Basic Assessment for the Proposed Road D1001 Upgrade, Construction of Earthworks, Layer works, Surfacing, Drainage and Retaining Structures on District Road 1001 (Km 0+000 To Km 4+803) in the KZ226 Area, Pietermaritzburg Region, KwaZulu Natal

Draft Environmental Management Programme (EMPr) for Comment
June 2022

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Competent Authority:
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Disclaimer

The opinions expressed in this report are based on the information supplied to Ksheera Environmental Consulting. Ksheera Environmental Consulting has exercised all due care in reviewing the supplied information. While Ksheera Environmental Consulting has compared key supplied data with expected outcomes, and duly interrogated all information supplied to us, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. The results of this study are further based on a literature review and other data obtained from published articles, reference books, field guides, official databases or any other official published or electronic sources. These are assumed to be correct and no review of these were undertaken by Ksheera Environmental Consulting. Opinions presented in this report apply to the site conditions and features as they existed at the time of investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which Ksheera Environmental Consulting had no prior knowledge nor had the opportunity to evaluate.

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Glossary

Activity (Development) – an action either planned or existing that may result in environmental impacts through pollution or resource use.

Alternative / Option – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative.

Applicant – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

Biodiversity – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

Construction – means 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.

Cumulative Impacts – impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities to produce a greater impact or different impacts.

Direct Impacts – impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

Ecological Reserve – the water that is necessary to protect the water ecosystems of the water resource. It must be safeguarded and not used for other purposes. The Ecological Reserve specifies both the quantity and quality of water that must be left in the national water resource. The Ecological Reserve is determined for all major water resources in the different water management areas to ensure sustainable development.

Ecosystem – a dynamic system of plant, animal (including humans) and micro-organism communities and their non-living physical environment interacting as a functional unit. The basic structural unit of the biosphere, ecosystems are characterised by interdependent interaction between the component species and their physical surroundings. Each ecosystem occupies a space in which macro-scale conditions and interactions are relatively homogenous.

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

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

Environmental Assessment– the generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.

Environmental Authorisation (EA) – an authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.

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

Environmental due diligence - a formal process that assesses real estate for potential risk of environmental contamination, such as soil or groundwater contamination.

Environmental Impact – a change to the environment (biophysical, social and / or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

Environmental Impact Assessment (EIA) – the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

Environmental Issue – a concern raised by a stakeholder, interested or affected parties about an existing or perceived environmental impact of an activity.

Environmental Management – ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental Management Programme – A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on

the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

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

Fatal Flaw – issue or conflict (real or perceived) that could result in developments being rejected or stopped.

Greenfield – is land that is undeveloped land in a city or rural area either used for agriculture, landscape design, or left to evolve naturally. These areas of land are usually agricultural, or amenity properties being considered for urban development.

Indirect Impacts – indirect or induced changes that may occur as a result of the activity. These types if impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.

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

Interested and Affected Party – 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, means an interested and affected party contemplated in Section 24(4) (a) (v), and which includes – *(a) any person, group of persons or organisation 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*.

Mitigate – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

No-Go Option – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

Rehabilitation– a measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Sensitive Environment – any environment identified as being sensitive to the impacts of the development.

Significance – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e., level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e., biophysical, social and economic).

Stakeholder Engagement – the process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and / or management of proposals or activities.

Sustainable Development – development which meets the needs of current generations without hindering future generations from meeting their own needs.

Watercourse – means:

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

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

Acronyms

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
ECO	Environmental Control Officer
EGL	Energy Grade Line
EIA	Environmental Impact Assessment
EIS	Ecological and Importance Sensitivity
EMPr	Environmental Management Programme
ERP	Emergency Response Plan
ETM	eThekwini Municipality
FEPA	Freshwater Ecosystem Priority Area
GNR	Government Notice Regulation
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
IMP	Integrated Management Plan
KZN DoT	KwaZulu-Natal Department of Transport
KZN EDTEA	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
MSDS	Material Safety Data Sheet
NCR	Non-Conformance Report
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 36 of 1998) (as amended)
NEMA	National Environmental Management Act (Act No. 107 of 1998) (as amended)

NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
PES	Present Ecological State
PU	Planning Unit
QMS	Quality Management System
RoW	Right of Way
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDC	Safe Disposal Certificate
SEF	Site Environmental File
SEMA	Specific Environmental Management Act
SHE	Safety, Health and Environment
WMA	Water Management Area
WUL(A)	Water Use Licence (Application)

1. Introduction

This Environmental Management Programme (EMPr) has been compiled in accordance with the stipulated requirements in Government Notice Regulation (GNR) 326 Appendix 4 of the EIA Regulations (2014 as amended in 2017), which outlines the legislative requirements and content of an EMPr.

This EMPr must be read in conjunction with the Basic Assessment Report and Environmental Authorisation and those responsible to the compliance with this EMPr must be fully familiar in all pertinent documents, assessment and authorisations/ licences and permits issued for this development.

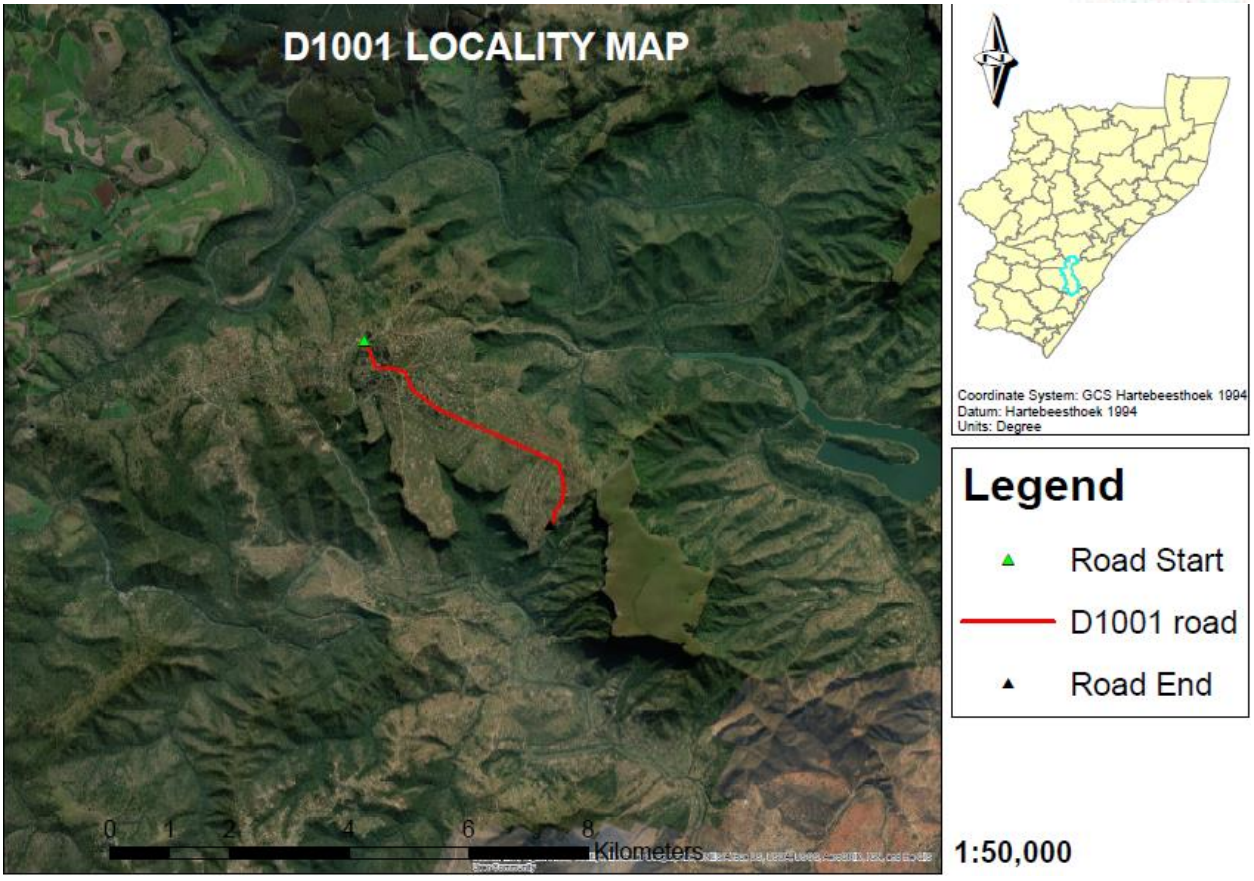
1.1. Background of Study and Technical Scope

The proposed upgrade of road D1001, falls within the Mkhambathini Local Municipality, within the uMgungundlovu District Municipality and therefore the Competent Authority (CA) is the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), uMgungundlovu District.
Nathoo Mbenyane Engineers (Engineers | Project Managers) was appointed by Department of Transport.

The report is intended to act as a tool for the Municipality to use in informing its decision towards investing in the project. The road D1001 is a link road between provincial roads P26 and P566 of which a portion was identified to be in need of an upgrade from gravel road to a surfaced road between km 0+00 and km 04+80. The road is situated in Mkhambathini Local Municipality and enables traffic travelling to and from Pietermaritzburg and Camperdown to bypass congestion in the Pietermaritzburg town and the N3 thus significantly shortening the route it further provides access to residents of these two towns be it in private vehicles or public transport.
At the moment the plan is for the existing culverts to remain at their positions subject to the vertical line.
For the culvert, DoT propose a 600mm pipe at existing position on CH30 to outlet to a natural watercourse.
At CH180, 3 options are proposed: -

- Two 750mm pipes minimum cover of pipe to be 800mm
- Two 900mm pipes minimum cover of pipe to be 800mm
- One 1200mm pipe minimum cover of pipe to be 840mm
- A culvert is also positioned at CH700 and a 750mm diameter pipe to outlet at a natural watercourse.

For additional design and technical information please refer to the Basic Assessment Report.


D1001 LOCALITY MAP
0 1 2 4 6 8
Kilometers
Coordinate System: GCS Hartebeesthoek 1994
Datum: Hartebeesthoek 1994
Units: Degree
Legend
Road Start
D1001 road
Road End
1:50,000

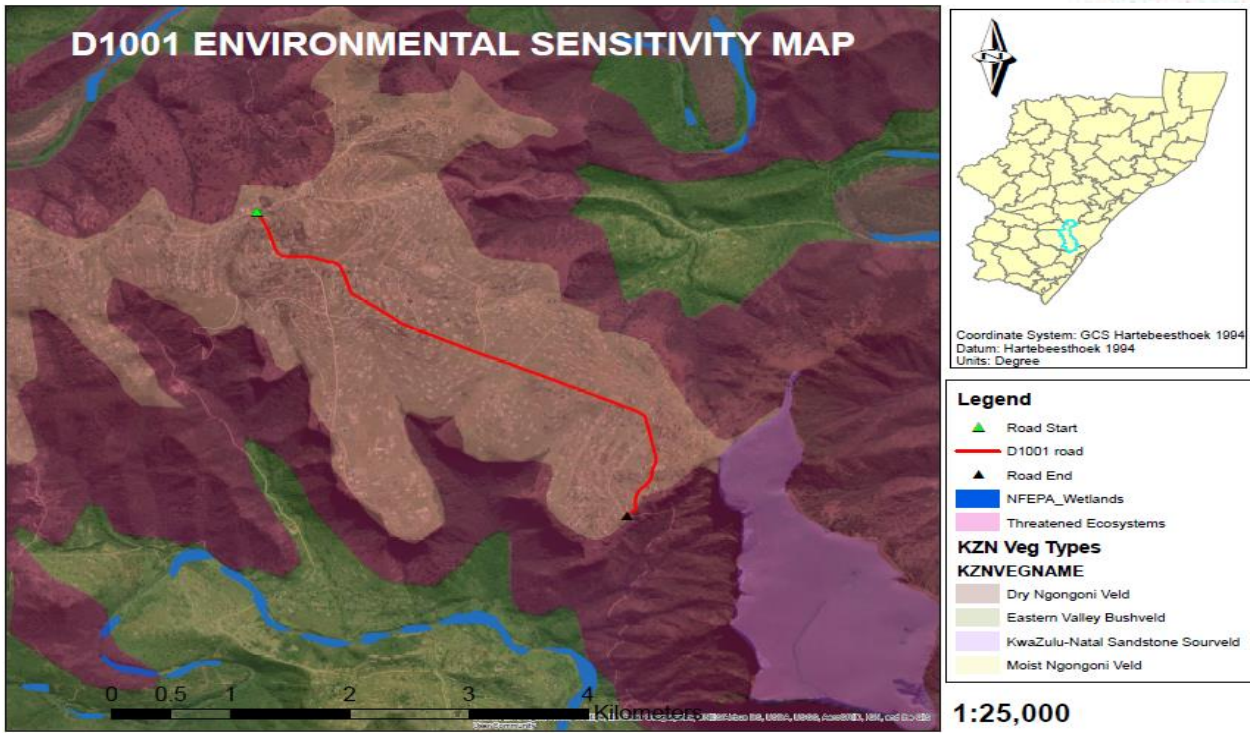


Figure 1: Locality of site (road D1001) and sensitivity mapping

1.2. Property Description

Table 1: Surveyor General Numbers

N	0	F	T	0	0	0	0	0	0	0	1	6	5	4	7	0	0	0	0	0	0
N	0	F	T	0	0	0	0	0	0	0	1	6	5	4	6	0	0	0	0	0	0
N	0	F	T	0	0	0	0	0	0	0	0	1	3	4	9	0	0	0	0	0	0
N	0	F	T	0	0	0	0	0	0	0	0	1	2	2	5	0	0	0	0	0	0
N	0	F	T	0	0	0	0	0	0	0	0	4	6	7	5	0	0	0	0	0	0

1.2.1. Land Use Zoning

Table 2: Land Use Zoning

The site is zoned	Transport
Is a change of land use or a consent use application required?	Yes
Must a building plan be submitted to the local authority?	Yes

1.2.2. Site Coordinates

Table 3: Site Coordinates

Latitude /Longitude	Degrees	Minutes	Seconds
Start			
South	29°	34’	26.28”
East	30°	33’	32.13”
Middle			
South	29°	35’	19.07”
East	30°	34’	35.53”
End			
South	29°	36’	08.39”
East	30°	35’	11.60”

1.2.3. Access / Directions

Head southwest on Prince Edward St toward Chief Albert Luthuli St/R103 34 s (95 m), Drive along N3 and R603 34 min (43.0 km) then take Ismont Rd to your destination.

2. Details of the Developer / Applicant

Table 4: Developer Details

Project applicant	
Trading name (if any)	Department of Transport
Representative	Ms Patronella F. Sibiya
Physical Address	Inkosi Mhlabunzima Maphumulo House, 172 Burger Street, Pietermaritzburg, 3200
Postal Address	Private Bag X9043, Pietermaritzburg, 3200
Telephone	033 355 0559
Facsimile	N/A
E-mail	

2.1. Details of the Environmental Assessment Practitioner

Managing Director, Novashni Sharleen Moodley has thirteen (13) years of experience in the Environmental Management field and established KsEC in 2017. Novashni (Sharleen) Moodley is an Environmental Scientist and an Environmental Assessment Practitioner (EAP) by profession. She holds a BSc in Environmental Science; a BSc (Honours) in Environmental Management (cum laude) and an MSc in Environmental Science. Novashni is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Pr. Sci.Nat: 400305/15, and is a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) Reg No 2021/4237. Novashni is an Assessor for the EAPASA registration board and serves on the Professional Advisory Council (PAC) for SACNASP. Novashni’s MSc

research was based on environmental planning, its confluence with Integrated Environmental Management (IEM), and public participation, by use of a case study. The research explored use of resources in livelihoods, environmental justice, the voice of stakeholders (indigenous knowledge) and climate change resilience in poor communities dependent on natural resources, within the stakeholder and planning theoretical frameworks. Novashni has credible experience in environmental planning and consulting. She specialises in the suite of IEM tools, viz. Environmental Impact Assessments (EIA), Basic Assessments (BA), Water Use Licence Applications (WULA), Strategic Environmental Assessment (SEA), Screening Assessments, Public Participation Processes (PPP), and Environmental Control Officer (ECO) audits. Novashni has experience in a range of projects, with a range of clients, such as mixed-use developments, water treatment, energy production, strategic (regional) planning and linear developments. Currently, Novashni functions as Director and Environmental Consultant at Ksheera Environmental Consulting Pty Ltd. Novashni is also an Associate at the Institute of Natural Resources (NPC, an applied sciences organisation), Associate at Integrated Development Management (IDM) and a director and shareholder at IDM Africa, the latter two consulting firms based and operating in Southern Africa. Novashni is the External Moderator for the Environmental Engineering (ENEL2ENH2) Module within the College of Agriculture, Engineering and Science at the University of KwaZulu-Natal. Refer to Appendix H of the cBAR.

Table 5: EAP Details[1]

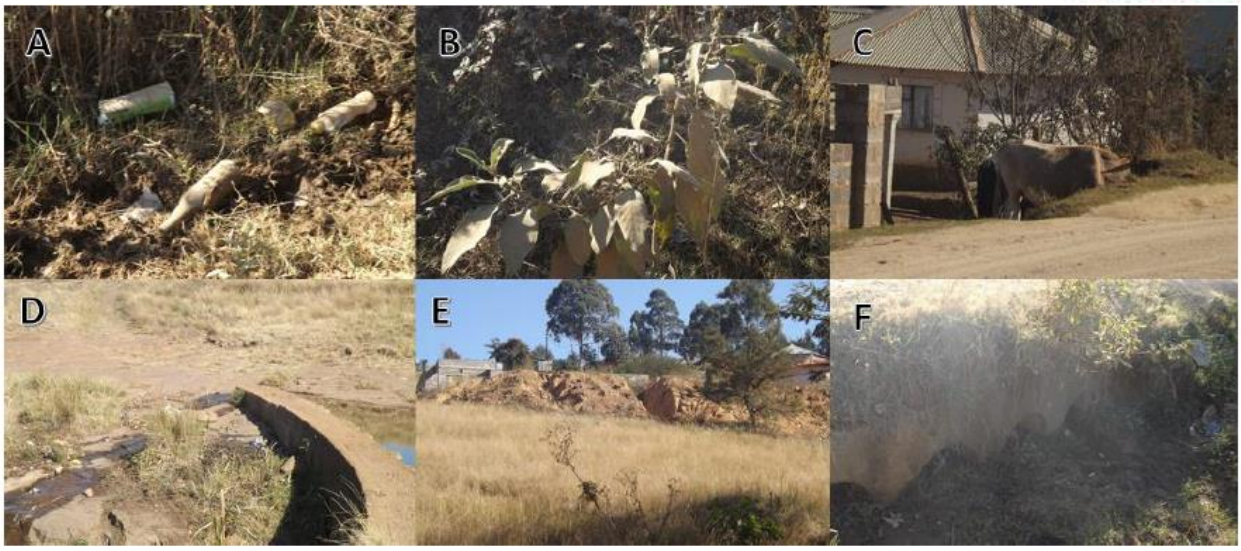
EAP	KsEC
Contact Persons	Mrs Novashni Sharleen Moodley
Address	19 Knoll Road Westville, Durban, 3630
Telephone	082 571 1425
Facsimile	N/A
E-mail	nsmoodley@ksec.co.za
Qualification	MSc Environmental Science Pr.Sci.Nat IAIAsa
Experience	13 Years

3.1 Description of the Study Area: Key Specialist Findings

Please refer to the Basic Assessment Report and respective specialist reports for detailed understanding of the project area.

Considering that this project is for the upgrade of existing infrastructure, several impacts are already existing, see plates below illustrating impacts to wetlands within the assessment area of the proposed D1001 Road upgrade. A) general waste within drainage lines, B) Alien vegetation as well as dust deposition from dirt road, C) Livestock grazing, D) Damming of wetlands downstream of the project area, E) Sediment sources from landscaping for houses as well as dirt roads and F) Sedimentation of the channel and alien vegetation on the banks.

[1] Refer to Appendix F for EAP CV



This project now has the opportunity to address some of the identified impacts resulting from the existing road and crossing structures. It is imperative to abide by the mitigation measures offered. These are included in the EMPr.

A variety of risks have been identified for the proposed project, with only a one notable Moderate risk (without mitigation) identified for the operational phase only. This is as of a result of the longevity of the possible impact post construction. The stormwater systems must be designed correctly to minimise increased stormwater runoff from flushing down the system causing erosion and sedimentation downstream.

The remaining risk identified were all rated as Low with the nearest wetland to the road being more than 50 m away. The recommended buffer was calculated as 15 m and according to Macfarlane, et al., (2017) a high-risk activity would require a buffer that is 95% effective to reduce the risk of the impact to a low-level threat. Thus, any risk to the wetland is essentially mitigated by the distance from the proposed upgrade. The prescribed mitigation measures must be implemented none the less to ensure the longevity of the Low risk and to adhere to best practice guidelines.

Considering the anthropogenic activities and influences within the area, several negative impacts to biodiversity were observed within the assessment area as depicted in the plates below. These include:

- Livestock overgrazing and trampling
- Invasive Alien Plants
- Roads and associated vehicle traffic
- Powerlines
- Homesteads and associated fences
- Rubbish dumping
- Vegetation clearing; and
- Possible persecution.

The loss and/or degradation of surrounding habitats due to construction phase activities was rated as an impact with a 'High' significance but was lessened to a 'Low' significance with the implementation of the appropriate mitigation measures. The spread and/or establishment of invasive alien species and the disruption/alteration of species activities due to noise, vibration and/or dust, were rated as impacts with a 'Moderately High' significance but were reduced to a 'Low' impact with the implementation of mitigation measures. The direct mortality of fauna due to construction phase activities was rated as a 'Moderately High' impact but with the implementation of the appropriate mitigation measures, is reduced to a 'Moderate' significance. The reduced dispersal/migration of fauna was regarded as a 'Moderate' risk but reduced to a 'Low' significance with the implementation of the appropriate mitigation measures.

The impact significance of continued encroachment by alien invasive plant species into surrounding habitat that was disturbed, was rated as 'Moderately High' prior to mitigation. Implementation of mitigation measures reduced the significance of the impact to an 'Absent' level. The impact significance of the introduction of pest species as a result of the increase in waste material not being transported away was rated as 'High'. Implementation of mitigation measures reduced the significance of the impact to a 'Low' level. The permanent destruction of the surrounding habitat due to improper waste control that occurred during the construction phase and the erosion of surrounding habitat due to ineffective stormwater management measures, was rated as impacts possessing a 'High' significance level prior to the implementation of mitigation measures. The significance of these impacts was reduced to a 'Low' impact level in consideration of the implementation of mitigation measures.

The field survey yielded two (2) wetland types. The wetland types identified, were four (4) channelled valley bottoms and one (1) hillslope seep. The overall PES ratings for the HGM units were moderately modified (class C). The overall levels of service for all HGM units were rated as being Intermediate. The EIS for the channelled valley bottom (HGM 2) to the east of the project area was calculated to be High (class B) importance. This rating can be attributed to the ecological importance of the drainage system and functionality of the wetland. The remaining HGM units were rated as Moderate (class C) importance, based on the limited habitat and diversity they provide to the area.

The Hydrological Functionality of all the HGM units were rated as Moderate (class C) importance. The flood attenuation offered by the wetlands contributes to the protection of the local area from flooding and drought. The Direct Human Benefits were calculated to have a have a Low (class D) level of importance for all HGM units. The REC for all the HGM units were set at moderately modified (class C) as the road will not have an impact on the overall PES of the wetlands and therefor the wetland integrity is to be maintained.

The wetland buffer zone tool was used to calculate the appropriate buffer required for the road upgrade. In the event that prescribed mitigation measures are implemented for the study, a 15 m buffer zone has been determined for the construction and operational phases.

The project is for the upgrade of the D1001 Road, and the associated drainage line crossings. The crossing consists of culverts which will be upgraded. Due to the fact that this project is for the upgrade of existing infrastructure, a number of impacts are already existing. This project now has the opportunity to address some of the identified impacts resulting from the existing road and crossing structures.

A variety of risks have been identified for the proposed project, with only a one notable Moderate risk (without mitigation) identified for the operational phase only. This is as of a result of the longevity of the possible impact post construction. The stormwater systems must be designed correctly to minimise increased stormwater runoff from flushing down the system causing erosion and sedimentation downstream.

The remaining risk identified were all rated as Low with the nearest wetland to the road being more than 50 m away. The recommended buffer was calculated as 15 m and according to Macfarlane, et al., (2017) a high-risk activity would require a buffer that is 95% effective to reduce the risk of the impact to a low-level threat. Thus, any risk to the wetland is essentially mitigated by the distance from the proposed upgrade. The prescribed mitigation measures must be implemented none the less to ensure the longevity of the Low risk and to adhere to best practice guidelines.

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a high confidence in the information provided. The survey ensured that there was a suitable groundtruth coverage of the project area and major habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and possesses habitats altered by anthropogenic activities, as well as natural features.

The project area overlaps with The Moist Coast Hinterland Grassland, of which the conservation status is classified as Vulnerable and protection level regarded as ‘Not Protected’. The proposed activity footprint overlaps with transformed land-cover and is regarded as possessing low sensitivity, albeit the surrounding landscape comprises of both, Irreplaceable and Optimal Critical Biodiversity Areas. There are surrounding habitats that were regarded as possessing a high level of sensitivity and these comprised of wetland systems, scrub forest, rocky grassland and Dry Coast Hinterland Grassland. These sensitive habitats possess flora SCC, as well as provide an array of ecosystem services.

Within the assessment area, two herpetofauna species were observed, likely due to the synergistic influences of anthropogenic impacts, seasonality, their inherent secretive behaviour and lack of available sampling time. Twenty-two species of avifauna, from an expected list of 233, were observed within the assessment area. No mammal species were recorded based on visual observation and tracks and signs. This is likely due to the anthropogenic activity within the landscape and the smaller species require passive sampling. However, due to budget constraints this could not be undertaken.

There are potential risks to the surrounding sensitive habitat arising from the construction of the proposed activity. It is, therefore, imperative that all habitats not within the development footprint be avoided and declared as ‘no-go’ areas.

Considering the findings of the assessment, it is the opinion of the specialists that the proposed upgrade of the D1001 Road is feasible. However, the impacts associated with the proposed development activities must be mitigated against to ensure the maintenance of ecological processes, and the concomitant delivery of ecosystem services, of nearby habitats. Careful consideration must be afforded to each of the recommendations provided herein and proven ecological (or environmental) controls and mitigation measures must be entrenched in the management framework. Due to the expected post-mitigation low risks a General Authorisation is permissible for the project.

The proposed upgrading of the D1001 may proceed from a general heritage point of view as no heritage sites or features are in danger of being destroyed or altered. The area is also not part of any known cultural landscape. There is no need for any mitigation. All the dwellings adjacent to the D1001 are younger than 60 years old. They therefore have no heritage value. No graves, older than 60 years old, or other heritage features are situated within 50m from the D1001.

However, the footprint is situated in an area with a moderate fossil sensitivity. A phase 2 paleontological desktop study, by an Amafa accredited palaeontologist, will be required before any development may proceed.

It must also be pointed out that the Provincial Heritage Act requires that operations exposing archaeological and historical residues should cease immediately pending an evaluation by the heritage authorities.

3. Objectives of the EMPr

The EMPr has the following objectives:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international.
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project.
- To identify measures that could optimise beneficial impacts.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the draft environmental management plan must be implemented, where appropriate.
- Provide rational and practical environmental conditions / requirements to:
    - Minimise disturbance of the natural environment.
    - Ensure water resource protection.
    - Prevent or minimise all forms of pollution.
    - Protect indigenous flora and fauna.
    - Prevent soil and sand erosion and facilitate the re-vegetation of affected areas.
    - Maintenance of newly re-vegetated areas.
    - Restrict noise disturbance; and
    - Ensure compliance 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.
  [redacted]tices based on prevention, minimisation, recycling, treatment or disposal of waste.
- Train the Developer, its employees and contractors with regard to their environmental obligations.

4. Structure of the EMPr

The EMPr addresses aspects of the project life cycle from the point at which work on the ground begins, whereas the Basic Assessment Report (BAR) addresses impacts and mitigation thereof prior to the project commencing. This EMPr therefore covers the phases as per Figure 2 below:

Figure 2: Phases of the EMPr

The implementable EMPr complies with Appendix 4 of the EIA Regulations 2014 (Government Notice Regulation – GNR 982, Regulations for the contents of EMPr) and is presented in tabular form in section 10 and comprises the aspects as per below:

Table 6: Tabular format of the EMPr

Aspect	Environmental Specification	Responsibility	Monitoring frequency
Meaning:	This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.	This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.	This section indicates when the actions for that specific aspect must be implemented and/or monitored.

4.1. The Dynamic Nature of the EMPr

The nature of environmental management is such that it deals with numerous disciplines and is applied to a myriad of study areas, each with its unique ecosystem functioning and requirements. Therefore, certain study areas may be considered to be pristine, whereas others may need to be more carefully observed as they are already significantly developed. This requires environmental management to develop tailor made solutions and responses to each and every project, through project specific tools within the Integrated Environmental Management (IEM) field, such as those of the BA, EIA and EMPr.

Part and parcel of ensuring these tailor-made solutions, is flexibility and accommodation of what the natural environmental can sustain. Hence, as the BA is predictive in nature, in assessing likely impacts, once the project is implemented for construction, certain aspects may come to light, and there must be provision to allow for the EMPr to guide activities around these. Therefore, the EMPr is a *"living*" or dynamic document which must be duly updated and complied with. To ensure this, the ***Deming Cycle*** or continuous development cycle is adopted, as demonstrated below:

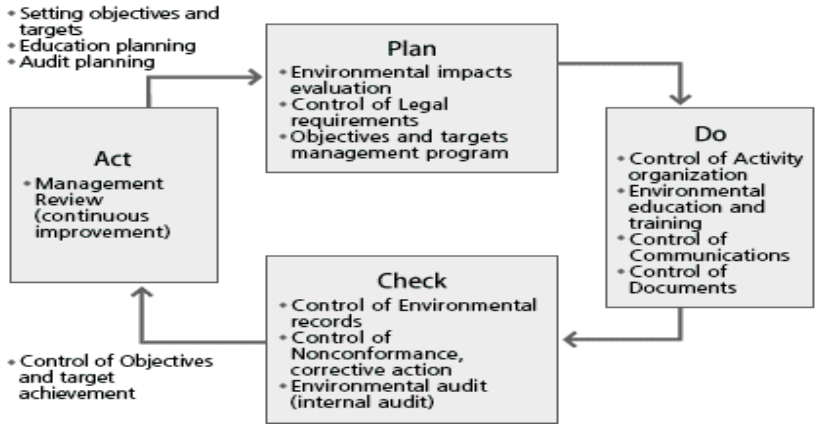


Figure 3: **The Continuous Development Cycle**

With reference to Figure 3 above, the following interpretations are provided:

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 in day-to-day management. Such a QMS must at least include the following information: (a) Location and extent of associated infrastructure; (b) Associated activities, such as the transportation of people and equipment; (c) Resources and experience required (staffing); (d) Materials and equipment to be used; (e) Management actions; (f) Human resources used; (g) Construction-monitoring activities; (h) Emergency / disaster incident and reaction procedures; and (i) 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 on-going basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy 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 must be updated regularly to address the changing circumstances of the scheme.*

5. Purpose of the EMPr

The primary objective of the EMPr is to bring into effect and action the measures of mitigation for the environmental impacts which emerge from the environmental assessment undertaken and provide an actionable and auditable tool which can be used to ensure the project is undertaken in an environmentally responsible manner.

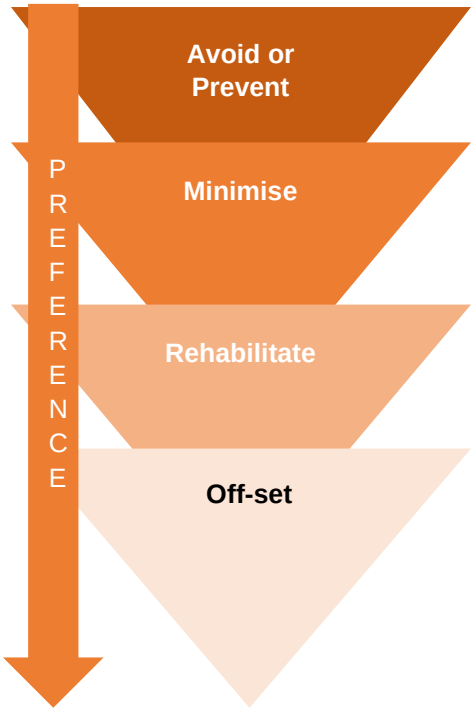
Therefore, the EMPr includes the following:

- Roles and responsibilities of the various responsible parties involved with the various phases of the project.
- Standards, guidelines and legal requirements (including any possible environmental permits required and the processes to be followed in obtaining these permits).
- Environmental specifications for construction.
- Environmental specifications for operation.
- Environmental specifications for rehabilitation; and
- Environmental awareness plan.

The EMPr specifies the minimum requirements to be implemented by the Developer, as per the scope of works and scope of the environmental authorisation (EA) if and once issued, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices. The EMPr also provides the framework for environmental monitoring throughout the construction, operational

and rehabilitation phases. The provisions of this EMPr are binding on the Developer during the life of the project. The EMPr must be binding on the Developer or any authority to which responsibility for all buildings and associated infrastructure has been delegated to.
It is noted that protection of the environment is enshrined in the Duty of Care requirement of the National Environmental Management Act (Act No. 107 of 1998) (as amended), which thus means that it is the duty of all landowners and users to ensure that the activities they carry out on a site do not cause detriment to the environmental facets thereof. The EMPr thus functions as a tool which can be monitored and audited that will allow the Developer the ability to ensure that all that operate on the site do so in an environmentally safe manner. It is also structured in such a way that the conditions may be linked to a standard construction contract. The EMPr is a live document which must be continuously updated, with the approval of the Competent Authority. It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented.

Core to the purpose of the EMPr is to implement the 'mitigation hierarchy' (DEA *et al*., 2013), which is demonstrated in Figure 4 below:



*Refers to considering options in project location, sitting, scale, layout, technology and phasing **to avoid impacts** on biodiversity, associated ecosystem services, and people. This is the best option but is not always possible. Where environmental and social factors give rise to unacceptable negative impacts the activity should not take place. In such cases it is unlikely to be possible or appropriate to rely on the latter steps in the mitigation.*

Refers to considering alternatives in the project location, siting, scale, layout, technology and phasing that would minimise impacts on biodiversity and ecosystem services. In cases where there are environmental and social constraints every effort must be made to minimise impacts.

Refers to rehabilitation of areas where impacts are unavoidable, and measures are provided to return impacted areas to near-natural state or an agreed land use. Although rehabilitation may fall short of replicating the diversity and complexity of a natural system.

*Refers to measures over and above rehabilitation to compensate for the residual negative effects on biodiversity, after every effort has been made to minimise and then rehabilitate impacts. **Offsets** can provide a mechanism to compensate for significant residual impacts.*

Figure 4: The Mitigation Hierarchy

6. Environmental Code of Conduct[2]

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that must be strictly adhered to.

It is the responsibility of the Contractor who must appoint or act as Site Environmental Officer and ECO (as appointed) to ensure that each contractor, sub-contractor and workforce understand and adhere to the Code of Conduct.

All persons are obliged to keep to the rules of this Code of Conduct

Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution must not be tolerated!

Environmental Rules

- Do not waste electricity, water or consumables.
- Only use authorised accesses.
- Do not litter.
- Dispose solid waste to the correct waste containers provided.
- Prevent pollution.
- Use the toilet facilities provided.
- Do not dispose contaminated wastewater to the stormwater or the environment;
- Immediately report any spillage from containers, plant or vehicles.
- Do not burn or bury any waste in the sand.
- Do not trespass onto private properties.
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal.
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions.
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area.
- Know the firefighting procedure and locations of firefighting equipment; and
- Know the environmental incident procedures.

[2] The Environmental Code of Conduct must be printed as a poster to be erected on-site, as a constant reminder of environmental ethics.

7. Legal Requirements

The following is a summary of the environmental legislation applicable to the proposed project.

Table 7: Legal Requirements

Legislation	Sections	Relates To
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (Act No. 107 of 1998 (as amended))	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The Developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
EIA Regulations (2014)	GNR983	Activities requiring a Basic Assessment study to be undertaken.
	GNR984	Activities requiring a Scoping and Impact Assessment study to be undertaken.
	GNR985	Activities in special geographical areas requiring a Basic Assessment study to be undertaken.
National Waste Act (Act No. 59 of 2008) and List of Waste Activities (November 2013)		Provides for specific waste management measures and the remediation of contaminated land.
Norms and Standards for the Storage of Waste, 2013	GNR 926 – Sections 7 – 20	Provides specific guidelines for the operational procedures for a facility for the storage of waste.
National Heritage Resources Act (Act No. 25 of 1999) and regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or

Legislation	Sections	Relates To
		burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), not already covered under the environmental law. Where covered under such law the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The HIA is thus approved under the environmental authorisation, which must take into account the provincial heritage resources authorities' comments prior to making a decision on the HIA.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Section 34	Control of noise.
	Section 35	Control of offensive odours.
National Dust Control Regulations (GNR 827 of November 2013)		Control of dust.
Occupational Health and Safety Act (Act No. 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.
National Water Act (Act No. 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents.
	Section 21	Water uses.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	Section 22	Application for a mining right.
	Section 39	Environmental management programme and environmental management plan.
Hazardous Substances Act (Act No. 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
National Environmental Management: Biodiversity Act (No. 10 of 2004)		Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.
	Section 53	Protection of threatened or protected ecosystems.
	Section 65	Control of alien species.

Legislation	Sections	Relates To
	Section 71	Control of invasive species.
National Forests Act (Act No. 84 of 1998) and Regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette.
	Sections 12-16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire of dispose of any protected tree, except under a licence granted by the Minister.
National Road Traffic Act (Act No. 93 of 1996)		Road safety.
Ordinance		Town Planning and Townships Ordinance 15 of 1986.
By-laws		Promulgated by-laws: ▪ Waste Management ▪ Property Rates by laws ▪ Legal Services ▪ Municipal Cemeteries ▪ Discharge of Industrial Effluent ▪ Electricity Supply
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication.
KZN Nature Conservation Ordinance (Ordinance 15 of 1974)		Sensitive species are protected under this Ordinance and must be considered.

8. Management and Monitoring Procedures

The following diagram outlines the roles and responsibilities and lines of communication which must be followed within them.

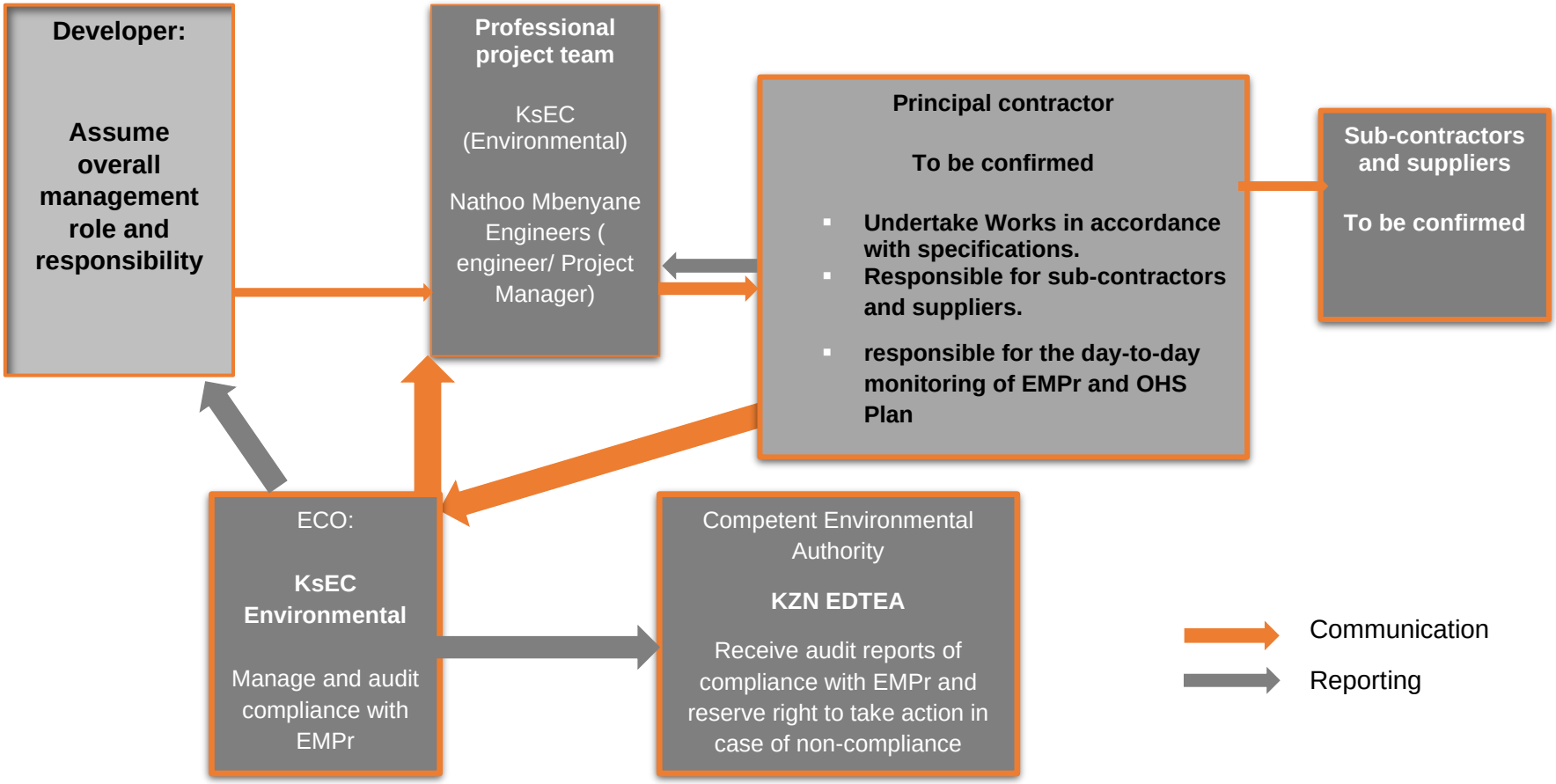


Figure 13: Project Team Organogram

The following outlines the defined and specific roles and responsibilities of each team member:

Table 8: Responsibilities per project team member

Developer
The Developer is ultimately responsible for ensuring compliance with the environmental specification and upholding 100% compliance with all National, Provincial and local legislation that relates to management of this environment. *The Developer will:* ▪ Appoint a Project Manager (PM) to assume ultimate project responsibility. ▪ Be familiar with the contents of the EMPr. ▪ Ensure the EMPr is in the tender documentation issues to prospective contractors. ▪ Request for, review and approve the Method Statements prepared by the Contractor. ▪ Review and comment on environmental assessments and/ or reports produced by the Contractor and ECO. ▪ Undertake regular site visits and ensure environmental specifications are implemented. ▪ Discuss with the ECO the application of penalties for the infringement of the Environmental Specifications, another possible enforcement measures necessary. ▪ Issue penalties as and when necessary. ▪ Arrange information meetings for or consults with I&APs about the impending construction activities where necessary. ▪ May on the recommendation of the Engineer and / or ECO order the Contractor to suspend any or all works on site if the Contractor or his Sub-Contractor / Supplier fails to comply with the said specifications. ▪ Maintain a register of complaints and queries by members of the public at the site office; and Ensure the EMPr is implemented as well as revised and updated as and when required.
Engineer

The Engineer will:

- Enforce the environmental specification on site.
- Be familiar with the contents of the EMPr.
- Request for, review and approve the Method Statements prepared by the Contractor.
- Review and comment on environmental assessments and/ or reports produced by the Contractor and ECO.
- Undertake regular site visits and ensure environmental specifications are implemented.
- Monitor compliance with the requirements of the specification.
- Assess the Contractor's environmental performance in consultation with the Contractor from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported to project meetings; and

Ensure the documentation, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

Contractor

The Contractor is required to:

- Be fully conversant with the EMPr and all conditions of the EA, and any permits, licences, etc.
- Implement, manage and maintain the EMPr for the duration of the contract.
- Appoint or act as Environmental Officer (EO) whose responsibility includes on-going monitoring and control of all construction activities concerning minimisation of environmental impact and adherence to the EMPr for the duration of the construction phase.
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the contract document.
- Supply method statements timeously for all activities requiring special attention as specified and/ or requested by the Developer, and/or Engineer during the duration of the contract.
- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/ her staff about the requirements of the environmental specification.
- Comply with requirements of the EMPr and any subsequent revisions in terms of this specification and the project specification, as applicable, within the time period specified.
- Ensure any Sub-Contractors/Suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf.
- Provide appropriate resources - budgets, equipment, personnel and training - for the effective control and management of the environmental risks associated with the construction phase of the development.
- Bear the cost of any delays, with no extension of time granted, must he or his Sub-Contractors / Suppliers contravene the said specifications such that the Engineer orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected;

- Bear the costs of any damages / compensation resulting from non-adherence to the said specifications or written site instructions.
- Review ECO reports and take cognisance of the information/ recommendations contained therein.
- Comply with all applicable legislation.
- Ensure that he/she informs the Engineer timeously of any foreseeable activities which will require input.
- Notify the ECO and PM, verbally and in writing at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental or social impacts, so that mitigatory measures may be implemented timeously.
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them.
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract.
- Communicate and liaise frequently and promptly with the ECO and the PM to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts.
- The Contractor will conduct all activities in a manner that minimises disturbance to the natural environment as well as directly affected residents and the public in general; and
- The primary contractor assumes responsibility and accountability of all appointed sub-contractors and must ensure their compliance with this EMPr.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of Method Statements that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved.
- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor.
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr.
- Take appropriate action if the specifications contained in the EMPr are not followed.
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr.
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr.
- Submit a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Ensure that the list of transgressions issued by the ECO is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints.
  - Health and safety incidents.
  - Incidents involving hazardous materials stored on site.
  - Non-compliance incidents

Environmental Control Officer

The ECO will:

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

It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Developer.

9. Compliance with the Environmental Specification

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works, but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operation required to complete the works. It is thus required that the Contractor must comply with the environmental specifications on an on-going basis.

The EMPr forms part of the contract documentation and is thus a legally binding document. It is also necessary for the Contractor to make provisions as part of their budgets for the implementation of the EMPr. In terms of NEMA, an individual responsible for environmental damage must pay costs both to the environment and human health and the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring. This is referred to as the Polluter Pays Principle. Section 28 of the NEMA specifically embodies the polluter pays principle. Therefore, any failure on the Contractor's part to comply with the EMPr will entitle the Developer to certify the imposition of a penalty subject to the details set out.

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

- There is evidence of contravention of clauses within the boundaries of the site, site extensions / access roads.
- Environmental damage ensues due to negligence.
- The Contractor ignores or fails to comply with corrective or other instructions issued by the Developer, ECO or Engineer within a specified time; and
- The Contractor fails to respond adequately to complaints from the public.

Failure to conform to the conditions set out in the following section (Section 10), the EMPr will result in the issuing of fines to the Contractor / Site Manager by the ECO. These fines will be paid by the Contractor and will be used in the rehabilitation or landscaping of the site.

The final amount, however, will be quantified by the Engineer and the appointed ECO prior to going on site. The values below are thus deemed to be a useful point of departure from which site and task appropriate values can be quantified.

Note that the escalation factor in terms of repeat offences also needs to be determined (e.g., doubling to a maximum combined value for a set of activities), and the point at which on repeat offence the contractor / sub-contractor is required to move off site.

Table 9: Fine System

Offence	Amount
Failure to demarcate working areas	R10,000
Working outside of demarcated areas	R30,000
Failure to obtain relevant permits	R50,000
Failure to relocate plant species and care for them once relocated	R50,000
Failure to stockpile topsoil correctly	R30,000
Failure to stockpile materials in designated areas	R10,000
Failure to take measures to prevent soil contamination	R10,000
Failure to take measures to control dust dispersion on site	R10,000
Washing of vehicles on site	R10,000
Pollution of water bodies and/or groundwater	R20,000
Failure to implement stormwater management provisions during construction	R20,000
Failure to control stormwater run-off	R30,000
Downstream erosion	R30,000
Failure to provide adequate sanitation	R10,000
Failure to erect temporary fences around trenches	R10,000
Failure to provide adequate waste disposal facilities and services	R50,000
Failure to reinstate disturbed areas within the specified timeframe	R30,000
Any other contravention of the project specific specification	R10,000

10. The mechanism for monitoring compliance with the impact management actions contemplated in Section 14

The following mechanisms will ensure compliance with the upgrade of road D1001 EMPr:

1. The appointment of Environmental Officer by the Contractor who will ensure day to day compliance.
2. The Developer must appoint an independent Environmental Control Officer who must undertake site audits against the EMPr at the frequency stipulated in the Environmental Authorisation.

11. A program for reporting on compliance

The ECO must submit audit reports to the EDTEA at the stipulated frequency and include in the report the following:

11.1. Project Scope

Pre-Construction

- Undertake a full documentation review of all projects environmental documentation;
- Develop an audit checklist based on the requirements of the EA, EMPr and any legislative documentation; and
- Undertake a once -off environmental induction training with the contractor.

Construction

- Provide Environmental Control Officer (ECO) duties for a period of 24 months.

- Conducting monthly site inspections and generate monthly audit reports detailing the level of compliance achieved in terms of the requirements of the EA and EMPr.
- Attend monthly project meetings and provide the project team with feedback pertaining to environmental matters.

Post-Construction

- Undertake an environmental closure audit and develop a closure audit report.

11.2. Detailed Project methodology

Approach

The ECO must be in a position to undertake monthly ECO site inspections (as a minimum or as stipulated in the EA) to monitor compliance with the requirements of the EA and the EMPr for the duration of the construction period.

A monthly environmental audit report must be compiled based on the information collected during the monthly site inspections. The monthly environmental audit report must include a full audit checklist detailing the level of compliance achieved with each requirement of the EAs and EMPr.

The monthly environmental audit report must further document findings and recommend corrective action to be considered for improved environmental performance. Subsequent reports will provide feedback on whether previous nonconformance raised has been resolved, thereby ensuring continual improvement of the site's environmental performance. Final reports will be submitted to the EDTEA.

It must be noted that the responsibility of the ECO is to monitor compliance with the EA and EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Contractor Environmental Officer (CEO) who must be appointed by the Contractor and must be based on the site on a daily basis.

Site meetings

The ECO must attend monthly site meetings. The day of the site inspections should be coordinated with the scheduled monthly meetings to ensure that the ECO forms part of the project team. The ECO will provide feedback pertaining to environmental matters at the mentioned meetings and provide management/corrective action/preventative measures to be considered.

Audit Checklist

The ECO use the EAs and EMPr to compile an audit checklist to be used as the audit standard for the project. The purpose of the checklist is to ensure a structured approach to the audit, to allow the audit team to focus on specific environmental commitments and requirements and to ensure that no activities on site are overlooked.

Closure Audit

An environmental closure report must be compiled by the ECO in line with the EA issued for the site on completion of the construction and rehabilitation activities. The report will include the following:

- date of the audit.
- name of the auditor.
- outcomes of the audit in terms of
    - compliance with the conditions of the EA; and
    - compliance with the approved EMPr.

The environmental closure report must be submitted to the EDTEA once finalized.

Documents required

In order to effectively undertake the above mentioned work the following documents will be required:

- EMPr.
- Final Basic Assessment Report
- The Environmental Authorisation
- Other approvals (WUL etc.).
- Environmental Impact Assessment Report & specialist studies.
- Final site layout plan; and
- Proposed project schedule.

12. Environmental Awareness Plan

the applicant will inform his or her employees of any environmental risk which may result from their work by providing training and education; and risks will be dealt with in order to avoid pollution or the degradation of the environment by educating the site staff through environmental awareness training.

Environmental Training

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure sound environmental management. To achieve effective environmental management, it is important that employees, contractors and sub-contractors are aware of their roles and responsibilities in terms of the relevant environmental legislation and the contents of the EA and EMPr.

The appointed ECO must undertake a once-off environmental awareness and training session with the Environmental officer as part of the initial phase of the project. The environmental awareness and training are aimed at:

- promoting general environmental awareness on site; and
- training on the implementation of the EA and EMPr and other requirements.

Training must be done in a verbal format. The training will be a once-off event; however, the contractor must make provision for weekly/daily training. Training must be done in compliance with COVID-19 safety protocols, such as the use of masks, keeping a 2m distance between persons and regularly washing hands / sanitizing. Environmental training may be done during “Toolbox Talks”. Environmental matters discussed during toolbox talks must be work and area specific to the day’s work. Proof of such training must be kept on file.
Construction staff must be adequately educated by the ECO, and the Contractor , as to the provisions included in the EMPr and general environmentally friendly practice.
The EA and EMPr forms part of the formal site induction for all Contractors, sub-contractors and casual labourers, preferably in their native language. The induction training will, as a minimum, include the following:

- What is meant by the environment;?
- The importance of conformance with all environmental policies.
- The environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Developer’s environmental management systems, including emergency preparedness and response requirements; and

The mitigation measures required to be implemented when carrying out their work activities. All Contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance record.

The Contractor is expected to have “toolbox” talks. These talks must be in accordance with the risks and trends associated with the project. All records of environmental induction and training (including toolbox talks) must be kept on site within the Site Environmental File (SEF).

13. Construction of Proposed Road Upgrade for Road D1001 EMPr

The EMPr specifies the minimum requirements to be implemented by the Developer as per the scope of works and scope of the EA, in order to minimise and manage the potential environmental impacts and

ensure sound environmental management practices. It also provides the framework for environmental monitoring throughout the construction phases.

The provisions of this EMPr are binding on the Developer during the life of the project. The EMPr must be binding to Mr Njabulo Ngwane or any authority to which responsibility for the construction activities has been delegated to, until such time that the EDTEA or applicable environmental authority has formally absolved the Developer from its responsibilities in terms of this EMPr.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times.

To simplify the EMPr requirements, each aspect related to the EMPr has been addressed in the tables below. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented.

The proceeding tables constitute the construction of the proposed Upgrade to the D1001 Road EMPr, together with the preceding sections, which are legally binding to the Developer and associated appointed Contractors / employees.

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
Authorisations, Permits and Licences		
All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction.	Developer	Once-off and On-going
All activities must comply with the EA, EMPr and all permits/licences.		
The activity which is authorised may only be carried out at the premises listed in the authorisation.		
Construction activities must comply with the Final Layout Drawings.		
Appointment of Contractor		
The Developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The Contractor must make adequate provision in their budgets for the implementation of the EMPr.	Developer	Once-off
The Principal Contractor (including sub-contractors and suppliers) must comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws.		
Contract documents must include statements to include the use of local communities or local community organisation in supplying services and labour to the construction activities.		
Staff training/induction must take place prior to construction commencing and any subcontractors utilised must be inducted before starting work on site.		
All Contractor employees must receive regular basic environmental awareness training and must be educated on the requirements of the EMPr and specialist studies.		Regularly - Weekly
A copy of the EMPr, containing the mitigation and management procedures for working within terrestrial habitats, will need to be made available at the construction site offices/site camp at all times.		Once-off
It is vital that all personnel are adequately trained to perform their designated tasks to the accepted standards.		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
Monitoring		
A monitoring programme must be in place not only to ensure compliance with the EMPr through the contract / work instruction specifications, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are or could result in significant environmental impacts for which corrective action is required. A monitoring programme must be implemented for the duration of the construction phase of the project. This programme must include: ▪ Audits will be conducted by the ECO for the duration of the construction phase at the frequency specified in the EA. The ECO must undertake environmental monitoring and the audits will consider compliance with the EMPr and licence conditions. ▪ External auditing may take place at unspecified times by the authorities and/or other relevant authorities. ▪ The ECO must undertake regular site inspections to ensure all legislative requirements are adhered to. ▪ The ECO must compile an audit report with a quantitative rating of the compliance with the EMPr for each site audit conducted. ▪ The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. The Contractor must be held liable for all unnecessary damage to the environment.	Developer	Once-off and On-going
The monitoring by the ECO must be extensive and inclusive; this involves the monitoring of construction related impacts as identified. Regular monitoring of the construction activities is critical to ensure that any problems with are picked up in a timeous manner. In this regard, the following potential concerns must be taken into consideration: ▪ Destruction of habitat outside the construction servitude including 'No-Go' areas. ▪ Signs of intense or excessive erosion (gullies, rills, scouring and headcuts) and/or sedimentation within, along the edge and/or immediately downstream of the construction zone. ▪ Erosion of disturbed soils and soil stockpiles by surface wash processes. ▪ Pollution of water resources (with a particular focus on water turbidity and hazardous substances such as fuels, oils and cement products). ▪ Poorly maintained and damaged erosion control measures e.g., sand bags, silt fences and silt curtains; and ▪ Evidence of unsafe working conditions (e.g., evidence of flow overtopping the bund wall/running tracks).	ECO	Weekly

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency

The following documentation must be kept on site in order to record compliance with the EMPr:
An Environmental File must be maintained by the Contractor which includes:
▪ Environmental Authorisation once issued by the EDTEA.
▪ The Final BAR.
▪ Copy of the approved EMPr.
▪ Copy of all other licences/permits if applicable.
▪ Copy of all rehabilitation plans.
▪ Copy of the Stormwater Management Plan.
▪ Environmental Policy of the Main Contractor.
▪ Environmental Method statements compiled by the Contractor.
▪ Non-conformance Reports.
▪ Environmental register, which must include:
  ▪ Communications Register – including records of Complaints, and, minutes and attendance registers of all environmental meetings.
  ▪ Monitoring Results – including environmental monitoring reports, register of audits, non-conformance reports.
  ▪ Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
  ▪ Waste Documentation such as, but not necessarily limited to: Waste Manifest Documents, Safe Disposal Certificates (SDCs) and Sewerage Disposal Receipts.
  ▪ Material Safety Data Sheets (MSDSs) for all hazardous substances.
  ▪ Dust suppression register.
  ▪ Written Corrective Action Instructions; and
  ▪ Notification of Emergencies and Incidents.
	Developer	Once-off and On-going

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
The Developer, together with the Contractor, must put in place a Complaints Register. The Contractor must ensure that the following information is recorded for all complaints / incidents: ▪ Nature of complaint / incident. ▪ Causes of complaint / incident. ▪ Party / parties responsible for causing complaint / incident. ▪ Immediate actions undertaken to stop / reduce / contain the causes of the complaint / incident. ▪ Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint / incident. ▪ Timeframes and the parties responsible for the implementation of the corrective or remedial actions. ▪ Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented. ▪ Copies of all correspondence received regarding complaints/ incidents. ▪ The above records will form an integral part of the Contractors' Records. ▪ These records will be kept with the EMPr on site, and must be made available for scrutiny if so, requested by the Developer and EDTEA.	Developer & Contractor	Once-off and On-going
A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the issue. Should the ECO assess an incident or issue and find it to be significant (e.g., non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information must be recorded in the NCR: ▪ Details of non-conformance. ▪ Any plant or equipment involved. ▪ Any chemicals or hazardous substances involved. ▪ Work procedures not followed. ▪ Any other physical aspects. ▪ Nature of the risk. ▪ Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and must take the hierarchy of controls into account. ▪ Agreed timeframe by which the actions documented in the NCR must be carried out. ▪ The ECO must verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor must sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.	Contractor	Once-off and On-going

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
The Contractor's environmental emergency procedures must ensure appropriate responses to unexpected/ accidental actions / incidents that could cause environmental impacts. Such incidents may include: ▪ Accidental discharges to water and land. ▪ Accidental spillage of hazardous substances (typically oil, petrol, and diesel). ▪ Accidental toxic emissions into the air; and ▪ Specific environmental and ecosystem effects from accidental releases or incidents. The Environmental Emergency Response Plan (ERP) is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following: ▪ Construction employees must be adequately trained in terms of incidents and emergency situations. ▪ Details of the organisation (i.e., manpower) and responsibilities, accountability and liability of personnel; ▪ A list of key personnel and contact numbers. ▪ Details of emergency services (e.g., the fire department / on site fire detail, spill clean-up services) must be listed; ▪ Internal and external communication plans, including prescribed reporting procedures. ▪ Actions to be taken in the event of different types of emergencies. ▪ Incident recording, progress reporting and remediation measures to be implemented; and ▪ Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release. The Contractor and their sub-contractor(s) must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.	Contractor	Once-off and On-going
Preparation of Method Statements		
It is a statutory requirement to ensure the well-being of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements must be developed for each set of tasks. A Method Statement details how and when a process will be carried out, detailing possible dangers / risks, and the methods of control required and must typically cover: ▪ Type of construction activity. ▪ Timing and location of the activity. ▪ Construction procedures. ▪ Materials and equipment to be used.	Contractor	As and when required

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
▪ Transportation of the equipment to/ from site. ▪ How equipment/ material will be moved while on site. ▪ Location and extent of construction site office and storage areas. ▪ Identification of impacts that might result from the construction activity. ▪ Methodology and/ or specifications for impact prevention/ containment. ▪ Methodology for environmental monitoring. ▪ Emergency/ disaster incident and reaction procedures (required to be demonstrated); and ▪ Rehabilitation procedures and continued maintenance of the impacted environment. The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statements. The Contractor must keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation. The following list (non-exhaustive) of Method Statements may be required to be generated: ▪ Stormwater management during construction ▪ Bunding. ▪ Construction site and office/ yard establishment. ▪ Cement mixing/ concrete batching/ bentonite mixing. ▪ Contaminated water. ▪ Dust. ▪ Environmental awareness course(s). ▪ Environmental monitoring. ▪ Erosion control. ▪ Fire, hazardous and/ or poisonous substances. ▪ Fuels and fuel spills (may form part of the item above). ▪ Storage, handling and decanting of diesel (may form part of the item above). ▪ Personnel, public and animal safety. ▪ Rehabilitation of modified environment(s). ▪ Solid and liquid waste management (including Hazardous waste management). ▪ Sources of materials (including MSDSs). ▪ Topsoil management;		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
▪ Wash areas.		
The ECO will monitor the implementation of the Statements. All copies of the statements and plans must be submitted to the appointed ECO. The ECO reserves the right to request a method statement which is not specified in this EMPr.	ECO	As and when required
Appointment of ECO		
The Developer must appoint an independent ECO to perform the function as set out in section 8.	Developer	Once -off
The nomination of the ECO must be given, in writing, to the EDTEA at least fourteen days before the start of any work.		
The ECO must undertake site inspections (audits) and provide audit reports at the frequency specified in the EA for the duration of the construction and rehabilitation phases. Each audit report must contain the results of the full audit. These audit results report on whether the response to the audit item is favourable, un-favourable or not applicable. Not applicable answers are for those aspects of the construction that have not yet started or are not applicable to the contract being considered. Graphs must be produced for each stage of the EMPr, general requirements, requirements during construction and post construction activities. Each of the aspects within each stage is allocated a percentage score. The percentage score is the percentage of favourable items against the total number of applicable items. The higher the score, the better the compliance. Complete compliance will result in a 100% score.	ECO	Weekly (site audit) monthly (report)
Notice of Construction		
A written notice must be given to the EDTEA prior to the commencement of construction. The notice must include site preparation activities as well as a date on which it is anticipated that the activity will commence.	Developer / ECO	Once-off
Public Communication		
The Developer must ensure that the adjacent landowners are informed and updated throughout the construction phases. Sufficient signage must be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards must include the following information: ▪ The name of the Contractor. ▪ The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.	Contractor / ECO	Once-off

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
13.1.1. Environmental Training and Awareness		
There must be full compliance with the Environmental Training and Awareness Plan outlined in Section 12.	Contractor and ECO	Once-off
13.1.2. Site Set-Up		
Prior to the establishment of the site area, the Contractor must produce a site layout plan showing the positions of all equipment storage, waste stockpiling, and other infrastructure for approval of the ECO and Developer. Choice of location for construction item storage must take into account location of local residents and environmentally sensitive areas (no-go areas) where applicable.	Contractor	Once-off and On-going
With regards to accessing the sites and avoiding disturbing adjoining terrestrial areas, the following is recommended: ▪ Construction activities and equipment lay-down areas must be limited to the property ▪ The outer edge of the construction servitude/working area (as defined above) must be clearly demarcated for the entire construction phase using a brightly coloured hazard fence or danger tape with steel droppers. This will ensure that impacts are confined to areas that are going to be transformed. ▪ All demarcation work must be signed off by the ECO before any work commences. ▪ All demarcations must be maintained in position until the cessation of construction works of a particular leg. ▪ Areas beyond the site are considered 'No-Go' areas. Access through and construction activities within the No-Go areas are strictly prohibited in these areas and need to be strictly controlled. ▪ Access must be confined to the existing road infrastructure. ▪ Do not paint or mark any natural feature. Marking for surveying and other purposes must be done using pegs, beacons or rope and droppers.		
Defining the Construction Servitude/Working Area: ▪ The construction servitude/working must be limited to the proposed development footprint only. ▪ The working servitude must be demarcated on both sides using orange bonox/other hazard netting prior to construction commencing. ▪ The demarcation work must be signed off by the ECO before any work commences. ▪ The location of stockpile areas and equipment lay down areas must be agreed to and demarcated to the satisfaction of the ECO prior to the clearing. ▪ No soil stockpile areas must be located outside of the site. ▪ No equipment lay-down or storage areas must be located outside of the property of the site.		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
▪ Before any work commences, sediment control/silt capture measures (e.g., bidim/silt curtains) must be installed downstream/downslope of the active working areas. Quantities of silt fences/curtains must be decided on site with the Engineer, Contractor and ECO. The ECO must be present during the location and installation of the silt curtains. ▪ Silt fences/curtains must be regularly checked and maintained (de-silted to ensure continued capacity to trap silt) and repaired where necessary. ▪ Any topsoil and vegetation from areas to be excavated must be stripped and stored at the designated soil stockpile area for use later in rehabilitation.		
Demarcations and 'No-go' Areas: ▪ All demarcation work must be signed off by the ECO before any work commences. ▪ Any Contractors found working inside the 'No-Go' areas (areas outside the working servitude) must be fined as per fining schedule/system setup for the project. ▪ The area across the road from the property (dunes) is a strict No-Go area.		
Accidental Incursions into 'No-Go' Areas: ▪ Areas outside of the construction corridor that are disturbed during the construction phase must be rehabilitated immediately. All disturbed areas must be prepared and then re-vegetated to the satisfaction of the ECO as per the relevant re-vegetation/re-planting plan.		
Working Servitude Clearing: No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e., for fire wood or medicinal use).		
The construction area must be clearly demarcated on the layout plan, and all other areas must be considered no-go areas for the construction personnel.		
No-go areas must be agreed to in consultation between the ECO, Contractor, and Developer prior to construction.		
Adequate signage must be placed in the area where construction will take place informing the public of the activities taking place.		
The Contractor must take responsibility for the site to conform to all contractual aspects and environmental standards applicable.		
The following must be on site and nothing further with regards to site establishment: ▪ site office (minimal sized container if required). ▪ ablution facilities. ▪ designated first aid area. ▪ eating areas.		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
▪ storage areas. ▪ batching plant (if required). ▪ Crushers (if required). Refuelling and maintenance areas are not permitted on site.		
No persons, other than a night-watchman / security guard, may stay overnight at the site.		
The Contractor must provide adequate refuse bins that must be cleaned / emptied, and the waste removed from site on a regular basis.		
The construction areas must be kept in an orderly state at all times.		
Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste must be strictly prohibited in identified no-go areas		
The Contractor must ensure that drainage on site is such to prevent standing water and/or sheet erosion from taking place or that it is not altered even temporarily which adversely impacts on drainage.		
Unauthorised access onto/into private properties is strictly prohibited.		
13.1.3. Ablution / Sanitation		
Where waterborne sewerage is not available, temporary chemical toilets must be provided by a company that has been approved by the Developer. Such toilets must be available for all site staff, both at the construction camp, and on site as agreed by the Developer.	Contractor	Once Off and On-going
The ECO must be consulted on the location of any temporary chemical toilets.		
Temporary toilets must be located within the property.		
In cases where facilities are linked to existing sewage structures, all necessary regulatory requirements concerning construction and maintenance must be adhered to.		
13.1.4. Access		
Access to the site is permitted only *via* existing access	Contractor Engineer Developer	On-going
The construction site must have strict access control to reduce the risks associated with vehicular transportation and pedestrian access on the site.		
Steep gradients must be avoided as much as possible.		
No vehicles are permitted to drive into sensitive sites and No-Go areas.		
All No-Go areas will be indicated as such with warning signs in all relevant languages.		
13.1.5. Equipment, Vehicles and Storage Areas		
Washing of vehicles on site is prohibited.	Contractor	On-going

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
Note that vehicle maintenance is not permitted on site. If emergency repairs are required to vehicles or construction plant, then the conditions as specified below must be implemented.		
Fire prevention facilities must be present at all storage facilities.		
Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.		
An oil balance must be implemented to demonstrate appropriate management of hydrocarbons.		
Plant and equipment must be adequately maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdrawn equipment or machinery from use if they consider these to be polluting and irreparable.		
Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste oils and greases. All used oils, grease or hydraulic fluids must be placed therein, and these receptacles must be removed from the site on a regular basis for recycling.		
A procedure for the management of oils spills must be introduced. This must address the cleaning of spillage from hard surfaces, utilising environmentally friendly cleaning materials as well as the removal and disposal of polluted sand.		
Fuel must be stored in tanks with lids, which will be kept firmly shut and under lock and key at all times, within a secondary containment facility.		
Fuel decanting and refuelling must take place within the construction camp. 50kg of hydrocarbon absorbent to be placed at the construction camp.		
13.1.6. Waste Disposal Facilities		
General waste produced on site includes: ▪ Office waste (e.g., food, waste, paper, plastic); ▪ Operational waste (clean steel, wood, glass); and ▪ General domestic waste (food, cardboards, paper, bottles, tins). An adequate number of general waste receptacles, including bins must be arranged around the construction area, on site to collect all domestic refuse, and to minimise littering.	Contractor	Daily
Different waste bins, for different waste streams must be provided to ensure correct waste separation and subsequent recycling, where applicable. Bins must be clearly marked and lined for efficient control and safe disposal of waste.		
A fenced area must be allocated for waste sorting and disposal on the site.		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
13.1.7. Security and Safety		
A security guard must be appointed to guard the site at all times.	Contractor	Once off / Daily
Potentially hazardous areas such as trenches are to be demarcated and clearly marked.		
Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.		
Material stockpiles or stacks, such as pipes, must be stable and well secured to avoid collapse and possible injury to site workers/ local residents.		
Flammable materials must be stored as far as possible from adjacent residents/ businesses.		
Fire fighting equipment must be present on site at all times.		
Obstruction to driver's line of sight due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	Developer	On-going
No materials are to be stored in unstable or high-risk areas, such as on steep slopes.		
13.1.8. General and Hazardous Substances and Materials		
Storage areas must be designated, demarcated and fenced. Storage areas must be secure, under lock and key, so as to minimise the risk of crime.	Contractor	Daily
Fire prevention facilities must be present at all storage facilities.		
Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume. Such a facility must be on an impervious surface. The storage area must be securely fenced and all hazardous substances such as fuel, oils, chemicals, etc., must be stored therein. Drip trays, a thin concrete slab or a facility with PVC lining, must be installed in such storage areas with a view to prevent soil and water pollution.		
No fuel storage tanks, and associated facilities are permitted on site.		
Symbolic safety signs depicting "No Smoking", "No Naked Flames" and "Danger" are to be prominently displayed in and around the fuel storage area.		
All waste fuel and chemical contaminated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.		

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
Storage sites will be provided with bunds to contain any spilled liquids and materials. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of stormwater from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.		
MSDSs must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or spillages.		
Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.		
A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes must only be disposed of at licenced landfill sites designed to handle hazardous waste. Appropriate SDCs must be provided for all hazardous waste being disposed of and must be kept on site within the SEF.		
The Contractor must ensure that his staff are made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training.		
Cement / concrete must not be mixed directly on the ground. Dagga boards, mixing trays and impermeable sumps must be used at all mixing and supply points. Unused cement bags are to be stored so as not to be affected by rain or run-off events.		
The washing of concrete trucks on site is prohibited.		
Used cement bags must be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags must be disposed of on a regular basis *via* the solid waste management system and must not be used for any other purpose.		
The washing of concrete trucks on site is prohibited.	Contractor	Daily
All visible remains of excess concrete must be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur.		
No paint products are permitted to be disposed of on site.		
The Contractor must maintain a record of the sourcing of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc.) used during construction.		
All material must be commercially sourced. No permits or licences for borrow pits have been applied for.		
13.1.9. Engineering Design		
Ensure correct, peer and supervisor reviewed designs are developed.	Developer	On-going

13.1. Pre-construction Phase

Table 10: Pre-construction EMPr

Environmental Specification	Responsibility	Frequency
All relevant plans for the area must be considered and adequate consultation with the relevant planning officials in the area.	Engineer	

13.2. Construction Phase

Table 11: Construction Phase EMPr

Environmental Specification	Responsibility	Frequency
13.2.1. Construction Phase Monitoring Requirements		
Regular monitoring of the construction activities is critical to ensure that any problems with are picked up in a timeous manner. In this regard, the following potential concerns must be taken into consideration: ▪ Destruction of habitat outside the construction servitude including 'No Go' areas. ▪ Destruction of conservation important/protected plants and trees. ▪ Signs of intense or excessive erosion (gullies, rills, scouring and headcuts) and/or sedimentation within, along the edge and/or immediately downstream of the construction zone. ▪ Erosion of disturbed soils, road batters and soil stockpiles by surface wash processes. ▪ Poorly maintained and damaged erosion control measures (e.g., sand bags, silt fences and silt curtains); and ▪ These risks can be monitored visually on site by the ECO (together with construction staff) with relative ease and must be reported on regularly during the construction process. Any concerns noted must be prioritised for immediate corrective action and implemented as soon as possible.	ECO	Monthly
13.2.2. Health and Safety		
All Procedures and equipment must be in accordance with the Occupational Health and Safety Regulations (OHSA) of South Africa, Act No. 85 of 1993. The Contractor must familiarise him/herself and his employees with the contents of the aforementioned legislation.	Contractor	Daily
First Aid kits must be on hand at all times.		
The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the deconstruction. Such safety measures and work procedures / instructions must be communicated to construction workers.		
The wearing of Personal Protective Equipment (PPE) on site is mandatory for all personnel and construction team members. Minimum requirements must include the wearing of an approved safety helmet, safety boots, safety eyewear, safety reflective jackets and dust masks, ear plugs, etc. where appropriate.		

Environmental Specification	Responsibility	Frequency
PPE signs must be erected on site at the areas where it is required, and the integrity and availability of the signs must be maintained.		
No person is to be allowed on site unless they are wearing approved safety equipment.		
Casual visitors must be required to sign a register at the security checkpoint and undergo a site induction by the Contractor. The responsible person must then be contacted before the visitor is allowed access to site. No unauthorised visitors are to be allowed on site.		
Workers' right to refuse work in unsafe conditions must be respected.		
All personnel must be trained in basic site safety procedures.		
The Contractor must design, test / exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; fires, etc.		
The Developer and/or Developer's agent will carry out regular audits on the Principal Contractor at least once per month. Similarly, principal Contractors must be responsible for carrying out regular audits on their contractors at least once per month. The results of both audit types must be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate.		
13.2.3. Fires		
No open fires or uncontrolled fires will be permitted on site.	Contractor	Daily
Fire fighting measures such as fire extinguishers must be located on site.		
No open fires to be permitted within the construction footprint.		
Ensure that no refuse waste is burnt on the site or on surrounding premises.		
Ensure that all workers on site are aware of the proper procedure in case of a fire occurring on site.		
Ensure adequate fire-fighting equipment is available and train workers on how to use it.		
The workforce must be made aware of fire prevention and fire fighting measures.		
13.2.4. Worker Conduct on Site		
A general regard for the social and ecological wellbeing of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: ▪ No alcohol / drugs to be present on the site. ▪ No contractor staff are permitted to enter the surrounding facility properties, ▪ No firearms allowed on site or in vehicles transporting staff to and from site, unless used by security personnel. ▪ Prevent excessive noise. ▪ Prevent unsocial behaviour. ▪ Bringing pets onto the site is forbidden. ▪ No harvesting of firewood from the site or from the areas adjacent to it. ▪ Construction staff are to make use of the facilities provided for them, as opposed to adhoc alternatives (e.g., fires for cooking, the use of surrounding bush for toilet facilities).	Contractor	Daily

Environmental Specification	Responsibility	Frequency
▪ Trespassing on private properties adjoining the site. ▪ Driving under the influence of alcohol is prohibited.		
13.2.5. Clearing and Protection of Fauna and Flora		
No natural vegetation is to be collected for use as firewood.	Contractor	Daily
There must be full compliance with the Invasive Alien Plant Eradication and Management Programme detailed in Section 14		
The focus of mitigation measures is to reduce the significance of potential impacts associated with the development and thereby to: • Prevent the direct and indirect loss and disturbance of faunal species and community (including potentially occurring species of conservation concern); and • Limiting the construction area to the defined project areas and only impacting those areas where it is unavoidable to do so otherwise.		
It is recommended that areas to be developed be specifically demarcated so that during the construction phase and operational phase, only the demarcated areas be impacted upon. All work areas, offices, and access roads must be clearly demarcated from surrounding natural areas and no persons are allowed to enter these areas under any circumstances;		
Recommended mitigation and rehabilitation measures for faunal community's hinge largely on protecting their habitats and ensuring it remains intact, as well as limited other disturbance factors such as noise and dust. In additional to this the following measures are recommended:		
A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna that is found during construction;		
If any faunal species are recorded during construction, activities must temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action. This is applicable to all species, especially smaller species such as rodents, reptiles and amphibians;		
Staff must be educated about the sensitivity of faunal species and measures must be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds or other animals must be strictly prohibited; and		
It is recommended that strips of vegetation comprising of local indigenous species be established along the edges of the development, where feasible, in order to maintain a corridor for the movement of fauna.		
All dumping of waste material, especially bricks and contaminated materials or soils, into the environment must be prevented. Solid waste is to be disposed legally off-site in the relevant waste disposal manner;		
All areas outside of the demarcated areas must be declared a 'no-go' area during the construction phase and all efforts must be made to prevent access to this area from construction workers and machinery;		

Environmental Specification	Responsibility	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated;		
Any topsoil that is removed during construction must be appropriately removed and stored. This includes on-going maintenance of such topsoil piles so that they can be utilised for re-vegetation purposes when necessary.		
Implementation of an alien vegetation management plan for the entire sit is required. This is especially in areas that are cleared of vegetation and left exposed. Upon completion of construction any exposed areas must be re-vegetated with local indigenous plants to prevent IAP encroachment;		
The wetland buffer area must be rehabilitated by removing the present sugarcane and replacing with species indigenous to the area. The initial planting must comprise of indigenous grass species to ensure that the soil is not exposed for an extended period; and		
Any landscaping that is to be part of the proposed development must use indigenous species naturally occurring within the area.		
No wild animal is permitted under any circumstance be hunted, snared, captured, injured, killed, harmed in any way or removed from the site. This includes animals perceived to be vermin (such as snakes, rats, mice, etc.). Any fauna that are found within the construction zone must be moved to the closest point of natural or semi-natural vegetation outside the construction corridor. The handling and relocation of any animal perceived to be dangerous/venomous/poisonous must be undertaken by a suitably trained individual.		
Given the need to maintain the terrestrial environment in its pristine condition and minimise all unnecessary impacts to the environment, the following financial penalty clause is recommended to encourage the Contractor and Developer to adhere to the recommendations of the specialists as well as recommendations contained in the EMPr. The following financial penalty applies: ▪ The penalty clause for stripping vegetation within the construction footprint but without approval from the ECO shall be R50 000.00 per incident. ▪ The penalty clause for stripping vegetation outside the construction footprint without approval from the ECO shall be R100 000.00 per incident and the disturbed areas shall be re-vegetated with trees saplings to match the tree density of adjoining habitats. ▪ The penalty clause for stripping vegetation without any relevant plant permits and licences shall be R100 000.00 per incident.		
Conservation-important plants falling just outside the construction footprint must be fenced off to minimise any accidental impacts such as destruction.		
No material storage or lay-down is permitted under trees.		
No heavy equipment, machinery and vehicles may be parked under any tree, unless authorized by the ECO.		
No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason. Any wildlife that is injured or killed on the site by accidental means i.e., hit by a vehicle, are to be reported to the Developer, who must take appropriate action to facilitate the recovery of the animal where possible i.e. take the animal to the SPCA.		
Any indigenous vegetation and topsoil cleared for the construction servitude/working area must be rescued and stored at the designated vegetation and soil stockpile area for use later in rehabilitation. In this regard, vegetation will need to be cleared in-situ (with sods/topsoil).		

Environmental Specification	Responsibility	Frequency
All alien invasives found must be immediately removed and disposed of responsibly in accordance with the requirements of the ECO. No artificial plants are permitted to be brought to site.		
Cleared areas must be planted with the present, indigenous grass sods as soon as is possible. All alien invasive vegetation that has colonised the construction site must be removed, preferably by uprooting. The contactor must consult the ECO regarding the method of removal.		
All bare surfaces across the construction site must be checked for alien invasive plants at the end of every month and alien pants removed by hand pulling/uprooting and adequately disposed.		
Herbicides must be utilised where hand pulling/uprooting is not possible. Only herbicides which have been certified safe for use in wetlands by independent testing authority to be used. The ECO must be consulted in this regard.		
A permit must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF), or EKZNW for any trees / plants (if any) that fall within the development footprint that is protected as per the National Forestry Act (Act No. 84 of 1998) and need to be removed or relocated. It must be ensured that for every tree removed; at least two (2) replacement trees must be planted in suitable localities.		
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.		
Where alien plants have been introduced on to the site during clearing and infilling, they must be removed. The Contractor must develop an Action Plan for the removal of alien invasive species and submit it to the ECO for approval.		
Invader species and weeds must be removed and disposed of in accordance with existing legislation on a regular basis.		
The removal of indigenous/endemic shrubs and small trees must be kept to a minimum and only be removed if absolutely necessary and where authorisation has been received where applicable.		
13.2.6. Heritage		
If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.	Contractor	Daily
The Contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Construction Engineer of such discovery which in turn must contact a registered archaeologist and AMAFA.		
Work may only resume once clearance is given in writing by the archaeologist and/or AMAFA.		
13.2.7. Traffic and Safety		
Temporary loading and off-loading areas and holding of construction vehicles must be designed prior to construction activities to ensure that the most preferable access and haulage routes has been identified.	Contractor	Daily
Implement proper road signs to warn motorists of construction activities ahead. Ensure that there are flag men and signs in place at access points to the construction site.		
Road signs for all lane closures to be done in accordance with the South African Road Traffic Signs Manual (SARTSM, 1999).		
Construction routes must be clearly defined.		
Disruption to the peak traffic periods 06h00 – 09h00 and 15h00 – 18h00 to be minimised or if possible avoided. For any planned night closures, the community must be notified a minimum of three days in advance.		

Environmental Specification	Responsibility	Frequency
All Contractors must ensure that their employees and in particular, construction vehicle drivers / operators comply with the safe access and egress plans that are to be put in place during the construction process. Appropriate warning and reduced speed signage must be erected where necessary.		
13.2.8. Pedestrian Protection		
Pedestrians to be protected from construction activities at all times.	Contractor	Daily
Pedestrian conflict with site access and construction vehicles to be managed by traffic officer.		
The construction site must remain fenced for the entire construction period.		
13.2.9. Construction Vehicles		
Access of all construction and material delivery vehicles must be strictly controlled.	Contractor	Daily
Holding of all construction vehicles is to be controlled to ensure that through traffic is not unnecessarily impeded.		
Vehicles and equipment must be serviced regularly to avoid the contamination of the area from oil and hydraulic fluid leaks, etc.		
Servicing of vehicles must be done off-site.		
All speed limits must be adhered to. The speed limit must be erected on a sign board where it can be clearly seen.		
Machinery or equipment used on site must not constitute a pollution hazard in respect of the above substances. The Contractor must order such equipment to be repaired or withdrawn from use if they consider the equipment or machinery to be polluting and irreparable.		
Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste. All used oils, grease or hydraulic fluids must be placed therein, and these receptacles will be removed from the site on a regular basis for disposal at a registered or licenced disposal facility.		
13.2.10. Culvert Construction		
It is critical to spread flows across the water resource, avoiding incisions in the landscape caused by concentrated flows. Temporary storm water channels should be filled with aggregate and/or logs (branches included) to dissipate flows;	Contractor	Daily
It is recommended that the material surrounding and holding the culverts in place include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows		
Culverts should avoid inundation (damming) of upstream areas by facilitating streamflow and catering properly for both low flows and high flows.		
13.2.11. Road Maintenance		
Contractors must ensure that any damage to the pedestrian walkway or holding areas are maintained in good condition by attending to any damages (e.g., road signs or stormwater damage, etc.) as soon as these develop.	Contractor	Daily
If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.		
All temporary road signs to be removed and pavement reinstated at completion of works.		

Environmental Specification	Responsibility	Frequency
13.2.12. Topsoil		
The Contractor must strip and stockpile all topsoil within the work area for subsequent use at a later stage.	Contractor	Daily
The removal of any topsoil from site is prohibited and this must be stockpiled and used solely in the rehabilitation of the works area.		
The following is recommended: ▪ The topsoil layer must be stripped from the construction footprint and stockpiled separately from overburden (subsoil and rocky material). ▪ In the absence of a recognizable topsoil layer, strip the upper most 300mm of soil. ▪ All stockpiled areas must ideally be established on disturbed flat ground within the site. ▪ Stockpile topsoil stripped from different sites separately, as reapplication during rehabilitation must preferably be site specific. A stockpile register may help in this regard. ▪ Erosion/sediment control measures such as silt fences, concrete blocks and/or sandbags must be placed around soil/material stockpiles to limit sediment runoff from stockpiles. ▪ Stockpiled soils are to be kept free of weeds and are not to be compacted. ▪ Stockpiled topsoil must be kept moist, and this can be achieved through irrigation of topsoil stockpiles on a weekly basis. ▪ If soil stockpiles are to be kept for more than 3 months, they must be hydroseeded with common indigenous grasses such as *Panicum* species and *Chloris* species. ▪ Spoil material must be hauled to a designated spoil site. No spoil material must be pushed down slope or discarded on site.		
▪ The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The Contractor must, where possible, avoid stockpiling materials in vegetated areas that will not be cleared. ▪ Erosion/sediment control measures such as silt fences, concrete blocks and/or sandbags must be placed around soil/material stockpiles to limit sediment runoff from stockpiles. ▪ Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled topsoil must be kept moist, and this can be achieved through irrigation of topsoil stockpiles on a weekly basis. ▪ The slope and height of stockpiles must be limited to 2m and are not sloped more than 1:2 to avoid collapse. ▪ Spoil material must be hauled to a designated spoil site or landfill site. No spoil material must be pushed down slope or discarded on site.		
Stockpiles must be protected from wind and rain with the use of tarpaulins where necessary. The Engineer is to use his discretion as to the mechanism to be used to ensure this protection.		
Topsoil must be kept separate from overburden and must not be used for infilling.		
Noxious weeds must be eradicated from topsoil stockpiles.		
The topsoil and spoil material must be used to create stormwater attenuation berms and contour the topography, accordingly, were required, rather than be spoiled.		

Environmental Specification	Responsibility	Frequency
13.2.13. Spoil		
Litter and general waste are to be removed from the topsoil and spoil material before stockpiling.	Contractor	Daily
Spoil sites must be shaped to fit the natural topography.		
Erosion/sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment run-off from stockpiles.		
Subsoil and topsoil are to be stockpiled separately. Stockpiled soil must be replaced in the reverse order as to which it was removed (subsoil first followed by topsoil).		
Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils.		
The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The Contractor must, where possible, avoid stockpiling materials in vegetated areas that will not be cleared.		
Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions.		
The slope and height of stockpiles must be limited to 2m to avoid collapse.		
Spoil sites must receive a minimum of 75mm topsoil.		
Slopes must not exceed a vertical: horizontal ratio of 1:3.		
13.2.14. Soil Erosion and Sedimentation		
Stockpiles of soil must be limited in height to 2m and must either be dampened on a regular basis or vegetated depending on the length of time the stockpile will exist.	Contractor	Daily
Flow and Erosion/Sedimentation Control Measures: Stormwater and erosion control measures must be implemented during the construction phase to ensure that erosion and sedimentation impacts to the water resources are minimised or possibly avoided. In this regard, the following measures must be implemented: ▪ Vegetation/soil clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. In this regard, the Contractor must be aware of weather forecasts. ▪ Construction activities must be scheduled to minimise the duration of exposure bare soils on site, especially on steep slopes. ▪ Run-off generated from cleared and disturbed areas/slopes that drains into watercourses must be controlled using erosion control and sediment trapping measures like silt fences, sandbags, earthen berms and synthetic logs, particularly where slopes are exposed. These control measures must be established at regular intervals perpendicular to the slope to break surface flow energy and reduce erosion as well as trap sediment. ▪ Sediment barriers (e.g., silt fences, sandbags, hay bales, earthen filter berms, retaining walls and check dams) must be established to protect water resources from erosion and sedimentation impacts from upslope. Sediment barriers must be regularly maintained and cleared so as to ensure effective drainage.		

Environmental Specification	Responsibility	Frequency
▪ Berms, sandbags and/or silt fences employed must be maintained and monitored for the duration of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the disturbed areas post rehabilitation. ▪ Ensure that any trenches or excavations are closed and compacted immediately after construction is completed. ▪ During construction, the Contractor must check the site for erosion damage after every rainfall event and rehabilitate this damage immediately.		
Stormwater and erosion control measures must be implemented during the construction phase to ensure that erosion is avoided or minimised. In this regard, the following measures must be implemented: ▪ Any vegetation clearing must be done immediately before construction to avoid prolonged exposure of the soil to weather elements. ▪ Construction activities must be scheduled to minimise the duration of exposure of bare soils on site, especially on steep slopes. Vegetation/soil clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities must be put on hold. In this regard, the Contractor must be aware of weather forecasts. ▪ Construction on slopes will need to ensure that adequate slope protection is provided. ▪ Removing water in any excavated trenches in a manner that does not cause erosion and does not result in silt-laden water flowing downslope. Water must be pumped out into a well-vegetated area to facilitate sediment trapping and reduce the chance of sediment entering downstream wetlands or rivers/streams. ▪ Run-off generated from cleared and disturbed areas such as slopes must be controlled using erosion control (e.g., sand bags, earthen berm etc.) and sediment trap measures (e.g. silt fences). ▪ Sediment barriers (e.g., silt fences, sandbags, hay bales, earthen filter berms or retaining walls) must be established to counter erosion and sedimentation. Sediment barriers must be regularly maintained and cleared so as to ensure effective drainage. Berms, sandbags and/or silt fences must be maintained and monitored for the duration of the construction phase and repaired immediately when damaged. The berms, sandbags and silt fences must only be removed once vegetation cover has successfully re-colonised the disturbed areas post-rehabilitation. ▪ After every rainfall event, the Contractor must check the site for erosion damage and rehabilitate this damage immediately. Erosion rills and gullies must be filled-in with appropriate ▪ Material and silt fences or fascine work must be established along the gully for additional protection until grass has re-colonised the rehabilitated area.		
Demarcations and No-Go areas must be done conspicuously. The outer edge of the construction servitude/working area must be clearly demarcated by the Contractor together with the ECO for the entire construction phase using plastic orange bonox fencing. Once the temporary access route has been agreed to by the ECO, the outer edge of the access route must be staked out by the Contractor using brightly coloured stakes prior to the access route being used by machinery. All demarcation work must be signed off by the ECO before any work commences.		
Erosion/sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment run-off from stockpiles.		

Environmental Specification	Responsibility	Frequency
Soil erosion on site must be prevented at all times, i.e., pre, during and post construction activities. Suitable erosion control measures must be implemented in areas sensitive to erosion such as near water supply points and edges of slopes. These measures must include: ▪ Phased construction activities must take place to ensure the removal of vegetation, only as it becomes necessary for work to proceed. This enables erosion and sedimentation to be minimised and centralised in relatively small areas easier to control and to stabilize. ▪ Vegetative cover – vegetation reinforces soil and holds it in place thereby reducing erosion. Temporary or permanent vegetation must be planted on all bare soil immediately after any ground disturbance. The prompt rehabilitation of exposed soil areas with indigenous vegetation will ensure that soil is protected from the elements. The unnecessary removal of vegetation especially on steep areas must be prevented. Taking necessary precautions in terms of design and construction and earthworks, cuts and fills must be taken. Soil stockpiles must be vegetated or covered to reduce soil loss as a result of wind or water to prevent erosion and sedimentation. Disturbed areas must be rehabilitated as soon as possible. ▪ Seeding, anchored mulch, wool binders or erosion control fabrics must be used to provide surface protection and stabilisation until vegetation is established. ▪ The suitable use of sandbags or Hessian sheets must be used to stabilise bare soil. ▪ The suitable use of geo-textiles, turf blankets or mats must be used as slope protection for exposed slopes. ▪ Proper drainage controls such as culverts and cut-off trenches must be used to ensure proper management of surface water run-off to prevent erosion and sedimentation. ▪ Construction vehicles must remain on designated demarcated areas. ▪ Work areas must be clearly defined and demarcated to avoid unnecessary disturbance of areas outside the maintenance area. ▪ Constant cognisance of the inherent high erosion risk potential of all soils and sites on the property must be taken and appropriate control and preventative measure put in place.		
13.2.15. General Waste Management		
General waste produced on site is to be collected in skips for disposal at a registered landfill site. Hazardous waste in not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site.	Contractor	Daily
Under no circumstances is waste to be burnt or buried on site.		
The excavation and use of rubbish pits on site is forbidden.		
Waste bins must be cleaned out on a regular basis (weekly) to prevent any windblown waste and/or visual disturbance.		
All general waste must be removed from the construction areas on a daily basis and disposed of in suitable waste receptacles. No general waste is to be disposed of on site.		
Provide adequate rubbish bins and waste disposal facilities on site and educate/encourage workers not to litter or dispose of solid waste in the natural environment but to use available facilities for waste disposal. Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed.		

Environmental Specification	Responsibility	Frequency
Recycling/re-use of waste is to be encouraged.		
Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered sites by a registered waste management company. No litter, refuse, wastes, rubbish, rubble, debris and builders' wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period, but disposed of at an approved site. The construction site must be kept clean and tidy and free from rubbish.		
Management of construction material/building rubble: ▪ Rubble generated from demolishing of existing infrastructure must be loaded onto a dump truck as soon as it is generated. ▪ Once loaded onto the truck, the rubble must be taken to a landfill site and a waybill must be retained as proof of safe disposal. ▪ Should rubble be required as a raw material for the construction, it must be taken to a designated stockpile area.		
Any form of waste material and rubble generated during construction must be removed from the site and disposed of at a facility registered in terms of section 20(b) of the NEM:WA (Act No. 59 of 2008), if it cannot be responsibly reused or recycled on site. No waste material may be buried (for the sole purpose of final disposal) or burnt. The Contractor is responsible for the removal of the rubble and waste must supply the applicant with a certificate indicating safe disposal.		
13.2.16. Hazardous and Industrial Waste Management		
Hazardous waste produced on site includes: ▪ Oil and other lubricants, diesel, paints, solvent. ▪ Containers that contained chemicals, oils or greases; and ▪ Equipment, steel, other material (rags), soils, gravel and water contaminated by hazardous substances (oil, fuel, grease, chemicals or bitumen). Hazardous waste is to be disposed of at a licenced hazardous waste landfill site. The ECO must approve a licenced waste disposal site at the inception of the project.	Contractor	Daily
Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).		
SDCs must be obtained from the waste removal company as evidence of correct disposal and kept on site within the Site Environmental File (SEF).		
It may be feasible for the waste to be transported to a central point where it can be collected in bulk by the waste disposal company. It must however be noted that: ▪ Transport of hazardous materials must be done in accordance with legislative control; and ▪ Relevant SABS Codes of Practice must be adhered to.		
13.2.17. Wastewater		
All wastewater generated at the proposed development must be disposed of in a suitable manner so as not to cause any surface or subsurface water pollution or health hazard.	Contractor	Daily

Environmental Specification	Responsibility	Frequency
Wastewater, including cement-contaminated water, must not enter any watercourse or the sea and must be managed by the site manager to ensure that the existing water resources on and off site are not polluted by activities emanating from the above development.		
Contaminated wastewater including cement-contaminated water must not enter any watercourse and must be managed by the Contractor to ensure that the existing water resources on and off site are not polluted by activities emanating from the above development.		
Used oil and wastewater must be disposed of to a registered facility. A SDC is to be obtained by the Contractor and kept on site within the SEF.		
Water containing waste must not under any condition be discharged into the natural environment. Measures to contain water containing waste and safe disposal of such must be implemented.		
13.2.18. Water Resource Management (Wetland, groundwater and soil contamination)		
There must be full compliance with the Wetland Impact Assessment mitigation.	Contractor	Daily
Concrete pipes must be strategically positioned under the road to drain surface water, this will ensure the road prism does not act as a barrier to water flow		
The footprint area of the road should be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;		
All construction activities and access must make use of the existing dirt road;		
Exposed road surfaces awaiting gravel must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be addressed immediately to prevent further erosion of the road;		
Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse;		
Temporary storm water channels should be filled with aggregate and/or logs (branches included) to dissipate flows. The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are cleaned up and discarded correctly; and		
A suitable storm water plan must be compiled for the road. This plan must attempt to displace and divert storm water from the road and discharge the water into adjacent areas without eroding the receiving areas. It is preferable that run-off velocities be reduced with energy dissipaters and flows discharged into the local watercourses.		
The contractors used for the construction must have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly therefore, all contractors and employees must undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good “housekeeping”;		
During construction activities, all rubble generated must be removed from the site;		
The first 300 mm of soil must be stockpiled separate from the soil excavated deeper than 300 mm;		
Construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access;		

Environmental Specification	Responsibility	Frequency
All chemicals and toxicants to be used for the construction must be stored outside the channel system and in a bunded area;		
All machinery and equipment must be inspected regularly for faults and possible leaks, these must be serviced off-site;		
Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);		
All removed soil and material must not be stockpiled within the system. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;		
Any exposed earth must be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;		
No dumping of construction material on site may take place; and		
All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials must be supported.		
The flow direction of any surface water run-off must be established prior to disturbing any area.		
Construction methods must comply with the stormwater management plan appended as Appendix D to this EMPr.		
Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.		
Pollution Prevention Measures The following measures must be implemented: ▪ An emergency spill response procedure must be formulated, and staff are to be trained in spill response. All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. Spills must be cleaned up immediately and contaminated soil/material disposed of appropriately at a registered site. ▪ 44-gallon drums must be kept on site to collect contaminated soil. These must be disposed of at a registered hazardous waste site. ▪ Fire prevention facilities must be present at all hazardous storage facilities. ▪ Portable toilets (1 toilet per 10 users) are to be provided where construction is occurring. Workers need to be encouraged to use these facilities and not the natural environment. Toilets must be located within the property site. Waste from chemical toilets must be disposed of regularly (at least once a week) and in a responsible manner by a registered waste contractor. Toilet facilities must be serviced weekly and in a responsible manner by a registered waste Contractor to prevent pollution and improper hygiene conditions. ▪ Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.		
Dirty water originating from maintenance activities is to be contained and disposed of correctly, to prevent the contamination of soil and/ or any watercourses.		
Bathing or washing of clothes, equipment or machinery within any watercourse is prohibited.		
Erosion and loss of soil must be prevented by minimising construction areas exposed to surface water run-off.		
Bare areas are to be rehabilitated as soon as the areas become available or after use.		
All water consumption on site must be recorded on a daily basis.		

Environmental Specification	Responsibility	Frequency
The abstraction of water from any water resource for construction purposes and/or dust suppression must not be permitted without a water use authorisation from the DWS.		
13.2.19. Spills, Incidents and Pollution Control		
Any spill incident, which may occur, must be investigated and immediate action must be taken. This must also be reported to the ECO.	Contractor	Daily
In the case of a spill of hydrocarbons, chemicals or bituminous material in the construction camp or on the construction site / bunding area, the spill must be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity.		
Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area;		
Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided and an emergency spill kit must always be available on site;		
Materials must be stored in leak-proof, sealable containers or packaging;		
No storage of vehicles or equipment will be allowed outside of the designated area;		
Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use		
No servicing of equipment on site unless absolutely necessary;		
Leaking equipment must be repaired immediately or be removed from site to facilitate repair;		
Have action plans on site, and training for contactors and employees in the event of sewage spills, leaks and other impacts to the surrounding environment; and		
A specialist Contractor must be used for the bioremediation of contaminated soil where the required remediation material and expertise is not available on site.		
An Emergency Response Plan (ERP) must be developed by the Contractor for approval by the Developer and review by the ECO.		
Should a pollution incident occur on site the Contractor must? ▪ Implement reasonable measures immediately to contain and minimise the impacts of the incident. ▪ Contain the spill. ▪ Notify all persons whose health may be affected by the incident. ▪ Undertake clean up procedures immediately. ▪ Notify the Contractor of the incident immediately who will advise the employee as to the measures that must be implemented. ▪ Record the incident in the Environmental Incident Register; and ▪ Implement measures to prevent similar incidents from occurring in the future.		
The following pollution prevention measures must be implemented at the site: ▪ The proper storage and handling of hazardous substances (e.g., oil, cement, bitumen, paint, etc.) needs to be administered. Construction materials liable to spillage are to be stored in appropriate containment structures (e.g., drip-trays). ▪ Storage containers must be regularly inspected to enable early detection of leaks.		

Environmental Specification	Responsibility	Frequency
▪ All employees handling hazardous materials are to be properly trained in their safe use, environmental restrictions and methods for proper disposal. ▪ Hazardous storage areas must be bunded prior to their use on site during the construction period. The bund wall must be high enough to contain at least 110% of any stored volume. ▪ Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater. Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater. ▪ Cement/concrete batching is to be located in an area to be hardened and must first be approved by the ECO. No batching activities are permitted to occur directly on the ground. ▪ Drip trays must be utilised at all fuel/chemical dispensing areas. Provide drip-trays beneath standing machinery/plant. ▪ Routinely check machinery/plant for oil or fuel leaks each day before construction activities begin. ▪ Vehicle maintenance must not take place on site unless a specific lined and bunded area is constructed within the construction camp for such a purpose. ▪ Ensure that transport, storage, handling and disposal of hazardous substances is adequately controlled and managed. Correct emergency procedures and cleaning up operations must be implemented in the event of accidental spillage. ▪ Spillages of oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately. An emergency spill response procedure must be formulated, and staff are to be trained in spill response. All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. ▪ Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.		
Subsoil and construction material stockpiles are to be bermed to prevent leachate and polluted run-off.		
In the event of a spill incident, the Emergency Response developed by the contractor must be followed.		
13.2.20. Noise		
Neighbouring landowners must be notified about construction activities.	Contractor	Daily
All construction vehicles and equipment are to be kept in good repair and must be fitted with standard silencers prior to construction.		
Where possible, stationary noisy equipment (for example compressors, generators etc. must be encapsulated in acoustic covers, screens or sheds. Portable acoustic shields must be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers).		
Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening.		
Machines in intermittent use must be shut down in the intervening periods between works or throttled down to a minimum.		
In general, operations must meet the noise standard requirements of the Occupational Health and Safety Act (Act No. 85 of 1993).		

Environmental Specification	Responsibility	Frequency
Construction staff working in areas where the 8-hour ambient noise levels exceed 60 dBA must wear ear protection equipment.		
Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SANS 10103 specifications for maximum allowable noise levels for central business districts. No pure tone sirens or hooters may be utilised except where required in terms of SANS standards or in emergencies.		
Noisy operations must be combined so that they occur where possible at the same time.		
Noise from labourers must be controlled.		
Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.		
The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour must be transported to and from the site by the Contractor or his sub-contractors by the contractors' own transport.		
Construction activities are to be contained to reasonable hours during normal working hours.		
Neighbours are to be given at least three (3) days warning prior to any blasting, piling or other 'noisy' activities.		
13.2.21. Air Quality Pollution Management and Odour Control		
Any oil containing equipment or containers must be managed in a manner to avoid oil exposure to atmosphere to limit evaporation of volatiles to atmosphere.	Contractor	Daily
Portable toilets must be regularly emptied to avoid and minimise sanitary odour pollution.		Weekly
No fires are to be allowed on site.		Daily
Vehicles must be maintained to avoid excessive emissions and smoke. Similarly, equipment must be serviced.		
13.2.22. Dust Control		
Dust track-on from disturbed areas to gravel road surfaces must be avoided by making use of one of the following measures to: ▪ Road sweeping. ▪ Chemical dust suppression of disturbed areas to reduce the amount of dust which can be lifted by the wheels of trucks. ▪ Wet suppression to the roads using a light spray. ▪ The washing down of the wheels of trucks before they exit only paved road surfaces.	Contractor ECO	Daily
Dust liberated to atmosphere must not reduce the visibility for private vehicles making use of the road passing by the site.		
Re-vegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. Plant roots bind the soil, and vegetation cover breaks the impact of falling raindrops, thus preventing wind and water erosion. Plants used for re-vegetation must be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and must easily be propagated by seed or cuttings.		

Environmental Specification	Responsibility	Frequency
All construction vehicles and equipment are to be kept in good repair.		
Speed limits of a maximum of 40 km/hr are to be implemented on site and enforced by the Contractor.		
Dust liberated to atmosphere must not reduce the visibility for vehicles making use of the road passing by the site.		
Shade cloth fencing is to be used to reduce dust aggravation.		
Construction activities are to be contained to reasonable hours during the day avoiding periods of sunrise and sunset.		
In areas where there is a large potential for dust liberation (high wind days) wet suppression using a light spray must be applied to the areas in question.		
A dust suppression registers as well as a complaints register must be kept.		
All complaints received need to be investigated with remedial action taken communicated to the affected party within 14 days.		
13.2.23. Stormwater Management		
The Stormwater Management Plan must be implemented to ensure proper management of stormwater on the site during and after construction to ensure that pollutants and sediment are not released into any water resources.	Contractor Engineer	Daily
Stormwater drainage must be *via* open drains/swales adjacent to the road with energy check structures rather than concrete drains. Under no circumstances must drop inlets and concrete pipes be utilised.		
The Stormwater Management Plan must be adhered to.		
Wherever possible, the temporary chutes/berms must not be aligned perpendicular to the slope.		
Removal of vegetation cover must be carried out with care and attention to the effect, whether temporary or long-term, that this removal will have an erosion potential.		
Precautions must be taken at all times on building sites to contain soil erosion and prevent any eroded material from being removed from the site.		
Landscaping and re-vegetation of areas not occupied by buildings or paving must be programmed to proceed immediately after building works have been completed or have reached a stage where newly established ground cover is not at risk from the construction works.		
On site stormwater control systems, such as swales, berms, soil fences and attenuation ponds are to be constructed before any construction commences on the site. As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.		
Earthworks on sites are to be kept to a minimum. Where embankments have to be formed, stabilisation and erosion control measures must be implemented immediately.		
Stormwater must not be allowed to pond in close proximity to existing building foundations.		
Regular monitoring of the sites must be undertaken.		
13.2.24. Social Considerations		
Working hours are restricted to 07:00 – 18:00 during weekdays and 08:00-17:00 over weekends if necessary.	Contractor	Daily

Environmental Specification	Responsibility	Frequency
Should work be required after these hours, the ECO must be notified and any person who resides in close proximity to the site and who may be impacted upon by the disturbance must also be notified.		
All neighbouring landowners and those that are disturbed due to construction activities are to be notified of construction activities and provided with regular feedback on the status of construction.		
The Contractor is to arrange for a suitable candidate to assist with the appointment of local labour and assist with labour disputes.		
13.2.25. Visual Considerations		
Storage facilities, elevated tanks and other temporary structures must be located such that they have as little visual impact on local residents as possible. Special attention must be given to the screening of highly reflective materials on site.	Contractor	Daily
13.2.26. Reporting & Record Keeping - Complaints Register		
Complaints received must be registered and recorded by the Contractor and also brought to the attention of the contractor. Both parties will respond accordingly. The following information must be recorded in the case of any complaint / incident: ▪ Time, date and nature of complaint. ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.	Contractor	Daily
All complaints received will be investigated and a response is to be given to the complainant within 7 days.		
13.2.27. Reporting & Record Keeping - Environmental Incidents Register		
All environmental incidents occurring on the site will need to be recorded in an Environmental Incident Book and brought to the attention of the ECO. The following information must be provided: ▪ Time, date and nature of complaint. ▪ Response and investigation undertaken; and ▪ Corrective and preventative actions taken and by whom.	Contractor	Daily

13.3. Post Construction / Rehabilitation / Operational and Maintenance Phase

Table 12: Post Construction Phase EMPr

Environmental Specification	Responsibility	Frequency
13.3.1. Construction areas		
All structures comprising the construction affected areas are to be removed from the site and surrounding areas.	Contractor	Post-Construction

Environmental Specification	Responsibility	Frequency
The area that previously housed the construction materials is to be checked for spills of substances such as oil, paint, diesel, etc. and these must be cleaned up.	Developer	
All hardened surfaces within the construction affected area must be ripped, all imported materials removed, and the area must be top soiled and re-grassed accordingly with indigenous species.		
The Contractor must arrange the cancellation of any temporary services.		
13.3.2. Vegetation		
All areas that have been disturbed by construction activities (including the construction affected areas) must be cleared of alien vegetation.	Contractor / Developer	Post-Construction
All vegetation that has been cleared during construction is to be removed from site or used as mulch, (except for vegetation which may result in inadvertently seeding alien vegetation).		
Prior to planting of any vegetation/seeds, the target area must be prepared according so as to minimise the success rate of the plant establishment. The following are general land preparation requirements for all areas requiring rehabilitation: ▪ All rubble, litter, foreign materials and waste products needs to be removed from the construction area and disposed of at proper local waste disposal/landfill facilities. Minimise additional disturbance by limiting the use of heavy vehicles and personnel during clean-up operations. ▪ Any soil stockpiles/spoil material must spread evenly on the ground to match the natural slope/natural ground level. ▪ All embankments are to be shaped to the specification of the project or recommendations of the engineer/ECO. Any erosion features within the construction site must be stabilised. Compacted soil infill, rock plugs, gabions, excavation and reshaping or any other suitable measures can be used for this purpose. ▪ Topsoil must be placed in the same area from where it was originally stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas. Where topsoil is lost during construction as a result of erosion, topsoil will need to be imported to the site and re-established. ▪ Such topsoil must be sourced commercially and legally. ▪ The topsoil must be compacted to similar compaction levels as natural soils in the area. The engineer will provide detailed advice on this. For seeding, the soil needs to be prepared to optimise germination. This is typically undertaken by hand or light machinery to loosen the soil in the seedbed but must be firm enough to facilitate good contact between the seeds and the soil.		
13.3.3. Materials and Infrastructure		
All residual stockpiles must be removed to spoil or spread on site as directed by the Developer and/ or Engineer.	Developer Engineer Contractor	Post-Construction
All leftover building materials must be returned to the depot or removed from the site.		
The Contractor must repair any damage that the construction works has caused to neighbouring properties.		
Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Developer.		

Environmental Specification	Responsibility	Frequency
13.3.4. Rehabilitation		
The Developer is responsible for compliance with the provisions for Duty of Care and Remediation of Damage in accordance with Section 28 of National Environmental Management Act (NEMA), Act No. 107 of 1998.	Contractor Engineer Developer ECO	Post-Construction
All remaining maintenance materials, building rubble and waste are to be removed from the site to an approved disposal site. Burying rubble on the site is prohibited.		
All disturbed surfaces compacted by maintenance activities including the ablutions and loading areas must be ripped to a minimum depth of 30cm to allow organic contaminants to breakdown and promote vegetation establishment.		
The Contractor is required to rehabilitate all impacted areas according to the approved Method Statement for the Rehabilitation of Modified Environments.		
Final rehabilitation must be completed within a period specified by the Engineer.		
The site and surrounding areas are to be cleared of all litter.		
Surfaces are to be checked for waste products from activities such as concreting or asphalting.		
All embankments are to be trimmed, shaped and replanted to the satisfaction of the ECO.		
Immediately after construction disturbed areas must be re-vegetated using the rescued plant sods and supplemented with transplants from adjoining like habitats if required. Alternatively, reseeding *via* broadcasting using an indigenous seed mix reflecting the general species composition of the area must also be used where necessary. If such seed mixes are not available, seed will need to be harvested from the area and grown nearby for later re-vegetation using plugs/sprigs.		
Alien and weedy vegetation that colonise the disturbed areas must be removed and eradicated.		
The soils must be adequately prepared prior to planting by a Contractor with experience in re-vegetation and under no circumstances must fertiliser be applied.		
13.3.5. End of Contractor Services		
A meeting is to be held on site between the Developer and the ECO to approve all remediation activities and ensure that the site has been restored to a condition acceptable to the ECO and the Developer.	ECO Developer	Post-Construction
A site close-out audit is to be undertaken by the ECO prior to handover of the site by the Contractor.		
13.3.6. Waste Management		
Waste management at the site subscribes to the principles of sustainable waste management. This includes: ▪ Waste prevention - the prevention and avoidance of the production of waste at source. ▪ Waste reduction - the reduction of the volume or hazardous nature of the waste during production. ▪ Resource recovery - recycling or re-use of the waste. ▪ Waste treatment - the treatment of waste to reduce volume or risk to human and environmental safety and health to reduce the degree of hazard when waste is disposed of in a landfill or discharged into a water source; and		

Environmental Specification	Responsibility	Frequency
▪ Waste disposal - the environmentally acceptable and safe disposal or discharge of waste, (e.g., encapsulation, incineration, landfill or discharge to a water source). These principles must be practiced to the greatest extent possible.		
The following must be ensured: ▪ Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed. ▪ No litter, refuse, wastes, rubbish, rubble, debris and builders waste must be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period. ▪ No solid waste may be burned on site.		
13.3.7. Social concerns		
Job creation expectations will have to be well managed *via* management systems and communication mechanisms that regularly inform the local community (on site and at local community centres) of the progress and job / skills needs at the development sites.	Developer	Construction and operational phases – on-going

14. Invasive Alien Plant Eradication Programme

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
    - Section 75 of the Act.
    - The relevant invasive species management programme developed in terms of regulation 4; and
    - Any directive issued in terms of section 73(3) of the Act.

IAP species were recorded within the project area and must therefore be removed and controlled by implementing an alien invasive plant management programme in compliance of section 75 of the Act as stated above.

It is pertinent that measures be implemented to prevent the introduction of additional listed IAPs onto the property, and from spreading from the property to the surrounding environment.

- Preventative actions
    - No listed invasive and alien plant species must be planted intentionally within the property; and
    - Areas bordering onto neighbouring land must be considered for control measures to prevent existing invasive plants from spreading beyond the boundaries of the property and vice versa.
- Early Detection and Rapid Response and Eradication actions
    - Regularly survey the property to detect any new or emerging listed invasive plant species.
    - Report Category 1 species to the Department of Environmental Affairs/Provincial Conservation Agency/Local Municipality/South African National Biodiversity Institute (SANBI) EDRR programme and ask for assistance with the control of the species.
    - Do not allow species to produce propagules, or start growing via vegetative means by immediately removing them; and
    - Increase surveillance in the areas after the species were controlled to quickly remove re-sprouting plants or seedlings.

The following monitoring framework must be implemented to ensure that IAPs are continually monitored, and progress pertaining to their control is recorded (**Error! Reference source not found.**). T he monitoring of the area throughout the process is crucial in order to prevent IAPs growing and spreading out of control, thereby threatening the wellbeing of indigenous flora.

Table 13: Proposed monitoring framework for the control of invasive alien plants

Metric	Frequency	Method	Response
How effective are the control methods	4-6 months after every operation	Survey the cleared areas and look for regrowth. Before and after photographs are effective for this. Observe for non-target effects of herbicide application.	If the survey reveals that the control methods are effective, e.g., low levels of re-sprouting, continue following the herbicide mixtures and control methods. If non-target plants are dying off where herbicides were applied, ensure appropriate training for herbicide applicators, demonstrate the off-target effects to herbicide applicators to ensure they are using the correct methods and herbicides. (If the results show that the control methods are not effective, adapt by e.g., cutting lower above ground or changing herbicides or timing of herbicide application.
Do the infestation levels decrease	Annually	Survey the cleared areas and record species, densities and size. Before and after pictures are very effective.	If the infestation levels are not decreasing, reconsider clearing intervals and look at clearing methods. If infestation levels are decreasing, then continue current control method.
Quantity of herbicides used	During every operation	Keep track of cost and ensure no wastage. Record herbicide usage	Track usage over time, it will reveal a certain trend in quantities for different infestation levels. Less herbicides must be used when the infestation levels are lower. Record herbicide cost.

Metric	Frequency	Method	Response
Does the indigenous vegetation recover in the cleared areas?	Annually	Survey the cleared areas and look out for indigenous species variety and presence. Before and after pictures are effective.	If there is recovery of indigenous vegetation, then continue current control method. If there is no recovery, consider rehabilitation with local indigenous species.
How many jobs were created	After every operation	Timesheets	Job creation figures are useful when asking for landowner assistance from WFW or to demonstrate contributions to jobs and socio-economic conditions
How many person days (PD) were spent per operations	After every operation	Timesheets	Keep track of cost and assist with planning and budgeting. Determine cost per person per day (PD)

Table 14: Specific specialist mitigation and management measures

Table 4-6 Summary of management outcomes pertaining to impacts to biodiversity associated with the proposed D1001 Road upgrade

Management Action	Phase	Responsible Party for Implementation
Areas rated as High sensitivity in proximity to the development area, must be declared as 'no-go' areas during the construction phase, and all efforts must be made to prevent access to this area from construction workers and machinery .	Construction	Project Manager Environmental Officer
The areas to be developed must be specifically demarcated to prevent movement of workers into sensitive surrounding environments;	Construction	Environmental Officer
Areas that are denuded during construction needs to be re-vegetated with indigenous vegetation. This will also reduce the likelihood of encroachment by alien invasive plant species.	Construction	Project Manager Environmental Officer
It should be made an offence for any staff to bring or plant any plant species into any portion of the project area, unless undertaken in line with the required/approved rehabilitation. No plant species whether indigenous or exotic should be brought into the project area, to prevent the spread of exotic or invasive species.	Construction	Environmental Officer
An extensive alien plant management plan be compiled to remove the alien vegetation from within the project footprint. The use of herbicide needs to be monitored and only be used by a qualified person	Construction	Environmental Officer
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species;	Construction	Environmental Officer
The development areas and access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon.	Construction	Project Manager Environmental Officer
Areas of indigenous vegetation, even secondary communities, should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste.	Construction	Environmental Officer
Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities. A fire expert should be consulted for suitable guidelines for the area and project requirements.	Construction	Project Manager Environmental Officer Health and Safety Officer

Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited.	Construction	Environmental Officer Health and Safety Officer
Prior and during vegetation trimming any larger fauna species noted should be given the opportunity to move away from the construction machinery.	Construction	Environmental Officer
Where possible, work should be restricted to one area at a time. This will give the smaller birds, mammals and reptiles a chance to vacate the area	Construction	Project Manager Environmental Officer
Prior to trimming vegetation and site activities, the area to be disturbed should be walked on foot by 1-2 individuals to create a disturbance for fauna to vacate the area. Sites should be disturbed on a needs basis only, and just prior to the activities on the site.	Construction	Project manager, Environmental Officer
A site plan of the area must be made available onsite for all contractors and personnel indicating parking & storage areas, site offices and placement of ablution facilities.	Construction	Project Manager Environmental Officer
The Contractor should inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. A minimum of one toilet must be provided per 10 persons.	Construction	Health and Safety Officer Environmental Officer
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.	Construction	Health and Safety Officer Environmental Officer
Where a registered disposal facility is not available close to the site, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may	Construction	Health and Safety Officer

Management Action	Phase	Responsible Party for Implementation
domestic waste be burned on site. Temporary storage of domestic waste shall be in covered waste skips.		Environmental Officer
Any topsoil that is removed during construction must be appropriately removed and stored according to the national and provincial guidelines. This includes on-going maintenance of such topsoil piles so that they can be utilised during decommissioning phases and re-vegetation; and	Construction	Environmental Officer
All livestock must always be kept out of the project area, especially areas that have been recently re-planted	Construction	Environmental Officer
Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and dumps especially. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated. No dust is allowed, whether intentionally or otherwise, to be blown across into the surrounding areas;	Construction	Environmental Officer
All removed soil and material must not be stockpiled within the wetland/watercourse and associated buffer zone. Stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds.	Construction	Environmental Officer
A pest control plan must be put in place and implemented. it is imperative that poisons not be used	Construction	Health and Safety Officer
Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.	Construction	Project Manager Environmental Officer
Have action plans on site, and training for contactors and employees in the event of sewage spills, leaks and hazardous chemical spills to the surrounding environment. A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site.	Construction	Project Manager Environmental Officer
Appropriate measures must be implemented to prevent excessive noise and vibration. No construction is to occur at night to avoid disturbance to amphibians.	Construction	Project Manager Environmental Officer
Appropriate speed reducing measures, such as speed bumps and speed limit signs, should be incorporated into the road design to reduce the chance of roadkill.	Operational	Project Manager Contractor
Effective and sustainable stormwater designs must be incorporated into the road design to prevent excessive runoff into the surrounding natural environment and thereby, causing erosion.	Operational	Project Manager Contractor

15. Spill Contingency Plan

15.1. Intent

A spill contingency plan is required for all undertakings involving the handling and storage of petroleum products or hazardous materials. Spill preventative measures are the best means of avoiding accidental release of fuel which can adversely affect the environment. This plan is intended to prevent spills and, in the event of a spill, to minimize the impact of the spill on the environment. The purpose of this Spill Contingency Plan is to:

- Facilitate the prompt, efficient and safe clean-up of materials spilled during the construction and operational phases during the development; and
- Identify the reporting procedures in the event of a spill.

This spill contingency plan is applicable to all site staff, contractors and service providers, employees and visitors to the site.

15.2. Material Safety Data Sheets

A register with details of all hazardous materials must be included in the Health and Safety File. The supplier of these hazardous materials must provide Material Safety Data Sheets (MSDS) for all products which must be displayed where hazardous materials are stored. The MSDS must include the following information:

- Product and Company Identification.
- Composition/Information on ingredients.
- Hazards Identification.
- First-Aid Measures.
- Fire-fighting measures.
- Handling and storage.
- Exposure control/personal protection.
- Physical and chemical properties.
- Stability and reactivity.
- Toxicological information.
- Ecological information.
- Disposal considerations.
- Transport information.
- Regulatory information; and
- Any other applicable information.

This must be provided free of charge from the supplier. Should a MSDS not be provided, the supplier must issue sufficient information to enable the Contractor to take the necessary measures as regards to health, safety and environmental.

15.3. Handling and Storage

All activities must be appropriately carried out as per the Hazardous Chemical Substances Regulations 1995, Section 14:

Labelling, packaging, transportation and storage

"An employer shall, in order to avoid the spread of contamination of an HCS1, take steps, as far as is reasonably practicable, to ensure:

a) That the HCS in storage or distributed are property identified, classified and handled in accordance with SABS 072 and SABS 0228.
b) that a container or a vehicle in which an HCS is transported is clearly identified, classified and packed in accordance with SABS 0228 and SABS 0229; and

c) *That any container into which an HCS is decanted is clearly labelled with regard to the contents thereof."*

15.4. Hazardous Materials

Hazardous materials must be managed as follows:

- Proper designated areas and storage facilities must be provided for all hazardous materials to prevent spillage into the environment.
- All hazardous materials storage facilities must be located on an impermeable surface and must be enclosed by a sealed bund wall. The bund wall must be capable of containing 110% of the maximum volumes stored to ensure that soil or watercourses are not polluted in the event of a spill in the storage areas.
- Rainwater contained within the bund wall is to be regarded as potentially contaminated and must not be released into the environment, unless it is established by chemical analysis (e.g., COD) that the water is not contaminated;
- Mixing of volumes of bitumen and asphalt cement must take place in a controlled environment on a designated impermeable surface equipped with an SOG trap. The trap must not overflow, and the waste captured must be disposed of at a registered landfill site or recycled;
- The Depot Manager must ensure all Safety, Health and Environmental risks of spills are communicated to all employees. All employees must also receive task specific training for handling of any hazardous material. Casual and contractors' labourers' are to be familiarized with all the relevant precautions when they are employed (Occupation Health and Safety Act 85 of 1993, Section 13);
- The Depot Manager must ensure that a site-appropriate spill kit and relevant personal protective equipment (PPE) is readily available in the event of a spill.
- The transfer of fuel must be stopped prior to overflowing, leaving room for expansion.
- All machinery must be maintained in good working order as to prevent soil and groundwater pollution from leaks and spills.
- All hazardous waste must be stored in designated containers and be disposed of at a registered landfill site.
- Vehicles transporting dangerous or hazardous chemicals may only be washed in a designated washing bay, equipped with an SOG trap.
- Smoking must be prohibited near the use of any hazardous material and flammable substances.
- Fire Extinguishers must be readily available where any hazardous materials are being stored or used.
- The area where a spill has occurred must be rehabilitated after the spill has been cleaned up.
- Drip trays must be used under generators and cement/bitumen mixers to shield the soil or vegetation below; and
- Where possible, oil must be recycled.

Most spills are caused by operator error, poor operation practices and inadequate maintenance. Common operator errors are overfilling, valves left open, poor transfer procedures, lack of product monitoring, and poor maintenance practices. Operational errors can be greatly reduced through:

- Task specific training:
  - A list of emergency contacts and numbers for important on-site staff and their roles, chemical spill response agencies, waste companies, and necessary authorities must be displayed and communicated to all employees. A secondary staff member must be appointed to co-ordinate responses to spills and emergencies in the absence of the Depot Manager.
  - Location of spill kits must be communicated to operating personnel as well as other employees.
  - Spill response training will need to be provided for the person(s) that are appointed to attend to spills.
  - Task specific training must be provided for those employees monitoring and handling any hazardous material. Proof of this training must be kept in the Health and Safety File.
  - Safety training at each depot must include operational procedures, emergency procedures, safe working procedures, information on specific hazards, first aid and fire-fighting, and proper use of PPE.
  - Unauthorized persons must not be permitted access to storage areas.
  - Instructions and phone numbers must be posted publicly regarding the report of a spill, particularly in residential areas; and
  - Routine sampling schedules (including groundwater monitoring where necessary) must be setup and implemented. A competent person must be appointed to undertake these tasks.
- Awareness of the critical nature of spill prevention:
  - Employees must be educated on the effects of the hazardous substances that are used to the local environment through discharge to stormwater systems, watercourses and beaches.
  - Employees must be educated on the nature of the product with regard to spills – Some of this information must be included in the Material Safety Data Sheet (MSDS); and
  - Employees must be educated on the toxicity of stored fuels and oils to humans, plants and animals. Petroleum contains a mixture of compounds that are hazardous to organism health. (e.g., Benzene which are cancer causing agents, Hydrocarbons which are linked to problems ranging from headaches to respiratory diseases.)
- Proper and continuous supervision of procedures:
  - Proper procedures must be in place for handling and storage of the hazardous materials. E.g., Portable equipment (e.g., generators and pumps) must be placed on impervious surfaces, alternatively adequate drip trays need to be provided; and when unreeling a fuel transfer hose, the nozzle must be in an upright position and be kept clear of the ground when returned to the storage position;
  - Workers must know and follow all procedures.
  - All employees must attend the procedural training as procedures may change; and
  - All procedures and records must be checked to verify compliance and record all findings.

16. ENVIRONMENTAL EMERGENCY RESPONSE PLAN

16.1. Intent

The environmental emergency procedures for all sites must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e., into the watercourse / stormwater systems) and land.
- Accidental spillage of hazardous substances (typically oil, petrol, diesel and bituminous products).
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

16.2. Response Procedure

In the event of a spill, the following procedure must be followed:

- Isolate and demarcate the area to protect all employees or visitors to the site.
- Immediately contain the spill to the spill area – i.e., ensure that spill does not run/flow away: the most common method is to place either absorbent or non-absorbent dikes around the perimeter of the spill.
- Identify nature of spill, for example paint, bitumen or diesel.
- Identify the source of the spill and stop the leak if possible, and safe to do so.
- Remove any sources of ignition.
- Assess the level of the spill.
- Report spill to ECO and KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA).
- Locate spill kit where applicable or wait for the hazmat service provider/fuel company to arrive to assist.
- Consult the Material Safety Data Sheets (MSDSs): MSDS are used to determine the necessary PPE required for a response to spill situations (for example protective suits, boots, gloves and/or respiratory protection).
- Identify method of clean-up and potential hazards.
- Protect stormwater drains or sewers, or any other point of access to the environment.
- Proceed with recovery of spilled fuel and clean up.
- Arrange for the appropriate disposal of the spilled material.
- All hazardous waste must be contained in separated designated containers and disposed of at registered landfill sites.
- In the event of small spills, arrangements for remediation must be made immediately.
- Spills must not be washed off onto the street, into watercourses or stormwater systems. No spills must be hosed into the natural environment.
- Records of the spill must be maintained in an Incidents register with:
  - Nature of incident.
  - Cause of incident.
  - Clean up measures; and
  - Mitigation measures taken.
- Where relevant, record in non-compliance register.
- The Contractor must retain Safe Disposal Certificates for any materials associated with chemicals/chemical spills disposed to landfill, to submit to EDTEA
- Adjustments must be made, if necessary, to the operational and emergency procedures and the Environmental Management System to prevent future occurrences; and

- In the event of a significant spill, the Contractor is to raise an incident report and report to relevant authorities i.e., DEA, and Department of Water and Sanitation (DWS) should it be required.

16.3. Spill Response Supplies

An emergency spill kit (e.g., Drizit kit) and designated hazardous waste bin must be available and visible at each site. The following supplies must be maintained, and records of inspections must be kept at all times:

- Spill kits.
- Sorbents, including hydrocarbon absorbent.
- Absorption pads and booms.
- Personal protective equipment (PPE).
- Caution tape and cones; and
- Tools, particularly a spade or scoop, and drums.

16.4. Notification

A list of the appropriate people to be notified in the event of a spill must be available on site with their contact details.

16.5. Conclusion

Any significant spill has the ability to endanger employees' health or lives, create environmental damage and have a large financial impact. Therefore, it is imperative that all the necessary precautions are taken to prevent spillage.

17. Declaration and Adoption

Declaration of Understanding of the EMPr

The following declaration of understanding of the EMPr will be required to be signed by the Client, Engineers, and Contractors.

DECLARATION OF UNDERSTANDING
OF THE D1001 UPGRADE
ENVIRONMENTAL MANAGEMENT PROGRAMME

I,_____
acting as Client / Engineer / Contractor / ECO representing

_____

declare that I have read and understood the contents of the Environmental Specifications (which include the Environmental Management Programme, the Record of Decision and the Environmental Authorisation, the Project Specifications and this guideline document) for
Contract:

_____

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: _____
Place: _____
Date: _____

Witness 1: _____

Witness2: _____