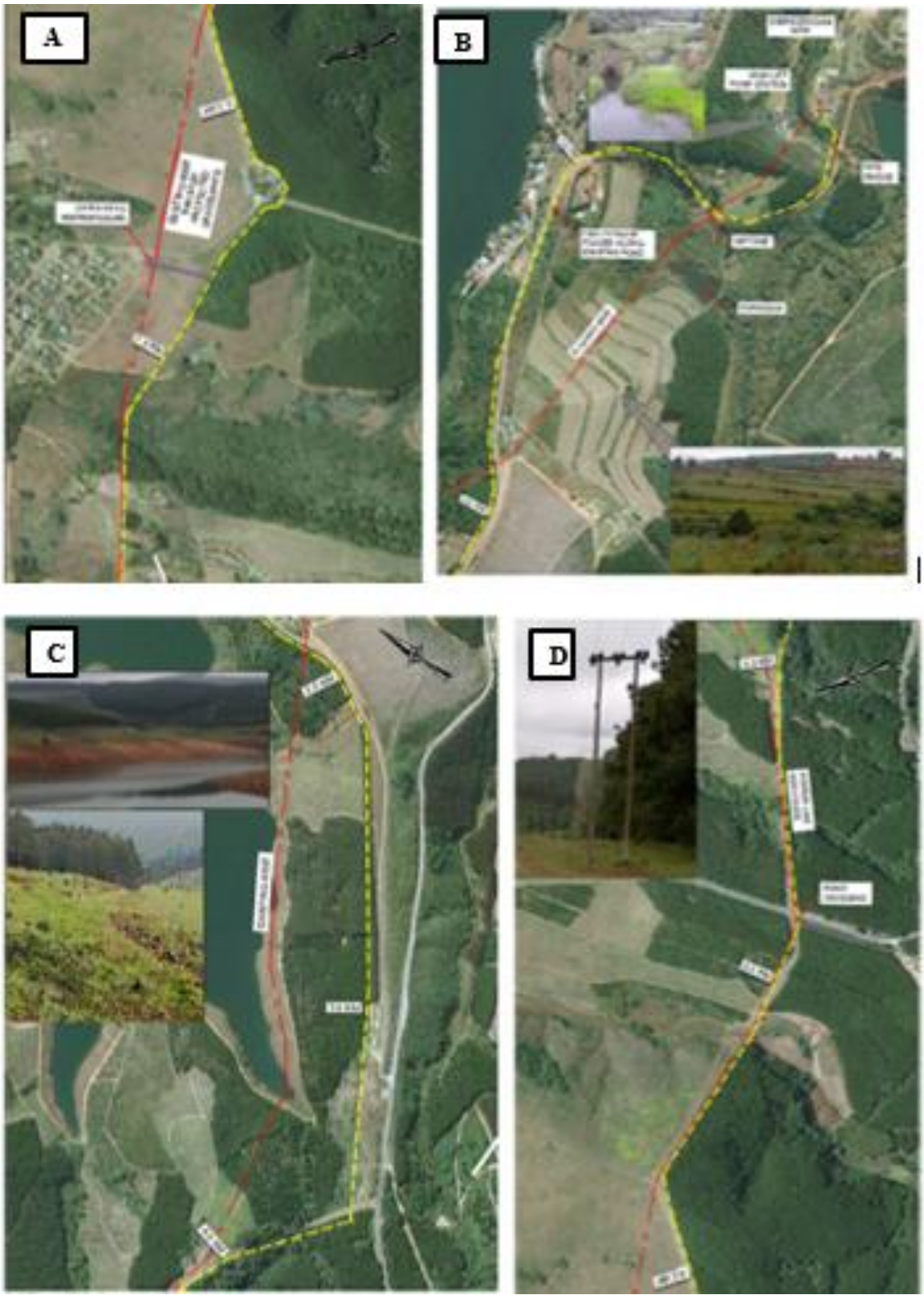

Figure 9: Ebenezer WSS Diversion sections

***Notes**: A & D = Deviation at endangered grassland area, and Haenertsburg cemetery; B = Deviation at farmland and near a farm dam; C = Deviation along the dam's basin.*

The ‘Routing Alternative’ cannot be taken in isolation but will require strict adherence to integration of the ‘Design Alternative’ which is discussed below.

10.2 Alternative B (Design Alternative)

The design alternatives form an integral part of the project proposal and becomes a part of the project description and need not be evaluated as separate alternatives (DEAT, 2004a). This ‘Design Alternative’ is in line with project design criteria described in S***ection 4***. Therefore, this section provides for a project design for conveyance and storage infrastructure as previously described.

10.2.1 Design for conveyance infrastructure

In order to mitigate environmental impacts associated with the proposed bulk conveyance infrastructure for this project, on most occasions the pipeline will constructed along the road reserves and parallel to existing pipelines.

The project design for conveyance infrastructure also provides for consideration for offtakes from PS1, Specon reservoirs, PS2, PS3 ,Witkos reservoirs, Palmietfontein reservoirs and Krugersburg reservoirs, including the deviations as discussed (***Section 10.1***) above.

The water conveyance will have seven (7) river crossings. The design for river crossings differs based on in-sutu conditions. At Great Letaba River from the pipeline section of Ebenezer Pumpstation to Rustfontein reservoirs, the river crossing the gantry to hook the pipe over the Groot Letaba River is proposed as an alternative of crossing under the river to limit environmental impact and potential risks associated with flooding during the construction. Whereas the other remaining six (6) river crossings at Chunies River with be underlaid in riverbed and overlain by the plum concrete to prevent the in-sutu eroding and damage to infrastructure as a result of exposed pipeline.

In order to mitigate identified environmental impacts on the pipeline around the Chuniespoort Pass, up 8.3 km from Specon, the new pipeline will be joined to the existing 1200mmø which is suspended by concrete plights along 1.5 km section of pumping main, which was originally designed to accommodate the future upgrading of the conveyance capacity along the pipeline

route crossing through Chuniespoort Pass. This will be done to avoid tunnelling or pipe jacking through the steep topography and rocky ground terrain, combined with the restricted area available for the construction of a new parallel pipeline, at this section of pipeline route.

The design along the road reserve and for road crossing will be done in accordance with DoT standard. These designs will be requirements to secure wayleave with regards to: Pipeline situated within the road reserve. specifications and requirements for pipe crossings underneath the roads, which will be constructed by means of pipe jacking. specification, requirements, and preferences with regards to access roads to the respective roads.

10.2.2 Design for abstraction works and OCSD

a) Design for upgrading of weir

The weir will be raised by 2.8 meters, to an elevation of 741.8 mASL, and will therefore also need to be extended on the right bank of the river. The left end of the weir will be raised up against the existing abstraction works and will therefore not need to be extended as required for the right side. The weir will be raised through the use of mass concrete which will be dowelled into the existing wall in order to achieve the required wall level.

In order to limiting the length of the weir extension, the weir extension will form a dogleg of 130° bend from the existing weir structure and will be aimed at a rock outcrop towards approximately south of the right end of the weir wall. This will also help to ensure that no water reaches the valley situated on the right of the river during major or minor floods and could result in inundation of upstream weir (see figure below). Therefore, an investigation between the end of the exposed weir wall and the valve chamber will inform the design.

Figure 10: Upgrading of weir design

b) Off-Channel Storage Dam

The design for OCSD will premise on the following four options:

- ***Option 1:*** *Rubble Masonry Concrete Dam*- The possible design for the multiple arch buttress structure proposed for the Olifantspoort OCSD will be based loosely on various structures previously constructed in South Africa and all construction proposed has been successfully previously applied elsewhere.

  The general layout of the dam structure has been proportioned and aligned to best fit the site topography while ensuring an economical solution with adequate and efficient structural performance. The arches are designed with an intrados radius of 14 m, an arch aperture of 140^0 and a structural thickness of 1.8 m. The buttresses will be 3 m in width, with a flaring towards the upstream end to provide increased hydraulic discharge capacity over the arches, and will indicate a downstream slope of 0.8 H:1 V. The arches and buttresses will be provided with 2.5 m high footings, protruding 0.3 m downstream and 1.5 m upstream. Simple gravity structures are utilised at the abutments.

- ***Option 2:*** *Concrete Faced Rockfill Dam*- Has advantages such as use of local materials, simple construction methods, shorter construction duration and lower cost. A concrete facing dam will be placed on the upstream face of the CFRD. This will be supported by a reinforced concrete plinth to be constructed on groutable bedrock along the upstream toe of the dam. The crest width will be 6 m. The upstream and downstream slopes were accepted to be 1.4 H: 1 V. Extruded kerbs from low-grade concrete will be used to ensure a smooth surface for the reinforced concrete slab.

- ***Option 3:*** *Hardfill Dam*- Hardfill is to comprise of rock material obtained from a quarry, river sand and cement. This will require concrete batching from site or using a recycler/soil stabiliser. The main portion of the dam was configured as a symmetrical faced hardfill dam, with an integral spillway. The non-overspill crest is configured as a vertically faced structure 6 m wide and 4 m high.

- ***Option 4****: Rockfill Dam with Geomembrane*- PVC geomembranes are used to provide the water barrier in embankment dams, and as external water stop for peripheral and vertical joints in Geomembrane Facing Rockfill Dam (GFRD). The GFRD make use of a PVC membrane as impervious membrane as opposed to the reinforced concrete face.

10.3 Alternative C (Technology Alternative)

The technology to be used in the activity, refers to a consideration of the method of operation, such that an alternative includes the option of achieving the same goal by using a different method or process (DEA&DP, 2007). The project involves bulk excavation for conveyance and storage infrastructure, such as excavation for laying of bulk pipeline, excavation for upgrading and extension of water and abstraction work, as well as major excavation for founding of OCSD basin.

The technology used will vary in line with *in-sutu* geological conditions along the conveyance sections, and at OCSD location, as outlined by ***Table 12 below***.

Table 12: SANS1200D Excitability Classes (Geology and excavation technologies)

In-sutu Geological Conditions at different depth	Description of material properties/ Excavatibility and Rippability
Soft	Material that can be efficiently removed or loaded without prior ripping, by means of bulldozer, tractor-scraper, track type front end loader, back acting excavator, without the use of pneumatic tools such as paving breaker.
Intermediate	Material that can efficiently be ripped by a tractor loader backhoe (TLB) of flywheel power approximately 0.10kW per millimetre of tined bucket width and adequately ripped by a bulldozer of mass approximately 35t, fitted with a single-tine ripper suitable for heavy ripping, and of flywheel power approximately 220kW. Or use of pneumatic tools before removal by equipment to one specified above.
Hard rock	Excavation in material that cannot before removal, be efficiently ripped by a bulldozer. This type of bedrock that cannot be removed without blasting or without wedging and splitting
Boulder (Class A)	Excavation in material containing more than 40% volume boulders of size in the range of 0.03-20m^3, in matrix of soft material or smaller boulder.
Boulder (Class B)	Excavation in material containing more than 40% volume boulders of size in the range of 0.03-20m^3, in matrix of soft material or smaller boulder, and which require individual drilling and blasting in order to loaded by a tractor type front-end loader or by a by a tractor loader backhoe (TLB)/back acting excavator

The soil conditions described below provide an indication of the type of the technology to be employed in this proposed project.

10.3.1 Prominent Geological formation for conveyance route

Prominent geological formation along Ebenezer WSS route, comprises roughly northeastwardly- and northwestwardly striking diabase dyke intrusions are indicated to cut through most of the strata underlying the pipeline routes. These may give rise to the occurrence of fractured bedrock exhibiting hard rock consistency at relatively shallow depth and discontinuous lines of rounded boulders at the surface. It is possible that several other even less prominent intrusions may also be encountered in other locations along the routes.

Prominent geological formation along Olifantspoort WSS route comprise occurrence of fractured bedrock exhibiting hard rock consistency at relatively shallow depth and discontinuous lines of rounded boulders at the surface.

Given the above discussed prominent geological formation on conveyance route, it is inferred that the In-sutu Geological Conditions at different depth range from Intermediate - Boulder (Class A). Therefore, the technology to be employed for excavation of pipeline will excavators such by a tractor loader backhoe (TLB) of flywheel power approximately 0.10kW per millimetre of tined bucket width. A bulldozer of mass approximately 35t, fitted with a single-tine ripper suitable for heavy ripping, and of flywheel power approximately 220kW. On some occasions there will be blasting or wedging where the bedrock outcrop is intercepted.

10.3.2 Abstraction works and OCSD

The prominent geological formation on the OCSD section is characterised by the rock *Gabbronorite* bedrock outcrops, comprise of large *Gabbronorite* boulders, with the most extensive outcropping occurring within the central and North-Eastern portions of the site. Whereas the weir and abstraction section are characterised by intermediate but stable geological linear features along olifants river emanating from the weathered Gabbronorite bedrock within the riparian zone.

Based on above summary of prominent geological formation at abstraction and OCSD section, it is inferred that the dam basin excavations considered to be highly variable due to the presence of frequent bedrock outcrop, hence hard rock excavation from the surface, and oft to intermediate excavatibility to a depth. Therefore, technology use for excavation will vary based on *in-sutu* material at varying depth, such as heavy mechanical excavator, bulldozer of mass approximately 35t, fitted with a single-tine ripper suitable for heavy ripping, and of flywheel power approximately 220kW. On some occasions, there will be blasting or wedging where the bedrock outcrop is intercepted.

10.4 Alternative D (Site Layout Alternatives)

The site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity (DEAT, 2004a). The 'Site Layout Alternative' proposes that proposed conveyance infrastructure be streamlined and be parallel to existing pipeline route, except where diversions are required. The 'Site Layout Alternative' also considered development of conveyance infrastructure servitude along the road reserve and in areas which will provide maintenance access. This alternative is desirable as it will minimise the impact associated with establishment of pipeline on environmental sensitive areas and development of conveyance infrastructure within virgin lands.

10.4.1 Site Layout-Construction of new weir

The 'Site Layout Alternative' proposes the construction of new weir, by considering the operational and environmental aspect associated with upgrading of existing weir as described in (***Section 4.1.1 & 4.1.2***).

The proposed new abstraction works has to be placed within 100 m downstream of the existing weir. This could be considered as preferred alternative as opposed to upgrading of existing weir illustrated by (***Figure 11***)below, due to following reasons:

- The floodplain opens up wide further downstream;
- The floods are relatively high near the left bank side at the existing abstraction works and downstream, which is required for self-scour of the intake during extreme flood events;
- The flooded floodplain width is relatively narrow over the first 100 m downstream of the existing weir which will limit the required new weir length.
- The river upstream of the existing abstraction works is straight and there is no clear bend affect with secondary currents that will help the self-scour of the intake if the new abstraction works is placed upstream of the existing one at a location say 200 m upstream.
- The upstream location could also affect the flows to the existing abstraction works during construction and the site is affected by the backwater effect of the existing weir.

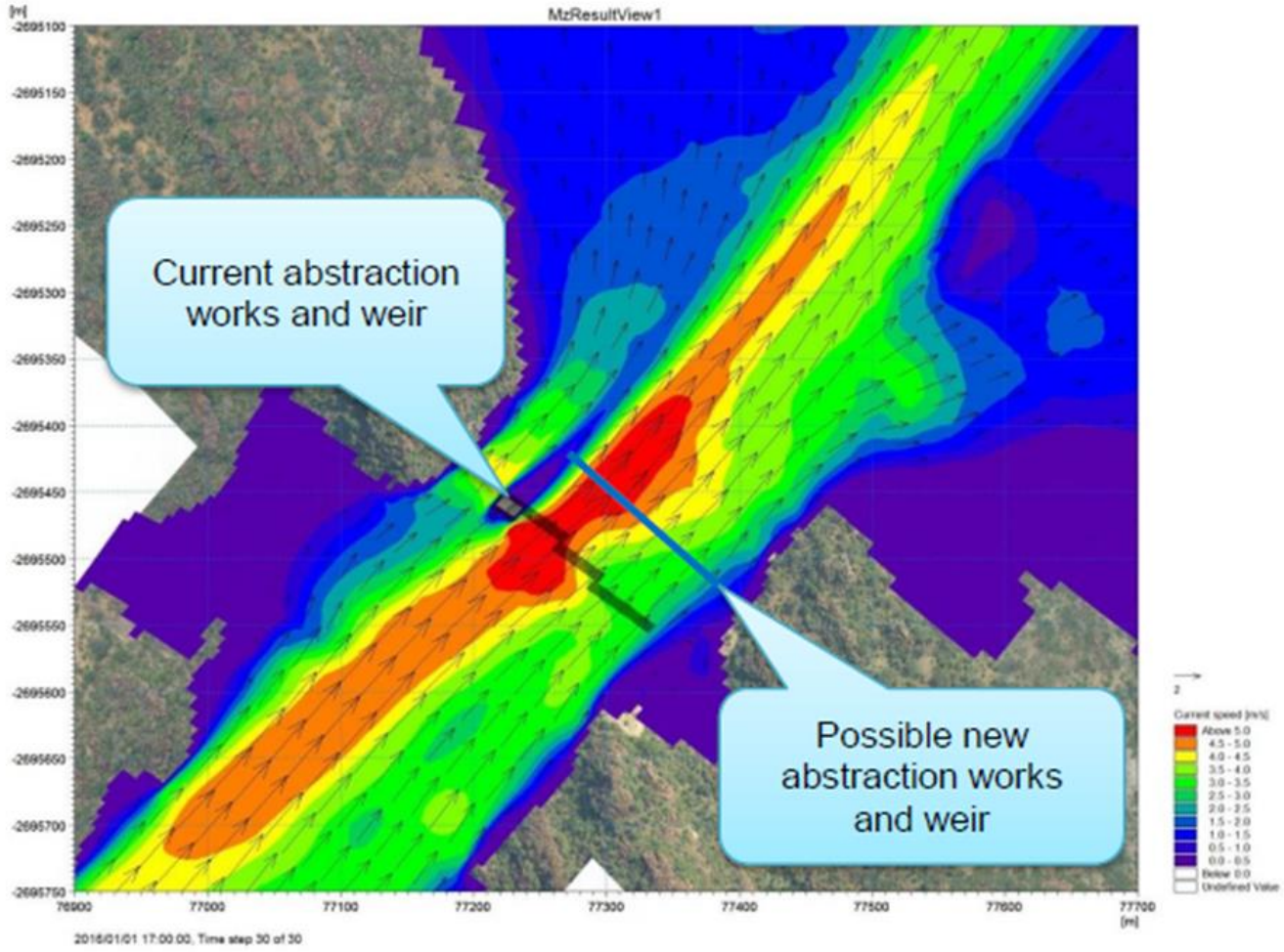

Figure 11: Abstraction Work-Simulated flow velocities at the peak of the 100-year flood

10.4.2 Site Layout OCSD

The proposed OCSD to be adjacent to the Olifantspoort abstraction and WTW (***Figure 12***). This will minimise environmental impact and will limit the construction footprint for raw water conveyance infrastructure from Olifantspoort abstraction to OCSD and further to Olifantspoort WTW.

10.5 Alternative E (Location Alternative)

The 'Location Alternative' could be considered part of site layout alternatives. The 'Location Alternative' provides for the entire proposal or for a component of a proposal, locations that are geographically quite separate, and alternative locations that are in close proximity(DEAT, 2004a).

10.5.1 OCSD Preferred Location

In this case as discussed in ***Section 10.5***, the OCSD will be highly dependent on its close proximity to the Olifantspoort abstraction and the WTW to reduce the construction footprint of raw water conveyance infrastructure between the OCSD and the above-mentioned two sites. Additionally, the OCSD in its proposed location, is highly dependent on the infrastructure and utility services developed for Olifantspoort WSS (***Figure 12***).

Lastly, the topographic and geological formation for the proposed OCSD site, highly favour the design for the dam, as discussed in ***Section 4.1.2*** design criteria.

10.5.2 New Weir Preferred location

This 'Location Alternative' proposed that the new weir location of a new weir is prescribed based on river conditions described in Section ***10.4.1*** above. Apart from that, the weir will be aligned to abstraction works with only configuration to site layout but within the similar geographical location , as the abstraction works will be placed within 100 m downstream of the existing weir (***Figure12***). This will mitigate impact, as the project footprint for raw water mains from the abstraction to OCSD and Olifantspoort WTW will remain unchanged.

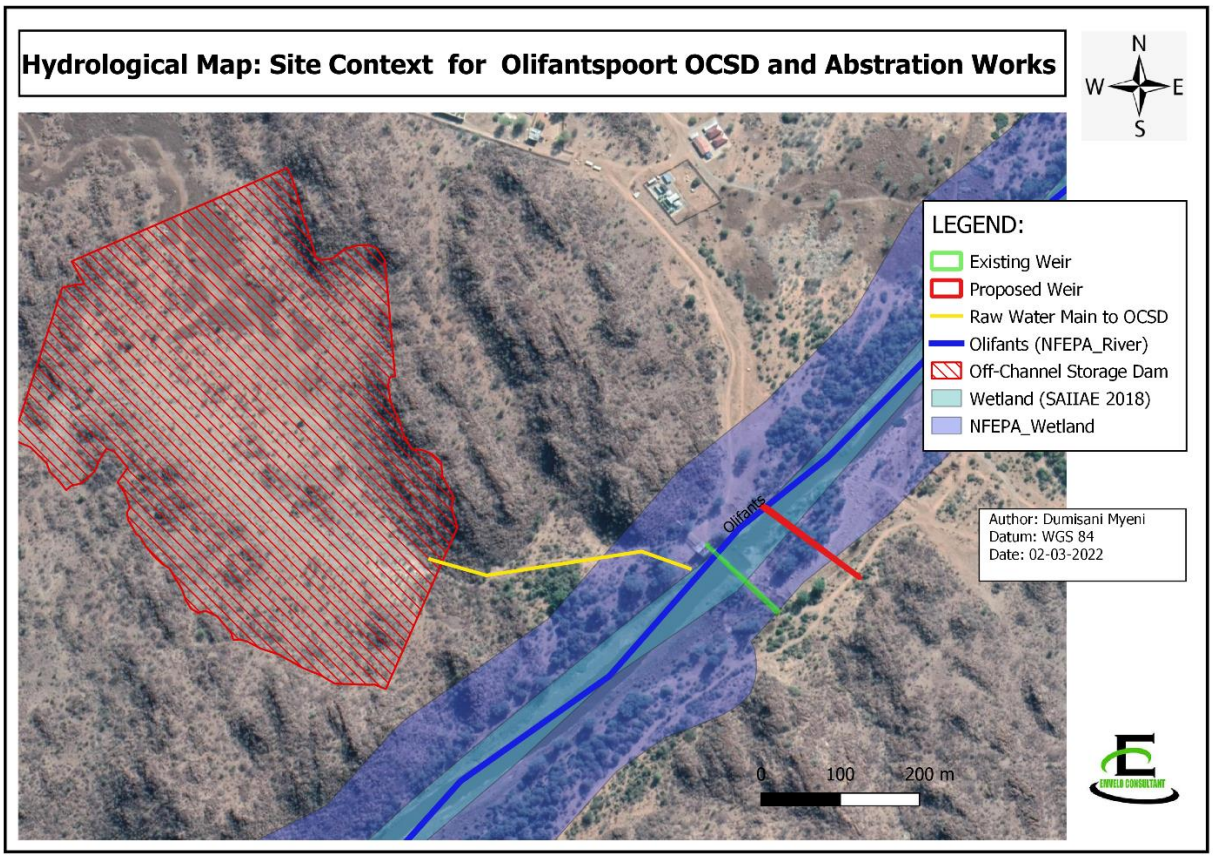

Figure 12: OCSD and Abstraction Works Site Layout.

Notwithstanding, at least three alternative sites should be considered as part of the EIA and the merits of each site evaluated against a set of environmental aspects. However, it is important to note that, a re-location of the OCSD and new proposed weir from the proposed site will have major financial and logistical implications in terms of cost benefit analysis when evaluated or ranked in terms of the feasibility of projects outside the proposed site, as well as creating undesirable impacts at another site (DEAT, 2004c).

10.6 Alternative E (No-Go Alternative)

In the absence of the proposed development, the residents of Polokwane City and surrounding communities will continue to experience disruptions, with regards to adequate water supply. It is important to note that the existing water infrastructure is ageing and no longer provides adequate water supply to meet the current water demand (Refer to Section 6.1& 6.2). It is also important to note that this infrastructure project serves to provide public good (water supply) to the affected communities mentioned. Therefore, projects that are proposed on public land

and/or for the public good should consider the major development alternatives that would meet the stated need for and purpose of the project (DEAT, 2004a).

Provision of clean drinking water is a national priority and one of the key elements of a decent standard of living for all South Africans (NPC, 2012).

The EAP is therefore of the view that the NO-GO option is undesirable in the face of social and economic needs of the Malangeni communities and South Africa's National Development Plan 2030 objectives.

10.7 Preferred Alternatives

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts (DEAT, 2004a).

With 'Alternative A: Routing Alternatives', the proposed project will have minimal environmental impact as this alternative proposes that, the proposed conveyance infrastructure run parallel to the existing pipeline. This 'Routing Alternative' also proposes few deviations where the pipeline will intercept with sensitive biophysical environment, existing infrastructure, and heritage resources., which will be consolidated with the 'Alternative B: Design Alternative'.

With 'Alternative C: Technology Alternative', the excavatibility and rippability determine the use of machinery, and due to persisting bedrocks, the preferred technology to be used will be heavy mechanical excavator, bulldozer of mass approximately 35t, fitted with a single-tine ripper suitable for heavy ripping, and of flywheel power approximately 220kW. On some occasions there will be blasting or wedging where the bedrock outcrop is intercepted.

With 'Alternative D: Location Alternatives' the proposed site for OCSD is the most preferred due to the following reasons: the topographic and geological formation for the proposed OCSD site, highly favour the design for the dam; OCSD will be highly dependent on its close proximity

to the Olifantspoort abstraction and WTW to reduce the construction footprint of raw water conveyance infrastructure between the OCSD and the above-mentioned two sites.

The above four alternatives cannot be evaluated in isolation as these are interlinked to one another.

10.8 Environmental sensitivity for potential alternatives

The qualitative sensitivity exercise for the proposed alternatives involves the use of preliminary desktop studies and an Environmental GIS assessment covering the following themes:

1) *Biophysical Environment:*

- Biodiversity (flora& fauna);
- Hydrological features (surface and ground);
- Geological stability.

2) *Social:*

- Air Quality (dust emanating from construction)
- Pollution and Waste
- Palaeontological, archaeological, cultural and heritage
- Noise pollution

Table 13 provides a description of the various categories used in the environmental sensitivity exercise. This table should be read in conjunction with ***Section 11***) below. The five categories of sensitivities are outlined by the legend below.

LEGEND:

Sensitivity Significance	Colour Code
Low	L
Low-Medium	L
Medium	M
Medium-High	MH
High	H

Table 13: Description of the various sensitivity categories

Study Component	Category	Description
Biophysical Components		
Biodiversity (flora & fauna);	High Sensitivity	The construction will result in vegetation clearance for construction of water conveyance and storage infrastructure. Moreover, the project also traverses across 'Critical Endangered' Grassland and other 'Least threatened' flora. Some portions of water conveyance and storage infrastructure upgrades will take place within CBA1 areas. The preliminary desktop studies for fauna availability identify the following attributes within the region: o Availability of endemic species within the study region o Availability of vulnerable species within the study region The environmental screening tool identified the Terrestrial Biodiversity Theme, as very high.
Hydrological features (surface and ground water)	High Sensitivity	The hydrological features include an assessment if the site is located on or near a watercourse (wetland, river, stream, lake, dam). Potential impacts on hydrological features caused by the construction at the Olifantspoort abstraction works for the proposed construction of a new weir or upgrading of existing weir, and upgrading of abstraction mains within Olifants River, will have negative impact on the river's hydrology from in-sutu riparian zone and downstream watercourses. This will result in riparian incision, banks inundation, stream flow reduction, and downstream pollution.

Study Component	Category	Description
		Some parts of the water conveyance traverse NFEPA wetlands.
Geology	High Sensitivity	•The impacts related to the construction-related earthworks • Incision and cut slopes •The loss of available topsoil, due to site clearance
Social		
Air Quality	Low-Medium Sensitivity	Certain activities during construction could have impact on air quality as a result dust and emissions from construction activities and machinery.
Pollution and Waste	Low-Medium	Waste emanating from construction activities
Social (including visual and noise)	Low Sensitivity	The social aspects of visual and noise includes a combination of the following impacts: o There is negligible visual impact, as the water infrastructure upgrade will be concentrated within the existing water infrastructure. o The noise generated during construction
Palaeontological, archaeological, cultural and heritage;	Medium-High	Possibility of removal or destruction of archaeological and/or paleontological sites or artifacts

11 DESCRIPTION OF BASELINE ENVIRONMENT

This section provides a general description of the status quo of the receiving environment in the project area. This serves to provide the context of the environmental aspects within the project region and site. It is most important to note that the description of a receiving environment forms an integral part of the environmental assessment tool that guides the identification of sensitive environmental features and possible receptors of the effects of the project.

11.1 Climate

The Southern African region is divided into three climatic regions: Wet, dry, and moderate regions. Limpopo Province encompasses: the Hot semi-arid climate (*BSh*); Humid subtropical climate (Cfa); Humid subtropical climate (*Cwa*); Oceanic climate (*Cfb*); Hot desert climates

(*BWh*); and Cold semi-arid climates (BSk), with categories classified by the Köppen-Geiger system (Climate-Data.org).

The climate region of this study is referenced to Polokwane and Tzaneen climatic region. The climate of the study region as classified by the Köppen-Geiger system is categorised as follows: Polokwane (*Cwb),* and Tzaneen (*Cwa*).

Tzaneen region has a warm and temperate climate with an average annual temperature of 18.0 °C and the annual precipitation of 661mm. Most rain is experienced during the summer months (December-February).

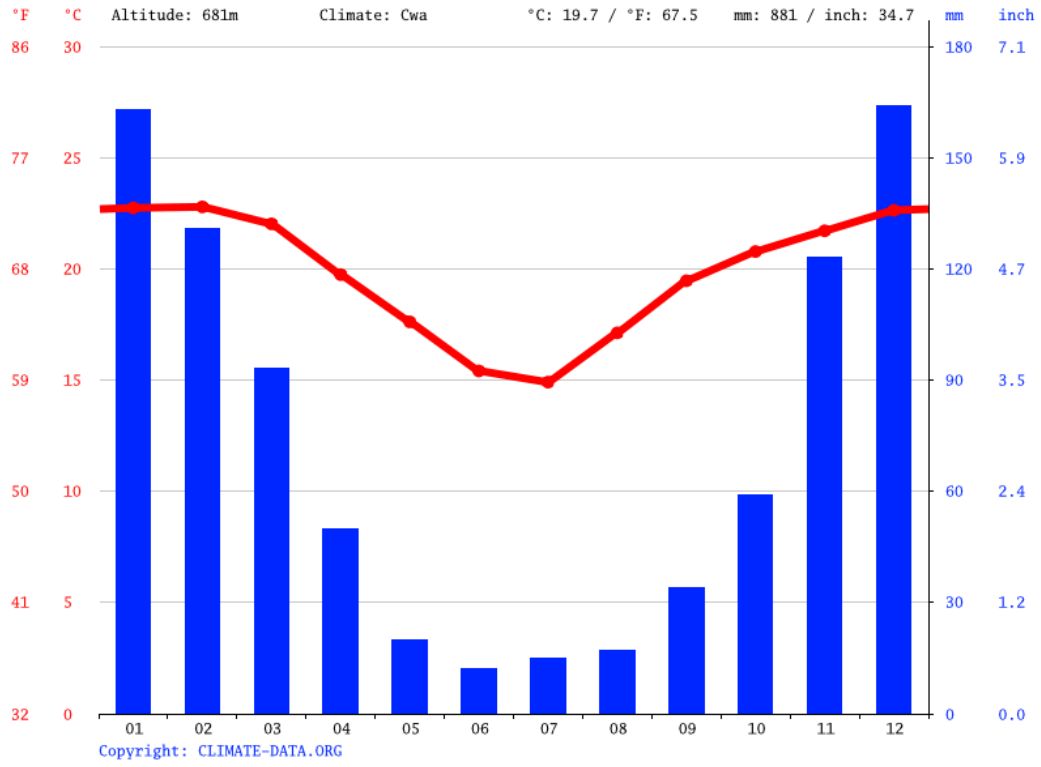

Figure 13: Tzaneen climate graph over a 12-month period [Source: Climate-Data.Org]

Tzaneen region has a warm and temperate climate, with an average annual temperature of 19.7 °C and annual precipitation of 881 mm, mostly received during the summer months (December-February).

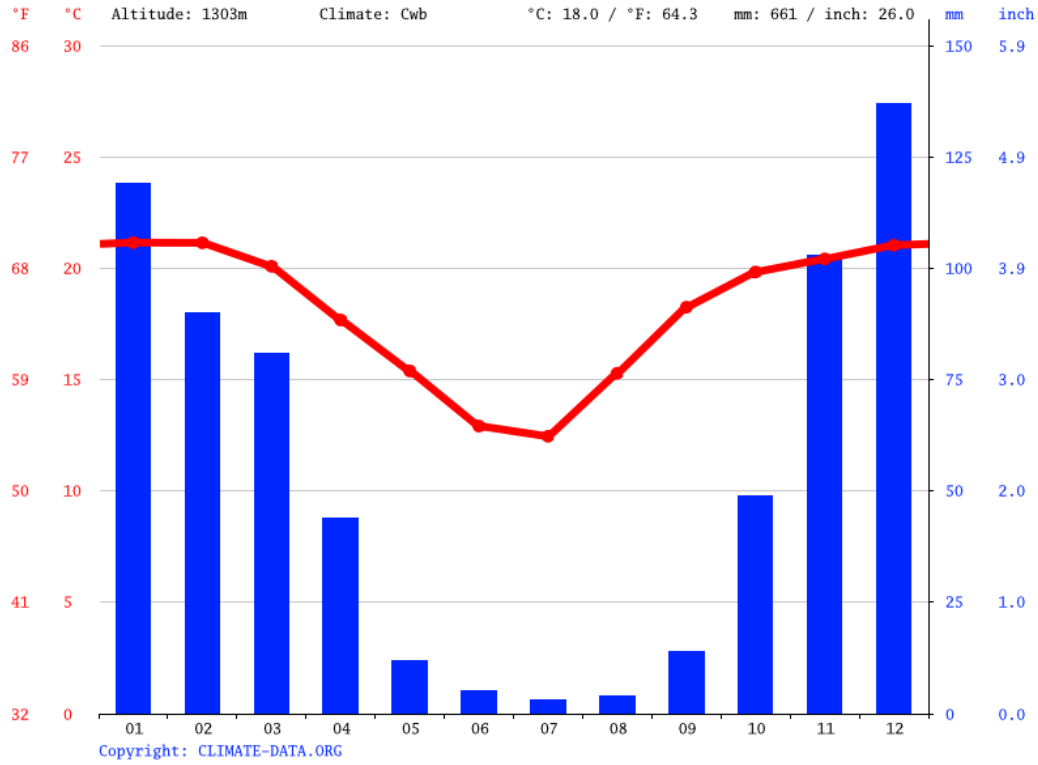

Figure 14: Polokwane climate graph over a 12-month period [Source: Climate-Data.Org]

Environmental factors to be taken into consideration with regard to the region's climatic trends, is that the construction of a weir within Olifants River need to take place during the low-flow condition season. Given the above-mentioned climatic trajectory (***Figure 13 & 14***), it is inferred that construction within the watercourse and the riparian zone, will have minimal impact on the hydrological and geological elements when conducted during April to November.

11.1.1 Potential impact

The projects it itself has no direct impact with regard to climate but will be influenced by the regional climatic conditions, as discussed above.

The measures to minimise the impact of the project, as influenced by the climatic conditions, will be assessed further in the EIA phase, through the Hydrological Impact Assessment, Aquatic Ecological Impact Assessment and the EMPr.

11.2 Hydrology

The hydrological system comprises an interlinked system of ecosystems such as the headwaters of a river catchment, rivers and wetlands downstream, lakes, groundwater, estuaries, and the marine environment.

The freshwater ecosystem within the Capricorn District, and Mopani District comprise diverse rivers and wetlands (***Figure 15***), as discussed below.

The project footprint is located along the B52E, B52D, B52A, B52C, and B81A Quaternary Catchments under the Olifants Water Management Area.

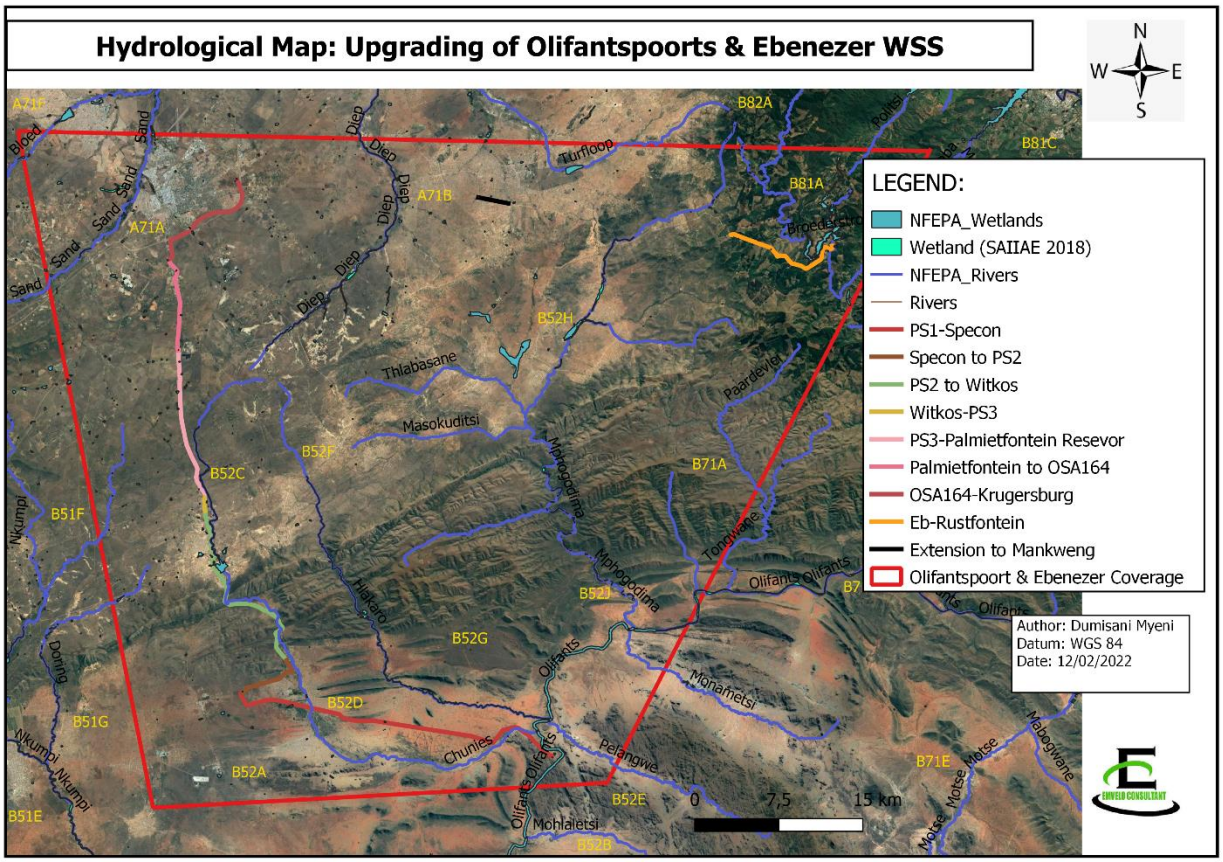

Figure 15: Hydrological Map (Upgrading of Olifantspoort & Ebenezer WSS)

11.2.1 Rivers (Olifantspoort Scheme)

The Olifantspoort WSS falls under the Capricorn District which has a distribution of the National Freshwater Ecosystem Priority Areas (NFEPA) catchments including River FEPAs (LEDET, 2019). The study area for Olifantspoort Scheme, includes the Olifants River forming a boundary and abstraction point, as well as traverses the Chunies Rivers. All these watercourses are free flowing rivers except for Chunies River. However, all of these rivers are classified as NFEPA rivers. (***Figure 15***).

The site hydrological context of Olifantspoort WSS (***Figure 16***) indicate that the existing weir and proposed new weir falls with a NFEPA River (Olifants River).

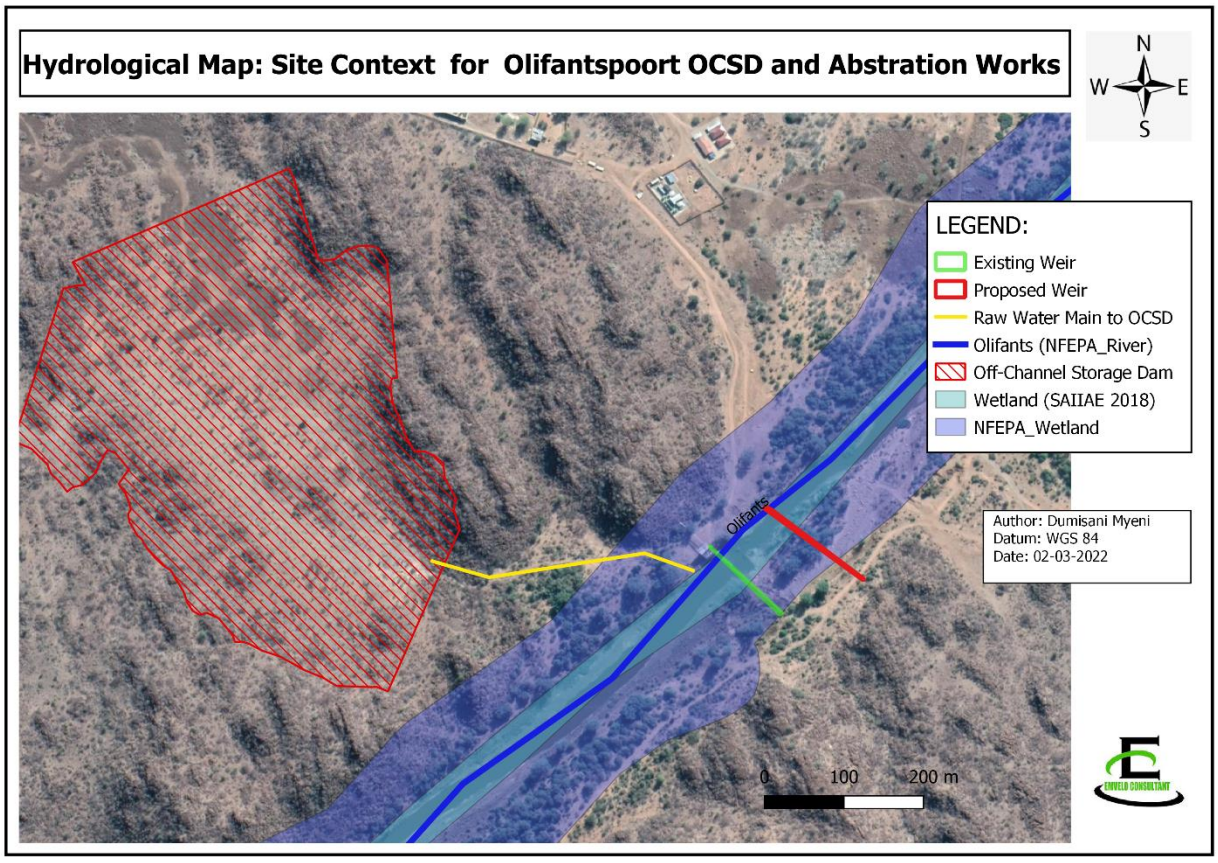

Figure 16: Site hydrological context at Olifantspoort OCSD and abstraction works

The section of bulk pipeline from PS1 to Specon has two interceptions with the Chunies River , which is a NFEPA River (***Figure 15***). Therefore, the proposed upgrade will have two river crossings at this section of pipeline.

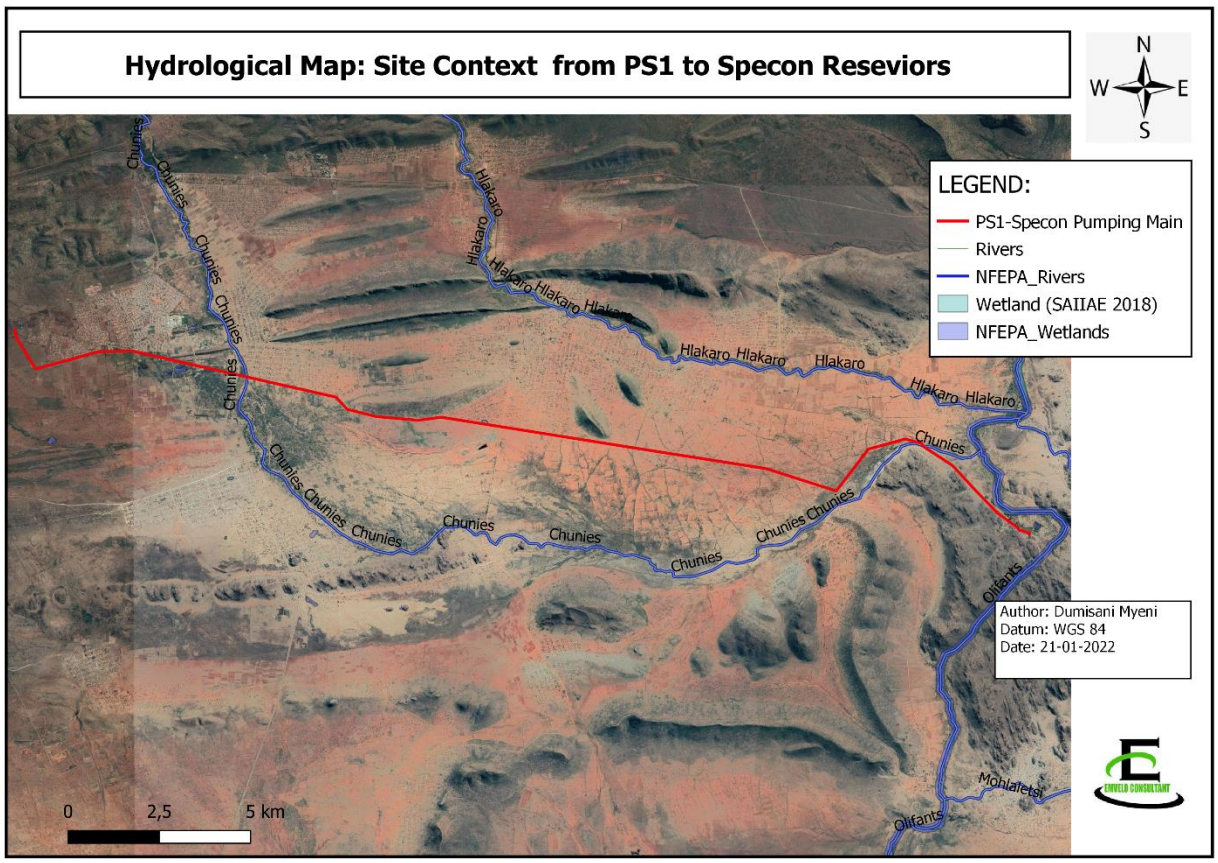

Figure 17: Site hydrological context between section of PS1 and Specon reservoir

The section of bulk pipeline from PS2 to Witkos has four interceptions with the Chunies River , which is a NFEPA River (***Figure 18***). The proposed upgrade will have four river crossings at this section of pipeline.

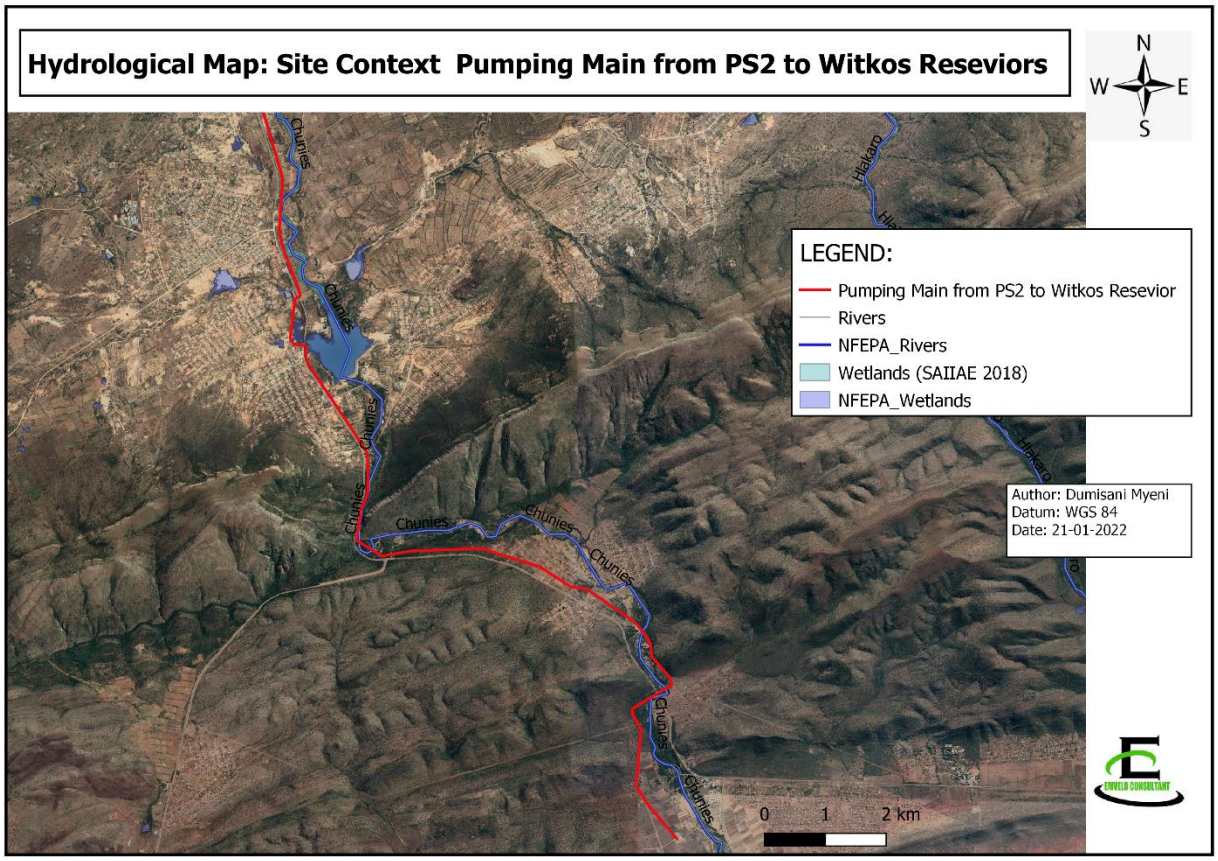

Figure 18: Site hydrological context between section of PS2 and Witkos reservoir

11.2.2 Rivers (Ebenezer Scheme)

The Ebenezer WSS falls under the Mopani District, which has two secondary catchments, namely: the Great Letaba Catchment in the north; and the Lower Olifants Catchment in the south. The Wolkberg in the southwest of the district, within the northern escarpment of the Drakensberg Mountains, forms the headwater for the Great Letaba River. This district shares Olifants River with Capricorn District as this river forms a boundary between three districts, namely Capricorn, Sekhukhune, and Mopani Districts, and the largest tributary of the Limpopo River. All the afore-mentioned river systems are classified as NFEPA rivers, and have numerous tributaries traversing the region, forming several dams, and plains across the region (LEDET, 2016).

The study area from Ebenezer pumpstation has water conveyance intercepting the Great Letaba River (***Figure 19***). Therefore, the Ebenezer WSS will have one river crossing at the Great Letaba River adjacent to Ebenezer pumpstation.

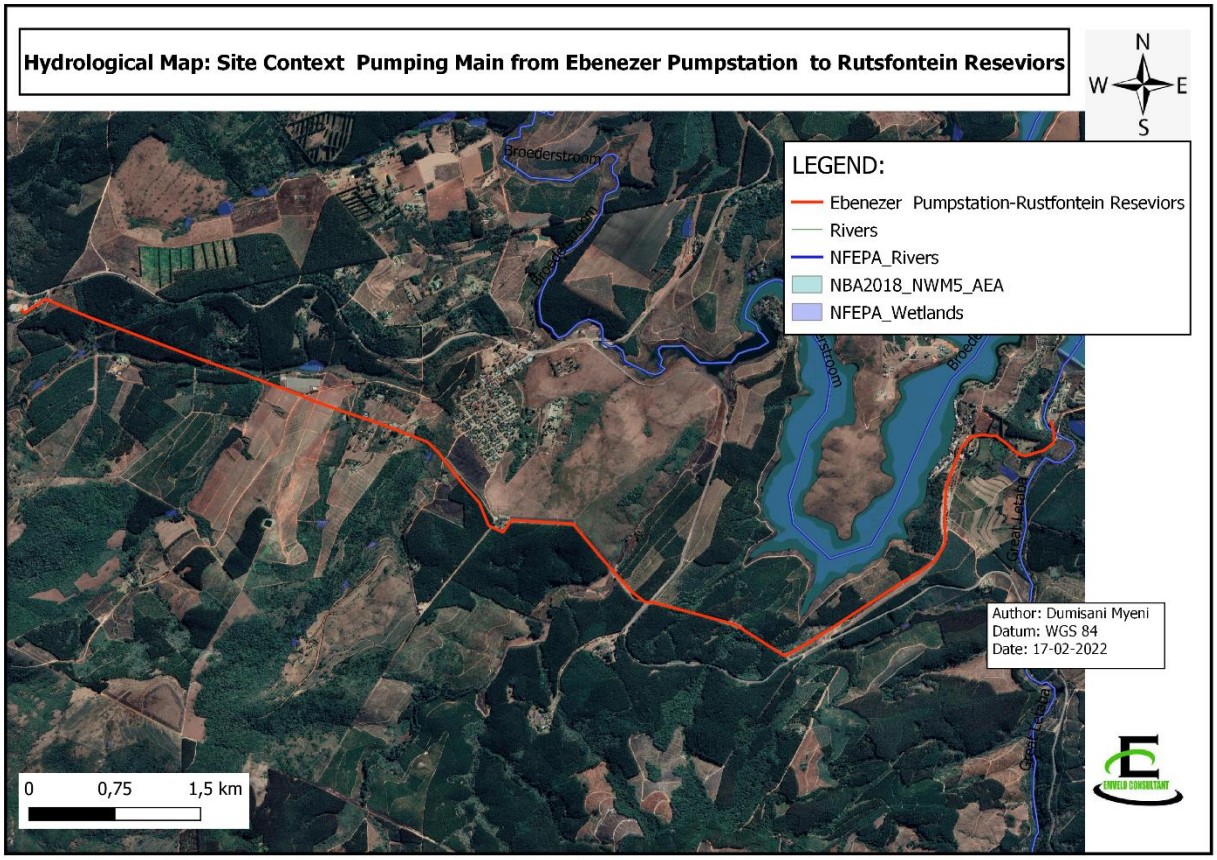

Figure 19: Site hydrological context between section of Ebenezer Pumpstation and Rustfontein reservoirs.

11.2.3 Wetlands (Olifantspoort Scheme)

The Capricorn District has a number of isolated wetlands dispersed across the region. However, the are no RAMSAR sites located within the district (LEDET, 2019).

The study area at Olifantspoort abstraction works at the valley bottom of a NFEPA wetland which is formed within the riparian zone of the Olifants River. As a result, the construction activities at the abstraction works and OCSD will intercept the wetland hydrological body (***Figure 16***).

The construction of water conveyance from PS1 to Specon reservoirs will intercept the NFEPA wetland hydrological body along the portion of Specon reservoirs (***Figure 17***).

The portion PS2 to Witkos reservoir transcends along Chuniespoort Dam which forms part of the NFEPA valley bottom wetland along the flood plain of Chunies River. This portion of water conveyance is also within an area of small wetlands forming a wetlands system (***Figure 18***).

Lastly, the conveyance along PS3 to Palmietfontein reservoirs traverse the area with a number of wetlands forming a hydrological body with the Chunies River (***Figure 20***).

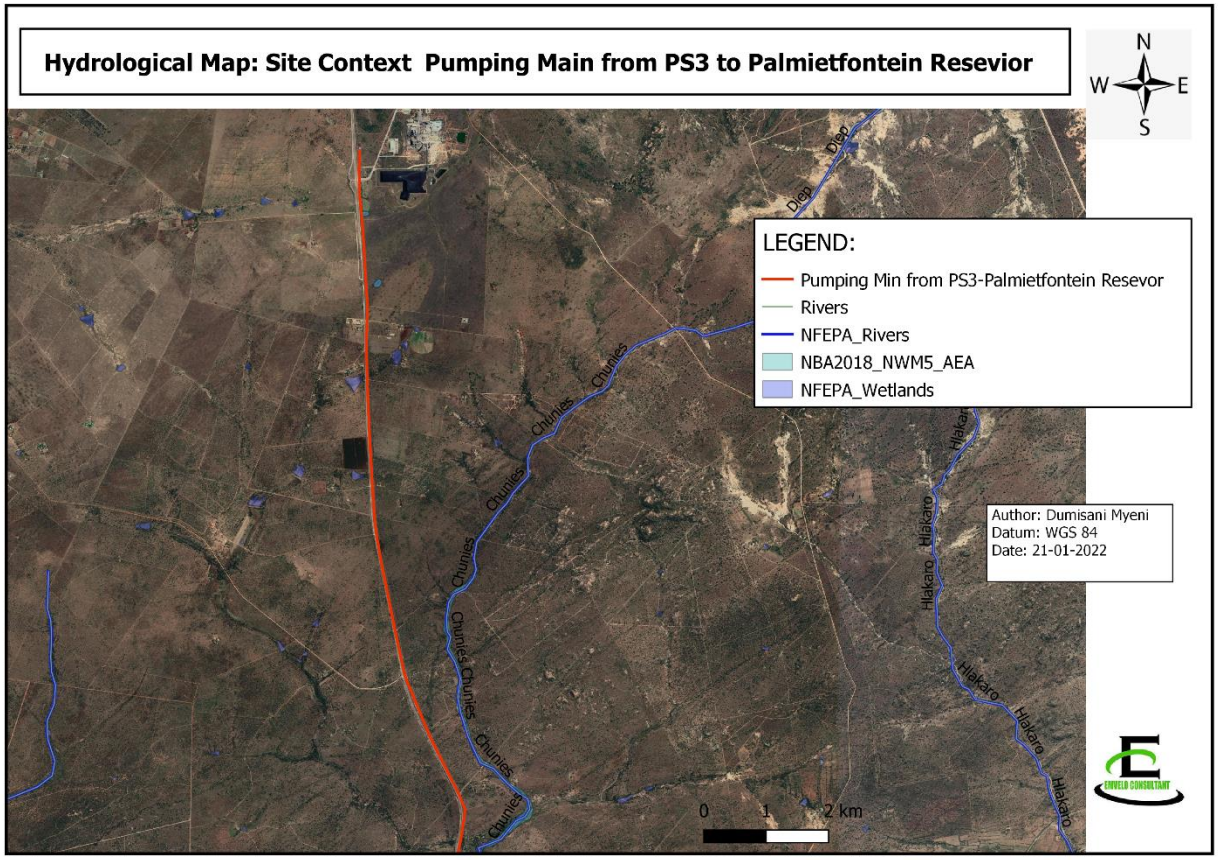

Figure 20: Site hydrological context between section of PS3 and Palmietfontein reservoirs.

The wetland delineation assessment will be conducted during EIA phase, to investigate the hydrological water bodies along the proposed water conveyance.

11.2.4 Wetlands (Ebenezer Scheme)

The Mopani District which hosts the Ebenezer WSS is characterised by undulating plains forming wetlands along differing altitudinal zones with seeps, dams , and vleis, etc. (LEDET, 2016). Wetlands are largely known for providing species habitat and ecosystem services.

The study area has wetlands dispersed across and along the altitudinal zones, with highest concentration along the plain of the Broederstroom River linking to Ebenezer Dam, and isolated wetlands hydrological bodies dispersed along the Rustfontein area (***Figure 19***). The wetland delineation assessment will be conducted during EIA phase, to investigate the hydrological water bodies along the proposed water conveyance.

11.2.5 Groundwater

The study area comprises the varying types of terrain and mainly shallow soils, with localized pockets of soils of variable thickness. These give rise to varying Existing Groundwater Leve (EGL) in the study area. However, there is very little possibility that groundwater will be encountered during construction, with exception of valley bottom wetlands. The Geotechnical Assessment is undertaken to describe the excitability and Energy Grade Line (EGL) conditions within the water conveyance portions. The mitigation measures will be further discussed in the EIA phase.

11.2.6 Potential impacts of the project hydrological features

The construction at Olifantspoort abstraction works for the proposed construction of a new weir or upgrading of the existing weir and upgrading of the abstraction mains within the Olifants River, will have negative impacts on the river's hydrology from the *in-sutu* riparian zone and downstream watercourse. This will result in riparian incision, banks inundation, stream flow reduction, and downstream pollution, if proper mitigation measures and good construction practice are not adhered. Therefore, in order to address the potential impacts as a result of the proposed construction activities, the EIA phase must integrate the findings of the Aquatic Impact Assessment, Hydrological Impact Assessment, and Wetland Impact Assessment. This is critical to further assess all impacts holistically and determine mitigation measures and the proposed construction methods. All mitigation measures will be discussed in the EMPr.

The proposed water conveyance upgrades will have seven (7) river crossings. The pipeline for Olifantspoort will have six (6) interception at the Chunies River, and Ebenezer will have one (1) interception at the Great Letaba River. This will result into riparian incision, banks inundation, stream flow reduction, and downstream pollution, if proper mitigation measures and good construction practices are not adhered to. Therefore, in order to address the potential impacts as a result of the proposed construction activities, the EIA phase must integrate the findings of the Aquatic Impact Assessment, Hydrological Impact Assessment, and Wetland Impact Assessment. This is critical to further assess all impacts and determine mitigation measures and proposed construction methods. All mitigation measures will be discussed in the EMPr.

Furthermore, the construction of water conveyance will intercept a number of wetlands along the route. Therefore, the Wetland Delineation and Impact Assessment is necessary to determine the impacts and mitigation measures, as a result of the proposed construction activities.

11.2.7 Potential Impact

Potential impacts on groundwater may arise if hazardous substances are allowed to leak onto bare soil and potentially leach into the ground. However, as the site is paved with concrete, it is unlikely that groundwater pollution may occur as a result of the current activities on site. Most areas where materials are stored are under roof and stored within lined and bunded facilities. Hence rainwater does not leach through or wash hazardous substances into clean water systems from these storage areas.

11.3 Topography

The Capricorn District is overlain by flat, gentle, and undulating, with the majority of flat terrain (LEDET, 2019). Given that the large proportion of Capricorn District is characterised by flat terrain, it is therefore inferred that the large portion of water conveyance upgrades for Olifantspoort WSS will traverse across the flat terrain with few exceptions of undulating terrain.

The locality at Olifantspoort abstraction works is characterised by a gentle terrain and incised valley which ranges between approximately 739m and 771 mAMSL within a space of

approximately 300m. PS1 to Specon portion is characterised by a gentle terrain with an elevation ranging from 744m and 1010 mAMSL. The portion between PS 2 to Witkos is characterised by gentle to undulating terrain which ranges between 1020m and 1228 mAMSL. The undulating terrain is only experienced along the Chuniespoort Pass. From Witkos to the Krugersburg reservoirs is characterised by gentle terrain.

Mopani District is predominately characterized by flat and undulating terrain, with the presence of an escarpment. This renders the region having varying terrain with an elevation that ranges between 200and 2 200 mAMSL(LEDET, 2019). The study area of Ebenezer WSS is characterised by undulating terrain ranging between 1305m and 1538 mAMSL.

11.3.1 Potential impacts

The topography characteristic of the study area comprises of a gentle and undulating terrain. The undulating terrain affect the water conveyance performance, thus requiring special engineering designs principles, which is likely to result in deep excavations, thus having an impact on geological features. Notwithstanding, the Geotechnical investigation is currently being conducted to determine the necessary mitigation and construction methods where the cut slopes will be required. This will be addressed in accordance with *in-sutu* material erodibility, excavatibility, rippability, and run-off propensity. Measures to mitigate geological instability will be discussed in EIA phase.

11.4 Biomes

The study is conducted within Capricorn, and Mopani regions, which host Olifantspoort and Ebenezer WSS, respectively. These regions are predominantly covered by Savanna biome, as 65% of the Capricorn District is overlain by this biome, with the remainder being made up of Forest (4%), Grassland (19%) and Azonal (11%) biomes. The Capricorn District has three centres of endemism, namely the Soutpansberg, Wolkberg and Sekhukhune land Centres of Endemism. Furthermore, 68% of Mopani District is overlain by Savanna biome with the remainder being made up of Grassland (16%) and Forest (10%) biomes (LEDET, 2016; LEDET, 2019).

11.4.1 Olifantspoort WSS biomes

As depicted in (***Figure 21***) below, the study area of Olifantspoort WSS from Olifantspoort abstraction works to Krugersburg reservoirs falls within the Savanna biome and have isolated Grassland biome intrusions.

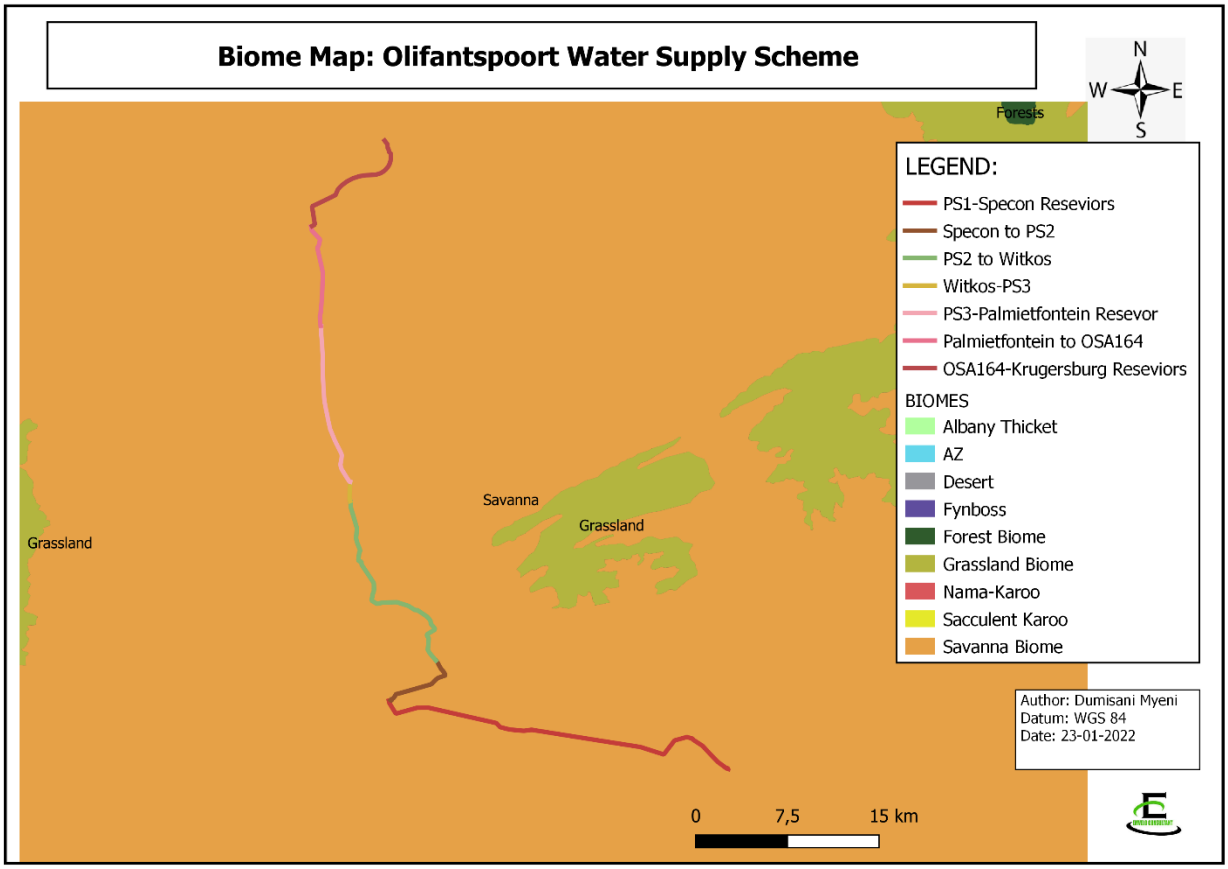

Figure 21: Map Showing the biome within Olifantspoort WSS study area

11.4.2 Ebenezer WSS biome

As depicted in (***Figure 22***)below, the study area Ebenezer WSS, from Ebenezer pumpstation to Rustfontein reservoirs falls within the grassland biome, with an intrusion of forest biome. While the extension Mankweng falls within the Savanna biome.

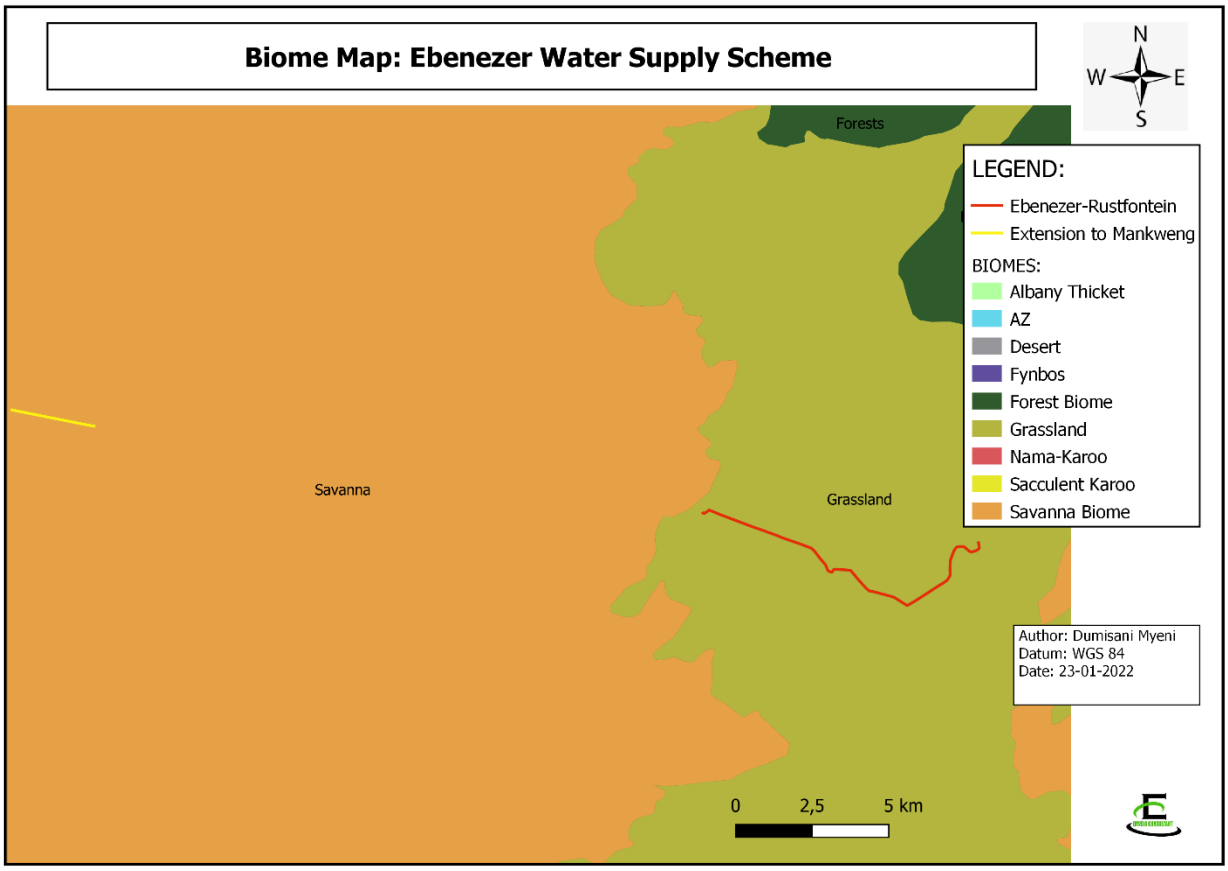

Figure 22: Map Showing the biome within Ebenezer WSS study area

11.5 Flora

As discussed in ***Section 11.4***, the Capricorn and Mopani District are dominated by Savana biome, with the remainder made up of Grassland, Forest and Azonal biomes. Therefore, the vegetation types within Capricorn corresponds to dominant biome, as the Capricorn District has 26 different vegetation types, to which six of the 26 vegetation types has a high conservation status, namely Sekhukhune Plains Bushveld, Polokwane Plateau Bushveld and Spingbokvlakte Thornveld '***Vulnerable***'; Tzaneen Sour Lowveld and Sekhukhune Norite Bushveld '***Endangered***'; and Woodbush Granite Grassland '***Critically Endangered'***. The Capricorn District has a high level of endemism as fifteen (15) of the vegetation types occurring within the district are classified as endemic and two (2) as near-endemic (LEDET, 2019).

The Mopani District has 25 different vegetation types, of which nine (9) of the 25 vegetation types have a high conservation status, with 5 of these are classified as '***Vulnerable***', two (2) as '***Endangered***' and two (2) as '***Critically Endangered'*** . The district has a high level of

species endemism as nine (9) of the vegetation types occurring within the district are classified as endemic and five as near-endemic (LEDET, 2016).

11.5.1 Olifantspoort WSS Flora

The vegetation type with the study area Olifantspoort WSS (***Figure 23***) is predominantly: Sekhukhune Plains Bushveld (SVcb27) '***Vulnerable***' with (19%) conservation target; Polokwane Plateau Bushveld (SVcb23) ' ***Least Threatened***' with (19%) conservation target; Ohriigstad Mountain Bushveld (SVcb26) '***Least Threatened'*** with (24%) conservation target; Mamabolo Mountain Bushveld(SVcb24) '***Least Threatened'*** with (24%) conservation target; and an intrusion of Northern Mistbelt Forest, and a Spingbokvlakte Thornveld (Mucina & Rutherford, 2006).

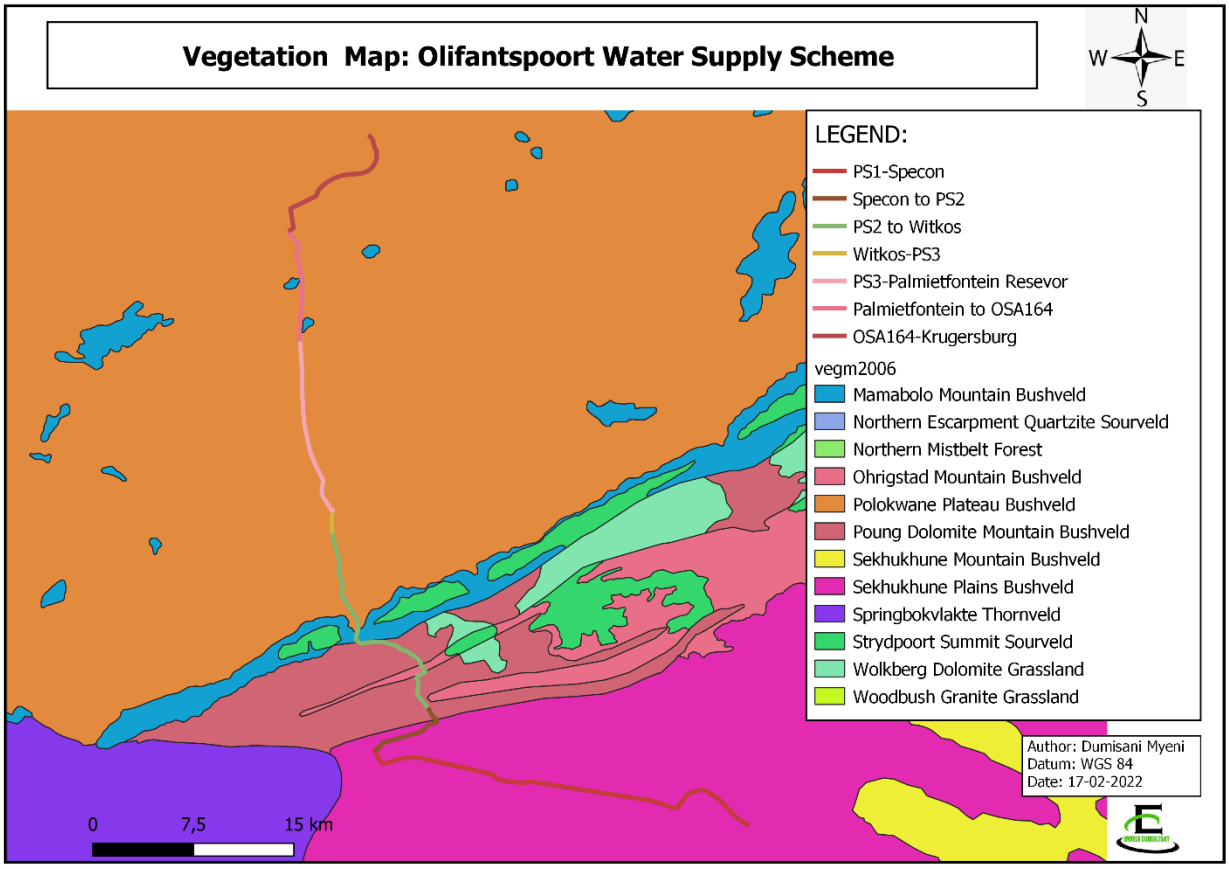

Figure 23: Map showing the vegetation types within Olifantspoort WSS study area

11.5.2 Ebenezer WSS Flora

The vegetation type with the study area Olifantspoort WSS (***Figure 24***) is predominantly: Woodbush Granite Grassland (Gm25) 'Critically Endangered' with (27% conservation target; Polokwane Plateau Bushveld (SVcb23)' ***Least Threatened'*** with (19%) conservation target; with an intrusion of Mamabolo Mountain Bushveld (Mucina & Rutherford, 2006).

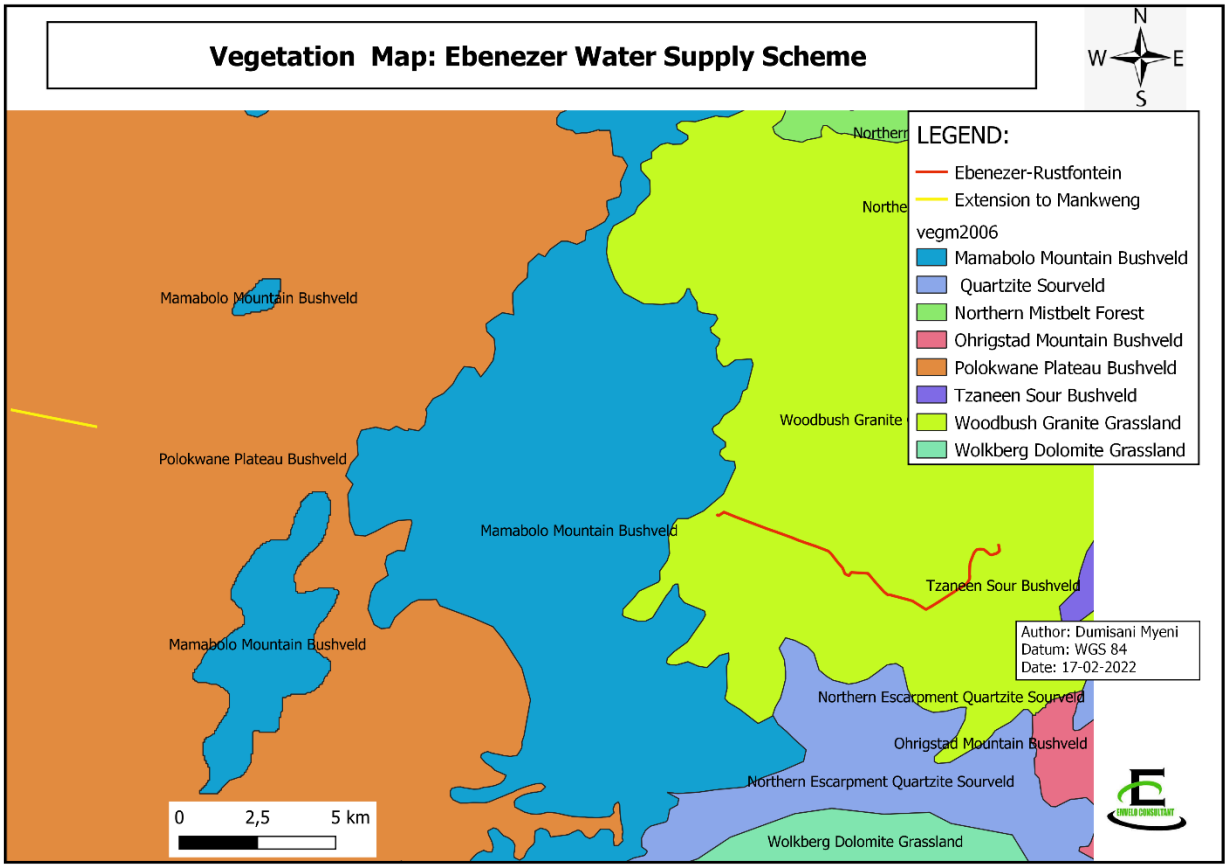

Figure 24: Map showing the vegetation types within Ebenezer WSS study area

11.5.3 Potential Impacts

The Potential impacts to vegetation could result from the uncontrolled clearance of vegetation along the construction corridors of the proposed water conveyance infrastructure. However, it is important to note that the proposed upgrade water conveyance will traverse within the servitude of existing pipeline, with an exclusion of diversions. The diversion is made to avoid the interception of conserved Woodbush Granite Grassland at Haenertsburg. Moreover, the assessment of neighbouring vegetated areas that support species habitat will be conducted through the Terrestrial Biodiversity Impact Assessment and discussed in EIR. Therefore,

proper mitigation can be achieved through carefully implementation of recommendations given by the EMPr, and by Terrestrial Ecological Impact Assessment.

11.6 Protected Areas

Protected areas in South Africa are defined as parts of the landscape that are formally protected by law in terms of the NEM: PAA and managed primarily for the purpose of biodiversity conservation. Therefore, the study falls within Kruger to Canyons (K2C) Biosphere Region (LEDET, 2016). There are two Protected Area with the study area (***Figure 25***), namely; Polokwane Game Reserve, Woodbush Forest Reserve and Turfloop Nature Reserve. The Olifantspoort WSS' water conveyance from OSA 164 to Krugersburg reservoirs traverse the Protected Area (Polokwane Game Reserve). However, the pipeline in this section will be placed with the existing pipeline servitude along the road reserve.

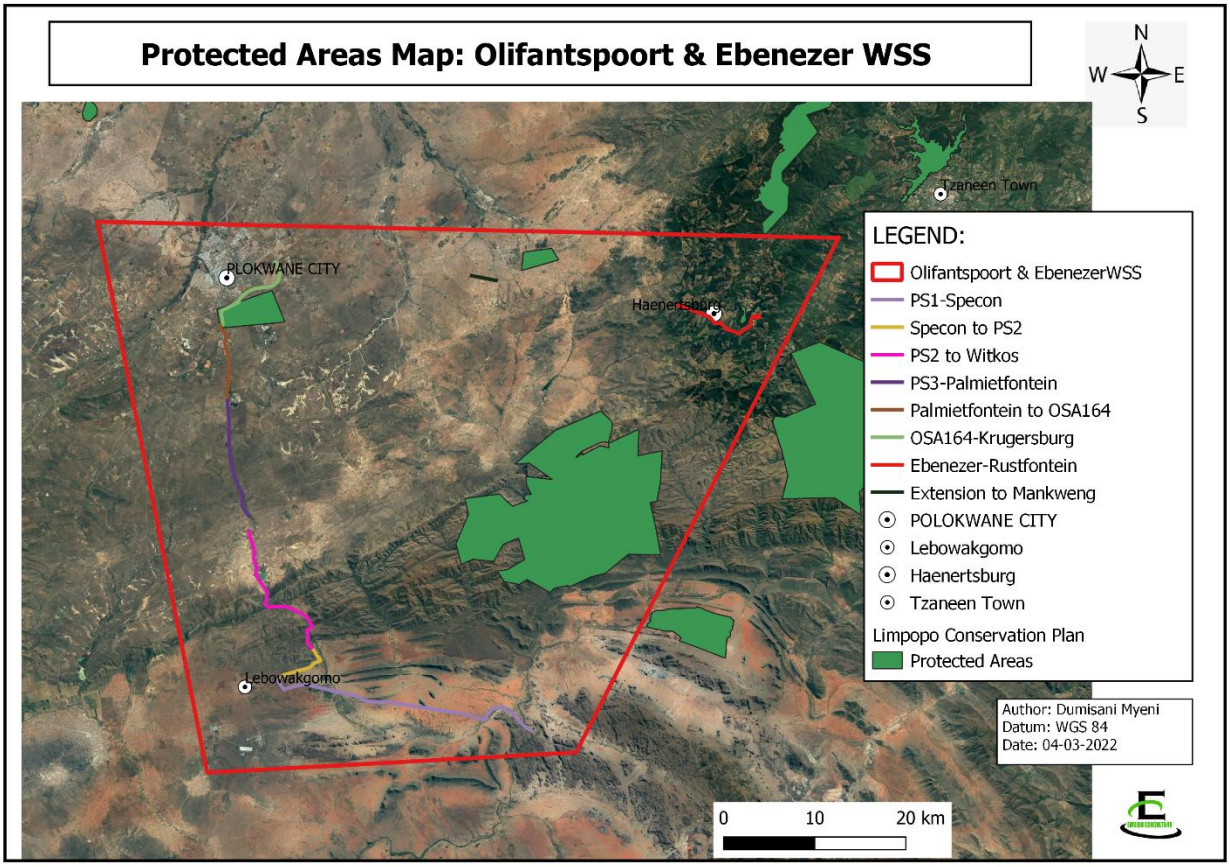

Figure 25: Map showing the protected areas within a study area

There are two main categories of areas that are required to meet conservation targets. These two main categories include Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The CBAs are crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets including corridors. The ESAs represent the functionality and not necessarily the entire natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within a Critical Biodiversity Areas (***Refer to table 14***).

Table 14: Subcategories of CBA and ESAs [Source: LEDET,2016]

Critical Biodiversity Areas (CBAs) – Crucial for supporting biodiversity features and ecosystem functioning and are required to meet biodiversity and/or process targets	
Critical Biodiversity Areas: Irreplaceable (CBA1)	Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems.
Critical Biodiversity Areas: Optimal (CBA2)	Areas that represent an optimised solution to meet the required biodiversity conservation targets while avoiding high-cost areas as much as possible (Category driven primarily by process but is informed by expert input).
Ecological Support Areas (ESAs) – Functional but not necessarily entirely natural areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within Critical Biodiversity Areas.	
Ecological Support Areas	Functional but not necessarily entirely natural terrestrial or aquatic areas that are required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the Critical Biodiversity Areas. The area also contributes significantly to the maintenance of Ecosystem Services.
Ecological Support Areas: Species Specific	Terrestrial modified areas that provide a critical support function to a threatened or protected species, for example agricultural land or dams associated with nesting/roosting sites.
Ecological Support Areas: Buffers	Terrestrial areas identified as requiring land-use management guidance not necessarily due to biodiversity prioritisation, but in order to address other legislation/ agreements which the biodiversity sector is mandated to address, e.g., WHS Convention, Triggers Listing Notice criteria, etc.

11.6.1 CBAs along the Olifantspoort WSS

There are a number of CBAs and ESA within the study area. Consequently, the Olifantspoort OCSD will be constructed within Critical Biodiversity Area 1 (CBA1) (***Figure 26***).

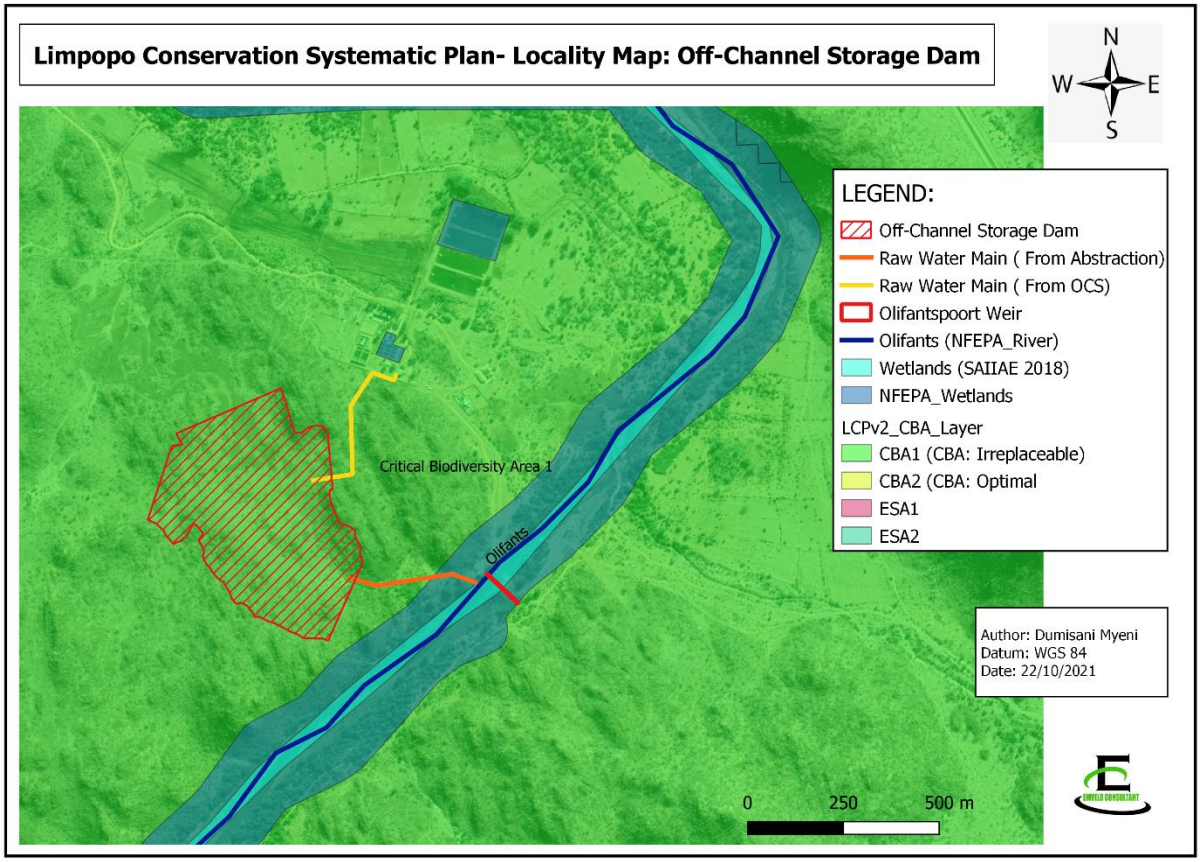

Figure 26: Map showing CBAs with OCSD

The Construction of Olifantspoort Weir upgrade will take place within (CBA1)/ CBA: Irreplaceable; PS1 to Specon main traverse CBA1, CBA2 (CBA: Optimal); PS2 to Witkos and Palmietfontein Reservoirs traverse CBA1, CBA2; Palmietfontein Reservoirs to OSA164 traverse CBA1, and Protected Area. OSA 164 to Krugersburg Reservoirs traverse the Protected Area, and CBA1 (***Figure 27***).

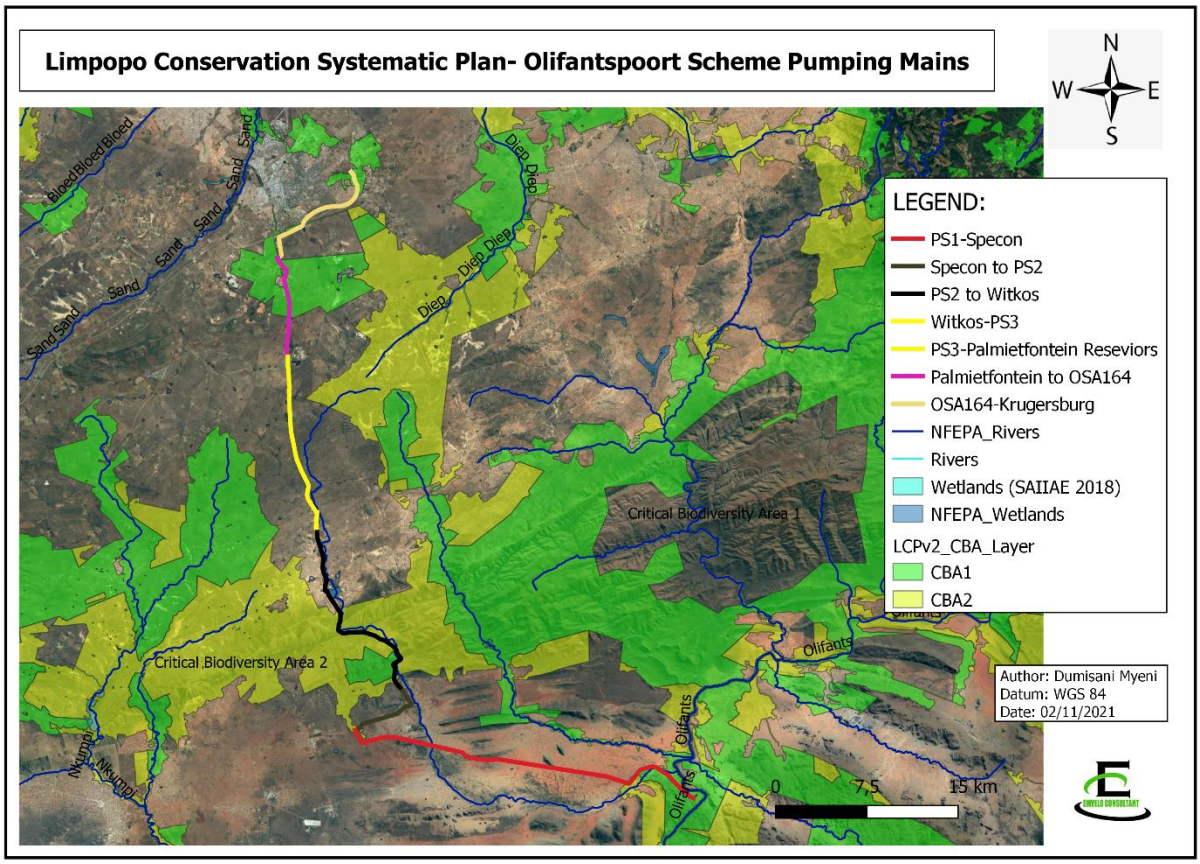

Figure 27: Map showing CBAs within Olifantspoort conveyance

The CBAs and ESAs support the species diversity and Species of Conservation Concern (SCC). Therefore, there are likely to be SCC within the project footprint. However, this will be further assessed by the Terrestrial Ecological Impact Assessment and discussed in EIR.

11.6.2 CBAs along Ebenezer WSS

The water conveyance along Ebenezer pumpstation to Rustfontein reservoir traverse vast tracks of CBA1. However, the conveyance has a diversion at Haenertsburg to prevent interception of conserved grassland (Woodbush Granite Grassland).In most cases, the pipeline route will be aligned to the road reserve (***Figure 28***) to minimise environmental impacts and for ease of maintenance.

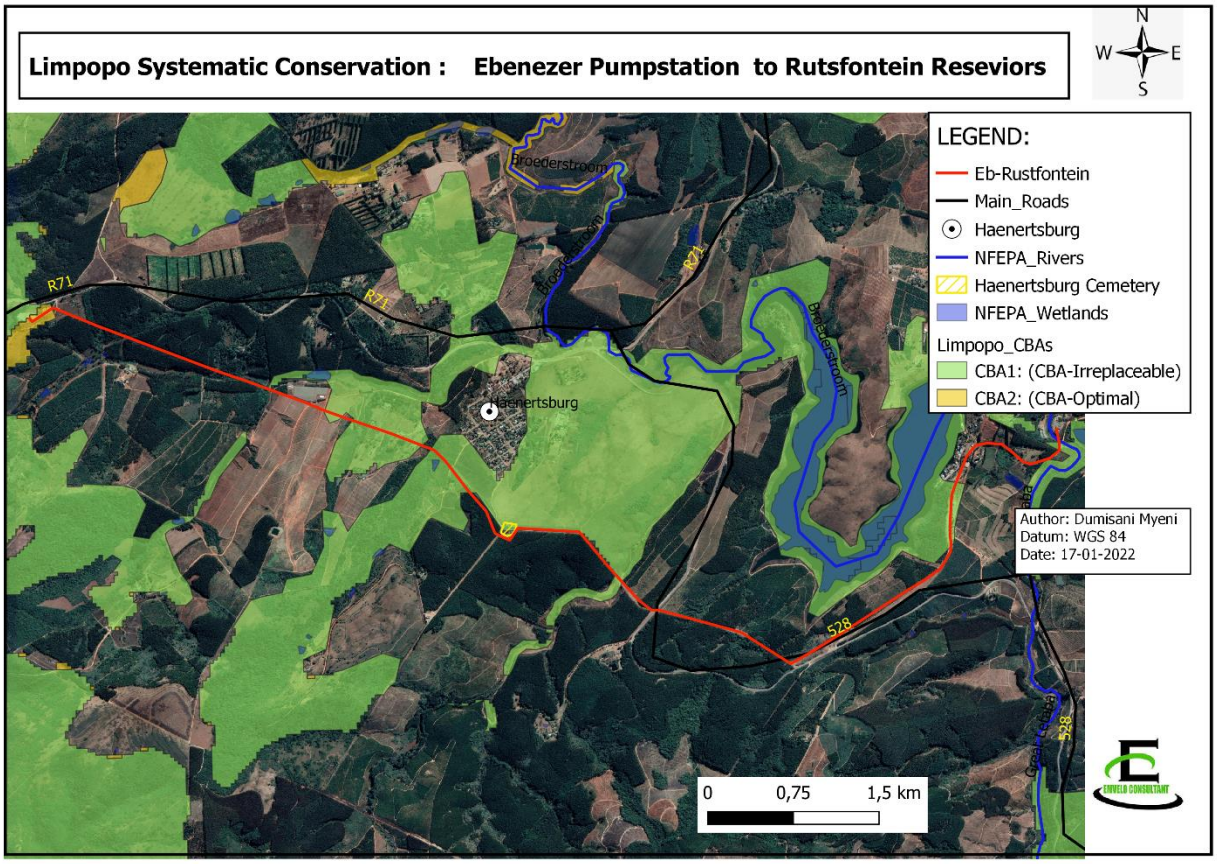

Figure 28: Map showing CBAs along Ebenezer WSS

11.6.3 Potential Impacts

Intensive vegetation clearance at project site can lead to fragmentation, reduction, and loss of habitat as well as loss of plant species such as SCC. Such habitat loss is likely to lead to the migration of wildlife away from the area. However, proper mitigation can be achieved through careful implementation of the recommendations given by the EMPr, and by Terrestrial Ecological Impact Assessment.

A Terrestrial Ecological Impact Assessment will be conducted and further discussed in the EIA phase. The identification of SCC will be covered in the EIR through the Terrestrial Biodiversity Impact Assessment.

11.7 Fauna

The Mopani and Capricorn district have endemic faunal species inhabiting within Limpopo and other parts of South Africa: Mammals such as Gunning's Golden Mole (*Amblysomus gunning*) '***Endangered***', Samango Monkey (*Cercopithecus albogularis*), Ground Pangolin (*Manis temminckii*) and Leopard (*Panthera pardus*) '***Threatened***'. Yellow Golden mole (*Calcochloris obtusirostris*) '***Near Threatened'***, Four-toed Elephant-shrew (*Petrodromus tetradactylus*) '***Near Threatened'***, Water Rat (*Dasymys robertsii*) '***Vulnerable***', Schwarz's White-collared Money (*Cercopithecus albogularis schwarzi*), African Wild Dog (*Lycaon pictus*), and Thin Mouse Shrew (Myosorex cf. tenuis) '***Endangered***', '***Endangere***d'. Reptiles such as Methuens Dwarf Gecko (*Lygodactylus methueni*), '***Vulnerable***'. Bird species such as the Blue Swallow (*Hirundo atrocaerulea*) '***Vulnerable***' and Cape Parrot (*Poicephalus robustus*) '***Critically Endangered'***. Amphibian species such as the Forest Rain Frog, (*Breviceps sylvestris*) '***Endangered***'. Insects such as Wolkberg Zulu Butterfly (*Alaena margaritacea*) '***Critically Endangered****'* (LEDET, 2016; LEDET, 2019).

Most of the protected faunal species are found predominantly within the conservation areas of the regions.

11.7.1 Potential Impacts

Vegetation clearance within the riparian and CBAs for the purpose of construction of water conveyance and storage infrastructure could modify the natural integrity of the watercourse, locality fauna disturbance might occur which could led to fragmentation, reduction, disturbance and alteration or loss of habitat, as well as the migration of animals away from the area. However, proper mitigation can be achieved through careful implementation of recommendations provided in the EMPr, Aquatic Ecological Assessment and Terrestrial Ecological Assessment.

The identification of SCC and all potentially sensitive fauna will be covered in the EIR through the Terrestrial Biodiversity Impact Assessment.

11.8 Geology

The Ebenezer WSS conveyance section is underlain by *Goudplaats Gneiss*, *Vrischgewaagd*, Turfloop Granite, and Eersteling geological formation, with *Dyke* intrusions.

The Olifantspoort WSS conveyance section is underlain by *Gabbro*, *Norite*, *Anorthosite*, quartzite of *Lakenvalei* Formation*, Ferro gabbro* and t*roctolite*, quartzite, shale, sandstone, and volcanic rocks, Geyser Granite, Turfloop Granite, and Hout River *Gneiss* geological formation.

11.8.1 Potential impacts

The construction activities for the purpose of upgrading the water conveyance and storage infrastructure for Olifantspoort and Ebenezer WSS will involve deep excavation and blasting where necessary. This also includes the excavation within the riparian habitat at river crossings. This activity may have impacts on geological stability of the riverbanks within the vicinity of conveyance, thus resulting in riverbanks incision and run-off erosion. Therefore, a Geotechnical Assessment will be conducted to assess the geological materials and provide mitigation measures during the EIA phase.

11.9 Visual environment and land use character

Subject to the direct visual influence of the upgrading of Olifantspoort and Ebenezer Water Supply Schemes and associated infrastructure, the zone of visual influence can be experienced at different scales by receptors located at various distances from the site. The viewshed area and zone of visual influence for new developments is classified as follows:

- High visibility - Visible from a large area (several square kilometres, >5km radius)
- Moderate visibility - Visible from an intermediate area (several hectares, 2.5 – 5 km radius).
- Low visibility - Visible from a small area around the project site (<1km radius).

The proposed development is the construction and upgrading water conveyance and infrastructure which is considered to have no negative visual impacts, as the proposed infrastructure will be concentrated within existing footprints. During construction activities it is

likely that the project could be considered “low visibility” as it can be visible from a small area around the project site (<1km radius).

11.9.1 Potential Impacts

The proposed water infrastructure project consists of mainly water pipeline which will be sub surface, and storage infrastructure which will be conveniently constructed in close proximity to existing storage infrastructure. Therefore, the project will have minor visual impacts only during construction, which can only be viewed at the local scale. Also, the dust and other visibility aspects will be managed through proper implementation of recommendations provided by EMPr during the EIA phase.

11.10 Heritage and cultural aspects

The Capricorn District inherited the Capricorn name from the Tropic of Capricorn which runs directly through the region. Therefore, renders as regional heritage aspect. Capricorn District also hosts the Bakone Malapa Northern Sotho Museum (an open-air ‘living’ museum demonstrating Sotho culture), the Hugh Exton Photographic Museum, Zion Christian Church Headquarters, which is located at Zion City Moria, the Zebediela Citrus Estate, the Polokwane Museum, the Polokwane Smelter, and the towns of Alldays, and Houtbosdorp (LEDET, 2019). Whereas, Mopani District hosts the Westfalia Estates, Manotsa and Madrid and Shiluvane (LEDET, 2016;LEDET, 2019).

According to the Environmental Screening Tool, the study area within water conveyance route has a high palaeontology sensitivity and low-medium archaeological and cultural heritage sensitivity. A Palaeontological, Archaeological and Cultural heritage Impact Assessment will be conducted during EIA phase, and mitigation measures with provided in EIR.

11.10.1 Potential Impacts

During the clearing of vegetation, and excavation and construction activities, heritage resources/artefacts/places that might be buried underground may be affected. Moreover, excavations (pre-construction and construction phase) could uncover the following: stone foundations, ash middens associated with the farmsteads and homesteads that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, knives, and possible adult

and infant burials (especially unmarked). These will be assessed by Palaeontological, Archaeological and Cultural heritage Impact Assessment, during EIA phase.

11.11 Socio-economic

The project will have positive impacts in terms of improving livelihoods. It is also expected that the local community will benefit through jobs during the construction, operation, and maintenance phase, which will enable the transfer of skills and boost the local economy. Additionally, local businesses will benefit from the supply chain processes. This will contribute to alleviating poverty and decrease the dependency ratio of the area. Most importantly, the upgrading of Olifantspoort and Ebenezer WSS scheme will provide sustainable water within Polokwane and the surrounding communities.

The pipeline will run parallel to the existing pipeline. Therefore, there will be not any displacement of households. There pipeline upgrades have also made the provision for deviations where settlements have encroached within the existing route. The findings and recommendation will be discussed in the EIR.

11.12 Traffic

Local communities, road users including school children will be impacted during construction activities in the area. Safety risks, and domestic and wildlife collisions, related to the movement of heavy equipment, materials and vehicles will likely increase during the course of the project.

The hauling of material and equipment to site will utilise existing local roads. Access roads will be aligned with pipeline servitude. A basic traffic management plan will be included in the EIR.

12 AIR POLLUTION AND WASTE

The construction activities of the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes lead to air pollution and waste generation, and such pollution and waste have detrimental effect on the receiving environment.

12.1 Air Pollution

The proposed development itself will not have direct impact on air pollution and atmospheric emission. However, certain activities during construction could have a minor impact on the ambient air as a result of emissions from the onsite equipment, machinery, and vehicles. These include dust emanating from construction activities and fumes (carbon monoxide) released by construction vehicles and machinery. These will be investigated further in EIA.

12.2 Waste

The waste generated during the operation will be collected and disposed off at Polokwane Waste Disposal Site. Measures to mitigate the impact related to construction waste will be discussed during EIA and a Waste Management Plan will be developed as part of the EMPr

12.2.1 Potential Impacts

The incorrect handling and disposal of hazardous waste (lubricants, fuel, chemicals, agricultural remedies, *inter alia*) could have detrimental impacts on nearby watercourses.

Potential impacts on groundwater may arise if hazardous substances are allowed to leak onto bare soil and potentially leach into the ground or disposed of incorrectly.

12.3 Noise management

The project sites will emit different levels of noise due the various construction activities, movement of heavy construction vehicles, use of machinery as well as from large number of workers on site. However, noise impacts are expected to be of short duration and only during certain times of the construction phase, which is likely to only have impacts to the immediate environment. Mitigation measures to manage the potential noise pollution will be included in the EMPr.

13 WATER USE AND SANITATION

Water supply:

All construction activities will use metered water from Lepelle Northern Water.

Sewer Facilities:

All construction sites will have chemical toilets located conveniently along the pipeline route, and all effluent waste will be disposed of at the Polokwane Wastewater Treatment Works.

14 EXISTING SERVICES

The water conveyance will intercept with national, provincial, and local public roads. The road crossings at national and provincial roads will occur at the points of the pipe jacking, with accordance to DoT standards. The deviation of pipeline route will be undertaken at some local roads, where excavation is needed to take place within the local roads. Also, where there is closure of local roads the detour route will be provided.

15 IDENTIFICATION OF POTENTIAL IMPACTS

The Scoping is a critical step in the EIA process, as it identifies significant issues that require further investigation as well as identifying the preferred site/s and technologies that will go through for further investigation. These issues will be carried forward into the EIA phase and subsequently in the EMPr.

This section seeks to provide an overview of the environmental issues to be further investigated or prioritized during an EIA phase and the methodology to be used when assessing those impacts. This allows for a more efficient and focused impact assessment in the EIA phase, where the analysis is focused on significant issues and reasonable alternatives.

15.1 Approach

The environmental issues associated with the pipeline were identified by referring to the following;

- Activities associated with the upgrading of Olifantspoort and Ebenezer Water Supply Schemes life cycle.
- Activities relating to the operational phase.
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (***see Section 12***), which included a desktop evaluation (via

literature review, specialist input, GIS, topographical maps, and aerial photography) and site investigations.

- Direct and indirect impacts related to the activities of the proposed pipeline
- Input from Public Participation
- Legal framework and policy context

This section does not only provide a detailed description of the receiving environment, but the section also outlines the possible impact associated with the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes .

15.2 Potential Biophysical and Social Impacts

The potential biophysical and social impacts were distilled from a range of sources and summarised in ***Table 15 and 16***s below. The cumulative impacts are also explained briefly in ***Section 16***.

Table 15: Summery of Potential Biophysical Impacts

Environmental factors	Summary of Potential Impacts	Further investigation/ EIA Provisions
Olifantspoort & Ebenezer WSS		
Potential Biophysical Impacts		
Flora	• There are 'Critical Endangered' Grassland and other 'Least threatened' flora. Uncontrolled vegetation clearance will result in spreading of Alien Invasive Pant Species.	• Terrestrial Biodiversity Impact Assessment.
Fauna	• Although there is evidence of endangered and endemic species in the region, most species are within the designated conservation areas. • It is also, likely that some of the fauna species may be encountered during construction	• Terrestrial Biodiversity Impact Assessment. • Aquatic Ecological Impact Assessment
Biodiversity	• The impacts were identified that could lead to a negative impact involving, alteration of natural habitat on the biodiversity environment since the proposed development area is largely destructive and there are CBAs and ESA within the reach of the development site. Impact associated with large scale clearance are: o Direct impacts on threatened flora species; o Direct impacts on protected flora species; o Direct impacts on threatened faunal species; o Direct impacts on common fauna species/faunal assemblages (including migration patterns, corridors, etc); o Loss/ degradation of surrounding habitat; o Increase in local and regional fragmentation/ isolation of habitat. • Red Data species are particularly sensitive to changes in their environment, having adapted to a narrow range of specific habitat requirements.	• Terrestrial Biodiversity Impact Assessment.

Environmental factors	Summary of Potential Impacts	Further investigation/ EIA Provisions
Olifantspoort & Ebenezer WSS		
Potential Biophysical Impacts		
Impacts on Aquatic Ecosystem Functions and Services	• There are NFEPA rivers and wetlands within the study area. Construction at Olifantspoort Abstraction will take place with Olifants River and the riparian zone. • The upgrade of water conveyance will have seven stream crossings (6 at Chunies River, and 1 at Great Letaba River). • The pipeline crosses through several wetlands. • Resulting in the alteration or destruction of aquatic habitat and subsequent loss of associated functions, which include flood attenuation. • Wetland habitat transformation or any other activity that will inhibit the ability of the watercourse to retain and slowly release flood water, due to construction and laying of bulk infrastructure within wetland regulated areas.	• Aquatic Ecological Impact Assessment • Hydrological Impact Assessment • Wetland Impact Assessment
Ground Water	• Potential impacts on groundwater may arise if hazardous substances are allowed to leak onto bare soil and potentially leach into the ground. Contamination of ground water due to hydrocarbon spillage and seepage into groundwater reserves, affecting groundwater quality is also likely. • Increased impervious surfaces due to construction compaction, and infrastructure within the area will further contribute to reduced water infiltration rates.	• Geotechnical Assessment • EIR and EMPr
Geology	• The Impacts related to the construction-related earthworks • Incision and cut slopes • The loss of available topsoil, due to site clearance	• Geotechnical Assessment • Terrestrial Biodiversity Impact Assessment.

Environmental factors	Summary of Potential Impacts	Further investigation/ EIA Provisions
Olifantspoort & Ebenezer WSS		
Potential Biophysical Impacts		
Invasive Alien Plant Species	• Increase in weeds and pest due to cleared vegetation • In places where wetland and riparian habitats may be removed, opportunistic alien pioneers might encroach.	• Terrestrial Biodiversity Impact Assessment

Table 16: Summery of Potential Social Impacts

Environmental factors	Summary of Potential impacts	Further investigation/ EIA Provisions
Olifantspoort & Ebenezer WSS		
Potential Social Impacts		
Visual	• No impact on the current visual landscape. • No impact on sensitive receptors	• EIR and EMPr.
Waste (General, Hazardous Waste and HCW)	• Possible waste emanating from construction activities	• EIR and EMPr.
Air Pollution	• Certain activities during construction could have impact on air quality as a result of dust from construction areas and emissions from vehicles and equipment.	• EIR and EMPr.
Paleontological, Archaeological, Cultural and Heritage	• There may be graves (especially unmarked graves) on the site and other important heritage resources. • Identify the potential heritage sites within the study area	• Paleontological, Archaeological, Cultural and Heritage Impact Assessment

	• Identify any impacts (if any) that may occur on these sites as a result of the upgrading of Olifantspoort and Ebenezer WSS. • Removal or destruction of archaeological and/or paleontological sites/artefacts. • Removal or destruction of buildings, structures, places, and equipment of cultural importance.	
Socio-economic	**Positive Impacts:** • Adequate Water Supply • Employment opportunities	• EIR and EMPr.
Traffic	• Safety risk to local road users, especially school children • Potential collision hazards to domestic animals and wildlife • The site access • Road crossings	• EIR and EMPr
Noise	• Noise during construction	• EIR and EMPr.

16 CUMULATIVE IMPACTS

In terms of the EIA Regulations, the cumulative impact is considered from the holistic point of view. It means that the impacts of an activity are considered from the past, present, and foreseeable future, together with the impact of activities associated with that activity. The activity itself may not be significant, but when combined with the existing and reasonably foreseeable impacts emanating from similar or diverse activities, may result in a significant impact. “Cumulative impacts can be: additive, synergistic, time crowding, neutralizing and space crowding” (DEA, 2017;14), as outlined on ***Table 17*** below.

Table 17: Cumulative Impacts

Impact	Description Mitigation
Impacts on Aquatic Ecosystem Functions and Services	Comprehensive mitigation will include prevention of stream sediment loads, prevention of stream inundation and flood attenuation. These will be provided by the Hydrological Impact Assessment, Aquatic Ecological Impact Assessment, and the Wetland Delineation Impact Assessment.
Impact on Geological Stability	Comprehensive mitigation will involve prevention of run-off, stream incision and bare ground within the project vicinity. These will be provided by the Geotechnical Assessment, Aquatic Ecological Impact Assessment, Terrestrial Ecological Assessment and Hydrological Assessment.
Invasive Alien Plant Species	Comprehensive mitigation will include rehabilitation plan and prevention of spreading of Alien Invasive Plant Species. These will be provided by Terrestrial Ecological Impact Assessment, and Aquatic Ecological Impact Assessment.

16.1 Mitigation Measures

The EIR will provide a detailed analysis of the impact and their significance to the receiving environment, using the above methodology as well as the input from the project team, specialists’ studies, and all the comments from the I&APs.

Suitable and practical mitigation measures will be developed to minimize the identified impacts of the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes on the receiving environment. The mitigation measures will seek to achieve the following;

- Initial efforts will strive to prevent the occurrence of the impact
- If the above is not achievable, mitigation will include measures that reduce or minimize the significance of the impact to an acceptable level;
- Remediation and rehabilitation will take place if measures cannot suitably prevent or reduce the impacts, or to address the residual impacts; and
- As a last measure, compensation will be employed as a form of mitigating the impacts associated with the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes.

The mitigation measures will be included in the EMPr, which will form part of the EIR. Together with the Environmental Authorization, the EMPr is binding on the Applicant, all contractors and sub-contractors and visitors to the site.

17 IMPACT ASSESSMENT METHODOLOGY

Each impact identified is assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To effectively implement the adopted scientific approach in determining the significance of the environmental impact, a numerical value was linked to each rating scale.

The following criteria will be applied to the impact assessment for the project:

Occurrence:

Probability - the probability of the impact describes the likelihood of the impact actually occurring.

Impact duration - the duration of the impact describes the period of time during which an environmental system or component is changed by the impact.

Severity:

Magnitude – refers to the 'degree of disturbance' to biophysical systems and components which expresses the change in the health, functioning and/or role of the system or component as a result of an activity.

Scale/extent - the extent of the impact generally expresses the spatial influence of the effects produced by a disturbance to an environmental system or component.

The following scale will be used:

Table 18: Impact Assessment Criteria

Probability = P 5 – Definite (More than 80 % chance of occurrence) 4 – Probable (Between 60-80% chance of occurrence) 3 – Possible (Between 40-60% chance of occurrence) 2 – Fairly Unlikely (Between 20-40% chance of occurrence 1 – Unlikely (Less than 20% chance of occurrence)	*Duration = D* 5 – Permanent - The only class of impact that will be non-transitory (indefinite) 4 - Long-term - The impact and its effects will continue or last for the entire operational life of the development (15 - 50years) 3 - Medium-term - The impact and its effects will continue or last for some time after the construction phase (5 - 15 years) 2 – Medium-short - The impact and its effects will continue or last for the period of a relatively long construction period and/or limited recovery time after this construction period (2 - 5 years) 1 – Short Term - Likely to disappear with mitigation measures or through natural processes which span shorter than the construction phase (0-2 years)
Scale = S 5 – International (beyond 200km) 4 – Regional (50-200km radius) 3 – Local (2-50km radius) 2 – Surrounding area (within 2km)	*Magnitude = M* 5 - High 4– Medium High 3 – Medium 2 – Medium Low

1 – Site (within100m)	1 – Low

Status of Impact

+ Positive / -Negative or 0-Neutral

The overall impact significance score/points (SP) for each identified impact is calculated by multiplying magnitude, duration, and scale by the probability of all this happening.

Once the impact has been assessed using the above significance categories, a rating is calculated. The rating will indicate a specific significance of the impact as illustrated by ***Table 19*** below. By identifying whether the impact is positive or negative, the significance will be read from the relevant portion of the table.

By calculating the significance rating of the impact, one can evaluate whether a negative impact can be mitigated and managed efficiently, or whether the impact is a fatal flaw, and thereby disallowing the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes from being approved. A positive impact could be a motivation for the for the upgrading of Olifantspoort and Ebenezer Water Supply Schemes to proceed.; this provides comparative information to decision-makers for approval or denial of the application. The range of possible significance scores is classified into seven rating classes.

***Note**: SP = (Magnitude + Duration + Scale) x Probability*

Table 19: Impact Ratings and the Implicated Significance

Significance	Environmental Significance Points	Colour Code
Negligible	0-10	N
Very low	11-20	VL
Low	21-30	L
Medium	31-40	M
Medium-High	41-50	MH
High	51-60	H
Very high	61-75	VH

18 PLAN OF STUDY

This section provides a summary of the key findings of the Scoping Phase of the EIA and to describe the activities to be undertaken in the Impact Assessment Phase of the EIA. Legislatively, the document is required to provide the following:

- A description of the environmental issues identified during the scoping phase that may require further investigation and assessment;
- A description of the feasible alternatives identified during scoping that may be further investigated;
- An indication of additional information required to determine the potential impacts of the proposed activity on the environment;
- A description of the proposed method of identifying these impacts; and
- A description of the proposed criteria for assessing the significance of these impacts.

The requirements of Regulation 28 of Government Notice R.543 promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998) have been reviewed in order to ensure compliance therewith. These requirements are as follows:

- A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
- Particulars of the public participation process that will be conducted during the environmental impact assessment process; and
- Any specific information required by the competent authority.

18.1 Description of tasks to be undertaken for the EIR

The following section describes the identified tasks that are required to form part of the EIR Process:

- Specific Project Detail
- Activity Motivation
- Project Alternatives
- Description of the Baseline Environment;
- Public Participation Process;
- Specialist Reports;
- Impact Assessment
- An Environmental Management Programme (EMPr)
- An environmental impact statements
- Proposed EIA Report Roadmap

18.2 Specific Project Detail

The upgrading of the Olifantspoort and Ebenezer Water Supply Schemes and associated impacts forming part of the licensing application will be described in detail. Process flow diagrams indicating inputs and outputs will be included.

18.3 Activity Motivation

Emvelo Quality and Environmental Consultant (Pty) Ltd (the EAPs) has engaged with Lepelle Northern Water (the Applicant) in order to solicit the activity motivation. This motivation includes the project need and desirability as discussed in (Section 9).

18.4 Project Alternatives

The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts (DEAT, 2004). Therefore, the Alternative A: Routing Alternative, Alternative B: Design Alternative, Alternative

C: Technology Alternative, and Alternative D: Location Alternativewill be assessed to offset the 'No-Go Alternative'.

18.5 Description of the Baseline Environment

A description of the Baseline Environment be provided, as described in Section 11, which will include additional information, such as desktop and field assessment from the specialist studies.

18.6 Summary of Public Participation Process

Consultation with I&APs regarding the possible significance of impacts and suitable mitigation measures will take place during the Public Participation Process.

The following public participation process is proposed for the EIA Phase:

i) Official notification of all registered I&APs from the Notification Period and Scoping Phase.

ii) Registration of any new I&APs.

iii) Public and/or focus group meetings

iv) Circulation of Draft Environmental Impact Report (EIR) to I&APs for comment, with a 30-day response period.

v) Submission of final EIR to the DFFE.

18.7 Specialist studies identified

The required specialist studies triggered by the findings of the Scoping process, aimed at addressing the key issues and compliance with legal obligations, include:

- Terrestrial Biodiversity Impact Assessment;
- Aquatic Ecological Impact Assessment
- Hydrology Assessment
- Wetland Delineation Impact Assessment.
- Paleontological, Archaeological and Cultural Heritage Impact Assessment;

- Geotechnical Assessment;
- Agricultural Impact Assessment

Prior to any work, both general and specific, the Terms of Reference will be determined for each specialist study. In determining general Terms of Reference for specialist studies, the following guideline will be used:

- Guideline for determining the scope of specialist involvement in the EIA processes (Münster, 2005).
- Guideline for involving biodiversity specialists in the EIA processes (Brownlie, 2005);

In addition to the above guidelines, the relevant specialists need to satisfy specific requirements stipulated by the following key environmental authorities/bodies:

- Limpopo Province: Limpopo Department of Economic Development Environment & Tourism
- Department of Water and Sanitation
- South African Biodiversity Conservation
- Kruger to Canyon Biosphere Reserve
- Limpopo Department of Transport and Community Safety
- South African Heritage Agency
- South African Council for Natural Scientific Professions (SACNASP)

For the incorporation of the findings of the specialist studies into the EIA report, the following guideline will be used:

- Guideline for the review of specialist input in the EIA processes (Keatimilwe & Ashton, 2005). Key considerations will include:
- Ensuring that the specialists have adequately addressed I&AP issues and specific requirements prescribed by environmental authorities.
- Ensuring that the specialists' input is relevant, appropriate, and unambiguous; and

- Verifying that information regarding the receiving ecological, social, and economic environment has been accurately reflected and considered.

18.7.1 General Terms of Reference

The following general Terms of Reference apply to all the EIA specialist studies to be undertaken for the proposed project:

- Address all triggers for the specialist studies contained in the subsequent specific Terms of Reference.
- Address issues raised by I&APs, as contained in the Comments and Response Report, and assess all potentially significant impacts. Additional issues that have not been identified during Scoping should also be highlighted to the EAP for further investigations.
- Ensure that the requirements of the environmental authorities that have specific jurisdiction over the various disciplines and environmental features are satisfied.
- Approach to include desktop study and site visits, as deemed necessary, to understand the affected environment and to adequately investigate and evaluate salient issues. Indigenous knowledge (i.e. targeted consultation) should also be regarded as a potential information resource.
- Assess the impacts (direct, indirect, and cumulative) in terms of their significance (using suitable evaluation criteria) and suggest suitable mitigation measures. In accordance with the mitigation hierarchy, negative impacts should be avoided, minimized, rehabilitated (or reinstated) or compensated for (i.e. offsets), whereas positive impacts should be enhanced. A risk-averse and cautious approach should be adopted under conditions of uncertainty.
- Consider time boundaries, including short to long-term implications of impacts for the project lifecycle (i.e. pre-construction, construction, operation, and decommissioning).
- Consider spatial boundaries, including:
    - The broad context of the project (i.e. beyond the boundaries of the specific site);
    - Off-site impacts; and
    - Local, regional, national, or global context.

- The provision of a statement of impact significance for each issue, which specifies whether or not a pre-determined threshold of significance (i.e. changes in effects to the environment which would change a significance rating) has been exceeded, and whether or not the impact presents a potential fatal flaw or not. This statement of significance should be provided for anticipated project impacts both before and after the application of impact management actions.
- Recommend a monitoring programme to implement mitigation measures and measure performance. List indicators to be used during monitoring.
- Appraisal of alternatives (including the No-Go option) by identifying the BPEO with suitable justification.
- Advise on the need for additional specialists to investigate specific components and the scope and extent of the information required from such studies.
- Engage with other specialists whose studies may have a bearing on this specific assessment.
- Present findings and participate in public meetings, as and when necessary.
- Information provided to the EAP needs to be signed off.
- Review and sign off on the EIA report prior to submission to DFFE to ensure that specialist information has been interpreted and integrated correctly into the report.
- Sign a declaration stating independence.
- The appointed specialists must consider the policy framework and legislation relevant to their particular studies.
- All specialist reports must adhere to Appendix 6 of NEMA 2014 Regulations [GN No. 326 (7 April 2017)].

18.8 Impact Assessment

The impact assessment will provide an evaluation of impacts prior to mitigation, as well as proposed mitigation measures, and then evaluate the impacts after mitigation. The potential environmental impacts identified in the study will be quantified as far as possible and the significance of the impacts will be assessed according to specific criteria as discussed in (Section 17).

18.9 Environmental Management Programme Report (EMPr)

A draft Environmental Management Programme (EMPr) for the existing facility will be provided with the EIR Report. The EMPr will not include plans for the construction, maintenance and operational phases of the project..

The EMPr will identify environmental targets and objectives and will describe the methods and procedures that need to be followed (such as the mitigation and monitoring of potential impacts) to achieve these goals and objectives. The EMPr will be compiled in such a manner that it can be easily incorporated into the daily management of the site.

The EMPr aims to provide environmental responsibility and a management framework within which all existing and future activities will occur, as well as providing for the protection of any potentially sensitive areas.

18.10 Environmental Impact Statement

An environmental impact statement will be provided as part of the EIA. The opinion of the EAP as to whether or not the activity should be authorised will also be included with the recommendations.

18.11 Environmental Impact Report

The Environmental Impact Report (EIR) will provide enough evidence or information for DFFE to make a final decision. At a minimum, the report will contain the following critical components which is in accordance with Appendix 3 of GN No. 326 (7 April 2017):

- A description of the policy and legislative context.
- A detailed description of the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes (full scope of activities).
- A detailed description of the routes and sites for the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes , which will include a plan that locates the activity applied for as well as the associated structures and infrastructure.

- A description of the environment that may be affected by the activity and the way physical, biological, social, economic, and cultural aspects of the environment may be affected by the proposed development.
- The methodology of the stakeholder engagement process.
- The Comments and Responses Report and an I&APs Database will be provided as an appendix to the EIA Report.
- A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activity.
- A summary of the methodology used in determining the significance of potential impacts.
- A description and comparative assessment of the project alternatives.
- A summary of the findings of the specialist studies.
- A detailed assessment of all identified potential impacts.
- A list of the assumptions, uncertainties, and gaps in knowledge.
- An environmental impact statement.
- Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorization.
- A reasoned opinion as to whether the proposed activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization.
- An opinion by the consultant as to whether the development is suitable for approval within the proposed site.
- An EMPr that complies with Appendix 4 of GN No. 326 (7 April 2017).
- Copies of all specialist reports appended to the EIA report; and
- Any further information that will assist in decision making by the authorities.

For the remainder of the Scoping process and EIA the interaction with DFFE will be as follows:

- Submit Draft Scoping Report
- Address comments on Scoping Report.

- Submission of the Final Scoping Report.
- Submit the Draft EIR
- Address comments on Draft EIR
- Submit Final EIR; and
- Obtain a decision.

18.12 Updating of IAP Database for EIR

The IAP database/spreadsheet will be updated and reviewed as and when necessary, during the execution of the EIA.

18.13 Review of Draft EIR

The draft ER will be circulated for 30 days, and this document will be lodged for public review using the public participation methods mentioned on (***Table 10***). (***Note****: This could change subjected to Covid-19 Regulation. Also, refer to PP Plan*).

Copies of the Draft EIR will be provided to the regulatory and commenting authorities.

18.14 Comments and Responses Report

A Comments and Responses Report will be compiled and included in the EIA Report, which will record the date when issues were raised, a summary of each issue, and the response of the team to address the issue.

In addition, any unattended comments from the Scoping Phase or where the status of the previous responses has changed will also be addressed in the Comments and Responses Report for the EIA phase.

18.15 Notification of Decision

All I&APs will be notified via email, within 14 days of receipt of the final decision, on the application.

19 EIR OUTLINE (PLAN OF STUDY)

The following report skeleton is proposed for the EIR:

Table 20: Proposed EIR outline

1. INTRODUCTION
2. PROJECT TITLE
3. PROJECT DESCRIPTION
4. PROJECT LOCALITY
4.1. Geographic Context
4.2. Site Locality
5. SITE ACCESS
6. ACTIVITY MOTIVATION
6.1 The Need
6.2 Desirability
7. DESCRIPTION OF ACTVITIES
7.1 Construction Activities
7.2. Design Criteria
8. PROJECT ALTERNATIVES
8.1 Routing Alternative
8.2 Design Alternative
8.3 Technology Alternative
8.4 Location Alternative
8.5 No-Go Alternative
8.6 Discussion of Preferred Alternatives
9. APPLICABLE LEGISLTAION, POLICIES AND GUIDELINES

10. DESCRIPTION OF BASELINE ENVIRONMENT

10.1 Climate

10.2 Hydrology

10.3 Topography

10.4 Biomes

10.5 Flora

10.6 Protected Areas

10.7 Fauna

10.8 Geology

10.9 Visual and Land use Character

10.10 Heritage and Cultural Aspects

10.11 Socio-economic Aspects

10.12 Noise

11. WASTE, EFFLUENT AND AIR POLLUTION

11.1 Waste

11.2 Effluent

11.3 Air Pollution

12.EXISTING SERVICES

12.1 Water Use

12.2 Roads

13.PUBLIC PARTICIPATION

13.1 Background

13.2 Objectives of Public Participation

13.3 Notification of I&Aps

13.4 Comments from I&Aps

14.IMPACT ASSESSMENT AND MITIGATION MEASURES

14.1 Impact Analysis for preferred Alternatives

15.CUMMULATIVE IMPACT ASSESSMENT AND MITIGATION MEASURES

16.RECOMMANDATIONS BY SPECIALISTS

17.RECOMMENDATION BY EAP

18.CONCLUSION

19.APPENDICES

-EAP Declaration

-EMPr

-Maps and Layouts

-Public Participation Records

-Specialist Reports

-Motivation for Exclusion of other Specialist Studies

-Environmental Screening Report

20 TIME FRAMES

Table 21 presents the proposed timeframes for the EIA (Scoping and EIR) process. Note that these dates are subject to change.

Table 21: EIA Time Frames

Scoping Phase	Start	Finish
Review of the Draft Scoping Report by authorities & I&APs (30 days)	11/03/2022	11/04/2022
Submit Final Scoping Report	15/04/2022	
DFFE Review and Decision (43 days review period) on scoping report	15/04/2022	27/05/2022
Review of Draft EIR by authorities & I&APs (30 days)	08/07/2022	08/08/2022
EAP Submit Final EIA Report & EMPr to DFFE	18/08/2022	
DFFE Review and Decision (107 days)	18/08/2022	Max 107 days
I&AP Notification on Decision (14 days)	Undetermined	

21 CONCLUSION

The scope of an environmental assessment is defined by the range of issues and alternatives it considers, the nature of the receiving environment, and the approach towards the assessment. Key outcomes of the Scoping phase for the Olifantspoort and Ebenezer WSS are as follows:

- Stakeholders were effectively identified and were afforded adequate opportunity to participate in the scoping process.
- Alternatives for achieving the objectives of the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes were duly considered.
- Significant issues pertaining specifically to the construction and operational phases of the upgrading of the Olifantspoort and Ebenezer Water Supply Schemes were identified.
- Sensitive elements of the environment to be affected by the proposed pipeline were identified.
- A Plan of Study was developed to explain the approach to executing the EIA phase, which also includes the Terms of Reference for the identified specialist studies; and
- The scoping exercise set the priorities for the ensuing EIA phase.
- No fatal flaws were identified in terms of the proposed activities and the receiving environment that would prevent the environmental assessment from proceeding beyond the Scoping phase. It is the opinion of the EIA team that Scoping was executed in an objective manner and that the process and report conform to the requirements of Regulation 21 and Appendix 2 of GN No. 326 (7 April 2017), respectively. It is also believed that the Plan of Study for EIA is comprehensive and will be adequate to address the significant issues identified during Scoping and to ultimately allow for informed decision-making.

This Draft Scoping Report is available for a review and comment period of 30 days, from ***11th of March 2022*** to the ***11th of April 2022***. Comments and submissions received in response to this report will be submitted to DFFE (the competent authority).

Written submissions must be addressed to:

Emvelo Quality and Environmental Consultant (Pty) Ltd

Attention: **Ms Phumzile Lembede**

PO Box 101672, Meerensee, 3901

Tel: 035 789 0632 Fax: 086 577 5220

Email: info@emveloconsultants.co.za / dumisani@emveloconsultants.co.za

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APPENDICES

APPENDIX A. DECLARATION OF INFORMATION

I, the undersigned **Phumzile Lembede**, on behalf of **Emvelo Quality and Environmental Consultant**, hereby declare that the information provided in this application is correct and true.

11 March 2022

Signature Date

Principal EAP **Emvelo Quality and Environmental Consultant**

Position Company

APPENDIX B. LOCALITY MAP AND LAYOUT

B-1: Locality Map

B-2: Layout

APPENDIX C: DEPARTMENT ACKNOWDGEMENT LETTERS

APPENDIX D SITE PHOTOGRAPHS

APPENDIX E PUBLIC PARTICIPATION PROCESS

E-1: News Paper Advert

E-2: Onsite Notices

E-3: Public Participation Plan and Register of I&APs

E-4: Background Information Document

E-5: Proof of Circulation to I&APs

E-6: Comments and Responses

APPENDIX F. EA PRE-APPLICATION MINUTES

APPENDIX G. EAP'S CV(S)

APPENDIX H. ENVIRONMENTAL SCREENING REPORTS