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DRAFT: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

EIA REF: 14/12/16/3/3/2/2145

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

23 AUGUST 2022

Prepared for:

Sigodi Marah Martin Management Support (Pty) Ltd.

On behalf of:

Lepelle Northen Water (SOC)

Applicant Details:

Applicant	**Lepelle Northen Water (SOC)**
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Project Principal Agent	**Sigodi Marah Martin Management Support (Pty) Ltd.**

Environmental Assessment Practitioner (EAP) Details

Name of Consultancy	**Emvelo Quality and Environmental Consultant (PTY) Ltd**
Name of EAP	**Phumzile Lembede (B.Sc. Honours in Environmental Management) Pr. Sci.Nat (Environmental Science), EAPASA & IAIAsa.** **Dumisani Myeni (B.Sc. Honours in Environmental Management); Cand.Sci.Nat. Nat (Environmental Science).**
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PROJECT TEAM	CLIENT CONTACT PERSON
Phumzile Lembede Dumisani Myeni	Gundo Motsoare

Overview: Mitigation of Impacts related to the Proposed replacement of Specon bypass pumping main within Lebowakgomo, and refurbishment/rehabilitation of Megoring and Thakgalang river crossings within Thakgalang, in order to ensure the Client's compliance with all relevant environmental legislations.

Project Team Details	
Principal EAP	***Phumzile Lembede*** (BSc. Honours in Environmental Management) Registered: Pr.Sci.Nat (Environmental Science) & EAPASA Field: Environmental Management & Water Resource 10 Years' Experience phumizle@emveloconsultants.co.za
Study Lead	***Dumisani Myeni*** (BSc. Honours in Environmental Management) Registered: Cand.Sci.Nat (Environmental Science) Field: Environmental Management, Water Resource & Waste Management. 8 Years' Experience dumisani@emveloconsultants.co.za

QMS - INFORMATION

PRINCIPAL EAP	STUDY LEAD
PHUMZILE LEMBEDE	DUMISANI MYENI
ENV. CONSULTANT	ENV.CONSULTANT

QMS-REVISION HISTORY

Revision	Revision Date	Details	Authorized	Name	Position
1	10-08-2022	FINAL EMPr	Y	Dumisani Myeni	Study Lead Env. Scientist
2	17-08-2022	FINAL EMPr	Y	Phumzile Lembede	Principal EAP Env. Scientist

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LIST OF ACCRONYM

C	Contractor
CEMP	Construction Environmental Management Plan
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DEV	Developer
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&AP	Interested and Affected Parties
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMWA	National Environmental Management Waste Act (Act 59 of 2008)
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)
PM	Project Manager
PPA	Project Principal Agent
PTO	Permission to Occupy
EA	Environmental Authorisation
SAHRA	South African Heritage Resources Agency
ToR	Terms of Reference

GLOSSARY OF ITEMS

ARCHAEOLOGICAL RESOURCES: includes (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation; wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP): describes the main environmental management requirements that the Contractor must comply with during the construction phase to ensure that the environment is considered, negative impacts avoided or minimised, and positive impacts enhanced. The CEMP is critical to the principal Contractor and the Contractor's Environmental Officer (EO) as well as any sub-contractors performing work on the principal Contractor's behalf.

CONSTRUCTION PROJECT MANAGEMENT TEAM: The team consists of a Project Manager as well as a Safety and Health Officer as required in terms of the Occupation Health and Safety Act (Act 85 of 1993) (OHSA) and an Environmental Control Officer (ECO) as required in terms of NEMA.

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

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.

DEVELOPMENT FOOTPRINT: any evidence of physical alteration as a result of the undertaking of any activity.

ENVIRONMENT: in terms of the National Environmental Management Act (No 107 of 1998) (as amended) (NEMA), Environment means the surroundings within which humans exist and that are made up of:

- the land, water, and atmosphere of the earth;

- micro-organisms, plants 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 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 CEMP and conditions stipulated by the authorities as prescribed in NEMA.

ENVIRONMENTAL MANAGEMENT PLAN (EMP): A plan generated by the Contractor describing the relevant roles and responsibilities and how potential environmental risks will be assessed and managed including the monitoring and recording thereof.

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

EMERGENCY: an undesired event that results in a probable significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.

FATAL FLAW: is an issue or conflict (real or perceived) that could result in developments being rejected or stopped.

HAZARDOUS 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.

INCIDENT: an is an event that may cause harm or potential harm to an environmental receptor e.g. air, water, land, wildlife or local habitat.

INDIGENOUS VEGETATION: refers to vegetation consisting of indigenous 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.

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.

MAINTENANCE: actions performed to keep a structure or system functioning or in service on the same location, capacity, and footprint.

METHOD STATEMENT: a method statement is a written submission by the Contractor to the Engineer in response to the specification or a request by the Engineer, setting out the plant, materials, labour, and method the Contractor proposes to carry out an activity, identified by the relevant specification or the Engineer when requesting a Method Statement. It contains sufficient detail to enable the Engineer to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

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

POLLUTION: the NEMA defined 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.

PROJECT ENVIRONMENTAL SPECIFICATION (PES): describes standards specific to a particular project. Variations and additions to the SES are set out in this PES. These would include the Environmental Authorisation (EA) issued to the project or elements generally drawn from the EA. The PES may also require a more stringent standard to that described in the SES if required by the EA or a particular industry code to which the project subscribes including any environmental constraints at a construction site. The PES need not be a separate document; however, it can be in a format of an appendix/addendum making reference to the EA, permit(s) or licence(s) applicable to the project. In cases where the project does not trigger any of the NEMA listed activities or any permit(s)/licence(s), the PES may be compiled to prescribe additional environmental management measures over and above the measures stipulated on the SES.

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.

SAFETY, HEALTH AND ENVIRONMENTAL (SHE) OFFICER: the SHE officer is a contractor's representative, responsible for the safety, health and environmental aspects on the construction site. The SHE officer will be responsible for the day-to-day monitoring of the EMP and Health and Safety Plan as per the OHSA.

STANDARD ENVIRONMENTAL SPECIFICATION (SES): describes the minimum standards for environmental management for a range of environmental aspects associated with all construction projects with which the Contractor must comply.

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) (NWA) and a reference to a watercourse includes, where relevant, its bed and banks.

WATER POLLUTION: the NWA defined 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 (aa) to the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property.

WETLAND: a 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 water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

WORKFORCE: refers to the entire project team including people employed by the Applicant/Client/Developer directly, his Principal Agent or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contractors and casual labour.

1 INTRODUCTION

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 Lepelle Northen Water (SOC) (LNW) 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. The proposed upgrading components form phase 1 for these broader schemes upgrade. These schemes supply potable water to the Polokwane Municipal area, and surrounding communities. Therefore, LNW has identified components of the project for advance implementation to secure Polokwane's current water needs. Consequently, the Environmental Impact Assessment (Scoping and full EIA) process has commenced, as a result of the proposed upgrades.

This EMPr has been prepared in compliance with the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ["NEMA"] and the Appendix 4 of 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.

1.1 Details of the EAP

The contact details of the Emvelo Quality and Environmental Consultant (Pty) Ltd. (the EAP) is detailed on the cover page with project details. Herewith, below the details of the project team conducted the EIA. The CVs are attached as (***Appendix F***) of EIR.

Table 1: Project Team

Name	Qualification	Professional Registration	Experience (Years)	Duties
Phumzile Lembede	B.Sc. Honours in Environmental Management.	Pr. Sci. Nat. (Environmental Science) EAP (EAPASA)	10	Principal EAP (Project Manager & Environmental Scientist
Dumisani Myeni	B.Sc. Honours in Environmental Management.	Cand. Sci. Nat. (Environmental Science)	8	Study Lead Environmental Scientist

2 PURPOSE OF THIS DOCUMENT

The purpose of this EMPr is to ensure that the environmental impacts of the various phases of the development of the receiving environment are managed, mitigated, and kept to a minimum. The document is binding on the Applicant; all contractors and sub-contractors; and visitors to the site. It must be included as part of any tender, as well as contractual documents between the applicant and any contractors. This will ensure that all environmental impacts are managed for the duration of project cycle. This document requires that responsibility, accountability, and commitment are promoted by the developer, the main contractor, and sub-contractors.

3 OBJECTIVES OF THE EMPR

The objectives of this document are to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
    - Minimise disturbance of the natural environment;

- Prevent or minimise all forms of pollution
- Protect indigenous flora and fauna;
- Prevent soil erosion and facilitate re-vegetation of affected areas;

- Comply with all applicable laws, regulations, standards, and guidelines for the protection of the environment;
- Adopt the best practical means available to prevent or minimise adverse environmental impacts;
- Ensure that the construction and operational phases of projects are undertaken within the principles of Integrated Environmental Management;
- Develop waste management practices based on prevention, minimisation, recycling, treatment, or disposal of waste;
- Describe all monitoring procedures required to identify impacts on the environment;
- Train employees and contractors with regards to their environmental obligations;
- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on-site; and
- Detail specifications deemed necessary to assist in mitigating the environmental impacts of Project.

4 SCOPE OF THE EMPR

In order to achieve the above objectives, the scope of work must be according to the requirements as stipulated in the Appendix 4 of GNR 326 EIA regulations, Government Notice No. 38282 as amended in 2017. The EIA regulations stipulate the requirements for the content of EMPr.

Therefore, the scope of the EMPr must include the following:

- Definition of environmental management objectives to be realised during the life of the project (i.e., construction, operation, and decommissioning phases);
- Definition of detailed actions needed to achieve these objectives, including how they will be achieved, by whom, by when, with what monitoring/verification, and to what target or performance level.

- Mechanisms must also be provided to address the changes in project implementation, emergencies or unexpected events and associated approval processes;
- Clarification of institutional structures, roles, communication and reporting processes required as part of the implementation of the EMPr;
- Description of the link between EMPr and associated legislated requirements;
- Description of the requirements for monitoring implementation of the EMPr, record keeping, reporting, review, auditing and updating of the EMPr.

5 LOCALITY MAPS SITE LOCALITY CONTEXT (SITE DESCRIPTION)

The upgrades for Olifantspoort and Ebenezer WSS phase 1 will take place and traverse along following localities, namely : 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 (Table 2 & 3) below, provides the Global Positioning System (GPS) co-ordinates for the outlined water packages for the proposed upgrades for Olifantspoort and Ebenezer WSS phase 1.

Table 2: 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 to 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

Table 3: 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.

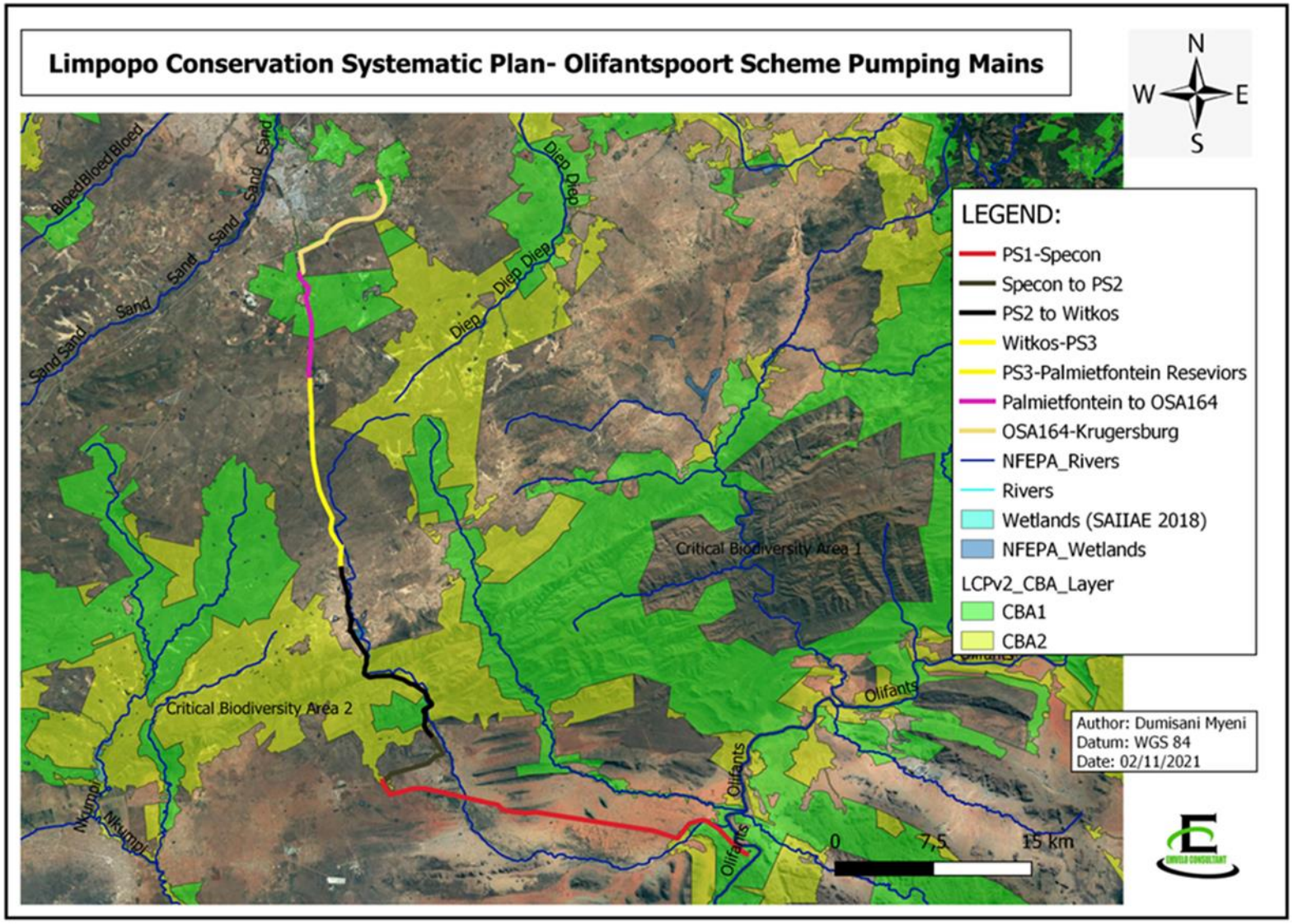

Figure 1: Map Showing Locality of Olifantspoort Supply Scheme Pumping Mains

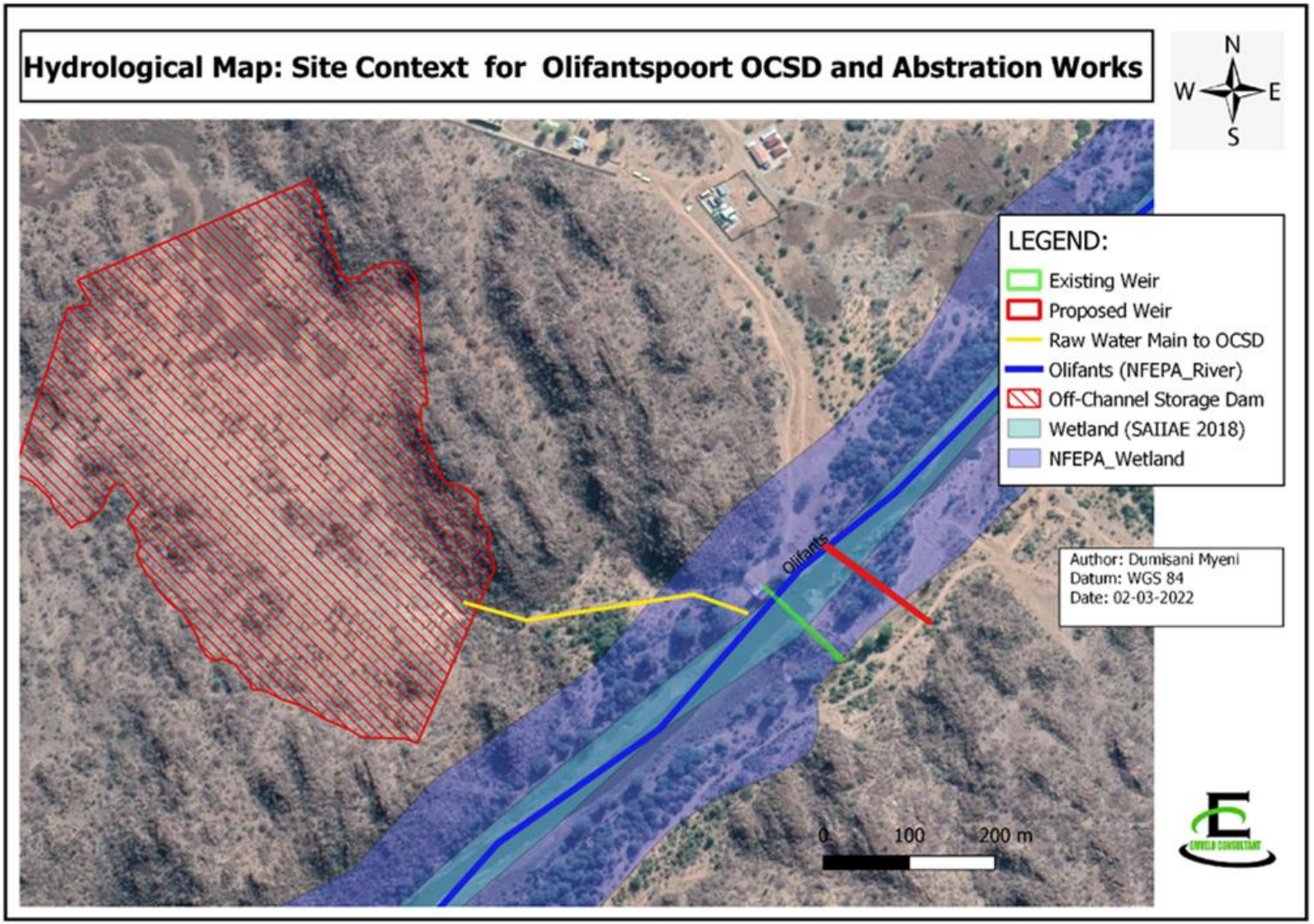

Figure 2: OCSD and Abstraction Works Site Layout

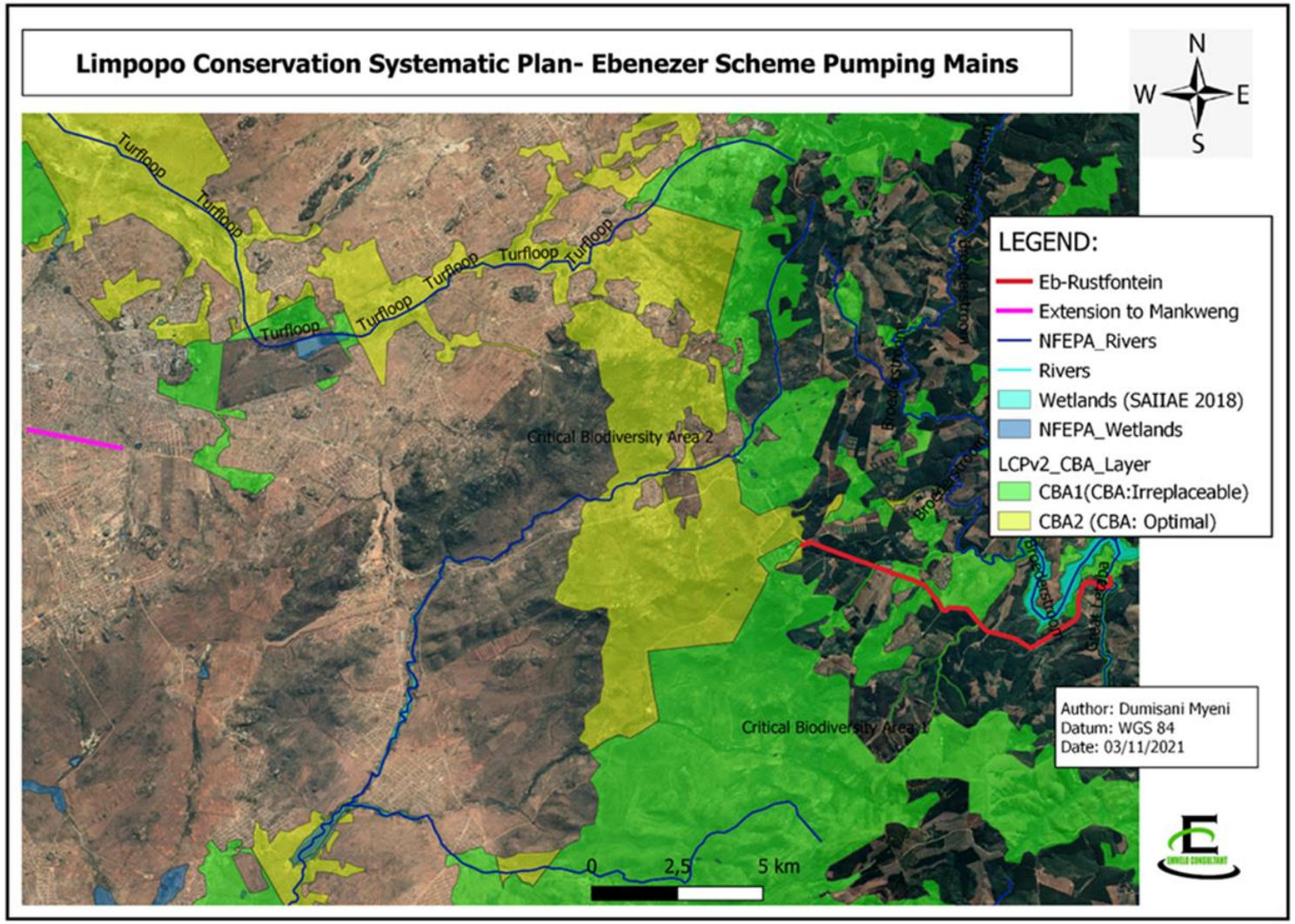

Figure 3: Map Showing Locality of Ebenezer Supply Scheme Pumping Mains

6 GENERAL PROJECT INFORMATION

This general project information outlines the following:

- Proposed construction activities;
- Description of the receiving environment from the site; and
- Identification of potential environmental impacts.

6.1 Description of Activities for Upgrading of Olifantspoort WSS Phase 1

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 construction of new weir at 100m downstream of existing Olifantspoort weir/ or alternatively upgrading of existing Olifantspoort weir;
- Upgrading of and raw water abstraction works;
- Construction of 200 000m2 Olifantspoort off-channel storage dam with 5m embarkment height; The dam will form off-channel storage from Olifants River with a capacity of 1750 000 m³ at the full supply level.
- Construction of 350m (1600mmø) raw water main from Olifantspoort abstraction to off-stream storage dam, and 450m(1600mmø) raw water main from off-channel storage dam to Olifantspoort WTW);
- Refurbishment of the Olifantspoort WTW by constructing new 60 Mℓ/d module, within Olifantspoort WTW facility;
- Refurbishment of Pump Station (PS): PS1, PS2 and PS3, by construction of new pumpstations within the pumpstation facilities.
- Upgrading of Specon Storage Reservoirs, construction additional 12Mℓ reservoir;
- 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.

6.2 Description of Activities for upgrading of Ebenezer WSS phase 1

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 approximately11km (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.

6.3 Description of the baseline environment

The Olifantspoort construction corridor will traverse six (6) distinct habitats that were delineated, namely grassland, bushveld, forest , thornveld, watercourse (instream, riparian, wetlands), and secondary vegetation, and settlement (rural, peri-urban and urban).

Ebenezer Scheme traverse four (4) distinct habitats that were delineated, namely grassland (natural habitat), bushveld (natural), farmlands (transformed), urban and peri-urban settlement (transformed).

The study area within Olifantspoort WSS has the following environmental sensitivities: The Olifantspoort Off-Channel Storage Dam will be constructed within Critical Biodiversity Area 1 (CBA1); The Olifantspoort abstraction works (weir and upgrade abstraction pipeline) will take place within Olifants River (NFEPA) and within CBA1. The pipeline route from PS1 to Specon reservoirs has some of its sections traversing along sensitive environment namely CBA1, CBA2, Chunies River (NFEPA), and one hydrological body (wetland). The pipeline route from PS2 to Witkos and Palmietfontein Reservoirs has some of its sections traversing the CBA1, CBA2 Chunies River (NFEPA), and three hydrological bodies (wetlands). The pipeline route from Palmietfontein Reservoirs to OSA164 has some of its section traversing along CBA1, three (3) hydrological bodies, and also traverse adjacent the Protected Area. The pipeline route from OSA 164 to Krugersburg reservoirs has other part of pipeline traversing adjacent the boundary of Protected Area (Polokwane Nature Reserve) , CBA1 and one (1) hydrological body (wetland).

Whereas the study area within Ebenezer WSS has the following environmental sensitivities: The pipeline route from Ebenezer pumpstation to the Rustfontein reservoirs complex has portions traversing the Great Letaba River (NFEPA), one (1) hydrological body (wetland system), and a vast track of CBA1. The section adjacent Haenertsburg village overlain by Woodbush Granite Grassland which is considered '*Critically Endangered'*.

6.4 Activities and aspects causing impacts

Having mentioned the above site characteristics, the planned activities will result in: Excavation within the instream habitat, and watercourses for river crossing and wetland; Infilling of concrete encase within a riverbed at river crossings, excavation and infilling for new weir, vegetation clearance within the construction corridors.

Potential negative impacts that are likely to occur during the construction and operational phases are outlined on (***Table 4***) below.

Table 4: Identification of potential environmental impact

#	Proposed construction work activity	Potential negative impact
1	Site camp establishment, parking of construction vehicle, hauling material to site and spoils to suitable site (still to be identified).	Clearance of natural vegetation, pollution and accommodation of traffic (bio-physical environmental and social impact).
2	Vegetation clearance within the construction corridors.	Clearance of indigenous vegetation, Plant SCC, Woodbush Granite Grassland (*Gm25*) '*Critically Endangered',* loss of animal species, prefoliation and colonization of A&IP species (bio-physical environmental impact).
3	Excavation of riparian, aquatic/instream habitat, wetland habitat within a construction corridors.	Working on watercourse, impending flow, removal of geological features, clearance of natural aquatic vegetation and pollution to water bodies, loss of animal species (bio-physical environmental impact).
4	Excavation across the riverbanks for pipeline crossing and replacement.	Erosion and river incision as a result of excavations within the instream habitat (Bio-physical impacts).
5	Excavation for installation of pipeline, construction of OCSD, and foundation base for associated infrastructure.	Erosion, geological instability, removal or paleontological and heritage artifacts, dust and water pollution (Biophysical and Social Impacts)
6	Hauling of material to site, including removal of spoil to suitable site (still to be identified).	Public safety, accommodation of traffic, and dust (social impact).

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

6.5 Sensitive areas

The proposed upgrade will take place within the watercourse, which constitute ecological risks. However, will have minimum negative impacts on the environment provided that all sensitive areas are respected, and correct construction mitigations are followed.

The primary sensitive area relating to this project is the watercourse (Olifants River, Chunies River, and Greater Letaba River) at the vicinity of abstraction works, and where the pipeline river crossing will take place. Therefore, any work in and around natural water bodies must be considered potentially negative and precautionary practices must be adopted.

Secondly, some portions of construction corridor traverse the CBAs. Therefore, the construction for the pipeline route will involve clearance of indigenous vegetation for the construction of pipeline corridor on the Critical Biodiversity Area, within rural area. Moreover, the section adjacent Haenertsburg village overlain by Woodbush Granite Grassland which is considered '*Critically Endangered'*.

Thirdly, the OSA164-Krugersburg and Palmietfontein to OSA164 pipelines traverse along the boundary of Polokwane Nature Reserve.

7 LEGISLATION REQUIREMENTS

The EMPr, which forms an integral part of the contract documents, informs the contractor as to his/her duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by the construction activities associated with project.

The contractor must note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation (NEMA, Section 28, "Duty of Care"), the EA conditions, and in terms of the additional conditions to the general conditions of the contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter will prevail.

Additionally, in terms of NEMA (second amendment), a developer may be guilty of an environmental contravention and liable for a penalty of up to R10m or a 10-year prison term (or both) when listed activities are undertaken without an EA or the project does not comply to the conditions of the environmental authorisation (EA).

It is expected that the contractor is conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract. Some of the environmental legislation applicable to this type of project include, but are not limited to, the following legislation:

Table 5: Environmental Statutory Framework

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 ➢ Section 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

Legislation	Relevance
	➢ 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) ➢ 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
GN No. 326 (7 April 2017)	➢ 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.
➢ 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 that are relevant to this application are**: Listing Notice 1 Activity 9, 12, 19 & 45; Listing Notice 2 Activity 11, 15 & 16; Listing Notice 3 Activity 12 & 14.**	
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).
NEMA, 1998 - GN R982 of 4 December 2014 - Environmental Impact Assessment	➢ Regulation 1 and 2: Interpretation, Purpose and Commencement of Regulations) ➢ Regulation 3: Timeframes) ➢ Regulation 4: Decision on Applicant and Notification to I&AP's ➢ 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

Legislation	Relevance
Regulations, 2014	➢ 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 Resources Act (Act No. 25 of 1999)	➢ Section 34 – protection of structures older than 60 years. ➢ Section 35 – protection of heritage resources. ➢ Section 36 – protection of graves and burial grounds. Section 51: Offences and Penalties ➢ Authority – Provincial Heritage Agency : Limpopo
National Road Traffic Act 1996	➢ Section 51: Waste on Or Near National Road ➢ Authority – Limpopo Department of Transport and community safety

Legislation	Relevance
(Act No. 96 of 1996)	
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
National Environmental Management: Waste Act, 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

Legislation	Relevance
(Act No. 59 of 2008)	➢ 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
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

Legislation	Relevance
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 DUTIES OF ROLE PLAYERS

A number of role players will be responsible for ensuring that environmental practices described for this report are implemented through each of the various phases of the project life cycle (construction, operations and maintenance, decommissioning). Formal responsibilities are necessary to ensure that all environmental procedures and actions are executed. Specific responsibilities of the Project Proponent, Project Manager/Project Principal Agent, Site Manager/Engineer, and Contractor/Operator are detailed below.

Table 6: 5.1 Personnel/Entity roles and responsibilities

#	Responsible persons/entity	Roles and responsivities
1	Applicant/ Project proponent	The project proponent (Lepelle Northern Water Pty Ltd.) is the holder of the Environmental Authorisation (EA) and is responsible for the implementation of the conditions of the authorization as well as the management measures contained in the approved EMPr (this report). In terms of NEMA, Section 28 (1) the construction of the pipelines and the associated infrastructure and the issuing of the EA implies that harm to the environment is authorised by law. Additionally, due to the need in the community for this essential service, such impacts cannot reasonably be avoided or stopped. Notwithstanding, Lepelle Northen Water (LNW) is required to minimise and rectify such pollution or degradation of the environment. All liabilities associated with the land will lie with the registered landowner. The holder is ultimately liable for the potential impact of the activities that are undertaken and is tasked with effective management of these impacts. The holder of the environmental authorization is responsible for; • Ensuring that all conditions of the EA , in conjunction with EMPr and CEMP are complied with; • Appointment of an Environmental Control Officer (ECO) for monitoring of implementation and compliance of the EA conditions in conjunction with EMPr and CEMP during the construction phase; • Assessment of all activities requiring special attention as specified and /or requested by the Project Principal Agent (PPA) or Project Manager (PM) and/or ECO for the duration of the contract; • Ensuring that the Contractor conducts all activities in a manner that minimizes disturbance to the directly affected residents and public in general, as advised by the PPA and/ or ECO; and • To order the Contractor, through the PPA, to suspend any or all works on-site if the Contractor or his subcontractor/supplier fails to comply with the any environmental specifications, the EA and the EMPr.

#	Responsible persons/entity	Roles and responsivities
2	Project Principal Agent /Project Manager	Sigodi Marah Martin Management Support (Pty) Ltd is the Project Principal Agent (PPA) for the upgrading of Olifantspoort and Ebenezer Water Supply Schemes, Phase 1 within the Jurisdiction of Capricorn and Mopani District Municipalities, Limpopo Province. The PPA has overall responsibility for environmental management on site which includes the implementation of the EMPr. Therefore, the PPA roles and responsibilities include the: • Overall responsibility for the implementation of the EA in conjunction with EMPr and CEMP; • The appointment of an ECO that will monitor the implementation of the EMPr; • Assessment of all activities requiring special attention as specified and /or requested by the Engineer (ENG) and/or ECO for the duration of the contract; and ensures that the Contractor conducts all activities in a manner that minimizes disturbance to the directly affected residents and public in general, as advised by the ENG and/ or ECO. • Ensuring that the Site Manager and the Contractor/Operator are aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regard to the environment; • Ensuring that all stipulations within the EA in conjunction with EMPr and CEMP are communicated and adhered to by Site Manager and the Contractor/Operator; • Assessing the Contractor's environmental performance in consultation with the ECO, and communicating directly with the Contractors on environmental issues observed on site; • Liaising with the Contractor on the matters concerning the environment, and issuing of the non-conformance notifications to Contractors in consultation with the ECO; • Arranging information meetings for and consulting with I&AP's about the impending construction activities;

#	Responsible persons/entity	Roles and responsivities
	Project Principal Agent /Project Manager (Continued….)	• Maintaining a register of complaints and queries by members of the public at the site office. This register is to be forwarded to the ECO on a monthly basis; • Ensuring the documentation of the state of the site prior to the commencement of construction activities, in conjunction with the Contractor; • Preventing actions that will harm or may cause harm to the environment, and take steps to prevent pollution of the site; • Reviewing and approving construction methods where necessary; and • Instructing the Contractor to suspend any or all works on-site if the Contractor or his subcontractor/supplier fails to comply with the conditions of the EA in conjunction with EMPr and environmental specifications.
3	Environmental Control Officer	The Environmental Control Officer (ECO) appointed by the PPA (on behalf of Lepelle Northern Water) has the responsibility for ensuring compliance of the EA in conjunction with EMPr and CEMP, and undertaking regular monitoring of the site. The ECO is responsible for conducting the environmental audits, during the construction phase of the project, according to the provisions EA in conjunction with EMPr and CEMP. The following are the duties of the ECO: • To understand the background of the project and ensure the implementation of the EA conditions and the EMPr; • To monitor the implementation of the EA conditions and the EMPr; • To advise the PPA about the interpretation, implementation, and enforcement of the EA and EMPr and other relevant environment-related matters;

#	Responsible persons/entity	Roles and responsivities
	Environmental Control Officer (Continued….)	• To brief the Contractor about the requirements of the EA, EMPr, Environmental Specifications as applicable; • To monitor and report to the PPA on the performance of the Contractor and the project in terms of environmental compliance; • To be fully conversant with all related environmental legislation and ensure compliance; • To ensure that all the environmental requirements contained within the EMPr are adhered to; • To report all non-compliances with the EA and EMPr to the relevant authority, after consultation with the PPA; • To regularly liaise with the Site Manager on matters relating to the environment; and • To compile monthly reports as to the implementation of the EMPr which must include a percentage compliance status to the EA and EMPr conditions.
4	Contractor	The Contractor shall comply with the requirements of the EA and EMPr and abide by the PPA's/PM's and ECO 's instructions regarding the implementation of the EMPr. The contractor shall: • Comply with all applicable legislation; • Be conversant with the requirements of the EA and the EMPr and ensure 100% compliance to all conditions therein; • Induct and educate all staff, including sub-contractors, about the requirements of the EA and EMPr; • Ensure that sub-contractors/suppliers who are utilised within the context of the contract comply with the environmental requirements of the EA and EMPr. The Contractor will be held responsible for non-compliance on their behalf;

#	Responsible persons/entity	Roles and responsivities
	Contractor (Continued….)	• Supply the method statement for all activities requiring special attention as specified and/or requested by the Engineer or ECO during the duration of the Contract; • Inform and educate their employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment (environmental training); and retain records of such training undertaken • Bear the costs of any damages/ compensation resulting from non-adherence to the EA and EMPr or written site instructions; • Conduct all activities in a manner that minimizes the disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment; and • Ensures that the PPA is timeously informed of any foreseeable activities that will require input from the ECO.
5	Contractor's SHE Officer	The Contractor will appoint a Safety, Health and Environmental (SHE) Officer before commencement of any work on site, whose role is to ensure implementation of the requirements of the EA conditions in conjunction with EMPr, and CEMP. The contractor's SHE Officer must have relevant environmental qualifications and experience required for the project. The Contractor's SHE Officer will liaise with the ECO appointed by PPA. It will be the responsibility of the Contractor's SHE Officer to ensure that all work is conducted according to the approved Environmental Method Statements and that the roles and responsibilities as set out in this document are fulfilled. The Contractor's SHE Officer will liaise with the ECO appointed by developer or the PPA. The Contractor's SHE Officer's tasks will include: • Be fully conversant with the EA conditions, EMPr and CEMP, and other relevant environmental requirements, and ensure 100% compliance to all conditions therein;

#	Responsible persons/entity	Roles and responsivities
	Contractor's SHE Officer (Continued….)	• Compile Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EA , EMPr and CEMP will be managed, and where relevant environmental best practice and how they will practically ensure that the objectives set up by this document is achieved; • Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor by means of conducting ongoing Environmental Awareness and Training of the Contractor's site personnel through the means of toolbox talks and other means of communication; • Undertake daily and weekly inspections of the work area(s) as per schedule or authorised through written instruction by PPA or ECO; • Ensure conformance/compliance to the EMPr, licenses and permits and approved Environmental Method Statements; • Monitor and verify that negative environmental impacts are kept to a minimum, as far as possible; • Report any non-compliance or remedial measures that need to be applied, to the ECO and PPA, in line with the requirements of the EMPr; • Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EA and EMPr; • Maintain an environmental management file and all relevant documentation and records related to environmental management; • Present a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.

9 ENVIRONMENTAL CAPACITY BUILDING PLAN

The environmental capacity building plan includes the schedules records of environmental training, induction, community involvement, and communication strategy.

9.1 Environmental training

The project team will be briefed on environmental aspects associated with the project, the compliance to environmental standards, licences and permits, the EA and the EMPr.

9.2 Induction

All staff and labourers will be required to attend a site environmental induction session, conducted in their preferred language. The site environmental aspects will be discussed during the induction session.

9.3 Community involvement

Affected and adjacent households must be informed about the construction activities, at least 7 days prior to commencement of the activities. Such I&APs must be also informed about the condition of the receiving environment and encouraged to report any environmental non-compliance by the Contractor to the PPA, subsequently the ECO.

9.4 Communication strategy

The environmental communication strategy will be developed, so that the project team and all relevant I&APs will follow a documented communication procedure. The PPA will be responsible for the communication throughout the project.

Emergency and incident reporting structures will be designed to handle any emergencies or incidents that might arise at the construction site and surroundings. The community strategy must include a designated disaster management team and community representatives. Emergency contact numbers and procedures will be communicated with the employees and community.

10 ENVIRONMENTAL CODE OF CONDUCT

One of the objectives of the EMPr is to ensure that all the workers, contractors, sub-contractors, and construction staff on this project, have an understanding of basic and relevant environmental issues and the potential impacts of on-site activities. This Environmental Code of Conduct provides the basic rules that must be strictly adhered to. It is the responsibility of the ECO to ensure that each contractor, sub-contractor, and workers understands and adheres to the Code of Conduct.

All persons are obliged to abide by the Code of Conduct. Therefore, ignorance, negligence, recklessness, or a general lack of commitment will be in compliance to the Code of Conduct.

10.1 Environmental Rules

The environmental rules apply to all personnel on site to:

- Prevent pollution;
- Prevent littering;
- Dispose all waste in the correct waste containers provided;
- Use the toilet facilities provided and not utilise the natural environment for their ablutions;
- Immediately report to the supervisor when a spillage occurs or becomes aware of a hazardous substance spillage from a vehicle, equipment, machinery or container;
- Not enter any property with the landowner or occupier's permission;
- Not dig, excavate or the erect any permanent or semi-permanent structure of any kind that is not in the scope of this project;
- Not excavate at proximity of grave sites, without the PPA's consent. All excavation must at least be 30m away from grave sites;
- Not climb over or through any fence or enter private and neighbouring properties;
- Maintain the character and visual quality of the area;
- Never deface, draw, add graffiti or cut lettering or any other markings on trees, rocks or buildings in the area;
- Collect all litter lying around and dispose correctly;

- Be familiar with basic fire-fighting procedures;
- Be aware of the locations of all fire-fighting equipment;
- Not to establish any fires allowed outside the confines of the construction camp;
- Not burn any waste;
- Care for plants and animals;
- Not injure, poach or kill any wildlife;
- Never damage, chop down or remove any tree or shrub (unless part of the scope of the project and the necessary permits/licences are in place);
- Refuse to perform any work if, in good faith and reasonably believe, at the time of the refusal that the performance of the work would result in an imminent and serious threat to the environment.

11 NON-COMPLIANCE

The application of a penalty clause to the Contractor will apply for incidents of non-compliance to the EA and EMPr, once the necessary investigations have been completed. The penalty imposed will be per incident and will be deducted from the Contractor's monthly payment certificate.

A non-compliance notice will be issued to the responsible contractor by the ECO via the Proponent's Project Manager. The non-compliance notices will be issued in writing, a copy filed in the generic EMPr file and will, as a minimum include the following:

- Time, location and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Root cause of the incident;
- Recommended / required corrective action to remedy/fix the incident;
- Recommended actions to prevent a recurrence of the incident; and
- Date by which the corrective and preventative actions will be completed.

The contractor shall act immediately when a notice of non-compliance is received and remedy/fix the non-compliance (where practical). Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated incident register and the response noted with the date and action taken. The ECO must be made aware of any such complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant Competent Authority (CA).

The contractor is deemed to be in non-compliance with the EA and the EMPr, *inter alia*, if there is a deviation from any environmental condition, environmental requirement, license or permit condition, or whose actions may cause an environmental impact.

12 PRE-CONSTRUCTION

12.1 Designing and Project Conceptualisation

Table 7: Project Design, Layouts and Conceptualisation

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Site layout and layout must clearly delineate the servitude for pipeline construction corridor. • A The route design must incorporate a pipeline construction corridor of not more than 10m width for construction corridor within the vicinity of Woodbush Granite Grassland, river crossings and wetlands, and of not more than 15m width on the remainder sections of pipeline. • The site layout plan must indicate areas that are no-go zones, to	Engineer	Site Delineation	Design/Planning Phase, and re-routing	PPA Approval	Design/Planning Phase	Site delineation in place , re-routing done.

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
limit large scale and unnecessary vegetation clearance. • The site layout for abstraction works (proposed new weir and activation works), and all wetlands and river crossings must clearly illustrate the proposed construction footprint within the site, clearly delineate the servitude for construction corridor.	Engineer	Site delineation	Design/Planning Phase	PPA Approval	*Adhoc* Basis	Site delineation in place
• Where possible the pipeline must be re-aligned along the road reserve or gravel roads to prevent intrusion into wetlands. This must be the first priority in determining the pipeline route within sensitive environment. • Develop a site layout design for re-routing 1.3 km of pipeline	Designer	Re-routing of pipeline according to EA conditions.	Design/Planning Phase	ECO & PPA Approval	*Adhoc* Basis	Design provided a diversions and re-routing

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
between the 6.0 to 8.0 km section of Ebenezer to Rustfontein Reservoir pipeline and within the Haenertsburg Village pipeline, to avoid the environmentally sensitive 'Critically Endangered' grassland (Woodbush Granite Grassland) within Haenertsburg Nature Reserve. The pipeline will be re-routed along areas that have been previously disturbed along the timber plantation boundary and behind Haenertsburg Cemetery. • The proposed pipeline must be constructed outside of any other remnant of Woodbush Granite Grassland so as not to disturb this vegetation.	Designer	Re-routing of pipeline according to EA conditions	Design/Planning Phase	ECO & PPA Approval	*Adhoc* Basis	Design provided a diversions and re-routing

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Design to re-aligned the first 300m section of PS1 to Specon adjacent the Olifantspoort WTW to be aligned and redirected along the existing gravel road to avoid intrusion into identified wetland system next to WTW. • The section between OSA164-Krugersburg and Palmietfontein to OSA164 of pipelines which traverse along the boundary of Polokwane Nature Reserve, must be aligned to R37 road reserve. • Re-route the pipeline to remain within development footprint, outside of wetlands. Install a 28m buffer for CVB wetlands; a 26m buffer for UVB wetlands; a 25m buffer for seepage wetlands; and 20m buffer for dams to restrict	Designer	Re-routing of pipeline according to EA conditions	Design/Planning Phase	ECO & PPA Approval	*Adhoc* Basis	Design provided a diversions and re-routing

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
development from encroaching into the wetland systems.						
• A design for a new Olifantspoort weir must incorporate a fish ladder to provide a fishway and aquatic species migration from either side of weir wall.	Designer	Best Weir Design Practice as recommended by Aquatic Ecologist	Design/Planning Phase	PPA	*Adhoc* Basis	Best Practice Weir Design
• A detailed method statement for working within the watercourse must be compiled by the contractor prior to the commencement of the project. This method statement must be approved by the aquatic ecologist or ECO.	Contractor	Construction Method Statement	Planning Phase	ECO	*Adhoc* Basis	Method Statement in line with EA Conditions.
• Identify and delineate the existing multiple access points to the pipeline routes. These access route must form integral part of site layouts which must be	Contractor	Basic Traffic Management Plan Access routes delineation.	Planning	PPA & ECO Approval	Once	All access routes delineated, and approved by local authorities

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
communicated to project team including delivery crew. • A basic traffic management plan must be included during construction phase. The mitigation to this will be addressed by proper implementation of Safety Management Systems during the construction.		Approval of access route by relevant authorities				
• The design along the road reserve and for road crossing must 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	Designer	Best Practice road crossing design Submission of wayleaves designs to DOT for approval. Submission of Wayleaves to	Design/Planning Phase	DOT Approval Municipality & Telkom Approval	Once	Wayleave approval

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
be constructed by means of pipe jacking. Specification, requirements, and preferences with regards to access roads to the respective roads. • Identify all existing underneath and surface infrastructure, such as water pipeline, telecommunication lines, powerlines which will be on the way, and submit the wayleaves to relevant authorities to approve the design and construction method. These designs will be requirements to secure wayleave.		Municipalities and Eskom				
• The design for pipeline route within rural settlement and peri-urban periphery must be informed by Social Facilitator through engagement with the households	Design	Re-routing	Design	PPA and Social Facilitator	*Adhoc* Basis	PTOs and Re-routing

Impact Management Outcome: All Engineer design the project output in a such a way that avoid and mitigate potential impacts associated with construction activities.						
Impact Management Actions	**Implementation**			**Auditing/ Approval**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
adjacent to pipeline route for assistance in identifying all unmarked grave that could be on the section development, and review designs to prevent intrusion into grave sites, by designs that will re-route activities at least 30 metre buffer. Such areas must be marked as "No-Go" areas.						

12.2 Environmental file

Table 8: Contents of environmental file

Impact Management Outcome: All relevant environmental documents and records are easily accessible to facilitate compliance to the EA and EMPr						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
Content of Environmental File must include but not limited to these docs: • Environmental Authorization • Relevant environmental permits and licences • Site Access Certificate (PTO) • Site Closure Inspection Form • Site layout plan • Waste Disposal Certificates • Environmental Site Rules / Environmental Awareness Toolbox Talk • Environmental training schedule • All audit reports and daily site inspection reports • Complaints Incident Register • EMPr, CEMP, PES as supplied by PPA, and EMP by Contractor	ECO & PM	Make use of EA and other authorisation conditions. Have a lever arch file, divided for the different docs and clearly labelled.	Project Implementation. Pre-construction	ECO	Monthly	In line with EA, EMPr, CEMP, WULA and other environmental permits and licences

Impact Management Outcome: All relevant environmental documents and records are easily accessible to facilitate compliance to the EA and EMPr						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Signed Declaration of Understanding • Other Environmental Standards required for this project • Contractor's information • Contractor's Environmental Method Statements • Contractor Environmental Policy • Contractor Organogram • Appointment of Contractor' SHE Officer and Declaration of Understanding (Including CV) • Schedule of Contractor' Plants and Equipment • MSDS and Hazardous Substance Register • Emergency Contact Register						

12.3 Environmental Capacity Building

Table 9: Environmental communication and awareness

Impact Management Outcome: All workers are aware of environmental impacts, understand their individual responsibilities in terms of this EMPr and are able to minimize the negative environmental impacts of the project						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The project team must receive environmental training on the environmental legislation, EA and EMPr conditions;	ECO & PM	Through scheduled sessions or as part of contract meeting	Pre-Construction/Initial contracts meeting	ECO	Once	Minutes/ Attendance Registers
• All staff and construction labourers must receive environmental training on the EA and EMPr conditions;	ECO, SHE Officer & CM	Through scheduled sessions	Prior to site establishment, and when required	ECO	Monthly	Attendance Registers
• All visitors to undergo environmental induction training.	CM & SHE Officer	Through Site Environmental Rules	Duration of a project	ECO	Monthly	Attendance Registers
• The Contractor to maintain effective communication with all relevant I&APs.	CM & SHE Officer	Information Posters & Suggestion scheme	Duration of a project	ECO	Monthly	Information poster at site office& work areas. Communication Records

13 CONSTRUCTION PHASE

13.1 Construction site camp establishment

Table 10: Construction site camp establishment

Impact Management Outcome: Site camps have zero to minimal environmental impacts for the duration of the project						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Establish the site camp on existing disturbed areas and not in environmental sensitive areas. • Site camp be establish at least 100m away from the watercourse. • Site offices, workers' toilets and holding areas for equipment, vehicles and materials, must not be located on grassland, Nature Reserves or forest fragments.	PM, CM & ECO	Client or Local authorities to designate the area for site camp. PM, CM & ECO prior site visit.	Prior to site establishment.	ECO	Once	Permission to Occupy (PTO) Letter, and photographs of prior to site establishment.
• Minimise/prevent disturbance or damage to indigenous vegetation when clearing the site.	PM, CM & SHE Officer	Buffer and demarcate a no go areas	During to site establishment,	ECO	Monthly	Buffer Demarcation
• Strip topsoil together with grass / groundcover from all areas where temporary structures are located,	PM, CM & SHE Officer	Rehabilitation Plan	During site establishment	ECO	Monthly	Images and adherence to rehabilitation plan.

and stockpile topsoil. Use topsoil for site rehabilitation						
• Buffer sensitive area and declare them a no go zone. Restrict encroachment of site camp activities to sensitive area	PM, CM, & SHE Officer	Site Camp layout plan, and demarcation. .	During site establishment	ECO	Monthly	Images, and Construction Site Camp layout plan and demarcation buffer.
• The construction site camp must have: Site office, demarcated site for parking and maintenance of vehicles, refuse bins and skips, employee welfare facilities (ablution, shelter, water), refueling area and sign; designated smoking area.	PM, CM, & SHE Officer	Construction Site Camp layout plan	During site establishment	ECO	Monthly	Images and adherence to Construction Site Camp layout plan.
• Mobile chemical toilets must be provided onsite, with a minimum ratio of one toilet per 15 staff members, male and female separately. • Mobile toilet must be serviced at regular intervals by approved service provider and be place not less than 100m away from watercourses.	PM, CM and SHE Officer	Provision of toilets close to working areas during the project.	Duration of a project	ECO	Monthly	Images, Service Certificates

13.2 Site Access and Movement of Construction Vehicles

Table 11: Access to construction site

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Where, possible use of existing access routes to pipeline route, and construction areas. • The material hauling route must be demarcated. No construction trucks, trucks transporting material and equipment will be allowed to pass through the residential areas where there are restrictions in terms of the axle load restrictions on the road. • Construct approved vehicle turning areas, avoiding selecting of ecological sensitive areas as turning point, and erect relevant road safety signage at strategic points for accommodation of traffic. Also, have turning area	CM & SHE Officer	Delineate all access routes. Permission of access Roads within residential areas. Traffic Management Plan Incorporated within Health and Safety Management Systems.	Construction Phase	ECO	Monthly	Approval for use of access roads Visible signage delineating construction access routes (Temporary road signs).

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
routes approved by the PPA, OHS Agent &ECO. • Construction staff must only use authorized paths and roads. • Implement rules to be applied to all drivers including the delivery personnel.						
• It is highly recommended that where there are no existing access road, or access road pass through residential areas, the construction access must follow the servitude of existing pipeline route. Progressive site clearance for pipeline and access route will be achieved through the following: • The construction servitude must include the trench, one-way running track, topsoil stockpile corridor and subsoil stockpile	CM & SHE Officer	Integration/ Streamlining of access road with pipeline route. Through progressive clearance and pipeline construction.	Construction Phase	ECO	Monthly	Progressive clearance which streamline access road with pipeline route. Buffer determination, and No access road traversing residential areas.

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
corridor. All areas of watercourses outside this servitude must be considered no-go areas. • The tractor excavator/bulldozer must strip the topsoil and set it aside for later reinstatement or soiling of batters as required. The excavated area must serve as for pipeline route and for access to reach further working area of pipeline route. No any other roads and tracts must be developed except the clearance for the pipeline route and making provision for maintenance road within the pipeline servitude. • In order to construct a pipeline, staging areas and storage yards are cleared, strategically located along the planned right-of-way.						

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Access road must be communicated to all staff members and delivery personnel, and must have adequate signage delineating the routes entrance and exits.						
• Rehabilitate the access road upon completion of the construction period. • The access road within the pipeline servitude must be up kept for use by the maintenance vehicle, or future pipeline upgrades.	CM	Rehabilitation Plan	Construction	ECO	Monthly	Adherence to rehabilitation plan.
• Temporary access roads must have stormwater system to prevent the ponding of water during heavy rains, and be	CM	Stormwater Management Plan	Construction	ECO	Monthly	No stagnant water within the access routes/cleared areas.

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
progressively monitored and rehabilitated after heavy rains.						Adherence to rehabilitation plan.
• No access road must be constructed within wetlands and Woodbush Granite Grassland.	CM &SHE Officer	Progressive access route clearance within pipeline servitude	Construction	ECO	Monthly	Pipeline within sensitive environment is buffered. Clearly delineation of no-go area.

13.3 Storages, Stockpiling and Material Hauling

Table 12: Storages, stockpiling and material hauling

Impact Management Outcome: All The storage, stockpiling and transportation of all hazardous materials will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Store hazardous materials in a secure storage and have MSDS. • Hazardous material must be stored in secure tight containers on liquid tight flooring to prevent seepage into the ground.	CM & SHE Officer	Restricted access to hazardous materials	Construction Phase	ECO	Monthly	Photographs, MSDS and Hazardous Chemical Substances (HCS) list
• Stockpiles and storage yards must be demarcated in areas already disturbed or where they will cause minimal disturbance. • Waste storage must be stored so as to prevent leakages or being blown away, preferably undercover to prevent runoff from rains • Clearly indicate which activities are to take place in which areas	ECO, SHE Officer & CM	Checklist for storage and stockpiling. Demarcate areas and limit these activities to single sites only.	Construction Phase	ECO	Monthly	Photographs and checklists

Impact Management Outcome: All The storage, stockpiling and transportation of all hazardous materials will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
within the site e.g. the mixing of cement, stockpiling of materials etc. Limit these activities to single sites only.						
• All bulk material must be stored on site camp and move to sites only when required. • All fine products must be covered during transportation and storage • Stockpile must not exceed 2m in height and be store in a relatively flat surface at least 32m away from watercourse. • During wind periods stockpiles must be covered or where necessary be watered to prevent dust emanating from the stockpiles.	CM & SHE Officer	Checklist for Material Onsite. Just In Time (JIT) for production method. Dust suppression	Construction Phase	ECO	Monthly	Checklists , incident register and photographs

13.4 Vegetation Clearance

Table 13: Vegetation clearance for pipeline route

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The Vegetation clearance for construction of the pipeline route and site camp must be minimal, and be limited only to demarcated servitude, as approved by the project plans and site layout. • The vegetation clearance of pipeline construction corridor must not be more than 10m width for the construction corridor within the vicinity of the river crossings (riparian zones), wetlands, and Woodbush Granite Grassland habitat. Clearance must not be more than 15m width on the remainder sections of pipeline,	CM & SHE Officer	Site demarcation and establish no-go areas. Rehabilitation plan Buffer determination	Construction Phase	ECO	Monthly	Checklist, photographs, and adherence to site project layouts and rehabilitation plan. Buffer clearly demarcated

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
where there are no sensitive environment. • Install buffers through visible pegging with construction barricades to restrict development from encroaching the sensitive environment. • Remain within development footprint, outside of wetlands. Install a 28m buffer for CVB wetlands; a 26m buffer for UVB wetlands; a 25m buffer for seepage wetlands; and 20m buffer for dams to restrict development from encroaching into the wetland systems. The buffer must be in a form of pegs and construction barricades.	CM & SHE Officer	Buffer determination	Construction Phase	ECO	Monthly	Buffer clearly demarcated

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The construction servitude must include the trench, one-way running track, topsoil stockpile corridor and subsoil stockpile corridor. All areas of watercourses outside this servitude must be considered no-go areas. • Install buffers through visible pegging with construction barricades to restrict development from encroaching the sensitive environment. • Where applicable, the expansion of the footprint of any upgrade / refurbishment activities at the Water Treatment Plant and pump stations must occur outside of all riparian and wetland areas and a 30m buffer zone to these	CM & SHE Officer	Site demarcation and establish no-go areas. Rehabilitation plan Buffer determination	Construction Phase	ECO	Monthly	Buffer clearly demarcated

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
watercourses. If buffer encroachment is required, this must be well-substantiated and a minimum 15m buffer should be maintained.						
• The project site must be surveyed prior to construction for identification of plant Species of Conservational Concern (SCC). • Establish buffer to section with plant SCC and declare it a no-go area.	ECO, SHE Officer & CM	Screening of construction corridors prior vegetation clearance.	Construction Phase	ECO	Monthly	No go areas clearly marked
• If possible, the plant species of conservation concern must not be removed, or disturbed. Where there is no choice but to remove the plant SCC, Relocate plant SCC to undisturbed areas within project locality.	CM & SHE Officer	Relocation Plan Site Rules	Construction Phase	ECO	Monthly & *Ad hoc* basis	Site Demarcation , buffer, and relocation plan.

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• If removal of plant SCC is needed, approval must be obtained from the ECO, before any disturbance or removal of plant species identified as of conservational concern, be relocated, by a specialized Botanist.						
• Only the approved existing access road must be used, and vehicles must not traverse virgin land.	CM & SHE Officer	Site rules	Construction Phase	ECO	Monthly	Site rules, no unauthorized access roads
• The vegetation clearance for construction of pipeline route and site camp must be minimal, and be limited only to pipeline servitude, as approved by the project plans and site layout. • Maximum clearance for construction corridor for pipeline route must be 10m.	CM & SHE Officer	Site rules Determine servitude size for 10m construction corridor. Pipeline servitude, and rehabilitation plan	Construction Phase	ECO	Monthly	Adherence to pipeline servitude, and rehabilitation plan.

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Strip topsoil together with grass / groundcover, and stockpile topsoil, separately to sub-soil along the pipeline route for later rehabilitation of pipeline route.						

13.5 Potential loss of wetland and riparian zone habitat

Table 14: Prevention of disturbance to wetland and riparian zone and instream habitat

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Where possible the pipeline must be re-aligned along the road reserve or gravel roads to prevent intrusion into wetlands. This must be the first priority in determining the pipeline route within sensitive environment. • If the there is no alternative but to work direct within the wetland. Disturbed watercourse habitats must be rehabilitated as soon as construction is complete or near complete and not left until the end of the project to be rehabilitated, to offset the impact on the wetland	CM & SHE Officer	Re-routing	Construction	ECO	Monthly	Development must follow approved routes Buffer determination in place.

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The construction area is to be defined and any areas beyond the construction area to be cordoned off with proper visible barricades and designated/labelled as a "no go" areas for personnel and construction vehicles. • A pipeline construction corridor must not be more than 10m width for construction within the vicinity of wetland systems, including riparian zone. The servitude must include the trench, one-way running track, topsoil stockpile corridor and subsoil stockpile corridor. All areas of watercourses outside this servitude must be considered no-go areas. • Install buffers through visible pegging with construction	CM & SHE Officer	Demarcation of construction corridor and , establish no-go zones.	Construction Phase	ECO	Monthly	Buffer determination in place. No go zones clearly demarcated, and buffered.

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
barricades to restrict development from encroaching the sensitive environment.						
• Remain within development footprint, outside of wetlands. Install a ***28m buffer for CVB wetland***s; a ***26m buffer for UVB wetlands***; a ***25m buffer for seepage wetlands***; and 20m buffer for dams to restrict development from encroaching into the wetland systems. The buffer must be in a form of pegs and construction barricades • Once a detailed alignment has been fixed, the construction corridor for **PIPELINE ROUTE** within riparian or wetland will be limited to a width of at least 10m, although this could be reduced if	CM & SHE Officer	Implement a Construction Method Statement for working within watercourses Rehabilitation plan. Environmental Checklist Site Environmental Rules.	Construction Phase	ECO	Monthly	Buffer determination in place. Construction corridor does not exceed 10m No go areas clearly demarcated, and buffered. Progressive rehabilitation conducted.

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
required at certain points to avoid environmental constraints. • Buffer the construction area using pegs and construction barricades to inhibit encroachment of construction activities over the large-scale clearance and excavation of riparian zone, and wetland. • Where applicable, the expansion of the footprint of any upgrade / refurbishment activities at the Water Treatment Plant and pump stations must occur outside of all riparian and wetland areas and a 30m buffer zone to these watercourses. If buffer encroachment is required, this must be well-substantiated and a minimum 15m buffer should be maintained.	CM & SHE Officer	Implement a Construction Method Statement for working within watercourses Rehabilitation plan. Environmental Checklist Site Environmental Rules	Construction Phase	ECO	Monthly	determination in place. Construction corridor does not exceed 10m No go areas clearly demarcated, and buffered. Progressive rehabilitation conducted.

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The contractor must not remove any vegetation within the wetland, riparian and instream habitat, other than that which is absolutely necessary along the construction corridor (footprint) • Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.						
• Once a detailed alignment has been fixed, the construction corridor for **ABSTRACTION WORKS** (Olifantspoort weir and abstraction works) within Olifants River riparian habitat must be limited to a specified buffer as allowed for construction corridor. • Buffer the construction area using pegs and construction barricades to inhibit encroachment of	CM & SHE Officer	Implement a Construction Method Statement for working within watercourses Rehabilitation plan. Environmental Checklist	Construction Phase	ECO	Monthly	Buffer determination in place. No go zones clearly demarcated, and buffered. Progressive rehabilitation conducted.

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
construction activities over the large-scale clearance and excavation of riparian zone. • The contractor must not remove any vegetation within the riparian zone and instream habitat, other than that which is absolutely necessary along the construction corridor (footprint)						
• All work to be done at ***ABSTRACTION WORKS*** (Olifantspoort Wier, and Abstraction Works) within riparian and instream habitats for Olifants River must be carried out during a low flow condition. • The work must also be carried out during dry period.	CM & SHE Officer	Streamline Construction works based on weekly weather focus. Method Statement for working within watercourses	Construction	ECO	Monthly	

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Vegetation at riparian zones within the vicinity of the abstraction works and river crossing must remain intact where possible, to limit high surface flows and mobilisation of sediments. • Vegetation must be cleared in a phased approach and trench should not be left bare and exposed to erosion. • Soils must be stabilised and sediment traps must prevent sediment from entering stormwater. • The monitoring plan must be developed in order to quantify the impact on the watercourses. • Disturbed watercourse habitats must be rehabilitated as soon as construction is complete or near	CM & SHE Officer	Strom water Management Plan Method statement for working within watercourses	Construction	ECO	Monthly	Water Quality Monitoring (no high level of turbidity) No signs of bank incision

Impact Management Outcome: Zero to minimal negative environmental impacts on wetland, riparian, and instream habitat.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
complete and not left until the end of the project to be rehabilitated. • Soil berms and sediment traps must be established to prevent sediment entering watercourses.						
• ***All PIPELINE RIVER CROSSINGS*** and pipeline within or adjacent wetlands which will be constructed within riparian zone and instream habitats must be carried out during a low flow condition. • All pipeline river crossings and pipeline within or adjacent to wetlands must be carried out during a dry period.	CM & SHE Officer	Streamline Construction works based on weekly weather focus. Method Statement for working within watercourses	Construction Phase	ECO	Monthly	Records of dates planned for excavation within watercourse habitat. Photographs of Excavation Machinery in action (photograph to be date stamped) Photographs of before and after clearance.

13.6 Surface Water Pollution and Degradation of Watercourses

Table 15: Managing Potential Impacts in Surface Water Quality and Degradation of Watercourses

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Excavation within riparian must not be undertaken during wet (rainy) periods or peak flow conditions. • All work to be done within the sensitive riparian and instream habitats should be carried out during low flow conditions, and dry periods.	CM & SHE Officer	Method Statement for working within watercourse	Construction Phase	ECO	Monthly	Banks stability in place. Records of rain and schedule in place No signs of banks incision and high level of turbidity
• No construction machinery must be operated direct into the instream habitat, except where cofferdam is in place. The use of heavy machinery (excavator) within the watercourse must be closely supervised. If possible, the excavator must only be positioned as far as possible	CM & SHE Officer	Coffer Dams Construction Method Statement	Construction Phase	ECO	Monthly	Coffer dam in place. Monitoring Plan. Surface Water Quality Results.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
away from the water edge, as it stretches the bucket to excavate the instream habitat. • A one-way running track must be established across the river bed for the excavators to move along. The running track must be shielded by a coffer dam and be constructed of a rock base overlain by coarse aggregate. • The use of heavy machinery (excavator) within the flowing river must be avoided as far as practically possible. The excavator be only position as far as possible within a riparian/river banks.						
• In the case that coffer dams are used to divert flow for construction purposes, these structures should be temporary in nature and be	CM & SHE Officer	Monitoring plan must be developed in order to quantify	Construction Phase	ECO	Monthly	Coffer dam structure intact. Monitoring Plan.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
removed from the river immediately after the required construction has been completed. • No construction of an artificial channel outside of the watercourse habitats for water diversion purposes will be permitted. Therefore, the de-watering process from the coffer dams should involve piping the water directly to the active channel downstream of the site as, or if, required. • A dewatering site must be identified in conjunction with the ECO and should be on flat ground away from the edge of the stream channel and preferably in a well vegetated area. • Pumped water must be discharged into a silt trap/hay-		the impact on the watercourses.				Surface Water Quality Monthly Results.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
bale trap adequately sized to deal with the expected volumes. Outflow from this trap should be via sheet flow and energy dissipation measures may be required. • Coffer dam must be maintained at all times, so that no water may enter and leave the construction area, as well as to prevent sediments concrete entering into surface water through the flow of a river.						
• Excavator must be parked 32m away from the watercourse and only parked on the designated bunded areas and dip trays must be placed under the machinery, when not used to capture any possible hazardous substance leaks.	CM & SHE Officer	Environmental Site rules. Construction Method Statement	Construction Phase	ECO	Monthly	Delineated Parking Areas for excavator. Dip tray in place

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• It is required that Construction Machinery not to be left along the riverbanks at after shift but to be parked at site camp within a delineated parking area						
• All watercourses must be protected from direct and indirect spills, and debris from entering into watercourse. • No disposal of any substance, such as concrete cement, oil or bitumen, within the watercourses is permitted. • ECO to conduct the Water quality monitoring, before and after excavation works within a **OLIFANTS WEIR** vicinity.	CM & SHE Officer	Monitoring Plan. Spill contaminant procedures ECO to conduct the Water quality monitoring, before and after major activity within the instream excavation and concrete pouring.	Construction Phase	ECO	*Ad hoc* basis	Monitoring Plan. Coffer dam. Water Quality.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• All clearance for pipeline river crossing must be within 10m of the construction corridor. • All clearance and excavations along the riparian and instream habitat for the purpose of construction new weir and pipeline river crossings must be limited to areas as demarcated and approved by the project plans.	CM & SHE Officer	Construction servitude demarcation Buffer determination	Construction	ECO	Monthly	Construction corridor demarcated
• Material excavated from the trench must be stored away from river and away from the proposed dewatering areas. To avoid mixing, excavated trench material must be placed on a geotextile. • Sediment barriers must be installed in areas sensitive to	CM & SHE Officer	Monitoring Plan. Storm water management plan. Construction Method Statement	Construction Phase	ECO	Monthly	Checklists, Measurement of Downstream Turbidity (water quality) and *in-sutu* run-off.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
erosion to prevent stream siltation. • The Contractor shall protect all areas susceptible to erosion and shall take measures, to the approval of the PPA. • Stockpiles must not be more than 2m in height, and stored on a relatively flat surface at least 32m away from the watercourse. • All work to be done within sensitive riparian and instream habitats must be carried out during a low flow condition. • After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.						
• The excavator will access the river to clear boulders etc and where required a hydraulic	CM	Construction Method Statement	Construction	ECO	Monthly	Best Construction Practice.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
breaker will be used to break any bedrock encountered, in order to make trench for installation of pipeline and weir infrastructure. • Rock blasting will never be allowed within the watercourse.						Adherence to Construction Method statement
• The infilling of a concrete for weir construction and concrete for pipeline river crossings must be done following the EA and WUL conditions. • The infilling of concrete encase at pipeline river crossings must be undertaken in with due diligent, such that there are no concrete spillages into the river. • For the infilling/backfilling and levelling using concrete, dependent on the size of the pours, an excavator will place the concrete. The bucket or skip will be filled ¾ full to reduce spillages	CM	Monitoring Plan Construction Method Statement	Construction	ECO	Monthly	Water Quality Monitoring. Construction best practice and adherence to Construction Method Statement .

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
whilst transporting the concrete. If any spillages do occur, they will be removed after the pour and disposed of at the concrete skip wash out bay.						
• The contractor must monitor the effect of construction on downstream, sediment loads when flow is occurring. • The monitoring program shall include sampling in the water upstream and downstream of the works during the period when construction in the stream is taking place. • Sampling times shall be selected to correspond with any periods of higher sediment load.	CM &SHE	Monitoring Plan Schedule activities to take place at low flow condition and dry period.	Construction Phase	ECO	Monthly	Water Quality Monitoring. No downstream sediment loads/ turbidity under controlled. Work conducted within low flow condition.

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The contractor must prepare a detailed method statement that will include, but not be limited to: timing and duration of excavation and infilling for **OLIFANTSPOORT WIER** construction. • The contractor must prepare a detailed method statement that will include, but not be limited to: timing and duration of excavation and infilling for **pipeline river crossing** construction. • An itemized list of the equipment to be used for the pipeline river crossings, • A description of the design and methods for the creation of any stream diversions,	CM	Monitoring Plan Construction Method Statement	Construction Phase	ECO	Monthly	Monitoring Plan Adherence to Construction Method Statement

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Measures that will be used to control sediment and turbidity, spillage of fuel and cement, • A monitoring programme to provide rapid feedback on the effectiveness of controls						
• Disturbed watercourse habitat must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated.	CM	Rehabilitation Plan	Construction	ECO	Monthly	Progressive Rehabilitation.
• Excavation must minimise the transport of sediment.	CM	Stormwater Management Plan	Construction	ECO	Monthly	Adherence to Stormwater Management plan
• No water is to be abstracted from the local rivers and streams. • The water to be used during construction will use metered						

Impact Management Outcome: Zero to minimal negative environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
water supplied by the Lepelle Northern Water utility, with the provision of existing water within the project locality. The water use will include water for construction, consumption, equipment cleaning and hygiene as well as dust suppression where required.						

13.7 Mitigation of the alteration of flow regimes

Table 16: Mitigation of the alteration of flow regime

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Pre-development site hydrology (i.e., runoff, infiltration, interception, evapotranspiration, groundwater recharge, and stream baseflow) must be preserved as far as possible.	CM & SHE Officer	Construction Method Statement	Construction Phase	ECO	Monthly	No siltation and impounding within a working area
• To only use temporary cofferdams to divert flow for construction purposes. Only during low flow conditions. • The use of silt fences or hay bales to isolate the construction area from the water body in situations where the flow velocities and volumes are low. • Construct and maintain earth berm to prevent flooding and	CM & SHE Officer	Construction Method Statement	Construction Phase	ECO	Monthly	No alteration of flow regime (No upstream impoundment) , Best construction practice, and adherence to construction method statement

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
sedimentation during construction. • In excavating the bed of the water body, the contractor must backfill the excavation with material which was originally removed from the stream bed. Further care must be taken to minimize the amount of material used for backfilling which have abrasive surfaces. • The infilling of concrete incase must be levelled and be aligned with *in-situ* basin.	CM & SHE Officer	Construction Method Statement	Construction Phase	ECO	Monthly	Best construction practice, and adherence to construction method statement
• Temporary pumping sump must be designed to achieve optimum hydraulic performance. • Minimise influence on downstream flow regime when diverting and impeding flow (cofferdams, earth berms etc).	CM & SHE Officer	Construction Method Statement	Construction Phase	ECO	Monthly	Best construction practice, and adherence to construction method statement

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
Use suitable stabilisation structures to prevent. • No construction of an artificial channel outside of the watercourse habitats for water diversion purposes will be permitted. Therefore, the de-watering process from the coffer dams should involve piping the water directly to the active channel downstream of the site as, or if, required. • If it is necessary that the flows require diversion in order for the work to be carried out, the flows must be returned to their original pathways and velocities post establishment. • Minimise impervious surfaces and maximise infiltration by maintaining vegetation as far as	CM & SHE Officer	Construction Method Statement	Construction Phase	ECO	Monthly	Best construction practice, and adherence to construction method statement

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
possible to convey and hold surface runoff and provide for a slow release into the receiving environment.						
• Stormwater management measures must be implemented in order to minimise diverted flows as the result of rains and prevent the siltation and sedimentation of nearby watercourse also minimise the impacts of the disturbed areas. • A rock mattress must be created at the downstream outlet of the flume pipe to reduce erosion at this point to the satisfaction of the ECO. • Sediment barriers must be installed in areas sensitive to erosion to prevent stream siltation.	CM& SHE Officer	Stormwater management plan *In-sutu* Stormwater systems	Construction Phase	ECO	Monthly	Checklists for storm water management, Adherence to stormwater management plan

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Reno mattresses or gabions may be required to prevent further incision in areas where the banks of channels are incised and these banks must be stabilised for the pipeline.						
• Best engineering construction practice of construction the OCSD spillway designed for the maximum discharge associated with 100-year recurrence interval flood. • The OCSD Drainage must be diverted to allow for natural drainage through the landscape.	CM & SHE officer	Stormwater Management Plan	Construction Phase	ECO	Monthly	No siltation and runoff
• All Excavation at riparian zones must not be undertaken during wet (rainy) periods or peak flow periods. The activities within watercourse must only be undertaken during agreed	CM & SHE Officer	Site rules	Construction Phase	ECO	Monthly	Site rules, no signs of banks incision by erosion.

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
working times and permitted weather conditions. If heavy rains are expected, the clearing and excavation activities must be put on hold. In this regard, the contractor must be aware of weather forecasts. It is recommended to undertake majority of the construction activities during the drier months.						
• Excavations must not be left open for an extended period, and must not be undertaken until such time that all required materials are available on-site, to facilitate immediate laying of the construction of subsurface infrastructure; • Stockpiles must not be more than 2m in height, and stored 32m away from the watercourse.	CM	The use of Just in Time (JiT) production model Stormwater management plan Construction Method Statement	Construction Phase	ECO	Monthly	Adherence to, Construction Method statement, Excavation checklists.

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Sediment barriers must be installed in areas sensitive to erosion to prevent stream siltation. • After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.	CM &SHE Officer	Record rain and take photographs. Progressively repair any sign of bank incision.	Construction Phase	ECO	Monthly	Rain records and site photographs

13.8 Stormwater Management

Table 17: Stormwater Management

Impact Management Outcome: Zero to minimal impact as a result of run-off and surface water ponding due to vegetation clearance and excavation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The design of the storm water system must make provision for erosion protection. • To mitigate against banks incision the appropriate erosion control measures that include a combination of stone pitching, gabion baskets and mattresses, energy dissipaters and grass lined drains are essential. • Within the areas of the proposed development, it is considered essential to effectively control and dispose of storm water and runoff, as uncontrolled runoff can cause damage to adjacent properties and can erode and destabilize fill embankments.	PM & CM	Construction Method Statement	Construction Phase	ECO	Monthly	No alteration of flow regime (No upstream impoundment) , Best construction practice, and adherence to construction method statement

Impact Management Outcome: Zero to minimal impact as a result of run-off and surface water ponding due to vegetation clearance and excavation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Stormwater management measures must be implemented in order to minimise diverted flows as the result of rains and prevent the siltation and sedimentation of nearby watercourse also minimise the impacts of the disturbed areas. • The Stormwater drainage system must be linked environmental requirements so as to avoid any legal issues (i.e. any activity triggering the NEMA No. 107 of 1998 EIA Regulation of 2014, as amended on 07 April 2017 amended, and Section 21 of the NWA No 36 of 1998, WULA).	CM& SHE Officer	Stormwater management plan *In-sutu* Stormwater systems	Construction Phase	ECO	Monthly	Checklists for storm water management, Adherence to stormwater management plan
• All excavation at riparian must not be undertaken during wet (rainy) periods or peak flow condition.	CM & SHE Officer	Site rules	Construction Phase	ECO	Monthly	Site rules, no signs of banks incision by erosion.

Impact Management Outcome: Zero to minimal impact as a result of run-off and surface water ponding due to vegetation clearance and excavation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Sediment barriers must be installed in areas sensitive to erosion to prevent stream siltation. • After every rainfall event, the contractor must check the site for erosion damage and immediately repair any damage recorded.	CM &SHE Officer	Record rain and take photographs. Progressively repair any sign of bank incision.	Construction Phase	ECO	Monthly	Rain records and site photographs
• Exposed soils must be vegetated as soon as possible in order to impede surface runoff and inhibit erosion of the surface soils.	CM	Rehabilitation (Progressive Rehabilitation)	Construction Phase & Operational Phase	ECO	Monthly	No evidence of run-off and bare soils

13.9 Protection of fauna

Table 18: Fauna and red data species protection

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The project area must be surveyed for potential animal SCC prior to construction in order to locate, capture and relocate any animal SCC. • The construction corridor must be surveyed prior clearance to locate animal species who mighty be foraging, roasting or nestling within the construction corridor. • During site preparation, special care must be taken during the clearing of the works area in order to minimize damage or disturbance of roosting and nesting sites. • During construction special care must be taken to avoid prevent	CM & SHE Officer	Demarcation of construction corridor, Buffer no go areas, and implement site rules	Construction Phase	ECO	Monthly	Buffer determination in place. Pipeline construction corridor does not exceed 15m. No go zones clearly demarcated, and buffered.

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
migration of species which are endemic to the project area or a loss of animal species currently found on site, animals with limited mobility are often the first to be affected by habitat fragmentation due to the effects on population viability as reptiles, bird species, small mammals, and invertebrates may be disintegrated into distinct populations. • Avoid habitat fragmentation and allow for fauna migration corridors.						
• Aquatic species must be protect during construction. Inspect for aquatic species existence before temporary construction of coffer dams for dewatering and concrete pouring. Should any	CM & SHE Officer	Survey and monitoring plan	Construction Phase	ECO	Monthly	Buffer determination in place. Minimal vegetation clearance within watercourse.

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
species be found it must be moved to further areas onsite.						No go zones clearly demarcated, and buffered. No limit to aquatic species movement.
• The fishway design could be a vertical slotted fishway, a rock-ramp type spillway. • The typical characteristics of the rock-ramp fishway are as follows: • The longitudinal slope of the fishway is 1V:10H to 1V:12H, thereby ensuring a design stream power of 150 W/m3. • The fishway has a "u" shaped main channel of 0.9 m width, with steps (broad crested weirs) every 2 m. The left-hand side of the fishway is located 0.1 m above the fishway weir crests and has a triangular shape. This left-hand	CM	Best Standard Practice weir construction methods	Construction	ECO	Monthly	Adherence to weir design, incorporated the fishway.

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
side shallow splash zone for eels is 0.6 m wide. • The fishway is designed for a discharge of 0.1 m3/s with the main weir spilling the remainder of the EWR but will operate for a range of river flows. • The upstream entrance to the fishway is controlled by a rectangular orifice in the gravel trap next to the trash rack. During floods this opening would be under water to limit possible debris entrainment. • The surface of the fishway should be formed by boulders/rocks using a grouted stone pitching technique. The fishway structure has a concrete base. Gabion boxes or Reno mattresses should not be used, because they will be						

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
scoured and damaged during floods and during low flow too much of the flow is between the rocks with too shallow water depths for fish above the rocks. •						
• The project boundary must be demarcated and vegetation clearing as well as topsoil removal must be limited to site only. • Maximum clearance for construction corridor for pipeline route must be 10m.	SHE Officer & CM	Demarcation of construction corridor. Buffer and Establish No-go zone.	Construction Phase	ECO	Monthly	Buffer determination in place. Pipeline construction corridor does not exceed 15m. No go zones clearly demarcated, and buffered.
• The Contractor must ensure that the work site is kept clean, tidy and free of rubbish at all times, to	SHE Officer & CM	Waste management	Construction Phase	ECO	Monthly	Photographs, receipts (registers), checklists. Site Rules

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
prevent attracting animals and pests. • The Contractor and his employees shall not bring any domesticated animals onto the site.						
• No faunal species are to be disturbed, trapped, hunted or killed.	SHE Officer & CM	Site rules	Construction Phase	ECO	Monthly	Environmental Rules Attendance Register.

13.10 Waste management

Table 19: General and hazardous waste management

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
General waste management: • Have sufficient bins for waste disposal. Refuse must be removed regularly to licensed landfill sites; disposal certificates need to be kept in the Environmental File. Waste that is produced must be kept on-site and managed to prevent nuisance such as litter and dust.	CM & SHE Officer	Integrated Waste Management approach: segregation of waste into separate bins	Construction Phase	ECO	Monthly	Photographs, way-bills, receipts, checklists. Site Rules.
Hazardous waste: • Hazardous waste must be stored in a secured waste receptacle. • All material contaminated with oils or hazardous material must be disposed of as hazardous waste. Waste bins need to be emptied/collected weekly by	SHE Officer & CM	Hazardous Waste Management	Construction Phase	ECO	Monthly	Waste manifest, (disposal certificates), Registers, Checklist, and Photographs.

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
contractors and waste manifest signed by the site manager. • Hazardous waste must be disposed of at a licensed facility and all records of waste manifest & disposal certificates needs to be kept in the Environmental File.						
Health Care (medical) Waste • Have separate "one-way" waste bins to dispose of medical waste. Do not mix medical waste with any other waste. Waste bins must be clearly marked and stored in safe place. • Waste bins need to be emptied/collected regularly by contractors and waybills signed by the site manager. Medical waste must be disposed at the designated landfill site.	SHE Officer & CM	Health Care Waste Management Plan	Construction Phase	ECO	Monthly	Waste manifest, disposal certificates, Registers, Checklist, and Photographs.

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• All construction sites must have portable chemical toilets located conveniently along the working areas, and all effluent waste will be disposed of at the Polokwane Wastewater Treatment Works.						

13.11 Heritage and/or archaeological sites

Table 20: Heritage and archaeological

Impact Management Outcome: Zero to minimal negative environmental impacts on heritage resources, especially graves						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Excavation for pipeline upgrade must be limited only to construction corridor, as approved by layouts. • The construction site camp must be established away from grave sites or suspected grave sites at a distance of at least more than 50m from the nearest grave.	CM	Demarcation of construction corridor	Construction Phase	ECO	Monthly	Clear Demarcation of construction corridor
• Engagement with the households adjacent to construction corridor for assistance in identifying all unmarked grave that could be on the section corridor, and review designs to prevent intrusion into grave sites, by re-routing the main pipeline route at least a 30-metre buffer.	CM &PPA	Social Facilitation	Construction Phase	ECO	Monthly	Clear Demarcation, Grave sites are buffered

Impact Management Outcome: Zero to minimal negative environmental impacts on heritage resources, especially graves						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Regular Archaeological Watching Briefs must be carried out during construction in case any chance findings are made. • A Chance Finds Procedure (CFP) must be implemented where possible heritage finds are uncovered/ discovered. • Should any artefact or heritage resource be encountered, the contractor is advised to stop the operation immediately, report to the ECO who must refer the matter to the Limpopo Heritage Agency. • a heritage practitioner / archaeologist must be engaged in the event that any possible heritage resources or artefacts are identified.	PM, ECO, CM, SHE Officer & Heritage Practitioner	Site rules Archaeological Watching Briefs	Construction Phase	ECO	Monthly	Checklist, reports and photographs.

13.12 Soil management

Table 21: Soil management during excavation of pipeline trenches

Impact Management Outcome: Soil conservation and prevention of soil erosion						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Prior to commencing with earthworks, the topsoil must be stripped and stockpiled separately from subsoil, if necessary. And must be kept for use during rehabilitation of disturbed areas	CM, SHE Officer	Site rules. Rehabilitation Plan.	Construction Phase	ECO	Monthly	Checklist and photographs
• Excavated material including topsoil must be stockpiled in stockpiles not exceeding 2m in height, in ideally flat area 32m away from the watercourse.	CM & SHE Officer	Checklist and site rules	Construction Phase	ECO	Monthly	Checklist and photographs.
• If at risk of being eroded, all stockpiles must be secured with sandbags around the base of the soil stockpile. And regularly be monitored to be kept free of weeds and invasive alien plants.	CM & SHE Officer	Site Rules, and Checklist	Construction Phase	ECO	Monthly	Checklist, and Photographs.

13.13 Backfilling of trenches and site levelling

Table 22: Backfilling of trenches and construction site levelling

Impact Management Outcome: Soil conservation and prevention of soil erosion						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Removed soil is to be used to backfill trenches. • Where *in-sutu* material is not suitable for infilling, the infill material must be obtained from approved borrow pits. • Excess topsoil is to be spread evenly over the area in a manner that blends in with the natural topography.	CM & SHE Officer	Site Rules, Checklist, and Rehabilitation Plan	Construction Phase	ECO	Monthly	Checklist and photographs. Checklist, Waybills and photographs.
• Excess sand and soil resulting from levelling activities of the work area must be stored in low heaps (less than 2m in height) either on the access road or already disturbed area.	CM & SHE Officer	Checklist	Construction Phase	ECO	Monthly	Checklist and photographs.

13.14 Air quality

Table 23: Air quality management

Impact Management Outcome: Air pollution is minimized through the application of dust prevention measures and good vehicle maintenance						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Control all dust emanating from site due to project activities. • Minimise or avoid dust generating activities during high winds. • Minimising vegetation clearance, implement clearing in stages, at the areas demarcated for project and apply dust suppression actions when required to stabilise cleared soil. • Surrounding neighbours must be informed if excessive dust will be generated. • Soil stockpile be wetted for dust suppression.	CM & SHE Officer	Dust suppression.	Construction Phase	ECO	Monthly	Checklist and photographs. No complaint
• Control dust emanating from stockpiles, construction access roads, site construction activities, and from movement of construction vehicles.	CM & SHE Officer	Dust suppression, Stockpile checklist, and regular cleaning of construction vehicles.	Construction Phase	ECO	Monthly	Checklist and photographs. Zero complaints

Impact Management Outcome: Air pollution is minimized through the application of dust prevention measures and good vehicle maintenance						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Minimize emissions resulting from construction activities.	CM	Servicing construction vehicles to meet emission requirement.	Construction Phase	ECO	Monthly	Checklist Zero complaints
• All fine products must be covered during transportation.	CM & SHE Officer	Site Rules and Checklist	Construction Phase	ECO	Monthly	Checklist and photographs.
• Prevent air pollution by avoiding or minimizing the lighting of fires No open fires at construction sites. Cooking must be done at designated areas under controlled conditions to avoid spreading of fires.	CM & SHE Officer	Site Rules	Construction Phase	ECO	Monthly	Photographs. Zero complaints

13.15 Servicing and re-fuelling and emergency response

Table 24: Servicing and refuelling

Management Impact Outcome: Avoid or minimise soil, surface water, and groundwater contamination						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Designate a bunded area for servicing of vehicles at the construction site camp • Use a dip tray in case of emergency repairs outside the workshop area. • Check vehicles regularly for fuel and oil leaks and repair immediately.	CM & SHE Officer	Checklist Portable Spill Clean-up Kits	Construction Phase	ECO	Monthly	Checklist, Photographs Zero incidents
• Refuel vehicles only by means of a pump and in a bunded area created for refueling.	CM & SHE Officer	Site Rules, Spill kits Checklist	Construction Phase	ECO	Monthly	Photographs Checklists
• In case of oil spillages on site, clean spills immediately using appropriate spill kits. Treate and dispose contaminated soil and materials used as hazardous waste	PM, CM & SHE Officer	Spill Contaminant Procedure	Construction Phase	ECO	Monthly	Incident Register Checklist Photographs.

13.16 Fire prevention and emergency response

Table 25: Fire prevention and emergency response

Management Impact Outcome: Prevention and control of fires and the spread of fires						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• The Contractor must take all the necessary precautions to ensure that fires are not started as a result of activities on site. • The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores. • No open fires for heating or cooking will be permitted on site, unless otherwise agreed and then only designated areas, under controlled conditions.	CM & SHE Officer	Site Rules, Checklist and Emergency Preparedness Plan	Construction Phase	ECO	Monthly	Checklist, Photographs, Zero Incidents
• Smoking must be prohibited in the vicinity of flammable substances	CM & SHE Officer	Site Rules and Designated Smoking Areas	Construction Phase	ECO	Monthly	Photographs Checklists
• The workforce must be regularly made aware of fire prevention and basic firefighting measures.	SHE Officer	Emergency Preparedness Plan	Construction Phase	ECO	Monthly	Induction Register
• Emergency procedure must in place, and communicated to all persons onsite	SHE Officer	Induction, toolbox talks, simulation excise/drill	Construction Phase	ECO	Monthly	Register

13.17 Public safety and traffic accommodation

Table 26: Road crossing, pipe jacking and construction vehicle movement

Management Impact Outcome: Management of traffic during construction to minimise disruptions and safety risks to all road users.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Allow for the accommodation of traffic during excavation for pipeline route road crossing. • Along the road reserve all clearance and excavation must be done in accordance with DoT standards. All road crossings must be done according to DoT standards. At the tar or main road crossings, where possible, the pipe jacking must be done, to avoid disturbance to existing road and minimise the impact on the traffic;	CM & SHE Officer	DoT standards Construction Method Statement Safety Standards	Construction Phase	ECO	Monthly	Construction Method Statement. Photographs, Checklists, no complaint.
• Cordon off all road crossing excavation, and close them before the shift is completed.	CM &SHE Officer	Checklist Construction Method Statement Safety Standards	Construction Phase	ECO	Monthly	Checklist, register, photographs, no incident
• Prevent motor vehicle incidents to the general public, at construction vehicle turning point from main	PM, CM & SHE Officer	Temporary traffic signs at strategic points from both side of the traffic.	Construction Period	ECO	Monthly	Photographs, Zero incidents

Management Impact Outcome: Management of traffic during construction to minimise disruptions and safety risks to all road users.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
road to site and from site to main road.		Flagmen during turning of large haulers.				
• Establish the temporary speed limit at an approach to construction vehicle turning point. To be adhered to make sign visible to all motorist	CM & SHE Officer	Temporary traffic sign with speed limit.	Construction Period	ECO	Monthly	Photographs, Zero incidents
• Temporary signing, traffic control signals, delineators, message boards, used for traffic accommodation in the work zone shall be visible by motorists and pedestrians.	CM & SHE Officer	Adhere to safety standards	Construction Period	ECO	Monthly	Checklist, Photographs
• Inform the residents about any temporary road closure, a week prior to the road closure	Social Facilitator	Social Facilitation	Construction Phase	ECO	Monthly	Records of Notices

13.18 Invasive alien species

Table 27: Control of invasive alien species

Management Impact Outcome: Prevent the spread of invasive alien plants						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• All invasive alien plants must be removed from areas under construction. • The control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs. • Prevent the spread of invasive alien plants by avoiding excessive vegetation clearing and leaving areas open	CM & SHE Officer	Alien removal plan	Construction and rehabilitation phase	ECO	Monthly	Checklist, photographs
• Manual methods such as cutting, weeding out, hoeing or pulling out by hand of invasive plants are recommended.	PM, CM & SHE Officer	Alien removal plan	Construction and rehabilitation phase	ECO	Monthly	Checklist, photographs
• Soil stockpiles must not be kept for extended periods as invasive alien	PM, CM & SHE Officer	Checklist, JIT Method and Rehabilitation plan	Construction and	ECO	Monthly	Checklist, photographs

Management Impact Outcome: Prevent the spread of invasive alien plants						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
plants will germinate and grow on such stockpiles.			rehabilitation phase			
• Prevent the transportation of invasive alien plants from borrow pits to other areas • Minimise movement of topsoil from one area to another to prevent the spread of invasive alien plants.	PM, CM & SHE Officer	Approved borrow pits		ECO	Monthly	Registers and checklist

13.19 Noise

Table 28: Noise management during construction

Management Impact outcome: To minimise or prevent unacceptable noise levels during construction activities and at certain times of the day or week.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• In recognition of the inherently noisy and temporary nature of construction activities, specify standard construction hours during which the usual fixed noise limits do not apply. • Avoid shouting or loud conversations especially in the early or late hours of the day.	CM	Shift must be between (07h00-17h00)	Ongoing	ECO	Monthly	Zero complaints Time sheets
• Minimise noise from construction activities to avoid impacts on human health and well-being • If certain construction activities require work outside the stipulated hours, all adjacent landowners must be informed prior to commencement of such activities.	CM	Commencing of any particularly noisy part of the activity must be after 09h00, and not on Sundays.	During site establishment and ongoing	ECO	Monthly	Zero complaints Filling records.
• Minimise noise emanating from construction vehicles and equipment.	CM	All equipment, vehicles, equipped with sound mufflers if necessary.	Construction phase	ECO	Monthly	Zero complaints, photographs, records.

14 POST CONSTRUCTION

14.1 Site camp decommissioning

Table 29: Site camp decommissioning

Management Impact outcome: Remediate/rehabilitate any negative environmental impacts at the site						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Remove all structures from site camp. All temporary structures, materials, waste, and facilities used for construction activities are removed upon completion of the project.	CM & SHE Officer	Site Close-out Report Rehabilitation plan	During site camp decommissioning	ECO	Upon completion of the project	Close-out report Checklist, photographs
• Use stockpiled topsoil to rehabilitate the construction site camp. • Fully rehabilitate all disturbed areas and ensure erosion measures are in place. • Only local indigenous plants must be considered for re-vegetation of the site. Such plants are able to establish themselves easily	CM & SHE Officer	Checklist	Once, During site camp decommissioning	ECO	Upon completion of the project	Checklist, photographs

14.2 Site clean-up and rehabilitation

Table 30: Site clean-up and rehabilitation

Management Impact Outcome: Site restoration to approximate original state						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• The Contractor must ensure that all temporary structures, materials, waste, and facilities used for construction activities are removed upon completion of the project. • All waste must be disposed of responsibly, following five-step hierarchy of waste management • Fully rehabilitate all disturbed areas and protect ensure erosion controls are in place, where necessary • Only local indigenous plants must be considered for re-vegetation of the site. Such plants are able to establish themselves easily • Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed	PM, CM & SHE Officer	Rehabilitation plan	During site camp decommissioning	ECO	Upon completion of the project	Checklist, photographs

14.3 Maintenance during operation

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Manage the impact on flow regime of within vicinity at proximity to pipeline river crossing, through best construction practice that proper implement engineering designs. • Concrete encase alignment must not form a heap but be aligned with the In-sutu instream habitat. • Regular inspection at river crossing for evidence of sediment and debris build-up during wet season and dry season, alternatively after heavy rainfall.	PM & CM	Quarterly inspection of river crossing Best practice river crossing design and construction practices	Throughout the project lifecycle	PM	Quarterly Throughout the project lifecycle	Design standards, and best construction practice
• Construct storm water system and make provision for erosion protection. Installation of gabion baskets and mattresses, energy dissipaters and grass lined drains • Stormwater management through regular inspection for evidence of	PM & CM	Storm Water Management Plan. Quarterly inspection of river crossing for possible runoff and incision etc.	Throughout the project lifecycle	PM	Quarterly inspection, Throughout the project lifecycle	Storm Water Management Plan. No runoff and incision

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
sediment and debris build-up during wet season.						
• Manage the changes to the backwater effect (inundation)within the vicinity of pipeline river crossing.	Project proponent	Monitor and maintain the banks incision, siltation and debris built up at upstream of the weir.	Operational phase	Project proponent	*Ad hoc* Basis	Photographs and reports
• Adequate maintenance measures need to be implemented immediately when pipeline issues and failures are identified.	Project proponent	Inspection Quarterly	Operational phase	Project proponent	Quarterly	Photographs and reports
• Maintenance vehicles must use the existing access route. • Mark the pipeline servitude • Clearance during pipeline maintenance must be within the existing pipeline servitude.	Project proponent	Maintenance management plan	Operational phase	Project proponent	Ad hoc Basis	Photographs and reports
• Adequate rehabilitation and maintenance measures, to be applied in rehabilitation of areas susceptible to erosion along the pipeline route. • Adequate stormwater management to ensure that rain water does not	Project proponent	Rehabilitation Plan Inspection Quarterly	Operational phase	Project proponent	Quarterly	Checklist and photographs

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
build-up, or does not form water ponding but rather channelled out of cleared areas. • Storm water control measures must be implemented with all storm water generated within disturbed earthwork areas channelled to temporary, constructed settling ponds which allow the water to naturally filter back to the watercourse after settling. • Effectively control and dispose of storm water and runoff, as uncontrolled runoff can cause damage to adjacent properties and can erode and destabilize fill material • The Stormwater drainage system must be linked environmental requirements so as to avoid any legal issues (i.e. any activity triggering the NEMA No. 107 of 1998 EIA Regulation of 2014, as						

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
amended on 07 April 2017 amended, and Section 21 of the NWA No 36 of 1998, WULA).						
• Exposed soils must be vegetated as soon as possible in order to impede surface runoff and inhibit erosion of the surface soils. • Vegetation growth must be monitored by a professionally appointed specialist (vegetation/biodiversity specialist) to ensure successful re-establishment of vegetative cover.	Project proponent	Rehabilitation Plan	Operational phase	Project proponent	Bi-annual	Full growth along the pipeline route
• Progressively, remove alien plant species within the pipeline servitude.	Project proponent	Inspection Quarterly	Operation Phase	Project proponent	Bi-annual	No Alien Plant Species

15 MONITORING

Monitoring will be undertaken to determine whether construction activities are impacting on the environment and that the EMPr is being implemented. Therefore, the preparation of a monitoring plan as part of an EMPr will ensure that the monitoring is conducted effectively and consistently and will deliver reliable, good quality data. Monitoring, in the broad sense, can also include visual evidence as well as a complaint register.

Monitoring will be an ongoing process to ensure that non-conformity is corrected, and necessary steps are taken timeously, to prevent further environmental degradation.

16 CONCLUSION

The application of the measures outlined in this Environmental Management Programme (EMPr) must ensure that the operation will have a minimal impact on the environment. If the measures outlined are not strictly adhered to, the contractor or responsible party can be charged and fined in terms of applicable legislation, and the project stopped. This EMPr will, therefore, administer and manage all activities on the project site and the actions of all the employees and agents of the Contractor.

This EMPr specifies the minimum environmental requirements to be implemented by the applicant as per the scope of works of the EMPr, in order to minimize and manage the potential environmental impacts and ensure sound environmental management practices are adhered to. It is essential that the EMPr requirements are carefully studied, understood, implemented, and adhered to at all the time by all relevant parties on this project.

This EMPr has been developed to set out actions to be taken and standards to be met in order to avoid, control, reduce or remediate adverse (negative) environmental impacts of the pipeline and associated infrastructure and to ensure compliance to:

- The Environmental Assessment findings and recommendations;
- Legislation obligations;
- Permit requirements (e.g., plant or heritage permits); and
- License conditions (e.g., EA or Water Use License)