Appendix H: Environmental Management Programme (EMPr)

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

PROPOSED EAST-WEST LINK ROAD RE-ALIGNMENT, CITY OF JOHANNESBURG, GAUTENG

Proponent:

Steyn City Properties (Pty) Ltd.

STEYN CITY

Report Compiled by:

PRISM
ENVIRONMENTAL MANAGEMENT SERVICES

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1 INTRODUCTION

1.1 Overview

The development of Porcupine Avenue from the border of Riverside View Extension 35 up to Runnymead Road was authorised by the Gauteng Department of Agriculture and Rural Development (GDARD) on 25 February 2016 (Gaut: 002/15-16/E0053). In addition to above 2016 Authorisation, sections of the road were also authorised as part of separate processes (Gaut: 002/12-13/E0070; Gaut: 006/13-14/E0091 and Gaut: 002/14-15/0022).

However, a small section of the authorised alignment (the intersection between 10th Road and Runnymead Road) impacts on the existing Equestrian Estate within Steyn City. It is therefore necessary to redesign this section. The proposed re-alignment involves the bending of the road so that it no longer impacts on Steyn City.

Two alternatives were assessed as part of the Basic Assessment Process in addition to the No-Go Alternative. These included:

- Proposal; and
- Alternative 1.

Based on the impact assessment undertaken as well as the findings of the specialist study and the need for the project, it is the opinion of the EAP, that the **Proposal be approved**. It should be noted that mitigation measures contained in this report apply to both alternatives. Where additional mitigation measures are required for the alternative (Alternative 1), these are indicated in *italics.*

1.2 Project Location

1.2.1 Proposal

The proposed re-alignment (Proposal) occurs on the Remainder of Portion 1 of the Farm Diepsloot 388 J.R. The coordinates of the re-alignment are provided in Table 1-1.

Table 1-1.: Corner Point Coordinates

	Coordinates	
Start Point	25°57'28.38"S	27°58'38.25"E
Middle Point	25°57'24.48"S	27°58'30.69"E
End Point	25°57'26.51"S	27°58'22.89"E

The Surveyor General 21-digit diagram number for Remainder of Portion 1 of the Farm Diepsloot 388 J.R is provided in **Error! Reference source not found.** below.

Table 1-2.: Surveyor General Diagram Numbers.

Portion	Surveyor General Diagram number
Remainder of Portion 1	T0JR00000000038800000

1.2.2 Alternative 1

The Alternative re-alignment (Alternative 1) traverses the following properties:

- Portion 5 of Farm of Diepsloot 388-JR.
- The Remainder of Portion 1 of the Farm Diepsloot 388 J.R
- Portion 25 of Farm Nietgedacht 535-JQ

The coordinates of the re-alignment are provided in Table 1-3.

Table 1-3.: Corner Point Coordinates

	Coordinates	
Start Point	25°57'36.43"S	27°59'54.03"E
Middle Point	25°57'29.52"S	27°59'6.59"E
End Point	25°57'28.89"S	27°58'14.53"E

The Surveyor General 21-digit diagram numbers for the relevant properties is provided in Table 1-4 below.

Table 1-4.: Surveyor General Diagram Numbers.

Property Details	Surveyor General Diagram number
Portion 5 of Farm of Diepsloot 388-JR	T0JR00000000038800005
Remainder of Portion 1 of the Farm Diepsloot 388 J.R	T0JR00000000038800000
Portion 25 of Farm Nietgedacht 535-JQ	T0JR00000000053500025

2 EMPR REQUIREMENTS AND REPORT OUTLINE

The contents of this EMPr has been compiled according to the prescribed minimum legal requirements contained in Appendix 4 of the EIA Regulations, 2014 (as amended). Refer to Table 2-1 below. Additional sections have been added to the report for purposes of best environmental practice.

Table 2-1: Contents of EMPr

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations
1.	Introduction	-
2.	EMPr Requirements and Report Outline	-
3.	Details of EAP	(a) details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
4.	Project Description and Activities, Aspects, and Impacts	(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.
5.	Environmental Sensitivity	(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;
6.	Goals and Objectives	(d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;
		(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d)
7.	General Roles and Responsibilities	(i) an indication of the persons who will be responsible for the implementation of the impact management actions

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations
8.	Environmental Awareness Plan	(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
9.	Waste Management Plan	-
10.	Emergency Preparedness Plan	-
11.	Monitoring Programme	(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);
		(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);
		(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
		(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
		(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
12.	EMPr	(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

3 DETAILS OF THE EAP

Prism EMS have been appointed to undertake the required Environmental Authorisation process in terms of the 2014 Environmental Impact Assessment (EIA) Regulations. Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the EMPr is provided in Table 3-1 and Curriculum Vitae is appended in Appendix I2 of the Basic Assessment Report.

Table 3-1.: Details of the EAP.

EAP:	Vanessa Stippel
Company:	Prism Environmental Management Services
Qualifications:	MSc. Ecology, Environment and Conservation
Experience:	6 years
Affiliation/ Registration	Professional Member of Southern African Institute of Ecologists and Environmental Scientists SACNASP Pr.Sci.Nat. (116221)
Address:	PO Box 1401, Wilgeheuwel, 1736
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Fax:	086 601 4800
Email:	vanessa@prismems.co.za

Designation	**Name**	**Qualification**	**Professional Registration**	**Specialist Assessment**
Prism EMS Team				
Contact Details	**Post:** PO Box 1401, Wilgeheuwel, Johannesburg, 1736		**Tel:** 087 985 0951 **Fax:** 086 601 4800 **Email:** prism@prismems.co.za Website: www.prismems.co.za	
Senior Environmental Assessment Practitioner	Ronaldo Retief	MSc Zoology BSc.Hons (Zoology) BSc (Natural & Environmental Science)	SACNASP Pr. Sci. Nat. (400134/10)	Environmental Impact Assessment Review
Principal EAP	De Wet Botha	MA. (PHED) Environmental Management	SACNASP Registration in process	Project Director

4 PROJECT DESCRIPTION AND ACTIVITIES, ASPECTS, AND IMPACTS

4.1 Project Description

The development of Porcupine Avenue from the border of Riverside View Extension 35 up to Runnymead Road was authorised by the Gauteng Department of Agriculture and Rural Development (GDARD) on 25 February 2016 (Gaut: 002/15-16/E0053).

In addition to above 2016 Authorisation, sections of the road were also authorised as part of separate processes (Gaut: 002/12-13/E0070; Gaut: 006/13-14/E0091 and Gaut: 002/14-15/0022) (see Figure 4-1 below).

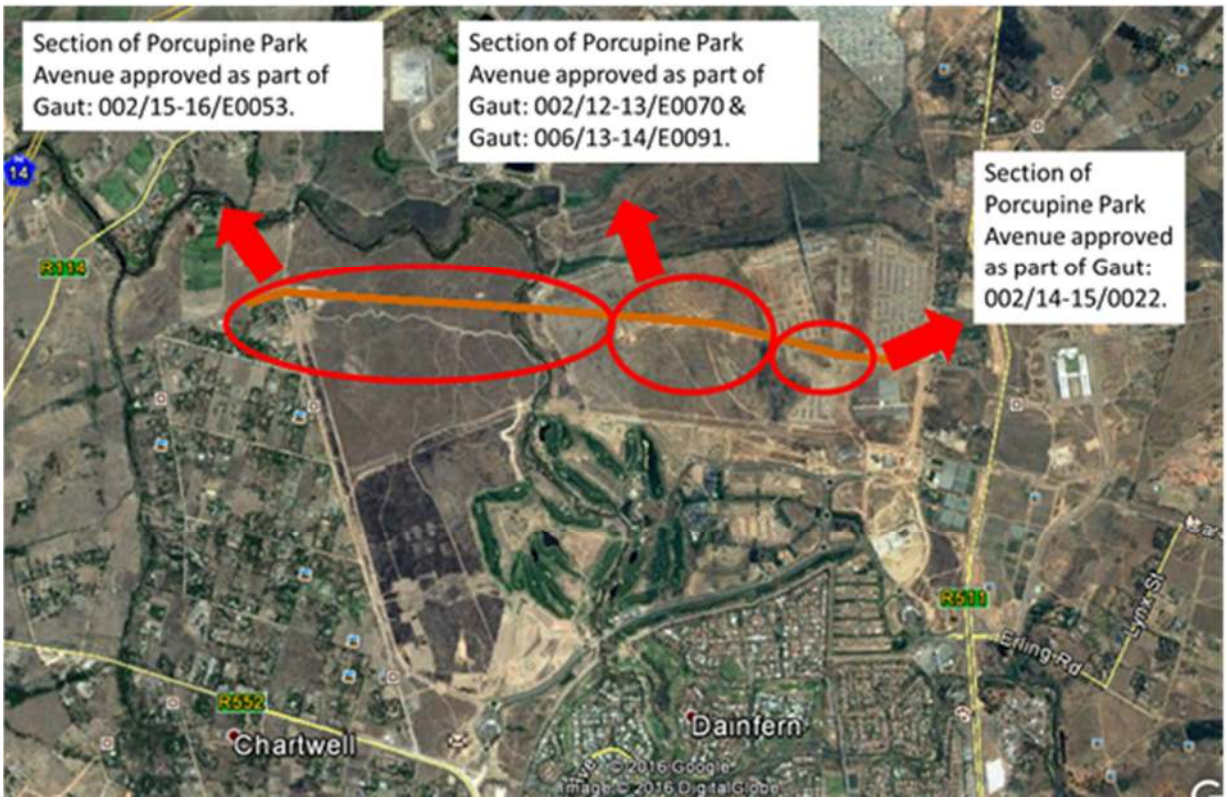

Figure 4-1: Previously Authorised Sections

However, a small section of the authorised alignment (the intersection between 10th Road and Runnymead Road) impacts on the existing Equestrian Estate within Steyn City. It is therefore necessary to redesign this section. The proposed re-alignment involves the bending of the road so that it no longer impacts on Steyn City.

The overall East West Link Road will carry high volumes of traffic and it will function as an important link in the greater road network. The aim of the road as a whole is to assist with the distribution and alleviation of traffic in this area of Johannesburg. The road has been planned as a Class 3 Arterial Road and will be

managed by Johannesburg Roads Agency (JRA), once the road is constructed. The applicant in terms of the environmental authorisation process is however, Steyn City Properties (Pty) Ltd.

4.1.1 Alternatives

Two alternative re-alignment options were assessed as part of the authorisation process.

4.1.1.1 Proposal

The proposed section that will be re-aligned is the western section of the road which commences east of Runnymead Road and follows in a western direction towards the intersection with the R114 (P39-1/ K52). As part of the preferred re-alignment (the Proposal), a small section of the road curve northwards so to miss the existing Steyn City Equestrian Estate. It will then curve southwards and joins up with the existing Runnymead Road and 10th Road intersection. From the intersection, it will follow the existing alignment again (**Figure 4-2**).

The preferred option occurs on the Remaining Extent of Farm Diepsloot 388-JR within Ward 96 of the City of Johannesburg Metropolitan Municipality. The property is owned by Johannesburg Property Company (JPC) and the area (Porcupine Park) is currently managed through a management agreement which is in place between City of Johannesburg and Steyn City Properties (Pty) Ltd (previously known as Golden Creek Investments (Pty) Ltd.

4.1.1.2 Alternative 1

Within Alternative 1, Porcupine Avenue will be re-aligned east of the Jukskei River on Portion 5 of Farm of Diepsloot 388-JR. It will then run adjacent to the Steyn City boundary (within the Remaining Extent of Farm Diepsloot 388-JR – i.e. Porcupine Park). It then will cross Runnymead Avenue slightly to the north of the existing Runnymead road and 10th road intersection. From the intersection, the road will curve to the south and then join the existing 10th road. This bend in the road will occur within Portion 25 of Farm Nietgedacht 535-JQ.

Figure 4-3 shows the extent of the re-alignment in terms of Alternative 1. It should be noted that with Alternative 1, the full alignment of Porcupine Avenue will run within Porcupine Park and a much larger section of the road will have to be re-aligned.

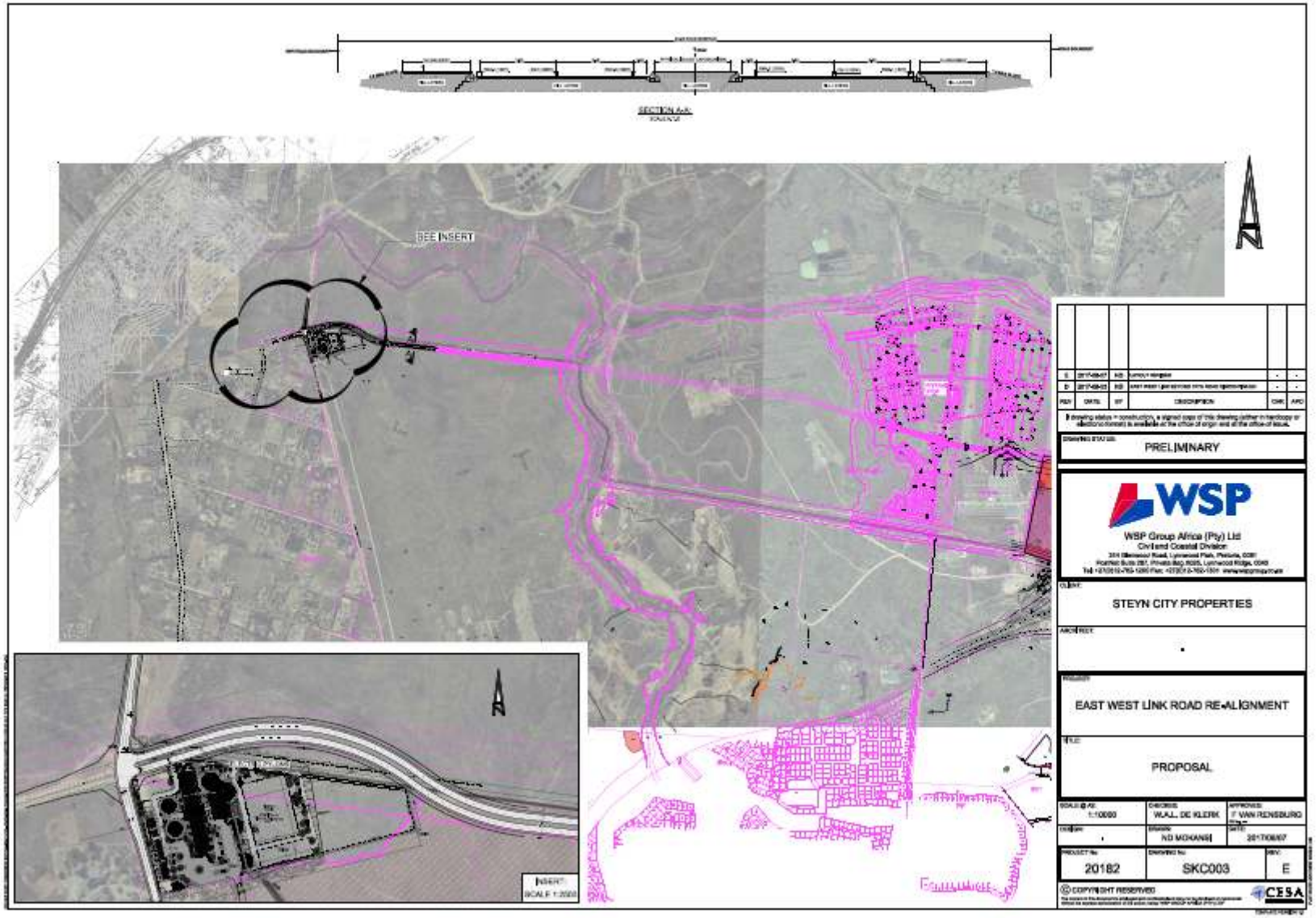

Figure 4-2: Proposed Re-alignment (Proposal)

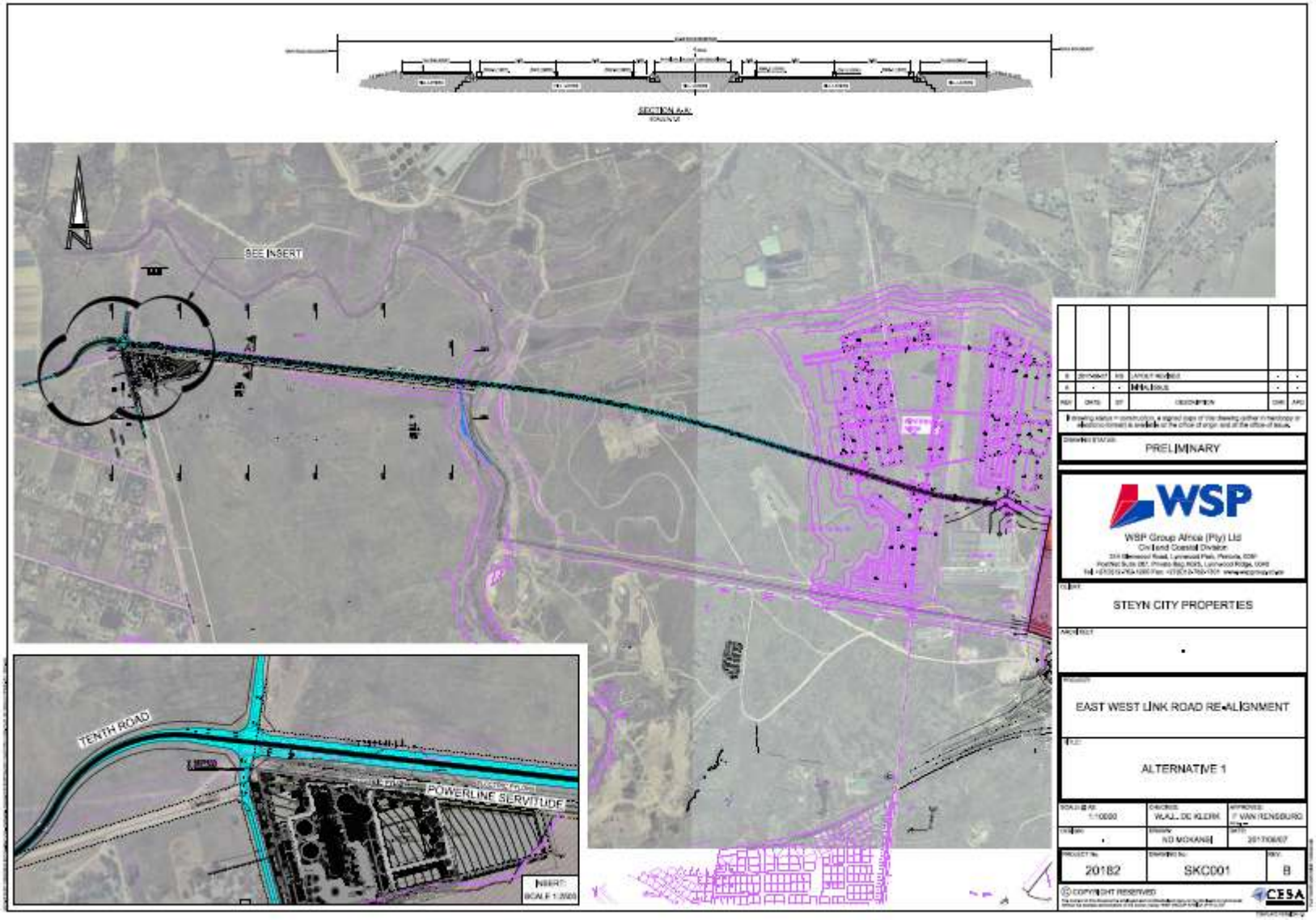

Figure 4-3: Alternative 1

4.1.2 Timeframes

The proposed development will be constructed in line with the following timeframes, see **Table 4-1**.

Table 4-1: Operational hours for construction phases.

Period	Open	Close
Weekdays	07:00	18:00
Saturdays	07:00	15:00
Sunday	Only when required	
Public holidays	Only when required	

4.1.3 Ancillary Infrastructure Required for Construction

No major infrastructure is required on site for the construction of the development. The required ancillary infrastructure for the purposes of supporting services is discussed below.

4.1.3.1 Security

A construction camp will be erected on site for the duration of the construction. This camp will be fenced for security purposes. A security guard will also be posted on site during non-operational times. A wall will be erected around the property boundary as part of the development project.

4.1.3.2 Sanitation

During the construction phase of the project, chemical toilets will be placed on site for the duration of the construction phase. Where possible, existing toilets that occur on site already will also be used.

4.1.3.3 Construction Camp and Laydown Areas

Designated areas will be established during the construction phase for construction equipment and vehicles. This area will be outside all sensitive areas (delineated wetlands etc.).

4.1.4 Operational Activities

Operational activities (such as grass cutting, cleaning up litter etc.) will be undertaken by the JRA when necessary. These activities will be undertaken in line with the timeframes indicated in **Table 4-2**.

Table 4-2: Operational hours for operational activities.

Period	Open	Close
Weekdays	07:00	18:00
Saturdays	07:00	15:00
Sunday	Only when required	
Public holidays	Only when required	

5 ENVIRONMENTAL SENSITIVITY

Error! Reference source not found. provides an overview of overall sensitivity of the study area that should be taken into account during construction and operation of the proposed re-alignment. These features include:

- **Two species of conservation importance (Orange Listed plant species), *Hypoxis hemerocallidea* (African potato) *and Boophone disticha*** – these species must be relocated where applicable, to a suitable site nearby before the construction work of the development, if approved, is initiated. This should be done by suitably qualified persons to ensure the success of the rescue effort.
- **Porcupine Park**– this area is sensitive and whilst construction within the area along the approved re-alignment is allowed, the impact must be limited to the construction footprint only.
- **Adjacent landowners/community** - communication channels need to be duly respected and adhered to when engaging with the community. Excavations to be adequately safeguarded.

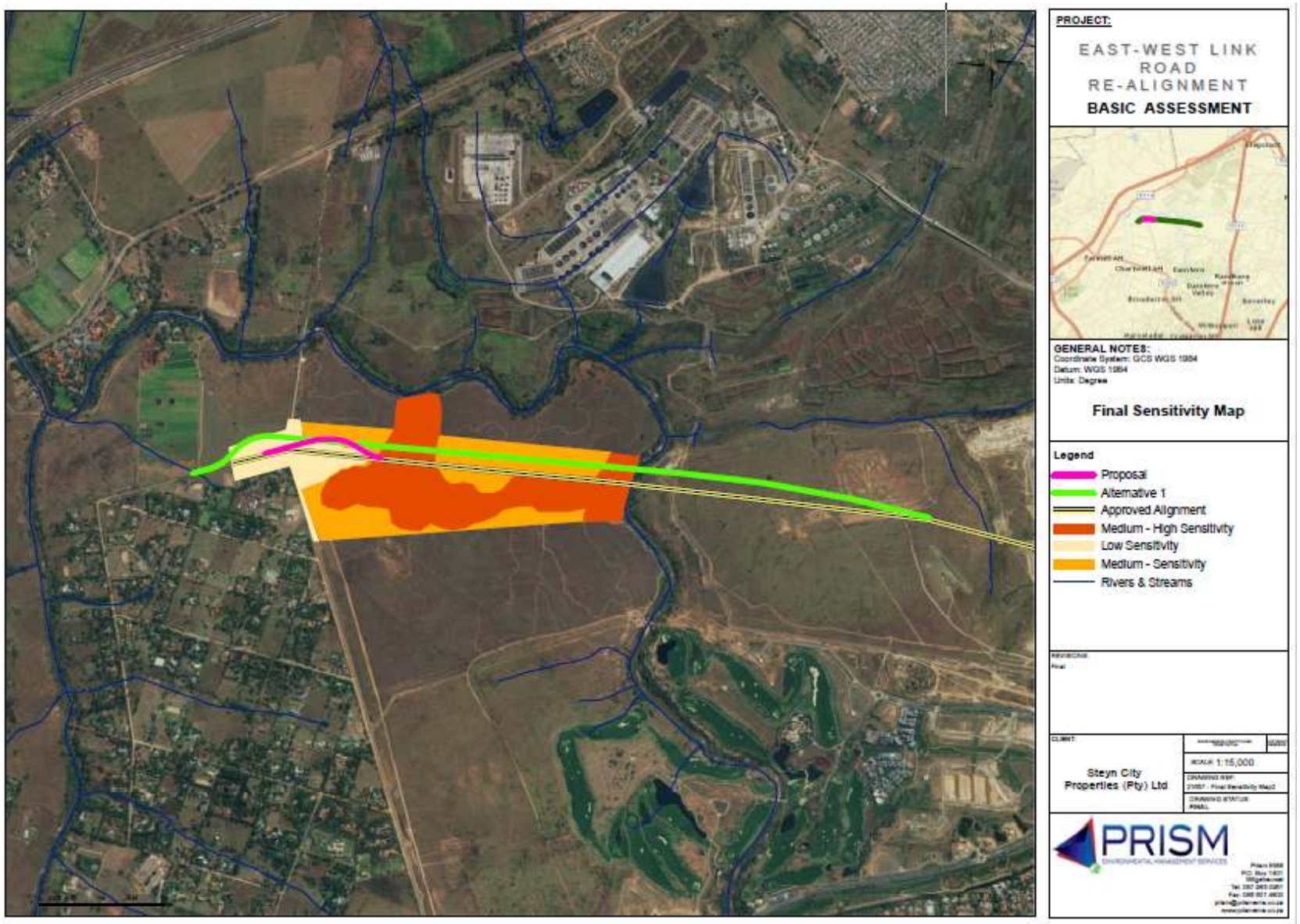

Figure 5-1: Overall Sensitivity Map

6 GOALS AND OBJECTIVES

The **EMPr** provides performance criteria required to address potential environmental impacts during the construction and operational phases of the proposed East-West Link Road Re-Alignment.

This document incorporates the relevant recommendations of the Basic Assessment Report and other environmental studies and at a high level aims to provide the following:

- Establish **management objectives** for the Development in order to enhance benefits and minimise adverse environmental impacts;
- Describe **actions** required to achieve management objectives; and
- Outline institutional structures and roles required to implement the EMPr.

6.1 Key Objectives of the EMPr

The key objectives of the EMPr for the construction and operation phases of the proposed East-West Link Road Re-Alignment are as follows:

- To ensure effective communication with stakeholders and regulatory authorities;
- To ensure good housekeeping practices and general neatness on site;
- To mitigate any possible negative impacts identified in the EMPr for the construction and operational phase of the development;
- To prevent pollution to the receiving environment that may emanate directly or indirectly from the source (development activities) both during the construction and operational phases;
- To preserve flora and fauna;
- To preserve topsoil for optimal rehabilitation and landscaping following construction;
- To control the establishment of alien invasive plants during the construction phase of the project, as well as following rehabilitation of designated construction camp areas within the site thereafter.
- To ensure water saving and recycling mechanisms are implemented and adhered to;
- To ensure that all legislative requriements are met by the proposed East-West Link Road Re-Alignment.

Following each site visit an audit report must be compiled to relay any non-compliance issues that need to be addressed, as well as compliance matters.

6.2 Impact Management Outcomes

Through effective implementation of the environmental management measures, the following outcomes must be achieved:

- Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.

- Environmental awareness creation and training is undertaken throughout the construction phase in order to minimise environmental impacts and ensure compliance to relevant legislation and authorisations
- Minimise environmental impacts associated with emergency procedures
- A safe working environment for contractors/construction workers and the public is provided.
- Proper management of site clearing is undertaken to ensure minimal environmental disturbance.
- Minimise environmental impacts associated with site establishment
- Ensure access to sensitive environmental features is restricted and proper access control is in place
- Minimal disturbances to traffic due to delivery of construction material.
- Proper management of labour force is undertaken to ensure that:
    - There are no security-related issues or disturbance to tenants or landowners outside the construction footprint.
    - There is optimal use of local labourers.
    - There is no disturbance to sensitive environmental feature
- Minimise environmental impacts associated with ablution facilities.
- Reduce the generation of waste by changing behaviours of contractors throughout the development
- Re-use waste generated by the construction where possible thereby resulting in decreased waste disposal volumes
- Waste separation and recycling must be undertaken as part of construction
- Waste generated during the East-West Link Road Re-Alignment Development to be disposed of at licensed landfills
- Minimal environmental impacts associated with waste
- Effective and safe management of hazardous and non-hazardous materials on site, in order to minimise the impact of materials on the environment.
- Minimal environmental impacts associated with the management of workshops and equipment
- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.
- Prevent polluted water from entering the surface water.
- Minimise noise disturbance to surrounding areas
- Preserve protected flora species outside of construction areas.
- Control alien plants and noxious weeds.
- Minimal impact to fauna species.
- To have no adverse impact on the historical inheritance of the area.
- The preservation and appropriate management of new findings should these be discovered during construction.
- Proper stormwater management as required by the Stormwater Management Plan to be implemented.
- Adequate reinstatement and rehabilitation of construction areas.

- Water conservation mechanisms to be implemented.

7 GENERAL ROLES AND RESPONSIBILITIES

There are various role players that are involved in responsible environmental management. An overview of the applicable role players and institutional arrangements are provided in Figure 7-1. Information on each role player is then provided in the subsections below.

7.1 Competent Authorities

Due to the fact that that activities are triggered in terms of the EIA Regulations, 2014 (National Environmental Management Act, 1998 (NEMA), the Gauteng Department of Agriculture and Rural Development (GDARD) is the relevant competent authority.

7.1.1 Gauteng Department of Agriculture and Rural Development (GDARD)

GDARD is the mandated authority in terms of NEMA that determined whether an Environmental Authorisation (EA) will be issued for the project, following a decision-making process conducted as part of the EIA. Conditions will be included in the EA, which need to be complied with by the project applicant. The EMPr will need to be updated to take into account these conditions.

GDARD also fulfils a compliance and enforcement role with regards to the EA. The Department may perform random inspections to check compliance. GDARD will also review the monitoring and auditing reports compiled by the ECO.

Amendments may be required to the EMPr, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by GDARD.

7.2 Authorisation Holder

Steyn City Properties (Pty) Ltd. is the applicant in terms of NEMA and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability for non-compliance also rests with the Authorisation Holder. Details of the Authorisation holder are contained in Table 7-1.

Table 7-1.: Details of the Applicant.

Applicant:	Steyn City Properties (Pty) Ltd
Contact Person:	Christo de Wet
Address:	P.O. Box 1623, Honeydew, 2040

7.3 Consultants

7.3.1 Project Manager

In order to ensure that the proposed development is constructed as per the relevant designs and requirements, a project manager will be responsible for managing the planning, design and construction phases of the project. The Project Manager will furthermore also be required to tend to any environmental matters at the request of the Environmental Control Officer (ECO). The Project Manager shall assist the ECO where necessary and shall have the following responsibilities in terms of the implementation of the EMPr:

- Regular site inspections;
- Reviewing and approving the Contractor's Method Statements;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary; and
- Communicating all environmental issues to the ECO

7.4 Contractors

Contractors will be responsible for constructing the proposed East-West Link Road Re-Alignment and associated infrastructure. All contractor/s employed by the developer in respect of any aspect of the construction of the subject site, will be bound by all and any agreement between the developer and the contractor, to ensure compliance with the Environmental Authorisation, mitigating measures included in the Specialist Studies, as well as this EMPr. The responsibilities include:

- Taking full responsibility for each of his/her employees.
- Be familiar with the contents of the EMPr and the specifications contained herein;
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions.
- Confirm legislative requirements for the construction works, and ensure that appropriate permissions and permits have been obtained before commencing activities;
- Prepare Method Statements, programme of activities and drawings/plans for submission to the ECO when requested.
- Undertake daily site inspections to monitor environmental performance and compliance with the Environmental Specifications.
- Notify the ECO immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- Notify the ECO at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously.

7.5 Independent ECO

A competent and independent ECO must be appointed and will undertake weekly inspections on site as well as monthly auditing against the EMPr and EA. The aforementioned report must be submitted to Steyn City Properties (Pty) Ltd. and GDARD for their records.

The ECO will also check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (water quality etc.).

In terms of Audits, the ECO will be required to ensure the following:

- All documentation (e.g. audit/monitoring/compliance reports and notifications) required to be submitted to the Department in terms of the EA.
- The holder of the EA must submit an environmental audit report to the Department within 30 days of the completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.
- The Environmental Audit Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of an approved EMPr.
- Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

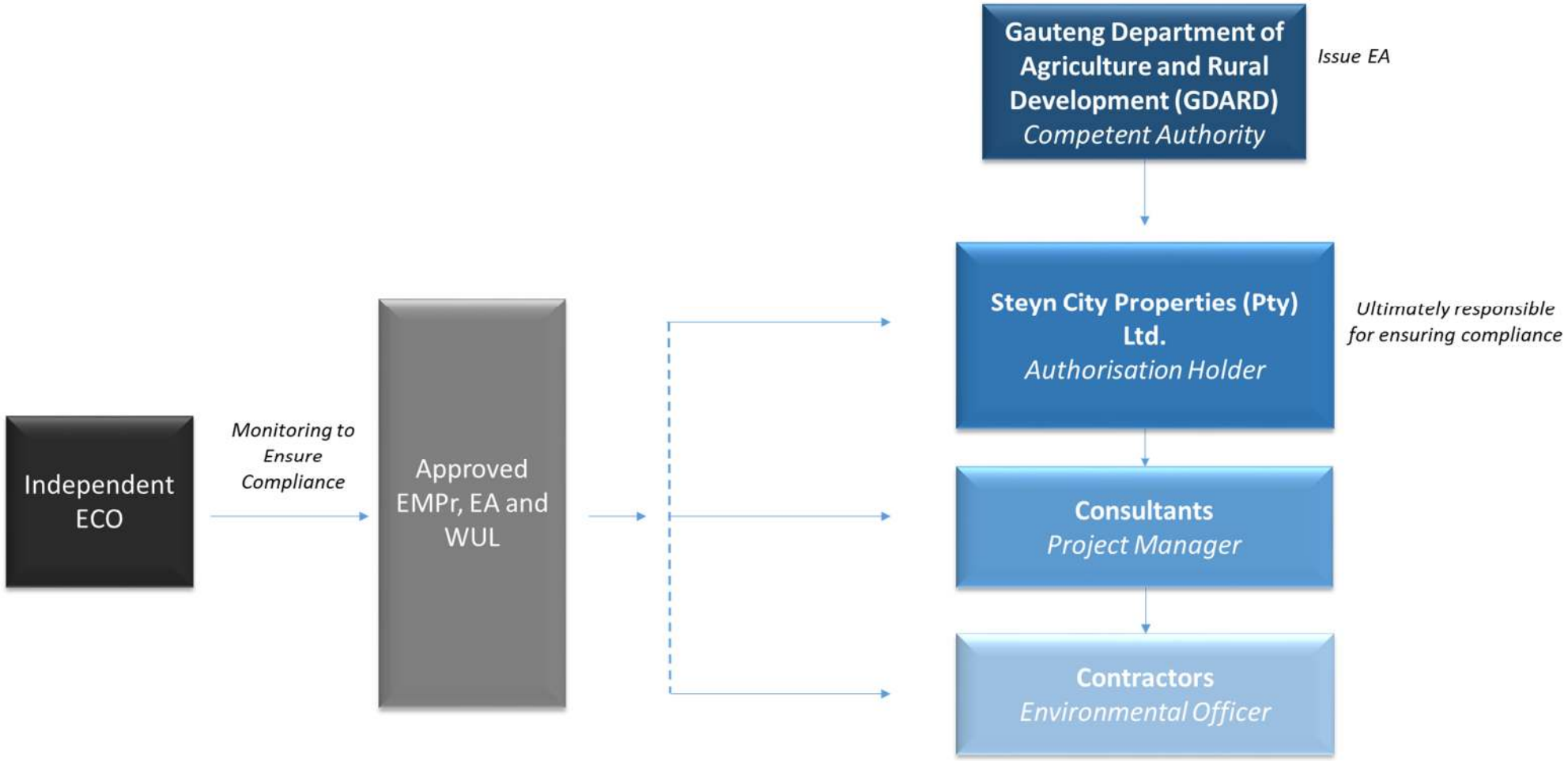

Figure 7-1: Roles and responsibilities.

8 ENVIRONMENTAL AWARENESS PLAN

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project. In contrast, **Environmental Awareness Creation** strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The Environmental Awareness Plan for the East-West Link Road Re-Alignment incorporates both training and environmental awareness to ensure that the proposed development is implemented in line with the requirements of the EMPr and that environmental sensitivities on site are managed correctly.

As part of this, Steyn City Properties (Pty) Ltd. is committed to remaining responsible and accountable for environmental practices on site. Being accountable for environmental practices undertaken during working tasks and activities remain the responsibility of both employer and employee awareness of the potential environmental impacts that could result from these activities.

All potential incidents to the environment may be effectively minimised through effective training and awareness of the employees using any of the following methods:

- Supervisory meetings (weekly);
- Induction training (annually);
- EMP Training (annually); and
- External environmental and/or health and safety courses (when applicable).

These methods are discussed below in more detail.

8.1 Meetings

Weekly supervisory meetings are ideal to facilitate awareness of specific environmental dangers pertaining to each week. Various topics may be discussed during these meetings, and must be recorded or logged. All attendees at each meeting must sign an attendance register, these records must be kept on file at the administration office. Topics for discussion may include:

- Topics applicable to the entire operation;
- Area specific topics (e.g wetland); and
- General environmental awareness:
    - Waste management
    - Spillages
    - Saving water
    - Electricity consumption
    - Dust control
    - Noise generation

- Housekeeping
- Indigenous Vegetation
- Alien vegetation
- Fire-making

Should issues be identified by the ECO, these can also be addressed during these weekly meetings.

8.2 EMPr Training

Aspects of the EMPr must be selected and discussed at training workshops at least annually. Such training topics may be focused around the incidents that are frequently reported during the previous year and may be focused around the following:

- Hydrocarbon spillages;
- Stormwater Control;
- Waste Management;
- Monitoring Protocols; and
- Safety topics.

Workers should be informed that they may refuse work that is harmful to human health and/or the environment.

8.3 Induction Training

All new employees are required to undergo induction training prior to commencement of work. Returning and existing employees must undergo repeat induction training at least annually. Environmental awareness training must form part of the induction and must include the basic topics relating to the environment:

- Main environmental legislation (e.g. NEM:WA[1] or NWA[2]);
- Constitutional right pertaining to the environment;
- Waste Management hierarchy;
- Environmental, social and economic concerns;
- Sensitive environmental features; and
- Prevention of poaching/fishing.

[1] National Environmental Management Waste Act (NEM:WA), 2008 (Act No. 59 of 2008)

[2] National Water Act (NWA), 1998, (Act No. 36 of 1998)

9 WASTE MANAGEMENT PLAN

In order to ensure waste is properly dealt with, waste management is included in the EMPr. In addition, a **Waste Management Plan** is discussed below.

9.1 Legal Requirements

Section 16 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended states that –

"A holder of waste must, within the holder's power, take all reasonable measures to –

- *Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
- ***Reduce, reuse, recycle and recover waste;***
- *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
- *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*
- *Prevent any employee or any person under his or her supervision from contravening this Act;*
- *Prevent the waste from being used for any unauthorised purpose.*

Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m^3 of general waste and less than 80m^3 of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.

9.2 Waste Hierarchy

Management objectives provided in this EMPr are aligned to the waste management hierarchy indicated in Figure 9-1.

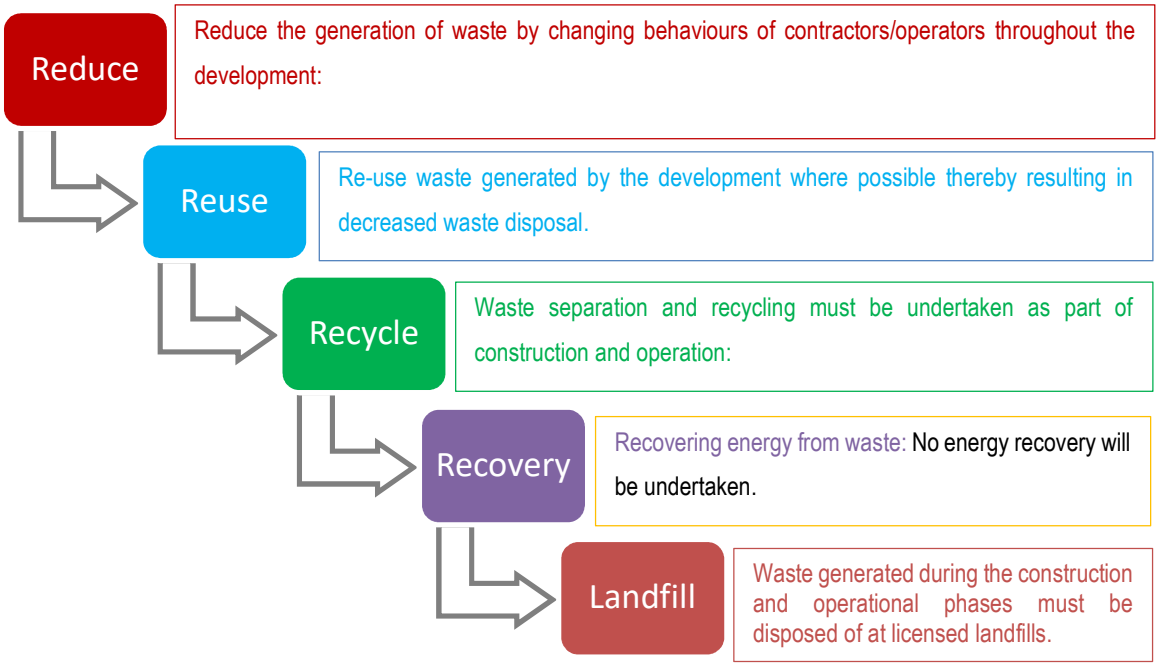

Figure 9-1: Waste Hierarchy.

9.3 Waste Management Actions

The following waste management actions must be implemented in order to ensure the objectives included in the waste hierarchy above are met.

9.3.1 Waste Avoidance and Reduction

Avoidance and reduction should be practiced wherever possible. Recommended actions include: but are not limited to:

- Bulk buying of materials to reduce the volume of packaging required.
- Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality.
- Buying items that last longer and can be repaired.
- Buying items in refillable containers.
- Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.

9.3.2 Recycling

Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests.

Potential priority recyclable waste streams include:

- Used Oil;
- Paper;
- Glass;
- Tyres;
- Plastics;
- Building rubble; and
- Electronic waste.

The following actions must be implemented:

- To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.
- These receptacles shall be fitted with a tight cover.
- All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving.
- Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.
- Locate these containers within office buildings and trailers.
- Establish a recycled material collection schedule.
- Arrange full bins to be hauled away.

9.3.3 Waste Disposal

The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriate licensed waste management facilities (the following source may be utilised – www.sawic.org.za). During operation, waste that is not collected for recycling must be collected by the municipality or by a municipality approved 3rd party collector.

In addition, it should be noted that the classification of waste determines the handling methods and the ultimate disposal of the material. All **hazardous waste** that may be generated by construction and operation must be managed as follows:

- Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).
- Obtain and provide an acceptable container with a label.
- Place hazardous waste material in the container.
- Inspect the container on a regular basis.

- Haul the full container to the licenced and correct disposal site.
- Provide documentary evidence of proper disposal of the waste.

In addition, the following actions must also be undertaken:

- Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.
- Skips should be covered to prevent waste blowing away.
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- No waste shall be buried or burned anywhere on the site.
- Permits to transport/dispose of waste must be in place.

10 EMERGENCY PREPAREDNESS PLAN

10.1 Potential Emergencies

The following potential emergencies that may occur on site include:

- Environmental Incidents:
  - Fuel and hydrocarbon spillages;
  - Sewage spillages from the Sewage Treatment Plant;
  - Flooding Risks; and
  - Fire Hazards.
- Safety Incidents:
  - Injuries related to operation of heavy machinery such as Front End Loaders, Excavators, Mobile Crushers etc. during construction;
  - Driving related accidents and incidents from Trucks on site during construction;
  - Accidents during earth moving, levelling and rehabilitation activities;
  - Drowning/injuries to guests using the East-West Link Road Re-Alignment during operation; and
  - Criminal incidents such as theft or potential violent crime during construction and operation.

10.2 Emergency Plan

10.2.1 Emergency Assemblage Area

A central area on site must be demarcated with appropriate signage for the gathering of all employees and visitors on site in the event of an emergency.

10.2.2 Emergency Procedures

The following procedures must be compiled in order for the identified potential emergencies to be managed effectively:

- Drill and evacuation procedure for any emergency related incidents containing information on the following:
  - Reporting structure for all incidents
  - Emergency contact information (e.g. telephone numbers)
  - Procedure to be followed for the specific emergency
  - First Aid information
- Spillages of fuel and hydrocarbons:
  - Immediate action plan (e.g. use of spill kits) to prevent spill for spreading
  - Reporting of incident to manager and supervisor to advise on next steps
- Procedure for Theft and Crime:

- Details on security system on site
- Emergency response units
- Panic alarms
- Details of community response units

10.2.3 Emergency Contact Information

A list of potential emergency contact centers specific to the area must be drawn up and displayed on common notice boards for all employees to access. The following emergency centers must be sourced:

- Nationwide emergency response
- Cellphone Emergency
- Ambulance
- Hospitals
- Fire Response
- Police

This list must be checked and updated at least quarterly to ensure that the information remains up to date.

11 MONITORING PROGRAMME

Monitoring is required to ensure that the receiving environment at the proposed East-West Link Road Re-Alignment is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

The method of monitoring the implementation of the management and mitigation measures stipulated within the EMPr are indicated in **Table 11.1**.

Table 11.1: Method of monitoring implementation of EMPr

Method	Frequency	Responsibility	Main Topics	Outcome
Internal Inspections	Daily – Weekly	Environmental Officer, and Project Manager	• Observe housekeeping practices • Check for spillages, leaks or any other sources of pollution • Observe waste management • Observe stormwater control	• Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr • Verbally inform employees on any identified issues
Internal Audits	Monthly	Project Manager	• Check compliance with management measures in EMPr	• Compile audit report with recommendations / actions where non-compliance was identified
External Inspections	Weekly	ECO	• Check compliance with management measures in EMPr	• Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr • Verbally inform employees on any identified issues. • Photos from inspections to be utilised in monthly reporting.
External audits	Monthly	ECO	• Check compliance with management measures in EMPr	• Compile audit report with recommendations / actions where non-compliance was identified

Method	Frequency	Responsibility	Main Topics	Outcome
Management Meetings	Quarterly – Bi-annually	Management	• Discuss (problem solve) recurring issues or actions that require management intervention	• Record minutes of main points of discussion • Implement outcome actions of meeting

11.1 Compliance Monitoring and Auditing

11.1.1 Environmental Audits

The mechanism for monitoring compliance with the management and mitigation measures stipulated within the EMPr must include an audit undertaken by an independent Environmental Control Officer (ECO) as discussed in Section 7.5.

The objective of the environmental audit is to:

- Report on the level of compliance with the conditions of the environmental authorisation and the management and mitigation measures stipulated within the EMPr;
- The extent to which the avoidance, management and mitigation measures provided in Section 12 achieve the objectives and outcomes in Section 6;
- Identify and assess new impacts and risks as a result of undertaking the activities;
- Evaluate the effectiveness of the management and mitigation measures generated in the EMPr;
- Identify shortcomings in the EMPr;
- Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr.

11.1.2 Procedure

The following methodology or procedure is to be used for assessment of the management and mitigation measures of the EMPr:

- **Pre-site preparation:** prior to the site inspection a review of the management measures contained in the EMPr, and a checklist must be drawn up.
- **Site inspection:** the East-West Link Road Re-Alignment must be traversed on foot and must include an assessment of each major component of the facility.
- **Documentation review:** after the site inspection a documentation review must be undertaken by requesting specific key documentation relating to the proposed development.

11.1.3 Evaluation Criteria

During evaluation of the EMPr, the following criteria must be used:

- Management measures stipulated in the plan;
- Environmental monitoring required;
- Legal requirements; and
- Best practice observations.

The scores and description used in the evaluation of the EMPr are indicated in **Table 11-2**. Where any indication of non-compliance is determined, recommended actions will be provided.

Table 11-2: Description of scoring during evaluation of the findings.

Score	Evaluation	Description
N/A	Not Applicable	Not applicable and will not be implemented or discussed/assessed.
0	Major Non-Compliance	Relates to the absence of a requirement needed to be implemented or the total breakdown of a process. A number of minor non-compliances listed against the same requirement may represent a total breakdown of a process and thus could collectively be a major non-compliance.
1	Minor Non-Compliance	The requirement is partially implemented or non-compliant.
2	Observation	Relates to a matter about which the Assessor is concerned but which cannot be clearly stated as non-compliance. Observations also indicate trends which may result in a future non-compliance.
3	Compliant	The project management plans and procedures are executed in a managed fashion (planned, tracked, verified and adjusted) based upon defined activities, inputs and outputs. Objective evidence is available for each process.

11.1.4 Reporting

All inspections undertaken as part of internal / external auditing must be provided in the form of a report. External audits will be submitted to the competent authority as required by the EIA Regulations, 2014.

11.2 Penalties

In order to ensure that there is adequate motivation for the contractor to comply with the conditions set out in the EMPr, the following applies with regards to penalties:

- The Contractor will comply with the environmental requirements on an ongoing basis, and any failure on their part to do so will entitle the Project Manager, in consultation with the Environmental Manager and ECO, to certify the imposition of a fine subject to the details set out in the EMPr.
- The Project Manager, Environmental Manager and any other specific personnel as designated by the Project Manager may alter the Schedule of Fines for this specific project.
- Fines may be issued per incident at the discretion of the Project Manager. Such fines will be issued in addition to any remedial costs incurred as a result of noncompliance with the requirements of the EMPr and documents supporting thereof. Fines may be omitted from construction guarantees as supplied by the contractor.
- The Project Manager and ECO will be the judge as to what constitutes a transgression in terms of the above clause. Further, note that in the event that transgressions continue to an unacceptable level the client may cancel the contract.

- Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental requirements, he will be liable to pay a penalty fine over and above any other contractual consequence. This may also lead into a Rectification Application in terms of Section 24G of the NEMA, which could lead to certain fines and / or prosecution.
- The Contractor is deemed NOT to have complied with this specification if:-
  - Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr.
  - Environmental damage ensues due to negligence.
  - The Contractor fails to respond adequately to complaints from the public.
  - Legal action is instituted against the developer in terms of Environmental laws due to any action / activities undertaken by the Contractor.
- Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.
- A record of penalties will be maintained within the procurement department, and may influence later commissions awarded to the contractor.

12 EMPR

12.1 Pre-Construction

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements
- Define and communicate roles and responsibilities for the implementation of the EMPr;
- Ensure that all structures within the construction area are identified and recorded;
- Determine and document the road conditions; and
- Develop and implement an environmental awareness programme.

Specific management measures related to the identified environmental aspects follow:

Table 12-1: Management measures to be implemented during pre-construction.

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
LEGISLATIVE REQUIREMENTS AND DOCUMENT CONTROL				
General Requirements	All relevant authorisations, licences and approvals are in place prior to the commencement of construction.	• Approvals to be in place prior to construction.	Once off prior to construction	Project Manager
	A formal document control system is in place to ensure all relevant documents are in place prior to commencement.	• An environmental file/document control system must be designed and put in place. • Prior to construction, the following documents must be included in the file: o EMPr o EA	Once off prior to construction	Project Manager
	Site specific method statements are compiled and approved.	• Based on the EMPr, the contractor must compile specific method statements which must be approved by the Project manager prior to construction. At a minimum this should include: o Method Statement for site clearing; o Method Statement for establishing the construction camp; o Method Statement with regard to waste and wastewater management; o Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils; o Method Statement for dust control; o Method Statement for the storage and handling of hazardous substances; o Method Statement for controlling alien invasive species and noxious weeds; and o Method Statement for rehabilitation of construction footprint.	Prior to construction	EO to compile Project manager to approve

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
BARRICADING OF SENSITIVE FEATURES				
Loss/disturbance of sensitive features	Proper management of sensitive features through identification and barricading.	• Suitable specialist(s) or ECO to identify sensitive species where special care needs to be taken to safeguard these features (e.g. barricading, relocation etc.). **All barricades must be in place prior to construction.** • *Before construction commences, all sensitive habitats, such as wetlands must be clearly demarcated with fencing or orange mesh netting. Barricading measures to be utilised should not restrict the movement of the fauna in the area (only applicable to Alternative 1).*	Once off prior to construction	ECO
SITE PLANNING AND LAYOUT				
Loss/disturbance of sensitive features	Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.	• Contractor to submit a site plan to the ECO and Project Manager for comment. The site plan must be approved by the Project Manager prior to the establishment of the site. The plan must show the following): o Sensitive environmental features; o Buildings and structures; o Contractors' camp and lay down areas; o Site offices; o Roads and access routes; o Temporary waste storage areas o Site toilets and ablutions; o Topsoil stockpiles areas; o Construction materials stores areas; o Workshops; and o Hazardous substance stores. • Authorised construction footprint to be pegged • Temporary Site offices to be constructed outside sensitive areas. • Ablution facilities must be located at least 100m away from wetlands.	Once off prior to construction	Contractor to compile plan, ECO to comment, Project Manager to approve.
ENVIRONMENTAL AWARENESS CREATION – INDUCTION				
General Requirements	Environmental awareness creation and training is undertaken prior to construction	• ECO to induct relevant contractor managers at the start of the project. This induction should provide an overview of the authorisation and the EMPr. The environmental	Once off prior to construction	ECO to induct construction managers/

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
	commencement to minimise environmental impacts and ensure compliance to relevant legislation and authorisations.	awareness training course for management shall include all management and foremen. • The Contractor must arrange that all of his employees and those of his sub-contractor go through the project specific environmental awareness induction before the commencement of construction and as and when new staff or sub-contractors are brought on site. • A system must be in place to ensure all new employees have received training. • All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participant's names on completion. A copy of the attendance register is to be retained by the ECO/Project Manager.		Environmental officer (EO) Contractor to induct all workers

12.2 Construction

Mitigation measures for all activities related to construction are provided below. The mitigation measures included in the Ecological Habitat Assessment undertaken as part of the Basic Assessment Report have also been incorporated below. Management actions are linked to a specific impact and overall management objective. Information on the institutional responsibilities and the frequency of the actions is also provided.

Table 12-2: Management measures to be implemented during construction.

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
ATMOSPHERIC EMISSIONS					
Dust emissions	Site Clearing General construction activities	Ensure that all possible causes of dust are mitigated as far as possible to minimise impacts to the surrounding environment	• A speed limit of 20km/h must be maintained on all dirt roads. • Dust suppression by means of either water or biodegradable chemical agent is required.	Daily	Contractor to implement actions ECO to monitor
Emissions from vehicles and equipment (CO2, NOx, SOx, VOC's etc.)	Use of vehicles and plant during construction	All vehicles/plant on site must be properly maintained to reduce emission sources.	• All vehicles used during the project should be properly maintained and in good working order. • A maintenance schedule should be drawn up to ensure all vehicles are serviced at the proper interval. • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	As required by maintenance schedule	Contractor to implement actions ECO to monitor
NOISE					
Noise increase due to construction activities	General construction activities	Ensure that noise disturbance to surrounding areas are minimised and that construction activities comply with the Noise Control Regulations and the provisions of South African National Standards; Environmental, Health and Safety (EHS) Guidelines, World Health Organisation (WHO, 2002).	• The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners. • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels. • Construction activities should be limited to daytime only.	Daily	Contractor to implement actions ECO to monitor
DISCHARGE TO SURFACE WATER					
Sewage	Site Camp Workshop	Construction activities are managed correctly to ensure no negative	• Management of Ablution Facilities o During the construction phase of the project, the existing infrastructure will be used where possible.	Daily	Contractor to implement actions

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
	Concrete mixing Construction activities within watercourses and buffers	impacts to water quality. This includes proper management of ablution facilities, workshop and equipment and concrete batching and mixing.	Chemical toilets will also be placed on site for the duration of the construction phase o Toilets are to be secured to the ground, and must have a closing mechanism. o Certified contractors to maintain and remove chemical toilets regularly. o The contractor must ensure that spillage does not occur when toilets are cleaned/serviced and contents must be properly stored and disposed of properly. • Management of workshop and equipment o Maintenance of equipment and vehicles is not allowed at the construction site. Faulty equipment must be removed from site and repaired at a workshop. o A designated vehicle wash bay must be put in place and must meet the following requirements: ▪ Must have an impermeable surface. ▪ Must have drainage measures in place to direct contaminated water towards the oil separator. ▪ Quality of water to be tested prior to release. If not safe then contaminated water must be disposed of as hazardous waste at a licensed waste disposal facility. Safe disposal certificates to be obtained from the final disposal facility. ▪ Emergency spill kit o No washing of plant outside of designated wash bay. o Drip trays will be provided for the stationary plant and for the "parked" plant. o All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site. • Management of waste water o The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the Camp. o Contaminated liquids and soil from the site must be disposed of at a permitted disposal site.		ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility

			• Management of concrete mixing
			  ○ Cement mixing to take place on an impervious surface (e.g. plastic or cement mixing pit).
			  ○ Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
			• *Management of activities in wetlands and watercourses (please note this is only applicable to the alternative alignment).*
			  ○ *Stock piling outside the wetland area*
			  ○ *Stormwater management*
			  ○ *Dry season construction*
			  ○ *Coffer damming and filtration*
			  ○ *No dumping of foreign material in streams, rivers and/or wetland areas is allowed*
			  ○ *Changes to the existing WUL must be obtained from the Department of Water and Sanitation. The necessary licenses must be obtained in terms of Section 21 of the National Water Act, 36 of 1998 from DWS*		

Silt	Construction activities	Ensure minimal siltation of nearby watercourses and wetlands during construction.	• Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. • To reduce the loss of material by erosion, disturbance must be kept to a minimum. • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. • Where possible, natural vegetation should be retained to reduce the risk of erosion. • Should erosion occur due to negligence on the part of the Contractor to apply the above measures, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility

			• Proper stormwater management must be implemented.
			• Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems.
			• Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.
			• Silt fences must be fit for purpose, effective and regularly maintained.
			• *Management of activities in wetlands and watercourses (please note this is only applicable to the alternative alignment).*
			  o *Stock piling outside the wetland area*
			  o *Stormwater management*
			  o *Dry season construction*
			  o *Coffer damming and filtration*
			  o *No dumping of foreign material in streams, rivers and/or wetland areas is allowed*
			• *Changes to the existing WUL must be obtained from the Department of Water and Sanitation. The necessary licenses must be obtained in terms of Section 21 of the National Water Act, 36 of 1998 from DWS*
			• *Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.*
			• *Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place.*		

Surface water run-off	General construction activities	Ensure stormwater is properly managed during construction.	• Compile and implement proper stormwater management plan. • Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and resident Engineer. • Cut off drains may not cause additional harm to environment. Care must be taken to consider their position and the receiving environment. • Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater	Once off (design and approval) Implementation – ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			during the construction phase, as well as during the operational phase. • Surface-water run-off and stormwater must be directed away from trenches and areas of excavation.		
Contamination of water from hazardous substances	Site Camp Storage areas	Effective and safe management of hazardous materials on site, to minimise the impact of materials on the environment.	• Proper storage of hazardous material o Hazardous materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS). At a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements: ▪ Earthed ▪ Fire extinguisher must be present ▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher o Storage areas should be located 100m from the edge of wetlands. o Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards. o Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided. o All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material. • Spillages	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			○ In the event of spillages of hazardous substances the appropriate clean up and disposal measures are to be implemented. ○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present ○ The ECO and Project Manager must be notified of all significant spillages. • Training ○ Staff that will be handling hazardous materials must be trained to do so. • General ○ Drip trays must be placed under all vehicles when immobile for longer than 24 hours. Vehicles suspected of leaking must be monitored and conduct a pre start-up inspection checklist. ○ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods. ○ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle. ○ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. ○ Spilled substances must be contained in impermeable containers for removal to a licensed hazardous waste site. ○ Contaminated wastewater to be contained, and removed to a registered site, to ensure water bodies on site are not contaminated.		
Disturbance of natural system	Construction activities within	Ensure that minimal disturbance of natural, aquatic systems takes	• Ensure that no workers or equipment enter sensitive areas and associated buffers.	Daily	Contractor to implement actions

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility

Disturbance of aquatic ecological systems	watercourses and buffers	place during construction.	• *Management of activities in wetlands and watercourses (please note this is only applicable to the alternative alignment).*
			  ○ *Stock piling outside the wetland area*
			  ○ *Stormwater management*
			  ○ *Dry season construction*
			  ○ *Coffer damming and filtration*
			  ○ *No dumping of foreign material in streams, rivers and/or wetland areas is allowed*
			• *Changes to the existing WUL must be obtained from the Department of Water and Sanitation. The necessary licenses must be obtained in terms of Section 21 of the National Water Act, 36 of 1998 from DWS*
			• *Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.*
					ECO to monitor

WASTE GENERATION					
Domestic Waste	Waste generation, storage and disposal	Domestic waste must be managed properly to ensure minimal impacts.	• Waste recycling to be put in place. • Domestic waste must be stored in containers labelled or colour coded for general waste. • Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. • Containers must be emptied frequently before reaching capacity • Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable. • No waste shall be buried or burned anywhere on the construction site. • All solid waste shall be disposed of by a certified contractor, off-site, at an approved landfill site if no municipal services is available. The Contractor shall supply the ECO with a certificate of disposal for auditing purposes. • Avoidance, reduction and reuse should be practiced wherever possible – see waste management plan. • Waste may not cause any nuisance (e.g. odour)	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Records of waste manifest documents must be retained at the administration office		
Construction Waste	Waste generation, storage and disposal	Construction waste must be managed properly to ensure minimal impacts.	• Construction waste must be collected and put into suitable closed bins on a daily basis. • Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away. • Construction rubble must be disposed of at a registered landfill site. • Avoidance, reduction, and reuse should be practiced wherever possible – see waste management plan. • Records of waste manifest documents must be retained at the administration office.	Daily	Contractor to implement actions ECO to monitor
Hazardous waste	Waste generation, storage and disposal	Hazardous waste must be managed properly to ensure minimal impacts.	• The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows: o Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required). o Obtain and provide an acceptable container with a label. o Place hazardous waste material in the container. o Inspect the container on a regular basis o Haul the full container to the licenced and correct disposal site. o Provide documentary evidence of proper disposal of the waste. • Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 80m^3 of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Containers must be emptied frequently before reaching capacity • All hazardous waste must be disposed of at the nearest hazardous landfill • Waste may not cause any nuisance (e.g. contamination) • Records of waste manifest documents must be retained at the administration office • Certificates of registration must be retained for transporters of hazardous waste, and retained in record at the administration office.		
SOIL ALTERATION					
Loss of topsoil	Site clearing	Effective management of topsoil, in order to minimise the impact of construction activities.	• During site preparation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. • Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case. • Topsoil should be used in landscaping and rehabilitation where possible.	At start of construction. Checks to occur on a monthly basis	Contractor to implement actions ECO to monitor
Alteration of topography	Site clearing Landscaping Construction of road	Changes to topography to be planned properly to prevent negative impacts.	• Changes to topography must be properly designed and landscaped. • Stormwater management measures must be implemented to ensure these changes to not impact on stormwater.	Ongoing	Contractor to implement actions ECO to monitor
Soil erosion	Site clearing Landscaping Construction of road	Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment	• Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. • To reduce the loss of material by erosion, disturbance must be kept to a minimum. • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. • Where possible, natural vegetation should be retained to reduce the risk of erosion.	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.		
Soil pollution	Site camp Storage of materials Ablution facilities Storage of Waste Workshop area	Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and surrounding environment	• All vehicle/equipment maintenance and washing must be done in the workshop area, equipped with a bund wall and grease trap oil separator. • Workshop area must be monitored for fuel and oil spills. • Spills must be cleaned up immediately and remediated to the satisfaction of the ECO and PM. • Spill kits must be comprehensive and available on site at all times. An adequate supply of absorbent material must be available to accommodate emergency spills. • Also see mitigation measures related to water quality and storage of hazardous material.	Ongoing	Contractor to implement actions ECO to monitor
RESOURCE CONSUMPTION					
Electricity consumption	General site activities	Electricity reduction mechanisms to be implemented.	• Enforce electricity reduction strategies • Environmental awareness training	Ongoing	Contractor to implement actions ECO to monitor
Water consumption	General site activities	Water conservation mechanisms to be implemented.	• Enforce water saving strategies including design of recycling and reuse, rainwater harvesting etc. • Environmental awareness training.	Ongoing	Contractor to implement actions ECO to monitor
Fuel consumption	Fueling of plant, vehicles and generators	Fuel conservation mechanisms to be implemented.	• Record and monitor fuel consumption regularly • Reduce theft of fuel (increase security)	Ongoing	Contractor to implement actions ECO to monitor
Raw materials consumption	General construction activities requiring raw materials	Raw materials conservation mechanisms to be implemented.	• Promote effective use of raw materials.	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
EFFECTS ON BIODIVERSITY					
Loss of habitat	Site clearing Construction of road.	No loss of habitat outside the approved footprint.	• Proper management of site establishment: o Locate construction camp in area where sensitive environmental features will not be impacted on. The location should be approved by the ECO, Project Manager and EO. o Construction camp should be fenced and access control should be exercised. o The extent of the site should by all means be limited, to avoid any additional clearance of vegetation. • Proper management of site clearing: o Restrict site clearing activities to construction area /domain. o Clearing of vegetation to be conducted in a phased manner (where possible). o *Disturbances to wetland areas must be minimized (only applicable to the Alternative 1 should it be approved).*	Ongoing	Contractor to implement actions ECO to monitor
Loss of fauna	Site clearing Construction of road.	Minimal disturbance to fauna occurs during construction.	• Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), Natal Nature Conservation Ordinance 15 of 1974 and Animal Protection Act (No. 71 of 1962). • No wilful harm to any animals, unless a direct threat is posed to a worker's health or safety. • Animals residing within the designated area shall not be unnecessarily disturbed. • Before construction starts, construction workers must be educated with regards to littering and poaching. • Environmental awareness training should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes. • No poaching or killing of animals to be allowed whatsoever.	Ongoing	Contractor to implement actions ECO to monitor
Loss of flora	Site clearing Construction of road.	Minimal disturbance to flora occurs during construction.	• Individuals of the Declining plant species *Boophone disticha* and *Hypoxis hemerocallidea* need to be relocated where applicable, to a suitable site nearby before the construction work of the development, if approved, is initiated. This should	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			be done by suitably qualified persons to ensure the success of the rescue effort. Permits for relocation are to be obtained form GDARD for the rescue effort if necessary.		
Degradation of ecological systems Disruption of natural corridors	Site clearing Construction of road.	Ensure that minimal disturbance of ecological systems and natural corridors takes place during construction.	• During construction activities, monitoring and control of alien weeds and invaders through hand removal; slashing (annuals) or chemical control (perennials). Chemical control may only be done upon approval from ECO. • Civil works will be restricted to daylight hours in order to reduce noise disturbance to surrounding fauna and avifauna. Furthermore, vehicles are to be maintained and serviced on a regular basis in order to ensure that they operate efficiently and without undue noise which may disturb fauna and flora. • If the development is approved care must be taken that no pollutants such as any hydrocarbons (fuels, oil) are spilled on soil and if spilled are cleared using acceptable, best practice methodology. • All workers will undergo environmental awareness training to address potential human and wildlife interaction and the permissible reactions to this interaction.	Ongoing	Contractor to implement actions ECO to monitor
INCIDENTS, ACCIDENTS, AND POTENTIAL EMERGENCY SITUATIONS					
Pollution incidents	Workshop Site Camp Storage of Hazardous material Use of plant and vehicles	Minimise potential pollution incidents due to construction.	• Proper emergency response procedure to be in place for dealing with spill or leaks at the construction site. • Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site, where practicable. • Remediation of the spill areas will be undertaken to the satisfaction of the Project Manager. • In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. • The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage. • All staff on site will be made aware of actions to be taken in case of a spillage.	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers).		
Health and safety	General construction activities	A safe working environment for contractors/construction workers and the public is provided.	• Appointed Safety Agent. • Contractor to submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. • All construction personal must be clearly identifiable. All employees must also be issued with employee cards for identification purposes. • All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993). • Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993). • Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, traffic signage). • Maintain access control to prevent access of the public to the construction areas, as far as practicable. • 24 hour security and access control. • Health and Safety awareness training. • A Dedicated Occupational Health and Safety system to be implemented by Contractor's Safety Officer. To be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2003).	Appointment and Plan – once off at start, other actions, ongoing	Contractor to implement actions ECO to monitor
Storage of hydrocarbons	Storage of fuel Site Camp Workshop areas	Effective and safe storage of hydrocarbons on site, in order to minimise the impact of hydrocarbons on the environment	• Proper storage of hydrocarbons o Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS). At a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements: ▪ Earthed ▪ Fire extinguisher must be present	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher • Storage areas should be located 100m from the edge of wetlands. • Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards. • Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided. • All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material. • Spillages o In the event of spillages of hazardous substances the appropriate clean up and disposal measures are to be implemented. o The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present o The ECO and Project Manager must be notified of all significant spillages.		
Fire	Storage of fuel Site Camp Workshop areas General Construction Activities	Minimise potential fire incidents during construction.	• Appropriate emergency response to be in place for dealing with fire at the construction site. • All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. • All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Burning of waste is not permitted. • Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. • Designated smoking areas should be provided, with special bins for discarding of cigarette butts		
SOCIAL					
Visual impact	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to visual environment.	• Suitable screening to be put in place during construction to minimise visual impacts. • No littering to be allowed. • Good housekeeping practices to be followed	Ongoing	Contractor to implement actions ECO to monitor
Safety and security	General construction activities	Proper management of labour force is undertaken to ensure that there are no security-related issues or disturbance to tenants or landowners outside the construction footprint.	• 24-hour access control to the site and 24-hour security. • Workers found to be engaging in activities such as excessive consumption of alcohol, drug use or selling of any such items on site must be disciplined.	Ongoing	Contractor to implement actions ECO to monitor
Traffic disruptions	General construction activities	Minimal disturbances to traffic due to road upgrades.	• Traffic warning and calming measures will be put in place when construction activities may impact on traffic flow.	Ongoing	Contractor to implement actions ECO to monitor
Loss of cultural heritage	General Construction activities Site clearing	No adverse impact on the historical and cultural inheritance of the area.	• No heritage resources have been identified in the vicinity of the alignment. • If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area. • The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.		
Loss of sense of place	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to sense of place.	• Suitable screening to be put in place during construction to minimise visual impacts. • No littering to be allowed. • Good housekeeping practices to be followed.	Ongoing	Contractor to implement actions ECO to monitor
ECONOMIC					
Decline/increase in economy	Supplier and contractor selection	Preferential use of local contractors and suppliers.	• Local contractors and suppliers to be used during the construction phase as far as possible.	Ongoing	Contractor to implement actions ECO to monitor
Employment	Employment of construction workers	Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.	• Wherever possible labour, materials and services must be sourced locally.	Ongoing	Contractor to implement actions ECO to monitor
REHABILITATION AND LANDSCAPING					
General	Rehabilitation and landscaping activities	Adequate reinstatement and rehabilitation of construction areas	• In line with the requirements the National Environmental Management: Biodiversity Act (Alien and Invasive Species Regulations, 2014), the following must be undertaken: o Eradicate all Listed Invasive Species (Category 1a), if present; o Control all Listed Invasive Species (Category 1b), if present; o Apply for a permit for all Listed Invasive Species (Category 2), if present; o Apply for exemption for all Listed Invasive Species (Category 3), if present. • After the construction phase, the area to be reinstated to the same or better condition than it was prior to construction.	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			• Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures • Ensure that all access roads utilised during construction are returned to a usable state and/or a state no worse than prior to construction. • Inert waste and rubble o Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated. o Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site, or with a registered service provider. • Hazardous waste and pollution control o Remove from site all pollution containment structures. o Remove from site all temporary sanitary infrastructure and waste water disposal systems. o Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner • Control of Invasive Plant species: o Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods. o Encroachment of alien vegetation should be monitored regularly and controlled; the area must be kept clear of all invader plants as per the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983). Rehabilitation measures must be employed until such a time as indigenous species are established. o As much vegetation growth as possible should be promoted within the proposed replacement in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping • Landscaping		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			○ Make safe all excavations outside of the construction area by backfilling and grading, as required. ○ In general, no slopes steeper than 1(V):3(H) are permitted in cut-and-fill areas, unless otherwise specified by the landscaping plan. ○ Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil. ○ Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material. ○ Shape the area surrounding the development to blend in with the surrounding landscape, where possible. Landscaping shall be done through the use of indigenous plant species, following water conscious design principles. ○ Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfill is landscaped to blend in with the surrounding landscape. • Topsoil replacement and soil amelioration ○ Execute top soiling activity prior to the rainy season or any expected wet weather conditions. ○ Execute topsoil placement only after all construction work has ceased. ○ Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes. Replace topsoil to the original depth. ○ Place topsoil in the same area from where it was 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 of similar quality. ○ The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage. ○ Do not use topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be appropriately treated.		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			○ Ensure that storm water run-off is not channelled alongside the gentle mounding, but that it is taken diagonally across it. ○ Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area. ○ After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area • Ripping and scarifying ○ Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be determined based on the site conditions immediately before these works begin. ○ Rip and/or scarify all disturbed areas (and other specified)		

12.3 Operation

Mitigation measures for all activities related to operation are provided below. Management actions are linked to a specific impact and overall management objective. Information on the institutional responsibilities and the frequency of the actions is also provided.

Table 12-3: Management measures to be implemented during operation.

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
ATMOSPHERIC EMISSIONS					
Emissions from vehicles and equipment (CO2, NOx, SOx, VOC's etc.)	Signage/Speed Limits	Speed limits must be adhered to.	• Employ speed limits on road • Employ mechanisms to ensure that road users stick to the speed limit, such as speed traps etc. (sticking to the speed limit, reduces fuel consumption and decreases emissions).	Ongoing	Authorisation Holder
NOISE					
Noise increase due to vehicles using the road	Signage/Speed Limits	Speed limits must be adhered to.	• Employ speed limits on road • Employ mechanisms to ensure that road users stick to the speed limit, such as speed traps etc. • Road surface will be layered with asphalt and materials to minimize noise impacts	Ongoing	Authorisation Holder
DISCHARGE TO WATER					
Surface water run-off/Disturbance of Aquatic Ecological Systems	General	Ensure stormwater is properly managed as required by the stormwater management plan.	• Storm water management system to be implemented and maintained.	Ongoing	Authorisation Holder
Contamination of water from hazardous substances	Accidents or incidents on the road resulting in spillages.	Effective and safe management of hazardous materials spills due to accidents on the road, to minimise the impact of materials on the environment.	• Employ speed limits on road • Employ mechanisms to ensure that road users stick to the speed limit, such as speed traps etc. to limit potential incidents on the road resulting in spills. • In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.	Ongoing	Authorisation Holder

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
WASTE GENERATION					
Domestic Waste	Litter management	Proper management of waste.	• As part of management of the road, litter should be collected and disposed of at an approved landfill site.	Ongoing	Authorisation holder
Hazardous waste	Accidents or incidents on the road resulting in spillages.	Proper management of hazardous waste.	• The only hazardous waste expected is through incidents/accidents resulting in oil/fuel spillages. Should this occur, the following process must be followed: • Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required). • Obtain and provide an acceptable container with a label. Place hazardous waste material in the container. • Inspect the container on a regular basis • Haul the full container to the licenced and correct disposal site. • Provide documentary evidence of proper disposal of the waste.	Ongoing	Authorisation holder
SOIL ALTERATION					
Soil erosion	Operational activities (Stormwater management)	Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment	• Stormwater management system to be implemented to reduce erosion. • Landscaping to minimise soil erosion.	Ongoing	Authorisation holder
Soil pollution	Accidents or incidents on the road resulting in spillages.	Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and	• The only hazardous waste expected is through incidents/accidents resulting in oil/fuel spillages. Should this occur, the following process must be followed: • Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).	Ongoing	Authorisation holder

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		surrounding environment	• Obtain and provide an acceptable container with a label. Place hazardous waste material in the container. • Inspect the container on a regular basis • Haul the full container to the licenced and correct disposal site. • Provide documentary evidence of proper disposal of the waste.		
EFFECTS ON BIODIVERSITY					
Loss of fauna	General	Minimal disturbance of fauna.	• Due to the shorter length of the preferred alternative (The Proposal) within Porcupine Park, this alternative is preferred and the potential for animals needing to cross the road is lessened (and thus the intensity and probability of the impact are reduced). • However, in order to prevent road kill incidents, it is suggested that a fence/wall be placed alongside the road reserve. This will also ensure that Porcupine Park cannot be accessed outside of the official access points which will minimise poaching incidents.	Ongoing	Authorisation holder
Disturbance of natural corridors.	General	Minimal disturbance of natural corridors.	• Currently fauna occurring within Porcupine Park are limited to the boundary of Porcupine Park. With the preferred alternative (The Proposal), a very small section of the area will no longer be accessible during operation. This impact is much greater for the alternative re-alignment which traverses the whole of the Porcupine Park. The preferred alternative (The Proposal) should therefore be implemented.	Ongoing	Authorisation holder
INCIDENTS, ACCIDENTS, AND POTENTIAL EMERGENCY SITUATIONS					
Pollution incidents	Accidents or incidents on the road resulting in spillages.	Proper management of pollution sources to prevent pollution incidents on site.	• The only hazardous waste expected is through incidents/accidents resulting in oil/fuel spillages. Should this occur, the following process must be followed: • Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required). • Obtain and provide an acceptable container with a label. Place hazardous waste material in the container. • Inspect the container on a regular basis • Haul the full container to the licenced and correct disposal site. • Provide documentary evidence of proper disposal of the waste.	Ongoing	Authorisation holder

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Health and safety	General	Minimise potential impacts/incidents	• Speed limits to be implemented. • Traffic calming and safety measures to be implemented during any maintenance activities taking place on the side of the road (e.g. collecting litter, cutting grass etc.).	Ongoing	Authorisation holder
SOCIAL					
Visual impact	Operation of East-West Link Road Re-Alignment	Minimal impacts to the visual environment during operation	• A suitable boundary wall/fence should be put in place to limit visual impacts. • Maintenance of the road should include litter collection. • Rehabilitation of construction footprint must be undertaken.	Ongoing	Authorisation holder
Safety and security	Operation of East-West Link Road Re-Alignment	Minimal safety and security issues related to the operation of the East-West Link Road Re-Alignment.	• Fence/wall to be put in place to limit access to Porcupine Park from the road and to ensure only access is through official access points.	Ongoing	Authorisation holder
Loss of sense of place	Operation of East-West Link Road Re-Alignment	Minimal impacts to the sense of place through proper management of visual and noise impacts.	• A suitable boundary wall/fence should be put in place to limit visual impacts. • Maintenance of the road should include litter collection. • Rehabilitation of construction footprint must be undertaken.	Ongoing	Authorisation holder