38 Jacaranda Street, Arboretum, Richards Bay
P.O. Box 101672, Meerensee, 3901
Telephone: 035 789 0632 / 078 284 9332 Fax: 086 535 8846
Website: www.emveloconsultants.co.za E-mail: info@emveloconsultants.co.za

Integrity | Honesty | Excellence

DRAFT: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

REF: DC25/0007/2021: KZN/EIA/0001652/2021

The Proposed Soul City/Stafford Hill Housing Development for Formalization of Semi-formal Settlement in Majorisa, within Ward 31 of Newcastle Local Municipality, Kwazulu-Natal.

April 2022

Prepared for:

Phumaf Engineers

On behalf of:

Newcastle Local Municipality

Applicant Details:

Applicant	Newcastle Local Municipality
Contact Person	Themba Nkomzwayo
Contact Details	084 380 7834/ 034 328 7851 Themba.nkomzwayo@newcastle.gov.za
Project Principal Agent	Phumaf Engineers
Address	356 Pretoria Avenue 2194 Randburg - Johannesburg Northern Suburbs Gauteng - SouthAfrica
Contact	011 789 3727

Environmental Assessment Practitioner (EAP) Details

Name of Consultancy	**Emvelo Quality and Environmental Consultant (PTY) Ltd**
Professional affiliation body	**Pr. Sci. Nat (SACNASP)** **Environmental Assessment Practitioner (EAPASA)** **IAIAsa Affiliate member**
Name of EAP's	**Phumzile Lembede (BSc Honours: Environmental Management).** **Dumisani Myeni (BSc Honours: Environmental Management).**
Postal Address	**P.O. Box 101672, Meerensee, 3901**
Physical Address	**38 Jacaranda Street, Arboretum, Richards Bay 3900.**
Contact Numbers	**(Tel): 035 789 0632 (cell): 078 284 9332** **(Fax): 086 577 5220**
Email Address	**info@emveloconsultants.co.za**

PROJECT TEAM	CLIENT CONTACT PERSON
Phumzile Lembede	Themba Nkomzwayo
Dumisani Myeni	

Overview: Assessment of impacts related to the proposed Soul City/Stafford Hill Housing Development for Formalization of Semi-formal Settlement in Majorisa, within Ward 31 of Newcastle Local Municipality, Kwazulu-Natal.

Project Team Details	
Principal EAP	***Phumzile Lembede*** (BSc. Honours in Environmental Management) Registered: Pr.Sci.Nat (Environmental Science) & EAPASA Field: Environmental Management & Water Resource 10 Years' Experience phumizle@emveloconsultants.co.za
Study Lead	***Dumisani Myeni*** (BSc. Honours in Environmental Management) Registered: Cand.Sci.Nat (Environmental Science) Field: Environmental Management, Water Resource & Waste Management. 9 Years' Experience dumisani@emveloconsultants.co.za

QMS - INFORMATION

REPORT AUTHOR	REVIEWED BY
DUMISANI MYENI	PHUMZILELEMBEDE
ENV. CONSULTANT	ENV.CONSULTANT

QMS-REVISION HISTORY

Revision	Revision Date	Details	Authorized	Name	Position
1	12-04-2022	Final EMPr Report	Y	Dumisani Myeni	Study Lead Env. Scientist
2	20-01-2021	Final EMPr Report	Y	Phumzile Lembede	Principal EAP Env. Scientist

Table of Contents

1 INTRODUCTION 1

2 PURPOSE OF THIS DOCUMENT 1

3 OBJECTIVES OF THE EMPR 1

4 SCOPE OF THE EMPR 2

5 STRUCTURE OF THE EMPR 4

6 EMPR AS DEMING CYCLE 5

7 PROJECT DESCRIPTION 7

7.1 Proposed construction activities 7

7.2 Project Locality 8

7.3 Sensitive areas 9

7.4 Activities and aspects causing impacts 9

8 LEGAL ENFORCIBILITY OF AN EMPR AND COMPLIANCE 11

9 DUTIES OF ROLE PLAYERS 15

9.1 The Holder of Environmental Authorisation (Client / Project Proponent) 15

9.2 The Engineer (Project Principal Agent) 16

9.3 Environmental Control Officer 17

9.4 Contractor 18

9.5 Contractor's Safety, Health and Environmental (SHE) Officer 19

10 ENVIRONMENTAL CAPACITY BUILDING PLAN 21

10.1 Environmental training 21

10.2 Induction 21

10.3 Community involvement 21

10.4 Communication strategy 21

11 ENVIRONMENTAL CODE OF CONDUCT 22

11.1 Environmental Rules 22

12 NON-COMPLIANCE 24

12.1.0 Application of Penalties 25

13 PRE-CONSTRUCTION 26

13.1 Environmental file 26

13.2 Environmental Awareness Training 28

13.3 Project Planning 29

13.4 Construction site camp establishment 34
13.5 Site access and movement of construction vehicles 37
14 CONSTRUCTION PHASE 38
14.1 Storages, Stockpiling, and Material Hauling 38
14.2 Vegetation clearance 40
14.3 Protection of aquatic environment 43
14.4 Alteration of watercourses characteristics 45
14.5 Protection of fauna 47
14.6 Waste management 49
14.7 Heritage and/or archaeological sites 53
14.8 Soil Stockpiles 55
14.9 Backfilling of trenches and site levelling 56
14.10 Air quality 57
14.11 Servicing and re-fuelling of construction plants and vehicles 59
14.12 SANITATION 60
14.13 Fire prevention 61
14.14 Public safety and traffic accommodation 63
14.15 Invasive alien species 65
14.16 Noise 67
15 POST CONSTRUCTION 68
15.1 Rehabilitation and Landscaping 68
15.2 Site clean-up 69
16 OPERATION & MAINTENANCE PHASE 70
16.1 Soil Erosion 70
16.2 Flow Regime 71
16.3 Vegetation clearance during maintenance 72
16.4 Surface and Ground Water 73
16.5 Pollution and waste 74
16.6 Social distress 75
16.7 Traffic Accommodation 76
17 MONITORING 77
18 CONCLUSION 77

List of Tables

Table 1: Phases of the EMPr....4
Table 2: Project Locality....8
Table 3: Identification of potential environmental impact....10
Table 4: Applicable Listing Notices....11
Table 5: Relevant legislations and environmental aspects....13
Table 6: Non-compliance penalties....25
Table 7: Contents of environmental file....26
Table 8: Environmental communication and awareness....28
Table 9: Project planning....29
Table 10: Construction site camp establishment....34
Table 11: Access to construction site (s)....37
Table 12: Storages, stockpiling and material hauling....38
Table 13: Vegetation clearance for site camp and Housing areas....41
Table 14: Protection of aquatic environment....44
Table 15: Alteration of watercourses characteristics....45
Table 16: Fauna and red data species protection....48
Table 17: General and hazardous waste management....50
Table 18: Heritage and archaeological....53
Table 19: Soil management during excavation....55
Table 20: Backfilling of trenches and construction site levelling....56
Table 21: Air quality management....57
Table 22: Servicing and refuelling....59
Table 23: Fire prevention....61
Table 24: Road crossing, stockpiles and construction vehicle movement....63
Table 25: Control of invasive alien species....65
Table 26: Noise management during construction....67
Table 27: Rehabilitation and Landscaping of the affected areas....68
Table 28: Site clean-up and rehabilitation....69
Table 29: Soil erosion....70
Table 30: Flow regime....71
Table 31: Vegetation Clearance....72
Table 32: Surface and Ground Water....73
Table 33: Pollution and Waste....74
Table 34: Social Distress....75
Table 35: Traffic Accommodation....76

LIST OF ACCRONYM

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

GLOSSARY OF ITEMS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WETLAND: a land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

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

1 INTRODUCTION

Emvelo Quality and Environmental Consultant has been appointed by Phumaf Engineers, on behalf of Newcastle Local Municipality, as an independent Environmental Assessment Practitioner (EAP) to undertake the environmental authorization processes as required by NEMA and a host of related environmental legislation. As part of this process, this is an Environmental Management Programme (EMPr) report which will be used to promote and ensure environmental monitoring and control during the planning and design, construction, and operational phases of the proposed development, has been compiled. The contents of this EMPr have been compiled according to the prescribed legal requirements contained in Appendix 4 of the Amended EIA Regulations, 2017.

2 PURPOSE OF THIS DOCUMENT

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

3 OBJECTIVES OF THE EMPR

The objectives of this document are to:

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

- Protect indigenous flora and fauna;
- Prevent soil erosion and facilitate re-vegetation of affected areas;

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

4 SCOPE OF THE EMPR

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

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

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

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

5 STRUCTURE OF THE EMPR

Table 1: Phases of the EMPr

Categories	Project Phases	Description
Category A	Pre-Construction Phase	This section will provide guidelines on pre-construction activities including site establishment and clearance; environmental induction and training and awareness; site access and health and safety.
Category B	Construction/ site Rehabilitation Phase	This section will provide guidelines on construction methods and considerations during the development phase.
Category C	Post Construction/ Operation Phase	This section of the EMPr provides management principles for the operational phase of the Development. This will include best practice, procedures and responsibilities as required for various associated activities.

This EMPr is a dynamic document which will be updated as required on a continuous basis to ensure environmental best practices. Amendment of this EMPr should be submitted to the competent authority (EDTEA- Amajuba District Municipality).

6 EMPR AS DEMING CYCLE

This EMPr is compiled in accordance with the Deming cycle which emphasises on continuous improvement that entails the reiterative actions such as plan, do, check, and act.

ACTION	DESCRIPTION
Plan	Project-specific planning for the proposed project involves consideration of the legal triggers, the specifics of the proposed development, and the nature of the receiving environment. This provides a starting point for targeted environmental management objectives. Environmental performance indicators are then determined with measurable targets prescribed to monitor the environmental performance of the project. Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.
Do	Throughout the development's lifespan, the developer will be required to develop and maintain a Quality Management System (QMS), designed to ensure that best management practices are implemented on day-to-day management. Such a QMS should at least include the following information: • Location and extent of associated infrastructure; • Associated activities, such as the transportation of people and equipment; • Resources and experience required (staffing); • Materials and equipment to be used; • Management actions; • Construction-monitoring activities; • Emergency /disaster incident and reaction procedures; and • Rehabilitation procedures for the impacted environment.

Check	A system of assessing monitoring results has been developed to check the environmental management performance. Continuous assessment facilitates proactive management of the environmental issues. Mitigation measures can then be successfully implemented on an ongoing basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficiency of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability.
Act	The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed, and instructions will be given in order to implement these in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and should be updated regularly to address the changing circumstances during the life cycle of the project.

7 PROJECT DESCRIPTION

This general project information outlines the following:

- Proposed construction activities;
- Locality of the development;
- Identification of sensitive areas and
- Identification of potential environmental impacts.

7.1 Proposed construction activities

The proposed development will comprise of the following components:

- Development for the formalization of erven to fit approximately 3500 housing units with inclusive of the In-Situ Upgrades/ Formalizations of 1800 existing erven over an extent of more than 217 hectares;
- Development of approximately 35 153m road networks within the settlement;
- Development of bulk sewer infrastructure and reticulation of approximately 18 420m with diameter ranging from 150mm ø – 370mm ø, for a Full Waterborne Sanitation System with estimated Average Daily Wet Weather Flow of 390 kl/day;
- Development of approximately 11 300 m of new stormwater infrastructure comprises the concrete lined channel and 5 700 m Pipe Culvert;
- Development of bulk water and connector infrastructure of 315mm ø uPVC pipe of approximately 6 250 m of pipeline with a peak flow rate of 112.22l/s and approximately 12 300m reticulation network.

The project aim for formalization and densification of Soul City. The construction period is estimated to be 5years with its commissioning period estimated to be by end of 2027.

Soul City is part of the broader Majorisa settlement that represents Masondale, Jobstown, Rivermeet and Sanspence farms.

7.2 Project Locality

The site co-ordinates are as follows:

Table 2: Project Locality

Latitude /Longitude	Degrees	Minutes	Seconds
Wetland Intrusion (Portion 4)			
South	27°	45'	40.46''
East	30°	04'	41.01''
Undeveloped Portion for Vegetation Clearance (Eastern Portion: Portion 6&8)			
South	27°	45'	16.87''
East	30°	04'	57.95''
Undeveloped Portion for Vegetation Clearance (Centre Portion: Portion 4)			
South	27°	45'	23.65''
East	30°	04'	35.55''
Undeveloped Portion for Vegetation Clearance (Western Portion: Portion 3& 11)			
South	27°	45'	35.20''
East	30°	04'	19.88''
Bulk Sewer Outfall Servitude (**START**) Portion 12			
East	27°	44'	55.44"
South	30°	4'	21.87"
Bulk Sewer Outfall Servitude (**MIDDLE**) Portion 6			
East	27°	45'	21.94"
South	30°	4'	48.59"E
Bulk Sewer Outfall Servitude (**END**) Portion 11			
East	27°	45'	38.39"
South	30°	4'	18.01"

7.3 Sensitive areas

The construction corridor intercept with the flood line at western portion, and one wetland within portion 4 of the development site. The vegetation structure and species composition of the comprise singular habitat of grassland which has been severely altered, has a very low conservation value and ecological sensitivity from a floral perspective, due to pathway, informal roads and grazing. The conservational importance of the site is considered low. The proposed development will have minimum negative impacts on the receiving environment provided that environmental aspects are managed through proper adherence to environmental management program as per mitigation measures described in section 13.

The primary sensitive areas relating to this project is a wetland system found within the study area, this wetland system is classified as NFEPA wetland area identified within 500m of the proposed development footprint, it was described as a Channelled Valley Bottom. This wetland was classified as an artificial system with a wetland condition classified as severely modified therefore, this wetland units is to be demarcated using a buffer of 20m and no activity must be performed within this buffered area, and/or on the wetland unit. Any work in and around natural water bodies must be considered potentially negative and precautionary practices must be adopted.

The secondary sensitive area relating to this development is the clearance of indigenous vegetation. The vegetation type that is predominate within the project area is Income Sandy Grassland which is in the Grassland Biome. The threatened floral species that may occur in the area are Alepidea peduncularis and Stachys rivularis. Clearing of vegetation must only take place in areas that were approved for construction. Furthermore, caution must be applied to identify and preserve protected or indigenous vegetation.

7.4 Activities and aspects causing impacts

Potential negative impacts that are likely to occur during the construction and operational phases are outlined on (***Table 2***) below.

Table 3: Identification of potential environmental impact

#	Proposed construction work activity	Potential negative impact
1	Site camp establishment	Clearance of natural vegetation, pollution, and accommodation of traffic (bio-physical environmental and social impact).
2	Vegetation clearance and excavation work	Clearance of geological features, clearance of indigenous vegetation, uncovering of cultural artifacts during excavations. Dust generation (Biophysical and social impact).
3	Open excavation and placing of material stockpiles	Stockpiles within watercourse, Pollution on water bodies (bio-physical environmental impact). Soil erosion, and disturbance of traffic flow (social impact).
4	Construction activities.	Soil erosion, infestation of Alien vegetation, air, water, and land pollution. Distraction of natural vegetation, solid and hazardous waste. Traffic impact and restricted access to households, disturbance of traffic flow (social impact).

8 LEGAL ENFORCIBILITY OF AN EMPR AND COMPLIANCE

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

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

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

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

Table 4: Applicable Listing Notices

Listing Notice	Activity	Description and Applicability
1 (GNR 327)	9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; ***Applicability*** It is estimated that approximately 11 300 m of new concrete lined channel and 5 700 m Pipe Culvert for storm water will be required for the Soul City development.

1 (GNR 327)	10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; ***Applicability:*** For the development of bulk sewer infrastructure and reticulation of approximately 18 420 m with diameter ranging from 150mm ø – 370mm ø, for a Full Waterborne Sanitation System with estimated Average Daily Wet Weather Flow of 390 kl/day.
1 (GNR 327)	12	The development of- Infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; ***Applicability:*** The north-western development boundary intrudes the 32m wetland buffer coverage. Also, there is a National Freshwater Ecosystem (NFEPA) Wetland within portion 4 of the proposed development site.
1 (GNR 327)	19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from ─ (i) a watercourse; ***Applicability:*** The north-western development boundary intrudes the 32m wetland buffer coverage. Also, there is a National Freshwater Ecosystem (NFEPA) Wetland within portion 4 of the proposed development site. Therefore, it is

		anticipated that the development of the bulk infrastructure will involve excavation works which will result in more than 20m^3 of spoils from excavation and infilling for instillation of bulk infrastructure within the wetland coverage.
2 (GNR 325)	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan' ***Applicability:*** The development will involve: The clearance for the formalisation of erven to fit approximately 3500 housing units with inclusive of the In-Situ Upgrades/ Formalizations of 1800 existing erven; The clearance for construction of 17.153km municipal roads, and bulk infrastructure. The clearance will take place over an extent of more than 217 hectares.

Table 5: Relevant legislations and environmental aspects

#	Legislation	Environmental Aspect
1.	Constitution of South Africa (Act No 108 of 1996)	Environmental rights of the local community
2.	National Environmental Management Act, 1998 (Act No. 107 of 1998);	Duty of care; reasonable measures; reporting of incidents; protection of workers; environmental whistleblowers; private prosecution; criminal proceedings; fines; EIA regulations
3.	Environmental Conservation Act, 1989 (Act 73 of 1989)	Establishment of waste sites; littering
4.	National Environmental Management: Biodiversity Act (Act No 10 of 2004);	Plants, animals, threatened or protected species (TOPS)

5.	National Environmental Management: Waste Act. 2008 (Act No 59 of 2008)	Waste generation, storage, and disposal
6.	The National Water Act, 1998 (Act 36 of 1998);	Watercourses (wetlands); water use
7.	Hazardous Substances Act (Act No 15 of 1973)	Hazardous substances and chemicals
8.	Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965);	Vehicle and machinery emissions
9.	National Environmental Management: Air Quality Act (Act 39 of 2004);	Emissions include dust generation
10.	National Heritage Resources Act (Act 25 of 1999)	structures older than 60 years, archaeological (human remains, wrecks, rock art, artefacts of military history older than 75 years) or paleontological (fossil remains of animals or plants) or any meteorite or graves
11.	The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983);	Soil erosion; spreading of weeds (alien invasive plants)
12.	Advertising on Roads and Ribbon Development Act (Act 21 Of 1940)	Litter along public roads
13.	National Building Regulations and Building Standards Act (Act 103 of 1977)	Erection of buildings; building standards
14.	Occupation Health and Safety Act (Act 85 of 1993)	Safety of workers and the public
15.	Fencing Act (Act 31 Of 1963)	Accessing properties; fences; farm gates
16.	Public Finance Management Act (Act 1 of 1999	Fruitless, wasteful, and irregular expenditure arising from environmental incidents or non-compliance to EA/EMPr

9 DUTIES OF ROLE PLAYERS

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

9.1 The Holder of Environmental Authorisation (Client / Project Proponent)

The Client (Newcastle Local Municipality) is the holder of the EA and is responsible for the implementation of the conditions of the authorization as well as the management measures contained in the approved EMPr (this report). In terms of NEMA, Section 28 (1) the construction of the pipelines and the associated infrastructure and the issuing of the EA implies that harm to the environment is authorised by law. Additionally, due to the need in the community for this essential service, such impacts cannot reasonably be avoided or stopped. All liabilities associated with the land will lie with the registered landowner. The holder is ultimately liable for the potential impact of the activities that are undertaken and is tasked with effective management of these impacts.

The holder of the EA is accountable for:

- Appointment of an Environmental Control Officer (ECO) as may be required for monitoring of implementation and compliance of the EA and EMPr during the construction phase;
- Ensuring that all conditions of the EA and EMPr are complied with;
- Ensuring that all the necessary environmental licences and permits are in place before any construction activity can begin in an affected part of the project area/route;
- Appointing a contractor required for the management of environmental impacts, such as waste management and monitoring of any other required activity;
- Assessment of all activities requiring special attention as specified and /or requested by the Project Principal Agent (PPA) or Project Manager (PM) and/or ECO for the duration of the contract;

- Ensuring that the Contractor conducts all activities in a manner that minimizes disturbance to the directly affected residents and public in general, as advised by the PPA and/ or ECO; and
- To order the Contractor, through the PPA, to suspend any or all works on-site if the Contractor or his subcontractor/supplier fails to comply with the any environmental specifications the EA and the EMPr.

9.2 The Engineer (Project Principal Agent)

Phumaf Engineers is the PPA for the proposed development of Soul City/Stafford Hill Houses for Formalization of Semi-formal Settlement in Majorisa, within Ward 31 of Newcastle Local Municipality, Kwazulu-Natal.

The PPA has overall responsibility for environmental management on site which includes the implementation of the provisions of this EMPr. Therefore, the PPA roles and responsibilities include the:

- The appointment of an ECO that will monitor the implementation of the CEMP;
- Overall responsibility for the implementation of the EMPr;
- Assessment of all activities requiring special attention as specified and /or requested by the ENG and/or ECO for the duration of the contract; and ensures that the Contractor conducts all activities in a manner that minimizes disturbance to the directly affected residents and public in general, as advised by the ENG and/ or ECO.
- Ensuring that the Site Manager/Engineer and the Contractor/Operator are aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regard to the environment;
- Ensuring that all stipulations within the EMPr are communicated and adhered to by Site Manager/Engineer and the Contractor/Operator;
- Assessing the Contractor's environmental performance in consultation with the ECO, and communicating directly with the Contractors on environmental issues observed on site;

- Liaising with the Contractor on the matters concerning the environment, and issuing of the non-conformance notifications to Contractors in consultation with the ECO;
- Arranging information meetings for and consulting with I&AP's about the impending construction activities;
- Maintaining a register of complaints and queries by members of the public at the site office. This register is to be forwarded to the ECO on a monthly basis;
- Ensuring the documentation of the state of the site prior to the commencement of construction activities, in conjunction with the Contractor;
- Preventing actions that will harm or may cause harm to the environment, and take steps to prevent pollution of the site;
- Reviewing and approving construction methods where necessary; and
- Instructing the Contractor to suspend any or all works on-site if the Contractor or his subcontractor/supplier fails to comply with the environmental specifications, and conditions of the EA or the EMPr.

9.3 Environmental Control Officer

The Environmental Control Officer (ECO) Should be appointed by the PPA (on behalf of Newcastle Local Municipality) has the responsibility for audit and enforce compliance with the EA and EMPr and undertaking regular monitoring of the site. The ECO is responsible for conducting the environmental audits, during the construction phase of the project, according to the provisions of the EMPr, CEMP and the EA.

The following are the duties of the ECO:

- To understand the background of the project and ensure the implementation of the EA conditions and the EMPr;
- To monitor the implementation of the EA conditions and the EMPr;
- To advise the PPA about the interpretation, implementation, and enforcement of the EA and EMPr and other relevant environment-related matters;
- To brief the Contractor about the requirements of the EA, Environmental Specifications and the EMPr, as applicable;

- To monitor and report to the PPA on the performance of the Contractor and the project in terms of environmental compliance;
- To be fully conversant with all related environmental legislation and ensure compliance;
- To ensure that all the environmental requirements contained within the EMPr are adhered to;
- To report all non-compliances with the EA and EMPr to the relevant authority, after consultation with the PPA;
- To regularly liaise with the Site Manager on matters relating to the environment; and
- To compile monthly reports as to the implementation of the EMPr which should include a percentage compliance status to the EA and EMPr conditions.

9.4 Contractor

The Contractor shall comply with the requirements of the EA and EMPr and abide by the PPA's/PM's and ECO 's instructions regarding the implementation of the EMPr. The contractor shall:

- Comply with all applicable legislation;
- Be conversant with the requirements of the EA and the EMPr and ensure 100% compliance to all conditions therein;
- Induct and educate all staff, including sub-contractors, about the requirements of the EA and EMPr;
- Ensure that sub-contractors/suppliers who are utilised within the context of the contract comply with the environmental requirements of the EA and EMPr. The Contractor will be held responsible for non-compliance on their behalf;
- Supply the method statement for all activities requiring special attention as specified and/or requested by the Engineer or ECO during the duration of the Contract;
- Inform and educate their employees about the environmental risks of their work and the way their tasks must be performed in order to avoid causing significant pollution or degradation of the environment (environmental training); and retain records of such training undertaken

- Bear the costs of any damages/ compensation resulting from non-adherence to the EA and EMPr or written site instructions;
- Conduct all activities in a manner that minimizes the disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment; and
- Ensures that the PPA is timeously informed of any foreseeable activities that will require input from the ECO.

9.5 Contractor's Safety, Health and Environmental (SHE) Officer

The Contractor shall appoint a Safety, Health and Environmental (SHE) Officer or an equivalent resource with the documented responsibility and letter of appointment for environment-related issues on this project, before commencement of any work on site. Such a resource will be responsible to ensure implementation of the requirements of the EA, EMPr, EMP, SES and PES where applicable. The contractor's SHE Officer should have relevant environmental qualifications and experience required for the project.

The Contractor's SHE Officer will liaise with the ECO appointed by developer or the PPA.

The responsibilities of the Contractor's SHE Officer are to:

- Be fully conversant with the CEMP, EMP, SES, PES and other relevant environmental requirements;
- Be fully conversant with the EA and EMPr, and ensure 100% compliance to all conditions therein;
- Be fully conversant with all relevant environmental legislation applicable to project, and ensure 100% compliance;
- Compile Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the CEMP will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the CEMP are achieved;
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor by means of conducting ongoing Environmental

Awareness and Training of the Contractor's site personnel through the means of toolbox talks and other means of communication;

- Undertake daily and weekly inspections of the work area(s) as per schedule or authorised through written instruction by PPA or ECO;
- Ensure conformance/compliance to the EMPr, licenses, and permits and approved Environmental Method Statements;
- Monitor and verify that negative environmental impacts are kept to a minimum, as far as possible;
- Report any non-compliance or remedial measures that need to be applied to the ECO and PPA, in line with the requirements of the EMPr;
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EA and EMPr;
- Maintain an environmental management file and all relevant documentation and records related to environmental management;
- Maintain a hazardous substances register; and
- Present a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.

10 ENVIRONMENTAL CAPACITY BUILDING PLAN

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

10.1 Environmental training

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

10.2 Induction

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

10.3 Community involvement

The line of communication between the Contractor, proponent and the community must be defined before the Contractor proceeds with the construction activity. Residents must be notified 30 days before the construction of the Soul City housing commences. A register of public concerns complains, and suggestions must be always kept on site for the ECO to review during monthly compliance monitoring sessions and must be presented at monthly project team meeting.

10.4 Communication strategy

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

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

11 ENVIRONMENTAL CODE OF CONDUCT

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

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

11.1 Environmental Rules

The environmental rules apply to all personnel on site to:

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

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

12 NON-COMPLIANCE

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

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

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

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

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

12.1 Application of Penalties

Where environmental damage has occurred, a pollution incident, and/or failure to comply with any of the environmental specifications contained in this EMPr, the developer and/or contractor shall be held liable.

Application of a penalty clause to the contractor will apply for incidents of non-compliance. The penalty imposed will be per incident and will be deducted from the Contractor's monthly payment certificate. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be:

Table 6: Non-compliance penalties

Failure to demarcate working areas	R4,000
Working outside of the demarcated area	R4,000
Failure to strip topsoil with intact vegetation (where applicable)	R4,000
Failure to stockpile topsoil correctly	R4,000
Failure to stockpile materials in designated areas	R2,000
Failure to take measure to control dust dispersion on site	R2,000
Failure to provide adequate sanitation for labourers	R2,000
Failure to erect temporary fences/shade cloth	R2,000
Failure to provide adequate waste disposal facilities and services	R4,000
Washing of vehicle on site	R4,000
Nuisance to neighbours by Construction staff	R2,000
Failure to control storm water run-off	R4,000
Failure to rehabilitate disturbed areas within the specified timeframe	R4,000
Any contravention of the requirements of DEDTEA	R4,000
Any other contravention of project specific specification	R2,000
Any other contravention of environmental specification	R2,000

13 PRE-CONSTRUCTION

13.1 Environmental file

Table 7: Contents of environmental file

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

• All audit reports and weekly site inspection reports • Complaints Incident Register • EMPr, CEMP, PES as supplied by PPA, and EMP by Contractor • Signed Declaration of Understanding • Other Environmental Standards required for this project • Contractor's information • Contractor's Environmental Method Statements • Contractor Environmental Policy • Contractor Organogram • Appointment of Contractor' SHE Officer and Declaration of Understanding (Including CV) • Schedule of Contractor' Plants and Equipment • MSDS and Hazardous Substance Register • Emergency Contact Register						

13.2 Environmental Awareness Training

Table 8: Environmental communication and awareness

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

13.3 Project Planning

Table 9: Project planning

Impact Management Outcome: Project plans prevents unnecessary environmental degradation, loss of fauna and flora SCC, damage to heritage resources and social distress.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
DAMAGE TO NATURAL VEGETATION • Prevent unnecessary damage and disturbance to natural vegetation due to poor planning by developing a site layout and clearly demarcate the servitude for construction corridor. Appointing an ECO, demarcating the no go area and developing a plan to rehabilitate disturbed areas after construction phase.	PM & CM	Site demarcation and establish no-go areas. Rehabilitation plan	Pre-Construction phase	ECO	Monthly	Checklist, photographs, and adherence to site project layouts and rehabilitation plan.
LOSS OF FLORA SCC • Ensure that the loss of plant Species of Conservation Concern (SCC) is minimized as much as	PM & CM	Conservation line to prohibit access. Site demarcation, Checklist, Buffer and site rules	Pre-Construction Phase	ECO		Checklist, photographs, and adherence to site project layouts

possible. This can be ensured by appointing Appoint the ECO to survey the site prior clearance for possible screening of red data species within the construction corridor.						
LOSS OF FAUNA SCC • Prevent loss of fauna species of conservation concern (SCC) when clearing vegetation. Appointing an ECO to survey the site for fauna SCC, developing a site layout plan that points out no go areas on site, Also, design a 20m layout buffer on the valley bottom wetland. These measures will ensure that fauna SCC are protected on site.	PM & CM	Conservation line to prohibit access. Site demarcation, Checklist, Buffer and site rules	Pre-Construction Phase	ECO		Checklist, photographs, and adherence to site project layouts
DEGRADATION OF WATERCOUSE HABITAT • Project planning should ensure the protection of watercourses from degradation, this can be done by developing buffer at least 20m from channel valley bottom	PM & CM	Construction site demarcation, establish no-go zones. Implement site environmental rules	Pre-Construction Phase	ECO		Site demarcation, checklist, and Photographs during clearance and records of dates of excavation works within the riparian.

wetland to protect wetland habitat and ecological corridor, and mark as no go area. Also, by scheduling the work to be done within wetland habitat to be carried out during dry period with low precipitation/ most favourable during dry season/ winter.		Rehabilitation plan.				Site Environmental Rules. No run-off
GEOLOGICAL INSTABILITY • Prevent water pounding, seepage and soil erosion due to poor planning. • Design adequate stormwater management system comprise surface and subsurface drainage for continual drainage of proposed settlement site to prevent seepage and geological instability because of ponding and sinkholes.	PM and CM	The use of Just in Time (JiT) production model, Stormwater management plan and engineering designs.	Pre-Construction Phase	ECO	Pre-Construction Phase	Best construction practice, and adherence to project designs. No signs of erosion and Photographs.
DISTARBANCE OF HERITAGE RESOURCES • Construction planning should ensure protection of heritage resources.	PM, CM and Social Facilitator	Community Participation and Site planning, Site screening and site Rules	Pre-Construction Phase	ECO	Pre-Construction Phase	Checklists, Photographs & Complains register.

• Engage with the households adjacent to project footprint for assistance in identifying all unmarked grave that could be on the section development, and review designs to prevent intrusion into grave sites, by designs that will re-route activities at least 30 metre buffer. Such areas must be marked as "No-Go" areas.						
SOCIAL DISTRESS • Minimize distress on residents due to possible household relocation. • This can be done by conceptualizing a Households Relocation Plan, conduct an in-depth community engagement during project inception phase. The Households Relocation Plan must aim to eliminate the risk of displacements that may be caused by the process of relocating household from one place to another.	PM, CM and Social Facilitator	Relocation Plan and Community engagements.	Pre-Construction Phase	ECO	Pre-Construction Phase	Complains register.

• Design to prioritize the in-situ upgrading, and relocation be only for those households within flood lines and bulk infrastructure servitude.						

13.4 Construction site camp establishment

Table 10: Construction site camp establishment

Impact Management Outcome: Site camp establishment to have minimal environmental impacts for the duration of the project						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Should the site camp be established on private property, consent letter should be obtained from the property owner and should be placed in the environmental file as well.	PP & PM	Client to obtain landowners consent	Prior to site establishment	ECO	Once	Permission to Occupy (PTO) Letter
• Site camp should be preferably established on disturbed areas and not in environmental sensitive areas. • Site camp should be established at least 100m away from any watercourse.	PM, CM & ECO	Client or Local authorities to designate the area for site camp. PM, CM & ECO prior site visit.	Prior to site establishment.	ECO	Once	Permission to Occupy (PTO) Letter, and photographs of prior to site establishment.
• Disturbance or damage to indigenous vegetation when clearing the site must be minimized as much as possible.	PM, CM & SHE Officer	Buffer and mark all red data plant species	Prior to site establishment, and during the project	ECO	Monthly	Photographs prior to site establishment, measured with current status

• Topsoil must be striped together with grass / groundcover from all areas where temporary structures are located, and stockpile topsoil.	PM, CM & SHE Officer	Rehabilitation Plan	During site establishment	ECO	Monthly	Images and adherence to rehabilitation plan.
• Always maintain the site camp perimeter fence. • Allow for fauna migration. Fencing must not obstruct the species migration corridors.	PM, CM, & SHE Officer	Site Camp layout plan. Ensure that correct fence is used, as well as away from migration corridors	During site establishment	ECO	Monthly	Images, and Construction Site Camp layout plan
SITE CAMP • The construction site camp must have: Site office, demarcated site for parking and maintenance of vehicles, refuse bins and skips, employee welfare facilities (ablution, shelter, water), refueling area and sign; designated smoking area.	PM, CM, & SHE Officer	Construction Site Camp layout plan	During site establishment	ECO	Monthly	Images and adherence to Construction Site Camp layout plan.
SANITATION AND ABLUTION • Mobile chemical toilets must be provided onsite, with a minimum ratio of one toilet per 15 staff members, male and female separately.	PM, CM and SHE Officer	Provision of toilets close to working areas during the project.	Duration of a project	ECO	Monthly	Images, Service Certificates and service agreement letter.

• Mobile toilet must be serviced at regular intervals by approved service provider and be place not closer than 100m away from watercourses.						

13.5 Site access and movement of construction vehicles

Table 11: Access to construction site (s)

Impact Management Outcome: Access to sites have zero to minimal environmental impacts for the duration of the project.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The use of existing access routes to construction areas should be encouraged where possible. • Construct approved vehicle turning areas, and erect relevant road safety signage at strategic points to accommodate traffic. • Landowner's consent needs to be obtained if the contractor will use private property as access route to other properties. • Temporary access roads must be rehabilitated after usage. • Construction staff may only use authorized paths and roads. • Rehabilitate the access road upon completion of the construction period.	PM, CM, ECO, and SHE Officer	Permission of access. Implement rules to be applied to all drivers including the delivery personnel. Temporary road signs.	Initial contracts meeting	ECO	Monthly	Accommodation of traffic/ no incidents. Site rules and registers. Photographs, and permission of access. Adherence to rehabilitation plan.

14 CONSTRUCTION PHASE

14.1 Storages, Stockpiling, and Material Hauling

Table 12: Storages, stockpiling and material hauling

Impact Management Outcome: All The storage, stockpiling and transportation of all hazardous materials will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Hazardous materials must be stored in a secure storage and have MSDS. • Hazardous material must be stored in secure tight containers on liquid tight flooring to prevent seepage into the ground. • Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected. • All diesel and other liquid fuel, oil and hydraulic fluid must be stored in appropriate storage tanks or in bowsers.	CM & SHE Officer	Restricted access to hazardous materials	Construction Phase	ECO	Monthly	Photographs, MSDS and Hazardous Chemical Substances (HCS) list

• An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance. Also, must be available at all times; • The responsible operator must have the required training to make use of the spill kit in emergency;	CM and SHE Officer.	Fuel and other hazardous materials must be stored on a bunded area.	Construction Phase	ECO	Monthly	Photographs
• Stockpiles and storage yards must be demarcated in areas already disturbed or where they will cause minimal disturbance. • Stockpiles should not exceed 1.5 meters and should not obstruct natural water pathway. • Waste storage must be stored so as to prevent leakages or being blown away, preferably undercover to prevent runoff from rains. • Stockpiles stored in the working areas should not obstruct access routes or pathways used by the community.	ECO, SHE Officer & CM	Checklist for storage and stockpiling. Demarcate areas and limit these activities to single sites only.	Construction Phase	ECO	Monthly	Photographs and checklists
• All bulk material must be stored on site camp and move to sites	CM & SHE Officer	Checklist for Material Onsite.	Construction Phase	ECO	Monthly	Photographs and checklists

only when required to avoid causing traffic in the area. • All fine products must be covered during transportation and storage		Just In Time (JIT) for production method.				
• Adequate fire-fighting equipment must be made available at all hazardous storage areas;	CM & SHE Officer	Having adequate fire extinguishers on all storage areas.	Construction phase	ECO	Monthly	Checklists and Photographs

14.2 Vegetation clearance

Table 13: Vegetation clearance for site camp and Housing areas

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Vegetation clearance for construction of housing settlement, associated bulk infrastructure and site camp must be minimal, and be limited only to development servitude, as approved by the project plans and site layout.	PM, CM & SHE Officer	Site demarcation and establish no-go areas. Rehabilitation plan	Construction Phase	ECO	Monthly	Checklist, photographs, and adherence to site project layouts and rehabilitation plan.
• Clearance within the watercourses (channel valley bottom wetland habitat) must be limited to only clearing areas along 20m buffer servitude as demarcated and approved by project plans.	PM, CM & SHE Officer	Site demarcation and establish no-go areas. Rehabilitation plan	Construction Phase	ECO	Monthly	Checklist, photographs, and adherence to site project layouts and rehabilitation plan.
• Contractor must ensure that All Red Data trees, plants or wildlife are identified and measures to protect them are in place.	ECO, SHE Officer & CM	Conservation line to prohibit access to them.	Construction Phase	ECO	Monthly	Photographs and checklists

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Only the approved existing access road must be used, and vehicles must not traverse virgin land.	CM & SHE Officer	Site rules	Construction Phase	ECO	Monthly	Site rules, no unauthorized access roads
• The project site must be surveyed prior to construction for identification of plant SCC. And Establish buffer to section with plant SCC and declare it a no-go area. • If possible, the plant species of conservation concern must not be removed or disturbed. Approval must be obtained from the ECO, before any disturbance or removal of plant species identified as SCC be relocated, by a specialized Botanist.	CM, ECO & SHE Officer	ECO to conduct site survey along the pegged pipeline route before clearance and excavation. Buffer sensitive areas to prevent any encroachment.	Construction Phase	ECO	Monthly & *Ad hoc* basis	Checklist and photographs.

Impact Management Outcome: The removal and/or disturbance of natural vegetation will be kept to a minimum to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The project boundary must be demarcated and vegetation clearing as well as topsoil removal must be limited to site only.	CM & SHE Officer	Site rules. Adherence to construction footprint	Construction Phase	ECO	Monthly	Adherence to construction footprint

14.3 Protection of aquatic environment

Table 14: Protection of aquatic environment

Impact Management Outcome: Zero to minimal environmental impacts on watercourses.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• All wetlands must be demarcated and regarded as no go areas. • Sedimentation of nearest wetlands must be avoided by limiting vegetation clearance and excavation along the wetlands. • Where practical, the use of machinery must be minimized within the 20m buffer of the wetlands. • Excavation work must not be done during a high rainfall period. The excavator be only position as far as possible within a riparian/riverbank. • All clearance and excavation within the vicinity of channel valley bottom wetland for the purpose of bulk infrastructure must be limited to areas as	CM & SHE Officer	Construction site demarcation, establish no-go zones. Implement site environmental rules Rehabilitation plan.	Construction Phase	ECO	Monthly	Site demarcation, checklist, and Photographs during clearance and records of dates of excavation works within the riparian. Site Environmental Rules. No run-off

demarcated and approved by project plans.						
• The watercourse must be protected from direct and indirect spills, and debris from entering watercourse. • Under no circumstances should there be disposal of any substance within the watercourse buffer.	CM & SHE Officer	Site rules Spill contaminant procedures ECO to conduct the Water quality monitoring.	Construction Phase	ECO	*Ad hoc* basis	Photographs and checklists. Adherence to CEMP. Downstream Water Quality.
• Sediment barriers such as silt nets must be installed in areas sensitive to erosion to prevent stream siltation.	CM & SHE Officer	Storm water management plan.	Construction Phase	ECO	Monthly	Photographs and checklists. Downstream Turbidity (water quality) and *in-sutu* run-off.

14.4 Alteration of watercourses characteristics

Table 15: Alteration of watercourses characteristics

Impact Management Outcome: Zero to minimal impact as a result of soil removal and/ infilling or deposition within a watercourse.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The best use of engineering designs to prevent alteration of flow regime within the vicinity of the wetlands.	PM & CM	Engineering design	Construction Phase	ECO	Monthly	Best construction practice, and adherence to project designs.
• Stormwater management measures should be implemented in order to prevent the siltation and sedimentation of nearby watercourse during a rainy period.	CM& SHE Officer	Stormwater management plan *In-sutu* Stormwater systems	Construction Phase	ECO	Monthly	Photographs and checklists.
• All excavation at riparian should not be undertaken during wet (rainy) periods or peak flow condition.	CM & SHE Officer	Site rules	Construction Phase	ECO	Monthly	Site rules, no signs of banks incision by erosion.
• Excavations must not be left open for an extended period, and must not be undertaken until such time that all required materials are	CM	The use of Just in Time (JiT) production model	Construction Phase	ECO	Monthly	Adherence to, Construction Method statement,

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

14.5 Protection of fauna

Table 16: Fauna and red data species protection

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• The project area must be surveyed for potential animal SCC prior to construction to locate, capture and relocate any animal SCC. • Before vegetation clearance commences, the site must be inspected for birds that mighty forage along the construction footprint.	CM & SHE Officer	Checklist, Buffer and site rules	Construction Phase	ECO	Monthly	Site rules. Checklist and Photographs.
• All construction activities must take place within an area demarcated for the development.	SHE Officer & CM	Construction site demarcation. Establish No-go zone.	Construction Phase	ECO	Monthly	Site rules. Checklist and Photographs.
• The Contractor must ensure that the work site is kept clean, tidy and free of rubbish at all times, to prevent attracting animals and pests.	SHE Officer & CM	Waste management	Construction Phase	ECO	Monthly	Photographs, receipts (registers), checklists. Site Rules

Impact Management Outcome: Zero to minimal negative environmental impacts on all fauna and red data species.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Poaching or killing of domestic animals is strictly prohibited.	SHE Officer & CM	Site rules	Construction Phase	ECO	Monthly	Environmental Rules Attendance Register.

14.6 Waste management

Table 17: General and hazardous waste management

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
General waste management: • The construction site must have sufficient bins for waste disposal. Refuse must be removed regularly to licensed landfill sites. • Disposal certificates need to be kept in the Environmental File. Waste that is produced must be kept on-site and managed to prevent nuisance such as litter and dust. • Waste bins need to be emptied/collected weekly. • Under no circumstances should waste get dumped on skips dedicated for community use.	CM & SHE Officer	Integrated Waste Management approach: segregation of waste into separate bins	Construction Phase	ECO	Monthly	Photographs, waybills (receipts) checklists. Site Rules.
Hazardous waste: • Hazardous waste must be stored in a secured waste receptacle. All	SHE Officer & CM	Hazardous Waste Management	Construction Phase	ECO	Monthly	Waste manifest, disposal certificates,

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
material contaminated with oils or hazardous material must be disposed of as hazardous waste. • Waste bins need to be emptied preferably weekly to avoid attracting animals and pests. • Hazardous waste must be disposed of at a licensed facility and all records & disposal certificates needs to be kept in the Environmental File.						Registers, Checklist, and Photographs.

Impact management Outcome: All general and hazardous waste will be managed to ensure zero to minimal negative environmental impacts.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
Health Care (medical) Waste • The site should have a separate "one-way" waste bins to dispose of medical waste. Medical waste should not be mixed with any other waste. • Waste bins must be clearly marked and stored in safe place. • Waste bins need to be emptied weekly to a registered landfill site. • Medical waste must be disposed at the designated landfill site. • Service provide for collection of waste must provide proof of safe disposal at approved waste facility.	SHE Officer & CM	Health Care Waste Management Plan	Construction Phase	ECO	Monthly	Waste manifest, disposal certificates, Registers, Checklist, and Photographs.

14.7 Heritage and/or archaeological sites

Table 18: Heritage and archaeological

Impact Management Outcome: Zero to minimal negative environmental impacts on heritage resources, especially graves						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Special care must be taken during the digging and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers. • If any artefact is discovered on site, work in the immediate vicinity shall be stopped immediately. • Immediately report such discoveries to the ECO who will inform the KwaZulu-Natal Amafa and Research Institute. • Work may only resume once clearance is given in writing.	PM, ECO, CM, SHE Officer & Heritage Practitioner	Site rules	Construction Phase	ECO	Monthly	Checklist, reports and photographs.
• The construction site camp must be established away from grave sites or suspected grave sites at a	PM, CM, ECO	Site screening and obtaining PTO.	Pre-construction (site establishment).	ECO	Once	PTO Letter, and photograph.

Impact Management Outcome: Zero to minimal negative environmental impacts on heritage resources, especially graves						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
distance of at least more than 50m from the nearest grave.						
• Regular Archaeological Watching Briefs should be carried out during construction in case any chance findings are made.	PM, CM, ECO	Site screening	Construction Phase	ECO	Monthly	Photographs and checklists
• Engagement with the households around the project area for assistance in identifying all unmarked grave that could be in project footprint. 50 metres buffer should be created, and such areas must be marked as "No-Go" areas.	PM, CM, & Social facilitator	Community Participation and Site planning	Construction Phase	ECO	Monthly	Meeting attendance register

14.8 Soil Stockpiles

Table 19: Soil management during excavation

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

14.9 Backfilling of trenches and site levelling

Table 20: Backfilling of trenches and construction site levelling

Impact Management Outcome: Soil conservation and prevention of soil erosion						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• Excess sand and soil resulting from levelling activities of the work area should be stored in low heaps (less than 2m in height) either on the access road or already disturbed area.	CM & SHE Officer	Checklist	Construction Phase	ECO	Monthly	Checklist and photographs.
• If there is requirement for backfill material, they must be imported from an approved borrow pit.	CM & SHE Officer	Checklist and Rehabilitation Plan.	Construction Phase	ECO	Monthly	Checklist, Waybills and photographs.

14.10 Air quality

Table 21: Air quality management

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

Impact Management Outcome: Air pollution is minimized through the application of dust prevention measures and good vehicle maintenance						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible Person**	**Frequency**	**Proof of compliance**
• All fine products must be covered during transportation.	CM & SHE Officer	Site Rules and Checklist	Construction Phase	ECO	Monthly	Checklist and photographs.
• Under no circumstances should there be open fires at construction sites. • Cooking must be done at designated areas under controlled conditions to avoid spreading of fires.	CM & SHE Officer	Site Rules	Construction Phase	ECO	Monthly	Photographs. Zero complaints

14.11 Servicing and re-fuelling of construction plants and vehicles

Table 22: Servicing and refuelling

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

14.12 SANITATION

Management Outcome: clean and well-maintained toilet facilities are available to all staff so to minimize the risk of disease and impact on the environment.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Construction workers must make use of ablution facilities all the times, and under no circumstances may nearby houses ablutions, open areas or bushes be used as a toilet facility.	PM and SHE officer	Strict rules on the use of the provided ablution facilities.	Ongoing	ECO	Monthly	Images, filling records. Environmental complains register
• Toilets must be located no closer than 100m to any water body. • Toilets must be secured to ground to prevent them from toppling.	PM and SHE officer	Toilets must be kept in good working condition and cleaned regularly.	Ongoing	ECO	Montly	Images, filling records.
• No spillage must occur when the toilets are cleaned or emptied.; • Toilets must be emptied on a regular basis (weekly) by a competent service provider. The service provider must provide proof from the Wastewater treatment Works (WWTW) where Ablution waste is emptied. Waybills should be kept inside the environmental file.	Project manager and SHE officer	Toilets must be kept in good working condition and cleaned regularly.	Ongoing	ECO	Once a month	Images, filling records.

14.13 Fire prevention

Table 23: Fire prevention

Management Impact Outcome: Prevention and control of fires and the spread of fires						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Under no circumstances there be fire on site camp and working area. • The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores. Such as a serviced fire extinguisher • No open fires for heating or cooking will be permitted on site, unless otherwise agreed and then only designated areas, under controlled conditions.	CM & SHE Officer	Site Rules, Checklist and Emergency Preparedness Plan	Construction Phase	ECO	Monthly	Checklist, Photographs, Zero Incidents
• Smoking must be prohibited in the vicinity of flammable substances • A designated area for smoking should be established on site, away 30m away from Hazardous substance storage area.	CM & SHE Officer	Site Rules and Designated Smoking Areas	Construction Phase	ECO	Monthly	Photographs Checklists
• The workforce must be regularly made aware of fire prevention and basic firefighting measures.	SHE Officer	Emergency Preparedness Plan	Construction Phase	ECO	Monthly	Induction Register

• Emergency procedure must in place, and communicated to all persons onsite	SHE Officer	Induction, toolbox talks, simulation excise/drill	Construction Phase	ECO	Monthly	Register

14.14 Public safety and traffic accommodation

Table 24: Road crossing, stockpiles and construction vehicle movement

Management Impact Outcome: Management of traffic during construction to minimise disruptions and safety risks to all road users.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Along the road reserve all clearance and excavation must be done in accordance with DoT standards. All road crossings must be done according to DoT standards. • Stockpiles should be stored away from the road to prevent injuries on pedestrians.	CM & SHE Officer	DoT standards Construction Method Statement Safety Standards	Construction Phase	ECO	Monthly	Construction Method Statement. Photographs, Checklists, no complaint.
• Cordon off all road crossing excavation and close them before the shift is completed.	CM &SHE Officer	Checklist Construction Method Statement Safety Standards	Construction Phase	ECO	Monthly	Checklist, register, photographs, no incident
• Prevent motor vehicle incidents to the general public, at construction vehicle turning point from main road to site and from site to main road.	PM, CM & SHE Officer	Temporary traffic signs at strategic points from both side of the traffic. Flagmen during turning of large haulers.	Construction Period	ECO	Monthly	Photographs, Zero incidents
• Establish the temporary speed limit at an approach to construction	CM & SHE Officer	Temporary traffic sign with speed limit.	Construction Period	ECO	Monthly	Photographs, Zero incidents

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

14.15 Invasive alien species

Table 25: Control of invasive alien species

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

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

14.16 Noise

Table 26: Noise management during construction

Management Impact outcome: To minimise or prevent unacceptable noise levels during construction activities and at certain times of the day or week.						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Construction Activities must take place strictly from 07h00 – 17h00. • Workplaces should avoid shouting or loud conversations especially in the early or late hours of the day.	CM	Site Rules	Ongoing	ECO	Monthly	Zero complaints Time sheets
• Minimise noise from construction activities to avoid impacts on human health and well-being. • If certain construction activities require work outside the stipulated hours, all adjacent landowners must be informed prior to commencement of such activities.	CM	Commencing of any particularly noisy part of the activity (such as use of a masonry saw or jack hammer) must be after 09h00, and not on Sundays.	During site establishment and ongoing	ECO	Monthly	Zero complaints Filling records.
• Minimize noise emanating from construction vehicles and equipment.	CM	All equipment, vehicles, equipped with sound mufflers if necessary.	Construction phase	ECO	Monthly	Zero complaints, photographs, records.

15 POST CONSTRUCTION

15.1 Rehabilitation and Landscaping

Table 27: Rehabilitation and Landscaping of the affected areas

Management Impact outcome: Remediate/rehabilitate any negative environmental impacts at the site						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• All the areas that are affected by the construction activities must be subjected to rehabilitation and landscaping. • Project must be timed so that rehabilitation can take place at the optimal time for vegetation establishment.	CM & SHE Officer	Rehabilitation plan	During site camp decommissioning	ECO	Upon completion of the project	Close-out report Checklist, photographs
• The stockpiled topsoil must be used for landscaping of the affected areas in the site camp and housing area. • Before placing topsoil, all visible weeds must be removed in accordance with the approved method statement for management of alien vegetation.	CM & SHE Officer	Method statements Rehabilitation Plan	Once, During site camp decommissioning	ECO	Upon completion of the project	Checklist, photographs

15.2 Site clean-up

Table 28: Site clean-up and rehabilitation

Management Impact Outcome: Site restoration to approximate original state						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• The Contractor must ensure that all temporary structures, materials, waste, and facilities used for construction activities are removed upon completion of the project. • All waste must be disposed of responsibly, following five-step hierarchy of waste management. • All remaining construction infrastructure, rubble and waste must be removed from the site and be disposed at a registered waste site and certificates of disposal must be provided. • The certificate of completion must not be issued until the rehabilitation is completed, inspected and declared complete by the ECO.	PM, CM & SHE Officer	Rehabilitation plan	During site camp decommissioning	ECO	Upon completion of the project	Checklist, photographs

16 OPERATION & MAINTENANCE PHASE

16.1 Soil Erosion

Table 29: Soil erosion

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Best construction practice of storm water system and make provision for erosion protection • Installation of gabion baskets and mattresses, energy dissipaters and grass lined drains. • Stormwater management through regular inspection for evidence of sediment and debris build-up during wet season. • Maintenance vehicles must use the existing access route.	PM	Engineering Design and Storm Water Management Plan.	Throughout the project lifecycle	PM	Throughout the project lifecycle	Storm Water Management Plan. Design standards, and best construction practice

16.2 Flow Regime

Table 30: Flow regime

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Engineering design and good construction practice to mitigate the impact on flow regime. • Adequate stormwater management systems will be installed with energy dissipating structures. • Stormwater management through regular inspection of stormwater system for evidence of sediment and debris build-up during wet season. • Revegetate, rehabilitation or pave all bare areas of soil are after construction. • Regular inspection at river crossing for evidence of sediment and debris build-up during wet season and dry season, alternatively after heavy rainfall.	PM	Engineering Design and Storm Water Management Plan.	Throughout the project lifecycle	PM	Throughout the project lifecycle	Storm Water Management Plan. Design standards, and best construction practice

16.3 Vegetation clearance during maintenance

Table 31: Vegetation Clearance

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Maintenance vehicles must use the existing access route. • Mark the bulk infrastructure servitude, mostly preferable the bulk infrastructure must be within the road reserve. • Clearance during bulk infrastructure maintenance must be within the existing construction footprint	PM	Adherence to site layout plans, site rules.	Throughout the project lifecycle	PM	Throughout the project lifecycle	Photographs

16.4 Surface and Ground Water

Table 32: Surface and Ground Water

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• The facilities within the settlement must have adequate waste bins and waste skips, and area must have signage discouraging littering and illegal dumping. • Sewer infrastructure must be regular maintained to prevent leakage and clogging. • Bus stop, parking areas for facilities must be paved to prevent accidental hydrocarbon spillages. • Promote the establishment of formal facilities for mechanical businesses to prevent direct spillages as result of informal mechanical businesses.	PM	Engineering designs, stormwater management plan, waste management method statement.	Throughout the project lifecycle	PM	Throughout the project lifecycle	Photographs, checklist, bins and waste skips and no contaminated soils.

16.5 Pollution and waste

Table 33: Pollution and Waste

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• The settlements must have adequate bins or waste skips within a walking distance. • The facilities within the settlement must have adequate waste bins and waste skips, and area must have signage discouraging littering and illegal dumping.	PM	Sufficient bins and waste skips	Throughout the project lifecycle	PM	Throughout the project lifecycle	No waste litter and no complains

16.6 Social distress

Table 34: Social Distress

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• A phased approach will be used to implement the development. • Phase 1 of the development is an informal settlement; the formalization process will be implemented using In-Situ Upgrading. • Temporary relocations: A temporary relocation involves moving a household while their site and top structure is redeveloped/developed and then moving them back to essentially the same location. • The permanent relocations are for households that are currently situated in flood line areas • or household that will be beneficiaries of social housing units or subsidised units.	PM	Adherence to relocation plan	Throughout the project lifecycle	PM	Throughout the project lifecycle	No complains

16.7 Traffic Accommodation

Table 35: Traffic Accommodation

Management Impact Outcome: Maintenance of site to meet its intended purpose during operation						
Impact Management Actions	**Implementation**			**Auditing**		
	Responsible Person	**Method of Implementation**	**Implementation Period**	**Responsible person**	**Frequency**	**Proof of compliance**
• Demarcate street crossing areas for school children. • Employ full time scholar patrol to safeguard school children from crossing a busy intersection nearby school. • Install speed humps and describe maximum speed as per DoT local road guideline.	PM	DoT standards Construction Method Statement Safety Standards	Throughout the project lifecycle	PM	Throughout the project lifecycle	Checklists and No complains

17 MONITORING

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

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

18 CONCLUSION

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

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