PROPOSED DEVELOPMENT OF AN OXIDATION POND SYSTEM AND TWO GRAVITY OUTFALL SEWAGE LINES ON PORTION 1 OF THE FARM SCHWEIZER-RENEKE TOWN AND TOWNLANDS 62 HO, SCHWEIZER RENEKE, NORTHWEST PROVINCE

Environmental Management Plan

JUNE 2023

Prepared for:

On behalf of:

Prepared by:

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LIST OF ACRONYMS AND ABBREVIATIONS

CER	-	Contractors Environmental Representatives
DEDECT	-	Department of Economic Development, Environment, Conservation and Tourism
DEO	-	Designated Environmental Officer
DWS	-	Department of Water and Sanitation
ECO	-	Environmental Control Officer
EIA	-	Environmental Impact Assessment
EIR	-	Environmental Impact Report
EMPr	-	Environmental Management Program Report
EPC	-	Engineering Procurement Contractor
I&AP's	-	Interested and Affected Parties
IDP	-	Integrated Development Plan
NEMA	-	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	-	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NHRA	-	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NSBA	-	National Spatial Biodiversity Assessment
NERSA	-	National Energy Regulator of South Africa
NWA	-	National Water Act, 1998 (Act No. 36 of 1998)
PHRA	-	Provincial Heritage Resources Agency
PPP	-	Public Participation Process
SAHRA	-	South African Heritage Resources Agency
SDF	-	Spatial Development Framework

GLOSSARY OF TERMS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 327, 325 and 324, as amended.

Archaeological resources: This means a) Material remains from human activity e.g. artefacts, hominid remains, artificial features and structures older than 100 years; b) Rock art older than 100 years; c) Wrecks in South Africa older than 60 years or considered to be of conservation value by SAHRA; and d) Features, structures and artefacts associated with military history older than 75 years, including the sites on which they were found.

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

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in it-self may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Ecology: The study of the interrelationships between organisms and their environments.

Environment: All physical, chemical and biological factors and conditions that influence an object.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Impact Report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

Heritage resources: This means any place or object of cultural significance.

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red Data species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

Soil compaction: Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact easier than moist or dry soils.

1 INTRODUCTION

This Environmental Management Programme (EMPr), amongst others, describes the mitigation measures and identifies the specific role players that will be responsible for implementation of the mitigation measures, in order to ensure that impacts on the environment are minimised during the construction and operational phase of the Ipelegeng Oxidation Pond and two gravity outfall sewer lines, Ipelegeng, North West Province.

This EMPr must form part of the contractual agreement between the relevant Managers and the Developer/Applicant.

1.1 NEMA Regulation 19(4) Report Compliance

Regulation 19(4) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, as amended, provides the content requirements for EMPrs. The table below lists the relevant requirements, indicates whether the relevant information is included in this report or not, and provides cross-references as to where the relevant information can be found in this report.

Table 1: Environmental Management Programme requirements in terms of Regulation 19(4) of the EIA Regulations of 2014, as amended.

Reg.	EMPrContent	Included (Yes, No or N/A)	Report Section Reference
(a)	A draft environmental management programme must comply with section 24N of the Act and include - details of:		
	(i) the person who prepared the environmental management programme; and	**Yes**	**Chapter 3**
	(ii) the expertise of that person to prepare an environmental management programme;	**Yes**	**Chapter 3**
(b)	A detailed description of the aspects of the activity that are covered by the EMP'r as identified by the project description;	**Yes**	**Chapter 4**
(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	**Yes**	**Chapter 2**
(d)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	**Yes**	**Chapter 9**
(e)	A description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to – (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and, (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	**Yes**	**Chapters 7 & 9**

Reg.	EMPrContent	Included (Yes, No or N/A)	Report Section Reference
(f)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Yes**	**Chapter 9**
(g)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**YES**	**Chapter 9**
(h)	An indication of the persons who will be responsible for the implementation of the impact management actions;	**YES**	**Chapter 7**
(i)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	**YES**	**Chapter 9**
(j)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	-	-
(k)	A program for reporting on compliance, considering the requirements as prescribed by Regulations;	**YES**	**Chapter 9**
(l)	An environmental awareness plan describing the way – (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and, (ii) risk must be dealt with in order to avoid pollution or the degradation of the environment; and	**YES**	**Chapter 8**
(m)	Any specific information that may be required by the Competent Authority.	**YES**	**Chapter 8**

1.2 Report Layout

The table below summarises the content layout of this report.

Table 2: Summary of Report content layout.

Chapter	Chapter Heading	Content Summary
1	Introduction	Provides a brief background to the proposed project and explains the compliance of this report with regards to Regulation 33 of the NEMA.
2	Map(s)	Provides map(s) and site layout plan(s) related to the activity.
3	Environmental Assessment Practitioner	Provides details of the EAP who prepared this EMP'r and provides information on the expertise of the EAP.
4	Project Description and Listed Activities Covered by this EMPr	Provides a brief project description and describes the relevant project phases and the NEMA Listed Activities triggered.
5	Existing Environmental and Impact Assessment Summary	Summarises the biophysical, social, economic and cultural aspects of the existing environment, and provides a summary of the impact assessment outcome.
6	Recommendations of the EAP	Provides a summary of the recommendations of the EAP specific to the proposed activity and management.
7	Persons Responsible for Implementing this EMP'r	Provides information on the persons who will be responsible for implementing this EMP'r, and explains requirements with regards to on-site communication, site instruction entries, method statements, and record keeping.

Chapter	Chapter Heading	Content Summary
7	Monitoring, Performance Assessment and Reporting on EMP'r Compliance	Provides information on monitoring, performance assessment and reporting on EMP'r Compliance, ECO site inspection reports, and photographs.
8	Environmental Awareness Plan	Provides information on environmental awareness and risk training, and basic rules of conduct.
9	Impacts and Mitigation Measures	Provides EMP'rs for the relevant project phases.
10	Emergency Response Plan	Provides information on the emergency response plan.
11	Incident Register	Stipulates the content requirements for incident registers.

2 MAP OF THE PROPOSED ACTIVITY

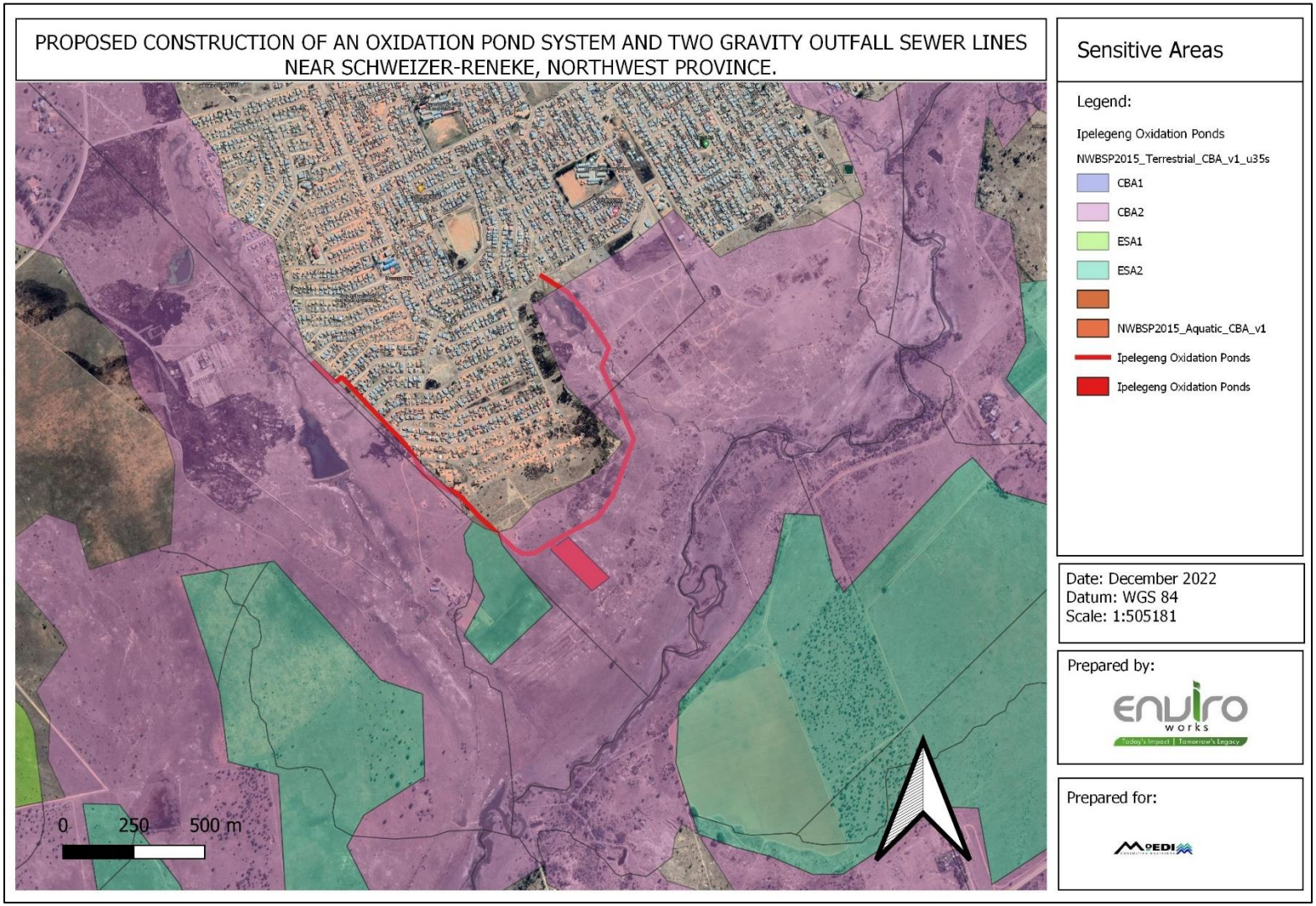

Figure 1: Sensitivity Map of Ipelegeng Oxidation Ponds and two sewer outfall lines, North West Province

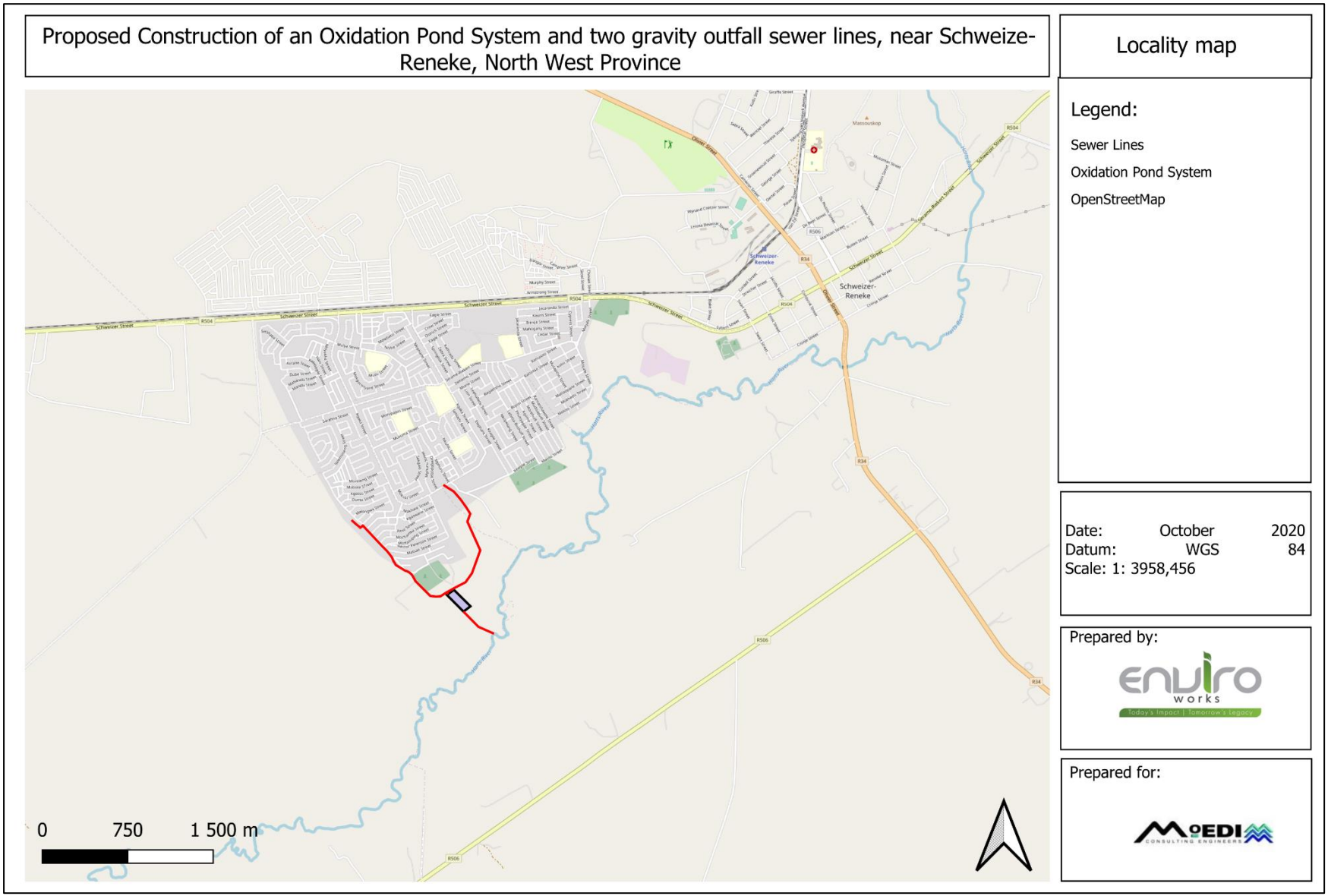

Figure 2: Locality Map of Ipelegeng Oxidation Pond and two sewer outfall lines, North West Province

3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

This Environmental Management Programme Report (EMPr) was prepared by Edmari Lewis from Enviroworks, the Environmental Assessment Practitioner (EAP) who is undertaking this EIA process and will be reviewed by Elana Mostert (EAP). The sections below provide the details of the EAP and explain the EAP's expertise to prepare this EMP'r.

3.1 Details of the EAP

Business name of EAP:	Enviroworks
Physical address:	Unit 81, Millenium Business Park, 19 Edison Way, Century City
Postal address:	Suite 1064, Private Bag X2, Century City, 7446
Postal code:	7446
Telephone:	079 459 9881
E-mail:	edmari@enviroworks.co.za

3.2 Expertise of the EAP

Name of EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs.)
Edmari Lewis	BSc. Hons. Geography and Environmental Management	Candidate SACNASP 147171 Candidate EAPASA 2021/3452	3 years

Curriculum Vitae of the EAP

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Edmari Lewis

RELEVANT QUALIFICATIONS

Baccalaureus Scientiae (B.Sc.) in Environmental and Biological Sciences: North-West University (2018)

Baccalaureus Scientiae (B.SC) Honours in Geography and Environmental Management: North-West University (2019)

WORK EXPERIENCE

June 2019 - July 2022: Environmental Consultant at Core Environmental Services (Mbombela)

August 2022 – current: Environmental Consultant at Enviroworks (George)

ENVIRONMENTAL IMPACT ASSESSMENT EXPERIENCE

- Manufacturing of precast concrete hollow core slabs, Mbombela, Mpumalanga Province, NORSE Projects (Pty) Ltd
- The proposed citrus plantation on portion 5 of the farm Duma 201-JU, Mbombela, Mpumalanga Province, AEONIK FARMS SEQUOIA (Pty) Ltd
- The expansion and operation of poultry facilities, Mbombela, Mpumalanga Province, Matumaini Farming
- The proposed Middelburg Dam Precinct Plan, Middelburg, Mpumalanga Province,
- Proposed Sebaka Cellular Mast, Mpumalanga Province, Thabure Towerco
- Proposed Rooibektiptol Cellular Mast, Mpumalanga Province, Thabure Towerco
- Proposed Doornkop Cellular Mast, Mpumalanga Province, Thabure Towerco
- The proposed increase in slaughtering capacity for the Barberton Abattoir, Barberton, Mpumalanga Province,
- The proposed clearance of 19 hectares of indigenous vegetation for agricultural purposes on portion 74 of the farm Abek 6-JU, Hazyview, Mpumalanga Province, Shekinah Glory Boerdery
- Proposed clearance of 18.5 hectares of indigenous vegetation for agricultural purposes on portion 1 and 5 of the farm Mooifontein 292-JU, Schoemanskloof, Mpumalanga Province, Poplar Creek
- Proposed clearance of 13 hectares of indigenous vegetation on portion 15 of the farm Sandford 291-JU, Hazyview, Mpumalanga Province, Sandford Agri (Pty) Ltd.
- Desilting of two dams on portion 1 of the farm Hull 92-KU, Klaserie Private Nature Reserve, Hoedspruit, Limpopo Province, Gladys Group
- Section 24G application for the unlawful clearing of indigenous vegetation, Mbombela, Mpumalanga Province, Wolmac Boerdery
- Section 24G application for the unlawful clearing of indigenous vegetation, Hazyview, Mpumalanga Province, Sandford Agri (Pty) Ltd
- Section 24G application for the unlawful clearing of indigenous vegetation, Mbombela, Mpumalanga Province, Ibhubesi Macs (Pty) Ltd

Scoping and Environmental Impact Assessment

- Scoping and Environmental Impact Assessment for the proposed Malalane Bypass Ring Road, Malalane, Mpumalanga Province, SANRAL

- Scoping and Environmental Impact Assessment for the clearance of 2000 hectares of indigenous vegetation for agricultural purposes, Nkomazi Game Reserve

BASIC ASSESSMENT EXPERIENCE

- The proposed citrus plantation on portion 5 of the farm Duma 201-JU, Mbombela, Mpumalanga Province, AEONIK FARMS SEQUOIA (Pty) Ltd
- The expansion and operation of poultry facilities, Mbombela, Mpumalanga Province, Matumaini Farming
- The proposed Middelburg Dam Precinct Plan, Middelburg, Mpumalanga Province,
- Proposed Sebaka Cellular Mast, Mpumalanga Province, Thabure Towerco
- Proposed Rooibektiptol Cellular Mast, Mpumalanga Province, Thabure Towerco
- Proposed Doornkop Cellular Mast, Mpumalanga Province, Thabure Towerco
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- Proposed clearance of 18.5 hectares of indigenous vegetation for agricultural purposes on portion 1 and 5 of the farm Mooifontein 292-JU, Schoemanskloof, Mpumalanga Province, Poplar Creek
- Proposed clearance of 13 hectares of indigenous vegetation on portion 15 of the farm Sandford 291-JU, Hazyview, Mpumalanga Province, Sandford Agri (Pty) Ltd.
- Desilting of two dams on portion 1 of the farm Hull 92-KU, Klaserie Private Nature Reserve, Hoedspruit, Limpopo Province, Gladys Group

WATER USE APPLICATION

- General Authorisation for the abstraction of surface and ground water for the purpose of bottling, Malalane, Mpumalanga Province, Vorn Water (Pty) Ltd.
- General Authorisation for the Crossings Channel Modification, Mbombela, Mpumalanga Province
- General Authorisation for the abstraction of groundwater for domestic use and CCA wood treatment
- General Authorisation for the proposed desilting of two dams located within Klaserie Private Nature Reserve, Hoedspruit, Limpopo Province

Section 24G Rectification Application

- Section 24G application for the unlawful clearing of indigenous vegetation, Mbombela, Mpumalanga Province, Wolmac Boerdery
- Section 24G application for the unlawful clearing of indigenous vegetation, Hazyview, Mpumalanga Province, Sandford Agri (Pty) Ltd
- Section 24G application for the unlawful clearing of indigenous vegetation, Mbombela, Mpumalanga Province, Ibhubesi Macs (Pty) Ltd

4 PROJECT DESCRIPTION AND LISTED ACTIVITIES COVERED BY THIS EMPR

4.1 Brief Project Description

Moedi Consulting Engineers on behalf of the Dr. Ruth Segomotsi Mompati District Municipality appointed Enviroworks, an independent Environmental Consultant, for the proposed construction of an oxidation pond system and two gravity outfall sewer pipelines outside the urban area of Ipelegeng township on Portion 1 of the farm Schweizer-Reneke Town and Townlands 62 HO and Portion 21 of the farm Palachoema 64 HO, near Schweizer-Reneke, North West Province (Refer to Figure 1 for the locality map).

The wastewater network of Ipelegeng has historically been known for regular spillages. As such the water service authority has embarked on a venture to optimise the system by implementing a bulk augmentation project. The aim of the 'Augmentation of Bulk Sewer Infrastructure in Ipelegeng' project is to optimise the wastewater system of Ipelegeng by decommissioning several pumping applications. In addition, the proposed scope of works comprises of the installation of two outfall sewer lines as well as the construction of a new oxidation ponds system. The proposed development (the estimated construction duration is 18 months) will consist of the following:

- The configuration of the existing sewer system entails that all wastewater generated in Ipelegeng gravitates to five (5) pumping stations. The current pumping system installed on site is not sufficient to convey wastewater to the Waste Water Treatment Plant (WWTP) and this results in spillages occurring due to the overloading of infrastructure (Refer to Figure 3 for the general layout plan). The motivation for the proposed project is twofold. Firstly, it will address the current capacity shortfall by reducing the inflow volume at pumping stations, and secondly, it will optimise the current sewer network to operate more efficiently by decreasing the pumping and repumping of sewage. It is proposed that two "cut-off" gravity outfall lines are installed to reduce the load on the pumping stations and furthermore, it is proposed that an oxidation pond are constructed to decommission Pumping Station A.
- The proposed construction of the oxidation pond system will be in the vicinity of Pumping Station A. The establishment of a pond system will ensure that wastewater accumulates in the system regardless of external factors. Thus, the construction of this pond system will eradicate sewer spillages immediately. Due to the fact that the oxidation pond system does not require any electrical or mechanical equipment, the application is considered to be the most suitable cost-effective solution for the Ipelegeng sewer lines.
- The two (2) gravity outfall sewer pipelines will be used to transport the sewage to the oxidation pond. The following co-ordinates will be applicable to:

	Latitude (S):			**Longitude (E):**		
Western Sewage Pipeline						
Starting point of the activity	27°	13'	02.71"	25°	17'	42.03"

Middle/Additional point of the activity	27°	12'	53.52"	25°	17'	27.58"
End point of the activity	27°	12'	41.48"	25°	17'	13.83"

Eastern Sewage Pipeline

Starting point of the activity	27°	13'	01.52"	25°	17'	44.30"
Middle/Additional point of the activity	27°	12'	49.92"	25°	17'	54.72"
End point of the activity	27°	12'	31.38"	25°	17'	43.18"

- The design criteria of the two pipelines are as follows:

  Western Outfall Sewer (Pipeline from P/s – A)

  Length: 1 278m

  Diameter: 343 mm (75 D Concrete pipe)

  Flow: 35 l/s

  Eastern Outfall Sewer (Pipeline from P/s – D)

  Length: 1 251m

  Diameter: 272 mm (75 D Concrete pipe)

  Flow: 21 l/s

  The projected volumetric daily throughput capacity will be 1 800 m^3 / day
- The proposed pond system will consist of a series of Anaerobic, Aerobic, and Maturation ponds within which wastewater is continuously allowed to flow from one pond to the next until the treated effluent is ultimately discharged into an Artificial Wetland (Refer to Figure 3 for the detailed design of the Oxidation Pond). Constructed wetlands are artificial aquatic environments that are utilised to treat organic, inorganic, and excess nutrient contaminants in wastewater. These wetlands consist of hydrophytes or macrophytes plants as well as coarse media to facilitate organic filtration. It is further proposed that the ponds itself is lined with concrete to allow for cleaning and desludging. When desludging occurs the sludge will be conveyed to the existing Schweizer Reneke WWTP, which has ample capacity to accommodate the anticipated sludge volume that is anticipated to be generated by the new proposed oxidation ponds.
- The Artificial wetland of the Ipelegeng oxidation ponds system was designed as a meandering Subsurface flow system and will be located south-east of the Ipelegeng Extension 3 (Latitude: 27°13'12.58"S & Longitude 25°17'53.51"E). The projected footprint of the wetland is 1725 m^2. The total length of the proposed wetland will amount to 860 meters resulting in a wetted surface area of 860 m^2 and a volume of 860 m^3 (Refer to Figure 4 for the detailed Wetland design).
- Treated wastewater will be discharged into the Harts River (Latitude: 27°13'13.44"S & Longitude 25°17'59.12"E). The total length of the discharge pipeline will be 338 m.

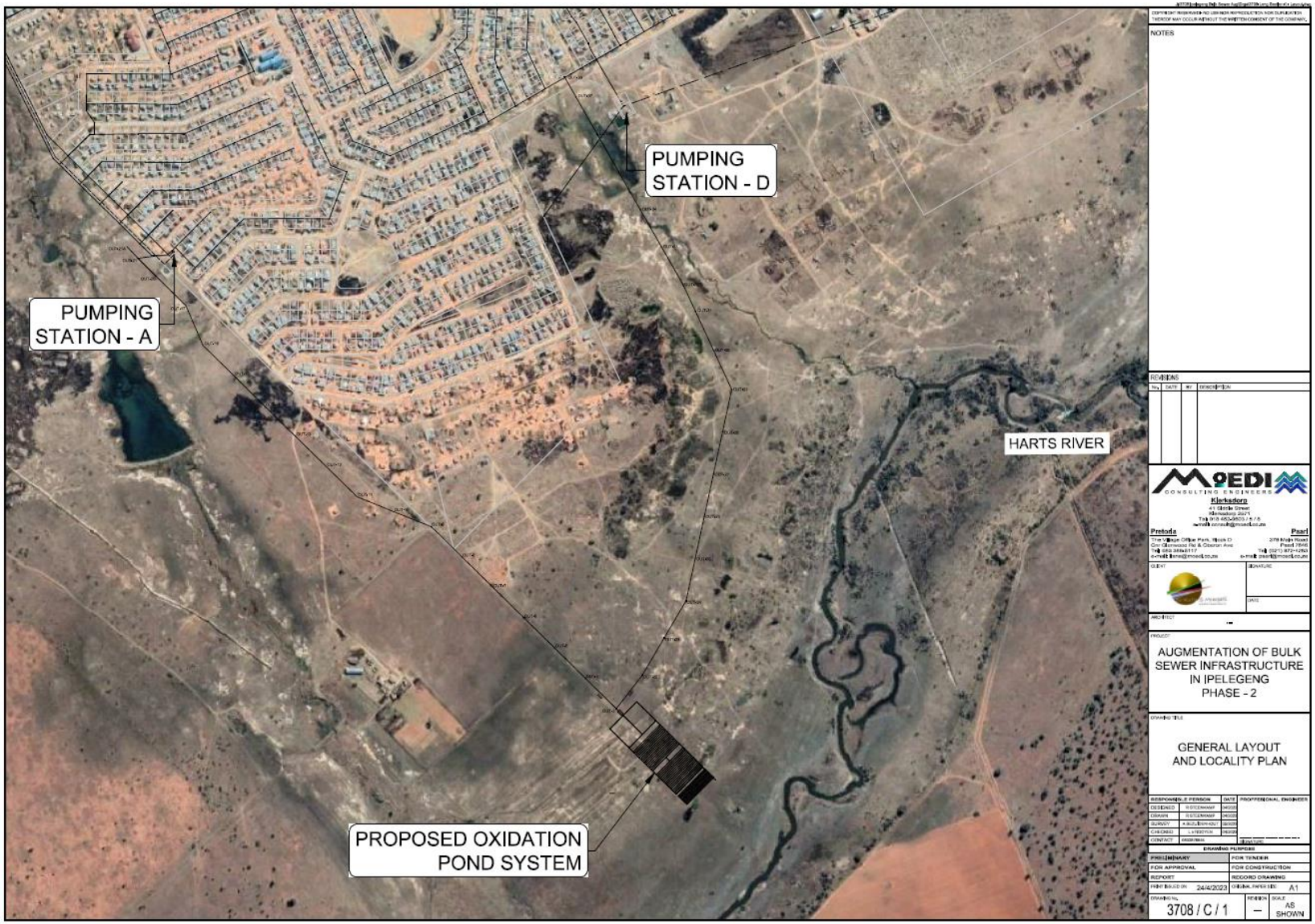

Figure 3: Layout Map of the proposed Sewer lines and Oxidation Pond System, Ipelegeng, North West Province

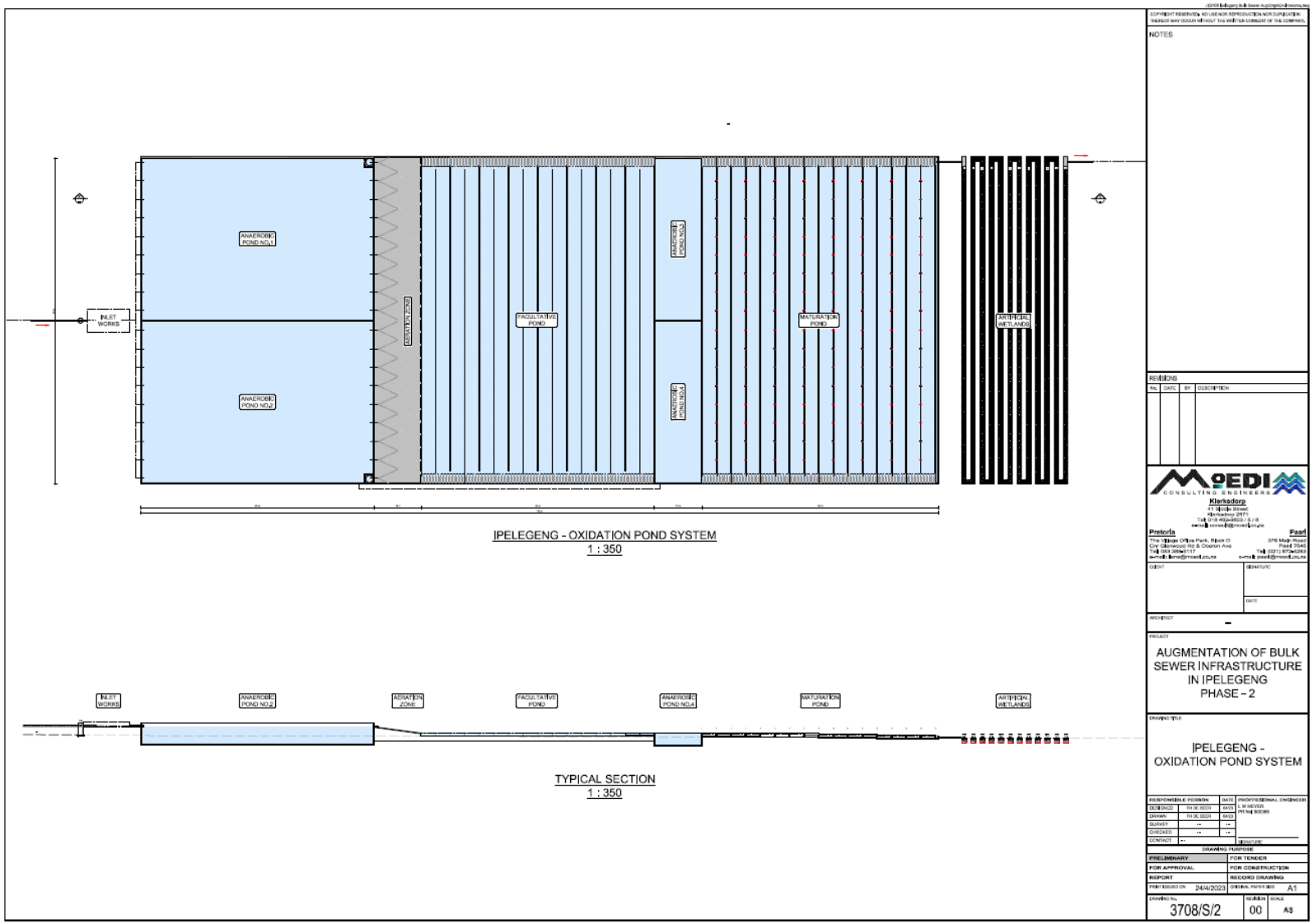

Figure 4: Detailed design of the Oxidation Pond System, Ipelegeng, North West Province

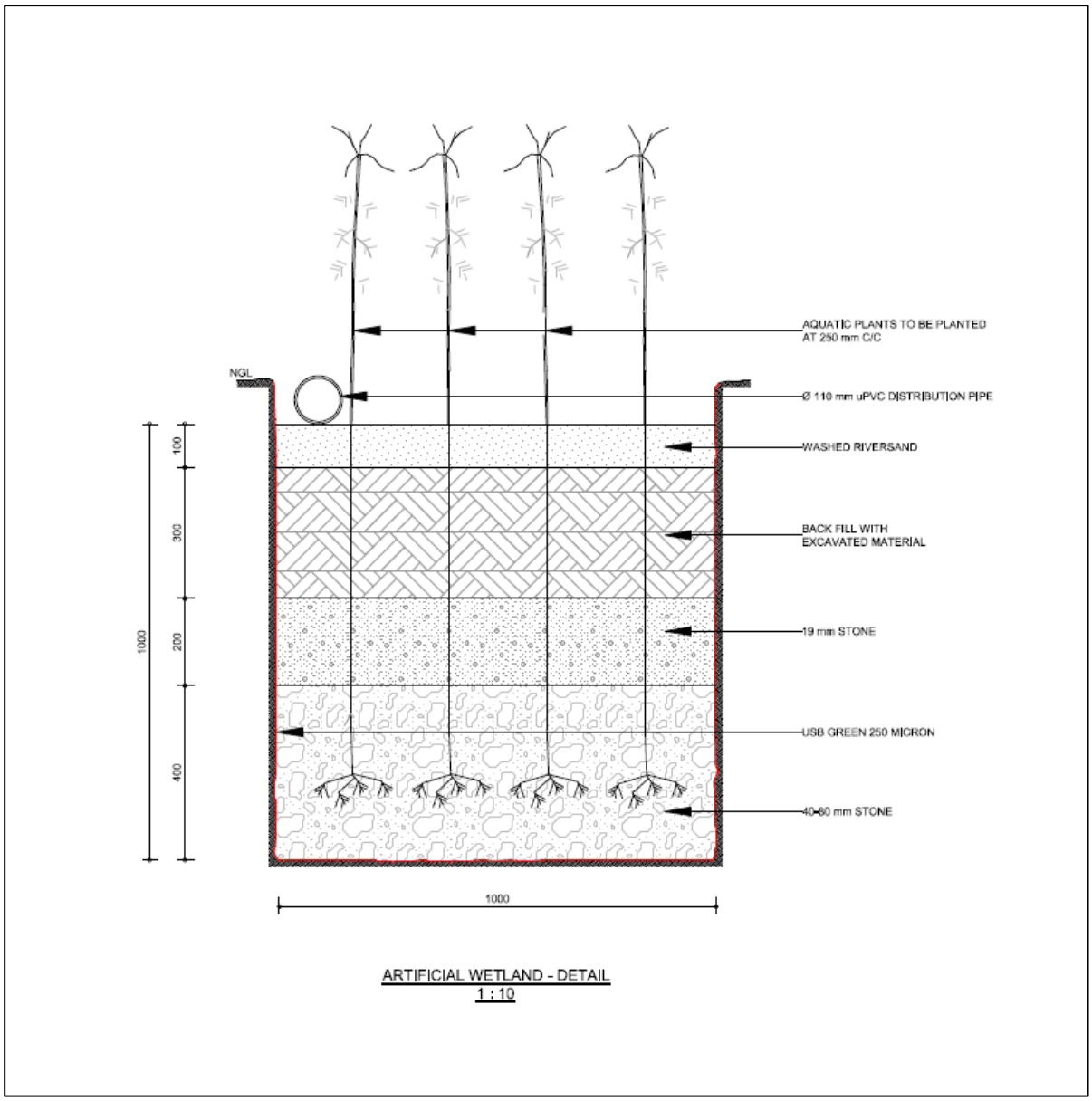

Figure 5: Detailed design of the artificial wetland

4.2 Project Phases

Two phases:

- Construction Phase
- Operational Phase.

4.3 NEMA Listed Activities Triggered

The NEMA EIA Listed Activities (as per the NEMA EIA Regulations Listing Notices 1, 2 and 3 of 2014, as amended) that will be triggered by the proposed project are listed in the table below.

Table 3: Listed Activities applicable to this application.

LISTED ACTIVITY	DESCRIPTION OF PROJECT ACTIVITY
GNR 327 as amended by GNR 517: **Activity 19:** **"**The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal, or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.**"**	According to the North West Biodiversity Sector plan the eastern outfall line falls within a watercourse. According to the Aquatic and Hydrological reports this watercourse is artificial. The applicability of this listed activity will be confirmed by the Department after the Public Participation Process.
GNR 327 as amended by GNR 517: **Activity 27:** **"**The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity.**"**	The physical footprint of the proposed construction of the oxidation pond is approximately 1.56ha, thus clearance of an area of 1 hectare or more, but less than 20 hectares will occur. Excluding the two sewer outfall lines and discharge line and therefore this activity will be triggered.
***GNR 324 as amended by GNR 517*:** **Activity 12:** **"**The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance	The physical footprint of the construction of the oxidation pond system and two gravity outfall sewer lines falls within the critical biodiversity area 2, and a vulnerable ecosystem. According to the North West Province Protected Area Expansion Implementation Strategy (2011), the status of the bushveld vegetation in Schweizer-Reneke is vulnerable. An area of 300 square

purposes undertaken in accordance with a maintenance management plan. North West Province iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority. vi) Areas within a watercourse or wetland or within 100 meters from the edge of a watercourse or wetland.**"**	meters or more of indigenous vegetation will be cleared within the critical biodiversity area 2. The footprint of the Eastern outfall sewer line and the discharge point will also be within 100 meters of a watercourse or wetland and an area of 300 square meters or more of indigenous vegetation will be cleared.

5 RECEIVING ENVIRONMENT AND IMPACT ASSESSMENT SUMMARY

The sections below summarise the existing receiving environment, and the outcome of the impact assessment that was undertaken for the proposed project.

5.1 The Receiving Environment

The proposed construction of an oxidation pond system and two gravity outfall sewer pipelines is located outside the urban area of Ipelegeng township on Portion 1 of the farm Schweizer-Reneke Town and Townlands 62 HO and Portion 21 of the farm Palachoema 64 HO, near Schweizer-Reneke, North West Province (Latitude: 27°13'12.58"S & Longitude 25°17'53.51"E).

The mean annual precipitation (MAP) for Schweizer-Reneke, North West Province is approximately 426 mm which is below average according to CapeFarmMapper, 2022, with most rainfall in the summer. The average annual temperature is 17.90 °C (CapeFarmMapper, 2022), associated with a high evaporation rate, which coincides with the average monthly temperatures of Schweizer-Reneke, North West Province. Winters in this area are particularly very dry. Schweizer-Reneke, North West Province has an arid climate that receives precipitation below the evaporation in the region. The climate is classified as BSk (Arid, steppe, cold) by the Köppen-Geiger system (1980–2016).

The regional geology of the study area is the Allanridge formation of the Ventersdorp supergroup. The Allanridge formation is exposed and consists mainly of Tholelitic and calc-alkaline basalt and andesite, tuff and pyroclastic breccia. According to CapeFarmMapper (2022), the geology in the study area consists of undifferentiated tonalite, granite and gneiss.

The study site is located in quaternary catchment C31F along the Harts River of the Lower Vaal Water Management Area.

The proposed development site consists of Schweizer Reneke Bushveld vegetation type. Schweizer Reneke Bushveld is currently listed as Vulnerable (A3) in Government Notice 2747 (November 2022). National land cover data show that Schweizer-Reneke Bushveld has experienced extensive spatial declines of approximately 51% since 1950. The proposed development footprint is predominantly situated in a Critical Biodiverse Area 2.

5.2 Specialist Investigations

On assessment of the proposed Ipelegeng Oxidation Pond System and two Sewer Outfall lines, the specialists determined the following:

HERITAGE IMPACT ASSESSMENT

A Heritage Screener was carried out for the proposal to construct an oxidation pond system and two gravity outfall sewer lines near Schweizer-Reneke, North West Province (Lavin, 2022).

In the development of the Amalia Extension 5 Township project, Pelser did not identify any archaeological sites. However, some historic farming remnants were recorded on site as well as a couple of cemeteries (Pelser, 2014, SAHRIS NID 167803). In Coetzee's (2017) Heritage Impact Assessment (HIA) for proposed diamond mining prospecting no Stone Age or Iron Age archaeological sites were found but further burial grounds and graves were recorded along with various historic homesteads. Coetzee further noted that, "Although erosion areas near the Harts River yielded no Stone Age assemblages, it is well known that Late Iron Age stone-walled settlements do not usually occur in open low-lying grasslands. The well-known Korana settlements of Chief Mossweu are located near Mamusa Hill (further west near Schweizer-Reneke) and other Tswana settlement (Rolong and Tlhaping) occur further north and west of the survey area. A total of four historical farmhouse complexes or individual houses dating to the late 19th and early 20th centuries were recorded. In addition, one historical stonewalled cattle kraal was also noted. These structures are associated with the land granted to the local farmers by Chief Mossweu in 1882. Seven graveyards and individual graves were recorded

which represent farm workers and the families that settled in the area since the 1880s. If the exhumation and reburial of the graveyards are envisaged, it will entail social consultation and permit application."

Given the extremely small footprint of the sewer upgrades and the highly disturbed ground that has already been heavily impacted by urbanisation and farming, it is unlikely that any significant archaeological heritage resources will be found for this development. There are no buildings or cultural landscape elements in the proposed development area. The proposed route of the pipeline falls within an existing path around a cemetery serving the community of Ipelegeng in Schweizer-Reneke. It is clear that the proposed development may well impact on modern graves and the route and excavation work will have to be carefully done to avoid impacts on any graves, however this is not a heritage concern as these graves are modern.

The proposed sewer system upgrades fall in an area of insignificant/zero palaeontological sensitivity according to the SAHRIS Palaeonsensitivity map as the geological context consists of biotite gneiss, augen gneiss, porphyritic and homogeneous granite, and pegmatite. There is therefore no need to carry out further palaeontological studies for this development.

PLANT SPECIES, ANIMAL SPECIES AND TERRESTRIAL BIODIVERSITY THEME COMPLIANCE STATEMENT

It is anticipated that the oxidation ponds and sewage outflow will have negligible impact on the biodiversity, fauna and botanical features identified by the Screening Tool as most of the footprint is disturbed and degraded and does not contribute significantly to the overall ecological functioning and biodiversity of the area. Most of the indigenous species identified on the footprint are non-threatened and non-protected. Any fauna species that utilised the area are expected to be common to the wider and non-threatened and not protected. Should any faunal species be impacted, individuals will be able to find refuge in the surrounding open space (Smith, 2023).

Taking into consideration the expected sensitivity of the footprint, sensitive features identified by the Screening Tool, the results from the expected baseline biodiversity and ecosystem of the site, which was verified by a site visit, it can be concluded that the footprint is of **low sensitivity** for the Plant Species, Animal Species and Terrestrial Biodiversity Theme. Provided that all the management outcomes are adhered to, this Compliance Statement is considered sufficient to meet the requirements for authorisation under the Plant Species, Animal Species and Terrestrial Biodiversity Theme Minimum requirements (Smith, 2023).

AQUATIC BIODIVERSITY THEME COMPLIANCE STATEMENT

The proposed development footprint is predominantly situated in a Critical Biodiverse Area 2. The CBA has been classified as being a Critical Corridor Linkage area (CBA_T8) as well as a Corridor (CBA_T7). Therefore, the primary purpose of the sensitive area is to perform the function of a Biodiversity Corridor (Smith, 2023).

Various aquatic features were identified as part of the project. These features are divided into four main types: floodplain wetland, channelled valley bottom wetland, streams, and artificial drainage lines (Smith, 2023).

Taking into consideration the sensitivity of the development footprint, sensitive features identified by the Screening Tool, the results from the baseline biodiversity and ecosystem of the site, which was verified by a site visit, it can be concluded that the proposed development footprint is of **low** sensitivity for the Aquatic Biodiversity Theme. Provided that all the management outcomes are adhered to, this Compliance Statement is considered sufficient to meet the requirements for authorisation under the Aquatic Biodiversity Theme Minimum requirements.

AGRICULTURAL COMPLIANCE STATEMENT

According to the Environmental Screening Tool, the agricultural sensitivity is classified as medium agricultural sensitivity due to the Low-Moderate to Moderate Land capability. Based on the observations made on site and analysis of the data collected, the proposed site for the development is considered as **medium** sensitivity for the following reasons (Bouwer, 2022):

- The moderate depth of the yellow brown apedal (800 mm).

- The Low-Moderate land capability calculated by the Department of Agriculture, Forestry and Fisheries, 2017.
- The absence of cultivated lands, with the primary land use being natural grassland.
- The absence of livestock and the small area (1.5 ha) which would not be able to sustain one large livestock unit.

Due to the medium sensitivity and lack of current agricultural activity, it is the specialist's opinion that the proposed development will not have a significant impact on agricultural in the area. In terms of agricultural sensitivity, the proposed development should thus be allowed to proceed at the identified site (Bouwer, 2022).

GEOHYDROLOGICAL IMPACT ASSESSMENT

A Geohydrological Impact Assessment was carried out for the proposal to construct an oxidation pond system and two gravity outfall sewer lines near Schweizer-Reneke, North West Province.

Taking all the different aspects and their limitations that were investigated during the Geohydrological Impact Assessment into account the following conclusions can be made (Lubbe, 2022):

- In case of overflow or spillage from the proposed oxidation pond, the effluent from the facility can flow to the topographical depression, which is the Harts River.
- The predicted impact of the facility on groundwater can be that the aquifer present is a minor weathered, fractured aquifer (increases the permeability of the aquifer) which indicate that the potential for the aquifer to become contaminated is high, however the infiltration potential of the contaminant to the groundwater table is low. Thus, the overall predicted impact on the groundwater quality with regards to site specific conditions, are low if the mitigation measures and recommendations are implemented. It is of uttermost importance that all activities associated with waste, i.e., oxidation pond, sludge dry beds, etc., should be lined with impermeable surfaces due to the nature of the highly permeable groundwater aquifer. It should be ensured that the sewage lines are constructed to ensure that leakage does not occur.

The proposed oxidation pond system and two (2) gravity outfall sewer lines, poses an overall low risk in terms of groundwater contamination potential and a high risk in surface water contamination potential; however, risks can be decreased by taking the above-mentioned recommendations and mitigation measures mentioned in the report into account (Lubbe, 2022).

HYDROLOGICAL IMPACT ASSESSMENT

A Hydrological Impact Assessment was carried out for the proposal to construct an oxidation pond system and two gravity outfall sewer lines near Schweizer-Reneke, North West Province.

- The study site is located in quaternary catchment C31F along the Harts River of the Lower Vaal Water Management Area. Ipelegeng is characterised by a MAP of 506 mm and a Mean Annual Evaporation (MAE) of 1 830mm that varies seasonally. More rainfall occurring mainly during the summer and winter months have more evaporation losses.

5.3 Environmental Impact Ratings

CONSTRUCTION PHASE IMPACTS

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON GEOGRAPHICAL, GEOLOGICAL AND PHYSICAL ASPECTS:					
Nature of impact: Negative impact of haphazard placement of infrastructure on the environment.	**Activity:** The proper establishment of a main site office and storage site during the construction period will ensure that the poor placement of materials and infrastructure will be avoided. Poor placement could also result in the damage or pollution to surrounding areas caused by construction activities.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	L	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Topsoil Removal and Soil Erosion.	**Activity:** The clearing of topsoil and excavation for the establishment of building foundations may result in the destruction of fertile topsoil and loss of vegetation cover associated with the development as well as access road.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	MH	L	-	-	-
Cumulative impact:	L	L	-	-	-
Nature of impact: Surface and groundwater contamination due to construction activities such as the use of	**Activity:** Spills could possibly occur on site and lead to the contamination of soil and groundwater.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
hazardous materials on site e.g., fuel and oil.					
Significance rating:	M	L	-	-	-
Cumulative impact:	L	-	-	-	-
Nature of impact: Handling of general waste materials on the development site.	**Activity:** The presence of personnel and construction operations on site will increase the likelihood of littering and the dumping of solid waste.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Increased risk of veld fires.	**Activity:** Due to the presence of construction personnel in natural areas, fires can occur if not managed to the correct standard. Fire may occur due to the presence and use of hazardous and flammable materials on site.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	MH	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Traffic impacts associated with the movement of construction vehicles on site.	**Activity:** The movement of vehicles on site may result in the destruction of biodiversity, compaction of valuable topsoil and mortalities of fauna on site.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Traffic impacts associated with the movement of construction vehicle.	**Activity:** The movement of vehicles in the vicinity of the construction site may cause damage to road surfaces as well as increase in the traffic volume of Route (R504).				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	L	L	-	-	-
Cumulative impact:	L	L	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON BIOLOGICAL ASPECTS:					
Nature of impact: Direct impact on vegetation during construction and loss of species.	**Activity:** The construction of several permanent structures on site will result in the loss of vegetation due to foundation excavation.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Cumulative impact:	-	-	-	-	-
Nature of impact: Dust nuisance generated by the operation of machinery and vehicles.	**Activity:** The construction activities of the proposed project could potentially result in fugitive dust emissions due to vegetation removal where dust could spread into the surrounding areas. The significance of this potential impact will likely; however, be only temporary.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	L	L	-	-	-
Nature of impact: Fauna and Flora will be directly impacted as a result of construction activities and human presence at the site.	**Activity:** The construction of facilities will result in some habitat loss for resident fauna, as some species will occur within the affected areas. In addition, increased levels of noise, pollution, disturbance, and human presence during construction will be detrimental to resident fauna. Sensitive and shy fauna may move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species (such as mole rats or blind snakes) would not be able to avoid the construction activities and might be killed.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Spread and establishment of Alien and Invasive Species.	**Activity:** Soil disturbances from construction will enhance the encroachment of Alien and Invasive vegetation that will out compete indigenous counterpart species for resources, displace and reduce faunal and flora biodiversity. Clearing current Invasive Alien species will increase the risk of spreading species if not properly removed and safety transported.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	L	-	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Nature of impact: Water quality of run-off water.	**Activity:** The Wetland and Harts River can potentially be at risk to increased surface runoff due to change in surface texture and effluent from the proposed development.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	L	L	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON SOCIO-ECONOMIC ASPECTS:					
Nature of impact: Occupational Health and Safety.	**Activity:** During the construction phase, accidents, occupational diseases, ill health, and damage to property can occur if pre-cautionary measures are not taken. Increased movement of vehicles may lead to increased accidents among local communities, construction workers and vehicle operators.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	MH	M	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Construction activities may have a positive impact on the local and	**Activity:** During the construction phase of the project the construction process may have a positive impact on the local and regional socio-economic conditions by means of employment creation.				The proposed development will not take place and as such no socio-economic benefits will be derived from this construction

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
regional socio-economic conditions.					period. The impact will thus be a negative one.
Significance rating:	L+	-	-	-	L
Cumulative impact:	-	-	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON CULTURAL-HISTORICAL ASPECTS:					
Nature of impact: Damage and destruction of vertebrate fossils during excavation activities.	**Activity:** Excavation activities can result in the discovery of cultural and historical artefacts beneath the earth surface. Damage or loss can occur if the correct procedures are not followed.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	L	L	-	-	-
Cumulative impact:	-	-	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL VISUAL IMPACTS:					
Nature of impact: Impact on the sense of place for surrounding users.	**Activity:** The movement of construction vehicles, machinery and personnel on site shall result in a visual impact on surrounding users. Furthermore, to this, the storage of materials and excavation shall result in disturbance and an unsightly character.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	L	-	-	-	-

Planning, design, and construction phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON NOISE ASPECTS:					
Nature of impact: Noise nuisance generated by construction works, vehicles and personnel.	**Activity:** The operating of vehicles and machinery on site results in the generation of noise disturbing users of the surrounding area.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	MH	L	-	-	-
Cumulative impact:	L	-	-	-	-

OPERATIONAL PHASE IMPACTS

Operational Phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL IMPACTS ON GEOGRAPHICAL, GEOLOGICAL AND PHYSICAL ASPECTS:					
Nature of impact: Handling of general waste materials on the development site.	**Activity:** Waste will be generated on site, if not disposed of correctly it will become a nuisance within the area.				No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Traffic impacts associated with the movement of vehicles within the area.	**Activity:** The regular movement of vehicles on the R504 and within the area would increase traffic flow and impede vehicle movement.				No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	L	L	-	-	-
Cumulative impact:	L	L	-	-	-
Nature of impact: Infiltration of effluent and chemicals that have the potential to change the quality of the groundwater.	**Activity:** Potential of leachate from the sewage treatment plant to pollute the groundwater by changing the quality of the groundwater. Discharge of treated effluent which do not comply to DWS standards can cause detrimental effects on both the ecological/watercourse and human health.				The pollution of groundwater can cause the proposed oxidation pond's environmental authorisation and associated licenses to be reviewed with associated penalties.

Operational Phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Discharge of treated effluent into the Harts River.					
Significance rating:	H	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: Infiltration of effluent and chemicals that have the potential to change the quality of the groundwater.	**Activity:** Considering the site-specific properties such as: • Recharge (low); • Rainfall (low rainfall MAP: 426 mm); • Temperature (high annual temperature of 17.90 °C – High evaporation); • Topography and drainage (drainage towards topographical depression – Harts River, however, will rather evaporate than run-off); • Water table (water table of 15.35 mbgl.); • Minor fractured, weathered aquifer (high permeability); • Groundwater vulnerability (very low - low), and, • Groundwater quality (good drinking water quality (EC Values) – high salinity).				The pollution of groundwater can cause the proposed oxidation pond's environmental authorisation and associated licenses to be reviewed with associated penalties.
Significance rating:	L	L	-	-	
Cumulative impact:	-	-	-	-	
Nature of impact: Increased risk of veld fires.	**Activity:** Due to the presence of personnel in natural areas, fires can occur if not managed to the correct standard.				No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.

Operational Phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	M	L	-	-	
Cumulative impact:	-	-	-	-	
Nature of impact: Water quality changes due to operations of the oxidation ponds	**Activity:** The general operation of the oxidation ponds and pipelines may result in seepage of untreated sewage and effluent into surrounding freshwater systems.				No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-
Nature of impact: General operation of oxidation ponds	**Activity:** The general operation of the oxidation ponds may result in improper stormwater management and alien invasive species establishment.				No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Significance rating:	M	L	-	-	-
Cumulative impact:	-	-	-	-	-

POTENTIAL IMPACTS ON SOCIO-ECONOMIC ASPECTS:		
Nature of impact: Oxidation Pond System.	**Activity:** The operation of the Oxidation Pond and two gravity outfall sewer lines will treat wastewater and reduce the discharge of contaminants and pathogens into the environment.	The no-go will not reduce spills and chances of discharge of contaminants and pathogens into the environment from spills

Operational Phase	Layout Alternative 1 (Preferred Layout)		Layout Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
Significance rating:	MH (+)	-	-	-	-
Cumulative impact:	-	-	-	-	-

6 RECOMMENDATIONS OF THE EAP

The following recommendations have been made by the Environmental Assessment Practitioner:

Construction Phase

- Disturbed areas should be rehabilitated as soon as possible after the construction period;
- No open fires are to be allowed on site;
- Designated smoking areas must be marked on site;
- All applicable mitigation measures recommended by the various Specialists should be strictly implemented; and,
- The EMPr should be approved by the DEDECT prior to construction and its implementation should form part of the conditions of the Environmental Authorisation.

Operational Phase

- The facility's compliance with the EMPr should be monitored intermittently during the operational phase of the project;
- No open fires are to be allowed on site. Fires must only be allowed in designated areas;
- Designated smoking areas must be marked on site;
- All applicable mitigation measures recommended by the various Specialists should be strictly implemented; and,
- The EMPr should be approved by the DEDECT prior to construction and its implementation should form part of the conditions of the Environmental Authorisation.

7 PERSONS RESPONSIBLE FOR IMPLEMENTING THIS EMPR

The "Responsibility" columns in the impact and mitigation tables provided below indicate which team member(s) are responsible for implementation of the identified mitigation measures, these team members include the following:

- Construction contractor(s);
- Construction manager;
- Applicant / Developer; and the
- Designated Environmental Officer

The sections below list further supplementary measures, which should also be implemented by the relevant team members.

During the **construction phase** the **construction contractor**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Be responsible to have the EMPr available on site at all times;
- Provide the applicant with a "Method Statement" which will indicate the procedures that will be applied in order to meet the requirements of any aspect of the EMPr; and
- Ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

During the **construction phase** the **contract manager**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Have the authority to stop work and issue fines;
- Receive reports from the ECO and report to the applicant;
- Enforce contractor obligations to the EMP-r; and,
- Support the ECO in his/her roles and responsibilities.

During the **construction phase** the **environmental control officer**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Meet with the contractor and project manager to hand over the site and go through the content of the EMPr, including the "do's and don'ts" of the project, to ensure that the parties understand their responsibilities to the EMPr;
- Be accountable for monitoring and auditing activities to ensure compliance with the EMP-r and the Environmental Authorisation;
- Work correctively with other role-players, but not be influenced in opinion and must report to the applicant only;
- May, in the event of there being a serious threat to or impact on the environment, correspond with the contract project manager to stop work;
- Complete an ECO checklist after each site inspection and distribute this to the project team within 5 days; and,
- Conduct a final environmental audit of the project on completion of construction and rehabilitation, for submission to the DESTEA to review.

During the **operational phase** the **applicant/developer**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Set aside a budget for maintenance;
- Maintain all facilities and infrastructure in good working order to effectively fulfil its intended purpose and to prevent negative environmental impacts;
- Not construct any additional buildings, infrastructure, etc. contrary to the Environmental Authorisation, without performing an environmental impact assessment where listed activities of the 2014 NEMA EIA Regulations (as amended) are triggered; and
- To immediately remedy any aspects that contribute to negative environmental impacts.

7.1 On-site Communication

The following sections describe the site communication measures that will need to be implemented.

7.1.1 Site Instruction Entries

The Site Instruction book must be used for the recording of general site instructions as they relate to the works on site. It must also be used for the issuing of **stop work orders** for the purposes of immediately halting any particular activities of the contractor/Site manager in lieu of the environmental risk that they may pose.

7.1.2 Method Statements

Method statements from the Site Manager will be required for specific sensitive actions on request by the Authorities or the ECO.

A method statement forms the baseline information on which work in sensitive environments takes place and is a "live document" allowing for modifications to be negotiated between the Contractor/Site manager and ECO/Engineer, as circumstances unfolds.

A method statement describes the scope of the intended work, step-by-step, in order for the ECO and Engineer to understand the Contractor's/Operator's intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impacts during these tasks. For each instance wherein it is requested that the Contractor/Operator submit a method statement to the satisfaction of the ECO, the format must clearly indicate the following:

- **What** – a brief description of the work to be undertaken;
- **How –** a detailed description of the process of work, methods and materials;
- **Where –** a description/sketch map of the locality of work (if applicable); and
- **When –** the sequencing of actions with due commencement dates and completion date estimates.

All method statements will form part of the EMP'r documentation and are subject to all terms and conditions contained within the EMP'r main document.

The Site Manager must submit the method statement to the ECO before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ECO.

7.1.3 Record Keeping

All records related to the implementation of this EMP'r (e.g., site instruction book, method statements) must be kept together in an office where it is safe and can be retrieved easily. These records must be kept for two (2) years and must at any time be available for scrutiny by any relevant Authority.

7.2 Monitoring

Several monitoring actions are proposed which would be undertaken by various project role players. For detail on these actions, "Responsible Person/Party", and "Monitoring Frequency" associated with the identified mitigation measures, refer to the "Monitoring" column in the Impact Assessment below (Chapter 9).

7.3 Performance Assessment and Reporting on EMP'r Compliance

A suitably qualified Environmental Control Officer (ECO) must be appointed by the Applicant/Developer to oversee the implementation of the Construction and Operation mitigation measures described in this EMP'r, as well as the conditions of authorisation as described in the Environmental Authorisation.

The ECO must be appointed by the Applicant/Developer.

The following applies, amongst others, to the ECO's role:

- The ECO must undertake **monthly site visits**;
- The ECO must **report to** the Applicant/Developer only; and
- The ECO must present an **environmental site induction/awareness training session** to all personnel before work on site commences, as are also described in the Environmental Awareness Plan.

7.3.1 Photographs

Photographs of all environmental transgression during the construction and operational phase must be included in ECO reports. These photographs should be stored with other records related to this EMPr. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMPr.

8 ENVIRONMENTAL AWARENESS PLAN

8.1 Environmental Awareness and Risk Training

All employees involved in work on site are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMP'r, prior to work commencing. The briefing will usually take the form of an on-site talk and demonstration by the DEO and/or ECO. The education/awareness programme must be aimed at all levels of employees on site. See "basic rules of conduct" below.

8.1.1 Basic Rules of Conduct

The following list represents the basic *Do's* and *Don'ts* towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

NOTE: ALL new site personnel must attend an environmental awareness/induction presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ECO.

DO:

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind;
- Report all fuel or oil spills immediately and stop the spill from continuing;
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence);
- Always use drip trays for stationary machinery, generators and break downs;
- Empty drip trays every day and dispose of waste as per correct procedure;
- Topsoil should always be removed first and stockpiled separately for use in rehabilitation;
- Always stay upwind if and where possible to protect yourself from dust and contamination;
- Make use of dust mask in areas with dust;
- Make use of goggles to prevent any dust particles entering your eyes;
- If you find any cultural, historical or pre-historic object on the construction site you must immediately notify a supervisor;
- Confine work and storage of equipment to within the immediate work area;
- Use all safety equipment and comply with all safety procedures;
- Ensure a working fire extinguisher is immediately at hand if any "HOT WORK" is undertaken e.g., welding, grinding, gas cutting etc.;
- Prevent excessive dust and noise; and,
- Report any breakdowns to management.

DO NOT:

- Do not litter - report dirty or full facilities, i.e., full dustbins and dirty or blocked toilets;
- Do not bury or burn any waste. All waste to be disposed of in an allocated refuse disposal container, bin or bag;

- Do not cover any spills with soil;
- Do not throw any oil filters, oil drums or hydraulic hoses in the field;
- Do not refuel plant near any streams, rivers or wetlands;
- Do not damage or cut down any trees without the relevant permission being given;
- Do not drive or park vehicles on topsoil;
- Never remove, destroy or disturb any cultural, historic or pre-historic object on site;
- Do not make any fires;
- Do not enter any fenced off or demarcated areas;
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses; and,
- Do not litter or leave food lying around.

9 IMPACTS AND MITIGATION MEASURES

A number of potential environmental impacts that may arise during the project have been identified. These are outlined in the following table below, and guidelines and mitigation measures are provided.

The Site Manager must familiarise himself with the requirements of the EMP'r, keeping in mind that other site-specific requirements as may be outlined in the Environmental Authorisation and Water Use License must also be complied with.

9.1 Construction Phase Environmental Management Programme

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
1. **ACTIVITY:** PERMITS AND AUTHORISATIONS				
1.1	**Aspects:** Legislative compliance. **Impact:** Non-compliance with South African environmental legislation. **Objective:** Ensure compliance with all triggered environmental legislation. **Target:** Commence site establishment with all permission and approvals received and on hand.	Developer	**Monitoring Action:** Obtain copies of all permits; Record Keeping **Responsible Person/Party:** Construction Manager **Monitoring Frequency:** Once off	
	Mitigation/Management Measures: a. The Developer is to have the following permits on commencement: • Environmental Authorisation; • Water Use License; and • Environmental Management Program;			
2. **ACTIVITY:** SITE LAYOUT PLANNING				
2.1	**Aspects:** Site Layout Plan. **Impact:** Negative impact on the environment of unmanaged and unplanned placement of Infrastructure. **Objective:** To ensure acceptable impact and management of environmental issues at the main site and storage site during construction by proper planning of layout of infrastructure placement. **Target:** All areas not demarcated for construction should remain vegetated in impact should be minimised.	Developer	**Monitoring Action:** Record Keeping **Responsible Person/Party:**	
	Mitigation/Management Measures:			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE	RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
a. Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure; b. The planning for layout must be done in consultation on-site with the Environmental Control Officer (ECO); c. The Contractor may not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes; d. The Contractor must ensure that all construction personnel, labourers, and equipment always remain within the demarcated construction sites; e. No servicing of vehicles may be permitted on site, unless for emergency purposes; f. Stockpiles may not be situated in such a manner that they obstruct pathways; g. Location of storage area must consider prevailing winds, distance to water bodies and general on-site topography; h. Place infrastructure as far as possible on sites that have already been transformed; i. Facilities may not be used as staff accommodation; j. The Contractors camp layout must consider availability of access for deliveries and services and any future works; k. The Contractors camp must be of sufficient size to accommodate the needs of all sub-contractors that may work on the project; and, l. The Contractor must implement the following as required: • Suitable sanitation facilities, adequate for the number of staff on site (1 for every 15 personnel and 1 for each gender); and		Project Manager / Engineer **Monitoring Frequency:** Once off	
3. **ACTIVITY:** CONSTRUCTION PROGRAMME / SCHEDULE			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
3.1	**Aspects:** Project Management. **Impact:** Order and timing of construction activities and associated impacts. **Objective:** To Provide a clear indication of the order by which key construction activities will transpire. **Target:** Anticipate timing of impacts to coordinate the availability of any specialists and/or authorities who may be required to conduct site inspections.	Contract Project Manager / Contractor	**Monitoring Action:** Meetings; Risk Register; ECO Audit Checklist; Photographs **Responsible Person/Party:** Project Manager / Contractor / ECO **Monitoring Frequency:** Once off	
	Mitigation/Management Measures: a. Draw up and sign off a project schedule with all contributing parties and service providers to commit to a timeline during which time construction milestones will be completed; b. Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made; c. Establish a risk register to identify and monitor potential factors which may result in setbacks for the project; d. Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; and, e. Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, and engineer and ECO are to keep records of this and the latter communicate this in the ECO Monthly Audit Checklist.			
4. **ACTIVITY:** COMMUNICATION WITH LAND-OWNERS				
4.1	**Aspects:** Landowner Consent. **Impact:** Disturbance of existing land use. **Objective:** Maintain a conflict-free relationship with landowners / users. **Target:** No complaints received from landowners / users of affected property.	Contract Project Manager / Contractor	**Monitoring Action:** Meetings; Risk Register.	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	Mitigation/Management Measures: a. Landowners are to be aware and in agreement of site access arrangements; b. The landowner has to be requested to liaise with the site supervisor of the construction contractor prior to entering the construction footprint area for safety purposes; c. All property gates are to be kept closed when not in use (or kept in the open/closed state in which it was found); and, d. Any complaint or liaison with regard to environmental aspects, compensation or disorder to economic activities, must not be addressed by the contractor. A public complaint register must be kept on site and the contract project manager must inform the Developer and/or ECO to take further action.		**Responsible Person/Party:** Contract Project Manager / Contractor / ECO **Monitoring Frequency:** Once off	
5. **ACTIVITY:** SITE ESTABLISHMENT				
5.1	**Aspects:** Demarcation of the site and vegetation removal. **Impact:** Direct impact on vegetation during construction and loss of species. **Objective:** Prevent unnecessary habitat destruction. **Target:** All areas not demarcated for construction should remain vegetated.	Construction contractor	**Monitoring Action:** ECO to take photographs of site before clearance; ECO Audit Checklist. **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. No natural surfaces are to be marked other than using droppers, beacons or other artificial object; b. Ensure the upkeep of demarcation boundaries throughout the period of construction until rehabilitation has been completed; c. Construction areas must be fenced; d. After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows;			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE	RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
e. No open fires are allowed on site during construction activities; f. Sufficient fire management equipment must be on the site; g. Smoking must be restricted to designated smoking areas; h. No dumping of sewage or hazardous waste into a terrestrial ecosystem; i. All activities must remain within the designated footprint; j. All areas outside of the footprint must be considered no-go areas; k. Development and access roads should be restricted to already disturbed areas as far as practically possible; l. Vehicles use must be restricted to designated roads; m. No hunting, snaring, shooting, nest raiding or egg collection by the construction staff may be allowed; n. Holes and trenches must not be left open for extended periods of time and should only be dug when needed for immediate construction. Trenches that may stand open for some days should have places where the loose material has been returned to the trench to form an escape ramp present at regular intervals to allow any fauna that fall in to escape; o. Construction workers should be educated on sensitive species likely to be found in the area and posters should be put up of species of conservation concern. If any of these species are found during construction, they will be advised to contact the ECO immediately in order to prevent harm to these species and their habitats; p. Keep the facility neat, tidy, and clean in order not to attract scavenging animals such as rats and mice; q. Ensure that the construction area is fenced off from adjacent areas which may harbour wild animals; r. Do not store building materials and excess stockpiled soils within riparian zones or within areas where natural vegetation occurs;			

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	s. Should any faunal species need to be translocated, a faunal or avifaunal (in the case of birds) specialist will need to be consulted; t. All personnel, during all phases of the project, must be inducted to ensure that they are aware of the environmental sensitivities on the site; u. No fauna may be caught, trapped, or harmed in any way; v. Clearance of vegetation should take place in phases (where practically possible), to increase the chances of smaller faunal species potential occurring in the development footprint, moving into the adjacent area; w. All staff must be trained to ensure that they are aware of any potential fauna may be on the footprint or surrounds; x. Vehicles must remain within a 30 km/h speed limit to avoid roadkill incidents; y. Any indigenous vegetation removed from the footprint should be scattered in adjacent area of recovering natural vegetation, to preserve potential microfauna and invertebrates found in amongst the vegetation; z. Alien plant material removed during construction and eradication efforts should be contained and disposed of properly to limit accidental spread; aa. Construction activities must be limited to the smallest possible area; bb. Designated authorised service roads must be used by all Construction Vehicles; cc. Alien Invasive Species (AIS) proliferation, which may affect adjacent natural habitat within surrounding areas, needs to be strictly managed adjacent to the footprint area; dd. Construction activities should be limited to the smallest possible area; ee. Construction vehicles should use existing authorised service roads;			

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	ff. Implement suitable alien invasive species establishment prevention measures during the construction phase such as proper storage, transport and disposal of plant material and minimising disturbance to the areas surrounding the development footprint; gg. Alien invasive vegetation material cleared during construction activities must be adequately contained and disposed of at a suitable, certified 'green waste' disposal site to prevent further spreading; hh. Areas around the proposed project footprint must be adequately rehabilitated to prevent significant alien invasive species establishment; and, ii. Herbicides must be used in the prescribed quantities and only periods of no rainfall			
5.2	**Aspects:** Topsoil stripping and conservation. **Impact:** Destruction of topsoil. **Objective:** Conserve and protect topsoil from erosion and destruction. **Target:** Topsoil condition maintained. **Mitigation/Management Measures:** a. Remove topsoil approximately 300 mm deep from establishment area and stockpile areas; b. Topsoil stockpiles to be kept free from weeds; c. Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rain/storm water; d. Topsoil needs to be stored on designated areas only. This need to be planned and indicated in the site-layout plan; e. Ensure that topsoil is not mixed with subsoil and/or any other excavated material; f. Provide containment and settlement facilities for effluents from concrete mixing and washing facilities;	Construction contractor	**Monitoring Action:** ECO Audit Checklist; Photographs; **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	g. Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan; h. Provide spill containment facilities for hazardous materials like fuel and oil; i. Topsoil must be used in all rehabilitation activities and may not be compacted to ensure that its plant support capacity remain of high quality; j. Rehabilitate denude areas especially slopes with appropriate species and erosion protection measures i.e., geotextiles, rocks, topsoil mixtures as per specifications; k. Implement suitable erosion prevention measures during the construction phase; l. Soil erosion must be controlled as an ongoing management strategy throughout the various phases of the proposed development activities; m. Make use of surface erosion control measures within disturbed areas to avoid erosion in times of high risk (e.g., rain season and time of high wind speeds); n. Implement stormwater management along any roadways and paths to reduce gulley erosion formation; o. Stormwater management should prevent excessive sediment to be carried into drainage channels and the natural environment; p. Removal of debris and other obstructing materials from the site must take place and erosion preventing structures must be constructed. This is done to prevent damming of water and increasing flooding dange; q. Disturbed areas, that will not form part of the operational footprint, but which were disturbed as part of the construction activities, should be rehabilitated and re-vegetated using site-appropriate vegetation and/or seed mixes, to prevent gulley erosion;			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	r. Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; s. No materials of any kind are allowed to be stored in the stormwater channels; t. Areas around the proposed project footprint, must be adequately rehabilitated to prevent significant erosion; u. Avoid the use of concrete lined channels for storm water management as this can increase the speed of water. This in turn increases erosion potential that can cause erosion on site and in watercourse banks and increase siltation downstream. If concrete-lined channels are used; they should end in silt traps; v. Soil disturbance must be kept to a minimum within and around the development footprint; w. All stockpiles must be stored outside of wetland buffers; and, x. Stockpiles must be covered in periods high wind and rain.			
6. **ACTIVITY:** EARTH-WORKS				
6.1	**Aspects:** Excavations; cut and fill; shaping and trimming. **Impact:** Alteration of the terrain by civil works. **Objective:** Minimise impact to the physical terrain features of the site. **Target:** Maintain Civil Works to within the construction footprint area.	Construction contractor	**Monitoring Action:** ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. Cut and fill areas must be identified by the Engineer and protection measures provided through an appropriate method and technology; b. Dispose of excess material at a registered solid waste landfill site Shaping and trimming operations are to be planned to allow for topsoil application, with provision for the specified depth of reapplied topsoil made.			
7. **ACTIVITY:** SITE INFRASTRUCTURE PLACEMENT AND OPERATION				

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7.1	**Aspects:** Structures and lay-down areas. **Impact:** Deterioration of site features and surrounding areas. **Objective:** Prevent the deterioration of site features like soil, rainwater runoff and erosion. **Target:** The preservation of site conditions evident on establishment of structures and lay-down areas. **Mitigation/Management Measures:** a. Locate all structures and storage areas, including offices, workshops and stores in approved locations are per the Site Layout Plan; b. The camp with storage and laydown areas are to be kept secure and neat with access control measures adopted during construction; c. Clearly define which activities are to occur within which areas of the site by erecting signage; d. All hazardous substances, such as fuel, oil, diesel, paint, etc., must be stored in a secondary containment system (trays or bund) which is capable of storing at least 110% of the liquid capacity. If bund areas are used, it should be sealed to avoid seepages; and e. A vehicle service area should be in place, for vehicle repairs, in such way that no spillages will occur into the environment.	Construction contractor	**Monitoring Action:** Photographs; ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
8. **ACTIVITY:** CONSTRUCTION SITE OPERATIONS				
8.1	**Aspects:** Security and fencing. **Impact:** Prevent danger to trespassing of persons. **Objective:** Keep the site secure from trespassing or theft and keep animals out. **Target:** Site remains secure during construction with no incidences of trespassing, theft and injury or death to animals.	Construction contractor	**Monitoring Action:** Photographs; ECO Audit Checklist	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	Mitigation/Management Measures: a. Be responsive to open or closed status of gates; b. New or the upkeep of fences should align to ensure safety of animals and maintain a reliable boundary area; c. Limit clearing of vegetation for fencing to the removal of trees and shrubs within 1 m of the fence line. All undergrowth should be maintained; d. Should construction activity require the removal of fences or gates to execute tasks, this must be replaced as soon as possible following completion; and, e. In all cases, the landowners on whose property any use of fences or gates, must be consulted, to ensure that parties are informed of construction activity, schedules and vehicle movement.		**Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
8.2	**Aspects:** Existing Services and Infrastructure. **Impact:** Damage to existing services and infrastructure. **Objective:** No damages to existing services and infrastructure. **Target:** No damages to existing services and infrastructure.	Construction contractor	**Monitoring Action:** Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	
	Mitigation/Management Measures: a. Take cognisance of the position of existing services and infrastructure (e.g. roads, pipelines, power lines and telephone services) that may get damaged due to construction activities; b. Ensure that existing services are not damaged or disrupted unless required by the contract and with the permission of the project manager; and c. In the event that infrastructure is damaged or services interrupted during construction, it will be done at the expense of the Contractor and shall receive top priority over all other activities.			

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8.3	**Aspects:** Traffic. **Impact:** Impact on traffic. **Objective:** Minimise the disruption of road users. **Target:** Minimal disruption of road users. **Mitigation/Management Measures:** a. All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits; b. Vehicles used for transport of materials and sand must be fitted with tarpaulins to prevent the release of such material or items onto road surfaces; c. Construction vehicles may not leave the designated roads and tracks and turnaround points must be limited to specific sites; d. Abnormal loads should not be transported after dark; e. Abnormal loads should be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends and school holiday periods; f. Transport of materials should be limited to the least number of trips possible; and g. Traffic deviations around the construction area must be planned in conjunction with the local authority to ensure safe and free flow of traffic. Safety signs must be utilised.	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	
8.4	**Aspects:** Traffic. **Impact:** Traffic impacts associated with the movement of construction vehicles on site. **Objective:** To minimise the destruction of biodiversity, compaction of valuable topsoil and mortalities of fauna on site.	Construction contractor	**Monitoring Action:** Incident Register;	

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	Target: Minimal destruction of biodiversity, compaction of valuable topsoil and mortalities of fauna on site.		Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	
	Mitigation/Management Measures: a. During construction create designated turning areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas; b. Monitor the establishment of (Alien) Invasive Species and remove as soon as detected, before regenerative material can be formed; c. Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, to limit destruction of road surfaces and sedimentation of downhill rivers/streams; d. All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to the licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; e. Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; f. Signage is always to be placed on vehicles; g. Any damage to public roads is to be reported to the management authority and repaired to its original condition; h. All construction vehicles must adhere to construction sites and avoid off road to minimise impact on vegetation and soil; i. After decommissioning, if access roads or portions thereof will not be of further use to the landowner, remove all foreign material and rip area to facilitate the establishment of vegetation, followed by a suitable revegetation program; j. Construction-related vehicles and machinery may not operate on site without reflective safety signage, car-top lights, and reflective personnel gear;			

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	k. Abnormal loads must be timed to avoid times of year when traffic volumes are likely to be higher, as would be expected over national holidays, weekends, and school holiday periods; l. Vehicles used for transport of materials and sand must be fitted with tarpaulins to prevent the release of such material or items onto road surfaces; m. Any damage to public roads is to be reported to the management Authority and repaired to its original condition; n. Transport of materials should be limited to the least number of trips possible; and, o. Abnormal loads may not be transported after dark			
8.5	**Aspects:** Erosion Control. **Impact:** Loss of topsoil, formation of bare soil and deterioration of habitat quality. **Objective:** Prevent soil erosion. **Target:** No signs of soil erosion are evident on site. **Mitigation/Management Measures:** a. Disturb as little ground area as possible, stabilize that area as quickly as possible, control drainage through the area, and trap sediment on site; b. Conserve topsoil with its leaf litter and organic matter, and re-apply this material to local disturbed areas to promote the growth of local native vegetation; c. Apply erosion control measures before the rainy season begins and after each season of construction, preferably immediately following construction; and, d. Maintain and reapply erosion control measures until vegetation is successfully established. Do soil chemistry tests if necessary to determine available soil nutrients.	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	

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8.6	**Aspects:** Handling of general – and hazardous waste materials on the construction site. **Impact:** The presence of personnel and construction operations will increase the likelihood of littering and dumping of solid waste. **Objective:** Management and disposal of general – and hazardous waste in an appropriate manner. **Target:** No record of pollution or site contamination by solid waste.	Construction contractor	**Monitoring Action:** ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. An adequate number of scavenger proof litter bins are to be placed throughout the site. Two (2) waste bins at least must be present, one (1) for hazardous waste and one (1) for non-hazardous waste at each working site. Dumping of waste on site is prohibited; b. Waste sorting and separation must form part of the environmental induction and awareness programme, to encourage personnel to collect wastepaper, glass, and metal waste separately; c. Keep all work sites including storage areas, offices, and workshops neat and tidy; d. Dedicate a demarcated and signposted storage area on site for the collection of construction waste; e. All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site as mentioned in the Basic Assessment Report; f. Care must be taken to ensure that no waste fall off disposal vehicles on-route to the landfill. If needed, a tarpaulin can be utilised; g. The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste; h. Littering by construction workers shall not be permitted;			

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	i. General refuse/rubbish shall be removed from site on a weekly basis to an approved registered landfill site or as soon as the waste bins are reaching full capacity; j. Minimise waste by sorting wastes into recyclable and non-recyclable waste; k. Ablution facilities must be serviced by a registered service provider, cleaned at least once a week, and safe disposal slips must be on file at the site office; l. A bi-weekly (twice a week) litter patrol of the entire site shall be conducted by the designated Environmental Site Agent (ESA); m. Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility, records and proof of disposal must be kept; and, n. A register must be kept of the quantities of waste disposed and proof of disposal must be available at the site office.			
8.7	**Aspects:** Sewage waste. **Impact:** Pollution and site contamination due to sewage. **Objective:** Provide facilities for appropriate collection and disposal of sewage. **Target:** No record of pollution or site contamination by sewage.	Construction contractor	**Monitoring Action:** ECO to take photographs of site before clearance; ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:**	
	Mitigation/Management Measures: a. Provide portable chemical ablution facilities, situated at convenient locations in proximity to work areas. This must be in relation to the quantity of users on site, with 1 ablution facility per 15 users and for each gender; b. Locations for the placement of ablution facilities include the workshop and areas for resting and eating. c. Do not locate a site ablution facility within the 1:100-year flood line, or within a distance of 100m of any drainage lines; d. Ablution facilities are to be maintained and cleaned regularly to ensure functionality and an adequate level of hygiene;			

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	e. Drinking water facilities, comprising of a water tank with a manual tap can be combined with hand washing facilities near site ablution; and, f. Only toilet paper is to be flushed down the chemical ablution facility. Personnel are to be informed on sanitary implementation as part of the environmental awareness.		Monthly	
8.8	**Aspects:** Dust Generation and visual Impact. **Impact:** Dust nuisance from site operations and visual impact of site operations on surrounding land owners. **Objective:** To avoid dust from excavated materials and construction activity and unnecessary visual impact caused by site operations. **Target:** Minimise the incidence of dust generation and visual impact.	Construction contractor	**Monitoring Action:** ECO to take photographs of site before clearance; ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. Implement dust suppression measures by watering (or acceptable methods) areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods; b. Ensure all vehicles remain on designated roads; c. Dust masks are to be supplied to workers; d. The transfer of soil or aggregate should be done over the shortest possible distance; e. Access roads are to be kept clean; f. Surface material that is scraped off during construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural;			

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	g. After construction decommissioning, if access roads or portions thereof will not be of further use to the landowner, remove all foreign material and rip the area to facilitate the establishment of vegetation, followed by a suitable revegetation program; h. Lay-down area(s) should be screened with shade cloth in an earth tone or other appropriate neutral colour; i. Site offices and structures should be limited to one location and carefully situated to reduce visual intrusion. Roofs should be grey and non-reflective; j. Lights within the construction camp should face directly downwards (angle of 180˚); k. Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare; l. Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact; and, m. The minimum amount of topsoil and vegetation should be removed during construction, and should be conserved and used for final rehabilitation.			
8.9	**Aspects:** Noise Generation. **Impact:** Noise nuisance from site operations. **Objective:** To avoid excessive noise generation from site operations. **Target:** Minimise the incidence of noise generation.	Construction contractor	**Monitoring Action:** ECO to take photographs of site before clearance; ECO Audit Checklist **Responsible Person/Party:**	
	Mitigation/Management Measures: a. Should multiple activities result in the excessive generation of noise, it should be strived to coordinate the incidence of these at the same time; b. Fit machinery with silencers;			

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	c. All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; d. The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; e. Vehicles should avoid use of the reverse gear as far as possible so as to avoid the sounding of sirens. This should not be considered for temporary access routes as disturbance of adjacent vegetation is to be avoided; f. Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; g. Unless otherwise specified by the ESA, normal working hours will apply (i.e. from 07H00–18H00, Mondays to Fridays); h. No loud music is permitted on site or in the Camp; i. Ensure that Employees and staff conduct themselves in an acceptable manner while on site, both during working hours and after hours; and, j. Vehicles are to abide by speed restrictions on access roads and limit trip generation so as to minimise disturbance to surrounding land users.		ECO **Monitoring Frequency:** Monthly	
8.10	**Aspects:** Fire Prevention. **Impact:** Uncontrollable fire. **Objective:** Prevent the outbreak of fires emanating from construction activity. **Target:** No incidences of fires are recorded for the site.			
	Mitigation/Management Measures: a. The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, windy winter months;	Construction contractor	**Monitoring Action:** ECO to take photographs of site	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE	RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
b. Assume acceptable precautions to guarantee that fires are not started as a result of works on site as specified below: the Contractor will be held responsible for any damage to structures or property on or neighbouring the Site as a result of any fire caused by personnel; c. Contractor should ensure that construction related activities that pose a potential fire risk, such as welding etc., are properly managed and confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months; d. Contractor should provide fire-fighting training to selected construction staff and take cognisance of the Veld and Forest Fire Act, Act No. 101, 1998; e. The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of the activities on site; f. Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site; g. Workers must be adequately trained in the handling of firefighting equipment, and can include but not limited to: a. Regular fire prevention talks and drills; and, b. Posting of regular reminders to staff; h. No open fires are permitted anywhere on site; i. Do not store any fuel or chemicals under trees; j. Do not store gas and liquid fuel in the same storage area (Hazardous substances to be stored in accordance with SANS);		before clearance; ECO Audit Checklist. **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	k. Any fires that occur on site shall be reported to the ECO immediately and then to the relevant Authorities; l. In the event of a fire, the Contractor shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring it under control; m. Do not permit any smoking within 3 m of any fuel or chemical storage area, or refuelling area. A designated smoking area must be established on site; and, n. All construction vehicles must be fitted with at least one fire extinguisher.			
8.11	**Aspects:** Local communities. **Impact:** Impact of construction workers on local communities, construction personnel and the local community. **Objective:** Construction workers should not alter existing social dynamics of local communities. **Target:** No incidences of conflict between.	Construction contractor	**Monitoring Action:** ECO Audit Checklist **Responsible Person/Party:** ECO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. Where possible, the Employer should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks; b. The Employer should consider the establishment of a Monitoring Forum (MF) for the construction phase. The MF should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers;			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	c. The Employer and the contractors should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation; d. The Employer and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase; e. The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis; f. The contractor should make necessary arrangements to enable workers from outside the area to return home over weekends and or on a regular basis during the 12–18-month construction phase. This would reduce the risk posed by non-local construction workers to local family structures and social networks; g. The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. This would reduce the risk posed by non-local construction workers to local family structures and social networks; and, h. No construction workers will be permitted to stay overnight on the site. Security personnel will be housed in the vicinity of the site.			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
8.12	**Aspects:** Soil and water contamination due to construction activities such as the use of hazardous materials on site. **Impact:** Pollution of soil and water contamination by hazardous waste. **Objective:** Provide facilities for appropriate collection and disposal of hazardous waste. **Target:** No record of pollution or site contamination by hazardous waste.	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	
	Mitigation/Management Measures: a. Concrete must be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose (preferable where no natural vegetation occurs); b. Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces; c. Material Safety Data Sheets (MSDSs) must be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimize the impacts in case of leakage; d. All spillages must be cleaned up immediately after they have occurred; e. Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site; f. Do not locate any ablution facilities, sanitary convenience, septic tank, or French drain within the 1:100-year flood line, or within a horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line; g. Vehicles and machinery must be regularly serviced to avoid leakages; h. At the work site the Contractor must maintain strict surveillance to ensure that no spills occur; i. No water courses may be used to clean equipment, or for bathing. All cleaning operations must take place off site at a location where wastewater can be disposed of correctly;			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	j. The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited; k. Fuel and chemical storage must be done within a designated area only, which is properly bund and able to contain 110% of the capacity of fuel or chemicals stored within; l. Construction vehicles must be inspected every morning before work commence to ensure that no leakages do occur; m. All personnel must receive induction on how to report spillages, contain them and treat them accordingly; n. Spill kits must be available at each working station; o. Drip trays must be placed beneath all construction equipment that are stationary on site or within the site camp; and, p. Hazardous waste must be stored in bins with a lid in a demarcated waste area and must be disposed of at a hazardous treatment facility with records on file			
8.13	**Aspects:** Water quality of run-off water. **Impact:** The Wetland and Harts River can potentially be at risk to increased surface runoff due to change in surface texture and effluent from the proposed development. **Objective:** Promote water quality and prevent the increase of surface runoff. **Target:** Good water quality and no increase in surface water runoff.	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:**	
	Mitigation/Management Measures: a. All rubble and litter should be cleared from the site and stored in designated waste bins and/or stockpile areas respectively. b. Strict waste management should be implemented during construction. c. Sufficient waste receptacles should be placed around the facility to encourage people to use them.			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	d. The principle of reduce, re-use and recycle should be followed. e. Construction site should be kept clean and tidy. f. Any waste should be disposed in a registered landfill and not be allowed to be dumped in the surrounding landscape. g. No dumping of waste or any other materials is allowed within any stormwater channels, drainage lines or the watercourses. h. Storage of material, waste, spoil, and construction equipment on or in stormwater drainage or inside of demarcated protected areas – is strictly prohibited. i. All surfaces used for waste storage should have an impermeable surface. j. Drip trays to be placed beneath stationary vehicles and generators. k. Machinery should be maintained and inspected for leaks. All hazardous chemicals should be handled and stored on impermeable surfaces. l. Hazardous chemicals should be kept on an impermeable bund area. m. Stormwater and run-off should be managed and diverted to not be in contact with waste. n. Regularly inspect all construction vehicles for leaks. Re-fuelling of vehicles must take place on a sealed surface area surrounded by berms to prevent ingress of hydrocarbons into topsoil. o. If any spills occur, they should be immediately cleaned up. p. An emergency response plan should be available for any chemical spill or ecological damage. q. Spill kits and material safety data sheets must be stored on site: In case of accidental spills of oil, petroleum products etc., good oil absorbent materials must be on hand to allow for the quick remediation of the spill. The kits should		Bi-Weekly	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE	RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
also be well marked, and all personnel should be educated to deal with the spill. Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat. The use of a product such as Sunsorb is advised. r. Proper toilet facilities must be available during constructional. Chemical toilets must be provided which should always be well serviced and spaced as per occupational health and safety laws and placed outside the 1:100-year flood lines. s. No dirty water runoff from the construction and decommissioning site must be permitted to reach the watercourses around the proposed site. t. Construction activities should be limited to the smallest possible area. u. Construction vehicles should use existing roads. v. Personnel must remain outside of delineated watercourses, unless required for authorised activities. Any work ins watercourses should be subject to a method statement; w. Method Statements must be compiled for the following activities: a. Handing of general waste b. Handling of hazardous waste c. Trenching within watercourses x. An effective stormwater management plan must be compiled to ensure effective stormwater drainage; y. The development footprint must remain as small as practically possible; z. All buffers as stated in the Aquatic Compliance Statement must be adhered to; and, aa. All bare areas must be rehabilitated via a Revegetation Method Statement.			

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
8.14	**Aspects:** Health and Safety. **Impact:** Dangerous working conditions for workers. **Objective:** To prevent any casualties on site. **Target:** No Personnel casualties on site. **Mitigation/Management Measures:** a. Ensure that PPE is available to Personnel; b. Adhere to the Occupational Health and Safety Act; c. Keep the first aid kit stocked; d. Issue all workers with necessary health and safety items; e. Potentially hazardous areas must be demarcated with danger tape; f. Appropriate signage must be placed to caution Employees and contractors not to enter certain structures without authorisation; g. Regular safety inspections must be conducted to ensure that participants are equipped with necessary safety equipment; and, h. All construction personnel to wear hard hats and reflector jackets at all times.	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist **Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	
8.15	**Aspects:** Heritage Resources. **Impact:** Damage and destruction of vertebrate fossils during excavation activities. **Objective:** To prevent any destruction of valuable artefacts. **Target:** No destruction of any vertebrate fossils and artefacts. **Mitigation/Management Measures:**	Construction contractor	**Monitoring Action:** Incident Register; Photographs; ECO Audit Checklist	

CONSTRUCTION PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	a. Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained Palaeontologist or Heritage Specialist must be notified to assess the finds, and this must then be reported to the South African National Resources Agency; b. Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the Heritage Authority. A registered Heritage Specialist must be called to the site for inspection and removal once authority to do so, has been given; c. Excavations must be limited to the footprint area and be maintained in a narrow corridor; d. All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: a. All construction in the immediate 50 m vicinity radius of the site must cease; b. The Heritage Practitioner must be informed as soon as possible; c. In the event of obvious human remains SAPS must be notified; d. Mitigation measures (such as refilling, etc.) must not be attempted; e. The area in a 50 m radius of the find must be cordoned off with hazard tape; and, e. Public access must be limited, and the area must be placed under guard.		**Responsible Person/Party:** Contractor **Monitoring Frequency:** Bi-Weekly	

9.2 Operational Phase Environmental Management Programme

The intention of providing an EMP'r for the operational phase is to provide guidelines for management of facilities and infrastructure to safeguard the environment against negative environmental impacts.

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
1. **ACTIVITY:** OPERATIONAL PHASE IMPACTS				
1.1	**Aspects:** Increased risk of veld fires. **Impact:** Veld fires posing a risk to biodiversity and safety of the surrounding community and infrastructure. **Objective:** To avoid veld fires. **Target: No veld fires**	Site manager/ DEO	**Monitoring Action:** Incident Register; DEO Checklist **Responsible Person/Party:** Site manager/ DEO **Monitoring Frequency:** Monthly	
	Mitigation/Management Measures: a. Take all reasonable and precautionary steps to ensure that fires are not started due to the activities on site; b. Ensure the work site is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site; c. Workers must be adequately trained in the handling of firefighting equipment, and can include but not limited to: a. Regular fire prevention talks and drills; b. Posting of regular reminders to staff; d. No open fires are permitted anywhere on site; e. Do not store any fuel or chemicals under trees; f. Do not store gas and liquid fuel in the same storage area (Hazardous substances to be stored in accordance with SANS); g. Any fires that occur on site shall be reported to the ECO immediately and then to the relevant Authorities;			

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	h. In the event of a fire, the Contractor/Site manager shall immediately employ such plant and personnel as is at his disposal and take all necessary action to prevent the spread of the fire and bring it under control; i. Do not permit any smoking within 3 m of any fuel or chemical storage area, or refuelling area. A designated smoking area must be established on site; and, j. All Vehicles must be fitted with at least one fire extinguisher.			
1.2	**Aspects:** Handling of general – and hazardous waste materials on the developed site. **Impact:** Incorrect disposal of both general- and hazardous waste may result in pollution to the surrounding environment and contamination of water resources. **Objective:** Management and disposal of general – and hazardous waste in an appropriate manner. **Target:** Disposal of general and hazardous waste in an appropriate manner **Mitigation/Management Measures:** a. Waste must not be stored on site in excess of ninety (90) days; b. All general waste must be disposed of at a registered landfill site; c. An adequate number of scavenger proof litter bins are to be placed throughout the site. Two (2) waste bins at least must be present, one (1) for hazardous waste and one (1) for non-hazardous waste at each working site. Dumping of waste on site is prohibited; d. Waste sorting and separation must form part of the environmental induction and awareness programme, to encourage personnel to collect wastepaper, glass and metal waste separately; e. Keep all work sites including storage areas, offices and workshops neat and tidy; f. Dedicate a demarcated and signposted storage area on site for the collection of waste;	Applicant/ Site manager	**Monitoring Action:** Waste register; DEO Checklist **Responsible Person/Party:** Site Applicant/ Site manager/ DEO **Monitoring Frequency:** Weekly.	

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	g. All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site; h. Care must be taken to ensure that no waste fall off disposal vehicles on-route to the landfill. If needed, a tarpaulin can be utilised; i. The burning or burying of general solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste; j. Develop a Method Statement (to be approved by the Engineer/ECO) for the management of all waste streams on site. k. Littering by personnel shall not be permitted; l. General refuse/ rubbish shall be removed from site on a weekly basis to an approved registered landfill site or as soon as the waste bins are reaching full capacity; m. Hazardous waste must be sorted from non-hazardous waste and disposed of at a hazardous treatment facility, records and proof of disposal must be kept; and, n. A register must be kept of the quantities of waste disposed and proof of disposal must be available at the site office.			
1.3	**Aspects:** Soil and water contamination due to operational activities such as discharge of effluent. **Impact:** Pollution of soil and water by hazardous waste and untreated effluent. **Objective:** Provide facilities for appropriate collection and disposal of hazardous waste. Target: No soil of water contamination	Applicant/ Site Manager/ DEO	**Monitoring Action:** Regular inspection of all infrastructure on site. **Responsible Person/Party:** Site manager	
	Mitigation/Management Measures: a. Effluent released from site must conform to the water quality standards as prescribed by the National Water Act (Act 36 of 1998), SANS and related regulations. Records of the sampling must be kept on file and corrective actions must be taken immediately if the quality does not conform to the required standards.			

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	b. Undertake monthly monitoring of the surface water quality downstream and upstream of the WWTW by a qualified Hydrogeological, Aquatic of Water Specialist to ensure that contamination does not occur from the site. c. Measures must be implemented to prevent the contamination of clean run-off from the site in order to protect the degradation of the drainage areas; d. Stormwater control must be conducted in a manner which prevent soil erosion (i.e. natural areas must be landscaped in order to ensure energy is removed from run-off); e. Stormwater control should be done by cleaning and repairing the canals; f. Drip trays must be placed beneath all stationary operational equipment; g. Hazardous substances must be stored within a bund area able to contain 110% of the volume of the substance stored within; h. Ensure that sufficient spill kits are available on site in order to remediate any spillages that might occur during repair and maintenance of equipment; i. Should a spill occur on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials; j. Groundwater monitoring to prevent groundwater contamination, through means of prevention when detected early enough; k. The facility should be kept clean and tidy at all times; l. Any waste generated should be disposed of accordingly in registered waste (landfill) sites and not dumped on site or the surrounding area; m. All surfaces that are associated with waste should have impermeable surfaces;		**Monitoring Frequency:** Bi-weekly	

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	n. Stormwater and runoff should be diverted and managed to not come in contact with any waste generated on site; o. Operation of the plant should be managed to prevent overflow and spillage; p. The integrity of pipes and associated infrastructure should be inspected and upgraded as needed; q. All spills must immediately be cleaned up and disposed of at a registered landfill site; r. The effluent water which will be treated from the oxidation pond should be tested regularly to ensure that it complies to SANS standards as recommended by DWS prior to being discharged into the receiving watercourse. The surface water quality downstream and upstream of the proposed oxidation pond should be monitored on a monthly basis by a qualified Hydrogeological Specialist to ensure that contamination does not occur from the proposed activity; s. At least two (2) monitoring boreholes, one (1) upstream from the facility and the other downstream of the facility, should be drilled on site to ensure that leakage from the treatment plant does not occur which will aid as an early detection tool; and, t. The groundwater quality should be assessed bi-annually by an accredited laboratory and distributed to the relevant authority on compliance during the operation of the facility.			
1.4	**Aspects:** Infiltration of effluent and chemicals that have the potential to change the quality of the groundwater. **Impact:** Groundwater contamination due to seepage of effluent. **Objective:** Prevent pollution to the groundwater table. Target: Prevention of effluent and chemical spills and good groundwater quality	Applicant/ Site Manager/ Qualified Geohydrologist	**Monitoring Action:** Regular inspection of all infrastructure on site. **Responsible Person/Party:**	
	Mitigation/Management Measures: a. Groundwater monitoring to prevent groundwater contamination, through means of prevention when detected early enough.			

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	b. The facility should be kept clean and tidy at all times. c. Any waste generated should be disposed of accordingly in registered waste (landfill) sites and not dumped on site or the surrounding area. d. All surfaces that are associated with waste should have impermeable surfaces. e. Operation of the plant should be managed to prevent overflow and spillage. f. The integrity of pipes and associated infrastructure should be inspected and upgraded as needed		Site manager/ Hydrologist, Aquatic, Water Specialist/ Accredited laboratory **Monitoring Frequency:** Monthly	
1.5	**Aspects:** Oils and Chemicals **Impact:** Potential pollution to the surrounding environment and contamination of water resources. **Objective:** Minimise chances of transgression of the acts controlling hazardous waste Target: No pollution to the surrounding environment or water resources	Site Manager	**Monitoring Action:** MSDS register; Chemical application register **Responsible Person/Party:** Site manager **Monitoring Frequency:** Weekly	
	Mitigation/Management Measures: a. The Site Manager must provide method statements for the handling and storage of chemicals with spill clean-up procedures; b. Chemical processes should be monitored and a register kept of application schedules; c. Storage of chemical compound that is used in the operation should meet the regulations; d. Keep all work sites including storage areas neat and tidy; e. Dedicate a demarcated and signposted storage area for stored chemicals; f. A register must be kept of the quantities of chemicals that is stored/used on site;			

OPERATIONAL PHASE: IPELEGENG OXIDATION POND AND TWO OUTFALL SEWER LINES, NORTH WEST PROVINCE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	g. The area where the chemicals is stored must be well ventilated and kept locked at all times. Only authorised personnel must have access to chemicals; and, h. Personnel responsible for chemical applications during the operation of the WWTW should be trained and issued with the necessary protective wear.			
1.6	**Aspects:** General Operation of the WWTW **Impact:** The general operation of the oxidation ponds may result in improper stormwater management and alien invasive species establishment. **Objective:** Minimise chances of improper stormwater management and alien invasive species establishment. **Target: Proper management of the operation of the WWTW**	Site Manager	**Monitoring Action:** MSDS register; Chemical application register **Responsible Person/Party:** Site manager **Monitoring Frequency:** Weekly	
	Mitigation/Management Measures: a. Structures must be inspected regularly for the accumulation of debris, blockages, instabilities, and erosion with concomitant remedial and maintenance actions. b. Regular inspections will be undertaken of any access roads and stormwater management drains for signs of erosion and sedimentation. c. Ongoing alien vegetation removal should take in and around the development footprint. d. Operational site should be kept clean and tidy. e. Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. f. No dumping of waste or any other materials is allowed within the watercourses or their regulated areas. g. If any spills occur, they should be immediately cleaned up.			

9.3 Impacts during the Decommissioning Phase

The proposed activity is not foreseen to be decommissioned in the future and therefore the potential impacts related with the Decommissioning Phase were not assessed in this report.

10 EMERGENCY RESPONSE PLAN

A Service Provider will be contracted to undertake clean-up of large accidental spills on site. The spills size will be determined by the discretion of a competent SECO (Site Environmental Control Officer), who will determine the size of the spill accordingly to the spill substance.

If the Dr. Ruth Segomotsi Mompati District Municipality chooses not to make use of a Hazardous Material Service Provider, they must ensure that they are compliant according to SANS standards and relevant legislation to transport the hazardous waste. If the Dr. Ruth Segomotsi Mompati District Municipality does not appoint a Hazardous Material Service Provider they must ensure that employees are trained and competent to perform Hazardous Material t tasks.

Smaller spills will be treated in-house by using appropriate spill absorbent kits and materials in accordance with a Spill Response Plan.

Staff using spill absorbent kits and materials will be trained in the application of the various products and the use of the products should a spill occur.

The following preventative measures will be undertaken:

- All sensitive sites will be identified such as rivers, drainage lines and wetlands and procedures developed to ensure proper handling of oil/ fuel or chemical spillages in these areas.
- It will be ensured that all employees are aware of the procedure to be followed in case of accidental spills and leaks.
- It will be ensured that the necessary materials and equipment for dealing with spills and leaks are available on site at all times.

All hazardous substances on site must be accompanied by their relevant MSDS (Material Safety Data Sheet). Training must be given to people working with these substances according to the MSDS.

10.1.1 Response Method

The responsible person must act as quickly as possible to locate the source and, if possible, to neutralize the spread of the liquid product:

- Be careful – do not take any action if there is imminent danger (if toxic fumes or gases are present, or if there is any risk of explosion, wait for the response team to arrive);
- If appropriate, approach the site carefully, with the wind at your back;
- Close taps or valves; and,
- Make temporary repairs to containers and temporarily seal all cracks.

The response steps mentioned will be applicable to all spills on site and in a water body or wetlands.

10.1.2 Spill on the Ground

To contain such spills, use appropriate spill absorbents from the spill kit. The material will be stored in a designated bunded area. This will be disposed of at an approved licensed facility.

10.1.3 Spill into Water Body or Artificial Wetland

Regardless of the size of the spill, the following will apply to all spills occurring near or into a stream, wetland or other water body:

<u>For a spill into standing water the following must be used:</u>

- Floating booms, floating barriers or absorbent socks. Holding tanks will be used by the contractor to recover and contain released materials on the surface of the water.

For spills threatening a water body the following must be done:

- Berms and or trenches must be constructed to contain the spill before it reaches the water body. It may be necessary to deploy booms and absorbent materials if the spill reaches the water body. The spill will be collected (by any of the above mentioned) and cleaned up in accordance with legislation.

For spills into a wetland the following must be done:

- The contaminated soil in the wetland must be excavated and placed on and covered by plastic sheeting. This must be stored in a designated area at least 100 metres away from the wetland system. The contaminated soil will be disposed of as soon as possible in accordance with legislation.
- It is important to remember that when a major spill occurs that the relevant Environmental Authorities must be contacted.

10.1.4 Methods and Materials for Containment and Clean up

Small spills:

- Stop leak if without risk.
- Move containers from spill area.
- Dilute with water and mop up if water-soluble. Alternatively, if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container.
- Use spark-proof tools (non-spark tool) and explosion-proof equipment.
- Dispose of via a licensed waste disposal contractor or at a licensed facility.

Large spills:

- Stop leak if without risk.
- Move containers from spill area.
- Approach the release from upwind. Prevent entry into sewers, water courses or confined areas.
- Proceed as follows:
    - Contain and collect spillage with non-combustible, absorbent material e.g. absorbents from spill kit, and place in container for disposal according to local regulations.
    - Use spark-proof tools and explosion-proof equipment.
- Dispose of via a licensed waste disposal contractor or at a licensed facility.
- If spillage is too large then a HazMat team must be contacted.

10.1.5 Accidental Release Measures

No action shall be taken involving any personal risk or without suitable training.
Steps to be followed:

- Evacuate surrounding areas.
- Keep unnecessary and unprotected personnel from entering.
- Do not touch or walk-through spilt material.
- Shut off all ignition sources.
- Avoid breathing vapour or mist.
- Provide adequate ventilation.
- Wear appropriate respirator when ventilation is inadequate.
- Put on appropriate personal protective equipment.

10.1.6 Environmental precautions

Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

10.2 Fire Emergency Procedures

'No smoking' signs will be displayed at areas of high fire risk throughout the site e.g. the workshop and fuel storage areas. Smoking will only be allowed at designated area to be established by SECO Officer.

The Dr. Ruth Segomotsi Mompati District Municipality shall ensure that all their fire equipment to be used on site will comply with the following:

- Extinguishers shall be placed in positions to ensure fast and easy access is maintained at all times.
- Placement of all extinguishers shall be depicted with the required pictograms.
- Extinguishers shall be serviced once annually, and after discharge or visible signs of depressurization.
- The Dr. Ruth Segomotsi Mompati District Municipality shall ensure a person is appointed to inspect the extinguishers on a monthly basis and the results of which are to be entered into a register designed for that purpose.

The Dr. Ruth Segomotsi Mompati District Municipality will provide training for Fire Extinguisher usage and only trained employees will attempt to use these site Fire Extinguishers.

10.2.1 Upon discovery of a fire/hearing explosion

- Sound the alarm (if available) and attempt to put out the fire with an extinguisher if you have been trained to do so – do not place yourself at any risk of injury;
- Inform your Supervisor immediately;
- Call the fire services if required;
- Leave the site and assemble at the assembly point;
- Receive and work with the emergency services;
- Take measures to prevent a repetition.

10.2.2 Upon hearing the fire alarm

- Vacate the works area;
- Report to the assembly point;
- Do not return to the works area until given all clear by Management.

10.2.3 Resources

- Presence of first aid kit and fire extinguishers;
- Presence of communications equipment;
- Presence of alarm card with important telephone numbers; and,
- Presence of assembly point.

10.2.4 Testing Emergency Procedures

Procedures will be tested during the works at appropriate intervals. Roll Call registers will be completed after every emergency procedure performed on site.

10.3 First Aid Emergency Procedures

The Dr. Ruth Segomotsi Mompati District Municipality shall ensure that all working areas and remote work locations are adequately provided with first aiders and first aid boxes/ equipment, as necessary and in accordance with legal requirements. The Dr. Ruth Segomotsi Mompati District Municipality must ensure medical treatment for its workforce including emergency evacuation.

The following first aid/ medical treatment is recommended to be available:

- Vaccination for exposure to sewage;
- Treatment for vector borne disease such as malaria;
- Treatment for burns/ scalds and sunburn;
- Eye Injuries;
- Treatment for sprains and broken bones;
- Treatment for serious cuts;
- Treatment for Bilharzia;
- Treatment for cholera;
- Treatment for local climate factors:
    - Heat stress/ exhaustion/ stroke;
    - Dehydration;
    - Insect bites/ stings, spider and scorpion bites;
    - Be aware where anti-venom is available for snake bites.

The First Aid attendant shall be trained in accordance with the requirements set out in the OHSA with recognized and accredited service providers.

Proof of training attended (certificate, registers) shall be attached to the written acceptance of appointment. It will be the first aid attendant's responsibility to ensure the contents of the first aid boxes are monitored and inspections recorded on the contents of the first aid box register.

Each first aid box shall be clearly marked "FIRST AID".

10.3.1 Procedure in the event of an accident

All incidents where an employee is injured on duty to the extent that he/ she:

- Dies
- becomes unconscious
- loses a limb or part of a limb

OR where:

- a major incident occurred
- the health or safety of any person was endangered
- where a dangerous substance was spilled
- machinery ran out of control

Procedure:

- Assess the situation and ensure it is safe before proceeding.
- Contact First Aider and/ or emergency services.
- Do not move the person unless there is a life-or-death situation.

Such incidents shall be reported as follow:

- Within two (2) hours telephonically,
- Preliminary report within 48 hours;
- Final report within seven (7) days.

Reports and statistics (if required) will be submitted to the Manager at the end of each month on all accidents/ incidents involving any person, material or equipment that was injured, damaged, or lost.

10.4 Roles in an Emergency

The following is an outline of roles and responsibilities for all workers during an emergency. The Emergency Management Team or responsible people has specifically assigned roles during an emergency.

10.4.1 Personnel Guide

All workers:

All workers should:

- FOLLOW all instructions in the Emergency Management Procedures including heading to assembly point for roll call and waiting for emergency to be declared over.
- FOLLOW all instructions given to the by the Emergency Management Team and be where they should be.

Manager:

The Manager is overall in charge of the site and shall delegate duties as required by the Emergency Management Procedures and shall empower the SHE Officer to lead the Emergency Management Team. He shall also approve and facilitate for all resources required for use in the emergency.

SHE Officer/ ECO Officer/ Responsible Person:

Responsibilities include:

- Take steps deemed necessary to ensure the safety of all workers and other individuals in the implementation of Emergency Management Procedures.
- Determine whether to implement Universal Emergency Procedures (evacuation; reverse evacuation; shelter in place; severe weather/ safe area; drop, cover and hold; lockdown).
- Activate the Emergency Management Team or responsible people.
- Arrange for transfer of workers and other individuals when safety is threatened by a disaster.
- Work with emergency service personnel.
- Maintain a line of communication with the emergency agencies, Relevant Government Agencies, Project Site Manager.
- Declare the emergency over when all has been done to secure the site.
- Initiate investigation procedures.

Health and Safety Committee (if applicable):

Health and Safety Committee shall be responsible for assisting the overall direction of the emergency procedures at the site. Responsibilities include:

- Take steps deemed necessary to ensure the safety of workers, and other individuals in the implementation of Emergency Management Protocols.
- Render first aid if necessary.
- Assist in the transfer of workers, staff and other individuals when their safety is threatened by a disaster.
- Help coordinate the activities of emergency service personnel.
- Maintain a line of communication with the Emergency Management Team leader.
- Assist as directed by the SHE Officer/ Responsible person.

The following table is provided to assist the ECO and Site Manager with remedial work options and problem solving:

Observation or Event	Action by Inspector or Observer	Action by Construction Contractor
Effluent release quality	Undertake regular sampling of the effluent and ensure the quality conforms to the requirements of DWS. Also check: ➢ That the source causing the pollution has been identified. ➢ Regular maintenance on the machines and pumps are carried out.	Action will be required ASAP: ➢ Effluent release must be stopped immediately to prevent pollution. ➢ The source of the pollution must be identified, and the problem must be rectified immediately.
Spillage of chemicals and hazardous substances	Report to Site Manger and continue observations. Also check: ➢ That the source causing the spillage has ceased, and that the affected area is isolated to prevent spreading of the Chemical, where after it must be rehabilitated.	Action will be required as soon as possible (ASAP) by following the next steps: ➢ Dig down into the soil to see how far down the pollution penetrated, ➢ If less than 300 mm penetrated: a. Turn the soil over to expose it to the air. b. Apply Mono Ammonium Phosphate (MAP) at a rate of 58gr/m² to the overturned soil. c. Water enough to keep the soil moist. ➢ If penetration is greater than 300 mm: a. Remove the affected soil and spread in a layer not more than 300 mm thick. b. Apply MAP at a rate of 50gr/m². c. Water enough to keep the soil moist. ➢ Repeat the above steps every six (6) weeks or until the soil is clean.
Erosion	Report to Site Manager Also check: ➢ That all vehicular movement is restricted to existing access routes to prevent crisscrossing of tracks through undisturbed areas.	Action will be required ASAP: ➢ Implement erosion protection works at identified problem areas. ➢ Implement remedial works at affected areas in order to restore the area to its previous or better status.

11 INCIDENT REGISTER

INCIDENT REGISTER: IPELEGENG WASTEWATER TREATMENT WORKS, NORTH WEST PROVINCE					
NAME OF PERSON REPORTING THE INCIDENT	**INCIDENT**	**DATE OF INCIDENT IDENTIFIED**	**HOW WAS INCIDENT ADDRESSED?**	**DATE OF RECTIFICATION**	**SIGNATURE**