CITY OF EKURHULENI

WETLAND REHABILITATION ENVIRONMENTAL AND MAINTENANCE MANAGEMENT PROGRAMME

KAALSPRUIT CATCHMENT

City of Ekurhuleni

March 2019

ZAS Architects and planners

EIMS

CITY OF EKURHULENI

ENVIRONMENTAL MANAGEMENT PROGRAMME AND MAINTENANCE MANAGEMENT PLAN

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March 2019

EXECUTIVE SUMMARY

City of Ekurhuleni's (CoE) core function is the prevision of services such as water, sanitation electricity and various other services. Furthermore, the municipality has a statutory mandate and responsibility to ensure a safe and healthy environment to those living and working within their area of jurisdiction, mandated by Section 24 of the Constitution of South Africa 1996 and the National Environmental Management Act 1998 (Act 107 of 1998) or referred to as NEMA 1998. Wetlands are one of South Africa's most threatened ecosystem, with 48% of wetland ecosystems critically endangered. Within CoE, a significant number of the wetlands are under threat or have already been lost.

Careful management and investment in the maintenance of healthy wetlands and the rehabilitation and restoration of damaged or degraded wetlands is needed to ensure the continued provision of these vital ecosystem services. Therefore, the need to develop a generic Environmental Management Programme (EMPr) and Maintenance Management Plan (MMP) was recognised to ensure all activities are addressed in an environmentally sustainable manner. This EMPr and MMP were compiled by Environmental Impact Management Services (Pty) Ltd. (EIMS). The Terms of Reference for this project was to compile an EMPr and MMP that included mitigation measures for planning, construction, operation, maintenance and rehabilitation phases of projects/ activities as well as to include specific standard operational procedures. Various acts, regulations and policies were utilised in the compilation of the document, which are discussed in Section 2 below.

An Ekurhuleni generic EMPr document was made available to EIMS to use as a template for the development of the catchment specific EMPr and MMP. The draft EMPr and MMP will be submitted for comment and review to all relevant CoE departments, the comments and input received will be incorporated into the final EMPr and MMP.

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ACRONYMS AND ABBREVIATIONS

AECO	Aquatic Environmental Control Officer
A&IS	Alien and Invasive Species
CLO	Community Liaison Officer
COE	City of Ekurhuleni
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EWT	Endangered Wildlife Trust
GDARD	Gauteng Department of Agriculture and Rural Development
GDS	Growth and Development Strategy
GIS	Geographic Information System
H&SO	Health and Safety Officer
IDP	Integrated Development Plan
IEO	Internal Environmental Officer
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act

NEMAQA	National Environmental Management Air Quality Act
NEMBA	National Environmental Management Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
NEMWA	National Environmental Management Waste Act
NHRA	National Heritage Resource Act
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act
PPE	Personal Protective Equipment
SABS	South African Bureau of Standards
SANS	South African National Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDBIP	Service Delivery and Budget Implementation Plan
SPCA	Society for the Prevention of Cruelty to Animals
SRAC	Sports, Recreation Art and Tourism (COE Department)
WUL	Water Use License
WULA	Water Use License Application

GLOSSARY

Activity: An action either planned or existing that may result in environmental impacts. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.

Affected Environment: The affected environment refers to those parts of the socio-economic and biophysical environment impacted on by the development.

Alien and Invasive Species: Plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health.

Alternatives: Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.

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

Conservation: The management of human use of the biosphere to yield the greatest benefit to present generations while maintaining the potential to meet the needs and aspirations of future generations. Conservation thus includes sustainable use, protection, maintenance, rehabilitation, restoration, and enhancement of the natural and cultural environment.

Development: Development is described as the improvement of human condition that involves the redistribution of resources which includes the transformation of the natural environment to some extent.

Disaster: means a progressive or sudden, widespread or localised, natural or human-caused occurrence which –

- Causes or threatens to cause
- Death, injury or disease;
- Damage to property, infrastructure or the environment;
- Disruption of the life of a community; and
- Is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources (Disaster Management Act, 2002)

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 the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, cultural, historical, and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

Ecological Corridors: Ecological Corridors are passages of natural habitats providing connectivity of different spaces of habitats along or through which species may travel without any impediments

Emergency Incident: An unexpected, sudden and uncontrollable release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property (NEMA, 1998).

Emergency Situation: A situation that has arisen suddenly that poses an imminent and serious threat to the environment, human life or property, including a 'disaster' as defined in section 1 of the Disaster Management Act, 2002 (Act No. 57 of 2002), but does not include an incident referred to in section 30 of NEMA 1998.

Environmental Impact Assessment: A planning and management tool for sustainable development, aimed at providing decision-makers with information on the likely consequences of their actions. An EIA is a systematic process where potential impacts both positive and negative associated with activities are assessed, alternatives reviewed and mitigation measures identified.

Environmental Impact: The positive or negative effects on human well-being and/or on the environment resulting from the effect of an activity.

Environmental Management Program (EMPr): A detailed program of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation (maintenance) phase and rehabilitation phases of the proposed project

Endemic Species: Any plant or animal species confined to, or exclusive to, a particular, specified area.

Floodline: Floodlines refer to the lines on a map depicting the water levels likely to be reached during flood with a specified recurrence interval (usually 1:50 years). A Floodplain is the land adjoining a water course (river) that is susceptible to inundation by water up to the one hundred year recurrence interval.

Hazardous Waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment, National Environmental Management Waste Act, (Act 59 of 2008) as amended in Act 26 of 2014.

Internal Environmental Officer: A CoE Environmental Resource / Legal Compliance official.

Interested and affected parties: Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. These may include local communities, investors, business associations, trade unions, customers, consumers and environmental interest groups. The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Irreplaceable area: The potential contribution of a site to a preservation or presentation goal. It is a fundamental way of measuring the conservation value of any site. An irreplaceable site will appear in

every analysis of alternative combinations of sites. In other words, it is one which must be included in a conservation area because significant options for preservation are lost if the site is excluded

Invasive Species: Invasive Species are species that have been introduced into an area, and are able to outcompete and displace indigenous or useful alien species. They may be plants, animals or microbes, and are widely regarded as among the biggest threats to the productive use of land and water, to the ecological functioning of natural systems, to health and to economy. Invasive species are divided into four categories (refer to the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2001) – Alien and Invasive Species Regulations for the comprehensive definition of the four categories and the list of species).

Category 1a: Invasive species which must be combatted and eradicated. Any form of trade or planting is strictly prohibited.

Category 1b: Invasive species which must be controlled and wherever possible removed and destroyed. Any form of trade or planting is strictly prohibited.

Category 2: Invasive species, or species deemed to be potentially invasive, in that a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees. Plants in riparian areas are Category 1b.

Category 3: Invasive species which may remain in prescribed area or provinces. Further planting, propagation or trade is however prohibited. Plants in riparian areas are Category 1b.

Mitigate: The implementation of practical measures to avoid, reduce or remedy any adverse impacts.

Open Spaces: Open Spaces are seen to include a variety of spaces providing from eco-based to activity-based; from personal to public; from those sustained by clear and substantial manipulation, design and intervention, to those that reflect little or no intervention. The role of natural resources in providing ecological goods and services is becoming more and more critical

Public Participation Process: A process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to the proposed development.

Proponent: Any individual, government department, authority, industry or association proposing an activity (e.g. project, programme or policy).

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

Scoping: The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment process. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

Study Area: The area that will be covered by the EIA process within which possible study corridors will be investigated.

Stakeholders: A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

Sustainable Development: Sustainable Development means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations. Source: National Environmental Management Act, 1998 (Act No. 107 of 1998).

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all waste as defined in schedule 3 of the National Environmental Management Waste Act, (Act 59 of 2008) as amended in Act 26 of 2014.

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

Wetland: In terms of the National Water Act (Act 36 of 1998) a wetland is defined as land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

1. INTRODUCTION

City of Ekurhuleni (CoE) is a large city / aerotropolis that, has to adapt and manage various challenges and opportunities relating to development and maintenance. The population growth has increased the demand for development and services to be provided, resulting in impacts on the environment. CoE has a statutory mandate and responsibility to ensure a safe and healthy environment to those living and working within their area of jurisdiction, mandated by Section 24 of the Constitution of South Africa 1996 and the National Environmental Management Act 1998 (Act 107 of 1998) or referred to as NEMA 1998.

Furthermore, CoE recognized the need to ensure that activities are addressed in an environmentally sustainable manner, as per Section 28(1) of National Environmental Management Act No 104 of 1998 (as amended) which states that:
"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped and rectify such pollution or degradation of the environment."

The EMPr is an environmental management tool that can be utilised to ensure the protection of the environment by means of identifying and describing how activities that have, or could have, an adverse impact on the environment, will be mitigated, controlled, and monitored. The EMPr will be utilised by CoE as a Standard Operating Procedure for the rehabilitation and maintenance of the wetlands within the Kaalspruit Catchment.

It must be noted that the EMPr is only an environmental management tool and all other relevant Acts, By-laws, Regulations, Policies and Standards relevant to the activity must be complied with. This document serves as a specification to in-house staff and outside service providers / contractors on how to address potential environmental impacts and standard operating procedures.

The EMPr will address the environmental impacts during the design, implementation and operational, closure, rehabilitation and maintenance phases of the watercourse and wetland rehabilitation activities within the Kaalspruit Catchment. In order to achieve this, a number of environmental specifications/recommendations are made, and standard operating procedures are provided.

1.1 PURPOSE OF EMPR

The EMP purpose is to provide the minimum health, safety and environmental requirements that address environmental impacts during design /planning, pre-construction, implementation, operational/ maintenance and rehabilitation phases of a project, as well as standard operating procedures for the following activities:

- Spillages of hazardous substances
- Clearing of vegetation

- Management of soil stockpiles
- Storage, transport and dispensing of fuel
- Management of heritage artefacts
- Emergency procedures as per NEMA section 30

In order to achieve this, a number of environmental specifications/recommendations are made. These are aimed at ensuring that the rehabilitation and maintenance contractors maintain adequate control over their projects in all phases.

1.2 OBJECTIVES

The objective of the EMP is to provide CoE with a working guide and standard operating procedures for the management of environmental impacts as a result of wetland rehabilitation and maintenance activities:

- To ensure sustainable management through compliance with recommendations made in the EMPr.
- To minimise disturbance to the environment – biological, physical and socio-economic.
- To identify impacts and propose measures for their mitigation.
- To address impacts in terms of their spatial and temporal aspects.
- To identify the actions to be taken and related responsibilities to ensure that environmental management is affected.
- To be a “cradle to grave” document. That is, the document is considered to be a live document that can be reviewed and updated over time to ensure optimal environmental management across the life of the wetland rehabilitation and maintenance.

It is essential that this EMPr compiled for CoE cannot be set in stone but must be a living document that can be adapted and be modified every five years or accordingly to allow for changing requirements and legislation.

2. LEGISLATION & POLICIES INCLUDED

An extensive set of national, provincial and municipal legislation and policies exist and will affect the development and implementation of the EMPr. This section will provide a brief overview of what these national and municipal policies are.

In order to protect the environment and ensure that activities and developments is undertaken in an environmentally responsible manner, there are a number of significant pieces of environmental legislation that need to be taken into account.

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996 (ACT 108 OF 1996)

The Constitution of South Africa (No.108 of 1996) is an essential part of legislation that provides a framework for environmental management in South Africa. The Bill of Rights (Section 24) in the Constitution of South Africa (No.108 of 1996) states that everyone has the right to a non-threatening environment and requires reasonable measures to be implemented to protect the environment. Section 24(b) (i) encourages prevention of pollution and ecological degradation and Section 24(b)(iii) promotes ecologically sustainable development. These principles are embraced in NEMA and processes and procedures are identified within NEMA to ensure the protection of the environment.
The Constitutional mandate of CoE, as for all Local Municipalities, is described in Chapter 7, and specifically Section 152(1)(d) of the Constitution which requires of Local Government to promote a safe and healthy environment. Specific executive duties are described in Part B of Schedule 4 and Part B of Schedule 5 of the Constitution.
Relevant functions listed in Part B of Schedule 4 are as follows:

- Air pollution;
- Building regulations;
- Electricity and gas reticulation;
- Local tourism;
- Municipal planning;
- Municipal health services;
- Municipal public transport;
- Pontoons, ferries, jetties, piers and harbours, excluding the regulation of international and national shipping and matters related thereto;
- Storm-water management systems in built-up areas;
- Water and sanitation services limited to potable water supply systems and domestic waste-water and sewage disposal systems.

2.2 THE MUNICIPAL SYSTEMS ACT, 2002 (ACT 32 OF 2002)

Municipal Systems Act (Act 32 of 2002) Chapter 2, Section 4, states that a "...municipality, within the municipality's financial and administrative capacity and having regard to practical considerations, has the duty to -

- Exercise the municipality's executive and legislative authority and use the resources of the municipality in the best interests of the local community;
- Provide, without favour or prejudice, democratic and accountable government;
- Encourage the involvement of the local community;
- Strive to ensure that municipal services are provided to the local community in a financially and environmentally sustainable manner;
- Consult the local community about- the level, quality, range and impact of municipal services provided by the municipality, either directly or through another service provider; and the available options for service delivery;
- Give members of the local community equitable access to the municipal services to which they are entitled;
- Promote and undertake development in the municipality;
- Promote gender equity in the exercise of the municipality's executive and legislative authority;
- Promote a safe and healthy environment in the municipality; and
- Contribute, together with other organs of state, to the progressive realisation of the fundamental rights contained in **Sections 24, 25, 26, 27 and 29** of the Constitution."

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 198)

The National Environmental Management Act (Act 107 of 1998) (NEMA) is South Africa's overarching framework for environmental legislation. NEMA sets out the principles of Integrated Environmental Management (IEM), which must be adhered to ensure sustainable development.

The principles of IEM should be applied to ensure sustainable development and a fundamental keystone of the IEM procedure is accountability to the various parties that may be interested in or affected by a proposed development. The IEM procedure aims to ensure that the environmental consequences of development proposals are understood and adequately considered during all stages of the project cycle, and that negative aspects are resolved or mitigated, and positive aspects enhanced.

NEMA aims to promote sustainable development, with wide-ranging implications for national, provincial, and local government. Included amongst the key principles is that all development must be environmentally, economically and socially sustainable and that environmental management must place people and their needs at the forefront, and equitably serve their physical, developmental, psychological, cultural and social interest.

Furthermore, Section 28(1) of the Act states that "every person who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution.

Other Acts associated with NEMA and which was taken into consideration when compiling the EMPr is the following:

- National Environmental Management Biodiversity Act (Act 10 of 2004) - NEMBA
- National Environmental Management Protected Areas Act (Act 57 of 2003) - NEMPAA
- National Environmental Management Waste Act (Act 59 of 2006) - NEMWA
- National Environmental Management Waste Amendment Act (Act 26 of 2014)
- National Environmental Management Air Quality Act (Act 39 of 2004) – NEMAQA

2.4 DISASTER MANAGEMENT ACT, 2002 (ACT 57 OF 2002)

The Disaster Management Act (Act 57 of 2002), requires all municipalities to apply section 44 as it relates to the integrated approach that must be promoted by departments within a municipality and such as pre-disaster risk reduction (mitigation, preparedness and sustainable development) are key considerations. Section 48 of the Act refers to the monitoring and the integration of initiatives aimed at prevention, mitigation and response initiatives with all stakeholders is critical to ensuring that environmental disasters are mitigated and or prevented.

2.5 GAUTENG ENVIRONMENTAL MANAGEMENT FRAMEWORK

The Environmental Management Framework (EMF) is an environmental tool that was compiled, including biophysical and socio-cultural systems, of a geographically defined area to reveal where specific land-uses may best be practiced and to offer performance standards for maintaining appropriate use of such land. The EMF identifies sensitive areas, areas for agriculture use and areas for development.

The Gauteng EMF must be taken into account in the consideration of applications for environmental authorisation as zones have various proposed land uses and other zones have restricted land uses.

The purpose of the Gauteng EMF is to assist environmental impact management, including the EIA process, spatial planning and sustainable development.

The objective of the Gauteng EMF is to:

- Provide a strategic and overall framework for environmental management in Gauteng;
- Align sustainable development initiatives with the environmental resources, developmental pressures, as well as the growth imperatives of Gauteng;
- Determine geographical areas where certain activities can be excluded from an EIA process;
- Identify appropriate, inappropriate and conditionally compatible activities in various Environmental Management Zones in a manner that promotes proactive decision-making;
- To make it efficient for urban development (including associated service infrastructure) to occur in defined selected areas with lower environmental concerns and high development demand in order to help facilitate the implementation of the Gauteng Growth and Management Perspective, 2014;
- Facilitate the optimal use of current industrial, mining land and other suitable derelict land for development of non-polluting industrial and large commercial developments;
- Protect critical Biodiversity Areas (CBAs as defined in C-Plan 3.3) within urban and rural environments.

The province has been classified into five zones, which promote and discourage certain activities in specific zones. The zones are summarised below:

<u>Zone 1: Urban Development Zone</u>

The intention with the zone is to streamline urban development activities in it and to promote development infill, densification and concentration of urban development, in order to establish a more effective and efficient city region that will minimise urban sprawl into rural areas.

<u>Zone 2: High Control Zone (within the urban development zone)</u>

This zone is sensitive to development activities, only conservation should be allowed in this zone. Related tourism and recreation activities must be accommodated in the area surrounding this zone.

<u>Zone 3: High Control Zone (outside the urban development zone)</u>

This zone is sensitive to development activities and in several cases also have a specific value that need to be protected. Conservation and related tourism should dominate development in this zone.

Zone 4: Normal Control Zone

This zone is dominated by agricultural uses outside the urban development zone. Agricultural and rural developments that support agriculture should be promoted.

Zone 5: Industrial and Large Commercial Focus Zone

The intention with zone 5 is to streamline non-polluting industrial and large scale commercial (warehouses) activities in the areas that are already used for such purposes and areas that are severely degrades in proximity to required infrastructure.

Special Control Zones:

Special control zones are areas that have specific additional objectives that should be taken into account in decision-making process. The following areas have been identified as special control zones:

- Dinokeng,
- Cradle of Humankind World Heritage site;
- Vaal dam;
- Johannesburg South;
- Johannesburg North (the greater Kayalami Conservancy).

2.6 CoE Environmental Policy

The CoE in delivering services to the community strives to maintain and promote sustainable environmental management by carefully blending ecological, social, and economic considerations into our future planning and decision making processes. The City of Ekurhuleni will balance the interests of the present with those of future generations, and ultimately, will strive to reduce the environmental impacts of current operations, activities, products, and services.

Within the framework of our Environmental Policy the City of Ekurhuleni commits to:

- Comply with all applicable international conventions, national environmental legislation and policies, regulations, codes of practice, and other environmental requirements to which the City of Ekurhuleni subscribes;
- Protect and manage the environment, conserve resources, minimise asset losses, and improve our environmental performance;
- Minimise the environmental impacts of the activities of the COE;
- Minimise the contribution to climate change, and adapt to the consequences of global climate change;
- Improve the quality standard of the environment through the reduction of pollution, implementation of a waste reduction hierarchy, an increase in social benefits in terms of health and resilience, and increased access to environmental resources;
- Establish partnerships with community organisations, government agencies, customers and Interested and Affected Parties (I&APs) and foster openness and communication with all stakeholders in order to share relevant information, contribute to the development of sustainable solutions, and respond in a constructive and timely manner;
- Implement environmental management activities aimed at enhancing and improving the environment within the CoE by improving the environmental content and performance of existing management systems like the IDP, GDS and SDBIP; and

- Regulate the environmental impacts of mining to restore a balance between consumptive and sustainable environmental resource uses.

To meet the goals and intended outcome of the Environmental Policy seven areas of impact are defined that require implementation. The long term outcomes are:

- Key natural resources are protected and conserved;
- Manage and protect valuable water resources;
- Waste management;
- CoE employees are aware of environmental matters and environmental education initiatives are implemented;
- Environmental principles are embedded in Infrastructure and development activities in CoE;
- Land, water and air pollution is prevented and reduced;
- Catchments are managed in an integrated manner;
- CoE is energy efficiency and has adapted to climate change impacts;
- Sound environmental governance.

2.7 CoE Corporate Disaster Management Plan

"The City of Ekurhuleni is committed to maintaining a vigilant state of disaster preparedness, response, rehabilitation and reconstruction within a safe and sustainable framework for the residents, staff, stakeholders and neighbours, because all are susceptible to disasters. Enlightened self-interest tells us that to be prepared is the greatest weapon against disaster. In recognition of the possibility of both small and large disasters, the Disaster Management Centre devised the following plan to ensure that appropriate actions are taken in the event of a disaster. This plan provides stakeholders with a set of disaster priorities, emergency procedure guidelines, lists of personnel and geographical information (GIS). It will be updated annually to ensure accuracy and currency."

2.8 Air Quality Management Plan for the CoE

Mission and Commitment

"To lead the protection and enhancement of the Metro's air quality through proactive and effective air quality management and sustainable development of the built environment and transportation systems of the Metro. To work in partnership with the community and stakeholders to ensure the air is Healthy to breathe and does to impact significantly on the wellbeing of persons. To reduce the potential for ecosystem damage from air pollution and to address global air quality problems.

As a result of the CoE's activities improvements in air quality are envisaged despite countervailing trends in population, development, and transportation growth."

In achieving such improvements, the CoE is committed to:

- Establishing a set of shared goals and strategies for air quality improvement.
- Establishment and continued implementation of a comprehensive air quality monitoring and management system.
- Involving and educating the public with the purpose of minimizing pollution and facilitating the effective participation of the public in air quality governance.
- Integrating air quality considerations into housing, transportation and spatial planning developments.

- Making greater use of innovative approaches to reducing pollution.
- Conducting sound research and effectively use new information technologies.
- Respond creatively and vigorously to new challenges and emerging issues."

A draft CoE Air Quality Bylaw was completed in January 2015. All conditions must be complied with once issued.

2.9 EKURHULENI <METROPOLITAN MUNICIPALITY BIOREGIONAL PLAN

Bioregional plan is a tool provided for in the National Environmental Management: Biodiversity Act (No. 10 of 2004) that can be used to facilitate the management and conservation of biodiversity priority areas outside the protected area network. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity.

It is designed to support integrated development planning and sustainable development by identifying an efficient set of Critical Biodiversity Areas that are required to meet biodiversity objectives, in a configuration that is least conflicting with other land-uses and activities. Where alternatives are available, the Critical Biodiversity Areas are designed to avoid conflict with existing IDPs, EMFs and SDFs in the region by favouring the selection of sites that are least conflicting with other land-uses. Within the CoE this process was facilitated by strong alignment with spatial priorities identified within the EBOSS.

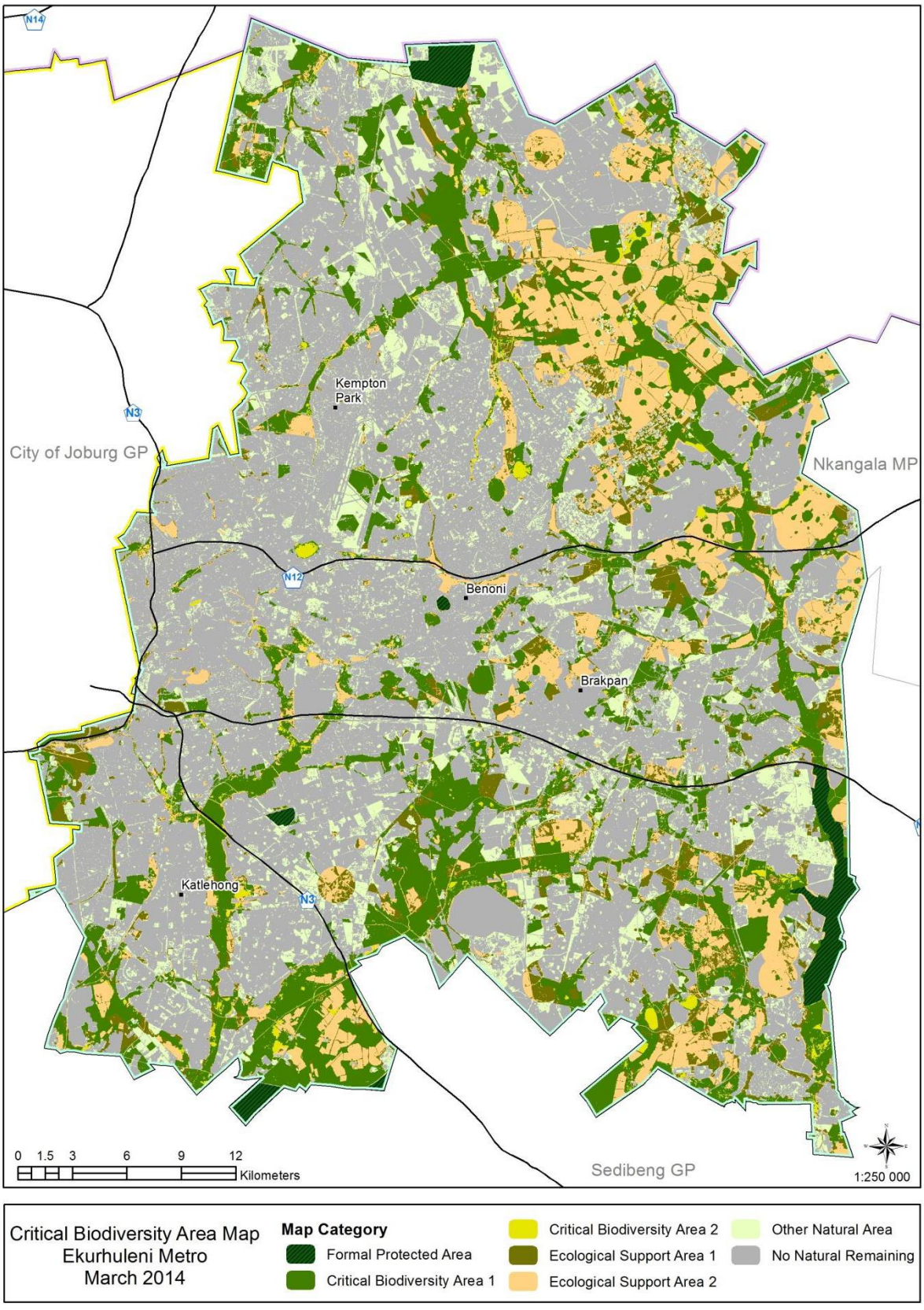

Figure 1: CoE Bioregional Plan

2.10 ADDITIONAL ACTS, REGULATIONS, POLICIES, GUIDELINES AND STANDARDS INCLUDED IN EMPR

- Gauteng Provincial Integrated Waste Management Policy (2006);
- Drug and Drug Trafficking Act (Act 140 of 1992);
- Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947);
- Fire Brigade Services Act (Act 99 of 1987, as amended in 2000);
- Hazardous Chemical Substances Regulation 1179 of 1995 as published under the Occupational Health and Safety Act (Act 85 of 1993);
- Law of Criminal Procedure and Evidence Act (Act 51 of 1977);
- Liquor Act (Act 59 of 2003);
- National Heritage Resources Act (Act 25 of 1999);
- National Land Transport Act, 2009 (Act 5 of 2009);
- National Road Traffic Act (Act 93 of 1996);
- SANS 10206 of 2010 (SABS 075) - The handling , storage and disposal of pesticides;
- SANS 10228 of 2012 (SABS 10229) – The identification and classification of dangerous good for transport by road and rail modes;
- SANS 10229-1 of 2010 (SABS 0229) – Transport of dangerous Goods: Packaging;
- SANS 10231-1 of 2014 (SABS 0231) – Transport of dangerous Goods: Operational requirements;
- SANS 10232-1 of 2007 (SABS 0232-1) – Transport of Dangerous Goods: Emergency Information Systems (Part 1);
- SANS 10232-3 of 2011 (SABS 0232-3) – Transport of Dangerous Goods: Emergency Response Guide (Part 3);
- SANS 10232-4 of 2012 (SABS 0232-4) – Transport of Dangerous Goods: Transport Emergency Card (Part 4);
- South African Police Act (Act 68 of 1995).

3. DESCRIPTION OF THE PROJECT

3.1 LOCALITY

The Kaalspruit catchment is located within heavily developed areas consisting of township and urban development with associated infrastructure, as well as subsistence agricultural areas (Figure 7 below). All these land uses can lead to typical water quality and water quantity impacts ranging from the failing of sewer infrastructure and the direct discharge of sewerage into watercourses, increased storm water flows off hardened surfaces resulting in erosion and deterioration of the natural watercourses and agricultural return flows containing a variety of pesticides and fertilisers which negatively affect water quality in the receiving watercourses. Wetland rehabilitation and maintenance within this catchment provides a potential opportunity to address some of these, and other impacts.

3.2 PROPOSED PROJECT

The CoE is embarking on a project to rehabilitate the wetlands within the City and has identified the Kaalspruit catchment as one of the catchments earmarked for rehabilitation and open green space integration. As part of the project, the wetlands within the catchment was assessed to determine the status of the wetlands and the measures required to achieve this. As part of the planning regime for the wetland rehabilitation, a high-level master plan, along with high-level conceptual designs and layouts of the various “hard and soft” engineering measures were developed. Due to the extensive nature of the wetland areas within the Kaalspruit catchment, a simplified approach was adopted to assess the areas within the project area. The study catchment area was subdivided into seven Kaalspruit rehabilitation zones. The subdivision is merely based on the point of confluence of tributaries in order to ensure manageable small catchments upstream.

The master plan rehabilitation strategy was developed in a three-phase process, including:

- Identification of the problems compromising wetland ecological integrity;
- Setting rehabilitation objectives based on an analysis of the problems and the feasible extent of addressing them to make ecological improvements; and
- Formulating solutions aimed at achieving the set objectives.

A range of problems undermining wetland ecological integrity were identified during the site visits. Addressing these impacts forms the underlying goal of the proposed master plan and wetland rehabilitation strategy. Rehabilitation inherently implies a concession that it will not be possible to reinstate all of the driving ecological processes within the wetlands, because:

- The hydrology of the catchment has been fundamentally altered; or
- The physical impact within the wetland will be too costly to reverse.

Only those processes that were realistically achievable were therefore considered and used to form the basis of the rehabilitation objectives. Under the current scenario, the goal of rehabilitating the wetlands to functional systems in some places was considered realistic. The rehabilitation interventions are split into two categories, namely hard and soft interventions:

Soft engineering wetland rehabilitation interventions:

These relate to all ancillary measures used to improve the overall wetland condition, contributing to the success of the rehabilitation effort. Soft interventions are typically measured in terms of which are easier, quicker and less invasive to implement within the wetland system. As part of the soft intervention, various parks and greenspaces where also highlighted. Examples of soft engineering intervention measures include:

- Small earthworks: General earthworks which can be done using a small, unskilled labour force, to reshape uneven ground to allow for a more natural ground slope;
- Small breached dam removal: Undertaken to allow more flow in the wetland's small "damlike" structure;
- Re-vegetation of stabilised areas: Undertaken to re-instate the natural bio-diversity with appropriate wetland and riparian species;
- Fencing of sensitive areas: Done to protect the sensitive areas from unmanaged grazing;
- Pushing back of agriculture: Where possible, agriculture will be pushed out of the wetland boundary;
- Informal road removal: Undertaken to allow normal flow of water in the wetland. Informal roads crossing the wetland could be removed where possible, linking the up- and downstream wetlands together;
- Plug and fill channels/trenches in the wetland: Done to reduce the danger risk, as well as to allow for free movement of water through the wetland. Plugging artificial drainage channels created by development or historical agricultural practices will be undertaken;
- Removal of alien vegetation: Done to reinstate natural bio-diversity and functional vegetation communities back into the wetland system;
- Litter clean-up: Undertaken to reduce general pollution of the wetland as well as to prevent physical blockage in culverts; and
- Creation of parks and green spaces: Creating useable public spaces that are fit for their intended purpose, while being aesthetically appealing.

Hard engineering wetland rehabilitation interventions:

These relate to specific side slope or instream measures that have specific functions, given their respective locations. These interventions are used to improve the overall wetland condition. Hard wetland rehabilitation interventions are typically designed to solve a specific pre-identified issue such as a head-cut, erosion gulley etc. Hard interventions typically require Water Use Licences (WUL) and are more complex to construct. Examples of hard engineering wetland rehabilitation interventions include:

- Earth berms with MacMat overlay: To slow water velocity and spread flow across a larger area;
- Concrete or masonry weirs: These structures will act as settling ponds, reducing the velocity of water to allow for sedimentation above the structure. These structures will also raise the water table of the localised area and disperse the overflow water in a controlled manner to reduce erosion;
- Concrete or concrete canvas structures: To stabilise head-cut or other erosion and to prevent gullies; and
- Litter traps: to capture litter in the rivers.

During the 2018 assessment of the wetlands within the Kaalspruit catchment, two types of instream intervention were identified. These include:

- Existing instream interventions: These are interventions already designed and constructed by previous consultants. These interventions are in need of maintenance to protect the current investment. Table 1 shows the list of existing interventions within the targeted areas, as well as the condition of these interventions and the maintenance measures proposed for these interventions.

Table 1: Existing structures within the targeted wetlands area within the Kaalspruit catchment.

Structure #	Coordinates	Structure	Maintenance/ Proposal
E1	26.037398°S, 28.21964°E	Concrete weir, good condition	Extend wingwall a further 10m with reinforced concrete wall
E2	26.039679°S, 28.219735°E	Large gabion structure, good condition	Cap gabions with concrete, add right wingwall further 10m
E3	26.043281°S, 28.217932°E	Gabion structure, fair condition	Concrete cap gabion baskets add wing walls 5m on both sides of structure
E4	26.045433°S, 28.216335°E	Gabion structure, fair condition	Concrete cap gabion baskets add wing walls 5m on both sides of structure
E5	26.045998°S, 28.216012°E	Gabion structure, fair condition	Concrete cap gabion baskets add wing walls 5m on both sides of structure
E6	26.046516°S, 28.221269°E	Concrete weir, good condition	Extend wingwall a further 5m with reinforced concrete wall on both side structure

Structure #	Coordinates	Structure	Maintenance/ Proposal
E7	26.046697°S, 28.221142°E	Gabion stormwater channel, poor condition	Replace gabions with Armoflex channel
E8	26.047243°S, 28.221443°E	Gabion stormwater channel, poor condition	Replace gabions with Armoflex channel
E9	26.048462°S, 28.221418°E	Concrete weir, poor condition	Extend wingwall a further 5m with reinforced concrete wall on both side structure
E10	26.049828°S, 28.221544°E	Large gabion structure with walkway, fair condition	Concrete cap gabions as well as reinforce foundations
E11	26.037877°S, 28.22019°E	Concrete weir, poor condition	Extend wingwall a further 5m with reinforced concrete wall on both side structure
E12	26.026751°S, 28.207989°E	Large concrete weir, good condition	Extend wingwall a further 5m with reinforced concrete wall on both sides of structure
E13	26.026366°S, 28.207391°E	Large concrete weir, good condition	Extend wingwall a further 5m with reinforced concrete wall on both sides of structure
E14	26.025717°S, 28.207225°E	Large concrete weir, good condition	Extend wingwall a further 5m with reinforced concrete wall on both sides of structure
E15	26.013464°S, 28.201733°E	Large low water crossing, fair condition	General concrete repairs
E16	26.016409°S, 28.213894°E	Large concrete weir, good condition	Extend wingwall a further 5m with reinforced concrete wall on one sides of structure
E17	26.032144°S, 28.190333°E	Large concrete weir, good condition	General concrete repairs and extend wingwalls a further 2m on both sides
E18	26.031217°S, 28.190328°E	Bridge, good condition	Currently under construction 2018

- Proposed interventions: Throughout the targeted wetland area, various hard instream interventions were conceptualised. Some examples of hard instream interventions include, but are not limited to, the following:
    - Armorflex and or MacMat Channels;
    - Low level berms with MacMat;
    - Concrete weirs;
    - Concrete weir with incorporated walkways;
    - Concrete weir with box inlet;
    - Concrete weir with round inlet; and
    - Litter traps.

A brief description of the examples of hard instream interventions are provided in this section. Table 2 shows the list of the proposed interventions within the targeted areas.

Table 2: Proposed structures within the targeted wetlands area within the Kaalspruit catchment.

Structure #	Coordinates	Structure	Maintenance/ Proposal
P1	26.04882°S, 28.221608°E	Armorflex and or Macmat Channel	All the stormwater channels entering the main wetland systems should be formalised to Armorflex channels. Sufficient energy dissipation measure should be constructed before stormwater enters the wetland system. Design connecting the current stormwater outlet and the Armorflex channel should be carefully considered.
P2	26.047747°S, 28.221371°E	Concrete Weir	These weirs are not designed for low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These

Structure #	Coordinates	Structure	Maintenance/ Proposal
			sizes should be confirmed in the detailed design.
P3	26.044872°S, 28.220895°E	Concrete Weir with Walkway	All Concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P4	26.047032°S, 28.215723°E	Concrete Weir with Walkway	All Concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P5	26.044625°S, 28.21705°E	Concrete Weir with Walkway	All Concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be

Structure #	Coordinates	Structure	Maintenance/ Proposal
			installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P6	26.038496°S, 28.220022°E	Concrete Weir with Walkway and Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P7	26.036724°S, 28.21897°E	Concrete Weir with Walkway and Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.

Structure #	Coordinates	Structure	Maintenance/ Proposal
P8	26.036132°S, 28.218499°E	Concrete Weir with Walkway and Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P9	26.03827°S, 28.221891°E	Concrete Weir with Walkway and Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P10	26.038363°S, 28.222911°E	Concrete Weir with Walkway and Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the

Structure #	Coordinates	Structure	Maintenance/ Proposal
			project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P11	26.038467°S, 28.224276°E	Concrete Weir	These weirs are not designed for low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P12	26.038675°S, 28.225659°E	Concrete Weir	These weirs are not designed for low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P13	26.038922°S, 28.227367°E	Concrete Weir	These weirs are not designed for low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and

Structure #	Coordinates	Structure	Maintenance/ Proposal
			at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P14	26.03926°S, 28.229319°E	Concrete Weir with Walkway	All Concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P15	26.039281°S, 28.230501°E	Concrete Weir	These weirs are not designed for low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.

Structure #	Coordinates	Structure	Maintenance/ Proposal
P16	26.02883°S, 28.209602°E	Concrete Weir with Walkway and Round Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P17	26.026916°S, 28.208499°E	Concrete Weir with Walkway and Round Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P18	26.06525°S, 28.196652°E	Concrete Weir with Walkway	All Concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the

Structure #	Coordinates	Structure	Maintenance/ Proposal
			project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
P19	26.015302°S, 28.217478°E	Concrete Weir with Walkway and Round Drop Inlet	All concrete weir doubles up as a low water pedestrian walkway. Please note that in high flows the water is designed to move over the entire structure and at such time the walkways will not be safe to use. Clear signage should be installed to highlight this. Structure can be optimised during the detailed engineering design phase of the project. Concrete weirs will need to be scaled for each individual point. These sizes should be confirmed in the detailed design.
L1	26.017148°S, 28.202292°E	Litter Traps	The proposed littler traps are special nets, called “StormX nets,” which are fitted to pipe or normal culverts. These nets will need to be cleaned periodically for them to function optimally. These nets have been chosen as they can be retro-fitted to existing infrastructure; this is important, as most of the areas proposed are extremally built-up and more formal litter traps will not have enough space.
L2	26.019288°S, 28.199386°E	Litter Traps	The proposed littler traps are special nets, called “StormX nets,” which are fitted to pipe or normal culverts. These nets will need to be cleaned periodically for them to function optimally. These nets have been chosen

Structure #	Coordinates	Structure	Maintenance/ Proposal
			as they can be retro-fitted to existing infrastructure; this is important, as most of the areas proposed are extremally built-up and more formal litter traps will not have enough space.
L3	26.016343°S, 28.213249°E	Litter Traps	The proposed littler traps are special nets, called "StormX nets," which are fitted to pipe or normal culverts. These nets will need to be cleaned periodically for them to function optimally. These nets have been chosen as they can be retro-fitted to existing infrastructure; this is important, as most of the areas proposed are extremally built-up and more formal litter traps will not have enough space.
C1 start point	26.016284°S, 28.187074°E	Armorflex and or Macmat Channel Two Stepped Levels	All the stormwater channels entering the main wetland systems should be formalise to Armorflex channels. Sufficient energy dissipation measure should be construct
C1 end point	26.013745°S, 28.191269°E		
C2 start point	26.015526°S, 28.2184°E	Armorflex and or Macmat Channel Two Stepped Levels	All the stormwater channels entering the main wetland systems should be formalise to Armorflex channels. Sufficient energy dissipation measure should be constructed before stormwater enters the wetland system.
C2 end point	26.016538°S, 28.213775°E		
C3 start point	26.017358°S, 28.216008°E	Armorflex and or Macmat Channel Two Stepped Levels	All the stormwater channels entering the main wetland systems should be formalise to Armorflex channels. Sufficient energy dissipation measure should be constructed before stormwater enters the wetland system.
C3 end point	26.016113°S, 28.215095°E		

Armorflex and or MacMat

Armoflex and or MacMat channels are proposed in areas where stormwater channels have high velocities and current channels are severely incised. Armoflex allows for larger velocities than MacMat, however MacMat allows for better vegetational growth within the channel; therefore, careful consideration should be given in the detailed design, to the final material used. Both materials should be anchored in trenches within the cement stabilised soil. In areas with extremely high velocities, small low-level weirs could be constructed in cooperation with Armorflex or MacMat, to slow down water velocity at various stages within the channel. The main purpose of this intervention is to slow down water velocity and prevent further gully erosion. Examples of Armorflex and MacMat channels are provide in Figure 2.

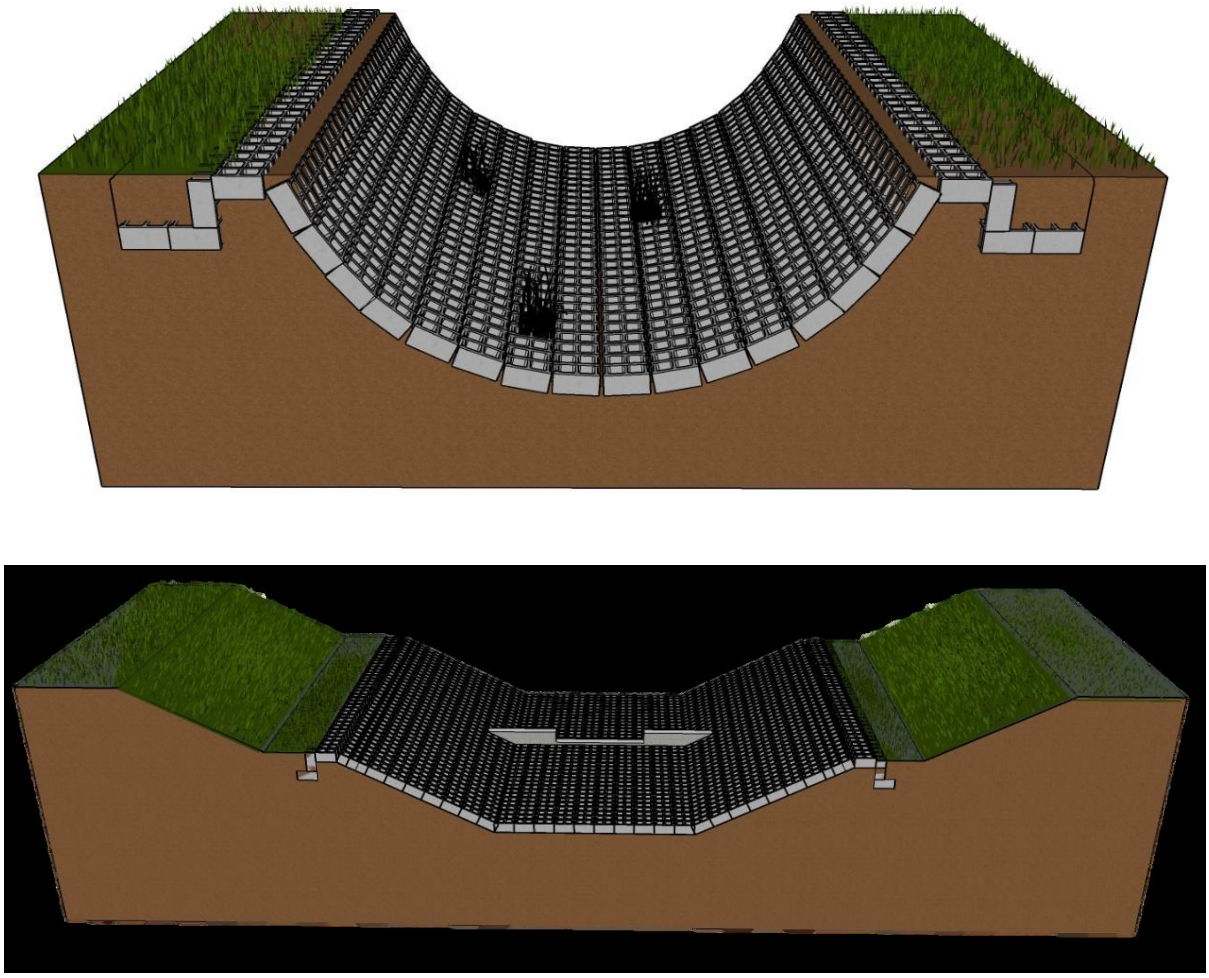

Figure 2: Armorflex and/or MacMat Channels

Low level berms with MacMat

Low level berms with MacMat are proposed in areas where the wetland is not severely incised. These berms are typically only 0.5m in height. The side slope is 1:5 in the upstream and the side slope is 1:7 in the downstream. Typically, these berms have a lower spillway zone which is protected with rock. Large flows move over the top of the berms. MacMat should be anchored in trenches, within cement stabilised soil, on either side of the berm. The main purpose of this intervention is to slow down water

velocity and gather a small amount of water, to allow for wetland vegetation to establish around the berm.

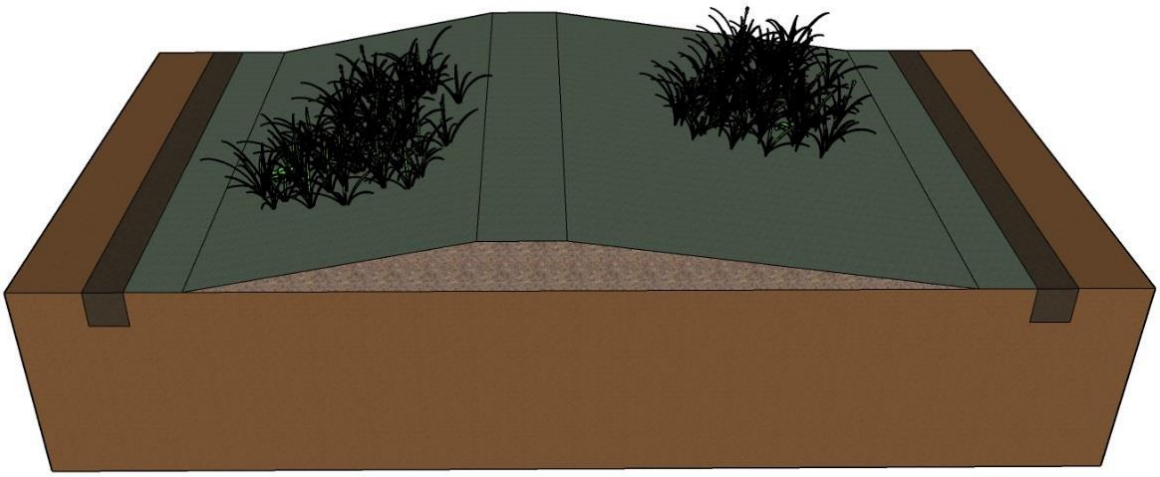

Figure 3: Low Level Berm with MacMat

Concrete weirs

The concrete weirs are proposed in the incised valley bottom wetlands. These weirs will raise the water table yet allow sufficient water to move through the weir to avoid cutting off the water source completely. The concrete weir structure allows energy dissipation in the plunge pool; thereafter it spills over back into the valley bottom wetland. This in turn slows water velocity in the valley bottom. All concrete weirs are designed with a footing, as well as long wingwalls, to ensure that no cutting occurs around the interventions. The soil around the wingwalls should be cement stabilised and compacted to the engineering specifications. An example of a concrete weir is provided in Figure 4.

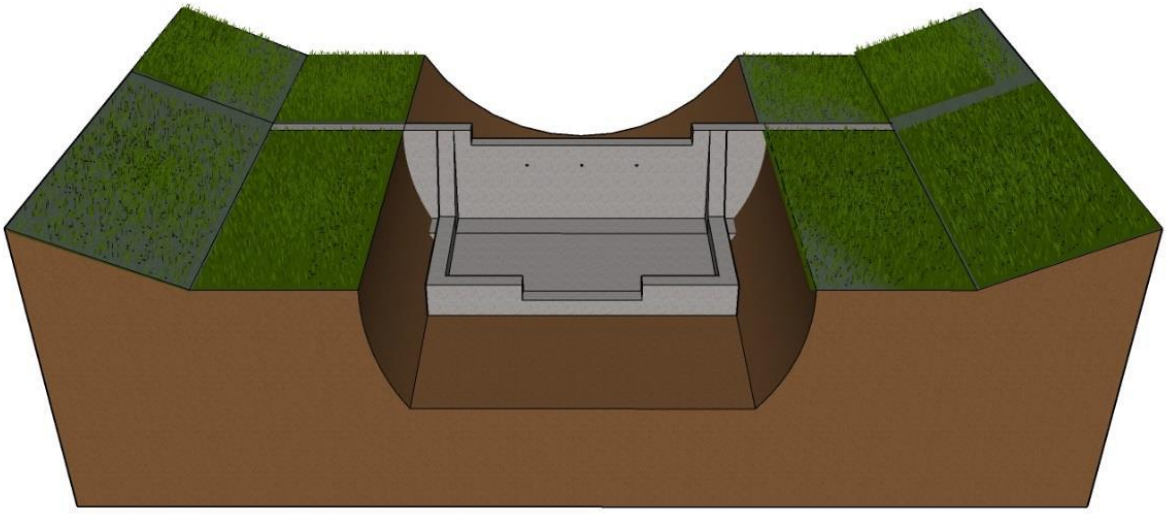

Figure 4: Concrete Weirs

Concrete weirs with incorporated walkways

Just as with the normal weirs, the concrete weirs with incorporated walkways are proposed in the incised valley bottom wetlands. The weirs also have an increase top width to allow for pedestrian walkway. This walkway has hand rails on either side. This allows easy crossing of the stream during low-flow periods. Signage should be installed to warn people that in high-flow periods, water will move over the weir and crossing is prohibited. An example of a concrete weir with a walkway is provided in Figure 5.

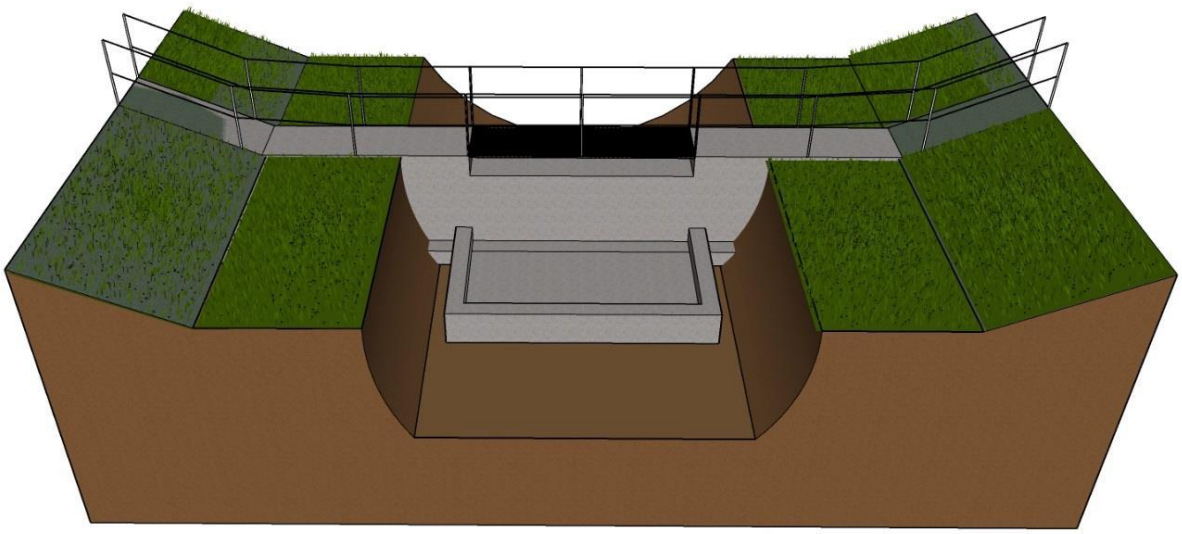

Figure 5: Concrete Weir with walkway.

Concrete weir box and or Round inlets

The concrete weirs with box- and/ or round-inlets, are proposed in the incised valley bottom wetlands, just like the normal weir. These weirs will raise the water table while allowing sufficient amounts of water to move through the weir so as not to cut off the water source completely. The concrete weir structure allows energy dissipation in the plunge pool; thereafter it spills over back into the valley bottom wetland. This in turn slows water velocity in the valley bottom.

All concrete weirs are designed with a footing, as well as long wingwalls, to ensure that no cutting occurs around the interventions. The soil around the wingwalls should be cement stabilised and compacted to the engineering specifications. The weirs also have an increased top width to allow for pedestrian walkway. This walkway has hand rails on either side. This allows for easy crossing of the stream during low-flow periods.

Signage should be installed to warn people that in high-flow periods, water will move over the weir and crossing is not prohibited. The box- and/ or round- inlets are for areas with increased flow, where the standard spillway length is insufficient to pass the volume of water.

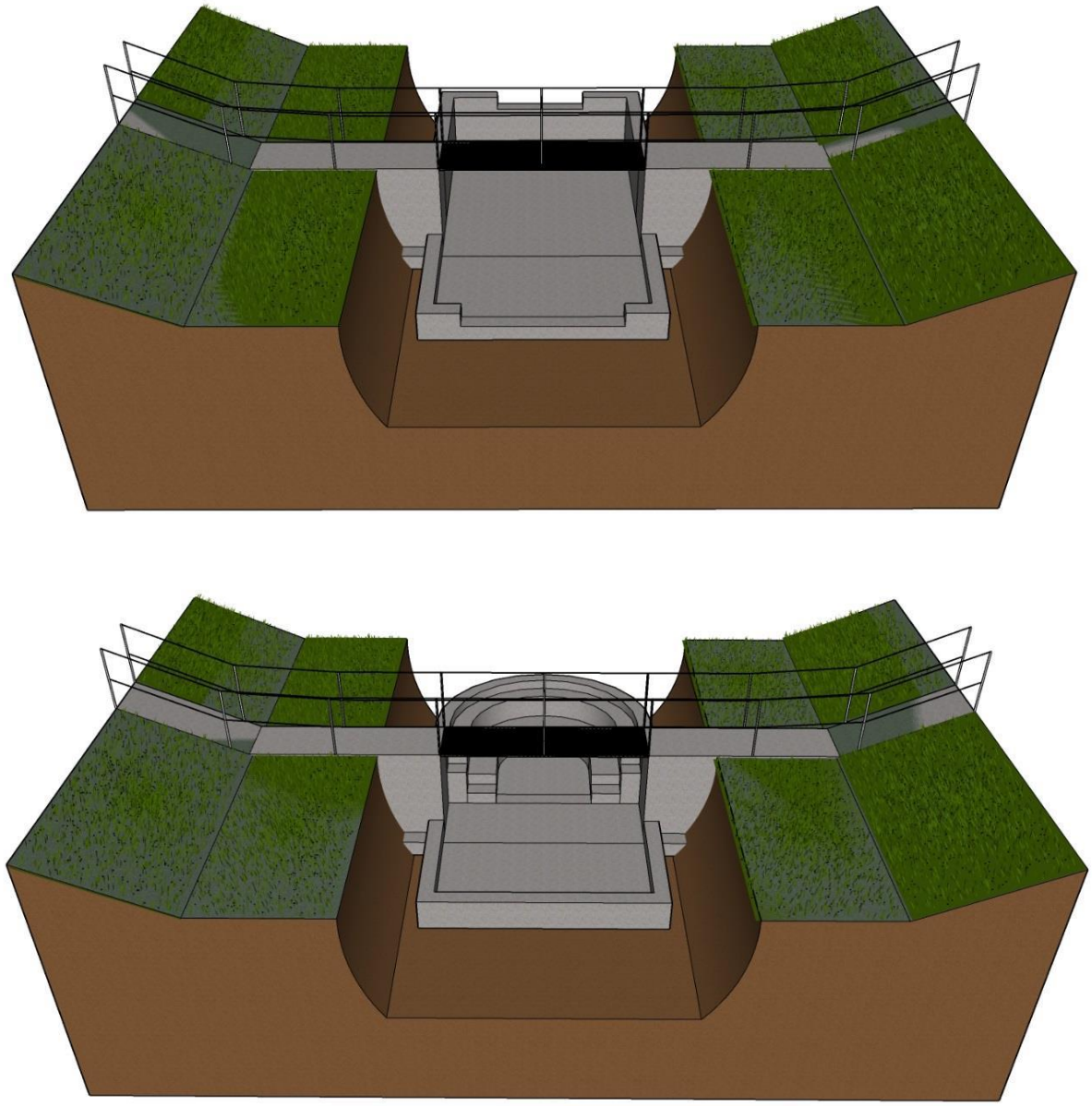

Figure 6: Concrete weir with box and/or round inlet (including walkway).

Litter traps

Litter traps are proposed at various points in the target wetlands. The proposed littler traps are special nets, called "StormX nets," which are fitted to pipe or normal culverts. These nets will need to be cleaned periodically for them to function optimally. These nets have been chosen as they can be retro-fitted to existing infrastructure; this is important, as most of the areas proposed are extremally built-up and more formal litter traps will not have enough space. It is important to note that this will only remove litter up to a certain size; smaller particles will move through the nets.

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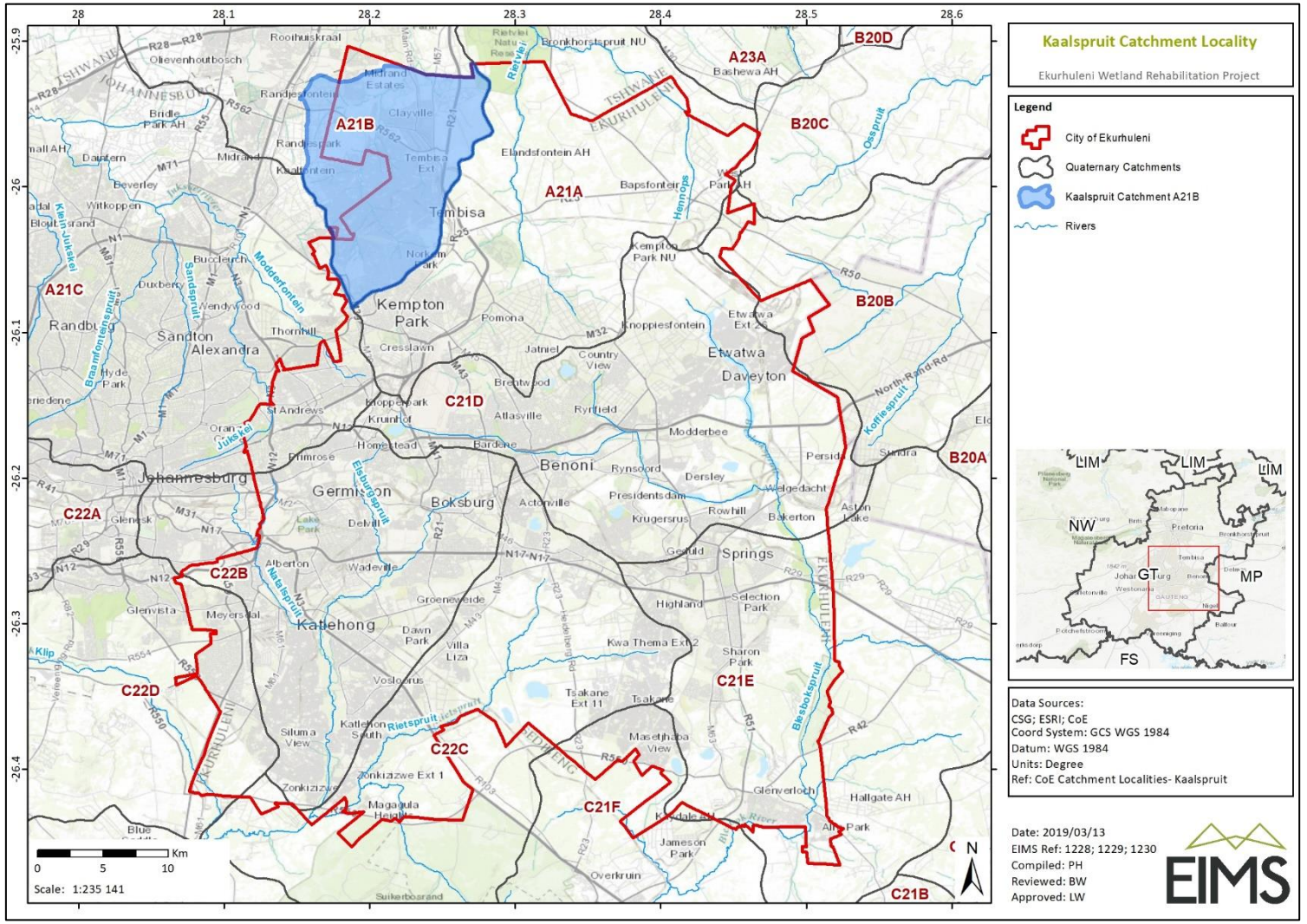

Figure 7: Locality Map of the Kaalspruit catchment within the CoE.

4. IMPLEMENTATION OF EMPR

4.1 COMPLIANCE WITH THE EMPR

The EMPr is a lifecycle document for the project and considers the mitigation of detrimental impacts as per NEMA principles. This document can act as a legally controlling document to Service provider / contractor is working on site.

This document should be implemented by all the Departments within CoE, as well as all service providers / contractors appointed by CoE must be obliged to apply the principles set out in this document.

In the event of environmental damage caused by any action, process or negligence of CoE departments or service providers / contractors it is the responsibility of the person who caused the damage to rectify and rehabilitate the affected environment at own cost, in line with the 'polluter pays' principle and be liable for any fines issued by the competent authority.

The transgressor is to immediately notify and report any and all infringements on the conditions of the EMP and / or Environmental Authorisation to the Engineer, ECO / IEO, CoE Environmental Compliance and Authorising Provincial and National Department.

Please see Annexure B for contact information for notification of non-compliance to relevant Departments.

4.2 IMPLEMENTATION OF THE EMPR

This EMPr will be issued to the CoE for use during the implementation, operational, maintenance and rehabilitation phases of the project. CoE will be responsible for the distribution to all relevant departments within CoE and service providers / contractors appointed. It is essential that the EMPr forms part of the tendering processes (Bill of Quantity) in order for the Service provider / contractor to budget for the environmental conditions and be included in the IDP.

Appointment of Environmental Officer

During the planning period, the CoE shall appoint an Environmental Control Officer (ECO) or an CoE Internal Environmental Officer (IEO), who shall be a senior member of the construction team and have overall environmental management responsibilities on site. The ECO / IEO must be appointed before construction starts and even before site establishment.

The ECO / IEO will have the following responsibilities during the construction period:

- Notify the Gauteng Department of Agriculture and Rural Development (GDARD) and the of commencement of construction. The Environmental Authorisation will specify how many days before construction the notification must be sent.

- Notify all neighbouring landowners and registered Interested and Affected Parties (I&APs) of the commencement of construction at least 14 days before construction commence or as per the specifications in the Environmental Authorisation.
- Submit a copy of the Environmental Authorisation and approved EMPr to the Service provider / contractor.
- Give training on the environmental concerns as per the Environmental Authorisation and the EMPr.
- Compile a contract and ensure that the Service provider / contractor signs the contract and understand ALL conditions as per the Environmental Authorisation and the EMPr.
- It is essential that the ECO / IEO confirms the fines with the Authorisation Holder to ensure that the correct fines are issued to the Service provider / contractor during non-compliance.
- Monitor activities of the main Service provider / contractor and all subcontractors and ensure that mitigation measures contained in this document are adhered to.
- The ECO / IEO must submit regular reports to GDARD on the status of the environmental compliance on site.
- The ECO / IEO will be responsible for maintaining communication channels with I&APs and the surrounding community throughout the construction phase. A record of all correspondence (if any) should be kept noting the date, details of I&AP, details of correspondence, issues discussed, and follow-up action taken.
- Ensure that all environmental sensitive areas are demarcated and managed as per the specific management plans / specialist studies.

During the operational phase, the Authorisation Holder will be responsible for environmental management of the proposed development. A responsible person should be appointed / selected to be responsible for the following:

- On-going environmental management;
- Compliance with this report;
- Controlling where required.

EMPr compliance monitoring and audits

The ECO / IEO appointed for the construction period will conduct regular monitoring inspections to ensure compliance with this EMPr and keep records of such monitoring as these may be requested by GDARD.

The results of the monitoring inspections must be reported to the main Service provider / contractor. The ECO / IEO shall also keep records of non-compliance and how this was rectified. This should be included in the monthly report. Fining scheme: Rigorous standards with penalties must be written into Service provider / contractors' and subcontractors' agreements to control soil erosion, pollution and earth compacting.

5. ROLES AND RESPONSIBILITIES

This EMPr includes mitigation measures for the most common impacts resulting from projects and maintenance. These mitigation measures identified are not exhaustive but are provided as a tool to assist the Municipality and those involved in activities and projects that may impact on the environment to understand which issues should be addressed as minimum requirement. All Legislation (acts and regulations) must be complied with as well as international and national standards.

The Proponent / City of Ekurhuleni (CoE)

The Proponent / CoE is the responsible party for the implementation of the project. In the case of an Environmental Authorisation the Proponent / CoE will be the applicant and therefore takes full responsibility for the conditions in the Environmental Authorisation and the EMPr. Depending on the type of the project the proponent / CoE could also be the overall Project Manager.

Project Manager

The Project Manager / Resident Engineer is the responsible person ensuring that the project is implemented correctly and as per the recommendations given by the Proponent / CoE and Environmental Control Officer. Depending on the type of project the Project Manager could either be the Resident Engineer (RE) or refer to the Responsible Project Manager within CoE.

- Ensure that the Proponent / CoE and the Contractor are aware of all the project specifications, legal constraints, standards and procedures that are relevant to the proposed project.
- Ensure that the Proponent / CoE and Contractor understand the conditions of the EMPr and that it is properly communicated to them.
- In conjunction with the Resident Engineer (if the RE and Project Manager is two different people); undertake inspections of the Service provider / Contractor's site as well as the construction works in order to check for compliance with the EMPr in terms of the specifications outlined in this document. Inspections shall take place at least once a month and copies of the monitoring checklist maintained on file;
- Keep a register of environmental incidents (oil spills, complaints, non-conformances, etc.) and other documentation related to the EMPr;
- Report to the Environmental Department should any problems related to conformance with this document to be solved in co-operation with the Service provider / contractors;
- Report and record all accidents and incidents resulting in environmental damage, injury or death.

Site Manager / Resident Engineer

- Be familiar with and understand the Environmental Impact Assessment Report.
- Be familiar with and understand the conditions as per the Environmental Authorisation and the Water License.
- Be familiar with and understand the conditions of the EMPr.
- Be familiar with and understand all the relevant environmental policies and procedures.

- Overall responsibility for the implementation of the EMPr, Environmental Authorisation and Water Use License.
- Communication between the Environmental Officer and any other neighbours or the Councillor.
- Prevent any actions that will harm the environment.

Contractor / Service Provider

- Be responsible for the overall implementation of the EMPR, the Environmental Authorisation and the Water Use License.
- Be responsible for educating the sub-contractor on the environmental concerns on the construction site and ensuring that it is implemented by all staff members working on site.

Environmental Control Officer (ECO) / Internal Environmental Office (EIO)

- The ECO / Internal ECO can either be appointed by the Proponent, Project Manager or the Contractor.
- The ECO / Internal ECO is responsible for monitoring, reviewing and verifying the contractors' compliance with the EMPr, Environmental Authorisation and the Water Use License.
- Monitor and verifying that the environmental impacts are kept to a minimum
- Ensure that all environmental sensitive areas are demarcated and managed as per the specific management plans / specialist studies.
- Assist the Project Team in finding solutions that are environmentally good solution.
- Monitor activities of the main Service provider / contractor and all subcontractors and ensure that mitigation measures contained in this document are adhered to.
- Keeping record of all activities on site and submitting reports regularly to the Authorities, if required.
- Notify the Authorities of commencement of construction. The Environmental Authorisation will specify how many days before construction the notification must be sent.
- Notify all neighbouring landowners and registered Interested and Affected Parties (I&APs) of the commencement of construction at least 14 days before construction commence or as per the specifications in the Environmental Authorisation.
- Give training on the environmental concerns as per the Environmental Authorisation and the EMPr.
- Compile a contract and ensure that the Service provider / contractor sign the contract and understand ALL conditions as per the Environmental Authorisation and the EMPr.
- It is essential that the ECO / IEO confirm the fines with the Authorisation Holder to ensure that the correct fines are issued to the Service provider / contractor during non-compliance.
- Monitor activities of the main Service provider / contractor and all subcontractors and ensure that mitigation measures contained in this document are adhered to.
- The ECO / IEO together with the CLO will be responsible for maintaining communication channels with I&APs and the surrounding community throughout the construction phase. A record of all correspondence (if any) should be kept noting the date, details of I&AP, details of correspondence, issues discussed, and follow-up action taken.

Community Liaison Officer (CLO)

The Community Liaison Officer (CLO) should provide a bridge between the local community, the community councillors, the Proponent and the Service provider / contractor.

- The CLO should attend regular meetings with the Project Team in order to report back on concerns received from the community.
- Keep a record of the concerns raised by the public, the staff members / work force and the Proponent.
- Notify the public of the dangers on construction site.
- Together with the Councillor assist with the allocation of jobs.

Below are the actions and specific responsibilities set out through the three phases of the project:

- Planning & Design Phase;
- Construction Phase;
- Operational / Maintenance Phase;
- Closure & Rehabilitation Phase.

PLANNING & DESIGN PHASE				
ASPECT	**POSSIBLE IMPACTS**	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
GENERAL	Degradation of sensitive environments	• Confirm Environmental Sensitive Areas with CoE: Environmental Resources Management • Ensure that all project licensing is in place and available on site	The Proponent	Once-off
		EMPr • This EMPr must be made binding to the contract • The EMPr must form part of the BID process/ meetings	The Proponent	Once-off
	Non-conformance with EMP and EA	**ECO** • The Proponent must appoint an ECO / IEO to oversee the environmental aspects of the project. • An aquatic environmental control officer (A-ECO), specialising in aquatic systems must be appointed should the project be located near or within a water resource to ensure the longevity of the impacted aquatic system. This appointment must be before the Service provider / contractor is on site.	The Proponents	Once-off
		• The ECO / IEO should form part of the project management team and should attend all project meetings.	ECO, Engineer, Proponent.	Continuous

PLANNING & DESIGN PHASE				
		• The ECO / IEO will be required to supply the engineer with a monthly report, as to the adherence or non-adherence of the Service provider / contractor s and sub-Service provider / contractor s to the environmental guidelines contained in this EMPr. • In the event of repeated non-compliance, a report, including the incident logs, should be forwarded to GDARD for review.		
Community participation and labour force	Conflict within the community	• Notification and cooperation with local councillor • Employment of local labour, from the surrounding communities and the implementation of training is to be instituted during the time period of the contract. • The original vision of community participation of the project proposed that a community liaison officer (CLO) be appointed by the Service provider / contractor. This person should provide a bridge between the local community, their community councillors and the consultant and Service provider / contractor. • It is recommended that the CLO should be a member of the community affected by the contract.	Service provider / contractor, Consulting Engineer	At project initiation, and as necessary

PLANNING & DESIGN PHASE				
Site Establishment	Degradation of environment	• The working area of the construction site shall be agreed on between the Consulting Engineer, ECO / IEO and the Service provider / contractor. • Prior to establishment of the site camp(s), the Service provider/ contractor shall produce a site establishment plan showing the positions of: ○ all building and laydown yards, ○ vehicle wash areas, fuel storage areas, ○ spoil sites, ○ overnight vehicle parking areas, ○ fenced area for the bulk of the site management (construction camp), ○ demarcated area for cooking fires or any other hazardous/ dangerous activities, ○ placement of toilets outside the 1:100 year flood lines, ○ for approval by the ECO / IEO. • Construction camps must be established in appropriate locations prior to the commencement of construction activities. • Camps, offices etc. maintained in an orderly and tidy condition. • No littering of the site.	Service provider / contractor, ECO, Proponent	At project initiation and as work progresses, as necessary

PLANNING & DESIGN PHASE				
Storm Water Management	Soil erosion Possible flooding of areas	• The storm water management plan must be in place and must be implemented and monitored on a regular basis.	Design Engineer Proponent	Continuously

CONSTRUCTION PHASE				
ASPECT	**POSSIBLE IMPACTS**	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
General	Degradation of environment and non-compliance	• A copy of the EMPr, Environmental Authorisation (EA) and Water Use Licence (WUL)/General Authorisation (GA) must be kept on site during the construction phase and be used as a point of reference throughout the project phase. • Any substantial changes to the EMPr shall be submitted to GDARD for acceptance before such changes may be affected. • General good construction and best industry practices should be employed to avoid adverse environmental impacts. • All persons employed by the Service provider / contractor s and sub- contractor s shall abide by the requirements of the general environmental protection specifications. • The onus is on the Service provider / contractor to ensure that the workforce is aware of and conforms to the environmental guidelines that are applicable to the project. • The Service provider / contractor shall not use the land forming the Site of, or connected with, the Works for any purpose whatsoever other than for the proper carrying out of the Works under the	Service provider / contractor, ECO	Monitor daily or as necessary

CONSTRUCTION PHASE				
		contract and shall place any camps that may be required for himself and his employees and animals only on sites approved by the ECO and consulting engineer. • No trees or bushes shall be damaged or cut down by the Service provider / contractor or by any of his employees whether for use on the Works or otherwise without the written consent of the Consulting Engineer or the Environmental Control Officer and then only where and in the manner as they may direct. • Construction equipment may not move outside the area defined as the site.		
Community participation and labour force	Conflict within the community and on site	• Labour should be recruited from the local community. • The labour force should be trained in the necessary skills for the project, if necessary. • Effective communication between the CLO, Proponent, Contractor / service provider and Engineer should be ensured. • Employment of local labour, from the surrounding communities and the implementation of training is to be instituted during the time period of the contract.	Service provider / contractor, Consulting Engineer	At project initiation, and as necessary

CONSTRUCTION PHASE				
		• The original vision of community participation of the project proposed that a community liaison officer (CLO) be appointed by the Service provider / contractor. This person should provide a bridge between the local community, their community councillors and the consultant and Service provider / contractor. • It is recommended that the CLO should be a member of the community affected by the contract.		
Site Establishment	Degradation of the environment	• To eliminate vegetation destruction, the construction camp / s must be placed in an area that is already disturbed and not sensitive. • Adequate ablutions should be supplied for workers within the OHS regulations (i.e. 1 toilet per 30 workers, 1 shower per 15 workers (where applicable)). • Safe and effective sewage treatment will require one of the following sewage handling methods: dry composting toilets such as “enviro loos”, or portable chemical toilets which are supplied and maintained by the site Service provider / Service provider / contractor located outside the 1:100-year Floodline. • Chemical toilets should be emptied regularly.	Service provider / contractor	Monitor daily, waste disposal weekly

CONSTRUCTION PHASE				
		• Toilet paper and hand washing liquid / soap must be supplied by the site Service provider / contractor. • Toilets and latrines should be placed within easy access of the workforce, to ensure that the surrounding environment is not used for this purpose. • Toilets should be anchored. • Placement of toilets should avoid the possibility of the area surrounding the toilet becoming flooded. • Provision for the removal of waste generated by the workers accommodation, as well as by the workshop, shall be made. • Sufficient rubbish disposal units should be made available for waste disposal. • No plant machinery may be stored or left near the aquatic areas, when not in use • Areas to be cleared of natural vegetation should be minimised. • The Service provider / contractor should supply a plan of all cleared areas to the engineer, which indicates areas that are prescribed by the engineer's design, as well as those intended for the purposes of carrying out the contract.		

CONSTRUCTION PHASE				
		• A fence should be erected around the construction storage or site office to minimise disturbance of vegetation and excessive littering. • Trucks should remain on demarcated roads and not deviate from paths on to vegetated land. • Fencing/demarcations of all wetland areas near construction areas as no go areas, where applicable.		
		• The camp and site workers accommodation will require rehabilitation at the end of the contract. For this to be effective the topsoil (Approximately 100mm) must be stripped and stockpiled prior to the establishment of the camp. On completion the total area will require ripping and the re-spreading of topsoil to generate vegetation. • There is no burning of rubbish / vegetation allowed on site and open/uncontained fires are prohibited.	Service provider / contractor	Site Decommissioning
		• Potable water should be supplied. Sufficient amounts of clean drinking water should be made available to the workers on site. • Care should be taken to adequately drain the areas surrounding water points in order to avoid the development of pools of standing water.	Service provider / contractor	Monitor daily

CONSTRUCTION PHASE				
		• To minimise run-off, which can cause erosion and pollution down slope, campsites should not be placed on sloped areas. If this is impossible, berms, channelling of water flow and other erosion control measures should be implemented (see next section, "Erosion"). • Any waste that attracts pests or produces an odour should be kept in enclosed containers that have a lid. • All waste should be disposed off at a registered landfill site.		
		• Construction should take place during the dry season, if possible. Failing this, additional measures should be taken to ensure that possible environmental damage is minimised. Measures may include, silt retention areas, erosion control mats, raised stream crossings to prevent mud being washed into streams from construction vehicles, etc. • Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a specialist notified in order for an investigation and evaluation of the find(s) to take	Service provider / contractor, ECO	Once-off

CONSTRUCTION PHASE				
		place (cf. NHRA (Act No. 25 of 1999), Section 36 (6))		
Storm water management	Flooding & erosion	• Methods for containing run-off include the use of hay bales in drainage lines, the use of silt fences or the use of gravel/rock and geotextile silt barriers. • It should be ensured that all storm water that results from the roadway is contained adequately in the storm water system and does not become a source of flooding to residences. • Storm water drainage should be channelled in erosion proof channels. • Storm water on the site must be managed, including measures to ensure that the energy of storm water that is to be released into the drainage areas is dissipated. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion. • Silt traps (interceptors) should be incorporated into the drainage system at road junctions or bridge crossings, where pollution risk is high from storm water run-off.	Service provider / contractor, ECO	As necessary
Erosion control	Soil degradation (loss of soil), siltation, air	• In the event of runnels or erosion occurring, the Service provider / contractor must affect repairs		

CONSTRUCTION PHASE				
	pollution due to dust creation.	timeously. Restorative repairs should include the backfilling of eroded areas. • Surfaces shall be suitably top soiled and vegetated as soon as is possible after final sloping. • The introduction of swales or infiltration basins should be implemented to reduce flow velocity of runoff water, prevent erosion, and remove chemical and particulate pollutants in runoff. • This is essential to protect the wetland adjacent to the road from these harmful effects. <u>Removal of silt:</u> • No harm may be done to species by removing them from the watercourse when de-silting. It is recommended to walk along removed silt regularly and return any animals to the watercourse. • Leave a fringe of undisturbed vegetation at the edge of the water at least one side of the watercourse. • Do not damage bed or banks therefore do not drive a machine into the watercourse. • Watercourse banks may not be exposed, as they will be more prone to erosion.		

CONSTRUCTION PHASE				
		• The removal of silt within a watercourse / wetland must be done using manual labour. • This can be done by using a spade and wheelbarrow to remove the silt from the watercourse. <u>Disposal of silt:</u> • Before silt is used it MUST be tested to ensure that the silt is not contaminated. • Plan where silt will be disposed of prior to the removal to ensure that it won't cause an environmental issue or wash into the watercourse. • Silt can be utilised for ground cover (spread evenly open on grassland) in immediate vicinity of removal, however it may not be spread in areas located within 32 meters of a watercourse. The silt may be transported to a different facility (example Park) if no space is available in the immediate vicinity of removal. • Removed silt must be spread thinly, away from the bank and the immediate bank top area but not on the slope of the bank.		

CONSTRUCTION PHASE				
		• No spreading of silt in depressions or wet areas, as these may be valuable habitat for plants and animals. • Silt may not be utilised as a ground cover or spreading as cover if the silt has been contaminated.		
Wetland/ water resources/ drainage lines	Degradation of aquatic systems, pollution of water, loss of ecosystems / habits.	• All wetland areas, near construction areas, should be demarcated to ensure that activities such as excessive noise and light do not alter the natural system. • The ramps for the in- and out flows from the construction site must be lined with Reno mattresses and or gabions to prevent structure undermining and to ensure flow is dispersed and mitigated. Gabion steps should not exceed 500 mm, to ensure ichthyofauna migration • Chanel lining must be done with Loffel stones (or Amourflex stones) or similar products. This is to prevent the loss of habitat to aquatic organisms living in the system. • No dumping of foreign material in streams, rivers and/or wetland areas is allowed. • A wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from DWS and	Service provider / contractor ECO Site manager **A-ECO**	Ongoing

CONSTRUCTION PHASE				
		the relevant DEA office. The necessary licenses must be obtained from DWS in terms Section 21 and 22 of the National Water Act, (Act 36 of 1998). • Removal of debris and other obstructing materials from the site must take place and erosion preventing structures must be constructed. This is done to prevent damming of water and increasing flooding danger. • If water is sprayed on the construction surface during the construction process, utmost care must be taken to ensure the runoff water does not pollute the system or any of the associated catchment areas. A storm water cut-off drain should be constructed between the construction area and the aquatic system to ensure that storm water flowing through the construction area can't flow into the aquatic system. • Any new erosion gullies must be remediated immediately. • Water run-off during thundershowers must not carry pollutants or sediment into the wetland. • Litter impacts from passing vehicles and pedestrians must be adequately dealt with by means of litter traps or a similar technique that does result in litter accumulating in the wetland.		

CONSTRUCTION PHASE				
		• The wetland should not be burnt for any particular reason without first consulting a specialist ecologist. • Dumping in the area should be controlled and policed. • Strict storm water attenuation planning must be implemented, to protect the system from impacts due to storm water release into the stream. The system must also include a pollution prevention system, to remove all the pollutants before it is allowed to re-enter the catchment or system at the construction areas. • Spill kits must be stored on site. The kits should also be well marked, and all personnel should be educated to deal with spills. Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat or while using spill prevention measures such as drip trays. • The appointed A-ECO must determine which proposed mitigation measures will be implemented regarding erosion and siltation prevention. • No heavy vehicles should be permitted in wetland habitat, unless absolutely necessary and existing access routes and disturbed areas should be utilised as far as possible to access intervention locations. Where no existing tracks are available, a single access track to each intervention location should be used.		

CONSTRUCTION PHASE				
		• Access tracks through wetland areas should ideally run parallel to the contour to limit the formation of preferential flow paths that could lead to erosion. Accessing intervention locations along tracks perpendicular to the contour should be avoided. • All disturbance footprints should be rehabilitated, including ploughing/ripping (in instances where the soils have become compacted), landscaping to the natural landscape profile, application of topsoil if necessary, and revegetation with appropriate, indigenous plant species. • Surface runoff along the access tracks should not lead to erosion. Where ruts have formed and remain following completion of construction activities, these should be plugged with regular shallow soil berms to prevent a preferential flow paths forming along the vehicle ruts. All vehicle ruts must be rehabilitated following completion of activity. • Agricultural plots to be limited to designated areas outside of wetland habitat only. • Implementation of soil management measures within communal subsidence agricultural plots, i.e.: contour berms to prevent sediment mobilisation into adjacent wetland habitat.		

CONSTRUCTION PHASE				
		• All alien vegetation clearing should be undertaken according to WfWetlands alien vegetation management protocols. • Only manual removal of alien vegetation should be permitted and should be limited to use of hand tool. • To ensure areas cleared of alien vegetation and areas that have been disturbed or revegetated remain free of alien and weed vegetation, ongoing management of alien vegetation should be implemented. • Only approved, low impact herbicides to be used for initial clearing of vegetation, along bricked walkways and during ongoing alien vegetation management within wetland. the use of broad-spectrum herbicides should be avoided, application should be limited to target individuals rather than being applied to a general area, and application should be avoided during periods of high rainfall when herbicides may be washed into downstream water resources. Working for Wetlands should be consulted for further information on the most appropriate products. • Apply best practice management to storage of materials and preparation and pouring of concrete, i.e.: remain outside of wetland habitat, do not store or mix cement and concrete (or other materials) directly on the ground, store and prepare on liner on a bunded		

CONSTRUCTION PHASE				
		area, 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). • No servicing or cleaning of vehicles/machinery to take on site. <u>Working in a watercourse:</u> • Ensure that no harm be done to protected species. • Plants removed from watercourse may not be left within watercourse and must be disposed as per green waste measures. • Indigenous plants that must be removed, should be removed, stored and nurtured on site, or taken to a local nursery, to be replanted and used for rehabilitation. • Bank side tree trunks and roots must be unharmed as they stabilise the banks and reduce erosion, preventing the channel from silting up. • Vehicle traffic across wetland areas must be avoided. • If at all possible manual labour should be used. • Undertake construction or repair associated with instream rehabilitation structures towards the end of the dry season when flows are low – it may then not		

CONSTRUCTION PHASE				
		be necessary to divert flows, and temporary impoundment may be sufficient. • Apply best practice to the diversion/impoundment of flows and the rehabilitation of disturbed wetland areas. • Minimise construction period to limit opportunity for erosion and mobilisation of sediment.		
Disturbance of Vegetation (Removal of vegetation)	Destruction / Loss of Habitat/ ecosystems. Erosion	• Undertake initial clearing of vegetation during dry season. • Vegetation clearing should be limited to the actual construction footprint. Prior to the commencement of any construction, the required disturbance footprint should be demarcated, and all activities should be located within the demarcated area. No vegetation disturbance, clearing or excavation to take place outside the demarcated area. • Wherever possible, as part of either revegetation activities or for use as grass cover on the sports fields, indigenous grass species with low watering requirements, should be used. • All sensitive environments must be demarcated prior to construction in the immediate vicinity. The demarcation must prevent vehicle access and should have notices indicating the sensitivity. Specialist can	Service provider / contractor ECO A-ECO	As necessary, to be discussed with the ECO on production of the site establishment plan

CONSTRUCTION PHASE				
		be consulted to assist with the demarcation of sensitive environments. • Trees selected for preservation in the site-specific study within or adjacent to the works areas must be fenced around their drip line. The fence must be clearly marked with danger tape • Minimal physical disturbance to the vegetation during construction phase should be sought and be conveyed to the construction team. Natural vegetation must be conserved as far as possible. • Vehicle access must be limited to existing access roads and should not drive over vegetated areas unnecessary. • All areas affected by the construction works will need to be rehabilitated and re-vegetated. This includes the areas that was disturbed, temporary access roads, construction camp sites, workers camp sites, etc. • No open or uncontained fires or burning of the vegetation is allowed on site, especially in winter months as veld fires can ensue and cause catastrophic consequences by burning masses of dry grass. • Painting and marking of natural features are not allowed. • All vegetation cleared must be removed and disposed appropriately, in consultation with the ECO.		

CONSTRUCTION PHASE				
		• Increased run-off due to vegetation clearance must be managed appropriately to avoid further erosion and incision of the banks. • Transplanting of indigenous plants must be encouraged at all times. Trees and shrubs must be planted so that their stems or trunks are at the same depth as in the original location. • Transplanted plants must be maintained and watered regularly to ensure the re-establishment. **Refer to Standard Operating Procedure for removal of vegetation in Appendix B**		
Mowing and edging of grass	Soil pollution; destruction of habitat. Air pollution due to dust generated.	• Reduce mowing near buffer zones between water and land if possible • Remove all litter and debris before mowing and edging. Dispose of litter / debris in plastic bags and dispose of at a registered waste disposal facility. • Ensure mowers and edgers project grass clippings away from waterways, drains and gutters. • Remove clippings from paved areas such as footpaths, driveways, roads and gutters. • Where possible send collected grass clippings to a composting facility. Use mowers which mulch clippings into smaller particles to help break them down, where possible.		

CONSTRUCTION PHASE				
		• Avoid mowing if the ground is very wet, as this can lead to erosion. • No washing of plant and equipment where waste water will flow into water resources. • Refuel on an impervious surface or over a drip tray and address any spills as per hazardous material management.		
Herbicides and Pesticides	Ground & water pollution due to spillages. Destruction of habitat and possible killing of animals. Personal injury due to incorrect usage.	• Use, storage and transportation of herbicides and pesticides must comply with Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947), as amended. • All contractors appointed to apply pesticides and herbicides shall be registered in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947), as amended. • Herbicides application shall be done by suitably trained personnel in, or under the direction of a qualified pest control operator, registered under the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No 36 of 1947). • Purchasing of pesticides, herbicides and other agricultural remedies, shall be done by suitably qualified persons.	Service provider / contractor ECO A-ECO	As necessary, to be discussed with the ECO on production of the site establishment plan

CONSTRUCTION PHASE				
		• Products will be used in accordance with labelled instructions and personnel will wear correct PPE as indicated. • Precaution must be taken to limit spills and exposure of the public, animals, foodstuffs, waterbodies and adjacent land to the products. • A register and material safety data sheets of all herbicides and pesticides used, and in stock, shall be kept and maintained on site. • The material safety data sheets shall be easily available at strategic points (example: first aid points and/ stores). • All containers must have adequate labelling. No labels may be removed from containers. • Pesticides and herbicides shall be transported in containers which are clearly labelled, leak-proof and not easily damaged. They shall not be transported beside or above any type of food. • All spills shall be managed and re-habilitated in accordance with the chemical label and the associated instructions, and all spillages shall be reported and recorded on the incident report immediately. <u>Storage of herbicides & pesticides:</u>		

CONSTRUCTION PHASE				
		○ Products will be stored in a building / container with in bunded impermeable liner, when not in use. ○ Storage areas will be secured to prevent unauthorised access. ○ The storeroom shall be well ventilated. Natural ventilation shall be provided. All vents shall be designed or protected, to prevent entry by any animal life. ○ Storekeepers shall ensure that stocks are regularly inspected for leaks and damage on containers. All damaged or empty containers shall be removed immediately and disposed of in accordance with the label requirements. ○ Flammable substances shall be clearly marked & fire fighting equipment will be available at storage area.		
Mammals	Injury / death to mammals.	• No species of animal may be poached, snared, hunted, captured or wilfully damaged or destroyed. • Any incidents of poaching wilfully disturbance or damage to wild animals, as well as accidental injury to or death of wild animals must be recorded and reported to the Engineer / project manager • Nesting sites of birds must not be disturbed, where possible.	Service provider / contractor ECO A-ECO	

CONSTRUCTION PHASE				
		• All animals injured on account of construction activities must be taken to the local SPCA. Dead animals must be disposed at a permitted landfill site.		

Herpetofauna	Injury / death to herpetofauna	• If the Giant Bullfrog or any herpetological species are encountered or exposed during the construction phase, they should be removed and relocated to natural areas in the vicinity. In consultations with the ECO, this remedial action might require the employment of a herpetologist to oversee the removal of endangered or vulnerable herpetofauna during the initial ground clearing phase of construction.
		• If any snakes are found on the site, they should be relocated by a suitably trained snake handler or alternatively, the following organisations can be contacted:
		  ○ SPCA;
		  ○ A Zoo;
		  ○ EWT.
		• No herpetofauna species should be unnecessarily disturbed, trapped, hunted or killed during the construction phase.
			Service provider / contractor
			ECO	

CONSTRUCTION PHASE				
Heritage	Damage caused to historical artefacts, bones. Contamination of historic find. Personal injury	• All heritage resources to be identified prior to site establishment and the cultural / historic features of the area should be retained in their current form and / or rehabilitated to ensure for their preservation. • All staff / labourers must be made aware of the possibility of the occurrence of heritage features. It could include ash deposits, bone concentrations, ceramic fragments and stone concentrations of any formal nature. • CoE is currently in the process of developing the Heritage Policy and while this has not yet been approved the National Heritage Resources Act, Act 25 of 1999, must be consulted; it includes a basic process as described below. <u>Should any historical artefacts be found during construction the following measures must be implemented</u>: o Construction in the immediate vicinity (50-meter radius) must cease. o CoE: SRAC must be notified prior to a suitable heritage practitioner being appointed. o A heritage practitioner must be contacted. o In the event of obvious human remains the SAPS must be notified.		

CONSTRUCTION PHASE				
		○ Area in a 50-meter radius should be cordoned off with hazardous tape. ○ Public access must be limited to area. ○ Area to be placed under guard. ○ No media statement to be released prior to a Heritage practitioner has had sufficient time to analyse the finds. **Refer to Appendix E for Standard operating procedure**		
Earthworks	Vegetation degradation, erosion, personal injury.	• Extensive cuts and fills should not be carried out near the areas designated as conservation or natural heritage zones. • All cut and fill surfaces need to be stabilised with appropriate material or measures when major civil works are complete. • Cut and fill slopes shall be shaped and trimmed to approximate the natural condition and contours as closely as possible and, where possible, be undulating. • The original soil profile should be replaced during construction activities or where other forms of excavation occur. • Erosion and Donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilised.	Design Engineer, Service provider / contractor	Once-off or as necessary

CONSTRUCTION PHASE				
		• All new cut and fill forms should be rounded on the edges to allow them to blend with the surrounding landforms. • Excavations will not be left open for a period longer than 48 hours. Excavations will be barricaded with safety net and notice boards if left open.		
Soil Management (Stockpiles)	Erosion, infestation of weeds on soil, loss of soil.	**Refer to Appendix C for Standard Operating Procedure for Stockpiles.**	Service provider / contractor Engineer ECO / IEO	As necessary
Access Roads	Traffic incidents, personal injury, dust, vegetation disturbance.	• Existing roads shall be used as far as possible. New, temporary access roads shall be approved by the Engineer or Engineers Representative in consultation with the ECO / IEO. No Deviation from approved access roads shall be allowed. • Vehicles should be driven at moderate speeds and special care should be taken (especially in wet weather) to avoid eroding tracks. • In case of a temporary track, a single track / road is to be created and the establishment of multiple tracks are to be avoided at all times.	Service provider / contractor Engineer, ECO / IEO	Daily

CONSTRUCTION PHASE				
		• All temporary access roads no longer required, shall be decommissioned, ripped and land rehabilitated to the original land use. • All storm water channels or berms shall be constructed so as to allow for easy vehicular crossing. • All existing pedestrian thoroughfares and footpaths should be kept intact, where possible, and the creation of new ones should not be necessitated.		
Solid Waste Control and Litter	Ground, soil & water pollution. Injury to Mammals. Rodent infestation.	• A weekly litter patrol of the entire construction site is to be conducted by the Service provider / contractor. The necessary remedial action is to take place within 24 hours of the inspection by the upgrading crew. • Large rubbish bins are to be placed at strategic points at approximately 100m apart in the construction area. • General refuse and rubbish must be removed from site on a weekly basis. • Rubble and upgrading refuse should be collected and removed weekly.	Service provider / contractor	Once off, Monitor weekly

CONSTRUCTION PHASE				
		• It is also recommended that smaller rubbish bins be placed on poles of the fences for pedestrians that may be passing around the fenced area. • If possible, material must be recycled and bins must be provided for recycling. Bins must clearly be marked. E.g. glass, paper, tin, organic material and construction waste.		
	Erosion, contamination of soil (ground/ soil pollution)	• Spoil Sites: Locality, intended operation, maintenance and future rehabilitation methods for spoil sites must be approved by the engineer and any relevant landowner. • Spoil sites may not be used for the disposal of hazardous or toxic waste. • All construction and solid waste must be collected in a central area prior to disposal. • All generators and fuel tanks should be positioned on drip trays to minimize spoiling of hazardous waste. • Waste should be collected and stored in bins provided by the Service provider / contractor and removed on a regular basis. • Hazardous waste should be minimized and managed at all times.	Service provider / contractor	Monitor weekly

CONSTRUCTION PHASE				
	Non-conformance with legislation.	• The Service provider / contractor shall remove all waste and transport all such waste material off site to dump areas, which have been approved by the Consulting Engineer, ECO / IEO or the Municipality. • A letter confirming the disposal of waste at a registered landfill site will be handed over to the ECO / IEO. • If applicable, rock spoil can be dumped on approval of the Consulting Engineer or ECO / IEO in old borrow pits and rehabilitated. The dumped material must be finally rounded off to have slopes not steeper than 1:3.	Service provider / contractor	Weekly
Concrete and Chemicals	Water contamination, soil contamination, habitat degradation.	• Concrete shall be mixed only in areas, which have been specially demarcated for this purpose by the ECO / IEO, or; • Concrete shall only be mixed on concrete mixing trays / impermeable surfaces ,wheelbarrows or mortar boards and berms should be constructed to contain water run-off on sloping areas. • All concrete that is spilled outside these areas shall be promptly removed by the Service provider / contractor and taken to an approved dumpsite.	Service provider / contractor ECO / IEO	Continuous, Monitor daily for high volumes of batching

CONSTRUCTION PHASE				
		• After all concrete mixing is complete; all waste concrete shall be removed from the mixing area and disposed of at an approved dumpsite. • Batching areas must be rehabilitated where necessary. • Storm water shall not be allowed to flow through the batching area. Cement sediment shall be removed from time to time and disposed of in a manner as instructed by the Consulting Engineer. • No cement / concrete batching within 32 meters of a water course. • Ready-mix concrete should be used as far as possible.		
Hazardous chemical management	Water contamination, soil contamination, habitat degradation	<u>General:</u> • MSDS's should be available for all hazardous material used and stored on site. • The MSDS must be requested from the product supplier and must include the following (Hazardous Chemical Substances Regulation 1179 of 1995): ○ Product and Company Identification ○ Composition/Information on ingredients ○ Hazards Identification ○ First-Aid Measures ○ Fire-fighting measures	Service provider / contractor ECO / IEO	Continuous, monitor weekly

CONSTRUCTION PHASE				
		○ Handling and storage ○ Exposure control/personal protection ○ Physical and chemical properties ○ Stability and reactivity ○ Toxicological information ○ Ecological information ○ Disposal considerations ○ Transport information ○ Regulatory information ○ Any other applicable information • Provided that there is no MSDS available sufficient information to enable the user to take the necessary measures as regards to the protection of health and safety must be provided. • Ensure that hazardous material is clearly marked as per SANS 10228 (SABS 0228) and SANS 10229-1 (SABS 0229). • Ensure that there is a spill kit available at all times, whether transporting the material or using it on site. • A container for hazardous material and or hazardous waste must be available on site at all times. • Spill kits must be available on site. • Staff should be trained to use the hazardous material and on the cleaning of spills. <u>Storage:</u>		

CONSTRUCTION PHASE				
		• Storage of potentially hazardous materials should be agreed with the Engineer / ECO / IEO. These materials include fuel, oil, cement, bitumen etc. • Dedicated and suitable storage facilities should be provided for hazardous material and chemicals that is provided with a bunded floor to prevent spills to ground. • No storage of fuel and diesel within the watercourse boundaries. • Sufficient care must be taken when handling these materials to prevent pollution. • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump or oil-separator which will separate these chemicals and oils. • All construction vehicles must be checked regularly for oil leaks. • Cement mixing must take place on an impervious surface and it is suggested that both plastic and mortar boards be used for this • The workers should also be made to carry out weekly cleaning of the site and daily inspection should be done to ensure no leakage or spillage has occurred on the site.		

CONSTRUCTION PHASE				
		Refer to appendix F for standard operating procedure in case of spillage of hazardous substances.		
Transport of fuel	Water contamination, soil contamination, habitat degradation	• Ensure that there is a spill kit available at all times, whether transporting the fuel or using it on site. • Ensure that there is a drip tray used should the fuel be transferred from one container to another. • Ensure that there are enough fire extinguishers on the vehicle and on site. • Container in which fuel is transported must be clearly marked according to the South African National Standards. • Containers must not have any leaks. • The containers must be stored in a safe place where the public has no access. • Record must be kept of the transport and usage of the fuel, this is done to ensure that fuel wasn't spilled or stolen along the route. • Drivers transporting the fuel must have the correct qualifications, training and approvals / licenses. **Refer to Appendix D for Standard operating procedure for dispensing, transport and spillage of fuel.** **Refer and comply to relevant SANS procedure*	Service provider / contractor, ECO / IEO	Continuous

CONSTRUCTION PHASE				
Noise	Community disturbance. Personal health. Noise pollution.	• Where possible construction work should be undertaken during normal working hours (07H00 – 18H00) • The construction crew must abide by the National Noise laws and the local by-laws regarding noise. • All employees must be given the necessary ear protection gear when working in noisy environments. • Local health authority must be informed if noise level at the site exceeds 7Db above ambient levels. • Should an extension of the construction hours be required, the adjacent property owners and occupiers are to be informed in writing two days in advance of any overtime activities.	Service provider / contractor, ECO / IEO	Continuous
Hygiene	Water & ground pollution,	• Under no circumstances may ablutions occur outside of the provided facilities.	Service provider / contractor ECO / IEO	Monitor Daily
Dust	Air pollution. Personal health.	• As per the National Dust Control Regulations 2013: • Airborne dust should be limited where possible and access roads should be wetted to prevent excess dust being lifted by vehicles and plant on site. These areas should therefore be monitored closely, and mitigation measures implemented when applicable.	Service provider / contractor ECO / IEO	Monitor daily

CONSTRUCTION PHASE				
		• In the event of serious levels of dust pollution, the implementation of constant dust monitoring by qualified consultants must be undertaken. • The Dust fall rate (D) shall not exceed the regulated rate of 600 mg/m^2/day (30 days average) in a Residential area, as promulgated in the National Dust Control Regulations 2013 (GN. 827 issued 1 Nov 2013). Should the dust fall exceed the regulated rate, a fine ranging from R5 million to R10 million may be issued or a term of 5 to 10 years of imprisonment. • The air quality should be measured regularly to ensure that the requirements are met. Should the requirement not be met an air quality specialist must be appointed to develop an air quality management program. • Water is to be used to dampen surfaces and curb dust production should the need arise. • Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution. • Vehicle to be used during the construction phase are to be kept in good working condition and should not to be the source of excessive fumes.		

CONSTRUCTION PHASE				
		• Fires are to be kept to a minimum so as to reduce smoke inhalation by the residents. • The cement bags must be placed in a bin / container that is closed in order to prevent the cement particles from blowing away. • Stock piles should not exceed 2m in height and must be kept stable so as not to allow lifting of dust. • Loose building materials and excavated material stockpiles adequately protected against the wind by covering with material such as canvas. • Appropriate dust abatement measures implemented to minimise dust generation on site (e.g. Wetting of active construction areas and unpaved roads and the vegetation of the semi-permanent stockpiles).		
		• All materials transported to site must be transported in such a manner that they do not fly off the vehicle. This may necessitate covering or wetting friable materials.	Service provider / contractor	Spot checks daily – weekly as necessary
Sewer Spill	Personal health, water & ground contamination.	• Report sewage spills immediately to CoE Department of Water and Sanitation as well as to CoE Environmental.		

CONSTRUCTION PHASE				
		• Investigate the source of spillage and block off to avoid further contamination. • Clean up crew (labourers) must wear correct PPE (at a minimum, rubber or latex gloves and rubber boots), dispose of gloves and wash rubber boots when leaving spill site. • Contaminated area must be clearly indicated and cordoned off if possible. Signage must indicate that water may not be used for consumption. • A vacuum / pump truck can be used to recover liquid and solid martial. • Hydrated lime or Chlorine water solution (bleach) can be used to disinfect area if located on non-permeable surface. • No disinfectant to be used on natural environment. • No waste water is allowed to enter storm water systems. • Should sewage spill flow into water resource, water quality must be monitored on a monthly basis to ensure the effective remediation, until water quality compares with the baseline water quality or with the upstream water quality.		

CONSTRUCTION PHASE				
		Refer to Appendix F for Standard Operating Procedure for Sewer Spill.		
Health and Safety	Personal & community health or injury.	• The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (Act 85 of 1993) and the National building regulations. • It is highly recommended that a Health and Safety Inspector or Officer be appointed to manage all safety aspects of the site.	Service provider / contractor	Daily
Security	Theft	• The Service provider / contractor must supply his own security arrangements for the construction camp. No construction workers are allowed on site after hours, except for designated security officers. • Inappropriate behaviour, such as drinking of alcohol and playing loud music, or any other disruptive activity may not be carried out by workers during or after hours. • No trespassing on private property will be allowed and the workers will have to obtain permission from the home owner or occupier to enter his / her property.	Service provider / contractor	Monitor Daily

CONSTRUCTION PHASE				
		• Owners and occupier of a property must be made aware of the need to access a property before entering. • The drivers of heavy vehicles (e.g. excavators, graders, greders) should be informed of the need for extra vigilance because of the possibility of pedestrians crossing the construction areas. • Pedestrian usage should be managed so that pedestrians should not have access to the construction area at any given time. This may necessitate the appointment of a responsible person to monitor this aspect. • Overnight access into driveways must be ensured, at the end of each day. This measure ensures the owners right to access to his / her dwelling as well as mitigates against the event of cars being stolen if the car is left outside the owner's property, as a result of construction.		
Traffic	Traffic congestion, motor vehicle accidents.	• Existing access routes should not be blocked or impeded by construction. If this is unavoidable, adequate prior planning should be implemented to ensure that safety and access to routes is maintained.	Service provider / contractor	Monitor Daily

CONSTRUCTION PHASE				
		• Construction vehicle may not be left overnight on or near to any environmentally sensitive area, or in a position where water runoff, in the event of rain, will cause a negative impact on the sensitive area, nor may it be kept unattended except inside the construction camp. • Roads should be kept free of construction debris. Debris, created as a result of construction, should be cleared timeously.		
Information Flow	Non-conformance / compliance to best practice and authorisations. Prosecution	• Business should be informed one week in advance of construction activities commencing in the vicinity of their properties. • Residents whose property is to be blocked off as a result of construction should be given warning three days prior to the commencement of said blockage. • Information on any unforeseen circumstances or disasters must be made available to residents in a timeously manner.	Service provider / contractor	As necessary
Record Keeping	Non-conformance / compliance to best practice and authorisations. / Prosecution	• The Engineer and ECO / IEO will continuously monitor the Service provider / contractor's adherence to the approved impact prevention procedures and shall issue to the Service provider	ECO / IEO Engineer	Continuous, report monthly, or as necessary

CONSTRUCTION PHASE				
		/ contractor a notice of non-compliance whenever transgressions are observed. • The non-conformance and remedial action shall be documented and reported by the ECO / IEO on the incident log to the engineer in a monthly report. • Repeated non-compliance, after notice has been issued, and sufficient time has been allowed for remedial action, shall be reported to GDARD for review and a penalty issued.		
Emergency Situations		**Refer to Appendix A for Standard Operating Procedure for Emergency situations as per NEMA section 30 & NEMA section 30A**		

OPERATIONAL / MAINTENANCE PHASE				
ASPECT	**POSSIBLE IMPACTS**	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
Public relations	Community conflict	• Where service disruption is inevitable, the contractor must advise the Project Manager at least 7 days in advance, allowing enough time to inform affected parties.	Proponent	Continuously
Wetland/ watercourse	Water pollution, degradation of habitat.	• All wetland areas should be demarcated to ensure that maintenance activities do not alter the natural system. • No dumping of foreign material in streams, rivers and/or wetland areas is allowed. • A wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from DWS and the relevant DEA office. The necessary licenses must be obtained from DWS in terms Section 21 and 22 of the National Water Act, (Act 36 of 1998). • Any new erosion gullies must be remediated immediately. • The wetland should not be burnt for any particular reason without first consulting a specialist ecologist. • Dumping in the area should be controlled and policed. • Spill kits must be stored on site during maintenance activities. The kits should also be well marked and all	Proponent Service provider	As required

OPERATIONAL / MAINTENANCE PHASE				
		personnel should be educated to deal with the spill. Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat or while using a drip tray. • Ensure that no harm be done to protected species. • Plants removed from watercourse may not be left within watercourse and must be disposed as per green waste measures. • Bank side tree trunks and roots must be unharmed as they stabilise the banks and reduce erosion, preventing the channel from silting up. • Vehicle traffic across wetland areas must be avoided. • No heavy vehicles should be permitted in wetland habitat, unless absolutely necessary and existing access routes and disturbed areas should be utilised as far as possible to access intervention locations. Where no existing tracks are available, a single access track to each intervention location should be used. • Access tracks through wetland areas should ideally run parallel to the contour to limit the formation of preferential flow paths that could lead to erosion. Accessing intervention locations along tracks perpendicular to the contour should be avoided. • All disturbance footprints should be rehabilitated, including ploughing/ripping (in instances where the		

OPERATIONAL / MAINTENANCE PHASE				
		soils have become compacted), landscaping to the natural landscape profile, application of topsoil if necessary, and revegetation with appropriate, indigenous plant species. • Surface runoff along the access tracks should not lead to erosion. Where ruts have formed and remain following completion of construction activities, these should be plugged with regular shallow soil berms to prevent a preferential flow paths forming along the vehicle ruts. All vehicle ruts must be rehabilitated following completion of activity. • Agricultural plots to be limited to designated areas outside of wetland habitat only. • Implementation of soil management measures within communal subsidence agricultural plots, i.e.: contour berms to prevent sediment mobilisation into adjacent wetland habitat. • All alien vegetation clearing should be undertaken according to WfWetlands alien vegetation management protocols. • Only manual removal of alien vegetation should be permitted and should be limited to use of hand tool. • To ensure areas cleared of alien vegetation and areas that have been disturbed or revegetated remain free		

OPERATIONAL / MAINTENANCE PHASE				
		of alien and weed vegetation, ongoing management of alien vegetation should be implemented. • Only approved, low impact herbicides to be used for initial clearing of vegetation, along bricked walkways and during ongoing alien vegetation management within wetland. the use of broad-spectrum herbicides should be avoided, application should be limited to target individuals rather than being applied to a general area, and application should be avoided during periods of high rainfall when herbicides may be washed into downstream water resources. Working for Wetlands should be consulted for further information on the most appropriate products. • If at all possible, manual labour should be used. • Undertake construction or repair associated with instream rehabilitation structures towards the end of the dry season when flows are low – it may then not be necessary to divert flows, and temporary impoundment may be sufficient. • Apply best practice to the diversion/impoundment of flows and the rehabilitation of disturbed wetland areas. • Minimise construction period to limit opportunity for erosion and mobilisation of sediment.		

OPERATIONAL / MAINTENANCE PHASE				
Vegetation	Degradation of vegetation. Habitat loss. Infestation of invasive species.	• Minimal physical disturbance to the vegetation during the maintenance phase should be sought and be conveyed to the construction team. Natural vegetation must be conserved as far as possible. • Vehicle access must be limited to existing access roads and should not drive over vegetated areas unnecessary. • No open/uncontained fires or burning of the vegetation is allowed on site, especially in winter months as veld fires can ensue and cause catastrophic consequences by burning masses of dry grass. • Painting and marking of natural features is not allowed. • All vegetation cleared must be removed and disposed of appropriately, in consultation with the ECO. . • Increased run-off due to vegetation clearance must be managed appropriately to avoid further erosion and incision of the banks. • Transplanting of indigenous plants must be encouraged at all times. Trees and shrubs must be planted so that their stems or trunks are at the same depth as in the original location. • Transplanted plants must be maintained and watered regularly to ensure the reestablishment.	Proponent Service provider	As required

OPERATIONAL / MAINTENANCE PHASE				
		• Refer to Standard Operating Procedure for removal of vegetation in Appendix B. • Wherever possible, as part of either revegetation activities or for use as grass cover on the sports fields, indigenous grass species with low watering requirements, should be used.		
Mowing and edging of grass	Soil pollution; destruction of habitat. Air pollution due to dust generated.	• Reduce mowing near buffer zones between water and land if possible. • Remove all litter and debris before mowing and edging. Dispose of litter / debris in plastic bags and dispose of at a registered waste disposal facility. • Ensure mowers and edges project grass clippings away from waterways, drains and gutters. • Remove clippings from paved areas such as footpaths, driveways, roads and gutters. • Where possible send collected grass clippings to a composting facility. Use mowers which mulch clippings into smaller particles to help break them down, where possible. • Avoid mowing if the ground is very wet, as this can lead to erosion. • No washing of plant and equipment is allowed where waste water will flow into water resources. • Refuel on a impervious surface or over a drip tray and address spills as per hazardous material management.	Proponent Service provider	As required

OPERATIONAL / MAINTENANCE PHASE				
Herbicides and Pesticides	Ground & water pollution due to spillages. Destruction of habitat and possible killing of animals. Personal injury due to incorrect usage.	• Use, storage and transportation of herbicides and pesticides must comply with Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947), as amended. • All contractors appointed to apply pesticides and herbicides shall be registered in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947), as amended. • Herbicides application shall be done by suitably trained personnel in, or under the direction of a qualified pest control operator, registered under the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No 36 of 1947). • Purchasing of pesticides, herbicides and other agricultural remedies, shall be done by suitably qualified persons. • Products will be used in accordance with labelled instructions and personnel will wear correct PPE as indicated. • Prevention must be taken to limit spills and exposure of the public, animals, foodstuffs, waterbodies and adjacent land to the products. • A register and material safety data sheets of all herbicides and pesticides used, and in stock, shall be kept and maintained on site.	Proponent Service provider	As required

OPERATIONAL / MAINTENANCE PHASE				
		• The material safety data sheets shall be easily available at strategic points (example: first aid points or stores) • All containers must have adequate labelling. No labels may be removed from containers. • Pesticides and herbicides shall be transported in containers which are clearly labelled, leak-proof and not easily damaged. They shall not be transported beside or above any type of food. • All spills shall be managed and re-habilitated in accordance with the chemical label and the associated instructions, and all spillages shall be reported and recorded on the incident report immediately. • Storage of herbicides & pesticides: • Products will be stored in a building / container with in impermeable liner. • Storage area will be secured to prevent unauthorised access. • The storeroom shall be well ventilated. Natural ventilation shall be provided. All vents shall be designed or protected, to prevent entry by any animal life. • Storekeepers shall ensure that stocks are regularly inspected for leaks and damage on containers. All damaged or empty containers shall be removed		

OPERATIONAL / MAINTENANCE PHASE				
		immediately and disposed of in accordance with the label requirements. • Flammable substances shall be clearly marked & firefighting equipment will be available at storage area.		
Mammals	Injury / death to mammals.	• No species of animal may be poached, snared, hunted, captured or wilfully injured or destroyed. • Any incidents of poaching, wilfull disturbance or injury to wild animals, as well as accidental injury to or death of wild animals must be recorded and reported to the Engineer / project manager. • Nesting sites of birds must not be disturbed. • All animals injured on account of construction activities must be taken to the local SPCA. Dead animals must be disposed at a permitted landfill site.	Service provider / contractor / ECO / A-ECO	As required.
Herpetofauna	Injury / death to herpetofauna.	• If the Giant Bullfrog or any vulnerable or endangered herpetological species are encountered or exposed during the maintenance phase, they should be removed and relocated to natural areas in the vicinity. The ECO should be consulted if this remedial action requires the employment of a herpetologist to oversee the removal of any herpetofauna during the initial ground clearing phase of he maintenance activity.	Service provider / contractor / ECO	As required.

OPERATIONAL / MAINTENANCE PHASE				
		• If any snakes are found on the, a suitable trained snake handler should relocate the snake, or alternatively, the following organisations can be contacted: • SPCA • A Zoo • EWT • No herpetofauna species should, unnecessarily, be disturbed, trapped, hunted or killed during the maintenance phase.		
Heritage resources	Damage caused to historical artefacts, bones. Contamination of historic find.	• The cultural/historic features of the area should be retained in their current form and/or rehabilitated to ensure their preservation. Efforts to better integrate development with the occurrence of these features should be encouraged. • Please refer to National Heritage Resource Act and CoE Heritage Policy (once available). **Refer to Appendix E for Standard Operating Procedure for Management of Heritage Resource**	Service provider / contractor / proponent	As required.
Waste (Solid waste and litter control)	Ground, soil & water pollution. Injury to Mammal.	• Large rubbish bins are to be placed at strategic points at approximately 100m apart in the maintenance area.	Service provider / contractor / proponent	As required.

OPERATIONAL / MAINTENANCE PHASE				
	Rodent infestation.	• Waste must be separated, stored and disposed of as green waste, hazardous, building rubble and general waste. • Building rubble (waste) that can be re-used (example paving) must be delivered to non-profit organisations or as per the instruction of the ECO. • All steel waste (old pipes) must be recycled. • No burning of waste (with the exception of alien and invasive species which will occur at a registered facility). • If possible, material must be recycled and bins must be provided for recycling. Bins must clearly be marked e.g. glass, paper, tin, organic material and construction waste. • All waste spillage occurring whilst collection of waste must be cleaned up immediately and disposed of. <u>Illegal dumping:</u> • All illegal dumping must be collected and disposed of at relevant registered disposal facility • Persons responsible for illegal dumping must be held accountable • Area where illegal dumping has occurred must be rehabilitated to its original state		

OPERATIONAL / MAINTENANCE PHASE				

		Electronic waste:
		• Dedicated bins must be provided for electronic waste.
		• A service provider must be appointed to collect electronic waste on a monthly basis and dispose of it accordingly (recycle all possible materials).
		
		Green Waste:
		• Dedicated bins must be provided for green waste.
		• Green waste must be minimised by:
		  ○ Chipping all possible wood waste.
		  ○ Composting all vegetation removed and pruned to be used for landscaping, dust control or erosion prevention.
		
		Hazardous waste:
		• Dedicated bins must be provided for hazardous waste.
		• All personnel working with hazardous waste must wear appropriate PPE, the type of PPE might change depending on the type of hazardous material / waste that is dealt with.
		• Separate dedicated bins must be provided for the disposal of the following items:		

OPERATIONAL / MAINTENANCE PHASE				
		○ Florescent globes and batteries. ○ Asbestos, which must be disposed of by a registered service provider at a Mono-disposal site. • A service provider must be appointed to dispose of the hazardous waste. The service provider must be registered in terms of NEMWA and comply with all relevant Acts, regulations and SANS standards for hazardous waste. • A service provider must comply with Regulation 20 of the Asbestos Regulations, 2001 when disposing or handling of asbestos. <u>Removal of animal carcasses:</u> • Please contact CoE Department of Waste Management at 086 054 3000 for the removal of carcases. • All carcasses must be bagged and disposed of via incineration. <u>Storage and Disposal of old tyres:</u> • Service provider must comply with Waste Tyre Regulation No. 425 of 2008.		

OPERATIONAL / MAINTENANCE PHASE				
Spillages	Ground & water pollution/ contamination. Habitat destruction.	• Please refer to construction phase for mitigation relating to sewer and chemical spillages. **Refer to Appendix F for hazardous and sewer spill Standard Operating procedure**	Service provider / contractor / proponent	As required.
Dust	Air pollution, personal health.	• Exposed surfaces must be wetted or kept wet during windy periods to reduce dust. • Soil that is transported must be suitably covered to prevent dust escape. • Veld fires and the burning of fossil fuels for domestic purposes should be controlled and minimised. • Vehicle to be used during the maintenance phase are to be kept in good working condition and should not to be the source of excessive fumes • All conditions in the CoE Air Quality Management Plan and CoE Air quality by-laws must be complied with.	Service provider / contractor / proponent	As required.

CLOSURE & REHABILITATION				
ASPECT	**POSSIBLE IMPACTS**	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
General	Degradation of environment and non-compliance	• The rehabilitation of construction sites must be done in parallel to the construction works and not only commence after all construction activities are completed. • All Rehabilitation Plans as per a project's Environmental Authorization, approved EMPr and / or specialist studies must be implemented. • A photographic record must be kept of the rehabilitation process. The site should be photographed before rehabilitation commence, during the rehabilitation process as well as afterwards. • EoE / the contractor responsible for rehabilitation must include a six (6) to twelve (12) month maintenance period as part of the contract. • Water sourced for irrigation during the maintenance / rehabilitation period cannot be from any natural features (wetland / watercourse) unless authorized by a water use license. • Limit irrigation volumes required on sports fields by timing irrigation during cooler hours/overnight.	Service provider / contractor / proponent	As required.

		• All refuse bins installed should be regularly emptied and waste removed to appropriate refuse disposal sites. • Ensure the maintenance of the wetland rehabilitation interventions. • Ensure adequate alien invasive vegetation control.		
Site establishment	Degradation of the environment	• On completion of construction the site should be left clean and free from all debris, hydrocarbons and waste, and all excavations filled appropriately and as soon as possible.	Service provider / contractor / proponent	As required.
Wetland / water resource	Degradation of aquatic systems, pollution of water, loss of ecosystems / habits	• When rehabilitation of a wetland / watercourse needs to be done, it is recommended that an aquatic specialist be appointed to assist with the rehabilitation and to provide input on what mechanism can be used. • Bioremediation of wetland / watercourses must be done according to the recommendations made by an aquatic specialist. • A wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from DWS and the relevant Environmental Department (GDARD / DEA). The necessary licenses must be obtained from DWS in terms of Section 21 and 22 of the National Water Act, (Act 36 of 1998).	Service provider / contractor / proponent	As required.

		• Monitoring of the wetland / watercourse according to DWS standards / water use license/ general authorisation. • Vehicle traffic across wetland areas must be avoided. • No dumping of foreign material in streams, rivers and/or wetland areas is allowed.		
Vegetation	Degradation of vegetation. Habitat loss. Infestation of invasive species.	• Minimal physical disturbance to the remaining / existing vegetation during the rehabilitation phase must be conveyed to the contractor. Natural vegetation must be conserved as far as possible. • Vehicle access must be limited to existing access roads and should not drive over remaining / existing vegetated areas unnecessary. • Should vegetation be cleared it must be removed and disposed appropriately, in consultation of the IEO/ECO. • Increased run-off due to vegetation clearance must be managed appropriately to avoid further erosion and incision of the banks. • Transplanting of indigenous plants must be encouraged at all times. Trees and shrubs must be planted so that their stems or trunks are at the same depth as in the original location. • Transplanted plants must be maintained and watered regularly to ensure the re-establishment.	Service provider / contractor / proponent	As required.

		• Only indigenous vegetation must be used during rehabilitation. • No kikuyu must be used, especially when rehabilitation takes place close to a wetland / watercourse. • During rehabilitation it is essential that alien and invasive species be removed as discussed as part of "Operational / Maintenance Phase". • Please refer to Standard Operating Procedure for removal of vegetation in Appendix A		
Soil	Erosion, infestation of weeds on soil, loss of soil.	• Should soil be sourced it must be sourced from a registered company to ensure that the soil is clean and free from alien and invasive species. . • If soil was stockpiled during construction or if soil was collected from another construction site, it is important that the soil is cleaned from any waste or alien and invasive plant species. • Compacted soils must be loosened by means of a plough, scarifier, pick, fork or rake. • Scarifying areas where topsoil were removed shall be carried out prior to the replacement of topsoil. • Any ripping operation shall not exceed a depth of 100 mm. • It might be required that the soil be mixed with fertilizer / compost before used as topsoil.	Service provider / contractor / proponent	As required.

		• Soil stockpiling must be done as per the requirements listed as part of "Construction Phase". • Refer to Standard Operating Procedure for removal of vegetation in Appendix B		
Exposed surfaces / soil (air quality)	Air pollution, personal health.	• Exposed surfaces must be watered down or kept wet during windy periods to reduce dust. • Soil that is transported must be suitably covered to prevent dust escape. • All conditions in the CoE Air Quality Management Plan and CoE Air quality by-laws must be complied with.	Service provider / contractor / proponent	As required.
Fertilizer/ compost	Ground & water pollution due to spillages. Destruction of habitat	• Should fertilizer / compost be required it must be sourced from a registered company to ensure that the fertilizer / compost used is clean. • Fertilizer / compost must be mixed in the correct quantities and applied appropriately in order to avoid pollution of the soils and / or wetland / watercourse.	Service provider / contractor / proponent	As required.
Topography	Sense of place Erosion.	• During rehabilitation the natural contours of the landscape must be restored. • If there are slopes that are steeper than 5%, special protection methods must be used to stop / prevent soil erosion during the vulnerable period before vegetation re-establishment occurs.	Service provider / contractor / proponent	As required.
Roads / Fences	Community safety, personal injury.	• All temporary works along the construction roads and onsite must be removed and fences and private roads disturbed by construction must be restored to their original condition.	Service provider / contractor / safety officer/ proponent	As required.

6. UNDERTAKING OF COMPLIANCE

I / we _____ hereby, in terms of National Environmental Management Act (Act 107 of 1998), undertake to comply with every item as listed in the plan as set out above, and accepts full responsibility thereof.

Signature: _____

Name: _____

Date: _____

Witness: _____

City of Ekurhuleni _____

7. CONTACT INFORMATION

Contact information in case of sewage spill:

CoE Water and Sanitation Department

CoE Environmental information:

Environmental Resource Management Department:

Legislative Compliance Division

011 999 3316

Contact information of DEA Green Scorpions:

Gauteng Green Scorpions Hotline 011 240 3510

Green.Scorpions@gauteng.gov.za

Contact Information of DWS Blue Scorpions:

Department of Water and Sanitation: Compliance Monitoring

012 336 6914

APPENDIX A: STANDARD OPERATING PROCEDURES FOR AN EMERGENCY REQUEST

STANDARD OPERATING PROCEDURE WHEN THERE IS AN ENVIRONMENTAL INCIDENT

Purpose: Section 30 of NEMA relates to the control of environmental incidents.

An "incident" means an unexpected, sudden and uncontrollable release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property."

Process to follow if an incident occurred:

- The responsible person / employer / company must report the incident to the relevant authority in the most effective way available;
- Reporting of the incident must include but may not be limited to the following
    - Nature of the incident;
    - Risk posed to public health, safety and property;
    - Toxicity of substances or by-products released by the incident;
    - Any steps that need to be taken in order to avoid or minimise the effect of the incident on public health and the environment to –
        - Director General
        - South African Police Services (SAPS) and the relevant fire department
        - Provincial head of department or municipality
        - All persons whose health may be affected by the incident
- The responsible person / employer / company must as soon as reasonably practical after knowledge of the incident
    - Take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons
    - Undertake clean-up procedures
    - Remedy the effects of the incident
    - Access the immediate and long-term effects of the incident on the environment and public health

- The responsible person / employer / company must within 14 days of the incident report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:
    - Nature of the incident;
    - Substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
    - Initial measures taken to minimise the impact;
    - Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
    - Measures taken and to be taken to avoid a recurrence of such incident
- A relevant authority may direct the responsible person / employer / company to undertake specific measures within a specific time to fulfil his or her obligations as discussed above
- A verbal directive must be confirmed in writing as soon as possible (within 7 days)

<u>Process to follow if an incident occurred but the responsible person is unknown:</u>

- Should the responsible person / employer or company fail to comply with a directive issued as per the conditions above, or if there is uncertainty as to who the person responsible is, or if there is an immediate risk of serious danger to the public or potentially serious detriment to the environment;

  A relevant authority (including the municipality) may take the measures it considers necessary to –
    - Contain and minimise the effects of the incident;
    - Undertake clean-up procedures;
    - Remedy the effects of the incident
- A relevant authority may claim reimbursement for actions taken as described above;
- A relevant authority which has taken steps as described above must, as soon as reasonably practicable, prepare comprehensive reports on the incident, which reports must be made available through the most effective means reasonably available to—
    - The public;
    - The Director General;
    - The South African Police Services (SAPS) and the relevant fire prevention service;
    - Relevant provincial head of department or municipality;
    - All persons who may be affected by the incident

The Department of Environmental Affairs (DEA) provided a template that can be used when reporting an Environmental Incident. The template is available on the website; it is the responsibility of the applicant to ensure that the latest version of the form is used. The website should therefore be checked to ensure that the latest version of the template was downloaded.

The template can be accessed as follow:

https://www.environment.gov.za/documents/forms#legal_authorisations

The template below is only an example.

NB! Please ensure that all the information provided in brackets are removed before submitting this report to the all the Authorities.

environmental affairs Department: Environmental Affairs REPUBLIC OF SOUTH AFRICA ENVIRONMENTAL MANAGEMENT INSPECTORATE	Document Type:	Emergency Incident Report
	Title for the incident:	
	Date of the incident :	

Reference:		Initial Submission Date:	
Revision No.:		Compiled by:	

This form provides a template for the emergency incident report required in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998) (hereinafter "NEMA") in which the responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.

In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an incident has had, could have had, is having, or will have a negative impact on human health or well-being.

1. RESPONSIBLE PERSON

In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident

1.1 Name:		1.2 Designation:	
1.3 Postal Address:		1.4 Physical Address:	
1.5 Telephone (B/H):		1.6 Telephone (A/H):	
1.7 Fax:			
1.8 E-mail:			
1.9 Nature of Business:			

Emergency incident report as required in terms of section 30(5) of NEMA, as amended

2. EMERGENCY INCIDENT SUMMARY INFORMATION

Mark the appropriate boxes

2.1 Fire:		2.2 Spill:		2.3 Explosion:		2.4 Gaseous Emission:	
2.5 Injuries		2.6 Reportable injuries:		2.7 Hospitalisation:		2.8 Fatalities:	
2.9 Open water impacts:		2.10 Ground water impacts:		2.11 Atmospheric impacts:		2.12 Soil impacts:	
2.13 Own emergency response involved		2.14 Fire prevention services involved		2.15 Government hazardous materials emergency response involved		2.16 More than 1 governmental emergency response service involved	
2.17 Emission of non-toxic substances at low concentrations		2.18 Emission of non-toxic substances at high concentrations		2.19 Emission of toxic substances at low concentrations		2.20 Emission of toxic substances at high concentrations	
2.21 No evacuation required		2.22 Immediate area evacuated		2.23 Immediate surrounds evacuated		2.24 Evacuation of the general public	
2.25 Others							

3. INITIAL EMERGENCY INCIDENT REPORT

In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or by-products released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.

3.1 Description	3.2 Date:	3.3 Time:	3.4 Medium:	3.5. Name and contact details:
Relevant fire prevention service: (in case of fire)	[submission date]	[submission time]	[Fax, phone, SMS, letter, etc.)	[Who was the report made to?]
LOCAL :				
PROVINCIAL: (Those deal with Environmental issues)				
DIRECTOR GENERAL: (Department of Environmental Affairs)				
Any other Director General of National Department, E.g. Department of Water Affairs				

4. INCIDENT DETAILS

In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure

4.1 Location of the incident	[Provide physical address of the location where the incident happened including the GPS co-ordinates]		
4.2 Incident start date and time:		4.3 Incident duration:	
4.4 Duration of exposure:			

4.5. Incident description:

Background of the incident:

Operation:

Incident type:

Root Cause of the incident:

Contributory Factors to the incident:

Conclusion:

4.6. Wind speed and direction		4.7. Ambient air temperature	
4.8. Weather conditions		4.9. Other relevant meteorological conditions	

5. POLLUTANTS RELEASED DURING INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.

List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)

5.1. Substance or mixture of substances	5.2. Reference Number	5.3. Phase eg solid, liquid or gas	5.4. Total Quantity emitted/released	5.5. Units eg Kg, L etc	5.6. Nature of emission/release
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[Emitted from truck, underground pipe, stack, etc.]

6. SECONDARY POLLUTANTS RESULTING FROM INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.

List all the pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.

6.1. Substance or mixture of substances	6.2. Reference Number	6.3. Phase	6.4. Total Quantity emitted/released	6.5. Unit	6.6. Nature of emission
[The name recognised by any national or internationally recognised chemical referencing system]	Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[Emitted from truck, underground pipe, stack, etc.]

7. POLLUTANT CONCENTRATIONS

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.

List all the pollutants detailed in previous section:

7.1. Substance or mixture of substances	7.2. Reference Number	7.3. Estimated pollutant concentration on different radius			
		7.3.1. 10m	7.3.2. 100m	7.3.3. 500m	7.3.4. >2000m
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[estimate the concentration of the pollutant in water, soil and/or air within a 10m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a 100m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]	[estimate the concentration of the pollutant in water, soil and/or air within a 500m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]	[estimate the concentration of the pollutant in water, soil and/or air within a > 2000 m radius of the epicentre of the incident] [provide the units used in a case of estimating concentration (e.g. ppm)]

[1] Concentration at the plume

[2] Concentration that was falling on the ground

8. INCIDENT IMPACT

In terms of NEMA section 30(5)(b), the responsible person must report on possible acute effects on persons and the environment and the responsible must provide data needed to assess these effects;

8.1. Minor injuries	[Describe the number and types of any minor injuries that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.2. Reportable injuries	[Describe the number and types of any injuries requiring statutory reporting that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.3. Hospitalisation	[Describe the number and types of any injuries that required professional medical care that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.4. Fatalities	[Describe the number and cause of any fatalities that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.5. Biological impacts	[Describe any impacts on biological life, other than human life, e.g. fish kills, plant mortality, etc.]
8.6. Impact area	[Describe the area possibly affected by the incident or the impacts thereof including: (i) size of the area; (ii) socio-economic context; (iii) population density; (iv) sensitive environments (if any), etc.]
8.7. Data	Attach relevant impact reports, medical reports, death certificates, post mortem reports, environmental monitoring data, etc. as Annexes C1, C2,... to this report

9. EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS

9.1. Foresight	[Briefly describe whether the incident could have, or had, been foreseen, e.g. was it included in any environmental impact assessment, risk assessment, health and safety plan, etc.]
9.2. Procedures and/or systems	Attach any relevant safety, health and environmental plans (including any statutory planning requirements) that detail what actions should be taken in the event of the incident that is the subject of this report
9.3. Procedure and/or systems failures	[Describe any failures or shortfalls in procedures and/or systems that may have contributed to the incident] ***All procedures and checklist in place and signed off.***
9.4. Technical measures	[Describe any technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident] Communications & discussions in place.
9.5. Technical failure	[Describe any failures of technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident]

10. INITIAL INCIDENT MANAGEMENT

In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.

10.1. Evacuation	[Describe any evacuation activities including information on the number of people evacuated and whether these people were staff or otherwise]
10.2. Technical measures	[Describe all technical measures taken to address the incident]
10.3. Mitigation measures	[Describe all measures taken to minimize the impact] ***SOPEP gear activated***
10.4. Emergency Services	[Describe any governmental emergency services involvement] ***SAMSA/TNPA advised***

11. CLEANUP AND/OR DECONTAMINATION

In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.

11.1. Cleanup and/or decontamination	*[Report on initial cleanup and or decontamination (remediation) measures taken to minimise the impact of the incident on human health and the environment. Provide copy of safe disposal certificate (if any)and details of the company that undertook the cleanup]*

11.2. Permissions and Instructions

Provide details of any permission and/or instructions received from any organ of state during initial incident management, cleanup and/or decontamination

11.3. Type	11.4. Statute	11.5. Issued By	11.6. Name and contact details
[Describe the nature or type of permission or instruction]	[Provide a reference to the legal mandate for the permission or instruction]	[Provide contact details for the permitting or instructing authority]	[provide a summary of the activities carried out in terms of the permission or instruction]

12. MITIGATION MEASURES

In terms of NEMA section 30(5)(e), the responsible person must report on measures taken and to be taken to avoid a recurrence of such an incident.

12.1. Measure	12.2. Objective	12.3. Cost	12.4. Timing
[Briefly describe each of the measures taken, and to be taken, to avoid a recurrence of such incident]	[Briefly describe the objective of the measure, i.e. the desired outcome of the measure]	[Estimate the cost of the measure in terms of capital costs and/or recurrent costs]	[Provide information on the timing for the full implementation of the measure]

13. AUTHORISATIONS

Provide details on all authorisations (including permits, licenses, certificates, etc.) in respect of the activity to which this incident relates.

13.1. Type	13.2. Statute	13.3. Issued By	13.4. Issue & Expiry Date
[Describe the nature or type of authorisation, e.g. Registration Certificate]	[Provide the reference for the authorisation, e.g. section X of the National Environmental Management Act (Act No. 107 of 1989)]	[Provide contact details for the issuing authority]	[provide the date of issue and expiry]

14. HISTORY

Provide details of all similar incidents involving the responsible person in the past (i.e. from 1998). Similar incidents include those that: (i) involved similar circumstances; (ii) involved similar emissions; (iii) involved similar personnel; and/or (iv) involved similar impacts.

14.1. Incident title	14.2. Report reference	14.3. Date of incident	14.4. Summary of event
[Provide the title used in the relevant emergency incident report]	[Provide the reference in respect of the relevant emergency incident report]	[Date of incident]	[Provide a summary of the event]

Signed by, or as a mandated signatory for, the responsible person:		Date:	

APPENDIX 1
List of affected people as results of the incident

NAME	ADDRESS	PHONE	FAULT	REMARKS

APPENDIX 2
Layout map of the area likely to be affected or affected as a result of the incident

Disclaimer

Any other information not covered in the reporting template must be included.

CAUTION

In terms of section 30 (11) of NEMA as amended, it is an offence not to report an incident and liable on conviction to a fine not exceeding R 1 million or imprisonment for a period not exceeding 1 year, or to both such a fine and such imprisonment.

STANDARD OPERATING PROCEDURE WHEN ORAL REQUESTS ARE MADE AS PER SECTION 30A OF NEMA

Section 30A of the National Environmental Management Act (Act 107 of 1998) refers to emergency situations and how to deal with such a situation without obtaining an environmental authorisation. This process can either be done by submitting a written request to the competent Authority or by submitting an oral request. Regulations (Government Notice R.310) were issued on 10 April 2015 that specifically addresses the procedure of an oral request. Although it specifically refers to the oral request it will be the same procedure for when submitting the written request.

An emergency situation is defined as: *"a situation that has arisen suddenly that poses an imminent and serious threat to the environment, human life or property, including a 'disaster' as defined in section 1 of the Disaster Management Act, 2002 (Act No. 57 of 2002), but does not include an incident referred to in section 30 of NEMA."*

National Environmental management Act (Act 107 of 1998): Regulations relating to the procedure to be followed when oral requests are made in terms of Section 30A (Government Notice 310 of 10 April 2015)

Purpose: Procedure for the submission and processing of oral requests for verbal directives

When to submit an Oral Request: The application may be lodged by any person who reasonably foresees that:

- He / she may commence with a listed activity identified in terms Regulations promulgated under Section 24(2)[1] of NEMA without and environmental authorisation; and
- Commencement of such activities would be directly in response to a situation that has arisen suddenly and which poses an imminent and serious threat to the environment, human life or property; or
- Commencement with such activities would be directly in response to a disaster as defined in Section 1 of the Disaster Management Act, 2002 (Act 57 of 2001)[2]

[1] Section 24 (2) of NEMA refers to the listed activities as per the Regulations and therefore includes the following: Listing Notice 1 (GN R.983), Listing Notice 2 (GN R.984) and Listing Notice 3 (GN R.985)
[2] Section 1 defines a disaster as follow:

This does not apply to a person who has commenced with an activity in terms of Regulations promulgated in terms of Section 24(2) of NEMA without and Environmental Authorisation and does not apply to an "incident" as discussed under Section 30 of NEMA.

Circumstances in which an oral request may be made include:

- If the immediate commencement of the activity is necessary to prevent or contain an emergency situation; or prevent, contain or mitigate the effects of an emergency situation; and
- The delay in submitting a written request would defeat the object of the directive.

Process for submitting an oral request:

- Inform COE: Environmental Resources Management or Environmental Legislative Compliance;
- Ensure that all information, as discussed below, is available;
- Submit the oral request to the Gauteng Department of Agriculture and Rural Development

The following persons can be contacted in the case that an oral request is submitted:

Gauteng Department of Agriculture and Rural Development (GDARD)

Postal Address:	PO Box 8769, Johannesburg, 2000
Street Address:	11 Diagonal Street, Newtown, Johannesburg, 2000
Telephone Number:	011 240 2600 (switch board)

Information required when an oral request is submitted:

- Nature, scope and possible impacts of the emergency situation;
- Activities that will be commenced with in response to the emergency situation;
- Cause of the emergency situation; and
- Proposed measures to prevent or to contain the emergency situation; or to prevent, contain or mitigate the effects of the emergency situation;

a progressive or sudden, widespread or localised. natural or human-caused occurrence which-
a) causes or threatens to cause –
i) death, or disease;
ii) damage to property, infrastructure or the environment; or
iii) disruption of the life of a community; and cope with its effects using only their own resources;
b) is of a magnitude that exceeds the ability of those affected by the disaster to

- The competent Authority may also request additional information.

Issuing of the verbal directive:

- The competent Authority may decline the oral request and request that a written request be submitted; or
- Accept the oral request;
- Should the oral request be accepted the person who submitted the request must confirm the oral request in writing within 24 hours of the oral request;
- This written confirmation can be hand delivered, emailed or faxed;
- The competent Authority must issue a verbal directive within 6 hours of receiving all the information;
- This verbal directive must be issued as a written directive within 7 days of the verbal directive;
- A site inspection will be held within 48 hours of issuing the verbal directive.

The competent Authority can amend, suspend or revoke the verbal directive and must issue a written notice in order to do that.

Penalties will be issued to a person who provided incorrect or misleading information, orally or in writing, to the competent Authority.

The list of Information Required is given below, note that this list is provided as per Government Notice No. R. 310, Government Gazette No. 38684, 10 April 2015.

WRITTEN RECORDING OF INFORMATION REQUIRED IN TERMS OF REGULATIONS 5 AND 6

1.	Name and identity number of person making the oral request ("the requester")
2.	Is the requester placing the request in his or her personal capacity or on behalf of a state body/parastatal/corporate entity?
3.	Name of state body/parastatal/corporate entity on whose behalf the request is made; registration number where appropriate and registered street address
4.	If the request is made on behalf of a state body/parastatal/corporate entity, in what capacity is the requester employed by that body?
5.	Location of the emergency situation [Street address and/or GPS coordinates]
6.	The nature of the emergency situation as stated by the requester, including the progression of the emergency (whether or not it has commenced/is imminent/has caused damage at the time of the oral request)

7.	The cause of the emergency situation; including confirmation of whether or not it was caused by the fault of the applicant
8.	The risk of the impact on the environment as a result of the emergency; including an impact which may already have occurred
9.	The risk of the impact on human health and well-being as a result of the emergency; including any impact which may already have occurred
10.	The proposed measures to be taken, including proposed timeframes for actions and whether they will provide a temporary or permanent solution to the situation
11.	What aspect of the emergency each measure will seek to address and how?
12.	The listed or specified activities that will be triggered by the proposed measures

13.	The estimated costs of the measures proposed
14.	Any reasonable alternative measures; including an estimate of the costs thereof
15.	The risk of the impact on the environment of the prevention, control or mitigation measures proposed
16.	Any post-event mitigation or rehabilitation measures that may be required

APPENDIX B: STANDARD OPERATING PROCEDURES FOR VEGETATION REMOVAL

STANDARD OPERATING PROCEDURE FOR VEGETATION REMOVAL

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and requirements applicable to the conduct of vegetation removal during any phase of an activity.

This SOP applies to all site personnel, including contractor and subcontractor personnel. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable national, provincial and local government regulations.

Please note that there is a procedure for the removal of natural vegetation and alien and invasive species

Removal of vegetation procedure

- Notify COE Environment Resource Management of planned vegetation removal
- Only vegetation directly affected by activities and indicated in writing by engineer may be removed or felled.
- Vegetation cleared for an activity must be phased to ensure exposed soil is limited
- The organic waste (vegetation) is to be stockpiled separately to the topsoil and spoil stockpiles as well as concrete and other building rubble / materials
- All vegetation cleared must be removed and disposed off at a registered landfill site.
- Indigenous trees removed can be processed through a wood chipper and reused
- Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented.

Removal of Alien and Invasive species:

- All alien and invasive plant species must be removed as per NEMBA Alien and Invasive Regulation, 2014. An Invasive species consultant must be appointed to identify and oversee removal of alien and invasive species.

Removal of seedlings:

Pull seedlings out as soon as possible, preferably when soil is moist.

Removal of Shrubs and small trees:

Physical removal

Use a 'Tree Popper' to remove shrubs and smaller trees. Alternatively, cut off the top growth and then remove the stem and roots from the soil. It is vital that the root ball and any taproots are totally removed to prevent re-growth.

Chemical removal

Herbicides can be sprayed on plants less than 2m in height for quick results. Spray when there is no wind. All plants that are subjected to the spray will be destroyed – seek for professional advice on which herbicides to use.

Removal of large trees;

Physical removal

If the tree is too large for physical removal, consider ring-barking the tree. This technique involves removing a ring of bark at least 25cm wide. Peel the bark down to just below ground level, pulling outwards. Bark peeling is a particularly useful method for destroying invader acacias. Ring-barking interferes with the circulation of the tree and results in it slowly dying. If you wish to hasten the process, fell the tree to a stump that is 30cm above ground level. Then loosen the bark on the stump by hitting it with a hammer and peel the bark downwards to ground level. Any re-growth that appears must be cut off cleanly at once, to prevent nutrition from new growth reaching the roots.

Chemical removal

Cut-stump treatment: Fell the tree, leaving a stump as flat and as close to the ground as possible, and apply a recommended herbicide. Basal stem treatment: Paint a herbicide (mixed with diesel) onto the base of the tree trunk and any exposed roots. Paint the herbicide up to a height of 25cm above ground level. In the case of multi-stemmed trees, each individual stem should be painted. The herbicide will enter the tree's circulation and eventually kill the tree.
Foliar spraying: In the case of re-growth from stumps (otherwise known as coppicing), mix a herbicide with water and spray on the re-growth. Allow the re-growth to reach a height of 50cm before treatment. Ensure that a full cover spray is achieved. Trees with bud banks or lignotubers can be destroyed using use a herbicide after sawing off the trunk at ground level.

Disposal of alien and invasive species

All alien and invasive plant species removed must be disposed of at a registered facility that will incinerate the species.

- All sensitive environments must be demarcated prior to construction in the immediate vicinity. The demarcation must prevent vehicle access and should have notices indicating the sensitivity. Specialist can be consulted to assist with the demarcation of sensitive environments.
- Trees selected for preservation in the site-specific study within or adjacent to the works areas must be fenced around their drip line. The fence must be clearly marked with danger tape
- Minimal physical disturbance to the vegetation during construction phase is should be sought and be conveyed to the construction team. Natural vegetation must be conserved as far as possible.
- Vehicle access must be limited to existing access roads and should not drive over vegetated areas unnecessary.
- All areas affected by the construction works will need to be rehabilitated and re-vegetated. This includes the areas that have been disturbed, temporary access roads, construction camp sites, workers camp sites, etc.
- No fires or burning of the vegetation is allowed on site, especially in winter months as veld fires can ensue and cause catastrophic consequences by burning masses of dry grass.
- Painting and marking of natural features not allowed
- All vegetation cleared must be removed and disposed off at a registered landfill site.
- Increased run-off due to vegetation clearance must be managed appropriately to avoid further erosion and incision of the banks.
- Transplanting of indigenous plants must be encouraged at all times. Trees and shrubs must be planted so that their stems or trunks are at the same depth as in the original location.
- Transplanted plants must be maintained and watered regularly to ensure the reestablishment.

APPENDIX C: STANDARD OPERATING PROCEDURES FOR MANAGEMENT OF STOCKPILES

STANDARD OPERATING PROCEDURE FOR MANAGEMENT OF STOCKPILES

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and requirements applicable for the management of stockpiles during on-site activities

This SOP applies to all site personnel, including contractor and subcontractor personnel. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable national, provincial and local government regulations.

Topsoil:

- Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected.
- Prior to earthing operations all topsoil (top 300mm as a minimum must be stripped and stockpiled separately from subsoil and rocky material.) Soil must be stripped in a phased manner so as to retain vegetation cover for as long as possible.
- Stockpiled topsoil should not be compacted and should be replaced as the final soil layer.
- No vehicles may be allowed access onto the stockpiles.
- To prevent topsoil from being spread out or mixed with the other spoil during the construction, soil stockpiles must be demarcated
- Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.
- All topsoil stockpiles will be maintained and in a weed free condition at all times. Weeds appearing on the stockpile will be removed by hand and disposed of.

Subsoil:

- The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the engineer, and stored separately from the topsoil.
- This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

All stockpiles:

- Stockpiles should not occur in areas with indigenous trees and shrubs that may be damaged. Preferably previous disturbed areas must be utilized.
- No soil loss from disturbed areas should occur.
- Stockpiles may not exceed a height of 2 meters
- Removed soil and stockpiling of soil must occur outside the extent of the watercourse to prevent siltation and increased runoff during construction. This includes the buffer zones and 1:100 year flood lines
- Stockpiled soil must be protected by erosion- control berms if exposed for a period of greater than 14 days during the wet season.
- Soil must not be stockpiled on drainage lines or near watercourses
- Soil must be exposed for the minimum time possible once stockpiled. The timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion.
- All short-term stockpiles will be treated with water or stabilizers to prevent erosion.
- Stockpiled soil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds should it be exposed for an extensive period.
- Photographic record must be kept of areas identified for stockpiling prior to the stockpiling occurring.
- All stockpiles must be utilized during activity and area disturbed by stockpiling must be resorted to original condition (Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained)

No foreign material generated / deposited shall remain in areas affected by stockpiling.

APPENDIX D: STANDARD OPERATING PROCEDURES FOR STORAGE, TRANSPORT AND DISPENSING OF FUEL

STANDARD OPERATING PROCEDURE FOR STORAGE, TRANSPORT AND DISPENSING OF FUEL

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and requirements applicable for the management of storage, transport and dispensing of fuel activities

This SOP is intended to serve as best practice guide, however it does not contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable national, provincial and local government regulations.

General:

- Familiarise yourself with the type of hazardous material by referring to the Material Safety Data Sheet (MSDS) for information.
- The MSDS must be requested from the product supplier and must include the following (Hazardous Chemical Substances Regulation 1179 of 1995):
    - Product and Company Identification
    - Composition/Information on ingredients
    - Hazards Identification
    - First-Aid Measures
    - Fire-fighting measures
    - Handling and storage
    - Exposure control/personal protection
    - Physical and chemical properties
    - Stability and reactivity
    - Toxicological information
    - Ecological information
    - Disposal considerations
    - Transport information
    - Regulatory information
    - Any other applicable information
- Provided that there is no MSDS available sufficient information to enable the user to take the necessary measures as regards to the protection of health and safety must be provided.
- Ensure that hazardous material is clearly marked as per SANS 10228 (SABS 0228) and SANS 10229-1 (SABS 0229).

- Ensure that there is a spill kit available at all times, whether transporting the material or using it on site.
- A container for hazardous material and or hazardous waste must be available on site at all times.
- Spill kits must be available on site.
- Staff should be trained to use the hazardous material and on cleaning of spills.

Storage:

- Storage of potentially hazardous materials should be agreed with the Engineer / ECO / IEO. These materials include fuel, oil, cement, bitumen etc.
- A walled concrete-plat formed, dedicated store with adequate flooring or lined bermed area should be used to accommodate chemicals such as fuel, oil, paint, tar, bitumen, as appropriate, to guard against infiltration of said chemicals into the soil.
- If fuel is to be stored *in situ*, it should be stored and maintained in a steel tank, supplied by the fuel suppliers. The fuel tanks shall be contained within a berm, constructed of bricks and mortar, concrete of Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils.
- All construction vehicles must be checked regularly for oil leaks.
- Cement mixing must take place on an impervious surface and it is suggested that both plastic and boards be used for this
- The workers should also be made to carry out weekly cleaning of the site and daily inspection should be done to ensure no leakage or spillage has occurred on the site.
- other appropriate material. The volume of the bermed area shall be of sufficient capacity to contain the full volume of the fuel tanks.
- Sufficient care must be taken when handling these materials to prevent pollution.

Transport:

- Ensure that there is a spill kit available at all times, whether transporting the fuel or using it on site.
- Ensure that there is a drip tray available should the fuel be transferred from one container to another.
- Ensure that there are enough fire extinguishers on the vehicle and on site.

- Container in which fuel is transported must be clearly marked according to the South African National Standards
- Containers must not have any leaks
- The containers must be stored in a safe place where the public has no access.
- Record must be kept of the transport and usage of the fuel, this is done to ensure that fuel wasn't spilled or stolen along the route.
- Drivers transporting the fuel must have the correct qualifications, training and approvals / licenses.

**Refer and comply to relevant SANS procedure*

What to do when there is a spill during:

- Notify / inform your supervisor and colleagues of the spill.
- Close off / demarcate the spill to prevent access to the spill.
- Identify the source and size of the spill and stop the spill / leak if possible.
- Wear protective clothing / equipment when attempting to clean a spill.
- Remove any source of ignition and don't allow any smoking close to the spill.
- Assess what type of material was spilled and review the MSDS for specific measurements regarding the hazardous substance.
- If a spill occurred close to a watercourse or storm water drain, the spill must be contained or prevented from entering the watercourse or drain by blocking it off. This can be done by either using absorbent or non-absorbent dikes around the perimeter of the spill.
- Spills should be cleaned using dry cleaning methods / dry absorbent material such as kitty litter, saw dust or products such as biozorb (specifically for oil), Petrozorb and Cellusorb Fibre. There are also other products available such as booms, pillows and socks. The type of material used will therefore depend on the type of spill and where the spill occurred.
- Remember to collect the material and residue in a container. The container must be sealed and deposited at a registered hazardous landfill site or alternatively collected by a registered waste removal company.
- Never hose down spills or leaks. Spills must not be washed into watercourse or storm water systems.
- Record spill in incident register:
    - Nature of incident
    - Cause of incident

- Contamination of soil / water (if any)
- Measures taken to control spill and treat contamination
- Mitigation measure identified to prevent re-occurrence

- Report the spill to COE or relevant Authority.
- Training is essential and COE employees will have to be trained on how to clean spills.
- The Service provider / contractor shall educate workers on the proper methods for cleaning workshop and fuel points to prevent fuel or oil being washed out of containment areas.

APPENDIX E: STANDARD OPERATING PROCEDURES FOR MANAGEMENT OF HERITAGE ARTEFACTS

STANDARD OPERATING PROCEDURE FOR MANAGEMENT OF HERITAGE ARTEFACTS

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and requirements applicable for the management of heritage artefacts

This SOP is intended to serve as best practice guide should historical artefact be found at a site prior or subsequently to commencement of construction or maintenance.

- All heritage resources to be identified prior to site establishment and the cultural / historic features of the area should be retained in their current form and / or rehabilitated to ensure for their preservation.
- All staff / labourers must be made aware of the possibility of the occurrence of heritage features. It could include ash deposits, bone concentrations, ceramic fragments and stone concentrations of any formal nature.
- COE is currently in the process of developing the Heritage Policy and while this has not yet been approved the National Heritage Resources Act, Act 25 of 1999, must be consulted; it includes a basic process as described below.
- Should any historical artefacts be found during construction the following measures must be implemented:
    - Construction in the immediate vicinity (50 meter radius) must cease
    - COE: SRAC must be notified prior to a suitable heritage practitioner being appointed.
    - A heritage practitioner must be contacted
    - In the event of obvious human remains the SAPS must be notified
    - Area in a 50meter radius should be cordoned off with hazardous tape
    - Public access must be limited to area
    - Area to be placed under guard
    - No media statement to be released prior to a Heritage practitioner has had sufficient time to analyse the finds.

APPENDIX F: STANDARD OPERATING PROCEDURES FOR THE SPILLAGE OF HAZARDOUS SUBSTANCES

STANDARD OPERATING PROCEDURE FOR THE SPILLAGE OF HAZARDOUS SUBSTANCES

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and requirements applicable for the Spillage of hazardous substances

This SOP is intended to serve as best practice guide, however it does not contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with project plans and applicable national, provincial and local government regulations.

What to do when there is a chemical / hazardous spill:

- Notify / inform your supervisor and colleagues of the spill.
- Close off / demarcate the spill to prevent access to the spill.
- Identify the source and size of the spill and stop the spill / leak if possible.
- Wear protective clothing / equipment when attempting to clean a spill.
- Remove any source of ignition and don't allow any smoking close to the spill.
- Assess what type of material was spilled and review the MSDS for specific measurements regarding the hazardous substance.
- If a spill occurred close to a watercourse or storm water drain, the spill must be contained or prevented from entering the watercourse or drain by blocking it off. This can be done by either using absorbent or non-absorbent dikes around the perimeter of the spill.
- Spills should be cleaned using dry cleaning methods / dry absorbent material such as kitty litter, saw dust or products such as biozorb (specifically for oil), Petrozorb and Cellusorb Fibre. There are also other products available such as booms, pillows and socks. The type of material used will therefore depend on the type of spill and where the spill occurred.
- Remember to collect the material and residue in a container. The container must be sealed and deposited at a registered hazardous landfill site or alternatively collected by a registered waste removal company.
- Never hose down spills or leaks. Spills must not be washed into watercourse or storm water systems.
- Record spill in incident register:
    - Nature of incident
    - Cause of incident
    - Contamination of soil / water (if any)

- Measures taken to control spill and treat contamination
- Mitigation measure identified to prevent re-occurrence

- Report the spill to COE or relevant Authority.
- Training is essential and COE employees will have to be trained on how to clean spills.
- The Service provider / contractor shall educate workers on the proper methods for cleaning workshop and fuel points to prevent fuel or oil being washed out of containment areas.

What to do when there is a sewer spill:

- Report sewage spill immediately to COE Department of Water and Sanitation as well as to COE Environmental
- Investigate source of spillage and block off to avoid further contamination
- Clean up crew (labourers) must wear correct PPE (at a minimum, rubber or latex gloves and rubber boots, dispose of gloves and wash rubber boots when leaving spill site)
- Contaminated area must be clearly indicated and cordoned off if possible. Signage must indicate that water may not be used for consumption.
- A vacuum / pump truck can be used to liquid and solid martial.
- Hydrated lime or Clorine – water solution (bleach) may be can be used to disinfect area if located on non-permeable surface.
- No disinfectant to be used on natural environment.
- No waste water is allowed to enter storm water systems

Should sewage spill flow into water recourse, water quality must be monitored on a monthly basis to ensure the effective remediation, until water quality is compliant with water quality regulations.

APPENDIX G: INVASIVE SPECIES MONITOR, CONTROL AND ERADICATION PLAN

Section 76 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) and its Regulations (Alien and Invasive Species Regulations, 2014) requires that all Protected Area Management Authorities and all other "Organs of State in all spheres of government", including all municipalities, draw up an "Invasive Species Monitoring, Control and Eradication Plan for land under their control," [Hereafter termed a Control Plan]. These plans have to cover all Listed Invasive Species in terms of Section 70(1) of this Act. These Control Plans must be completed by 30 September 2016.

Once the Invasive species Monitoring, Control and Eradication Plan is completed, it must be included in the EMPR under Appendix G.