DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

FOR

THE PROPOSED ADAMAYVIEW OUTFALL SEWER PIPELINE UPGRADE IN THE CITY OF MATLOSANA IN NORTH WEST PROVINCE

SEPTEMBER 2017

COMPILED BY:	MASHUDU VICTOR SIPHUGU
STATUS OF THE REPORT:	DRAFT
REVISION	01

Table of Contents

LIST OF ACRONYMS 5

DEFINITIONS/INTERPRETATIONS 6

1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER WHO PREPARED THE DRAFT EMPR 12

1.1 Biographical Details 12

1.2 Expertise of the EAP 12

2 INTRODUCTION 13

3 DESCRIPTION OF THE ACTIVITY AND THE ACTIVITY ASPECTS COVERED BY THIS ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR) 14

4 PURPOSE, OBJECTIVES AND PRINCIPLES OF THIS ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR) 15

4.1 Purpose and Objectives 15

4.2 Principles 17

5 BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT 17

5.1 Vegetation 17

5.2 Vertebrates 17

5.3 Invertebrates 18

5.4 Avifauna 18

5.5 Red Data Species and Critical Biodiversity 18

5.6 Sensitivity 18

5.7 Geology 19

5.8 Groundwater Conditions 19

6 KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT 19

7 ROLES AND RESPONSIBILITY AND ORGANIZATIONAL STRUCTURE RELATING TO THE IMPLEMENTATION OF THIS EMPR 22

7.1 Proponent/ Applicant 22

7.2 Engineer / Project Manager 22

7.3 Contractor 22

7.3.1 The Contractor's Environmental Officer (Contractor EO) 23
7.4 The Environmental Control Officer 24
8 DOCUMENTS REQUIRED ON SITE 26
8.1 Method Statements 26
8.2 Environmental Register 27
8.3 Site Instruction Entries 27
8.4 ECO Diary Entries 27
8.5 Monthly Audit Reports 28
8.6 The Environmental Management File 28
9 TRAINING AND ENVIRONMENTAL AWARENESS 29
10 MONITORING 29
11 REPORTING 30
12 NON-COMPLIANCE AND PENALITIES 31
13 DESCRIPTION OF ACTIVITIES 32
13.1 Pre-construction 32
13.2 Construction 32
13.3 Site Rehabilitation 33
14 IMPACT MANGEMENT PROGRAM 33
14.1 PRE-CONSTRUCTION PHASE 35
14.2 CONSTRUCTION PHASE 37
14.2.1 Protection of Flora 37
14.2.2 Alien invasive plant species management 38
14.2.3 Protection of fauna and collection of firewood 40
14.2.4 Water Resources Protection 41
14.2.5 Heritage Resources 44
14.2.6 Domestic Waste Management 45
14.2.7 Hazardous Waste Management 46
14.2.8 Construction waste management 48

14.2.9 Effluent management 49
14.2.10 Erosion Control 50
14.2.11 Storm water and Dewatering management 51
14.2.12 Soil Management 53
14.2.13 Handling of fuels and re-fueling of vehicles and equipment 55
14.2.14 Workshops, equipment maintenance and storage 61
14.2.15 Handling and batching of concrete and cement 62
14.2.16 Transportation of materials and traffic management 64
14.2.17 Dust Management 65
14.2.18 Noise Management 66
14.2.19 Fire Management 69
14.2.20 Private land, other property and infrastructural issues 70
14.2.21 Health and Safety 71
14.2.22 Social Issues 72
14.2.23 Temporary Site Closure 75
14.3 SITE REHABILITATION AND CLOSURE 77
14.4 OPERATIONAL PHASE 79
14.4.1 Alien invasive plants management 79
14.4.2 Water resources protection 80
14.4.3 Fire Management 81
14.4.4 Domestic Waste Management 82
15 BIBLIOGRAPHY 83

LIST OF ACRONYMS

EA - Environmental Authorization

ECO - Environmental Control Officer

Contractor EO – Contractor's Environmental Officer

EMPr - Environmental Management Programme

READ – Department of Rural, Environment and Agricultural Development in the North West Province

DAFF – Department of Agriculture, Forestry and Fisheries

DMR – Department of Mineral Resources

DWS – Department of Water and Sanitation

CBA – Critical Biodiversity Area

ESA – Ecological Support Area

HIA - Heritage Impact Assessment

NEMA – National Environmental Management Act, 107 of 1998 (as amended)

OHS - Occupation Health and Safety

OHSA – Occupational Health and Safety Act (Act 85 of 1993)

SAHRA - South African Heritage Resource Agency

SHE - Safety Health and Environmental

WULA - Water Use License Application

DEFINITIONS/INTERPRETATIONS

Alien invasive plant/vegetation - An invasive plant species listed in terms of Section 70(1) of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).

Construction Activity - Any action taken by the contractor, his sub-contractors, suppliers or personnel during the construction process as defined in the contract documents.

Construction Waste - means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any building structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition.

Contractor - The **Principal Contractor** as engaged by the City of Matlosana or their Agents for infrastructure construction operations, including all sub-contractors appointed by the main contractor of his own volition for the execution of parts of the construction operations; and any other contractor from time to time engaged by the Municipality or their Agents directly in connection with any part of the construction operations which is not a nominated sub-contractor to the Principal Contractor.

Cultural significance - means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Degradation - the lowering of the quality of the environment through human activities e.g. river degradation, soil degradation, atmospheric degradation.

Development - Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

Domestic Waste - means waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes generated directly by the consumption of products for domestic use.

Emergency – A sudden unforeseen event needing immediate or prompt action.

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

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

Environmental Assessment Practitioner - Means the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

Environmental Control Officer (ECO) - An individual appointed by the developer to monitor the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities as prescribed in NEMA.

Environmental authorization – The authorization granted by the competent authority of a listed activity or specified activity in terms of NEMA, and includes a similar authorization contemplated in a specific environmental management Act.

Environmental Impact - Any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment (EIA) - A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and scoping and environmental impact reporting and mitigation of identified negative impacts.

Environmental Management Programme (EMPr) - The programme that has been approved by the Competent Authority in terms of NEMA, 107 of 1998 stipulating information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified.

Expansion - means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

General Waste Landfill Site - A waste disposal site that is designed, managed, permitted and registered to allow for the disposal of general waste.

Groundwater - All subsurface water that fills voids between highly permeable ground strata comprised of sand, gravel, broken rocks, porous rocks, etc. and move under the influence of gravitation.

Hazardous Waste Landfill Site - A waste disposal site that is designed managed permitted and registered to allow for the disposal of hazardous waste.

Hazardous Waste - means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles.

Heritage Resources - means any place or object of cultural significance, including all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

Heritage - That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 28 of 1999).

Impact - A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Incident - An undesired event which may result in physical harm to a person or death, or damage to the environment, plant and/or equipment, and/or loss of production.

Integrated Environmental Management - is a philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision making tools (such as multi-criteria decision support systems or advisory councils).

Method Statement - A method statement is a written submission by the Contractor setting out the plant, materials, labor and method the Contractor proposes using to carry out an activity, identified by the relevant specifications, guidelines and legislation.

Mitigation Measures - Measures designed to avoid, reduce or remedy adverse impacts.

Pollution - The National Environmental Management Act, No. 107 of 1998 defined pollution to mean any change in the environment caused by – substances; radioactive or other waves; or noise, odors, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change

has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Proponent – The organization or individual who intends to undertake a listed activity and has as such applied for the Environmental Authorization. Can also be considered to be the Developer or an Applicant.

Recycle - A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.

Rehabilitation – This is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption.

Re-Use - To utilize articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.

Contractor's Environmental Officer (Contractor EO) - The Contractor EO is a Contractor representative, responsible for the day-to-day implementation and monitoring of the EMPr.

Sensitive area – Means any area that is denoted as sensitive due to its particular attributes, which could include the presence or rare or endangered vegetation, the presence of heritage resources (e.g. archeological artifact or graves), the presence of a unique natural feature, the presence of a watercourse or water body, or the presence of steep slopes.

Sensitive Heritage Remains – This is sometimes used to distinguish graves and cemeteries, as well as ideologically significant features such as holy mountains, initiation sites or other sacred places. Graves in particular are not necessarily heritage resources if they date from the recent past and do not have headstones that are older than sixty years. The distinction between 'formal' and 'informal' graves in most instances also refers to graveyards that were used by colonists and by indigenous people. This distinction may be important, as different cultural groups may uphold different traditions and values with regard to their ancestors. These values have to be recognized and honored whenever graveyards are exhumed and relocated.

Spoil material - Is material unsuitable for construction purposes and for which no other useful purpose can be found in appurtenant works on the project (e.g. for the provision of protection berms). Such material is considered as waste material that requires spoiling at convenient areas to be identified by the engineer/developer and/or contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contamination.

Topsoil – Means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Waste - means any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered.

Waste Disposal Facility – means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.

Water Pollution - The National Water Act, 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (aa) to the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property.

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

1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER WHO PREPARED THE DRAFT EMPR

1.1 Biographical Details

Company Name of EAP	Lambeu Consulting and Training Services (Pty) Ltd
Name of EAP	Mr. Mashudu Victor Siphugu
Postal Address	PO Box 214, Noordwyk, 1687
Telephone	011 069 6527
Cellphone	076 703 9447
Fax	086 219 9008
Email	mashudu@lambeu.co.za
EAP Qualifications	Masters in Environmental Management – UNW, Potchefstroom; MSc (Botany) – Rhodes University; BSc (Hons) Botany – Rhodes University; BSc Botany and Zoology – University of Venda

1.2 Expertise of the EAP

The EAP over 20 years of technical consulting experience in broad environmental management, and Environmental Impact Assessments, in particular. He has directed and conducted many Environmental Impact Assessment studies and has written and reviewed many Basic Assessment, Scoping and Environmental Impact Assessment Reports, and many Environmental Management Plans/Programmes, reviewed and approved by Provincial and National Competent Authorities.

2 INTRODUCTION

The City of Matlosana Municipality proposes to upgrade their existing Adamayview outfall sewer pipeline from a 375mm in diameter to 1050mm in diameter, in Klerksdorp in the Dr Kenneth Kaunda District of the North West Province. In terms of the National Environmental Management Act, 1998 (NEMA, Act 107 of 1998) and the EIA Regulations published under Government Notice Regulation (GN R) No. 982 of 08 December 2014, as amended, in terms of the above Act, the proposed activity requires Environmental Authorization before they could be undertaken.

Lambeu Consulting and Training Services (Pty) Ltd has thus been appointed as an independent Environmental Assessment Practitioner (EAP) by the City of Matlosana Municipality to facilitate the Environmental Basic Assessment process for the proposed development that entails amongst others compilation on the Basic Assessment Report and accompanying Environmental Management Programme (EMPr).

The EMPr typically becomes part of the Environmental Authorization (EA) prepared by the relevant environmental authority and becomes the basis for monitoring compliance with the recommendations of the EIA both during the Construction and Operational Phases.

The Environmental Management Programme (EMPr) addresses the construction and operational phases of the project. It serves as a stand-alone document to be disseminated to and used by the contractor, resort manager and others involved in the construction and/or operational phases of the development.

It should be noted that the guidelines listed hereunder are not to be considered finite. Experience has shown that additional environmental issues are bound to arise as the project unfolds. When this happens, the Environmental Management Programme (EMPr) must be updated accordingly.

The Environmental Management Programme will ensure that the environmental commitments sketched as mitigation measures in the BA are adhered to. In addition, the EMPr can be used to evaluate the effectiveness of mitigation measures.

3 DESCRIPTION OF THE ACTIVITY AND THE ACTIVITY ASPECTS COVERED BY THIS ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR)

The City of Matlosana intends to upgrade about 3.7km portion of their Adamayview Outfall Sewer Pipeline from the current 375mm to 1050mm in diameter. The Adamayview outfall sewer pipeline runs along the non-perennial Palmietspruit, a tributary of the Schoonspruit River in Klerksdorp, then to Swart Street Sewage Pump Station and the sewage is pumped to the Klerksdorp Waste Water Treatment Works for treatment.

The sewer upgrade will start on the northern side of the N12 highway passing through Klerksdorp adjacent to the new Matlosana Mall, and will cross under the highway, run through different land portions along the Palmietspruit and will connect to the bigger outfall along Barend Street, next to Protea Hotel in Klersksdorp. The co-ordinates along the pipeline route are as follows:

- Start co-ordinates: 26°50'51.59"S; 26°41'50.88"E;
- Middle co-ordinates: 26°51'46.72"S; 26°40'36.43"E; and
- End co-ordinates: 26°51'43.94"S; 26°40'14.03"E.

The land portions/servitudes through which the sewer pipeline runs are the following:
Townlands of Klerksdorp, 424 IP, Portions 0337, 0564, 0601 and 000; and
Elandsheuvel, 402 IP, Portions 0545

The proposed sewer upgrade route is depicted in the google map presented as Figure 1 below:



Figure 1 – Locality Map Showing the Proposed Outfall Sewer Pipeline Upgrade Route (brown line with blue dots)

Pipeline will be of concrete material, and both trenching and directional drilling will be used as methods of construction. The pipeline will be a gravity system and as such will be dug to a maximum depth of two and half (2.5) metres at its very deepest. The development footprint for the pipeline will be approximately three (3) metres in diameter and the pipeline will be laid within that. The total length of the pipeline is anticipated to be 3.7 kms with approximately 32 manholes along the way.

4 PURPOSE, OBJECTIVES AND PRINCIPLES OF THIS ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR)

4.1 Purpose and Objectives

This Environmental Management Programme (EMPr) details the measures to be adopted to address the identified impacts during the pre-construction (planning and design); construction and operational phases of the project. This EMPr highlights:-

- Potential Impacts - impacts that are likely to arise from the above-mentioned development;
- Impact Management Objective – the target or strategy to be achieved through impact management;

- Mitigation measures or Impact Management Actions – the actions to be undertaken to achieve the impact management objective;
- Management indicators or impact management outcomes – criteria against which the implementation of the actions and the level of achievement of the performance objectives will be measured;
- Monitoring – the mechanism for monitoring compliance with the proposed impact management actions;
- Reporting – the process and responsibility for reporting monitoring results;
- Environmental awareness - an arrangement on how stakeholders involved in the implementation of the activity/project more especially the contractor and sub-contractor workers, will be made aware of the environmental issues associated with the activity;
- Specify time periods within which the measures contemplated in the draft Environmental Management Programme must be implemented, where appropriate; and
- Roles and responsibilities that various parties should play in implementing the mitigation measures.

This EMPr has been prepared as a supporting documentation to accompany the Environmental Authorization. The objectives of this EMPr are to provide:

- A guideline(s) to mitigate potential environmental harm for each activity undertaken;
- A mechanism to the Proponent, the contractor and all the sub-contractors to comply with current legislation applicable to the project;
- A means of identifying environmental issues and to provide general procedures which must be considered when undertaking construction activities;
- A mechanism to reduce the potential impacts of the construction and operation of the facility; and
- A basis for establishing environmental due diligence during the construction and operational phases.

In essence, the EMPr is to provide the Proponent and contractors/subcontractors with a practical guide to measure compliance by all parties with the environmental requirements. The EMPr achieves this by providing a framework for comprehensive monitoring and control of construction and operation of the development. The aim is to minimize the potential for negative environmental impact by ensuring that environmental management considerations are implemented from the start to the end of the project.

4.2 Principles

The elements of mitigation measures are divided into three types of actions organized in this hierarchy:

- first, avoid adverse impacts as far as possible by use of preventative measures;
- second, minimize or reduce adverse impacts to as low as practicable levels; and
- third, remedy or compensate for adverse residual impacts, which are unavoidable and cannot be reduced further.

Key principles for the application of mitigation consistent with the above framework include the following:

- give preference to avoid and prevent measures;
- identify customized measures to minimize each of the main impacts predicted;
- ensure they are appropriate, environmentally sound and cost-effective; and
- use compensation or remedial measures as a last resort.

5 BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 Vegetation

The project site is located within the highly threatened Grassland Biome of South Africa with approximately two percent currently conserved. The study area falls within the Vaal-Vet Sandy Grassland, which in turn comprises part of the Grassland Biome. This type is situated in the North-West and Free State Provinces, south of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. The site mainly consisted of a herbaceous layer dominated by grasses as well as sporadic tree species and a discontinuous layer of shrubs. The site for the proposed sewer outfall pipeline development housed some alien invasive species and weeds. There were however, a number of indigenous species observed at the site (Dotwana, 2017).

5.2 Vertebrates

The proposed development site comprised of highly transformed areas such as residences, dumping areas, mine residue sites and transformed vegetation patches which make for unsuitable habitat for many animals, especially habitat specific threatened faunal species. No mammal, amphibian or reptile species were observed at the time of assessment (Dotwana, 2017).

5.3 Invertebrates

During the site visits, invertebrates were observed on site including species from the orders, Lepidoptera (*Junonia hierta*). No Arachnids or Molluscs were observed. No Red or Orange Listed or priority invertebrates were observed on site (Dotwana, 2017).

5.4 Avifauna

A total of 6 bird species were observed at the proposed development site during the time of assessment and these included: *Bostrychia hagedash* (Hadada ibis), *Vanellus armatus* (Blacksmith lapwing), *Vanellus coronatus* (Crowned lapwing) and *Acridotheres tristis* (Common myna) (Dotwana, 2017).

5.5 Red Data Species and Critical Biodiversity

None of the plant species recorded in the study area are found in the "Red Data List of Southern African Plants" or on the updated PRECIS database of the National Botanical Institute (NBI), Pretoria. None of the animal species recorded on site are red listed and due to the developed nature of the area, human disturbance in the area, no red data fauna and flora species are likely to occur on the site.

According to the North West Province Biodiversity Conservation Assessment, a section of the site falls within a Critical Biodiversity Area. The entire proposed site is located within an Endangered Ecosystem.

Due diligence and care must be undertaken by the Environmental Control Officer (ECO) of the project during the construction phase, to identify species of importance that may have been missed (Dotwana, 2017).

5.6 Sensitivity

The majority of the development site is regarded as of High sensitivity. The high sensitivity status is given due to the fact that the proposed sewer outfall upgrade pipeline runs along the Palmietspruit River and associated wetland system (Dotwana, 2017).

5.7 Geology

According to the geological map for this region the pipeline alignment is underlain by bedrocks of the contact zone between the Ventersdorp and Witwtersrand Supergroups. These comprise amygdaloidal lava, agglomerate and tuffs as well as quartzite, conglomerates and shales. The thickness of soils residual from these materials are usually thin, with thin to intermediate thickness of transported soils mantling them. The near surface soil conditions comprises of slickenside materials that are likely to become unstable in excavation works (Intraconsult, 2017).

5.8 Groundwater Conditions

Groundwater seepages occurred at around 1.8m bgl in many of the trial holes opened in the dry season (August 2017). Greater groundwater inflows should be anticipated in other seasons of the year (Intraconsult, 2017).

6 KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT

TITLE OF LEGISLATION, POLICY OR GUIDELINE	APPLICABILITY TO THE PROJECT AND PERMIT/LICENCES THAT MAY BE REQUIRED
The Constitution of the Republic of South Africa Act No. 108 of 1996	The Constitution is the supreme law of the land and includes the Bill of rights which is the cornerstone of democracy in South Africa and enshrines the rights of people in the country. It includes the right to an environment which is not harmful to human health or well-being and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.
National Environmental Management Act 107 of 1998	This is a fundamentally important piece of legislation and effectively promotes sustainable development and entrenches principles such as the 'precautionary approach', 'polluter pays' principle, and requires responsibility for impacts to be taken throughout the life cycle of a project NEMA provides the legislative backing (Including Impact Assessment Regulations) for regulating development and ensuring that a risk-averse and cautious approach is taken when making decisions about activities. It provides a legislative ground on which the regulations to ensure that adverse impacts on the environment can be investigated and mitigation measures to keep the adverse impacts of activities can be minimized and that arrangement for monitoring and managing impacts can be formulated.

National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations of December 2014, as amended	These regulations provide the framework for the content and intent of the EMPr.
National Environmental Management: Biodiversity Act No 10 of 2004	The Biodiversity Act provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. According to section 57 of this Act, "gathering, collecting or plucking any specimen of a listed threatened or protected species" and " picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species" without a permit is prohibited.
National Forests Act (Act 84 of 1998)	Section 15 of this Act states that "No person may cut, disturb, damage or destroy any protected tree except under licence granted by the Minister" The implication of this section of the Act to this project is that a Licence will need to be obtained in order to cut, disturb, damage or destroy any protected tree identified on the project site. This licence/permit must be obtained from the Department of Agriculture, Forestry and Fisheries,
National Environmental Management: Waste Act (Act 59 of 2008)	Sections 21, 22,24,26 and 27 of this Act deals with the general requirements for storage of waste, storage of general waste, collection of waste, prohibition of unauthorized waste disposal and littering respectively. Section 25 of this Act deals with a Duty of Care with regard to the handling of hazardous. The implication of this Act to this project is that the handling of general and hazardous waste in a manner that is in contravention of the Act is an offence which is punishable by a fine or imprisonment
National Water Act (Act 36 of 1998)	A Water Use Licence may be required in terms of the National Water Act (Act No. 36 of 1998) section 21, where water use is defined as: a) abstracting water from a water resource; The implication for this project is that the above water use defined is applicable to this project, and then a Water Use /Licence or General Authorization will be required
Mineral and Petroleum Resources Development Act (Act 28 of 2002)	According to this Act, the sourcing of soil material from a borrow pit is an activity which requires a permit. The implication for this project is that should there be a need to source the soil material from a borrow pit, such soil material can only be sourced from a permitted borrow pit (a borrow pit with a permit).
National Heritage Resources Act (Act 25 of 1999)	Section 35 of this Act states that "No person may, without a permit issued by

	the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site." Section 36 of the same Act states that "No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. Grave is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place" The implication of this Act to this project is that should any activities listed above occur on the project site, a permit will be required. For an example if there is a need to relocate any grave from the project site then a permit will be required.
Conservation of Agricultural Resources Act 43 of 1983	According to this Act, it is the responsibility of the land user to control the weeds and invader plant species on his/her land. In this case it will be the responsibility of the Proponent and the Contractor to control the weeds and invader plants within the project site
Occupational Health and Safety Act (Act 85, of 1993	The Act is relevant to health and safety issues with regard to any people who will be working on as well as those visiting the construction site.
Hazardous Chemical Substances regulations (25 August 1995)	These Regulations deal with the handling and storage of hazardous substances. It is applicable to this project due to the need to ensure the safety of people working with hazardous chemicals (specifically fuels), a well as safe storage, use and disposal of containers.
SANS 10103 (Noise Regulations)	The measurement and rating of environmental noise with respect to annoyance and to speech communication.

7 ROLES AND RESPONSIBILITY AND ORGANIZATIONAL STRUCTURE RELATING TO THE IMPLEMENTATION OF THIS EMPR

7.1 Proponent/ Applicant

The proponent has the overall responsibility to ensure that this Environmental Management Programme is implemented. In ensuring that this EMPr is implemented, it is recommended that among others, the Proponent should:

- ✓ Ensure that all permits and authorizations relevant to this project are obtained from the relevant Authorities;
- ✓ Designate/appoint a qualified Environmental Control Officer (ECO) who will be responsible for overseeing/monitoring the implementation of this EMPr; and
- ✓ Ensure that all Engineers and Contractors appointed by Proponent for the design and implementation of this project are contractually bound to implement mitigation measures that are relevant to their scope of work.

7.2 Engineer / Project Manager

The Engineer/ Project Manager (PM) must ensure that the project is designed in a way that avoids or minimizes environmental and social impacts. It will be responsibility of the Engineer/PM to oversee the overall implementation of the project as well as the compliance with the EMPr and incorporate any potential environmental aspects identified in the EIA process into the design.

7.3 Contractor

Since the contractor will be responsible for the construction of the proposed resort, he/she will be responsible for the overall implementation this EMPr. The Contractor will comply with the requirements of the EMPr and abide by the Proponent/ Applicant's instructions regarding the implementation of the EMPr. The Contractor will be expected to:

- Appoint an Environmental Officer who will be called the Contractor's Environmental Officer (Contractor EO). The role of the Contractor EO will be to ensure implementation of this EMPr where

applicable and as such he/she should have relevant environmental qualifications and experience required for the project.

- Ensure any Sub-Contractors/Suppliers who are utilized within the context of the contract comply with the environmental requirements of the project, in terms of the EMPr.
- Compile Activity-/Aspect-based Environmental Method Statements for all activities proposed. The Environmental Method Statements will enable the potential positive and negative environmental impacts associated with the proposed construction activity to be identified and mitigation measures put in place. All method statements must be signed by the Contractor, thereby indicating that the works will be carried out according to the methodology described therein. **Activities may only commence once the Environmental Method Statements have been approved by all the relevant parties.**

7.3.1 The Contractor's Environmental Officer (Contractor EO)

The Contractor's Environmental Officer's tasks will include:

- Daily/ weekly and/or monthly inspections of the work area(s) as per schedule or authorize through written instruction by Proponent/ Applicant or Environmental Control Officer;
- Prepare project-specific activity/aspect based Environmental Method Statements;
- Identify local, provincial and national environmental legislation that applies to the Contractor's activities;
- Monitor compliance with EA, EMPr, other approvals/permits/licences and approved Environmental Method Statements;
- Ongoing Environmental Awareness Training of the Contractor's site personnel;
- Reporting, investigating and recording of any environmental incidents caused by the Contractor or due to the Contractor's activities, including their sub-contractors;
- Close out of environmental incidents;
- Attendance at all SHE meetings and induction programmes, and toolbox talks where possible;
- Waste Management;
- Water Management;
- Ensure that environmental signage and barriers are correctly placed; and
- Taking required corrective action within specified time frame and close off non-conformances.

7.4 The Environmental Control Officer

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by the Proponent to objectively and regularly monitor the contractor's implementation of this EMPr as may be determined by the sensitivity of the project or by conditions of the Environmental Authorization. The ECO may not be appointed by the Contractor, and will report to the Proponent and READ only. The ECO has the authority to stop any works if, in his/her opinion, there is or may be a serious threat to or impact environment; caused directly by the contractor's actions or activities during the construction phase. In all such work stoppage situations the ECO is to inform the Contractor of the reasons for the stoppage within 24 hours. All ECO reports will be sent to the Proponent to keep them abreast of compliance on site. The project's environmental authorization may require that ECO reports be provided to the Department of Environmental Affairs. Upon failure by the Contractor, or his employees, to show adequate consideration EMPr, the ECO may recommend to the Proponent to have the Contractor's representative or any employee(s) removed from the site, or the matter is resolved.

The ECO will:

- Be fully conversant with the EMPr;
- Be familiar with the recommendations and mitigation measures of the associated EMPr for the project;
- Monitor the implementation of the EMPr during the construction and rehabilitation phases;
- Ensure site protection measures are implemented on site;
- Monitor that the Principal Contractor, sub-contractors, construction teams and the Proponent are in compliance with the EMPr at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities at least once a month for compliance.
- Conduct monthly audits of the site according to the EMPr, and report findings to the Developer/Contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr and EA prescriptions. These monthly reports are to be submitted to the Proponent and READ; and

- Conduct once-off training with the Contractor on the EMPr and general environmental awareness.
- Compile an Environmental Completion Statement or a Site Closure Report indicating the completion of the project and the overall compliance with the EMPr and the EA. This statement or report is to be submitted to READ.

8 DOCUMENTS REQUIRED ON SITE

As part of ensuring that all environmental issues (conditions) are taken into consideration and that all mitigation measures relevant to construction activities are implemented on a daily, continuous and consistent basis, the Contractor (through appointed/designated in-house Environmental Officer) is expected to keep the following documents on site.

8.1 Method Statements

A Method Statement details what, how, where and when a particular task or process will be carried out, detailing possible dangers/risks or impacts associated with the task or the process and the method that will be used or mitigation measures that will be undertaken to avoid or minimize the risk/dangers or impacts.

These include, but are not limited to, the following:

- Establishment of construction lay down area;
- Hazardous and non-hazardous waste management;
- Storm water management;
- Handling, Storage and Management of Hazardous Substances;
- Contaminated water management;
- Hydrocarbon spills;
- Diesel tanks and refueling procedures (if applicable);
- Dust control;
- Spoil dumping;
- Sourcing, excavating, transporting and dumping of fill material;
- Noise and vibration control;
- Removal of rare, endemic or endangered species;
- Removal and stockpiling of topsoil;
- Rodent and pest control;
- Environmental awareness training;
- Site establishment and demarcation;
- Emergency procedures for environmental incidents;

- Closure of construction laydown area;
- Rehabilitation; and
- Emergency.

8.2 Environmental Register

The ECO or Contractor EO will put in place an Environmental Register and the Contractor will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident;
- Causes of complaint/incident;
- Party/parties responsible for causing complaint/incident;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented; and
- Copies of all correspondence received regarding complaints/incidents.

8.3 Site Instruction Entries

The Site Instruction Book entries will be used for the recording of general site instructions as they relate to the works on site and the measures of the EMPr. It will also be used for the issuing of stop orders by the ECO for the purpose of immediately halting activities of the Contractor or his employees pose.

8.4 ECO Diary Entries

The purpose of these entries will be to record the comments of the ECO as they relate to activities on the site including orders.

8.5 Monthly Audit Reports

Monthly reports will be compiled by the Environmental Control Officer (ECO) and could be presented at the Site Meetings. Monthly reports will describe, in detail, the cause, nature and effects of any environmental non-conformance in the event of penalties being evoked. The monthly report should also reflect whether the mitigation measures have been implemented timeously and to the satisfaction of the ECO.

8.6 The Environmental Management File

The Contractor will make available on site an Environmental Management File the specific contents of which will be determined by the Proponent and the ECO. Some of the documents which may form part of the Environmental Management file are the following:

- Copy of the EMPr;
- Copy of the Environmental Authorization;
- Copy of all other licenses/permits;
- Copy of all rehabilitation plans;
- Copy of the Storm water Management Plan;
- Copy of relevant legislation;
- Environmental Policy of the Main Contractor;
- Approved Environmental Method statements compiled by the Contractor;
- Non-conformance Reports;
- Environmental register, which shall include:
    - Communications Register–including records of Complaints, and, minutes and attendance registers of all environmental meetings;
    - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR);
    - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record; and
    - Waste manifests.

- Waste Documentation such as Sewerage Disposal Receipts;
- Material Safety Data Sheets for all hazardous substances;

- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions; and
- Notification of Emergencies and Incidents.

9 TRAINING AND ENVIRONMENTAL AWARENESS

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimization of environmental harm. Training needs should be identified based on the available and existing capacity of site personnel (including the Contractors and Sub-contractors) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. Amongst others, the environmental training should be aimed at:

- Promoting environmental awareness;
- Informing the Contractor of all environmental procedures, policies and programs applicable;
- Providing generic training on the implementation of environmental management specifications; and
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal format. The Contractor should make provision for weekly training or Toolbox Talks. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimized and environmental compliance maximized.

10 MONITORING

Firstly the Proponent should ensure that any appointed service provider at any stage of this project is contractually bound to implement the mitigation measures as outlined in this EMPr relevant to his/her scope of work.

The Proponent should then appoint an independent Environmental Control Officer (ECO) who will monitor the compliance with the Environmental Management Program. The appointed Environmental Control Officer should develop an instrument such as an audit checklist based on the EMPr and the Environmental Authorization (EA), which shall be used to check as to whether mitigation measures recommended in the EMPr and other requirements stipulated in the EA are implemented. At least once a month the Environmental Control Officer should go to the construction site to conduct an audit for compliance with the EMPr and the EA conditions. It is also strongly suggested that the ECO must be involved at the site establishment stage to ensure that the construction camp/office is sited in a manner that will not create environmental problems.

The ECO during his/her monitoring site inspection should note and record:

- Areas of non-compliance with the EMPr;
- The difficulties that are encountered in carrying out the EMPr mitigation/control measures; and
- Amendments that may be required to any of the mitigation measures in the EMPr.

The Proponent should put a mechanism in place to READl with any service provider with regard to issues of non-compliance with the EMPr.

The Contractor will appoint an Environmental Officer who will ensure that all environmental issues (conditions) are taken into consideration and that all mitigation measures relevant to construction activities are implemented on a daily, continuous and consistent basis.

11 REPORTING

After monitoring the site, the ECO will immediately report the findings of his/her site monitoring, highlighting areas of non-compliance to the Contractor's Environmental Officer and the Proponent. After the findings of the site monitoring and the required corrective measures have been explained to him/her by the ECO, the Contractor's EO must sign the instrument on which the monitoring findings and corrective measures required have been recorded. At least on monthly basis the Environmental Control Officer should compile a monitoring report, which should be submitted to the Proponent and the Competent Authority. If project site meetings are held during the construction period, the appointed Environmental Control Officer should attend such meetings and present a report on his/her findings with regard to

compliance with the EMPr and the EA as well as issues pertaining to the implementation of the corrective measures highlighted to the Contractor or any other responsible party. In this site project site meetings issues pertaining to the necessary amendments to the EMPr as dictated by the reality on site can also be discussed.

12 NON-COMPLIANCE AND PENALITIES

In terms of the National Environmental Management Act 107 of 1998 (NEMA) an individual responsible for environmental damage must pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the *Polluter Pays Principle* as embodied in Section 28 of the NEMA embodies the polluter pays principle. It is for the reason that various environmental legislations have sections which deal with offences and penalties. For example, A person convicted of an offence for violating some of the sections of the National Environmental Management: Waste Act (Act 59 of 2008) is liable to a fine ranging between R5 000 000 and R10 000 000 or to imprisonment for a period ranging between five and ten years, or to both a fine and such imprisonment. According to a National Environmental Management: Biodiversity Act (Act 10 of 2004) a person found guilty of tempering with a listed protected species can be fined and imprisoned. This is similarly the case with violating the National Forests Act (Act 84 of 1998).

The Contractor must comply with the environmental management requirements of this EMPr on an ongoing basis. Where the Contractor inflicts damage upon the environment or fails to comply with any of the environmental specifications contained within this EMPr, he/she shall be liable to pay a penalty for breach of the conditions of the environmental specifications which form part of the works contract. Penalties shall be issued per incident for the Contractor's responsibility at the discretion of the Proponent in consultation with the ECO. The amount of the penalty shall be determined by the Proponent, in consultation with the ECO. The Proponent shall inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract. It must be emphasized that Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

The Contractor is deemed not to have complied with the EMPr if:

- There is evidence of contravention of clauses within the boundaries of the site, site extensions and haul / access roads;
- Environmental damage ensues due to negligence;
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Proponent or the ECO within a specified time;
- The Contractor fails to respond adequately to complaints from the public.
- The contractor fails to comply with a site instruction given by the Proponent based on the ECO report;
- Legal action is instituted against the Proponent in terms of Environmental laws due to the actions or negligence of the Contractor.

13 DESCRIPTION OF ACTIVITIES

The activities that are going to be undertaken entails but not limited to the following:

13.1 Pre-construction

- Establishment of the contractor's camp and laydown areas;
- Surveying and pegging the servitudes;
- Vegetation/faunal search and rescue ;
- Staff procurement, induction and training;
- Establishment of fuel storage and dispensing sites;
- Establishment of stores for explosives and flammables;
- Establishment of storage of other materials
- Establishment water supplies;
- Establishment of batching sites (if applicable);
- Removal of vegetation within the camp and laydown areas;
- Fencing

13.2 Construction

- Vegetation clearing within the proposed site;
- Excavations and compaction of layer works
- Removal and stockpiling of topsoil;
- Fencing of the construction sites;

- Storage and handling of hazardous material;
- Handling and disposal of construction waste;
- Handling and storage of general waste;
- Handling and storage of hazardous waste;
- Handling and storage of fuels.
- Transportation of materials;
- Use of sanitation facilities and handling of sewage waste;
- Concrete batching (if applicable) and use of cement;
- Maintenance of plant;
- Construction of structures:
    - upgraded outfall sewer pipeline;
- Fencing of the servitude (if applicable); and
- Commissioning of the outfall sewer pipeline.

13.3 Site Rehabilitation

- Removal/decommissioning of the contractor's camp site
- Rehabilitation of the spoil sites;
- Removal of all construction, hazardous and domestic waste;
- Rehabilitation of the disturbed areas

14 IMPACT MANGEMENT PROGRAM

In this section the activities and/or aspects that will be undertaken and the impacts that are likely to arise from such activities at the site establishment (pre-construction), construction, site rehabilitation, and operational stages of the project are presented. For each stage of the project the activity, aspect, potential impact, impact management objective and the impact management actions or mitigation measures to be undertaken, the impact management action outcomes or indicators, resources, time scheduling, verification responsibility and frequency are presented in a table format. The impacts are categorized and presented as follows:

Section 14.1 Pre-construction phase

Section 14.2 Construction phase

- 14.2.1 Protection of Flora
- 14.2.2 Alien invasive plants
- 14.2.3 Protection of Fauna and collection of firewood
- 14.2.4 Water Resources Protection
- 14.2.5 Heritage resources
- 14.2.6 Domestic Waste Management
- 14.2.7 Hazardous Waste Management
- 14.2.8 Construction Waste Management
- 14.2.9 Liquid Waste Management
- 14.2.10 Soil Erosion
- 14.2.11 Storm water management
- 14.2.12 Soil management
- 14.2.13 Handling of fuels and re-fueling of vehicles and equipment
- 14.2.14 Workshops, equipment maintenance and storage
- 14.2.15 Handling and batching of concrete and cement
- 14.2.16 Transportation of materials
- 14.2.17 Dust Management
- 14.2.18 Noise Management
- 14.2.19 Fire Management
- 14.2.20 Private land, other properties and infrastructural issues
- 14.2.21 Health and Safety
- 14.2.22 Social issues
- 14.2.23 Temporary Site Closure

Section 14.3 Site Rehabilitation

Section 14.4 Operational Phase

- 14.4.1 Noise Management
- 14.4.2 Alien invasive plants management
- 14.4.3 Water resources protection
- 14.4.3 Fire Management
- 14.4.4 Domestic Waste Management

14.1 PRE-CONSTRUCTION PHASE

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Establishment of the construction camp sites	Construction camp	Damage or loss of existing vegetation and changes to the area's water quality	**Objective:** To prevent negative influence to the surrounding surface water and groundwater. **Target:** • Site establishment shall take place in an orderly manner and all amenities shall be installed at camp sites before the main workforce move onto site • A method statement is required from the contractor at appointment stage that includes the layout of the camp, management of ablution facilities and wastewater management • The planning and design for the construction camp must ensure that there is a minimum impact on the environment. • A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities. • The contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. • The contractor shall inform all site staff to the use of supplied ablution facilities and under no circumstances shall the staff be allowed to	Construction camp established in compliance with objectives.	Contractor and Contractor EO	Contract	Pre-construction, Establishment of Site	ECO	Once off

			relieve themselves anywhere other than in the supplied facilities. • The contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste dump • A certificate of safe disposal shall be obtained by the contractor and kept on file. • Where a registered waste site is not available close to the construction site, the contractor shall provide a method statement with regard to waste management. Under no circumstances may solid waste be burned on site. • The construction camp must be placed on already disturbed land or land of low environmental sensitivity as far as possible. • The construction camp should be fenced off so as to limit the unnecessary removal of vegetation. • Fences and security access must be maintained, throughout the project. • All fences removed to facilitate access will be replaced by the contractor once machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners. • Emergency and contact numbers of the contractors must be available and prominently displayed on a signage board that is clearly visible. • To avoid additional transformation of natural vegetation and potential loss of habitat for species of concern it is strongly recommended						

			that the construction related infrastructure be placed on existing transformed areas, e.g. cultivated lands • Proper impact mitigation measures are required to minimise wetland impacts and reduce the development footprint within the wetland as far as possible.						

14.2 CONSTRUCTION PHASE

14.2.1 Protection of Flora

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Clearing of vegetation on site, fencing and other construction related activities	Vegetation clearing	Vegetation loss including loss of protected plant species	**Objective:** To minimize the loss and damages of plant species and vegetation. **Target:** • The project footprint site must be clearly demarcated to ensure that no vegetation clearing is done outside the demarcated project footprint. • Vegetation clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation	No unnecessary loss of vegetation and protected plant species	Contractor and Contractor EO	Contract	During the clearance of construction site and throughout the construction phase	ECO	During construction

			clearing shall be subject to the Contractor's EO approval and shall occur in consultation with the ECO. • No vegetation located outside the construction site shall be destroyed or damaged. As far as is reasonably practicable, existing roads must be used for access to site and right of way. • No dumping of solid waste or refuse shall be allowed within or adjacent to areas of natural vegetation. • No material storage or lay down is permitted under trees. • No collection of firewood on site is allowed. • To avoid additional transformation of natural vege potential habitat for species of concern it is strong recommended that the construction related infras placed on existing transformed areas, e.g. cultiva • The contractor will be held liable for the replacement of any plant or feature under the protection of these specifications that is removed or damaged by the contractor's negligence or mismanagement. • No open fires are permitted.						

14.2.2 Alien invasive plant species management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**

Delivery of plant on site and construction activities	Alien invasive plants	Introduction and spreading of alien invasive plant	**Objective:** To control the establishment and spreading of alien invasive plants on the construction site. **Target:** • Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment). • Colonization of disturbed areas and topsoil stockpiles by weeds and invasive plants on site must be monitored and controlled on an on-going basis. • The type of herbicide to be used must be approved by the ECO in consultation with a registered pest control service provider. • Any eradicated exotic/invasive plant or weed vegetation must be removed from site and disposed of at an approved waste disposal facility. • No domestic and/or exotic plants may be planted on site. • Alien infested topsoil stockpiles should be monitored and any alien invasive species eradicated once they have been identified. • An Action Plan or the weed management strategy must be developed that will assist in preventing the introduction of weeds to the site and the removal of alien invasive species from the site throughout the lifespan of the construction stage.	• Invasive plant species and weed management strategy or action plan; and • Absence of weeds and invasive plants within the construction site.	Contractor and Contractor EO	Contract	Entire construction phase	ECO	On-going basis for the duration of the construction

14.2.3 Protection of fauna and collection of firewood

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Construction activities and interaction of contractor with fauna	Fauna	Injuries and death of fauna on site Loss of habitats for fauna	**Objective:** To protect fauna on the site and to prevent interference with stock that may be grazing on or adjacent to the site. **Target:** • Under no circumstances shall any animals be handled, removed, killed or be interfered with by the contractor, his employees, his subcontractors' employees. • If not threatened, or causing a threat to anyone, the animal is to be left alone. • If threatened e.g. trapped in an excavation, in way of site clearing, or causing a threat e.g. a potentially venomous snake, the ECO is to be contacted to advice on the capture of the animal and release thereof into the surrounding area or a nearby reserve. Where required assistance/input from local conservation staff may be required. No untrained person shall attempt to capture a potentially venomous snake. • The contractor and his employees shall not bring any domesticated animals onto the site. • Gates must be kept closed to prevent stock in the area from straying. • The contractor shall ensure the work site be	• No evidence of unduly disturbed or injured wildlife. • Stock camp access gates kept closed when not in use.	Contractor and Contractor EO	Contract	Entire construction phase	ECO	On-going basis for the duration of the construction

			kept clean, tidy and free of rubbish that would attract rodents and other scavengers. • The footprint of the disturbed area must be kept as minimum as possible to minimize possible loss of faunal habitats • Excavations must be checked on a daily basis for any signs of fauna which may have fallen in.						

14.2.4 Water Resources Protection

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Construction activities within watercourses and sourcing and usage of water	Watercourses	Contamination and pollution of groundwater. Hydrology disturbances of the hydrology of water	**Objective:** To minimize negative construction impacts on natural water channels. **Target:** • Construction camp, storage, washing and maintenance of equipment, storage of construction materials or chemicals as well as any sanitation and waste management facilities must not be located within the 1 in 100 flood line of any natural drainage line. • The pollution of surface or ground water shall be prevented. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water from excavations,	Less pollution on groundwater and less damages to watercourses.	Contractor and Contractor EO	Contract	Entire construction phase	ECO	On-going basis for the duration of the construction

			construction water, and water carrying soil particles or waste products. • The Contractor must ensure that rainwater runoff that contains pollutants, does not directly enter natural and sensitive areas such as rivers and streams. • Drainage / runoff diversion systems shall be installed to divert runoff from areas that have material that is considered a pollutant to the natural environment. These include batching plants, vehicle washing bays, workshops, chemical stores, asphalt plants and so on. • Clearing of vegetation should be kept to a minimum. • No water shall be abstracted from any water course (stream, river, or dam) without the expressed permission of the Construction Manager and the ECO. Such permission shall only be granted once it can be shown that the water is safe for use, that there is sufficient water in the resource to meet the demand, and once permission has been obtained from the Department of Water and Sanitation in accordance with the requirements of the National Water Act (Act 36 of 1998). • Method Statement(s) must be prepared by the Contractor for the various water uses. The Contractor shall keep record of the quantities of water used during construction (including use by sub-contractors), irrespective of the purpose of						

			use. • Where applicable, all the conditions (including the impact management measures to be undertaken) as stipulated in the relevant authorization (Water use license or General Authorisation) granted by the Department of Water and Sanitation for the water uses must be adhered to. • Establish emergency response measures and a clearly defined chain of communication to rapidly deal with any unforeseen impacts to water resources, e.g. spills. **Increased sediment transport into water resources** • Design and implement a storm water management system that aims to minimise the concentration of flow and increase in flow velocity, as well as minimising sediment transport off site. • Phase vegetation clearing activities as far as possible to limit the area exposed at any one time. • Where practically possible, the major earthworks should be undertaken during the dry season (roughly from April to August) to limit erosion due to rainfall runoff.						

14.2.5 Heritage Resources

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Construction activities	Heritage resources	Possible destruction of heritage resources uncovered during excavations	**Objective:** To ensure that artefacts of heritage or paleontological importance uncovered on site are protected. **Target:** • The ECO shall record (photos and GPS location) and safeguard any suspected artefacts and will advise on demarcation of this area and notify a relevant specialist to view material and ascertain whether further study of the area is required (at the Developer's expense). • Should a specialist confirm a genuine artefact or fossil and recommend further study of the area, work in the applicable area is to cease until further notice and Heritage Resources Agency is to be informed immediately by the ECO. • Should any human remains be disturbed, exposed or uncovered during excavation, work in the applicable area is to cease and these shall immediately be reported to the south African Police Service and, if suspected that the remains are older than 60 years, the South African Heritage Resources Agency • The removal of discovered archaeological	Handling of discovered artefacts of heritage importance in line with the Heritage Resources Act	Contractor	Contract	Entire construction stage	ECO in consultation with the relevant heritage specialists	On-going basis for the duration of construction

			remains by a contracted archaeologist shall be at the Proponent's expense. • Should any significant fossil remains be encountered on site, the ECO shall similarly record (photos and GPS location) and safeguard these until such time as the North West Provincial Heritage Authority and /or a professional palaeontologist can inspect the find and suggest the required mitigation measures.						

14.2.6 Domestic Waste Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Storage and disposal of domestic waste generated on site	Domestic waste	Littering Unpleasant odours Site infestation with rodents Decreased aesthetics of the site	**Objective:** To ensure that waste generated on site is managed in manner that is not detrimental to the environment and human health. **Target:** • The Contractor shall provide labourers to clean up refuse in the Contractor's camp and working areas daily. • Litter and waste materials (excluding rubble) shall be disposed of into scavenger proof bins. Bins shall be provided at all eating areas. • The separation and recovery of recyclable materials is required and as such the	Site that is not littered with a provision of properly labelled bins, Waste disposal certificates	Contractor and Contractor EO	Contract	Waste bins to be provided at site establishment stage and made available throughout the whole construction stage.	ECO	On-going basis for the duration of the construction stage

			contractor is expected to obtain and label recycling containers for the following (whichever relevant) and locate them within temporary office building and trailers: - Office Waste; - Glass; and - Plastic • The contractor should establish recycled material collection schedule • The contractor will also arrange for full bins to be hauled away • The Contractor shall ensure that all waste is removed to appropriate licensed waste management facilities. • The contractor will provide documentary evidence of proper disposal of waste.						

14.2.7 Hazardous Waste Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Generation, storage and disposal of hazardous waste	Hazardous waste	Contamination of soil and groundwater	**Objective:** To avoid the contamination of soil and groundwater by hazardous waste **Target:** Hazardous waste produced on site includes: ✓ Oil and other lubricants, diesel, paints, solvent; ✓ Containers that contained	The implementation of mitigation measures with regard to hazardous waste	Contractor and Contractor EO	Contract	Construction stage	ECO	On an on-going basis for the duration of construction stage

			chemicals, oils or greases; and ✓ Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (oil, fuel, grease, chemicals or bitumen). The Contractor shall manage HAZARDOUS WASTE anticipated to be generated by his operations as follows: • Characterise the waste to determine whether it is general or hazardous in accordance with the National Environmental Management: Waste Act (Act 59 of 2008). • Obtain and provide an acceptable container with correct and visible classification label. Place hazardous waste material in allocated container. • Inspect the container on a regular basis as prescribed by the Contractor's waste management plan. • Track the accumulation time for the waste. Haul the full container to the disposal site. • Provide documentary evidence of proper waste disposal of the waste (Waste Disposal Certificate).						

14.2.8 Construction waste management

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Generation, storage and disposal of construction waste	Construction waste	Land pollution Decreased aesthetics on site	**Objective:** To ensure proper storage and disposal of the construction waste **Target:** • The Waste Management Plan must developed and be adhered to at all times. • All construction waste shall be stored in waste skips located strategically on site. These skips shall be collected for removal to a licensed landfill site. No construction waste may be stored on site for longer than 90 days. • The separation and recovery of recyclable materials is required and as such the contractor is expected to obtain and label recycling containers for the following (whichever relevant) and locate them within temporary office building and trailers: - Aluminium; - Steel; - Ferrous Metals; - Non Ferrous Metals; and -Waste Timber • Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work.	Storage and disposal of construction waste in line with the recommended mitigation measures	Contractor and Contractor EO	Contract	The provision of waste bins and skips will be done prior to construction stage but the storage and disposal will be done throughout the construction stage	ECO	Frequency of construction waste disposal will be determined by the ECO

			• Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities are introduced to site. • The contractor will provide documentary evidence of proper waste disposal of the construction waste.						

14.2.9 Effluent management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Handling of effluent on site	Effluent	Groundwater pollution	**Objective**: To ensure that effluent is not discharged into watercourses. **Target:** • The Contractor shall prevent discharge of any waste water containing pollutants, such as cements, lime, chemicals and oils and fuels into any drainage lines or onto any adjacent natural vegetation. • All effluent water from site shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water courses (streams, rivers, pans dams etc.). Only domestic type wastewater shall be allowed to enter the designated system. • Wash areas shall be placed and constructed in such a manner so as to	The handling of effluent in line with the recommended mitigation water	Contractor	Contract	Construction phase	ECO	On an on-going basis

			ensure that the surrounding areas are not polluted. A Method Statement shall be required for all wash areas where hydrocarbon, hazardous materials and pollutants are expected to be used. This includes, but is not limited to paint equipment and concrete batch plant/ready mix chute cleaning.						

14.2.10 Erosion Control

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Controlling erosion on site	Erosion	Loss of soil fertility due to erosion of topsoil. Siltation and sedimentation of watercourses	**Objective**: To ensure that erosion on site is controlled. **Target:** Other structural and non-structural (vegetative) erosion control measures will be designed, implemented, and properly maintained by the contractor in accordance with best management practices which will include the following: • Scheduling of activities to minimise the amount of disturbed area at any one time; • Implementation of re-vegetation as early as feasible; • Limiting construction traffic and/or avoidance thereof on access roads and areas to be graded to the extent feasible at drainage	Implementation of these erosion control measures	Contractor and Contractor EO	Contract	Construction stage	ECO	On an on-going basis for the duration of the construction stage

			ditches; • Compacting loose soil as soon as possible after excavation, grading, or filling; • Using silt fences, geo-textiles, temporary rip-rap, soil stabilisation with gravel, diversionary berms or swales, small sedimentation basins, and gravelled roads to minimise transport of sediment ; • Implementing the erosion and sedimentation control method statement and ensuring that construction personnel are familiar with and adhere to it; and • Managing runoff during construction. The Contractor shall be responsible for checking and maintaining all erosion and sedimentation controls.						

14.2.11 Storm water and Dewatering management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Management of storm water	Storm water	Discharging of contaminated water from the site into watercourses leading to groundwater contamination	**Objective:** To avoid discharging of contaminated storm water from the site into watercourses within or near site. **Target:** The Contractor shall take note that discharges to controlled waters such as the sea, rivers,	Containment of contaminated storm water on site and no discharging of contaminated storm water into watercourses	Contractor	Contract	Construction stage	ECO	On on-going basis for the duration of the construction stage

			groundwater or to sewerage systems are controlled under South African Water Legislation. The following specific measures are required: • Temporary drainage must be established on site during the construction period until permanent drainage is in place. • Contractors are responsible for maintaining the temporary drainage in their areas. Contractors must provide secondary drainage that prevents erosion. • Contractors must employ good housekeeping in their areas to prevent contamination of drainage water. • The Contractor shall clear stagnant water on site. • The Contractor shall ensure that no contaminated surface water flows off-site as a result of Contractor operations. Silt traps shall be constructed to ensure retention of silt on site and cut-off ditches shall be constructed to ensure no runoff from the site except at points where silt traps are provided. • The Contractor shall be responsible for checking and maintaining all silt traps for the duration of the project. • If applicable, the Contractor shall be responsible for collection, management, and containment within the site boundaries of all dewatering from all general site preparation activities. The dewatering water shall be						

			contained within the site boundaries by sequentially pumping or routing water to and from sub-areas within the site as the construction activities proceed. No discharge/dewatering to off-site land or surface water bodies will be allowed. • On-site drainage shall be accomplished through gravity flow. The surface drainage system shall consist of mild overland slopes, ditches and culverts.						

14.2.12 Soil Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Excavation and storage of soil and sourcing of soil material from borrow pits	Soil	Dust; Siltation and sedimentation of watercourse; Establishment of weed invaders	**Objectives** To ensure that the soil is stored properly and that soil material is sourced from permitted borrow pits **Target**: **Management of topsoil and subsoil** • Stockpiles must be positioned in areas sheltered from the wind and rain to prevent erosion and dispersion of loose materials. • Stockpiled soil shall be protected by adequate erosion-control measures. • Soil stockpiles shall be located away from drainage lines, watercourses and areas of temporary inundation.	Separation of topsoil from subsoil and management of soil stockpiles per guidelines in the EMPr	Contractor and Contractor EO	Contract	Construction stage	ECO	On an on-going basis for the duration of the construction.

			• Stockpiles shall not exceed 2m in height unless otherwise permitted by ECO. • Topsoil shall be stockpiled separately from other materials and kept moist. • The topsoil in the specific region is regarded as the top 300 mm (maximum) of the soil profile irrespective of the fertility appearance or physical depth, unless otherwise confirmed by the ECO. • Topsoil is to be stripped up to this depth when it is in as dry a condition as possible in order to prevent compaction. • Topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process. • All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction. • Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation. • All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction. • Where topsoil has become mixed with subsoil or is not up to the original standard, fertiliser or new topsoil shall be provided by the Contractor. **Sourcing soil material from borrow pits**						

			The contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, a mining permit (borrow pit permit) an EMPr for the establishment, operation and closure of the quarry or borrow pit shall have been approved by the Department. It is the responsibility of the contractor to ensure that he is in possession of a copy of a permit and of the approved EMPr, prior to commencement of work on the quarry or borrow pit. The conditions imposed by the relevant permit and EMPr may be legally binding on the contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific EMPr and these specifications the former shall apply. The cost of complying with the requirements shall be deemed to be included in existing rates in the Pricing Schedule. **No sourcing of soil material from a borrow pit that is not permitted will be allowed.**						

14.2.13 Handling of fuels and re-fueling of vehicles and equipment

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Handling of fuels and re-	Fuels	Contamination of soil from	**Objective**	Storage of fuels and refuelling of	Contractor	Contract	Construction period	ECO	On an on-going basis

fuelling of vehicles and equipment on site		fuel spillages	To avoid the contamination of soil by fuels leaking or spilling from containers. **Target** **Storage of fuels** • The contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. • All fuels/flammable substances are to be stored within a demarcated area in the Contractor's camp on site. • All fuels shall be stored in a secure area in steel tanks supplied and maintained by the fuel suppliers. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage or spillage of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. • Any leakage, spillage or overflow of fuel shall be attended to without delay. • The storage area and perimeter must be free of vegetation and be well away from stored combustible materials. • The Contractor shall ensure that all liquid fuels (petrol and diesel) and other flammable substances are stored in containers with lids, which are kept firmly shut. All containers must be in such a condition as to be reasonably safe from damage and to prevent	vehicles and equipment done according to the EMPr. Avoidance of spillages and response to spillages in a manner stipulated in this EMPr					during the construction period

			leakage there from. The rated capacity of a tank/container must be able to accommodate expansion of the product contained therein due to the rise in temperature during storage. • Only empty and externally clean containers may be stored on the bare ground. Containers containing fuels as well as all empty and externally dirty containers shall be placed in a drip tray or situated on a smooth and level impermeable surface (concrete floor) contained within a bund wall. The volume inside the bund/drip tray shall be equal to 110% multiplied (x) by the total capacity of all the storage containers/tanks contained therein. • The requirements for fuel storage and management as detailed in SANS 10089 part 1 and SANS 10131 must be implemented. **Stationary/Designated re-fuelling** • No vehicles or machines shall be serviced or refuelled on site except at designated and approved servicing or refuelling locations. • No oil or lubricant changes shall be made on site except at designate locations, or in case of breakdown or emergency repair. • The Contractor shall store fuel and oil at a secure area, which shall be bunded to contain 110% of the total volume within the bund and designed with an impervious layer or liner or paved surface to prevent spillage						

			from entering the ground. • The Contractor shall provide details of its proposed fuel storage and re-fuelling facility to the ECO for approval. The design shall comply with the regulations of the National Water Act, (Act 36 of 1998), the Hazardous Substances Act, (Act 15 of 1973), National Environmental Management Act, (Act 107 of 1998), and the Occupational Health and Safety Act, (Act 85 of 1993), mainly the Construction - and Hazardous Chemical Substances Regulations. **Mobile re-fuelling** In certain circumstances, the refuelling of vehicles or equipment in a designated area is not a viable/practicable option and refuelling has to be done from a tank, truck or container moved around on site. In such circumstances, the Contractor may request approval from the Proponent EO in consultation with the ECO to conduct mobile refuelling subject to the following control measures: • Secondary containment equipment shall be in place. This equipment shall be sized to contain the most likely volume of fuel that could be spilt during transfer. • Absorbent pads or drip trays are to be placed around the fuel inlet prior to dispensing. • Mobile refuelling units are to be operated by a designated competent person.						

			• The transfer of fuel must be stopped prior to overflowing. Fuel tanks or refuelling equipment on vehicles may only be filled to 90% carrying capacity. • Mobile fuelling tanks must be stored in an area where they are not susceptible to collisions. The fuel storage area must be located away from drainage channels. • Mobile refuelling operations shall not take place within 15 meter of any residential buildings, or 7.5 meter from other structures, property lines, public ways or combustible storage. • All mobile refuelling tanks are to be properly labelled and fire extinguishers shall be located near the fuel storage areas. These extinguishers must be of a suitable type and size. **Spill response** The Contractor shall have adequate spill response materials/equipment on site which must be aligned with the volumes of hazardous substances used on site and the risk of pollution to sensitive environmental attributes. The Contractor shall provide details for approval by the Proponent Construction Manager and the ECO of its spill response plan in the event of any spills of fuel, oils, solvents, paints or other hazardous materials. The plan will show measures to be taken in removing contaminated material from site and demonstrate complete						

			removal of contamination. The Contractor shall instruct construction personnel on the following spill prevention and containment responsibilities: • Immediately repair all leaks of hydrocarbons or chemicals • Take all reasonable means to prevent spills or leaks • Do not allow sumps receiving oil or oily water to overflow • Prevent storm water runoff from contamination by leaking or spilled drums of oil or chemicals • Do not discharge oil or contaminants into storm water or sewer systems If a spill occurs on land, the Contractor must: • Immediately stop or reduce the spill • Contain the spill • Recover the spilled product • Remediate the site • Implement actions necessary to prevent the spill from contaminating groundwater or off-site surface water • Dispose of contaminated material at a location designated thereto and provide proof thereof Any spill to water has the potential to disperse quickly; therefore, the spill must be contained immediately using appropriate containment equipment. If a spill to water occurs, the Contractor must: • Take immediate action to stop or reduce the						

			spill and contain it • Notify the appropriate on-site authorities • Implement actions necessary to prevent the spread of the contamination by deploying booms and/or absorbent material • Recover the spilled product • Properly dispose of spilled material and provide proof thereof						

14.2.14 Workshops, equipment maintenance and storage

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures** **(Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Servicing and storing of plant	Servicing and storing of plant	Contamination of soil and water by fuels leaking from plant	**Objective** To store and service the plant on site in a manner that protects the soil and groundwater from being contaminated by fuels leaking from the plant. **Target** • All vehicles and equipment must be kept in good working order to maximize efficiency and minimise pollution. • Maintenance, including washing and re-fuelling of plant on site must be done at designated locations at workshop areas. These designated areas must be agreed with the Proponent EO and the ECO. • The Contractor must ensure that no contamination of soil or vegetation occurs around workshops and plant maintenance facilities. All machinery servicing areas	The storage and servicing of the plant in manner that is recommended in this EMPr	Contractor	Contract	Construction stage	ECO	On an on-going basis in the duration of the construction stage.

			must be bunded. Drip trays should be used to collect used oil, lubricants and other during maintenance. • Drip trays must be provided for all stationary plant. • Washing of equipment should be restricted to urgent maintenance requirements only. • Adequate wastewater collection facilities must be provided.						

14.2.15 Handling and batching of concrete and cement

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Handling and batching of concrete and cement	Use of cement	Contamination of soil Littering of the site with cement empty bags Decrease in quality of ambient air	**Objective** To use the cement in a manner that avoids the contamination of soil **Target** • Concrete batching shall only be conducted in demarcated areas which have been approved by the Proponent EO in consultation with the ECO. • Such areas shall be bunded and have an impermeable surface protection so as to prevent soil and groundwater contamination • The batching facility will not be placed in areas prone to floods or the generation of stagnant water. Access to the facility will be controlled so as to minimise potential	Cement being used in manner recommended in this EMPr	Contractor	Contract	Construction stage	ECO	On an on-going basis for the duration of construction

			environmental impacts. • Hand mixing of cement and concrete shall be done on mortarboards and/or within the bunded area with impermeable surface or concrete slab. • Bulk and bagged cement and concrete additives will be stored in an appropriate facility at least 10m away from any watercourses, gullies and drains. • All concrete washing equipment, such as shovels, mixer drums, concrete chutes, etc. shall be done within the washout facility. Water used for washing shall be restricted as far as practically possible. • Ready-mix concrete trucks must not wash out anywhere except in an area designated and approved by the Proponent EO in consultation with the ECO for this purpose. • Concrete and cement or any solid waste materials containing concrete and cement will be disposed of at a registered disposal facility. • Empty cement and bags, if temporarily stored on site, must be collected and stored in weatherproof containers. Used cement bags may not be used for any other purpose and must be disposed of at the registered disposal facility on a regular basis. • The Contractor shall periodically clean out hardened concrete from the wash-out facility or concrete mixer, which can either be reused or disposed of as per accepted waste management procedures.						

14.2.16 Transportation of materials and traffic management

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Transportation of materials	Transportation of materials	Dust; Disturbance of traffic on public roads	**Objectives** • To promote safety of workers and adjacent public road users. • To keep public roads clear of lost materials. • To protect environmental on the site from being damaged by vehicles **Target** • The movement of vehicles must be restricted within the access roads in order to avoid damage to the environment • Turning of vehicles should only take place within a clearly demarcated "turn area" located within the approved construction footprint. • The contractor must co-ordinate the loading and offloading of material during the construction phase so as to ensure that vehicular movement is in one direction only at any one time and that side-tracks are not created on the site. • Vehicles should only be parked within designated parking areas as demarcated on the site layout plan. • The Contractor is responsible for ensuring that all suppliers and delivery drivers are aware of procedures and restrictions (e.g.	No evidence of materials falling or having fallen from the contractor's/suppliers' vehicles onto adjacent public roads; Construction Vehicles being road-worthy parked in designated area on site; Vehicles not leaving the access roads	Contractor	Contract	Construction stage	ECO	On an on-going basis for the duration of construction

			no-go areas) in terms of the EMPr and other specification. • The Contractor is to ensure that all vehicles are in a road-worthy condition. • All trucks and vehicles removing spoil from the site via a public road must have load areas and must be covered by a tarpaulin (plastic/synthetic sheets (covers) to prevent rocks and spoil falling onto the road surfaces. Should the covering of vehicles not be possible, vehicles are only to be loaded to a capacity of 80% of the maximum capacity of the vehicle. If it is not possible for the contractor to comply with this requirement, a detailed method statement must be provided to the ECO for approval. • The Contractor will be held responsible for any clean-up resulting from the failure to properly secure transported materials.						

14.2.17 Dust Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Construction activities and transportation of material	Dust	Air pollution	**Objective** To minimize the pollution of air with dust **Target** • Material in transit should be loaded and contained within the load bin of the vehicle in such a way as to prevent any spillage onto	Dust controlled in a manner recommended in this EMPr	Contractor	Contract	Construction stage	ECO	On an on-going basis in the duration of the construction

			the roads and the creation of dust clouds. • If necessary, the load bin of the vehicle shall be covered with a tarpaulin to prevent dust. • Dust is to be controlled on unpaved access roads and site roads using sprayed water. • Contractors are responsible for managing dust generated as a result of their activities. • Where possible haulage distances will be minimized • Environmentally friendly soil stabilisers may be used as additional measures to control dust on gravel roads and construction areas. • Dust suppression measures will also apply to inactive construction areas. (An inactive construction site is one on which construction will not occur for a month or more). • Construction material being transported by trucks must be suitably moistened or covered to prevent dust generation. • Minimise disturbance of natural vegetation. • Water used for dust control shall only be taken from approved sources.						

14.2.18 Noise Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Movement of vehicles and construction machinery	Construction vehicles and machinery	Noise	**Objective** To minimize noise during construction activities	Minimal noise on site and no complains about noise from	Contractor	Contract	Construction stage	ECO	On an on-going basis for the duration of

during construction activities Construction Activities			**Target:** Maintenance of equipment and operational procedures: Proper design and maintenance of silencers on diesel-powered construction equipment, systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the frequency of occurrence and magnitude of individual noisy events. Placement of material stockpiles: Where possible, material stockpiles should be placed so as to protect the site boundaries from noise from individual operations. **Other mitigation Measures** • Construction activities should be restricted within normal working hours (7H00-17H00) • Sensitive social receptors shall be notified of any excessive noise-generating activities that could affect them. • Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, SANS 10103:2004, so that it will not produce excessive or undesirable noise when released • All the Contractor's equipment shall be fitted with effective exhaust silencers (where applicable) and shall comply with the South African Bureau of Standards recommended code of practice, SANS 10103:2004, for construction plant noise generation • If on-site noise control is not effective, protect the workers by ensuring that all noise-related	nearby residents					construction

			occupational health provisions are met (Occupational Health and Safety Act, (Act 85 of 1993). • No noisy construction, especially blasting, must occur at (if night work is required) without prior written consent from the nearby residents; • Blasting can be an emotive issue for residents around an excavation area. Good liaison between operator and residents is essential to prevent unnecessary anxiety. • Wherever possible, the operator should inform each resident of the proposed times of blasting and of any deviation from this programme in advance of the operations; • On each day that blasting takes place it should be restricted as far as practicable to regular periods. • The choice of appropriate drilling rigs, such as down-the-hole hammers or hydraulic drifters as opposed to compressed air drifters, will reduce the impact of noise emissions from this activity; • Each blast should be carefully designed to maximize its efficiency and reduce the transmission of noise; and • It is good noise pollution practice to not leave vehicle engines idling unnecessarily, and to remain as far as practical from any noise sensitive areas.						

14.2.19 Fire Management

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Construction activities	Flammables and combustible materials on site, Plant operating on site, Open fires made by personnel	Fire hazard	**Objectives** To maintain the site in such a way that the risk of fire will be minimized. **Target** • The Contractor shall take all reasonable and active steps to avoid increasing the risk of fire through their activities on Site. • Fires shall only be allowed in facilities or equipment specially constructed for this purpose. Fires for heating or cooking, e.g. a braai facility, shall only be permitted at a designated site at the site camp approved at the discretion of the Proponent EO in consultation with the ECO and shall be away from any flammable stores or combustible materials. Such fires shall be supervised at all times; a fire extinguisher shall be at hand as well as sufficient water to completely douse the fire after use. • A firebreak shall be cleared and maintained around the perimeter of the camp and office sites. • All conditions incorporated in the requirements of the Occupational Health and Safety Act shall be implemented. • There will be no burning of waste on site.	No fires in unauthorized locations; No unauthorised burning of wastes on site; Fire fighting equipment available accessible and serviceable; Fire response and evacuation plan available.	Contractor	Contract	Site establishment and Construction stage	ECO	On an on-going basis

14.2.20 Private land, other property and infrastructural issues

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Construction activities	Private land Existing infrastructure	Damage to private property; Damage to existing infrastructure or installations; Disruption of services	**Objectives** • To avoid any damage to private property • To avoid any damage to existing infrastructure and disruption of services • To avoid any conflict with owners of properties within and around the site **Target** • No activity on private property shall be allowed without written consent by the relevant landowner and Proponent representative and the ECO. • Any damage to private property caused by the Contractor during the construction period shall be repaired to the satisfaction of the Proponent Construction Manager. • Under no circumstances shall the Contractors engage in formal discussions with landowners without prior consent by the Proponent Construction Manager and Proponent EO. • Where pipelines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such.	No damage to existing infrastructure; No use of private land without proper consent; No damage to private property	ECO	Contract	Construction stage	ECO	On an on-going basis for the duration of the construction

			• Any damage to pipelines shall be repaired immediately. • All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Upon completion of the project all roads directly damaged by construction activities shall be repaired to their original state.						

14.2.21 Health and Safety

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Construction activities and behaviour of construction workers	Health and Safety of personnel on site	Injuries	**Objective** To ensure that the health and safety of personnel on site is not compromised **Target** The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), and its associated regulations including the drafting of a suitable Health and Safety Plan which will be implemented during the construction phase..	Adherence to the Occupational Health and Safety Act (Act 56 of 2004), and its associated Regulations,	Contractor	Contract	Construction stage	ECO/Health and Safety Officer	On an on-going basis for the construction duration

14.2.22 Social Issues

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Construction activities	Public Safety	Reduced actual personal safety; Increased hazard exposure	**Objective** To minimize the risk of members of the public being injured during construction activities **Target** • Ensure all construction equipment and vehicles are properly maintained at all times. • The construction site must be fenced off and community members must not be allowed to loiter within the construction site. • Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly. • The speed of construction vehicles and machinery in must be kept low. • Ensure that fires lit by construction staff are only ignited in designated areas and those safety precautions, such as not lighting fires in strong wilds and completely extinguishing fires before leaving them unattended, are strictly adhered to.	Less or no accidents associated with construction activities' Speed of construction vehicles and machinery kept at low level in the community areas	Contractor	Contract	Construction stage	ECO	On an on-going basis for the construction duration
Influx of non-local construction workers in the	Social pathologies	Increase in crime; Increase in	**Objective;** To mitigate social pathologies that may arise in the local community as a result of the influx of	Targets achieved	Contractor	Contract	Construction stage	ECO	On on-going basis for the duration of the

local area and their interaction with the local community		alcoholism; Increase in prostitution and infidelity; Increase in the spread of HIV/AIDS; Conflicts between non-local construction workers and the local community	construction workers **Target** • Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing; • Fence off all construction sites and control access to these sites; • Liaise with the South African Police Services (SAPS) and existing local community safety structures/systems to ensure that criminal activities are monitored; • Encourage local people to report any suspicious activity associated with the construction sites; • Prevent loitering within the vicinity of the construction sites; • Ensure that an onsite HIV and AIDS policy is in place and that construction workers have easy access to condoms; • Implement HIV / AIDS and alcohol abuse campaigns in the communities; • Before construction work commences, the contractor must be introduced to the local community and interaction with the local community with regard to their way of living and other protocols must take place; • It is recommended that a Community Liaison Officer be appointed to serve as a link between the Contractor and the local community; • Make use of local labour as far as possible						construction period

Construction activities	Physical intrusion of the project on the existing environment	Loss of sense of place	**Objective** To ensure that local people do not lose a sense of place in their area because of the construction activities **Target:** • Ensure that, at all times, people have access to their properties as well as to social facilities such as schools, churches, transport and shops; • Investigate and consult local communities on the need to provide suitable access points around the construction sites; • In order to minimize visual intrusion in visible sensitive areas Soil stockpile must be kept as low as practically possible; • Construction activities must be restricted within normal working hours in order not to subject the local community to noise at night; • The camp site for construction workers must be demolished or removed from the site at the end of the construction phase; • Ensure that local activities such as business and sports are not affected negatively by construction activities; • Liaise with leaders in those areas to ensure that any community concerns are recognised and where reasonable are swiftly addressed.	Targets achieved	Contractor	Contract	Construction stage	ECO	On an on-going basis for the duration of the construction stage
Interaction of the contractor with the local community	Employment opportunities	Creation of employment opportunities for local people and	**Objective** Ensure that employment opportunities for local people and SMMEs are maximized.	Local community members and SMMEs employed by the Contractor	Contractor	Contract	Construction stage	ECO	On an on-going basis for the duration stipulated on

		SMMEs Skills transfer from the contractor to the members of the local community	**Target** • Local residents should be recruited to fill available semi and unskilled jobs; • Women should be given equal employment opportunities and encouraged to apply for positions; • A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction; • A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase; • Liaise with local community structures (e.g. Civic structures) to identify local labour pool; • Prioritise sub-contracting to local SMEs; • Consultation with the local communities must ensure that the temporary nature of the employment opportunities is clearly communicated.						the contracts of the workers/SMMEs

14.2.23 Temporary Site Closure

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Temporary closure of the site	Construction site	Potential impacts associated	**Objective** To minimize potential impacts in the period the	Closure of the construction site done in line with	Contractor	Contract	Closure of the construction	ECO	Each time the construction

		with the closure of the site	site will be temporarily closed. **Target** • If the Site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO to confirm the following:. ✓ Fuel stores are as low in volume as possible, no leaks; ✓ Fire extinguishers are serviced and accessible; ✓ All trenches and manholes are closed and secured; ✓ Fencing and barriers in place; ✓ Security persons briefed and have facility for contact; ✓ Fire hazards identified and minimized; ✓ Material stockpiles secured; ✓ Structures vulnerable to high winds secure. ✓ Dust mitigation in place as applicable; ✓ Slopes and stockpiles stabilized; ✓ Portable toilets empty and secured; ✓ Refuse bins empty and secured and wastes removed from site; ✓ Drip trays empty & secure. • The Contractor is to ensure that all temporary closure requirements are met before leaving the site.	the requirements of the EMPr			site		site is closed for more than a week

14.3 SITE REHABILITATION AND CLOSURE

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Rehabilitation of the construction site	Rehabilitation	Construction site can be prone to more environmental damage if not rehabilitated; Materials and structures left on the construction site could pose risks to the bio-physical component of the environment. Structures left on site could continue to cause physical intrusion into	**Objectives** To rehabilitate all the damages on the construction site and to restore the site to its original state as far as practically possible. **Target** The Proponent is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998. But since the construction activities would have been undertaken by the Contractor on behalf of the Proponent, the Contractor will be responsible for rehabilitating the entire construction site upon completion of the construction work. • The Contractor will submit the rehabilitation plan for approval to the Proponent EO and the ECO six weeks before the completion of the construction works. The rehabilitation plan will include amongst others the following critical aspects:	Site rehabilitation done in line with the EMPr	Contractor and Contractor EO	Contract	End of Construction stage	ECO	Once-off

		the social environment	✓ Details of soil preparation procedures including proposed fertilisers or other chemicals being considered for use. ✓ A list of the plant species that will be used in the rehabilitation process. Note that these should all be indigenous species, and preferably species that are endemic to the area. The assistance of an appropriately qualified botanist should be sought in developing this list ✓ Procedures for watering the planted areas (frequency of watering, methodology proposed etc.). ✓ An indication of the monitoring procedures that will be put in place to ensure the successful establishment of the plants (duration and frequency of monitoring, proposed criteria for declaring rehabilitation as being successful). • The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes and not part of the permanent works is removed upon completion of the project. The site clean-up shall be to the satisfaction of the Construction Manager and the ECO. • The ECO shall undertake an						

			environmental closure inspection after the contractor has confirmed that works have been completed and provide the Contractor and Construction Manager with an inspection report of closure requirements not adequately complied with. • The ECO shall provide a final environmental closure report to the READ, the Proponent, and the Contractor after all outstanding issues have been addressed. • Exposed areas should be rehabilitated with indigenous plants to the project area as soon as construction is finished. • Following construction, rehabilitation of disturbed areas is required, especially next to the non-perennial river the sewer pipeline crosses.						

14.4 OPERATIONAL PHASE

14.4.1 Alien invasive plants management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Maintenance of the outfall sewer pipeline	Alien invasive plants	The spread of alien invasive plants within the servitude of the sewer pipeline	**Objective** To minimize the spread of invasive alien plants during the operational phase. **Target** • A plan to control the spreading of	• Operational phase invasive plants management/control	Proponent	Proponent	Operational phase	Proponent	To be determined by the Proponent as informed

			invasive plants within the servitude of the pipeline must be developed and implemented; and • Further damage to the environment because of maintenance work on the pipeline must be avoided since this may increase the chances for the alien invasive plants to re-establish themselves.	plan; and its implementation					by the plan

14.4.2 Water resources protection

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Continual use and maintenance of the sewer pipeline of water	Watercourses **(Stream and Wetland)**	Water quality may deteriorate as a result of erosion and sedimentation Contamination of water by fuel and other chemicals Contamination of water as a result of sewerage leaks	**Objective**: To minimize negative impacts on the streams during the operational phase of the sewer pipeline. **Target**: • A storm water management plan must be developed and implemented at the operational phase on a continuous basis • A erosion control plan must be developed and implemented at the operational phase on a continuous basis • Sewer monitoring and maintenance plan be developed and implemented to anticipate and remedy potential leaks and overflows before they realise.	Less pollution on groundwater and less damages to watercourses.	Proponent	Proponent	Entire operational phase	Proponent	On-going basis for the operational period

		and overflows	• Servicing of maintenance vehicles should not be done within a distance of 100 m from any natural drainage channel and wetland • An oil spillage cleaning kit must always be available when maintenance work is done on site and accidental oil spillages must be cleaned and the contaminated soil be disposed of at a registered hazardous waste site.						

14.4.3 Fire Management

Activity	**Aspect**	**Potential Impact**	**Mitigation Measures (Objective and Target)**	**Performance Indicator**	**Implementation Responsibility**	**Resources**	**Time Schedule**	**Verification Responsibility**	**Frequency**
Behaviour of sewer pipeline maintenance workers	Sewer pipeline maintenance workers	Veld fires	**Objective** To avoid the risk of veld fires during the maintenance of the sewer pipeline **Target** • No open fires must be made during the maintenance of the sewer pipeline. • Cigarettes stumps should be put off before thrown away; and • Maintenance workers must always be sensitised about the dangers of veld fires.	No fires caused by maintenance workers	Proponent	Proponent	Operational phase	Proponent	Whenever any sewer pipeline maintenance work is done

14.4.4 Domestic Waste Management

Activity	Aspect	Potential Impact	Mitigation Measures (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
Handling of domestic waste	Domestic waste	Littering	**Objective** To avoid littering during the maintenance of the sewer pipeline **Target** • Domestic waste generated during maintenance work should be collected into refuse bags for disposal into the nearest municipal waste bin in town where service of collecting waste for disposal into landfill site is rendered by the municipality. • Maintenance workers must consistently be made aware of the importance of not littering.	No littering within the servitude of the sewer pipeline	Proponent	Proponent	Operational phase	Proponent	Whenever maintenance work is done on the sewer pipeline

15 BIBLIOGRAPHY

DEAT (2004) Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Dotwana, A (2017). Fauna and Flora Assessment Report for the Adamayview Outfall Sewer Pipeline Upgrade for the City of Matlosana Municiality, North West. Johannesburg, Gauteng

Intraconsult (2017). Adamayview: Bulk Outfall Sewer Pipeline: A Geotechnical Report for Instratin for 3.7km of the Alignment. Fourways, Gauteng

Gibixego, A. (2017). Aquatic Assessment Report for the Adamayview Outfall Sewer Pipeline Upgrade for the City of Matlosana Municipality, North West. Johannesburg, Gauteng

Nemakhavhani, L. (2017). Wetland Delineation and Assessment Report for the Adamayview Outfall Sewer Pipeline Upgrade for the City of Matlosana Municipality, North West. Johannesuburg, Gauteng