



**CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME IN SUPPORT OF THE PROPOSED
CONSTRUCTION OF THE BULK SEWER PIPELINE AND UPGRADE OF THE BULK WATER PIPELINE IN
LANGAVILLE EXT 12, CITY OF EKURHULENI, GAUTENG PROVINCE**

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**Prepared for:
City of Ekurhuleni – Human Settlements Department**

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**Prepared by:
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Project: Environmental Management Programme for the Proposed Construction of the Bulk Sewer Pipeline and Upgrade of the Bulk Water Pipeline in Langaville Ext 12, City of Ekurhuleni, Gauteng Province

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1 DEFINITIONS AND ABBREVIATIONS

CEMP	Construction Environmental Management Plan
Client	City of Ekurhuleni – Human Settlements Department
Developer	City of Ekurhuleni – Human Settlements Department
Contractor	The main contractor as engaged by the Employer for construction operations, including all Sub-Contractors appointed by the main Contractor of his own volition for the execution of parts of the construction operations; and any other Contractor from time to time.
Construction Manager	The Employers Construction Manager works together with the Employers Project Manager to ensure that construction proceeds in accordance with the relevant specifications and deadlines
GDARD	Gauteng Department of Agriculture and Rural Development
NEMA	National Environmental Management Act (Act No. 107 of 1998)
SPLUMA	Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)
Safety Health and Environmental Officer	Contractors Environmental Officer responsible for ensuring compliance with the CEMP daily

2 TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Drainage line: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial and riparian vegetation may or may not be present

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Environment: the surroundings within which humans exist and that are made up of:

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

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



Environmental management programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

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

General waste: Waste which does not pose an immediate hazard or threat to health or to the environment' and includes the following waste flows: domestic waste, construction and demolition waste, business waste, inert waste.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Waste that has the potential to cause a negative threat/impact to humans and/or the environment. It includes, but is not limited to, batteries, neon lights, fluorescent lights, printer cartridges, oil, paint, paint containers, oil filters, IT equipment etc.

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

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

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.



Rehabilitation- is defined as the return of a disturbed area to a state which approximates the state, as far as possible, which it was before disruption. Rehabilitation should aim to accelerate the natural succession processes so that the plant community develops in the desired way.

Reinstatement-is defined as the initial soil works that replaces soil levels back to the original state as far as possible. It may include an initial light temporary grassing.

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Topsoil means that layer of soil covering the earth and which provides a suitable environment for the germination of seed, allows the penetration of water, is a source of micro-organisms, plant nutrients and in some cases seed, and of a depth of up to 0,3m. Topsoil (top 300mm as a minimum) must be temporarily stockpiled separately from subsoil or rocky material (the topsoil contains both the seedbed and nutrient supply necessary for plant growth - if mixed with subsoil layers the usefulness of the topsoil for rehabilitation will be lost) Topsoil shall be stripped from all areas to be utilized during construction period and where permanent structures and access is required

Waste: As per National Environmental Management: Waste Act means-

- a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or
- b) disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
- c) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste.

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

Watercourse: as per the National Water Act means -

- (a) a river or spring;



- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and ban.

3 INTRODUCTION

3.1. Background and Introduction

The City of Ekurhuleni has identified the requirement for a bulk water and sewer line to be implemented for the Langaville Ext. 12 proposed development. The proposed Langaville Ext.12 development consists of a mixed residential type of housing units planned for the lower income housing market.

The following bulk water and sewer reticulation lines and proposed diameters have been identified:

3.1.1. Bulk Water Line:

- * Installation of 4000m x 400/450mm Ø parallel reinforcement pipeline
- * Installation of 800m x 250mm Ø parallel reinforcement pipeline
- * Installation of 1050m x 250mm Ø pipeline
- * Installation of 100m x 160mm Ø pipeline

The water lines required to service the proposed development are the **1050m** and **100m** lines that will connect onto the existing municipal infrastructure. These two water lines are newly added lines into the network system. The 1050m line will start from Rokhana Street and will run parallel to Tonk Meter Road (M86) in a southerly direction and then turn west towards the proposed development. This line will provide a connection point at the north-eastern corner for the proposed development.

The 100m line will start at the unknown street running from Masibeni Street to Maziya Street at the north-western boundary of the site and terminate at 100m to the proposed development.

Refer to drawing no. CE103-1100-Rev A (1050m & 100m WATER LINE). The water lines required to address the pressure problem within the system are the 4000m and 800m lines. These lines have been horizontally aligned to replace existing AC (Asbestos Cement pipes).

- * Refer to drawing no. CE103-1100-Rev A (1050m & 100m WATER LINE).

The water pipelines earmarked for repair and upgrade are all located in existing servitudes. The pipelines of interest in this Basic Assessment process as those of 100m and 1050m as these occur in sensitive environments. The others are precluded as they occur within the urban urge and within road reserves. However the mitigation measures provided are holistic of all works on site.

The wetlands closest to the water pipelines, and consequently the most likely to be impacted are Pans 2 and wetland 2 which lies within the 1050m servitude and Pan 3 occurs within the 1050m pipeline servitude.

Particularly Pan 3 lies immediately adjacent to a section of pipeline 1050m. Earthworks associated with removal of old pipes and replacement with new pipes may negatively affect the wetland.

3.1.2. Bulk Sewer Line:

- * Installation of 315mm Ø pipeline
- * Installation of 250mm Ø pipeline

The GLS report has indicated the current sewer collector system has sufficient capacity to receive the outflow from the proposed development. The new bulk sewer line will connect the development from its bottom south-east corner and travel east, crossing Tonk Meter Road, towards the collector sewer located in Wentzel Street. The proposed development can be accommodated within the Grundlingh WWTP drainage area.

The start point of the sewer is regarded as an ecological support area due to the Tsakana grassland which is regarded as endangered. However the vegetation on site is significantly transformed and not a true representative of the Tsakane clay grassland. The proposed sewer pipeline is located outside the delineated boundaries of Wetland 1 and its buffer zone and therefore it is unlikely that the construction related activities will affect this wetland. However, spills of sewage into the downslope wetland during operation will have a significant effect on aquatic biota and water quality.

- ✚ The Sewer and Water pipelines designs will be carried out according to the City of Ekurhuleni's guidelines, standards and the facility drawing are attached within Appendix C***

3.2. Project Locality

The proposed development, will be established within the Langaville Ext. 12 residential area, this can be accessed from Tonk Meter Road and Siboyala Street. The R51 lies to the east and the M45 lies to the south. The new residential area of Sharon Park lies directly north of the proposed sewer line. The water pipelines included in this assessment comprise five sections that lie north of Vlakfontein Road and west of Tonk Meter Drive. South Rand Road (N17) lies 2km north of the northernmost section of the water pipeline discussed in this report (**Error! Reference source not found.**). The central co-ordinates of the proposed development are 26°00'12.86" South and 28°13'44.52" East.

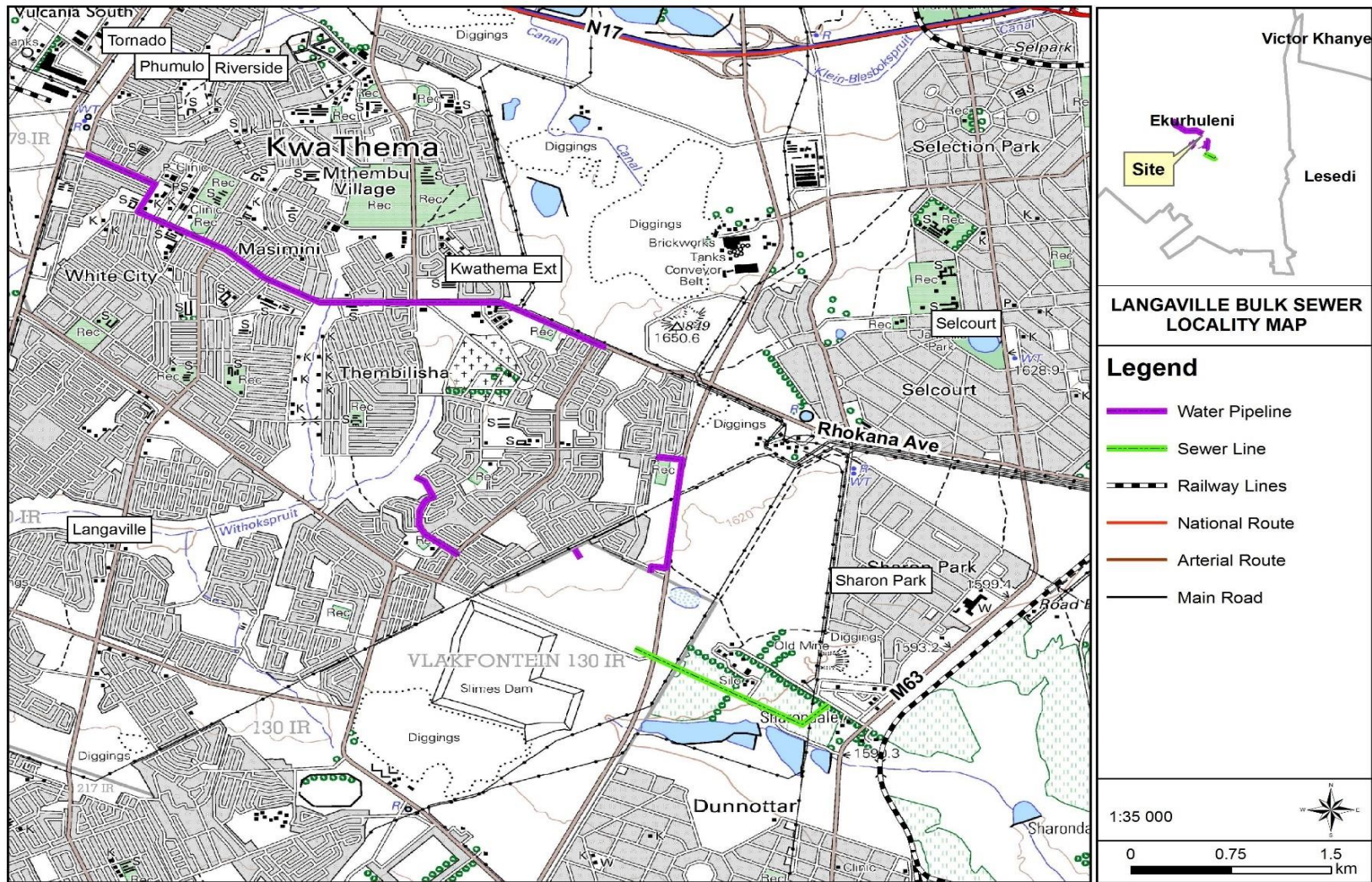


Figure 1: Locality Map

In light of the above, this Environmental Management Programme (EMPr) has been developed to ensure that the construction and operation of the proposed bulk sewer and water pipelines are undertaken in an environmentally responsible manner and to prevent any negative impacts on the receiving environment. The EMPr describes the main requirements that the Contractor must comply with during the construction phase to ensure that the environment is considered, negative impacts avoided, or minimised and positive impacts optimised. The EMPr and associated documents also address the requirements of the planning documents that shall apply to the construction phase of the project. This document is important to all parties that will be involved in the construction of the proposed bulk sewer and water pipelines - including all subcontractors and their employees.

The purpose of the standard is to:

- Describe how the environment will be managed during the construction phase.
- Detail the role of the Contractor with respect to the implementation of the EMPr for this project.
- Aid the Contractor in understanding the EMPr.
- Provide a set of standards for environmental management during the construction phase.

3.3. Description of the Expected Potential Impacts

Watercourses in the 500m area of investigation around each section of pipeline discussed in this report lie in two quarternary catchments. In quarternary catchment C21E 2 valley bottom and 3 pan wetlands drain into the Blesbokspruit. In Quarternary catchment C22C 3 valley bottom wetlands drain into a tributary of the Rietspruit. A canalised watercourse extends across both catchments. Figure 2 presents the delineated wetlands as well as the associated buffer zones and DWS regulated area.

3.3.1. Expected Wetland Impacts

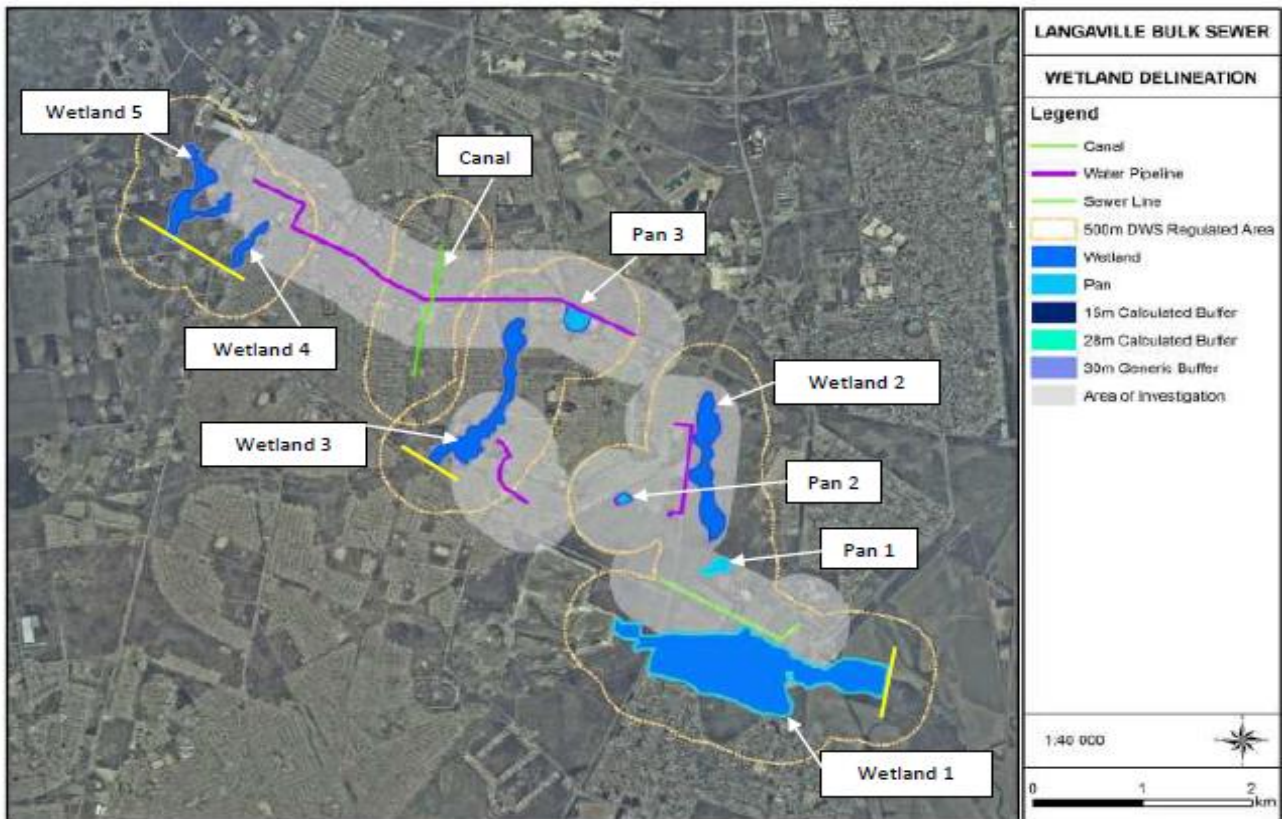


Figure 2: Wetland delineation also showing buffer zones and DWS regulated zones

Table 1: Identified wetlands on site and Expected Impacts

	Quaternary Catchment and WMA areas	Important Rivers possibly affected
	C21E and C22C – #5 WMA, Vaal Major	The wetlands in catchment C21E on the study site drains into the Nigel dam which in turn drains into the Blesbokspruit River. Wetlands in catchment C22C drain into a tributary of the Rietspruit
Watercourse classification	Catchment C21E: <ul style="list-style-type: none"> – Channelled valley bottom wetland 1 – Unchannelled valley bottom wetland 2 – Pan 1 – Pan 2 – Pan 3 – A section of a canal Catchment C22C: <ul style="list-style-type: none"> – Unchannelled valley bottom wetland 3 – Unchannelled valley bottom wetland 4 – Unchannelled valley bottom wetland 5 	
Buffer Zones	Wetland 1 is potentially affected by a sewer pipeline. The calculated buffer zone for this wetland is 18m. The generic buffer is 30m. All other wetlands are potentially affected by water pipeline replacement. Their	

	calculated buffer zones are 15m, generic buffer zones are 30m.			
NEMA 2014 Impact Assessment	The impact scores for the following aspects are relevant to the operational phase:		Without Mitigation	With Mitigation
	Impacts to hydrological function at a landscape level	Construction	M	L
		Operation	M	L
	Changes to sediment regimes	Construction	M	L
		Operation	L	L
	Establishment of alien plants	Construction	M	L
		Operation	M	L
	Loss of wetland habitat	Construction	M	L
		Operation	L	L
	Pollution of regional watercourses	Construction	M	L
		Operation	M	M
	Loss of aquatic biota	Construction	M	M
Operation		M	L	

Impacts on the wetlands all fall within the Medium category which can be reduced to Low significance with the implementation of the project EMPr.

Gauteng Conservation Plan

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province on the basis of its contribution to reach the conservation targets within the province. Critical Biodiversity Areas (CBAs) contain irreplaceable, important and protected areas (terms used in C-Plan 2) and are areas needed to reach the conservation targets of the Province. In addition, 'Ecological Support Areas' (ESAs), mainly around riparian areas and other movement corridors were also classified to ensure sustainability in the long term. Landscape features associated with ESAs is essential for the maintenance and generation of biodiversity in sensitive areas and requires sensitive management where incorporated into C-Plan 3. The pipelines lie on unclassified area with watercourse crossing classified as Important and Ecological Support Areas, refer to Figure 3.

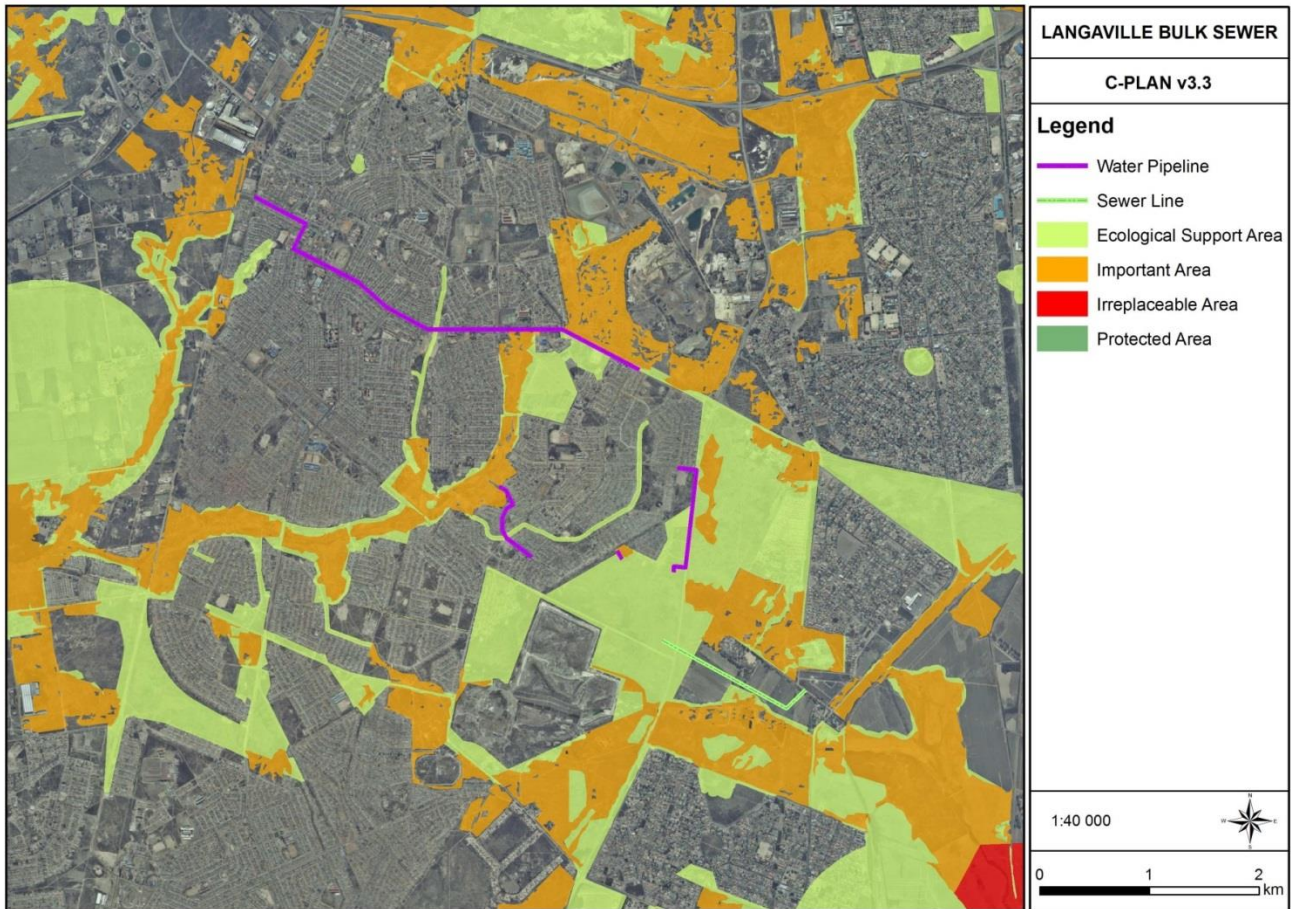


Figure 3: C-Plan classification of the study area and surroundings

Visual Impacts: The proposed development will be in keeping with its surrounding environment. Therefore the potential significance was rated as having a predominately Medium significance

Heritage impacts:

No known heritage resources occur in the study area.

However, however some of the heritage resources tend to occur below ground, therefore should graves, fossils or any archaeological artefacts be exhumed during construction, work on the area where the artefacts were found must cease immediately and it should immediately be reported to the police, ECO and heritage practitioner or local museum so that an investigation and evaluation of the finds can be made

The impact is expected to be very Low with or without mitigation.

Fauna, Avifauna and Hepertofauna Impacts: The study area occurs in an urban built up area therefore very minimal impact will occur.

Additional potential impacts that may occur during the construction phase will include

- Noise,



- Air quality impacts e.g dust generation and exhaust fumes from construction vehicles and machinery
- Health and safety and security impacts,
- Pollution of inappropriate waste handling,
- Soil contamination,
- Social and economic impact and air quality impacts.

These impacts were all recorded to be of **Medium to Low significance Rating** and with mitigation they can be reduced to low and very low. No impacts of Very high significance are envisaged to occur on site

Relevant mitigation and rehabilitation measures are discussed in SECTION 7.

It thus of utmost importance that the mitigation measures proposed in this EMPr be adopted and be monitored by an independent person throughout the construction phase.

4 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Several laws and regulations apply to the protection of the environment and contain environmental principles and standards that need to be applied and permits and licences that need to be obtained. This EMPr will be subject to regulatory control under a range of State, Provincial and Local regulations. Such legislation largely embraces pollution prevention, resource use and conservation, and socio cultural (heritage) protection. This chapter reviews legislation pertaining to the proposed development.

According to Section 2 (1, 2 & 3) of the National Environmental Management Act No. 107 of 1998 (NEMA), all organs of state have to apply certain principles set out in NEMA when taking decisions that may significantly affect the environment. The key principles of this Act include that all “actions” that they approve must be economically, socially and environmentally sustainable. It further states that “people and their needs” must be at the forefront of “its concern” and their interests must be served equitably. The intent of this EMPr is to ensure that the developer conducts all its activities related to the operation and maintenance of this parking in accordance with the provisions of the NEMA, and has taken into account the provisions of the Constitution and the principles of Integrated Environmental Management.

Key environmental legislations that is applicable to the project are outlined below:

Table 1: List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
Constitution of the Republic of South Africa, Act 108 of 1996:	<ul style="list-style-type: none"> ▪ Section 24 of the Constitution provides for the environment that is not harmful for the health and people’s wellbeing. 	-	The proposed Development has been properly planned to ensure that it conforms to the principles of sustainable development.
National Environmental Management Act (Act No. 107 of 1998)	<ul style="list-style-type: none"> ▪ NEMA requires, inter alia, that: <ul style="list-style-type: none"> ○ Development must be socially, environmentally, and economically sustainable.” 	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment ▪ Gauteng 	In terms of sections 24 and 24D of the National Environmental Management Act (No

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<ul style="list-style-type: none"> ○ Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimized and remedied.” ○ A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.” ▪ EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorization are identified within these Regulations. ▪ In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorization. 	<p>Department of Agriculture and Resource Development</p>	<p>107 of 1998), as read with the EIA Regulations 2014 of GN R982 – R985 a Basic Assessment process is required to be undertaken for the proposed project.</p>
<p>National Environmental Management Act (Act No. 107 of 1998)</p>	<ul style="list-style-type: none"> ▪ A project proponent is required to consider a project holistically and to consider the cumulative effect of potential impacts. ▪ In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any 	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment ▪ Gauteng Department of Agriculture and Resource Development 	<p>While no permitting or licensing requirements arise directly, the holistic consideration of the potential impacts of the proposed project has found application in the EIA Phase.</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<p>pollution or degradation of the environment associated with a project is avoided, stopped or minimized.</p>		<ul style="list-style-type: none"> ▪ The implementation of mitigation measures are included as part of the EMPr and will continue to apply throughout the life cycle of the project.
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</p>	<ul style="list-style-type: none"> ▪ The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. ▪ In terms of the regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities. ▪ Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that <ul style="list-style-type: none"> ○ The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste; ○ Adequate measures are taken to prevent accidental spillage or leaking; 	<p>National Department of Forestry, Fisheries and Environment (hazardous waste)</p> <p>GDARD (general waste)</p>	<p>In terms of GNR921, no waste license is required for the project. However, Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in this EMPr.</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<ul style="list-style-type: none"> ○ The waste cannot be blown away; ○ Nuisances such as odor, visual impacts and breeding of vectors do not arise; and ▪ (e) Pollution of the environment and harm to health are prevented. 		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> ▪ S18, S19 and S20 of the Act allow certain areas to be declared and managed as “priority areas”. ▪ Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. ▪ The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. ▪ Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan. 	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment. ▪ City of Ekurhuleni 	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project for dust management.
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> ▪ Under S21 of the Act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorization. ▪ In terms of S19, the project proponent must ensure that 	<ul style="list-style-type: none"> ▪ National Department of Human settlement Water and Sanitation ▪ Gauteng Department of 	The proposed development requires a Water Use License as per the following regulations: According to the National Water Act

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<p>reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.</p>	<p>Agriculture and Resource Development</p>	<p>(NWA), 1998 (Act No.36 of 1998), the project will be required to be licensed in terms of the National Water Act (Act 36 Of 1998) for the following activities under Section 21:</p> <ul style="list-style-type: none"> ▪ Impeding or diverting the flow of water in a watercourse ▪ Altering the bed, banks, course or characteristics of a watercourse. <p>The water use license application has been initiated. Requirements set by S19 will apply throughout the life cycle of the project.</p>
<p>Environment Conservation Act (Act No. 73 of 1989)</p>	<ul style="list-style-type: none"> ▪ National Noise Control Regulations (GN R154 dated 10 January 1992) 	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment ▪ Gauteng Department of Agriculture and Resource Development ▪ Local Authorities 	<p>There is no requirement for a noise permit in terms of the legislation. However the act finds applicability in ensuring construction noise is below the legislated 85decibels</p>
<p>Hazardous</p>	<ul style="list-style-type: none"> ▪ This Act regulates the control 	<p>Department of Health</p>	<p>It is necessary to</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
<p>Substances Act (Act No. 15 of 1973)</p>	<p>of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitizing, or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> ▪ Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance; ▪ Group IV: any electronic product; ▪ Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force. 		<p>identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled.</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
National Environment Management Protected Areas Act, 2003 (Act No. 57 of 2003).	Wetlands and other critical Biodiversity areas are regulated under the NEM: BA. Activities that fall within the parameters of these areas require specialist assessment to determine the impacts and the residual effects of mitigation measures	National Department of Forestry, Fisheries and Environment	A wetland specialist was appointed to determine the impacts and the residual effects of mitigation measures. Refer to appendix G1.
Conservation of Agricultural Resources Act (Act No 43 of 1983).	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorized according to one of the following categories:</p> <ul style="list-style-type: none"> ▪ <u>Category 1 plants</u>: are prohibited and must be controlled. ▪ <u>Category 2 plants</u>: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread. ▪ <u>Category 3 plants</u>: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands. 	Department of Forestry, Fisheries and Environment	Alien mitigation measures have been included in the project EMPr. In addition an Alien Plant guideline report is attached as Appendix A of the EMPr.
The Gauteng Conservation Plan (Version 3.3)	<ul style="list-style-type: none"> ▪ The plan has classified areas within the province on the basis of its contribution to 	GDARD	On the study site only the sections associated with the

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
(GDARD, 2011)	<p>reach the conservation targets within the province. Critical Biodiversity Areas (CBAs) contain irreplaceable, important and protected areas (terms used in C-Plan 2) and are areas needed to reach the conservation targets of the Province. In addition 'Ecological Support Areas' (ESAs), mainly around riparian areas and other movement corridors were also classified to ensure sustainability in the long term. Landscape features associated with ESAs is essential for the maintenance and generation of biodiversity in sensitive areas and requires sensitive management where incorporated into C-Plan 3.</p>		<p>watercourse is classified while the rest of the areas remain unclassified. The areas associated with the watercourses are classified as Important and Ecological Support Area.</p>
<p>National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004)</p>	<ul style="list-style-type: none"> ▪ This Act provides management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resource. ▪ Protection of biodiversity features and where possible relevant permits will need to be obtained. ▪ The National Environmental Management: Biodiversity Act 	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment ▪ Gauteng Department of Agriculture and Resource Development 	<p>During the site visit it was observed that numerous additional alien invasive species were present on site. Alien plant management measures are included in the project EMPr.</p> <p>A water use licence will be required to be obtained from Department of Water and Sanitation</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<p>(NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014 the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014).</p> <ul style="list-style-type: none"> ▪ The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within close proximity to a watercourse. 		<p>for undertaking works in the watercourse and its buffer areas.</p> <p>An environmental authorisation from GDARD is being applied for, for undertaking works in the water course. and ecological support areas</p>
<p>The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011)</p>	<ul style="list-style-type: none"> ▪ The plan has classified areas within the province on the basis of its contribution to reach the conservation targets within the province. Critical Biodiversity Areas (CBAs) contain irreplaceable, important and protected areas (terms used in C-Plan 2) and are areas needed to 	<p>GDARD</p>	<p>On the study site only the sections associated with the watercourse is classified while the rest of the areas remain unclassified. The areas associated with the</p>

Title of legislation, policy or guideline (Promulgation Date)	Applicable Requirements	Administering Authority	Description of compliance
	<p>reach the conservation targets of the Province. In addition 'Ecological Support Areas' (ESAs), mainly around riparian areas and other movement corridors were also classified to ensure sustainability in the long term. Landscape features associated with ESAs is essential for the maintenance and generation of biodiversity in sensitive areas and requires sensitive management where incorporated into C-Plan 3.</p>		<p>watercourses are classified as Ecological Support Areas</p>
<p>Promotion of Access to Information Act, 2000 (Act No 2 of 2000):</p>	<p>Legislation that allows the public access to information about activities that influence their well-being and to make contributions to decision making.</p>	<ul style="list-style-type: none"> ▪ National Department of Forestry, Fisheries and Environment ▪ Gauteng Department of Agriculture and Resource Development 	<ul style="list-style-type: none"> ▪ No permitting is required the act finds applicability during the public participation process phase of the basic assessment process.
<p>National Heritage Resources Act (Act No. 25 of 1999)</p>	<ul style="list-style-type: none"> ▪ Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including ▪ (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length <p>Section 34. (1) of the act states that`` No person may alter or demolish any structure or part of a structure which is older than</p>	<p>South African Heritage Resources Agency</p>	<p>From the heritage screening that was undertaken for the project, no known heritage resources occur on site..</p>

5 OVERVIEW OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

5.1 Composition of the EMPr

The CEMP shall form an integral part of all contracts with Contractors. The CEMP shall be included in the Tender Documents issued to prospective Contractors. The Contractors shall incorporate all requirements set out in the CEMP in their submissions to the Employer.

5.2 Objective of the EMPr

The objectives of the environmental management plan are to:

- Provide a description of the background to the project and the affected environment, thus providing the context within which the management requirements are to be implemented.
- Ensuring that the suitable record keeping, and reporting structures are put in place to ensure that implementation of the stipulated environmental management measures are monitored in the long-term.
- Ensuring that the roles and responsibilities for the management of various aspects are clearly defined and understood.
- Ensuring that all associated activities are undertaken in a way that minimises identified potential negative effects on the surrounding environment.
- Ensuring that relevant environmental management are well stipulated understood and documented for all relevant parties.
- Encourage and achieve the highest environmental performance and response from all employees and contractors
- Ensure that management efforts are proactive and focussed to prevent impacts from occurring; and
- Supplement the proactive approach with reactive measures to minimise the severity or significance of any impacts that cannot be prevented at source.

The mitigation measures recommended in this EMP will apply to the construction phase of the project cycle.

5.3 Purpose of Environmental Specifications

The purpose of environmental specifications is to incorporate the relevant recommendations of the studies undertaken for the project (i.e. Wetland and Aquatic Impact Study) into an environmental performance specification for implementation during the construction phase of the project.

The EMPr is configured as a performance specification to ensure that the Employer and any entities that enter into formal agreements with themselves viz. Consultants, Contractors and Sub-Contractors, achieve an acceptable level of environmental performance.

No advice, approval of method statements or any other form of communication from the Employer shall be construed as an acceptance by the Employer of any obligation that absolves the Contractor from achieving any required level of performance. Further, there is no acceptance of liability by the Employer which may



result from the Contractor failing to comply with the required specifications, i.e. the Contractor remains responsible for achieving the required performance levels.

6 ROLES AND RESPONSIBILITIES

Effective implementation of the EMPr requires that all parties or role players involved in this project need to comply with the directives set out. A concise description of impacts and their mitigation/management measures will be provided and understood by all role players responsible for the implementation and monitoring of the mitigation measures. The project will comprise of the following role players:

Table 2: Roles and Responsibilities for the personnel involved in the project

FUNCTION	RESPONSIBILITY
<p>Developer</p>	<ul style="list-style-type: none"> • The developer remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMPr. • Although the developer appoints specific role players to perform functions on his/her behalf, this responsibility is delegated. • The developer is responsible for ensuring that sufficient resources (time, financial, human, equipment, etc.) are available to the other role players (e.g. the ECO, ELO and contractor) to efficiently perform their tasks in terms of the EMPr. • The developer is liable for restoring the environment in the event of negligence leading to damage to the environment. • The developer must ensure to appoint an independent Environmental Control Officer (ECO) to monitor and audit the implementation of the EMPr and environmental authorisation. • The ECO must have the appropriate experience and qualifications to undertake the necessary tasks • The developer must ensure that the EMPr is included in the tender documentation so that the contractor who is appointed is bound to the conditions of the EMPr. • The developer must appoint an independent Environmental Control Officer (ECO) during the construction phase to oversee all the environmental aspects relating to the development. • Submit an environmental audit report to the relevant competent authority (GDARD).
<p>Construction Manager</p>	<p>The Construction Manager takes complete responsibility of the whole project and any contracted parties and ensuring that all environmental management facets are adhered to. The roles and responsibilities of the Engineering Manager during the Construction Phase will include:</p> <ul style="list-style-type: none"> • Identifying the need for remedial measures with regard to proposed works; • Communicating directly with the Contractor and sub-contractors; and • Issuing non-conformance notifications to contractors that do not comply with the requirements as set out in the EMPr.
	<p>The Principle Contractor is responsible for the following:</p>

FUNCTION	RESPONSIBILITY
<p>Contractor</p> <p>Principle Contractor (continued...)</p>	<ul style="list-style-type: none"> • Ensure that all activities on site are undertaken in accordance with the EMPr; • Monitor all the sub-contractors' activities with regard to the requirements outlined in the CEMP; • Ensure that all employees and sub-contractors comply with the EMPr; • Immediately notify the Construction Manager of any non-compliance with the CEMP, or any other issues of environmental concern; and • Ensure that non-compliance is remedied timeously and to the satisfaction of the Construction Manager. <p>Please note: A number of Contractors will be employed by the Developer for different components of the project. This EMPr applies to each individual Contractor. The Principle Contractor's primary responsibilities are to construct the works and ensure compliance with the EMPr</p> <p>The Contractor shall appoint the Safety Health and Environmental Officer (SHE Officer) whose role is to ensure compliance with the requirements of the EMPr.</p> <p>The Contractor has a duty to demonstrate respect and care for the environment. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation, resulting from their presence on site.</p> <p>The contractor must appoint a Safety, Health and Environmental Officer (SHE) to assist with day-to-day monitoring of the construction activities. Any issues raised by the ECO will be routed to the HSE for the contractors' attention.</p>
<p>Contractor's Health Safety and Environmental Officer</p>	<p>It will be the responsibility of the Safety, Health and Environmental Officer (SHE) to ensure that all work is conducted according to approved Environmental Method Statements and that the requirements of the EMPr are implemented in a timeous and proper manner in his / her work area. The SHE Officer shall:</p> <ul style="list-style-type: none"> • Undertake regular inspections of the work area(s); • Prepare activity based Environmental Method Statements; • Monitor compliance with the EMPr and approved Environmental Method Statements; • Conduct ongoing environmental awareness training of the Contractor's site personnel; • Report and record any environmental incidents caused by the Contractor or due to the Contractor's activities; • Take required corrective action within specified time frames and close out of environmental incidents; • Attend all Safety, Health and Environmental meetings, toolbox talks and induction programmes;

FUNCTION	RESPONSIBILITY
	<ul style="list-style-type: none"> • Be responsible for waste management; • Ensure that environmental signage and barriers are correctly placed; and • Submit monthly checklists to the Construction Manager.
<p>Independent Environmental Control Officer</p>	<p>The Environmental Control Officer (ECO) is appointed by the developer as an independent monitor of the implementation of the EMPr. He/she must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. The ECO must attend relevant project meetings, conduct inspections to assess compliance with the EMPr and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:</p> <ul style="list-style-type: none"> • Assisting in ensuring that the necessary environmental authorisations and permits have been obtained prior to construction commencing. • Reviewing the Contractor’s construction Method Statements. • Monthly site inspections of all construction areas with regard to compliance with the EMPr. • Monitoring and verifying adherence to the EMPr, the EA and approved Method Statements at all times. • Monitoring and verifying that environmental impacts are kept to a minimum. • Taking appropriate action if the specifications are not followed. • Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site. • Advising on the removal of person(s) and/or equipment not complying with the specifications. • Auditing the implementation of the EMPr and compliance with the EA on a monthly basis. • Compiling a final audit report regarding the EMPr and its implementation during the construction period after completion of the contract and submitting this report to the Employer and the authorising authority. <p>The ECO has the right to enter the site and do monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (e.g. wearing of safety boots and protective head gear).</p>

7 MATTERS PERTAINING TO THE IMPLEMENTATION OF THE CEMP

7.1 Availability of the EMPr

A copy of the EMPr and Issued Environmental Authorisation shall be available at the site offices of the Contractor and at the Construction Manger's site office. All Contractor's personnel will be required to go through an environmental induction programme before commencing work on site and this shall be reinforced through regular toolbox talks. The Contractor shall ensure that all personnel that work on site are familiar with and understand the requirements of the EMPr and Environmental Authorisation.

7.2 Procedures for construction phase

Key procedures for the implementation and monitoring of the requirements of the EMPr and Issued Environmental Authorisation in the Construction Phase are outlined below, with relevant details provided in subsequent sections:

- The client shall undertake an initial site visit in conjunction with the Construction Manager, and the Contractors to advise on issues of environmental concern and agree on communication and reporting procedures;
- The SHE Officer shall facilitate an initial environmental awareness training workshop with key on-site staff regarding the importance of the EMPr and Issued Environmental Authorisation, prior to commencement of construction activities;
- The SHE Officer will inspect the site regularly to monitor and review the environmental performance of the Contractors against the commitments of the EMPr and Environmental Authorisation;
- The SHE Officer will prepare weekly compliance checklist reports, detailing any environmental issues, non-compliance and actions to be implemented, to be submitted to the Environmental Manager;
- Where non-compliance with the EMPr or Method Statements, issued Environmental Authorisation or where environmental damage is noted by the Construction Manager, the SHE Officer will be formally notified of the required corrective action; and
- The Contractor will be expected to implement the required corrective action as detailed in the formal notification, and within the timeframes specified by the Construction Manager.

7.3 Environmental Awareness Training

Environmental awareness training courses should be provided to all personnel on site. It is incumbent upon the SHE Officer to ensure that all personnel are aware of the objectives and specific provisions of the EMPr. The SHE Officer will undertake the environmental inductions for key personnel on site, after which the SHE Officer will provide training for all employees and Sub-contractors on a regular basis. The environmental training should include, amongst others, aspects such as:

- Environmental issues on site;

- Roles and responsibilities;
- The construction environmental management measures;
- Cultural awareness; and
- Heritage discovery procedures.
- How to report on encounters with any fauna on the construction site.

Courses shall be held during normal working hours and all attendees shall remain for the duration of the course and, on completion, sign an attendance register that clearly indicates participants' names. A copy of the register shall be handed to the Construction Manager.

The SHE Officer is to ensure that the telephone numbers of emergency services including the local firefighting services are displayed on site and are up at the Contractors site offices. The SHE Officer shall also provide suitable environmental signage on site, this includes information signs, prohibitory signs and warning signs.

7.4 Environmental Method Statements

A Method Statement is a document prepared by the Contractor and submitted to the Construction Manager setting out specific details regarding the plant, materials, labour and method the Contractor proposes using to carry out certain activities, usually activities that may have a harmful effect on the environment.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities and ensuring that these meet the requirements of acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility.

It is an extremely useful tool as it provides a clear and documented statement of the approaches that the Contractor will pursue to undertake an activity, particularly one that may have adverse environmental impacts. It also provides a reference point to detect deviations from the agreed approach to each planned activity.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- The nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;
- Material and equipment requirements and storage on site;
- Transportation of equipment to and from site;

- Method for moving equipment/material while on site;
- Emergency response approaches;
- Response to compliance/non-conformance with the requirements of the CEMP; and
- Any other information deemed necessary by the contractor.

Method Statements that will typically be required for this project include:

- Environmental awareness training preparation;
- Material and equipment storage and delivery;
- Fuel/oil spills;
- Waste management;
- Erosion and storm water control;
- Traffic control;
- Dust control;
- Noise and light control;
- Construction camp establishment;
- Batching site selection and maintenance;
- Demarcation of site boundaries and No"-Go" areas; and
- Closure activities.

The Method Statements will be submitted by the SHE Officer to the Construction Manager not less than 14 days prior to the intended date of commencement of an activity. The Construction Manager shall approve and/or reject the Method Statement within 7 days. An activity covered by a Method Statement shall not commence until the Construction Manager has approved such a method and once approved, the Contractor shall abide by these Method Statements. Any activities not complying with what has been set out in the Environmental Method Statement will be stopped and the costs associated with this delay will be for the Contractor's account.

7.5 Non-compliance and Corrective Action

Should, under any circumstance, the contractor's activities pose any damage on the environment and not comply with measures as stipulated in the EMPr and Issued Environmental Authorisation the contractor will be held responsible for such are taken to rectify such damage, at the contractor's expense. It is the

duty of the Construction Manager to monitor compliance with the EMPr, and report and notify the contractor of any non-compliance, highlighting the following:

- Details of the nature of the non-conformance;
- The actions to be taken to correct the situation; and
- The date by which each corrective action should be executed.

The Contractor will also be liable to produce a Corrective Action Plan, within which he/she will detail how the required corrective actions will be implemented. This plan will be submitted to the Construction Manager for approval prior to implementation. Once approved and the corrective measures have been carried out, the Construction manager will then be required to sanction the success or failure of the corrective action.

7.6 Incorporation into the Contract Documentation

The Construction Manager contractually engages the Contractor to undertake the construction works. The Contract will stipulate the requirement to implement the EMPr. If compliance with the EMPr is not achieved in any area, the SHE Officer or Construction Manager can suspend part or all of the works, as required.

If any Contractor or Sub-contractor is notified of sub-standard or non-compliant environmental conditions by the relevant party, and if that Contractor fails to correct those conditions and re-establish compliance with the CEMP, this will constitute a breach of the contract. If advised of such a situation, the Construction Manager, will have the power to remove the Contractor and/or any of their employees from site on behalf of the Client.

7.7 Documentation and Records

All records related to the implementation of this EMPr (e.g. field instruction book, environmental method statements) must be kept together in an area where it is safe and can be retrieved easily. These records should be retained by the Contractor and should at any time be available for scrutiny by any relevant authorities. The frequency and nature of reporting of environmental management performance will depend upon the nature of the activity and aspect that is being managed. Reporting may take several forms:

- Reports to Construction Manager/SHE Officer on critical issues that may arise;
- Compliance checklist reports on a weekly basis;
- Monthly reports on environmental performance and compliance or non-compliance;
- Performance reports on key indicators on a quarterly basis;

- Environmental monitoring reports to confirm whether or not environmental monitoring results fall within specified limits on the EMPr and Environmental Authorisation; and
- Summary reports to external stakeholders- where applicable.

Reports and records to be kept are presented in the Table 3 ON the next page overleaf

Table 3: Reports required during construction/operations

#	Report	Frequency	From	To	Aim / Objective
1	Environmental Audit Reports	Monthly	Contractor SHE Officer. ECO	Construction Manager, Developer	Detailed project compliance across all relevant legislation, identifying non-compliances, actions to be taken to rectify and timeframes to implement actions by responsible persons.
2	Corrective Action Plans	As required	Construction Manager/SHE Officer in the event of environmental non-conformance	SHE Officer	Detail how the required corrective actions will be implemented.
3	Incident Reports	As required	Construction Manager/SHE Officer in the event of an incident	SHE Officer	Report any environmental incidents, how they occurred, damage caused and how future incidents will be prevented.
4	Final environmental audit report	Within 30 days of completion of rehabilitation activities.	SHE Officer ECO	Developer	Detailed project compliance across all relevant legislation, identifying non-compliances, consolidation unresolved issues for final close out.
5	Close-out report	Within 30 days of site handover	SHE Officer ECO	Developer GDARD	Assess site closure measures and provide recommendations for additional clean-up and rehabilitation measures.

8 ENVIRONMENTAL MANAGEMENT MEASURES

8.1 General Guidelines on Site

The following measures provide guideline solutions to frequently anticipated issues on most development activities:

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds, etc. is ultimately the responsibility of the applicant/developer as stipulated under Section 28, of NEMA.
- The study area must be clearly defined, surveyed and cordoned according to the project authorisation. All workforce members and other construction personnel are not to go beyond the fenced mark;
- The Contractors must adhere to agreed and approved access points and haul roads;
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damage to be repaired immediately and to the satisfaction of the owner;
- Surrounding landowners and businesses must be informed of the starting date of construction as well as the phases in which the construction shall take place;
- The Contractor must adhere to all conditions of contract including this EMP and Environmental Authorisation once issued;
- All private and public man-made structures near the project site must be protected against damage at all times and any damage must be rectified immediately;
- Proper site management and regular monitoring of site works must be conducted;
- Regular site inspections and good control over the construction process throughout the construction period must be conducted; and
- A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions.

8.2 Environmental Management Measures

The following table detail the environmental management measures that have to be put in place for the various aspects of the project that may result in impacts, both negative and positive, on the receiving and surrounding environment. Environmental management measures for the construction phase are detailed in below. The environmental management tables also provide information on the frequency at which each aspect



and management measure should be monitored, and the person responsible for implementing the management measures.

Table 2: Pre-construction and Construction Phase EMPr

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
PRE-CONSTRUCTION			
Construction commencement	<ul style="list-style-type: none"> It is recommended that written notification of commencement be given to Ekurhuleni Metropolitan Municipality no later than fourteen (14) days prior to the commencement of the activity. The notice should include a date on which it is anticipated that the activity will commence, as well as the relevant construction permit a reference number. 	Once-Off	Developer
Appointment and Duties of ECO	<ul style="list-style-type: none"> The Developer must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the EMPr. The developer must provide the ECO and contractor with a copy of the EMPr. The ECO must form part of the project management team and attend all project meetings. The contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site. 	Once-Off	Developer/ECO
ECO	<ul style="list-style-type: none"> Report on environmental compliance at the monthly site meetings A monthly Environmental Monitoring Report will be prepared by the ECO for submission to the Developer indicating the level of compliance of the project to the EMPr and environmental conditions. 	Monthly	ECO
Permits and Permissions	<ul style="list-style-type: none"> The Developer must ensure that all licensing, permits or certificates required for the project are in place prior to the commencing of any activities on site. 	Once-off	Developer
	<ul style="list-style-type: none"> Construction Manager must ensure that copies of all licensing, permits or certificates required are kept at the construction site camp. 	On-going	Construction Manager
Emergency	<ul style="list-style-type: none"> Finalise Emergency Response Plan which should include: 	Inspect Daily	Construction manager

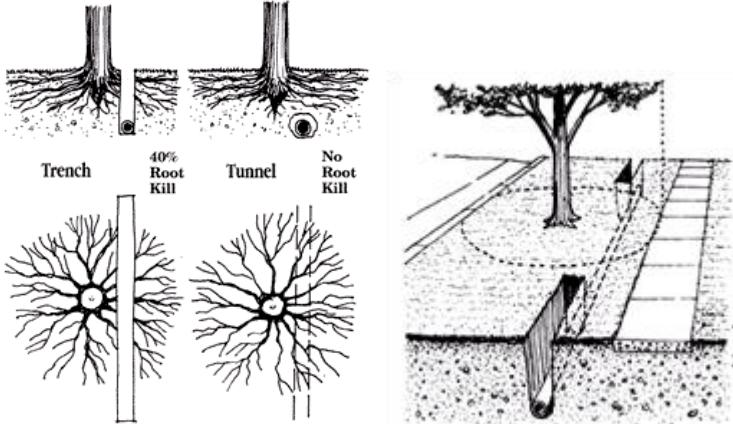
Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
Response Plan	<ul style="list-style-type: none"> ○ Responsibilities and procedures for emergencies such as fire, explosions, evacuations, spills and accidents requiring medical responses. ○ Management measures for communities and individuals affected; and ○ Communication procedures, including communication with potentially affected Construction Manager communities. 		
Grievances	<ul style="list-style-type: none"> ● Develop grievance mechanisms for the recording and management of complaints and grievances. A sample Public Grievance form is found in Appendix 1. 	Inspect Weekly to ensure that complaints are well recorded and addressed	Contractor and Construction Manager
Traffic	<ul style="list-style-type: none"> ● The management measures from the Traffic Assessment must be implemented as detailed in that report. General traffic control measures should be implemented as follows: <ul style="list-style-type: none"> ○ The Contractor is to implement and enforce strict speed controls and inform construction vehicles of relevant speed limits where possible. Drivers are to be informed of designated no-go areas and are to limit movement therein. ○ Reduce additional safety and congestion concerns e.g. install and maintain official traffic signaling (i.e. signs calling attention to the works, speed restrictions, road diversion) on local roads surrounding the development before and during the execution. ○ Erect speed limit signage at the access points and around the site. 	Once-off	Contractor
Records and administration	<p>Ensure the following are up to date and available on site:</p> <ul style="list-style-type: none"> ● A complaint register; ● An approved method statement; ● Copies of monthly checklists, compliance reports, incidence reports and corrective action reports; 	Inspect weekly to ensure that complaints are well recorded and addressed	Construction Manager/ SHE Officer

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> • EMPr • Environmental Authorisation • Photographs of areas of concern (photos of non-compliance areas as well corrective action); and • Attendance registers of environmental awareness training. 		
Recruitment of Labour	<ul style="list-style-type: none"> • Where possible, the contractor must make use of local labour in support of the local economy. • Advertise employment opportunities adequately, so as not to limit application opportunities. • Implement a transparent process of recruiting construction staff, following pre-established and accepted criteria. 	Once-off	Contractor/Construction Manager
Site Establishment	<ul style="list-style-type: none"> • The Contractor must, in agreement with the Construction Manager, decide upon an area for the location of a construction camp. The construction camp should be properly demarcated and fenced, and be adequately sized, with sufficient space for site offices, construction vehicles, equipment, material and waste storage areas. 	A visual Inspection	Construction Manager
	<ul style="list-style-type: none"> • The construction camp must be located in an area with minimal damage or disturbance to the environment. • Establish no-go areas- where no construction personnel, equipment/machinery or vehicles are permitted. 	A visual Inspection	Contractor/Construction Manager
	<ul style="list-style-type: none"> • The contractor shall establish his construction camps, offices, workshops, and any other facilities on the site in a manner that does not adversely affect the environment. However, before construction can begin, the contractor shall submit to the Construction Manager for his approval, an Environmental Site Establishment and Layout Method Statement with plans of the exact location, extent and construction details of these facilities and the impact mitigation 	Once-off	Contractor/Construction Manager

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>measures the contractor proposes to put in place.</p> <ul style="list-style-type: none"> The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. Regardless of the chosen site, the contractor's intended mitigation measures shall be indicated in the Method Statement. 		
Site Housekeeping	<ul style="list-style-type: none"> The construction camp should be kept clean and orderly at all times. 	Weekly inspections of the state of the concentration camp	Construction Manager and Contractor
CONSTRUCTION			
Construction Activities	<ul style="list-style-type: none"> The contractor shall establish his construction camp, office/s and any other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment. The construction campsite should not be established anywhere near the watercourses and its buffer areas 	Once-off	Developer, Construction Manager
Ablution Facilities	<ul style="list-style-type: none"> Provide ablution facilities (i.e. chemical toilets)- if required. Should portable toilets be used, these should be secured to the ground within the site camp to the satisfaction of the Construction Manager/SHE Officer to prevent them toppling due to wind or any other cause. Provide suitable toilet facilities which are covered, closed, ventilated and should offer hand-washing facilities. 1 toilet per 25 workers should be provided, although 1:15 is preferred. Toilets should be located within a radius of 100 m for construction staff in areas of concentrated construction activities. If workers are not making use of the toilet facilities due to distance from work areas, additional toilets will need to be provided. <ul style="list-style-type: none"> Ablution facilities will be available at the site camps as well as around the construction areas. 	Weekly inspections	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> Maintain toilets in a hygienic state (i.e. toilet paper to be provided, toilets to be cleaned and serviced regularly (at least twice- monthly by an appropriate waste contractor), and toilets to be emptied before long weekends and builders' holidays). The waste shall be disposed at a licensed waste disposal facility by the appointed removal contractor. Ensure that no spillages occur when the toilets are cleaned or emptied. Repeated incidents of spillage of chemicals and or waste (i.e. more than one incident), will require toilets to be placed on a solid base with a sump. Urination or defecation on site, other than at the designated ablution facilities, is strictly prohibited. 		
Break Areas	<ul style="list-style-type: none"> Designate areas for personnel to eat during breaks within the site boundary. 	Monitor weekly	Contractor
Handling of Construction Materials	<ul style="list-style-type: none"> Imported materials shall be free of weeds, litter and contaminants. Materials to be obtained from reputable commercial sources. Stockpile areas shall be approved by the Construction Manager/SHE Officer before any stockpiling commences. Where possible, stockpiles shall be located in sheltered areas where they are not exposed to the erosive effects of the wind. Stockpiles shall not exceed 2m in height. 		
Vegetation Clearing	<ul style="list-style-type: none"> The extent of construction works must be limited to the development footprint and the designated buffer area. Areas to be cleared need to be clearly marked and clearing of vegetation must only take place within these demarcated areas. Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary. Limit clearing of vegetation to those areas within the footprint of construction activities and bulk earthworks. Retain as much indigenous vegetation as possible so it can be replanted 	On-going	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>during rehabilitation.</p> <ul style="list-style-type: none"> • Clear as much alien vegetation as possible to retain nutrients for indigenous vegetation. • Avoid removing large, established indigenous trees where possible. Where damage to the trees cannot be avoided, the trees can be removed and replaced with the same species post construction. • Severed roots of street trees may be reduced with careful planning to avoid root damage. Trees could fall when the structural roots have been compromised causing damage to property. • Instead of trenching through roots, consider the option of boring under the roots. • Avoid removing large, established indigenous trees where possible. Where damage to the trees cannot be avoided, the trees can be removed and replaced with the same species post construction. • Severed roots of street trees may be reduced with careful planning to avoid root damage. Trees could fall when the structural roots have been compromised causing damage to property. • Instead of trenching through roots, consider the option of boring under the roots. • Trenches adjacent to a trunk could cut off about 40% of the tree roots (Figure 4 which could destabilise the tree in windy conditions. As per Airhart and Zimmerman (2003) trenches should ideally be dug outside of the drip line of trees where possible. The best route is to trench directly toward the tree trunk, but tunnel under the tree trunk. This will sever less roots. Alternatively, trench just one-third into the drip line from either side then tunnel under the middle of drip line to connect the trenches. • Pneumatic digging is a method that allows trenching through a tree's critical 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>root zone without severing vital roots</p> <ul style="list-style-type: none"> Figure 4) Tunnel underneath roots where possible, instead of trenching through roots and b) Tunnelling under drip line  <p>Figure 4) Tunnel underneath roots where possible, instead of trenching through roots and b) Tunnelling under drip line</p>		
Erosion	<ul style="list-style-type: none"> Ensure that erosion management and sediment controls are strictly implemented from the beginning of site clearing activities. All topsoil stockpiles must be protected against wind, erosion and seeds, i.e. by use of shade cloth or netting. Topsoil stockpiles should not exceed 2 meters in height. 	Visual inspection	Construction Manager
Extensive earth works	<ul style="list-style-type: none"> The extent of construction works must be limited to the development footprint and the designated buffer area. Earth works should be done in accordance with the construction schedule. Vehicles and machinery to be used by authorised/permitted personnel. Care should be taken to avoid health and safety incidents. 	On-going	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> Place signs and/or danger tape around exposed excavations to warn the public of the inherent dangers. <ul style="list-style-type: none"> This is with particular reference to excavations exceeding 1-1.5m in depth. Excavated material to be placed in a designated place outside of the construction area 		
Soil disturbance	<ul style="list-style-type: none"> Topsoil stockpiles be protected against wind, erosion and seeds, i.e. by use of shade cloth or netting. Topsoil stockpiles should not exceed 2m in height. All soils compacted as a result of construction activities falling outside of project footprint areas should be ripped and profiled. Sloped areas can be temporarily stabilized during construction using geotextiles. All exposed earth should be rehabilitated promptly with suitable vegetation to stabilize the soil. 	On-going	Construction Manager/ECO/ Contractor
Soil and groundwater contamination	<ul style="list-style-type: none"> It is recommended that appropriate storm water management system must be implemented during construction. The plan must include measures to ensure that all runoff from the forecourt is directed into the existing storm water management system. All construction vehicles should be properly maintained to prevent leaks. Cement mixing must be confined to a designated area and must be done on an impervious surface. Any fuel stored on site must be kept in a bunded containment area and be clearly marked. Drip trays are to be utilized during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. Drip trays are to be inspected on a weekly basis for leaks and effectiveness 	On-going	Construction Manager/ECO/ Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.</p>		
<p>Minimise Impacts to the Hydrological Function of the watercourses on site</p>	<ul style="list-style-type: none"> • The position of the structures should avoid the delineated watercourses of their buffer zones • At Pan 3, take particular care to ensure that only the minimum are required for pipeline replacement is disturbed. The adjacent wetland must be fenced off and entry into this sensitive area must be prevented and monitored • Dewatering from trenches during the pipe implementation phase should not be discharged directly into watercourse. Dewatering discharge must be routed through properly constructed silt traps and erosion control measures. • A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse. • Where disturbance of wetland habitat occurs, rehabilitation should be implemented 		
<p>Prevent Sedimentation of the Watercourses on site</p>	<ul style="list-style-type: none"> • Store topsoil and subsoil stockpiles from the trench outside of buffered the watercourse • Dewatering from trenches during the pipe implementation phase should not be discharged directly into wetland or river systems. Dewatering discharge must be routed through properly constructed silt traps. • These dewatering silt traps should be located outside of the buffered watercourse areas and be frequently monitored to ensure they remain effective. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. • Remove only the vegetation where essential for construction and do not 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>allow any disturbance to the adjoining natural vegetation cover.</p> <ul style="list-style-type: none"> • During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the adjacent surface vegetation. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Monitoring should be done to ensure that sediment pollution is timeously dressed 		
<p>Control of the Spread on Invasive Plant Species</p>	<ul style="list-style-type: none"> • Undertake an Alien Plant Control Plan which specifies actions and measurable targets • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. • Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Pan • Rehabilitate or revegetate disturbed areas. • All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO. • If filling material is to be used, this should be sourced from areas free of invasive species. • No foreign plant matter or soil may be introduced into the area. • Ensure that the outside areas are kept clean and tidy and provide adequate 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>waste removal services for disposal of waste to prevent the attraction of scavenging pest species to the site.</p> <ul style="list-style-type: none"> Inspect and clear domestic waste from site on a daily basis. 		
<p>Minimise the Loss of Loss and disturbance of watercourse habitat and fringe vegetation</p>	<ul style="list-style-type: none"> The development footprint should remain outside the delineated wetland and buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas Implement an Alien Plant Control Plan Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish 		
<p>Prevent the Pollution of the Watercourses (Water Quality)</p>	<ul style="list-style-type: none"> Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone. Implementation of appropriate storm water management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. Provision of adequate sanitation facilities located outside of the watercourse 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>area or its associated buffer zone</p> <ul style="list-style-type: none"> • The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. • After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. • Maintenance of construction vehicles / equipment should not take place within the watercourse • Measures should be put in place to prevent spills or water contaminated by waste material by for example constructing sumps or drains which can contain any spills in order for contaminated water to be isolated from the watercourse and removed from the site for appropriate disposal • A lined holding tank must have sufficient pumps and other measures to ensure that any spills are contained and can be safely removed without impact to the watercourse. • The design of the holding tank must accommodate 1:50 year flood lines to ensure that realistic flooding does not result in the release of contaminants downstream. 		
<p>Minimise the Loss of Aquatic Biota</p>	<ul style="list-style-type: none"> • Ensure that no additional vegetation is removed, • Avoid unnecessary aquatic ecosystem crossing - limit work within the stream, river or wetland. The use of single access points for crossings. • Other than approved and authorized structure, no other development or maintenance • Infrastructure is allowed within the delineated wetland and riparian areas or their associated buffer zones. • Mark all areas which don't form part of the proposed development within 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>wetlands and riparian areas as no-go areas.</p> <ul style="list-style-type: none"> • Weed control in aquatic ecosystem and buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • All management procedures listed above for the change in water quality. • It is essential that the ecological reserve of the two non-perennial tributaries should be determined prior to impoundment • Installation of early warning systems to detect possible leakage in the sewer pipeline. 		
Spill Prevention	<ul style="list-style-type: none"> • Potentially hazardous materials used during the construction phase (including cement and solvents) must be housed under cover (where practical) and utilised in bunded areas, where necessary. • It is recommended that vehicles and construction equipment be maintained off-site as far as possible. • Refuel and service vehicles on an impermeable surface; • Make use of a drip tray/ sand tray under the fuel nozzle when refuelling vehicles or equipment on site; • Place drip trays/sand trays under engines of vehicles or mechanical equipment when parked or stored overnight or longer; • Make all relevant staff aware of the need to prevent spills, leaks and disposal of contaminated water onto the ground and ensure that they are adequately trained to take corrective action should an accidental spill occur. • Accidental oil and fuel spillages to be cleaned up immediately by the Contractor, placed in sealed containers and disposed accordingly. • Spill kits must be made available and the correct procedures followed during the clean-up of spills. 	On-going	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> Any significant spills on-site must be reported to the KwaDukuza Municipality and must be remediated as per the requirements of the CEMP. 		
Disruption to existing critical service infrastructure	<ul style="list-style-type: none"> The construction schedule should be adhered to ensure that construction occurs timeously. The extent of construction works must be limited to the development footprint and the designated buffer area to limit disruption to other airport operations. Construction activities will be restricted to hours that will cause the least disruption. 	On-going	Contractor
Visual impacts	<ul style="list-style-type: none"> Construction activities will be restricted to hours that will cause the least disruption. Lighting on site is to be sufficient for safety and security purposes No stockpiles should exceed 2m in height. Wind-blown dust from stockpiles and construction activities, should be controlled. Limit exposed areas (removal of vegetation) to the project footprint. Keep all areas neat, clean and organized in order to portray a general tidy appearance. The construction site and material stores, should be kept tidy. Measures to control wastes and litter should be included in the contract specification documents. All rubbish and rubble removed to a recognized waste facility. A certificate of disposal must be obtained for any waste that is disposed of. The construction camp must be located as far from other buildings as possible. 	Weekly	SHE Officer
Noise and light pollution	<ul style="list-style-type: none"> Construction activities will be restricted to hours that will cause the least disruption. Vehicles and machinery to be kept in good working order Mechanical equipment with lower sound power levels will be selected to 	Weekly	SHE Officer

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>ensure that the permissible occupation noise-rating limit is in accordance with the levels stipulated for the particular zoning area.</p> <ul style="list-style-type: none"> • Equipment to be fitted with silencers as far as possible to reduce noise. • All equipment to be adequately maintained and kept in good working order to reduce noise. • Introduce a formal recording system/grievance mechanism to capture public perceptions and complaints with regard to noise. • Lights that are to be installed at the site camps should be of the correct wattage and brightness so as not to disturb airplane operations-especially at night. • Track investigation actions and introduce corrective measures for continuous improvement. 		
<p>Traffic disruption</p>	<ul style="list-style-type: none"> • It is recommended that the public to be notified 7 days prior to construction commencing. • Strict adherence to working hours must be maintained. • Limiting the number of vehicles entering and exiting the construction site will ensure that traffic is kept to what is needed for construction and monitoring purposes. • Access roads should be planned ahead of time, with the public receiving sufficient warning of impending traffic. • Alternative routes to be provided for local motorists as far as possible should road closures be required. • Flagmen to be posted when construction works are being undertaken adjacent to roads. • Signage is to be displayed indicating construction activities. • Any damage caused to surrounding roads as a result of construction activities must be repaired as soon as possible to prevent further deterioration to the 	<p>On-going</p>	<p>Construction Manager/SHE Officer</p>

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>private or public road network.</p> <ul style="list-style-type: none"> Construction vehicles and plant must not be permitted outside of the demarcated construction area. 		
Dust fallout	<ul style="list-style-type: none"> Minimise the extent of open areas. Retain existing vegetation for as long as possible and only clear areas when required. Wash the paved surfaces within the construction area; Minimise haulage distances; Apply water to gravel roads with a spraying truck when required; Environmental friendly soil stabilizers may be used as additional measures to control dust Topsoil stockpiles should be covered to prevent the surface soil from being blown away. Minimise material handling and the frequency of disturbance of stockpiles to minimise wind erosion. Dust suppression techniques to be used on all dust generating surfaces. <ul style="list-style-type: none"> Pre-water areas earmarked for disturbance, if possible. The speed of construction vehicles to be restricted to 40km/h within the construction area or near stockpiles. Trucks transporting any form of soil or waste should be covered with a canvas. Implement a system of reporting excessive dust conditions by construction personnel (as instructed through Environmental Awareness Training); and Water for dust control shall be taken only from approved sources. 	<p>On-going</p> <p>Inspection A register of speeding complaints should be registered by the Construction Manager</p>	<p>Construction Manager/Contractor</p>
Health and Safety and security	<ul style="list-style-type: none"> The construction management needs to communicate the commencement and duration of construction activities to the community. Clear signage needs to be put up to make and keep the community awareness 	<p>On-going</p>	<p>Construction Manager/SHE Officer</p>

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>of construction activities so as to prevent any hazardous occurrences.</p> <ul style="list-style-type: none"> • Provide adequate safety warning signage on the roads. • Construction workers and vehicle operators must take heed of normal road safety regulations, thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner must be enforced and maintained so as not to cause harm to any individual. • A safe designated speed limit must be set by the project managers to limit possible road strikes and accidents. • Construction paths must be clearly demarcated. • Demarcate and open trenches site during construction. • Limit access to the construction site to the workforce only. Comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). • Construction footprints, including site offices, excavations, storage areas, materials lay-down areas, stockpile area, and workers rest areas should be clearly demarcated or fenced off before construction commences. • All construction activities should be limited to the demarcated areas. • Access to these demarcated areas strictly controlled. • Enforce the use of appropriate Personal Protective Equipment at all times (i.e. hard hats, steel capped safety boots, protective goggles). • Security to be provided (where possible) after hours to protect equipment in the construction camp. • No construction staff must be permitted to trespass on private land. Any construction personnel found to be trespassing on private land must be immediately subjected to a disciplinary action. • Access to site to be strictly controlled. • All flammable substances must be stored in dry area which do not pose an 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>ignition risk to the said substances</p> <ul style="list-style-type: none"> • Ensure all construction vehicles and machinery is under the control of competent personnel. • No open fires will be allowed on site unless in a demarcated area identified by the ECO • Entry points and access routes to the sites must be clearly marked and traffic limited to those areas as far as possible. • Suitable warning and information signage should be erected before construction commences. • Adequate toilet facilities must be provided for all staff members as standard health and safety practice. • The ablution facilities must be regularly serviced to reduce the risk of surface or groundwater pollution • Packaging and other waste material may not be burned on site under any circumstances. • The Contractor shall supply firefighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities. • Smoking is only allowed in designated safe smoking 		
Signage	<ul style="list-style-type: none"> • The construction management needs to communicate the commencement and duration of construction activities to the community. • Clear signage needs to be put up to make and keep the community aware of construction activities so as to prevent any hazardous occurrences. • Provide adequate safety warning signage on the roads. • Display telephone numbers of emergency services, including the local firefighting service, in the Contractor's office and at the entrance to the site. 	Visual inspection	Construction Manager/ SHE Officer

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> Contact the emergency services in the area in the case of an emergency. Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.). 		
Traffic	<ul style="list-style-type: none"> Arrange for deliveries to be made during off peak hours. 	Traffic Visual Assessment, Visual inspections	Contractor
	<ul style="list-style-type: none"> Have strict adherence to working hours. 	Daily	Contractor
	<ul style="list-style-type: none"> Limiting the number of vehicles entering and exiting the construction site will ensure that traffic is kept to what is needed for construction. Speed limits on site should be reduced to 20 km/h. Install and maintain official traffic signalling on local roads surrounding the development during the construction phase in conjunction with local traffic authorities Inform drivers of construction vehicles of relevant speed limits and implement speed control mechanisms where possible. Have suitable equipment and personnel available to rapidly deal with traffic incidents in accordance with the Road Incident Emergency Response Plan. 	Weekly	Contractor
No-Go Areas	<ul style="list-style-type: none"> Confine all vehicles to designated access roads and parking areas. Prevent use of vehicles in “No Go” Areas. Limit movement of machinery and construction vehicles to the defined network of road accesses. 	Visual Inspection	Construction Manager/SHE officer
Waste	<ul style="list-style-type: none"> An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste shall be disposed of at a landfill licensed in terms of section 20 (b) of the National Environmental Management Waste, 2008 (Act 59 of 2008). 	Weekly	Construction Manager, Contractor and SHE Officer

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> • Minimise waste generation, e.g. by providing re-usable items and refillable containers (e.g. for drinking water). • Waste bins are to be located at the construction camp and construction sites and must have clear markers saying the type of waste (general or hazardous) contained therein. • Bins to have secured lids to prevent waste from being blown into the surrounding area. • Spoil that won't be used as backfill will be disposed of at a registered landfill site, suitable for the storage of such waste material. • Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site and must be disposed of accordingly at a hazardous waste landfill. • The storage area for hazardous material must be concreted, bunded, covered, labelled and well-ventilated • Waste generated by construction workers must be collected and disposed of regularly at the nearest registered landfill. • Records of all waste being taken off site must be recorded and kept as evidence • Evidence of correct disposal must be kept. • Burning of waste material will not be permitted. • Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. • On-site chemical toilets will be provided for domestic purposes during construction phase. • The contractors will be responsible for the maintenance of the chemical toilets. 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> • Should any spills or incidents occur; the material will be cleaned up immediately and disposed of appropriately. • All incidents must be reported to the responsible site officer as soon as it occurs. • Separate waste bins must be provided for the hazardous waste and general waste • Waste bins must be labelled for waste stream identification 		
Concrete/Cement Work	<ul style="list-style-type: none"> • Use Ready-Mix concrete rather than batching on site where possible. • Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place off site at a location where wastewater can be disposed of in the correct manner. If this is not possible a suitable washing facility is to be developed on site in consultation with the SHE Officer. • Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable). • Ensure that cement is mixed on mortar boards and not directly on the ground (where unavoidable). • Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste. • Place cement bags in bins with lids and dispose of bags as waste to a licensed waste disposal facility. • Contaminated water from batching areas shall be contained and sediments allowed to settle before being disposed of as waste water. 	On-going	Contractor, SHE Officer
Hazardous Materials	<ul style="list-style-type: none"> • Keep relevant Material Safety Data Sheets (MSDS) on site for all potentially hazardous substances (as defined in the regulations for hazardous chemical substances). In the event of an emergency, procedures detailed in the MSDS shall be followed. • Maintain a register of all hazardous substances stored on site. 	On-going	Contractor, SHE Officer

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<ul style="list-style-type: none"> • Store all hazardous substances (including hazardous waste substances e.g. oils, bitumen, hydraulic fluids) within secondary containment in a suitable storage facility. Major stocks of hazardous materials other than fuel should preferably be stored off-site. • No hazardous substance shall be disposed of on site. • Ensure that hazardous substances (including cement) are not placed directly on the ground. • Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants. 		
Storage and Dispensing of Fuel	<ul style="list-style-type: none"> • Identify a suitable designated area for the fuel storage tanks. • Store fuel in accordance with relevant SABS specifications and all fuel storage tanks shall be provided with adequate bunding (110% of the largest tank). The bund floor shall be impermeable and sloped to a sump to enable removal of spilled fuel and contaminated water. • Refuel and service vehicles on an impermeable surface; • Make use of a drip tray / sand tray under the fuel nozzle when refuelling vehicles or equipment on site; • Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc. • Adequate fire-fighting equipment shall be provided at the fuel storage and dispensing areas. • Should any spills or incidents occur; the material will be cleaned up immediately and disposed of appropriately. • All incidents must be reported to the responsible site officer as soon as it occurs. 	On-going	Contractor, SHE Officer
Protection of	<ul style="list-style-type: none"> • The Contractor is to submit a Heritage Resources Method Statement which 	Once-off	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
Heritage Resources	<p>details the procedures that will be followed in the case of uncovering a heritage resource.</p> <ul style="list-style-type: none"> The Contractor/SHE officer is to inform the Construction Manager of any finds on site. The relevant cultural heritage agency (i.e. South African Heritage Resources Agency (SAHRA)) must be notified. All work in the area is to be ceased until the find has been assessed by the agency or persons they have indicated. The contractor is to be aware of the potential of uncovering a find during excavations and dredging and staff undertaking these activities should be observing the area. The contractor is to allow for any valuable material recovered during excavations and dredging to be adequately stored and preserved. Permits are to be obtained prior to the removal of any heritage resource. 		
Fire Control	<ul style="list-style-type: none"> No fires are permitted on site. Ensure that no smoking is permitted on the site except for within a designated area in the site camp (to be included in the site camp Method Statement). Suitable firefighting equipment must be readily available in this area. Appoint a fire officer who shall be responsible for coordinating emergency response in the event of a fire. Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated. Suitably maintain firefighting equipment. 	On-going	Contractor, SHE Officer
Surface run-off	The Contractor shall be aware that, apart from run-off from overburden emplacements and stock piles, storm water can also be contaminated from, workshops, vehicle wash-down pads, etc., and that contaminates during construction can include hydrocarbons from fuels and lubricants, sewerage from	On-going	Contractor

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>employee ablutions, etc.</p> <p>Construction activities such as surface grading and excavation will disturb surface areas on-site. This will increase the potential for soil erosion and subsequent sediment transport during periods of precipitation run-off or when excavation dewatering is required. Construction activities also have the potential to change local surface drainage and sediment transport patterns, site floodplain delineation, and percolation rates into the soil.</p> <ul style="list-style-type: none"> • Contractors must effect good housekeeping in their areas to prevent contamination of drainage water • The Contractor shall clear stagnant water • The Contractor shall ensure that no contaminated surface water shall flow off-site as a result of Contractor operations. Silt traps shall be constructed to ensure retention of silt on site and cut-off ditches shall be constructed to ensure no run-off from the site except at points where silt traps are provided • If applicable, the Contractor shall be responsible for collection, management, and containment within the site boundaries of all dewatering from all general site preparation activities. The dewatering water shall be contained within the site boundaries by sequentially pumping or routing water to and from sub-areas within the site as the construction activities proceed. No discharge of dewatering water to off-site land or surface water bodies will be allowed. • On-site drainage shall be accomplished through gravity flow. It is recommended that the surface drainage system consist of mild overland slopes, ditches, and culverts. The graded areas adjacent to buildings shall be sloped away with a 5% slope. Other areas shall have a minimum slope of 0,2% or as otherwise indicated. • It is recommended that both structural and non-structural (vegetative) 		

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	<p>erosion control measures be designed, implemented, and properly maintained in accordance with best management practices which will include the following:</p> <ul style="list-style-type: none"> ○ Scheduling of activities to minimise the amount of disturbed area at any one time ○ Limiting construction traffic and/or avoidance thereof on access roads and areas to be graded to the extent feasible at drainage ditches ○ Compacting loose soil as soon as possible after excavation, grading, or filling ○ Managing run-off during construction <ul style="list-style-type: none"> ● The Contractor shall be responsible for checking and maintaining all erosion and sedimentation controls 		
<p>Closure of Construction Activities and rehabilitation</p>	<ul style="list-style-type: none"> ● Rehabilitate affected areas on the site as soon as construction activities in the relevant area are completed, rather than undertaking all rehabilitation at the end of the contract period. ● Revegetate disturbed areas with indigenous species- where applicable ● Use harvested topsoil for rehabilitation. ● Remove all construction equipment, vehicles, equipment, waste and surplus materials, site office facilities, temporary fencing and other items from the site. ● Clean up and remove any spills and contaminated soil in the appropriate manner. ● Do not bury discarded materials on site or on any other land not designated for this purpose. ● Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction. ● The Wetland and Rehabilitation Plan compiled for this report must be used to 	<p>On-going</p>	<p>Contractor</p>

Management Aspect	Mitigation Measure/ Actions to be implemented	Monitoring Frequency	Responsibility
	rehabilitate any impacts that will occur within the wetland		

9 REHABILITATION

All working areas shall be rehabilitated once construction work has been completed and before the team leaves the site. This includes closure and rehabilitation of temporary access routes. Any areas that the Construction Manager/SHE believes may have been impacted upon or disturbed, shall be rehabilitated to the satisfaction of the Construction Manager. Once construction is complete the Contractor shall clear everything from the site not forming part of the operational site. The area to be rehabilitated shall. The table below provides measures to be implemented in the post-construction phase.

Aspect/Impact	Rehabilitation Measure	Monitoring Frequency and Responsibility
Removal of construction structures	<ul style="list-style-type: none"> • Clear and completely remove from site all construction plant equipment, storage containers, signage, temporary fencing, temporary services, fixtures and any other temporary works; and • Ensure that all access roads utilised during construction (which are not earmarked for closure and rehabilitation) are returned (as far as possible) to their state prior to construction. 	Once-off, Construction Manager ECO
Topsoil replacement	<ul style="list-style-type: none"> • 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 and roads. Replace topsoil to the original depth (i.e. as much as was removed prior to construction). • Prohibiting the use of topsoil suspected to be contaminated with the seed of alien vegetation (i.e. black wattle). Alternatively, the soil is to be sprayed with specified herbicides. • Backfill planting holes with excavated material / approved topsoil, thoroughly mixed with weed free manure or compost (per volume about one quarter of the plant hole), one cup of 2:3:2 fertiliser and an approved ant and termite poison. • Where local soil has poor drainage, broken rock (Approx. 75 mm in diameter) must be placed to a depth of 150mm at the bottom of the planting hole prior to planting and backfilling with approved plant medium mixture. 	Once-off, Construction Manager ECO
Waste and Rubble Removal	<ul style="list-style-type: none"> • Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. • Load and haul excess spoil and inert rubble to fill in 	Once-off, Construction Manager ECO

Aspect/Impact	Rehabilitation Measure	Monitoring Frequency and Responsibility
	<p>borrow pits/dongas or to dump sites indicated/approved by the SHE Officer.</p> <ul style="list-style-type: none"> Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site. 	
Solid & Hazardous Waste	<ul style="list-style-type: none"> Store hazardous waste as indicated in the CEMP. Dispose of all hazardous waste not earmarked for reuse, recycling or resale at a registered hazardous waste disposal site. Remove from site all temporary fuel stores, hazardous substance stores, hazardous waste stores and pollution control sumps. Dispose of hazardous waste in the approved manner. Do not hose oil or fuel spills into a storm water drain or sewer, or into the surrounding natural environment. Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste). 	Once-off, Construction Manager, ECO
Erosion protection	<ul style="list-style-type: none"> Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction site. Retain shrubbery and grass species wherever possible. 	After rainfall events, the Developer
Closure Environmental Audit	<ul style="list-style-type: none"> The ECO shall inspect the site and compile a closure Environmental Audit report on the success of rehabilitation on site and submit such report to the Developer and GDARD-if required/specified in the Environmental Authorisation 	ECO Developer

10 OPETATION PHASE

Mitigation Measures that will be followed during the Maintenance of the activities. The Developer must adhere to all Measures proposed under the Construction Phase to minimise impacts that will arise from Maintenance Activities on site .e.g. repair or burst pipelines etc.

11 CONCLUDING RECOMMENDATIONS

In implementing the proposed project, and this CEMP, the following is recommended:

1. Maintaining the existing infrastructure as far as possible- like the storm water management system, roads, fences/boundaries and other structures.
2. Managing the operational areas in accordance with the integrated and spatial development plans and implementing the environmental protection measures detailed therein.
3. Implementing the CEMP to guide the pre-construction and construction phases and to provide a framework for the on-going assessment of environmental performance.
4. Maximising the employment of local people and the procurement of local resources during operations to ensure maximum benefit to the provincial/local economy.

APPENDIX 1: PUBLIC GRIEVANCE RESPONSE FORM

A.1 PUBLIC GRIEVANCE RESPONSE FORM

Reference Number		Date	
Corrective action required?			
Immediate:	YES / NO		
If YES, what was done:			
If NO, describe Action Plan			
Task:			
Responsible:			
Schedule:			
Date Implementation:			
Successful?	YES / NO		
Describe communication to complainant:			
Signature of person responsible		Date	
Signature of Contractor		Date	
Signature of SHE Officer		Date	
Notes on lessons learnt:			