GA Environment

BASIC ASSESSMENT AND WASTE MANAGEMENT LICENCE APPLICATION PROCESS FOR THE PROPOSED LICENSING OF THE GROBLERSHOOP LANDFILL, !KHEIS LOCAL MUNICIPALITY; NORTHERN CAPE PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

PROJECT REFERENCE NR: NC/ZFM/!KH/GRO/10/2016

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ENVIRONMENTAL MANAGEMENT PROGRAMME
as part of the

BASIC ASSESSMENT AND WASTE LICENCE APPLICATION PROCESS FOR THE PROPOSED LICENSING OF THE GROBLERSHOOP LANDFILL; !KHEIS LOCAL MUNICIPALITY, NORTHERN CAPE

Prepared for:

Department of Environmental Affairs
Environment House,
473 Steve Biko,
Arcadia,
Pretoria, 0083

Submitted to:

Northern Cape Department of Environment and Nature Conservation
Private Bag X6102
Kimberley
8300
Tel. No.: (053) 807 7300
Fax. No.: (053) 807 7328

Prepared by:

GA Environment (Pty) Ltd
P.O. Box 6723
Halfway House,
Midrand
1685
Tel. No.: (011) 312 2537
Fax. No.: 011 805 1950
e-mail: environment@gaenvironment.com

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PROJECT DETAILS

Title	**:**	Environmental Management Programme as part of the Basic Assessment and Waste Licence Application Process for the Proposed Licensing of Groblershoop Landfill, !Kheis Local Municipality, Northern Cape
Competent Authority:		Northern Cape Department of Environment and Nature Conservation
Competent Authority Reference No.:		NC/ZFM/!KH/GRO/10/2016
Authors	**:**	Ntsebo Mofoka, *BSc Hons (cum laude)*
Applicant	**:**	!Kheis Local Municipality
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ABBREVIATIONS

DEA..... Department of Environmental Affairs
DWS.....Department of Water and Sanitation
EA ..... Environmental Authorisation
EAP ..... Environmental Assessment Practitioner
ECA .....Environmental Conservation Act, 1989 (Act No. 73 of 1989)
ECO..... Environmental Control Officer
EIA ..... Environmental Impact Assessment
EMPr.....Environmental Management Programme
EO..... Environmental Officer
ESO ..... Environmental Site Officer
I&AP .....Interested and Affected Parties
DENC.....Northern Cape Department of Environment and Nature Conservation
NEMA..... ... National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA .....National Water Act, 1998 (Act No. 36 of 1998)
OHS Act .....Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
OHS ..... Occupational Health and Safety
SHEQ ..... Safety, Health, Environment & Quality
IEM.....Integrated Environmental Management
WML.....Waste management Licence

DEFINITIONS

Aspect - Element of an organisation's activities, products or services that can interact with the environment.

Auditing - A systematic, documented, periodic and objective evaluation of how well the Environmental Management Programme (EMPr) is being implemented and is performing with the aim of helping to safeguard the environment by facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems, while keeping track of their compliance with the Environmental Authorization.

Contamination - Polluting or making something impure. The presence of a minor and unwanted constituent, contaminant or impurity in a material or natural environment.

Corrective (or remedial) action - Response required in addressing an environmental problem that is in conflict with the requirements of the EMPr. The need for corrective action may be determined through monitoring, audits or management review.

Degradation - The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.

Developer– Entity which applies for environmental approval and is ultimately accountable for compliance to conditions stipulated in the EA and EMPr

Environment - The surroundings within which humans exist and that are made up of land, water and atmosphere of the earth, micro-organisms, plant and animal life: or any part or combination of the two and the interrelationships among them, the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact Assessment (EIA) - An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives; recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.

Environmental Management System (EMS) - Environmental Management Systems (EMS) provide guidance on how to manage the environmental impacts of activities, products and services. They detail the organisational structure, responsibilities, practices, procedures, processes and resources for environmental management. The ISO14001 EMS standard has been developed by the International Standards Organisation.

Environmental policy – A statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.

Habitat - A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. It is the natural environment in which an organism lives, or the physical environment that surrounds a species population.

Impact - A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time, space, magnitude and intensity.

Indigenous species - Flora and Fauna species that are naturally found in an area.

Infrastructure - The network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage, etc.

Mitigation - Measures designed to avoid, educe or remedy adverse impacts. Actions that limit, stop or reverse the magnitude and/or rate of long-term effect on the environment.

Natural environment - Encompasses all living and non-living things occurring naturally on Earth or some region thereof. It is an environment that encompasses the interaction of all living species. Climate, weather, and natural resources that affect human survival and economic activity.

Policy - A set of aims, guidelines and procedures to help you make decisions and manage an organisation or structure. Policies are based on people or an organisation's values and goals.

Process - Development usually happens through a process - a number of planned steps or stages.

Recycling - A process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material. Collecting, cleaning and re-using materials.

Rehabilitation**', as defined by the United States National Research Council (1974)**, implies that the disturbed land will be returned to state and productivity level in accordance with an approved land use plan, ensuring that the system a stable ecological state; that it does not contribute to further environmental deterioration and is consistent with the surrounding aesthetic values (Wali, 1992).

Resources - Parts of our natural environment that we use and protect, e.g. land, forests, water, wildlife, and minerals.

Stormwater management – Strategies implemented to control the surface flow of stormwater such that erosion, sedimentation and pollution of surface and ground water resources in the immediate and surrounding environments are mitigated. This is specifically important during the construction and Operation phases of a project.

Waste Management – Classifying, recycling, treatment and disposal of waste generated during construction and operational activities. Generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes.

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

GA Environment (Pty) Ltd are independent environmental managers and impact assessors, that have been appointed by National Department of Environmental Affairs, on behalf of the !Kheis Local Municipality, to compile and submit an Environmental Management Programme (EMPr) in order to comply with the National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA] for the Proposed Licensing of the Groblershoop Landfill.

The Groblershoop landfill was commissioned prior to the establishment of the Minimum Requirements for Waste Disposal by Landfill compiled by the Department of Water and Sanitation (DWS) under the old name of the Department of Water Affairs and Forestry (DWAF, 1998 2nd Edition) and the promulgation of the National Environmental Management Waste Act (NEMWA hereafter), 2008 (Act No. 59 of 2008). The !Kheis Local Municipality is now applying for an Operational license for the Groblershoop landfill. The Licensing of the Groblershoop landfill will ensure that the municipality adhere to the requirements of the NEMWA and that the waste at the Groblershoop landfill is handled and managed as per the Environmental requirements.

As part of the process, an Operational and a Closure Plan for the Licensing of the Groblershoop landfill has been compiled to ensure that site is properly managed in a manner that will minimise environmental, social, financial and economic risks. It is to be noted that detailed designed Engineering of the site will be undertaken following the approval of this Waste Licence application. The scope of work for this application is limited to obtaining the Waste Licence for the Groblershoop landfill based on environmental requirements for the site. The Operational plan serves as a guide for operations supervisory personnel and sets forth contingency plans for special problems and situations that may arise during the landfill operations.

It is the requirement of the Basic Assessment process that risks to the environment are identified and these possible risks should be taken into account during the planning phase of the development. These risks are presented in this Environmental Management Programme (EMPr). The implementation of this EMPr, through the appointed contractor, remains the responsibility of the applicant, the !Kheis Local Municipality.

This EMPR document has thus been compiled in accordance with the Integrated Environmental Management (IEM) philosophy which aims to achieve a desirable balance between conservation and development (DEAT, 1992). IEM is a key instrument of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended [NEMA, 2013]. NEMA promotes the use integrated environmental management for activities that may have a significant effect on the environment. IEM prescribes a methodology for ensuring that environmental management principles are fully integrated into all the stages of the development process. NEMA advocates the use of several environmental management tools that are appropriate for the various levels of decision-making. One such tool is an EMPr.

The compilation of this EMPr has also been based on the findings of the on site assessment undertaken by GA Environment and the Specialists involved in the project. Input from the Department of Water and Sanitation (DWS), the South African Heritage Resources Agency (SAHRA) as well as other parties. All the Environmental specifications and the procedures discussed in this document were also developed in accordance with the relevant legislation applicable to the development as well as environmental best practice.

The NEMA EIA Regulations, December 2014 regulate the procedures and criteria for the submission and consideration of the EMPr including its content. *It must be noted that the EMPR is a living document that can be amended should the need for this arise. The amendment must however be undertaken according to the EIA Regulations that will be relevant at the time of the required amendment.*

1.2 Site Location

The Groblershoop landfill is located on Erf 1679 Groblershoop, a town located approximately 120 km South East of Upington. The site is south of the Duineveld township which is approximately 5km from the Groblershoop Town. The boundaries of the area indicated as that to be licenced is approximately 300m from the boundaries of the residential area. Access to the landfill site can be gained from the N10, which connects Groblershoop to Upington. From the N10, the site can be accessed from Meitjies Street in Duineveld. A disused reservoir exists north east of the site close to the residential area. The area immediately east of the site comprises what is most likely agricultural land. To the west of the site the natural environment is disturbed only by the N10 Road and a landing stip. The Groblershoop

landfill site falls within the jurisdiction of Dr ZF Mgcawu District Municipality. The site co-ordinates are 28°54'59.33"S; 22° 0'12.35"E. The site is indicated in **Figure 1**.

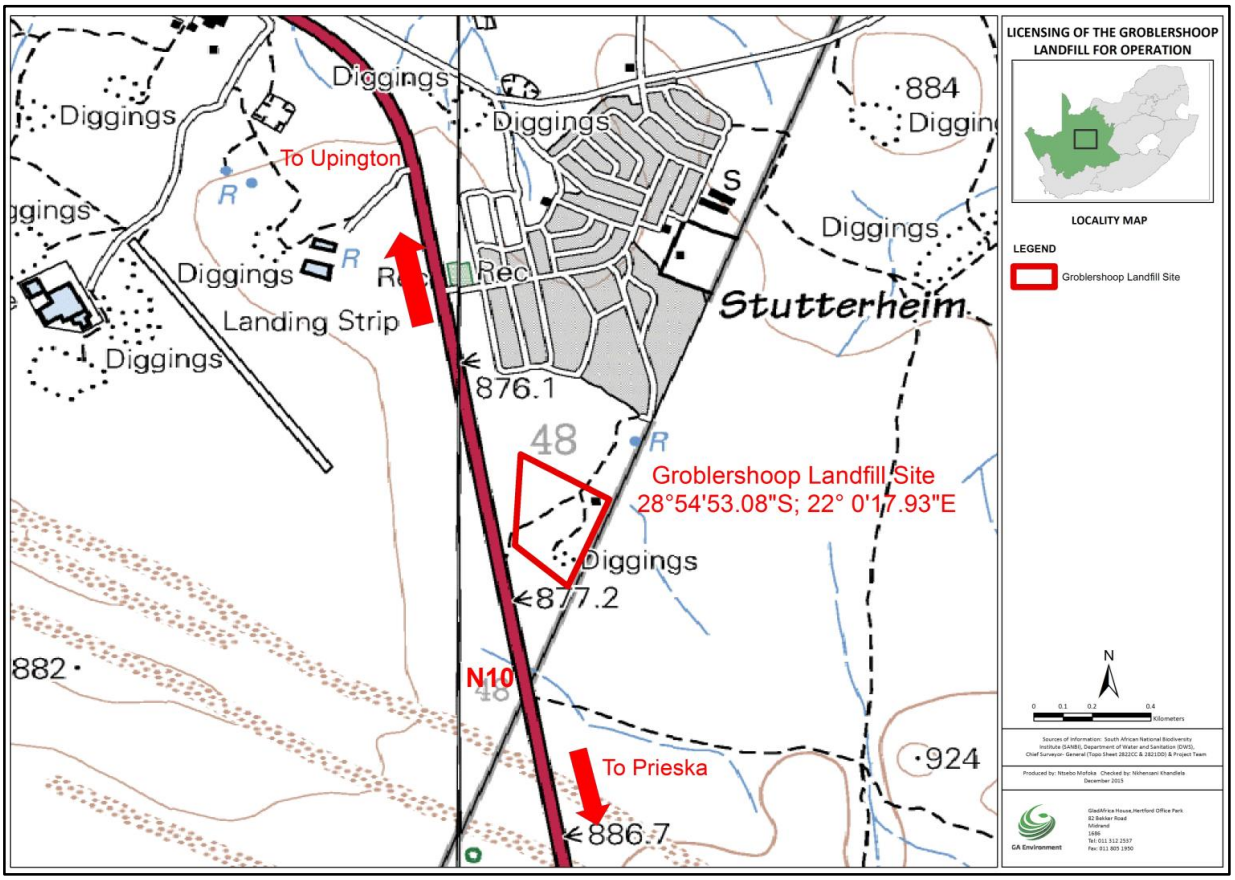

Figure 1: Locality Map of the Groblershoop Landfill Site

1.3 Details of Environmental Assessment Practitioner

This draft Environmental Management Program was compiled by:

Company Name:	GA Environment (Pty) Ltd
Contact person:	Ms. Ntsebo Mofoka
Postal Address:	P.O Box 6723, Midrand, 1685
Telephone Number:	(011) 312 2537
Fax Number:	(011) 805 1950
E-mail:	ntsebom@gaenvironment.com

Ms. Ntsebo Mofoka is an Environmental Assessment Practitioner (EAP) who holds a B.Sc. (Hons) Environmental Management (cum laude). She has 3.5 years of working experience in the Environmental Management Field and a year in the field of Landscape Architecture. Ntsebo specialises in, among various environmental management tools, Integrated Environmental Management (IEM), Environmental Impact Assessments (EIAs), Basic Assessments (BAs) as well as

mapping with the use of ArcGIS. She has been involved in projects related to Waste Management, Linear Infrastructure, Mixed-Use developments and Conservation Planning and Biodiversity Management. Ntsebo is currently an EAP at GA Environment (Pty) Ltd.

1.4 Scope of the Environmental Management Programme (EMPR)

The EMPr serves to provide corrective measures needed during the Pre-construction, Construction and Operational phases of the Groblershoop landfill. These are briefly discussed below.

1.4.1 Pre-construction

Activities that will form part of these phase are those that must be undertaken prior to the commencement of the construction and operational phases of the project.

1.4.2 Construction and Operation

The bulk of the impacts during this phases will have immediate effects (e.g. noise, dust and pollution). If the site is monitored on a continual basis during the Construction and Operational phase, it is possible to identify when these impacts as they occur. These impacts can then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from the !Kheis Local Municipality. The Construction and Operation of the site will but not be limited to:

- Shaping and landscaping of the waste body;
- The construction of storm water management infrastructure;
- Capping of the waste body in accordance with the Minimum Requirements;
- Concrete palisade fencing;
- Upgrade of gravel service / maintenance roads;
- Vegetative cover of the final landform;
- Post Operation environmental monitoring where necessary; and
- Investigation of options for end use.

1.4.3 Closure and Post operation (monitoring)

The Closure and Post operational phase will entail the closure of the landfill site, the covering of the waste body, re-capping, reshaping, and landscaping of the waste disposal area and ultimately the rehabilitation of the landfill. It is anticipated that the Municipality will determine appropriate end use following the final rehabilitation of the site. The decommissioning phase will eliminate all environmental problems that occur as a result of landfill operations.

1.5 National and Provincial Acts and Guidelines

It is understood that any development, during its construction and operational phase, is a dynamic activity within a dynamic environment. The Developer, Engineer, Contractor and sub-contractor must therefore be aware that certain activities conducted during construction and operation phase may require further licensing or environmental approval, e.g. bulk fuel storage, waste disposal, etc. The Contractor must consult the ER, SHEQ Officer and ECO on a regular basis in this regard. The common list of legislative references contained herein is by no means exhaustive, but is applicable to the general principals of this document.

- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
- Environment Conservation Act, 1989 (Act No. 73 of 1989)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- National Environmental Management: Protected Areas Act, 2004 (Act No.31 of 2004)
- Fencing Act, 1963 (Act No. 31 of 1963)
- Forest Act, 1984 (Act No. 122 of 1984)
- National Act on Forests Act, 1998 (Act No. 84 of 1998)
- National Building Regulations and Standards Act, 1977 (Act No. 103 of 1977) (SABS 0400)
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)
- National Road Traffic Act, 1996 (Act No. 93 of 1996)
- National Veld and Forest Fires Act, (Act No. 101 of 1998)
- National Water Act, 1998 (Act No. 36 of 1998)
- Water Services Act, 1997 (Act No. 108 of 1997)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
- Road Transportation Act, 1977 (Act No. 74 of 1977)

This EMPr has been compiled as per the requirements of NEMA EIA Regulations 2014 and in terms of Section 24N of the National Environmental Management Act (Act No. 107 of 1998).

1.5.1 General guidelines

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

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds etc. is ultimately the responsibility of the applicant / developer. Section 28 of NEMA, 1998.

- The study area must be clearly defined and surveyed according to the project authorisation. All workforce members and other construction personnel are not to go beyond the defined footprint. Landowners are not comfortable when strangers come onto their properties.
- The Contractors must adhere to agreed and approved access points.
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damages are to be repaired immediately.
- Relevant landowners, businesses must be informed of the starting date of construction, as well as the phases in which the construction shall take place.
- The Contractor must adhere to all conditions of contract including this EMPr.
- Proper planning of the Operation process must be undertaken to allow for disruptions due to rain and wet conditions.
- All private and public manmade structures near the project site must be protected against damage at all times and any damage must be rectified immediately.
- Proper site management and regular monitoring of site works should take place.
- Proper documentation and record keeping of all complaints and actions taken must be kept at the site office.
- Regular site inspections and good control over the Operation process throughout the construction period should be undertaken.
- A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions.
- An ESO, on behalf of the Contractor, should be appointed to implement this EMPr. The EO and not the Contractor or his / her ESO is to deal with any landowner related matters.
- Environmental Audits should be carried out during and upon completion of Operation on a biweekly basis.
- Social issues in terms of safety for human life, on employees should be encouraged. All construction areas and activities should be cordoned off and no casual access be gained, where deep trenches or open electrical infrastructure are to be exposed.

1.6 Tasks and Responsibilities

In order to ensure the sound development and effective implementation of the EMPr, it is necessary to identify and define the responsibilities and authority of the various persons and organisations that will be involved in the project. The following key roles will need to be provided for during the implementation of the EMPr:

- Authorities;

- Developer/ Proponent;
- Consulting Engineers (CE);
- Engineers Representative (ER);
- Environmental Officers (EO);
- Environmental Control Officer (ECO);
- Project Manager (PM);
- Contractors (C);
- Environmental Assessment Practitioner (EAP);

These roles and line of communication has been incorporated below:

1.6.1 Role players and Responsibility matrix

In order for the EMPr to be successfully implemented, all the role players involved in the project need to co-operate. An example of declaration of understanding between various parties working on site regarding the requirements of the EMPr must be produced (Refer to **Appendix 1**). For this, role players must clearly understand their roles and responsibilities, they must be professional and they must form respectful and transparent relationships, and maintain open lines of communication.

[Pre–EA] Potential role players or project teams will include the Authorities, Other Authority (OA), Developer / Proponent – (Developer), Consulting Engineers (CE), Engineers Representative (ER), Environmental Site Officer (ESO), Environmental Control Officer (ECO), Project Manager (PM), Contractors, Environmental Assessment Practitioner (EAP). Furthermore the surrounding landowners, I&APs and the relevant environmental and project specialists are also important role players.

[Post-EA] These role players or the project team will consist of the Authorities, Other Authority, Developer / Proponent, Consulting Engineers (CE), Engineers Representative (ER), Environmental Officers (EO), Environmental Control Officer (ECO), Project Manager (PM), Contractors, Environmental Assessment Practitioner (EAP). Furthermore landowners, I&APs and the relevant environmental and project specialists are also important role players.

The functions and responsibilities of these role players are outlined in **Table 1.**

Table 1: Functions and Responsibilities of the Project Team

KEY	FUNCTION	RESPONSIBILITY
D	**Developer/ Proponent** **!Kheis Local Municipality**	Developer/ Proponent is ultimately accountable for ensuring compliance with the EMPr and conditions set out in the Waste Licence (WL). The ECO must be contracted by the developer (full time or part time depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of WL's, and the EMPr for the project. The developer is further responsible for providing and giving the mandate to enable the ECO to perform their responsibilities. The developer must ensure that the ECO is integrated as part of the project team..
CE	**Consulting Engineer**	Contracted by the developer to design and specify the project engineering aspects. Generally the engineer runs the works contract. The CE may also fulfil the role of PM on the proponent's behalf (See PM). The RE will also be required to be familiar with the EMPr specifications.
PM	**Project Manager**	The Project manager has overall responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the PM. All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any construction activity in contravention of the EMPr in accordance with an agreed warning procedure.
ER	**Engineers Representative**	The consulting engineer's representative onsite. They have the power / mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the SHEQ Officer or ECO. The ER oversees site works, liaison with Contractor and ECO.

ECO	**Environmental Control Officer**	An independent appointment by the Developer to objectively monitor the implementation of relevant environmental legislations, conditions of the WL's, and this EMPr for the project. The ECO must be onsite prior to any site establishment and must endeavour to form an integral part of the project team. The ECO should be proactive and have access to specialist expertise as and when required, these include botanist's ecologists etc. The ECO must conduct audits on compliance to relevant environmental legislation, conditions of WL, and the EMPr for the project. The size and sensitivity of the development, based on the EIA, will determine the frequency at which the ECO will be required to conduct audits. The ECO must liaise the relevant authorities and the project team. The ECO must communicate and inform the developer and CE of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMPr documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible. The ECO must convey the contents of this EMPr to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce. •The ECO must indicate suggested corrective action measures to eliminate the cause of the non-conformance incidents. In order to keep a record of any impacts, an Environmental Log Sheet (refer to Example in **Appendix 3**) is to be kept on a continual basis.
C	**Contractor**	The principle Contractor is responsible for implementation and compliance with the requirements of the EMPr and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMPr. The contractor is required, where specified, to provide Method Statements setting out how the management actions contained in this EMPr will be implemented.

ESO	**Environmental Site Officer**	The ESO is employed by the Developer as his / her environmental representative to monitor, review and verify compliance with the EMPr by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. The ESO must be onsite one week prior to the commencement of construction. The ESO must ensure that he / she is involved at **all phases** of the constriction (from site clearance to rehabilitation).
A	**Lead Authority**	The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of this EMPr and other authorisation documentation is carried out; this will be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.
OA	**Other Authority / ies**	Other authorities are those that may be involved in the approval process of this EMPr. Their involvement may include reviewing EMPr's to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of this EMPr.
EAP	**Environmental Assessment Practitioner**	The definition of an EAP in section 1 of NEMA is "the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations". GA Environment is the EAP for the Developer.
EO	**Environmental Officer**	The EO or ESO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area / habitat in which they are working. The EO and not the Contractor or his / her ESO is to deal with any landowner related matters.

1.6.2 Awareness Training

The ECO is responsible for ensuring everyone onsite is given an environmental awareness induction session (including social risks for learners at the schools) which not only clearly defines what the environment is and gives specifics detailing the local environment, but also outlines the requirements of the EMPr as a management tool for the protection of the environment. Refresher courses must be conducted as and when required. The EO or ECO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area / habitat in which they are working, etc. Awareness posters and a hand outs must be provided to create awareness throughout the site.

1.6.3 Contractor Environmental Method Statements

Method Statements are written submissions to the Engineer by the Contractor, in collaboration with his / her ECO, in response to a request by the EO and or Engineer. The Method Statements set out the plant, materials, labour and method that the contractor proposes using to carry out an activity, identified by the EO and / or Engineer. The Method Statements contain the appropriate detail such that the EO and Engineer are able to assess whether the Contractor's proposal is in accordance with the requirements of the EMPr. The contractor must sign each Method Statement along with the EO and Engineer to formalise the approved Method Statement. An example of a template that can be used to record all applicable Method Statements by the Contractor is attached as **Appendix 2**.

All Method Statements, including those which may be required as ad-hoc or emergency construction method statements, must be submitted to the Engineer for approval prior to the commencement of the activities at the proposed Operation of the Groblershoop landfill.

Any changes to the method of works must be reflected by amendments to the original approved Method Statement. Any changes in this regard must be approved by the EO and Engineer on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMPr.

The pro-forma Method Statements attached must be used and method statements for the following activities must be submitted to the EO, ECO and Engineer for approval before Operation commences:

- Solid waste management;
- Stormwater Management;
- Crew camps and construction lay-down areas;
- Workshop and maintenance areas;
- Cement and concrete batching;
- Dust control;
- Emergency spills procedures;
- Diesel tanks and refuelling procedures;
- Sourcing, excavating, transporting and dumping of fill, spoil material and waste;
- Erosion control;
- Safety onsite (SHEQ requirements)
- Topsoil management;
- Rehabilitation Work for wetland; vegetation clearing; storage of hazardous chemicals; and
- Fire.

1.7 Site Documentation

The following is list of documentation should be held onsite and made available to the ECO and / or Competent g Authority on request.

- Site daily diary / instruction book / incident reports;
- Records of all remediation / rehabilitation activities;
- Copies of EO reports (management and monitoring);
- This EMPr;
- All applicable EAs and WML's;
- A Complaints register;
- Method statements signed by the contractor;
- The project Operation Plan; and
- The project Operational Plan.

Any other documents that are approved by the EMPr and the EA must also be included in the list above.

1.7.1 Pro forma documentation

a) *Prior to the commencement of Operation activities*

The following attached pro forma documentation should be filled out and is binding to the EMPr and project contract and includes, but is not limited to the following:

- Declaration of understanding by the Developer;
- Declaration of understanding by the Engineer;
- Declaration of understanding by the Contractor;
- Method statements;
- ECO / Engineer approval for method statements; and
- Access negotiations and physical access plan based on the Master Plan of the study area, if available.

b) *During construction activities*

The following attached pro-forma documentation is to be filled out and maintained. These are binding to the EMPr and project contract. They include, but are not limited to, the following:

- Method Statements;
- ECO / Engineer approval for method statements;
- Environmental incidents; and
- Records of all remediation / rehabilitation activities.

2. OPERATION PHASE EMPR – IMPLEMENTATION

The point of departure for this EMPr is to ensure a pro-active rather than re-active approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed during the construction phase of the project. Therefore, the purpose of this EMPr is to provide management measures that must be implemented by Developers, Engineers and Contractors alike to ensure that the potential impacts of the Operation of the landfill and its associated impacts are minimised. It must also be ensured that the EMPr is maintained and upheld as a dynamic document i.e. a living document, in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. The EMPr should be used for all phases of the project.

The tables outlined in this report form the core mitigation measures appropriate to the pre-construction and construction (Operation phase). The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria / targets and timeframes are clearly specified.

2.1 Preconstruction phase (Operation phase)

The ***'pre-Operation'*** section of this EMPr, refers to the period of time leading up to and prior to commencement of construction activities, and is included to ensure pro-active environmental management measures with the goal of identifying avoidable environmental damage at the onset and sustain optimal environmental performance throughout the construction phase. Most impacts will occur during the construction phase (Operation of the landfill) and must be mitigated through the contingency plans identified in the pre-construction phase.

The bulk of environmental impacts will have immediate effect during the ***'construction'*** phase. If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the measures outlined in this section, together with a commitment to sound environmental management from the project team.

2.2 Construction phase (Operation and rehabilitation phase)

The "***construction***" section refers to all construction and its operation-related activities that will occur within the approved area until the project is completed. This "construction" section is divided into three functional areas, namely "materials"; "plant"; and "construction". Each of these functional

areas within the EMPr contains specific mitigation requirements and requested contractor method statements stipulated where required.

2.3 Structure and Contents of Tables

The table consists of seven parts which are included as key requirements of EMPr as defined in the NEMA EIA Regulations 2014. These sections are described below as follows:

- **Phase of development –** This section will identify either pre-construction (planning) or actual construction activities during the Operation phase.
- **Impact / issue -** This section will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.
- **Mitigation Measure -** This column will include all the necessary mitigation measures for each impact / issue'.
- **Management objectives -** This column will indicate what the management objectives to be achieved for each mitigation measure.
- **Measurable targets -** This column will indicate what evidence is to be used as an indication to whether or not the 'Management objectives' have been implemented and hence achieved.
- **Frequency of action -** Provides time guidelines for the 'Responsible party' by which he / she is to action or manage the required mitigation.
- **Responsible Party –** Provides the details of the responsible team member which should account on the activities highlighted in column 1 to 4.

Phase of development	PRE-CONSTRUCTION
Impact / issue	GENERAL PLANNING (A)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE PARTY
A1 Project contract and programme i. The EMPR shall be required as part of the NEMA process thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. ii. A copy of this EMPr shall be available onsite. The Contractor must ensure that all the personnel onsite, sub-contractors and their team, suppliers, are familiar with and understand the specifications contained in this EMPr.	• Contingencies for minimising negative impacts anticipated to occur during the Operation • Ensure environmental awareness and formalise environmental responsibilities and implementation	• Contract records • Signed declaration pro forms by contractor • Mitigation measures to be complied with	Once-off	• Developer • ECO • Contractor
A2 Appointments and duties of project team i. Before construction activities commence, role players must have a clear indication of to their role in the implementation of this EMPr ii. Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr. iii. Transparency of the process and ensuring that the relevant stakeholders are in agreement.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase • Engaging with the relevant stakeholders on issues pertinent to finalization of expropriation process	• Contract records • Signed declaration pro forms • Appointment of role-players • Accepted finalized agreements between stakeholders. Property owners fairly compensated.	Once-off	• Developer • ECO • Contractor
A3 Method statements i. As required in 1.1.3, certain method statements must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO. ii. Where applicable, the contractor shall provide job-specific training on an ad-hoc basis when workers are engaged in activities which require method statements.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Approved method statements and relevant pro forma documents • Regular Review of the Method statements in line with current activity • Training records	As and when required and need be.	• ECO • Contractor

Phase of development	PRE-CONSTRUCTION
Impact / issue	GENERAL PLANNING (A)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE PARTY
A4 Site demarcation and development i. The surveys for the overall project area and construction footprint as approved in the WL must be completed and clearly demarcated and fenced (where practical) before the contractors set up their crew camps or begin construction. ii. "No-go" areas such as casual access areas and sensitive natural areas, identified during the EIA process must be clearly demarcated (e.g. warning tape) prior to the commencement of construction activities. iii. The site activities and sequencing of the construction activities should be regulated by relevant legislature, regulations, and standards iv. The Environmental – Architectural Design Guidelines should be considered and implemented, where applicable.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase • Adherence to the EMPr and legislative requirements	• Demarcated area's • Filled in section of this document • EMPr adhered to	As and when required	• ECO • Contractor
A5 Emergencies, non-compliance and communication i. The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of the natural water resources from spills; contamination of soils from spills; soil erosion, Safety (Casual Access) and Stormwater Management. ii. The contractor understands that failure to adhere to the requirements of the EMPr 'Tolerances', over and above the costs incurred for any remediation required as result of the specific non-compliance, shall be followed.	• Contingencies for minimising negative impacts anticipated to occur during the construction phase	• Method statements	As and when required	• ECO • Contractor
A6 Permits and Permissions i. The Contractor shall ensure that all pertinent permits, certificates and permissions have been obtained prior to any activities commencing on site and ensure that they are strictly enforced / adhered to. ii. The Contractor shall maintain a database of all pertinent permits and permissions required for the contract as a whole and for critical activities for the duration of the contract.	• Adherence to the EMPr and legislative requirements	• Compliance with legislation and EMPr requirements	Prior to Construction	• Developer • Contractor

Phase of development	PRE-CONSTRUCTION
Impact / issue	GENERAL PLANNING (A)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE PARTY
A7 Existing Services and Infrastructure i. The Contractor shall ensure that existing services (e.g. Fencing, roads, pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the RE. ii. The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted. iii. Such repair or reinstatement will be to the Contractor's cost and shall receive top priority over all other activities. iv. A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.	• Avoiding impact on surrounding services and infrastructure	• Infrastructural impacts • Services impacts	Daily	• Developer • ECO • ESO • Contractor
A8 Environmental Awareness Training The Contractor shall ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include but not be limited to; i. What is meant by "Environment" ii. Why the environment needs to be protected and conserved iii. How construction activities can impact on the environment iv. What can be done to mitigate against such impacts v. Awareness of emergency and spills response provisions vi. Social responsibility during construction of the sub-transmission lines e.g. being considerate to local residents vii. It is the Contractor's responsibility to provide the site foreman with environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. viii. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary. ix. Use should be made of environmental awareness posters on site.	• Raise awareness of importance of Environmental protection	• Environmental Management • Reduce and manage potential Environmental impacts	Daily	• Developer • ECO • ESO • Contractor

Phase of development	PRE-CONSTRUCTION
Impact / issue	GENERAL PLANNING (A)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE PARTY
x. The need for a "clean site" policy also needs to be explained to the workers. xi. Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. xii. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed.				

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Materials (B)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
B1 Stockpiles i. All stockpiled material must be easily accessible without any environmental damage. ii. The stockpiles may only be placed within demarcated areas which must be approved by the ECO. iii. Stormwater runoff from any stockpile sites and other related areas must be directed into the stormwater system with the necessary pollution prevention measures such as silt traps. iv. Stockpiles are to be stabilised if signs of erosion are visible. v. Soils from different horizons must be stockpiled so that topsoil stockpiles do not get contaminated by sub-soil material. vi. Topsoil stockpiles must be monitored for invasive vegetation growth. Contractors must remediate as and when required in consultation with the ECO. vii. No plant, workforce or any construction related activities may be allowed onto topsoil stockpiles. viii. Topsoil stockpiles must be clearly demarcated as no-go areas. ix. Stockpiles should not be higher than 2.5 meters to avoid compaction, while the slopes of the stockpiles should not be steeper than 1 vertical to 1.5 meters horizontally.	• Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Containment of invasive plant growth should be encouraged • Minimise contamination of stormwater run-off will be encouraged	• No visible erosion scars once construction is completed	Daily	• ECO • ESO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Materials (B)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
B2 Oil and chemicals i. The contractor must provide method statements for the "handling & storage of oils and chemicals" and "emergency spills procedures". ii. These substances must be confined to specific and secured areas within the contractor's construction site, and in a way that does not pose a danger of pollution even during times of high rainfall. These areas must be imperviously bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks. iii. Drip trays (minimum of 10 cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised to prevent environmental harm. iv. The surface area of the drip trays will be dependent on the vehicle and must be large enough to catch any hydrocarbons that may leak from the vehicle while standing. v. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle. vi. Spill kits must be available onsite and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site. Spill kits must be made up of material / product that is in line with environmental best practice (SUNSORB is a recommended product that is environmentally friendly). vii. All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site, (this includes contaminated soils, and drenched spill kit material).	• Prevention of pollution of the environment • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statements as set out by the contractor adhered to.	Daily	• ECO • ESO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Materials (B)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
B3 Cement and Concrete i. The contractors must provide and maintain a method statement for "cement and concrete batching". The method statement must provide information on proposed storage, washing & disposal of cement, packaging, tools and plant. ii. The mixing of concrete must only be done at specifically selected sites on mortar boards or similar structures to contain run-off into soils, rocky outcrops, streams, wetlands and natural vegetation. iii. Cleaning of cement mixing and handling equipment must be done using proper cleaning trays. iv. All empty containers must be stored in a dedicated area and later removed from the site for appropriate disposal at a licensed facility. v. Any spillage that may occur must be investigated and immediate remedial action must be taken. vi. The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste to a registered landfill site. vii. Cement batching areas must be located in consultation with the ER, ESO or ECO to ensure residues are contained and that the proposed location does not fall within sensitive areas.	• Minimise the possibility of cement residue entering into the surrounding environment • Minimise pollution of soil, surface and groundwater resources	• No evidence of contaminated soil on the construction site • Method statement	Monitored daily	• ECO • ESO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Materials (B)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
B4 DANGEROUS AND TOXIC MATERIALS **(Provision of storage facilities)** i. Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock-and-key, as appropriate, in well-ventilated areas. ii. Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. iii. In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) for must be informed immediately. iv. Storage areas must display the required safety signs depicting "no smoking", no naked flames" and "danger" containers must be clearly marked to indicate contents as well as safety requirements. v. The contractor must supply a method statement for the storage of hazardous materials at tender stage. vi. Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDSs must be updated as required. vii. Casual access to the storage facilities should not be encouraged. All dangerous materials and equipment should be safely locked away as to prevent contract workers and employees from using and entering these areas freely.	• Prevention of pollution of soil, surface and groundwater resources	• No visible signs of pollution • No litigation due to transgression of pollution control acts	Monitor daily	• ECO • Contractor
B5 USE OF DANGEROUS AND TOXIC MATERIALS i. The contractor must keep the necessary materials and equipment onsite to deal with spills / fire of the materials present should they occur. ii. The contractor must set up a procedure for dealing with spills / fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval by the appointed EO. iii. A record must be kept of all spills and the corrective action taken.	• Prevention of pollution of soil, surface and groundwater resources • Minimise chances of transgression of the acts controlling pollution	• No pollution of the environment • No litigation due to transgression of pollution control acts	As and when required	• ECO • ER

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
C1 CONSTRUCTION SITE i. The contractors must provide and maintain a method statement for "Crew camps, eating areas, construction lay down areas and other areas of the site". ii. Dedicated wash areas must be provided and maintained in good working order. iii. The construction site must be monitored for dust fallout and dust suppression applied as required. This may include the laying of gravel. The use of grey water can be considered as an option if the required permits have been acquired from DWS iv. The contractor must provide labourers plastic bags to clean up the construction site on a daily basis. These areas must then be inspected by the contractor or his / her ESO to ensure compliance with this requirement. v. The contractor is responsible for cleaning the construction site of all structures, equipment, residual litter and building materials at the end of the construction period. vi. Erection of the construction site should be encouraged in already disturbed areas onsite.	• Minimise water pollution • Minimise dust fallout in the immediate surroundings • Minimise unwarranted environmental damage outside the footprint • Maintain a clean and healthy working environment • Crew camp activities should be in line with the OHS regulations	• No signs of water or soil pollution (surface- and groundwater resources) • No complaints received from the surrounding landowners / I&AP's • No visible signs of litter at the crew camps • Method statements adhered to	Monitor daily	• ECO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
C2 EATING AREAS FOR CONSTRUCTION WORKERS i. The contractors must provide and maintain a method statement for "construction site and construction lay down areas". ii. The Contractor must, in conjunction with the ECO, designate restricted eating areas for eating during normal working hours. Adequate closed refuse bins must be provided and cleaned on a daily basis. iii. No fires shall to be lit outside of a facility designed to contain fires. The adequacy and positioning of these structures must be determined in consultation with the ECO. iv. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited. v. Informal traders must not be allowed to congregate on pavements or outside the construction site. However, at the contractor's discretion, facilities can be made available within the designated eating area. vi. Litter (even if originating outside the camp) and concrete bags, etc. must be picked up daily and put into suitably closed bins to prevent pollution.	• Control potential influx of vermin and flies and rats • Neat work place and hygienic environment • Minimise negative social impacts to the employees.	• No visual sign of vermin, flies and rats • No complaints from I&APs and the landowner / client	Once off, monitor daily	• ECO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
C3 TOILETS AND ABLUTION FACILITIES i. The contractor is responsible for providing all sanitary arrangements for his and the sub-contractors team. A minimum of one chemical toilet must be provided per 12 workers of the appointed contactor. ii. Sanitary arrangements must be to the satisfaction of the ECO and the OHS official Toilets must be of the chemical type. The contractor must keep the toilets in a clean, neat and hygienic condition. The contractor must supply toilet paper at all toilets at all times. Toilet paper dispensers must be provided in all toilets. iii. Toilets provided by the contractor must be easily accessible to ensure they are utilised. All toilets will be located within the construction site. Should toilets be needed elsewhere, their location must first be approved by the ECO. iv. The contractor (who must use reputable toilet-servicing company) must be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) must ensure that all toilets are cleaned and emptied before the builders' or other public holidays. v. Toilets out onsite must be secured to the ground and have a sufficient locking mechanism operational at all times.	• Ensure proper sanitation is achieved which will encourage the workforce to utilise toilets provided and not the surrounding habitat or the bush • Minimise potential of diseases onsite and influence the health of the employees • Minimise potential to pollute soils, water resources and natural habitats	• Workforce use toilets provided and not the bush • No complaints received from I&APs as well as members of the workforce • No visible or measurable signs pollution of the environment (soils, ground and surface water)	As and when required	• Contractor
C4 WASTE MANAGEMENT i. The contractors must provide and maintain a method statement for "solid waste management". The method statement must provide information on proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes. ii. Any illegal dumping of waste must not be tolerated, this action will result in a fine and if required further legal action will be taken. This aspect must be closely monitored and reported on; proof of legal dumping must be able to be produced on request. iii. Bins must be clearly marked for ease of management. iv. All refuse bins must have a lid secured so that animals cannot gain access.	• Sustainable management of waste by recycling • Minimise litigation and complaints by I&APs • Control potential influx of vermin and flies thereby minimising the potential of diseases and pests onsite and the surrounding environment • Minimise potential to pollute soils, water resources and natural habitats	• Disposal of rubble and refuse in an appropriate manner with no rubble and refuse lying onsite • Ensuring the site is neat and tidy • No complaints are received from surrounding residents, businesses and road users • Sufficient containers available onsite for disposal of domestic and construction related impacts	Continuous throughout the construction phase of the project	• ECO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
v. Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder's wastes generated on the site. vi. Subcontractor(s) must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr. Proof of this undertaking must be issued to the ECO. vii. All solid and chemical wastes that are generated must be removed and disposed of at a licensed waste disposal site. The contractor is to provide proof of such to the ECO. viii. A waste disposal management plan should be encouraged. ix. Chemical containers and packaging brought onto the site must be removed for disposal at a suitable and licenced site. x. A skip, with a cover, must be used to contain refuse from construction i.e. bins, rubble and other construction material.	• Adherence to the waste disposal management plan	• No visible or measurable signs of pollution of the environment (soils, ground and surface water) • Method statement adhered to and waste disposed of in accordance with the waste disposal management plan		

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
C5 DUST i. The contractors must provide and maintain a method statement for "dust control". The method statement must provide information on the proposed source of water to be utilised and the details of the licenses acquired. ii. The construction site must be watered during dry and windy conditions to control dust fallout. iii. Dust production must be controlled by regular watering of roads and works area, should the need arise. **NB:** Concrete dust is toxic and damages soil properties, therefore watering to prevent dust spread must not be done where concrete dust has fallen or it will infiltrate into the soil. Concrete bags must not be allowed to blow around the site. iv. In addition to the standard dust suppression measures and where these measures are not sufficient, main access roads and construction site must be surfaced with a temporary surface such as gravel to assist with dust suppression. v. All vehicles transporting material that can be blown off (e.g. soil, rubble, etc.) must be covered with a tarpaulin, and speed limits of 40 km/h must be adhered to. vi. Excessive dust conditions must be reported to the ECO. vii. All forms of dust pollution must be managed in terms of the NEM: AQA and its amendments.	• Reduce dust fall out at construction site • Minimise loss of valuable soil material	• No visible signs of dust around the contractor's camp • No complaints from I&APs • No incidences reported to ECO • No visible evidence of dust contamination on the surrounding environment • Method statement adhered to	Monitor daily	• ECO • Contractor
C6 WORKSHOP EQUIPMENT, MAINTENANCE AND STORAGE i. The contractors must provide and maintain a method statement for "workshop maintenance and cleaning of plant". ii. All maintenance and washing of vehicles and equipment must take place in the workshop area that is equipped with a bund wall and grease trap oil separator. During servicing of vehicles or equipment, a suitable drip tray must be used to prevent spills onto the soil, especially where emergency repairs are done outside the workshop area. Leaking equipment must be repaired immediately or be removed from site to facilitate repair. All potentially hazardous and non-degradable waste must be collected and removed to a registered waste site.	• Prevent pollution of the environment • Minimise chance of transgression of the acts controlling pollution • Disposal of hazardous substances in an appropriate manner	• No pollution of the environment • No litigation due to transgression of pollution control acts • Method statement adhered to	Monitor daily	• ECO • ER • EO • Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Facility(C)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
iii. Workshop areas must be monitored for oil and fuel spills and such spills must be cleaned and remediated to the satisfaction of the EO or ER. Cleaning and remediation must be done with products that are in line with best environmental practice i.e. SUNSORB iv. A method statement is required from the Contractor, tendering for the project to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage. v. The Contractor must be in possession of an emergency spill kit that is complete and available at all times onsite. The Contractor must ensure that senior and other relevant members of the workforce are trained in dealing with spills by using emergency spill kits. vi. The following must be applied • All contaminated soil shall be removed and disposed of as hazardous waste at a registered facility or placed in containers to be taken to one central point where bio-remediation can be done. • All spills of hazardous substances must be reported to the ECO. • The contractor must comply with the regulations of the OHS				
C7 NOISE i. All construction vehicles must be in a good working order to reduce possible noise pollution. ii. Construction and the use of construction machinery should be limited between 06h00 and 18h00 on weekdays only. Work hours during the construction phase must be strictly enforced unless permission is given iii. No construction should occur during weekends, unless the adjacent residents have been notified in writing at least three days in advance. iv. Noise reduction is essential and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. The use of silent compressors is a specific requirement. v. Noisy activities must take place only during working hours. The ECO must inform all I&APs in writing 24 hours prior to any planned activities that will be unusually noisy or any other activities that could reasonably have an impact on the surrounding environment, road users and neighbouring land owners. These activities could include, but are not limited to, piling, use of pneumatic jack-hammers and compressors, bulk demolitions, etc. vi. The contractor must ensure that noise levels remain within acceptable limits and that labourers have equipment such as ear plugs to be used during the undertaking of activities with high levels of noise	• Maintain noise levels below "disturbing" as defined in the National Noise Regulations • Minimise the nuisance factor of the development	• No complaints from surrounding landowners or I&AP's	As and when required	• ECO • Contractor

Phase of development	CONSTRUCTION AND OPERATION				
Impact / issue	Facility(C)				
MITIGATION MEASURE		MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
vii. Maintenance of equipment and operational procedures: Proper design and maintenance of silencers on diesel-powered equipment					

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
D1 FIRES i. The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what fires will be utilised as well as details on the fuel to be utilised. ii. Fires will only be allowed in facilities especially constructed for this purpose within the fenced Contractor's construction site should there be one. Wood, charcoal or anthracite are the only fuels permitted to be used for fires. The contractor must provide sufficient wood (fuel) for this purpose. iii. Fires within the designated areas must be small in scale so as to prevent excessive smoke being released into the air. iv. No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation. v. No fires are allowed near or adjacent to the edge (riparian habitat) of identified wetland. .	• Minimise risk of veld fires and loss of natural habitat • Maintain safety on site and the community in general	• No veld fires started by the contractor' s workforce • No claims from landowners for damages due to veld fires • Method statement adhered to	Monitor daily	• ECO • EO • Contractor
D2 EROSION AND SEDIMENTATION i. To reduce the loss of material by erosion, the contractor must ensure that disturbance onsite is kept to a minimum. The contractor is responsible for rehabilitating all eroded areas in such a way that the erosion potential is minimised after construction has been completed.	• Minimise erosion damage • Minimise impeding the natural flow of water • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Re-growth of disturbed areas.	• No erosion scars • No loss of topsoil • No interference with the natural flow of water • The footprint has not exceeded the agreed boundaries • All damaged areas successfully rehabilitated by the landscaper	As and when required	ECO

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
D3 FAUNA i. All activities onsite must comply with the regulations of the Animal Protection Act, 1962 (Act No. 71 of 1962) [APA]. ii. The extent of the construction site must be demarcated and no vegetation is to be removed outside of this zone. iii. All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake a specialist must be called in to safely relocate the animal. iv. Development should be located in areas of lowest and clustered closest to existing developments especially taking into account the current development layout v. Sensitive areas should be fenced off (whilst maintaining natural movement of fauna) prior to construction as "No Go" zones and all construction related impacts / activities should be prohibited within these zones. vi. Boards containing information pertaining to Orange / Red / Listed floral species (i.e. identification, conservation status and importance, biology, habitat requirements and management requirements) within the area should be erected within the construction and development zone and should be clearly visible to any construction personnel / visitors / residents. vii. Intentional killing of faunal species should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of the conservation issues pertaining to the species occurring on the study site viii. All construction activities must be limited to daylight hours ix. Minimisation of disturbance of trees and construction footprint	• Minimise disturbance to animals • Minimise interruption of breeding patterns of birds • Minimise destruction of habitat and impacts on the riparian habitat • No casual access of workers and the general community	• No complaints from any I&AP • No litigation concerning applicable animal protection acts	Monitor daily	• Contractor • ECO • Faunal Specialist

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
D4 FLORA i. Retain as much of the existing vegetation as possible to act as a visual screen. This can be phased out and replaced by new vegetation as the construction progresses but it's important to retain it for as long as possible. ii. Locally indigenous plants must be used in the landscaping of the site. Should this not be viable exotic plants may be utilized, however these plants may not exhibit the ability to be classified as problem plants spreading uncontrollably. Plants that are proclaimed as problem plants or noxious weeds must be excluded from the landscaping plan and these must be removed immediately. iii. No open fires shall be allowed onsite under any circumstances, fires will only be permitted in adequate facility within the construction site, Forest Act, 1984 (Act No. 122 of 1984) [AFA]. iv. A plant rescue and vegetation rehabilitation plan should be implemented. v. Construction workers may not remove flora and neither may anyone collect seed from the plants without permission from local authority. vi. All construction vehicles and equipment as well as construction material should be free of plant material. vii. Landscape development should incorporate indigenous vegetation. viii. Clearing of vegetation should be minimal within and outside the landfill boundaries. ix. Rehabilitation / restoration of remaining indigenous vegetative cover and grassland during and after rehabilitation; x. Management of point discharges during construction activities to avoid unnecessary soil erosion; xi. Implementation of best management practices regarding stormwater and earthworks; xii. Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone during construction activities; xiii. Implementation of appropriate stormwater management during rehabilitation to prevent the ingress of run-off into the excavation; and particularly; and xiv. Prevention of erosion, and where necessary rehabilitation of eroded areas.	• Minimal disturbance to vegetation where such vegetation does not interfere with construction • Prevent litigation concerning removal of vegetation • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Minimise risk of veld fires • Removal of alien plant species to encourage indigenous plant growth • Remove only vegetation where essential for construction and do not allow any disturbance to adjoining natural cover.	• No litigation due to removal of vegetation without necessary permission • No visible erosion scars once construction is completed • The footprint has not exceeded the agreed boundaries • All damaged areas and banks successfully rehabilitated • No veld fires started by contractors work force • No claims from landowners for damages due to veldt fires • Plants that are found during clearing should be planted into landscaped gardens.	As and when required	• Contractor • ECO • Ecological Specialist (where applicable)

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
D5 ALIEN VEGETATION i. Alien vegetation should be removed from the study area and an alien control plan should be encouraged in line in with NEMBAA legislation after sourcing advice from Biodiversity Specialist ii. Attention must be given to newly re-shaped/ recapped areas, and any other areas disturbed during closure operations which may be vulnerable to infestation by invasive and alien plant species. iii. Monitoring programme be implemented to enforce continual eradication of alien and invasive plant species iv. Control and manage the removal of vegetation v. Vegetation removal to be undertaken in consultation with the ECO	• Prevent spread of aliens	• Absence of alien species	• Based on advice from the Biodiversity Specialist	• Contractor • ECO
D6 HERITAGE RESOURCES **The Mitigation Measures below are based on the recommendations from SAHRA as well as Environmental Best Practice:** i. The construction team should be made aware of the possible occurrence of Heritage Resources as part of the induction by the ECO. The induction must be undertaken prior to the commencement of construction activities on the site; ii. Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA iii. In future, should the licensed landfill site require authorization for activities such as the construction of storm water management infrastructure outside the application area, the expansion of the landfill site or any other activities outside the application area, SAHRA must be notified of the development in terms of section 38 (1) and 38 (8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA); iv. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, work must immediately cease and the SAHRA APM Unit	• Avoid damage and loss of heritage resources.	• Knowledge of the construction team on the manner in which heritage resource, where encountered should be handled • Limited or no damage to heritage resources	Ongoing	• Contractor • ECO • Heritage Specialist

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
(Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted **immediately**. The CaseID: 9274 must be used in all correspondence. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required The archaeologist must then compile a 'chance find procedures' in case where possible heritage to address the manner in which the uncovered heritage resources should be managed. v. If any heritage resources, including graves or human remains, are encountered they must be reported to SAHRA and the South African Police Services (SAPS) immediately. vi. Under no circumstances may any labourer destroy or interfere with any heritage feature e.g. the cemetery nearby or any other issue of heritage significance; vii. No heritage feature can be removed, destroyed and/or interfered with on site without the permission of an accredited archaeologist; and viii. If at any stage the site is disturbed a qualified archaeologist must be contracted to evaluate the damage and make recommendations on the appropriate mitigation measures.				
D7 NO-GO / SENSITIVE AREAS i. All construction activities must remain within the boundaries of the development area, as demarcated at the start of construction. ii. The construction footprint must be kept to a minimum, must be clearly demarcated (e.g. warning tape) prior to the commencement of construction activities thus reducing the infringement of the development on surrounding habitats. This should especially be encouraged as to prevent local communities from gaining casual access to the construction site and minimising the risks associated with loss of lives or the risks involved with sustaining possible injuries. This is applicable for the wetland onsite.	• Reduce loss of fauna and flora habitat	• Containment of footprint	Monitor daily	• Contractor • ECO

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
iii. Demarcate all sensitive sites including those to be used for open spaces i.e. soil compaction, etc. iv. Toolbox talks can be used to indicate where the sensitive sites are.				
D8 ACCESS ROUTES / POINTS i. Any authorised clearing for access roads must be done under the supervision of the ECO. ii. Any damaged or degradation will be investigated and fines issued, the affected areas must be immediately rehabilitated. iii. Access roads for earthmoving-equipment must be clearly designated and be positioned as close as possible to the proposed development site. No driving off from the marked roads is permitted and designated parking areas must be identified and demarcated with applicable signage. iv. Access Control is needed for areas to be proclaimed as the conservancy. Sensitive areas should be fenced off. Protection of construction staff. v. Access Control is needed for prevention of unauthorised access for non-construction staff.	• Minimise loss of topsoil and enhancement of erosion • Minimise fauna and flora displacement by destruction of natural habitats	• No erosion on access roads after completion of construction • No loss of topsoil due to runoff water on access roads	As required, monitor daily	• Contractor • ECO

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
D9 CRIME, SAFETY AND SECURITY i. The site and crew are to be managed in strict accordance with the OHS Act and the National Building Regulations. ii. The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of the ground, accidents to employees and limiting casual access to the construction site for workers, use of hazardous substances and materials, etc. iii. The contractor must ensure that lists of all emergency telephone numbers / contact persons are kept up to date and that all numbers and names are posted at relevant locations throughout the construction site. iv. The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, as well as the police and ambulance services must be available at prominent locations around the construction site. v. A Health and Safety Officer as well as an independent firm must be appointed to audit the site's compliance with the OHS Act during construction.	• Reduce the risk of potential incidences • Minimise the potential for impacts associated with loss of human lives and risk of injuries	• No incidences reported by any I&AP	Monitor daily	• Applicant • ECO
D10 VISUAL IMPACT i. Shade cloth must be utilised to conceal and minimise the visual impact of construction site, lay down and storage areas. ii. Only general waste must be removed every week or more often as the need arises and be disposed of at a registered landfill (if there is no space available). iii. Keep dust levels down by regularly wetting dirt roads and exposed soil areas inside the construction site. iv. Clearly demarcate the construction site to limit the area of disturbance. v. Remove rubble and other rubbish off site as soon as possible.	• Minimise visual impact. • To achieve the goal of reducing the visual intrusion of the proposed development and to assist in blending the proposed development into the surrounding character, the enviro-architectural design guidelines will inform the key aspects of architectural form, materials and finishes for the proposed development. It	• No complaints from I&AP's and local residents. • Evidence of windblown litter	Monitor daily	• Applicant • ECO

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE
vi. Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed soil surfaces. vii. Minimise large and potentially unsightly cut-and-fill embankments by stepping the building platform and thereby lowering the structure by as much as possible. viii. Shape the cut and fill embankments by rounding the edges and giving it a more natural appearance if space permits. Alternatively, embankments must be stabilised preferably through planting to cover up any exposed soil or hard retain wall structures and to restrict erosion. ix. Retain as much of the existing vegetation as possible to act as a visual screen. This can be phased out and replaced by new trees as the construction progresses but it's important to retain it for as long as possible. x. Locate the stockyards is not visible xi. Keep the construction site neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of the sight from sensitive viewpoints. xii. Enhance the screening capacity of the site by erecting a temporary fence with a 5m high shade cloth around the construction site. xiii. As far as possible, efforts must be made to undertake this during non- windy conditions to avoid windblown litter affecting surrounding properties.	should be noted that no precise formula or model exists to ensure innovative design and blending with the visual character of the area. • Reduce and limit dust clouds. • Limit area of disturbance. • Limit the duration of exposed soil surfaces. • Locate construction site and stockpiles in the least visible area. • Provide additional screening to increase the visual absorption capacity of the site.			

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
D11 HYDROLOGY **The Mitigation Measures below are based on the recommendations from DWS as well as Environmental Best Practice:** i. Increased run-off during construction must be managed using suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the Resident engineer as well as the ECO. Stormwater, wherever possible, should be allowed to soak into the land in the area on which the water fell e.g. retention ponds ii. In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of NWA is be responsible for all costs incurred by organisations called to assist in pollution control and / or to clean up polluted areas. iii. The contractor must ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system. Design of the stormwater drainage system must ensure that the local and surrounding natural systems are not negatively impacted. Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses must be taken. These measures must be reviewed and audited by the ECO. iv. No wastewater may run freely into any of the surrounding streets or naturally vegetated areas. Runoff containing high sediment loads must not be released into natural or municipal drainage systems or nearby watercourses. v. Approval from DWS must be obtained for any activities that require authorisation in terms of Section 21 of NWA. vi. The Municipality must consult with the DWS regarding the need for a Water Use License before commencement of activities on site and In the case of	• Minimise pollution of soil, surface and groundwater resources in the immediate and surrounding environments • Minimise impeding the natural flow of water • Minimise the impact on natural water flow dynamics • Minimise scarring of the soil surface and land features • Minimise erosion of embankments and subsequent siltation of rivers and streams • Minimise damage to water resources	• No visible signs of pollution • No signs of siltation of the stream south-east of the site. • No visible erosion scaring once construction is completed • Minimum loss of topsoil • No access roads through river and stream banks • No visible erosion scars on embankments once construction is completed • No erosion or siltation downstream and wetland • No deviation from baseline data during regular sampling	As and when required, monitor daily	• Applicant • ECO

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
pollution of the watercourse the Regional Representative of the DWS must be informed immediately. The Official to be informed is C Swartz who can be reached on 054 338 5800. The project file number to be used in the correspondence is 16/2/7/P/15/2. vii. Cement mixing, if applicable, will need to take place on a hard surface or cement mixing trays (mortar boards) will need to be used for this purpose. Cement mixing will not be permitted to occur where run-off can enter watercourses viii. No vehicle washing must occur on site unless in a designated wash bay which must then be constructed. Wash bays must be installed with sand and grease traps. ix. Management of on-site water use must be strictly implemented **D 11.1 Groundwater** i. Use of impermeable liner (HDPE or GCL) to prevent ground water contamination and leachate; ii. Storm-water management measures to prevent ponding and to encourage storm water to flow around/ off the site, must be implemented on site. iii. Measures to prevent ongoing illegal dumping of waste must be implemented iv. Adhere to all the mitigation highlighted in specialist reports v. Construction vehicles are to be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. vi. All cement mixing must occur on impervious surfaces and within controlled bermed areas. vii. Oil residue must be treated with oil absorbent such as Drizit or similar and this material removed to a licensed waste disposal site. viii. Contractor/s must provide regularly serviced portable chemical toilets for construction workers at a distance no more than 200 m from the site rehabilitation				

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
ix. No materials may be discharged from the construction camps. **D 11.2 Stormwater** i. The landfill can be rehabilitated (landscape the landfill to resemble the natural topography) ii. Construction of an attenuation/leachate pond onsite to capture runoff water and polluted water from the landfill, and surrounding environment iii. Ensure effective stormwater management principles to reduce the loss of topsoil during heavy downpours				

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
D12 SOIL i. The contractors must provide and maintain a method statement for "management of topsoil" ii. Topsoil must be deemed to be the top layer of soil containing organic material, nutrients and plant seeds. For this reason it is an extremely valuable resource for the rehabilitation and vegetation of disturbed areas. iii. Ripping must be done to a depth of 250mm in two directions at right angles. Topsoil must be placed in the same soil zone from which it has been stripped. iv. At the beginning of the construction phase, topsoil removed for vegetation clearance must be stripped to a minimum depth of 150 mm and stockpiled on the demarcated topsoil stockpile areas. v. All topsoil must be removed and stockpiled on the site. vi. Single handling is recommended. Stockpiles must not be higher than 2m to avoid compaction. vii. Dust suppression is necessary for stockpiles older than a month – with either water or a biodegradable chemical binding agent. viii. Backfilling must be undertaken in such a way that the final contours blend with the surrounding environment. ix. Slopes can then be capped with topsoil. This requires a minimum layer of 100 mm in most areas. x. Construction of anti-erosion berms xi. Ripping of compacted soil to avoid sheet erosion xii. Ensuring that stockpiles are well managed to minimise erosion xiii. Planting of grass xiv. Regularly inspect all storm water channels xv. Provide soil conservation measures in areas of susceptible erosion	• Minimise scaring of the soil surface and land features • Minimise disturbance and loss of soil • Minimise construction footprint • Minimise sedimentation of nearby drainage lines • Containment of invasive plant growth	• No visible erosion scars once construction is completed • Minimal invasive weed growth • No signs of sedimentation and erosion • Method statement adhered to.	Daily	Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
D13 IMPACT ON AIR QUALITY i. Implement dust suppression measures (wetting or application of soil binding compound) in all areas that will be affected by construction activities and where dust will be generated. This must also be undertaken during windy and dry weather conditions ii. A continuous dust monitoring process needs to be undertaken during construction. iii. Speed restriction of 20km/h must be implemented for all construction vehicles. iv. All vehicles transporting friable materials such a sand, rubble etc. must be covered by a tarpaulin or wet down	• To ensure that the air quality is not affected	• No signs of dust on site	Daily	Contractor

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
D14 IMPACT ON SOCIO ECONOMICS i. All adjacent landowners must be informed of the construction processes prior to commencement of construction activities. ii. Adjacent land owners must be informed timeously of any service stoppages in their areas. iii. Notification must include possible timeframes for stoppages. iv. Consequences of such stoppages must be clearly indicated to all surrounding/affected land owners. v. Affected land owners must be timeously informed of any/all maintenance of the bulk water services supply which may result in service stoppages to their properties. Again this must include possible timeframes so alternatives can be provided.	• To ensure that communities in the vicinity of the facility are involved in the project and are able to improve their economic conditions through the acquisition of employment	• Locals' knowledge about the employment opportunities for community members on the project	Ongoing	Developer
D15 IMPACT ON TRAFFIC AND LOCAL ROADS i. Vehicular movement beyond the property boundaries may not occur during peak hour traffic times (07h30 – 08h30 and 16h00 – 17h00). ii. There must be an erection of signage warning motorists about the presence of construction vehicles as well and the need to reduce speeds. iii. It must be ensured that a backlog of traffic does not develop at the access points during peak hours through the upgrade to the road system and the implementation of an efficient and effective access control system. iv. Speed restriction of 20km/h must be implemented for all construction vehicles v. Construction vehicles must not dispose of soil of other material on roads. Where this occurs, the material must immediately be removed.	• To ensure that locals are not negatively affected by the presence of construction vehicles through events such as car accidents.	• Locals' knowledge about the presence of construction vehicles on site	Ongoing	Contractor and subcontractor's

Phase of development	CONSTRUCTION AND OPERATION
Impact / issue	Site Activities (D)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION	RESPONSIBLE PARTY/PARTIES
D16 HEALTH AND SAFETY IMPACTS i. Signs in appropriate local languages must be erected on site to warn people entering the sites of the potential risks ii. The site and excavations must be fenced off and demarcated using danger tape to ensure that no animals or residents enter the area. iii. Safety clothes and equipment must be worn at all times. iv. The Safety Officer on site should put any other measures in place to ensure that health and safety of all persons entering the site either legally or illegally is not compromised v. No fires should be allowed at or around the construction site.	• To ensure the safety of humans and animals	• Community knowledge about the importance of safety on the site	Ongoing	Contractor

3. MONITORING PHASE EMPR

3.1 Preamble

The following tables form the core mitigation measures appropriate to the operational phase of the EMPr. The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria / targets and timeframes are clearly specified.

3.2 Structure and contents of tables

The table consists of four parts as follows:

Environmental Consideration / Impact / issue - This row will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.

Mitigation Measure - This column will include all the necessary mitigation measures for each impact / issue'.

Frequency of action - Provides time guidelines for the 'Responsible party' by which he / she is to action or manage the required mitigation

Responsible Party – Provides the details of the responsible team member which should account on the activities highlighted in column 1 to 4.

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The measures mitigation measures for the maintenance and management, monitoring phase (Post Operation and rehabilitation activities) will apply. Some of these are in the tables below. It must be noted that the complete impacts and mitigation measures will form part of the closure phase of the project for a licence will have to be compiled as per the waste legislation.

Phase of development	**POST OPERATION AND REHABILITATION ACTIVITIES**
Impact / issue	**FENCING (E)**

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
i. The site should be fenced so that no further development or dumping of additional waste of any kind can be carried out. ii. The security of the site should be maintained at all times	• To prevent illegal access and dumping	• No damage to the fence and no signs of illegal access	Monthly	Developer

Phase of development	**POST OPERATION AND REHABILITATION CATIVITIES**
Impact / issue	**BIODIVERSITY (F)**

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
i. The site must be fully rehabilitated and stabilised (for example, through revegetation ii. The vegetation that has been established on the landfill needs to be maintained in order to prevent erosion	• To ensure that the site is rehabilitated according to acceptable standards	• Improvement to the site conditions and establishment of vegetation	Every two months	Developer

Phase of development	POST OPERATION AND REHABILITATION CATIVITIES
Impact / issue	WATER QUALITY (G)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
i. Surface and Groundwater Monitoring in accordance with requirements of the Minimum Requirements for Water Monitoring at Waste Management Facilities, 1998 as published by the Department of Water Affairs (now Department of Water and Sanitation)	• To ensure that activities do not affect water resources	• No reports of water contamination as a result of site activities	Monthly	Developer

Phase of development	POST OPERATION AND REHABILITATION CATIVITIES
Impact / issue	FIRE (I)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
i. A 5 meter fire break must be maintained around the site			Monthly	Developer

Phase of development	POST OPERATION AND REHABILITATION CATIVITIES
Impact / issue	STORMWATER (J)

MITIGATION MEASURE	MANAGEMENT OBJECTIVES	MEASURABLE TARGETS	FREQUENCY OF ACTION / MONITORING	RESPONSIBLE
i. Discharge points must be inspected for blockages of any kind; these must be removed timeously to ensure the efficient operation of the storm water management system			Monthly	Developer

3. MONITORING PHASE EMPR

3.3 Preamble

The following tables form the core mitigation measures appropriate to the operational phase of the EMPr. The tables present the objectives to be achieved and the management actions that need to be implemented in order to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria / targets and timeframes are clearly specified.

3.4 Structure and contents of tables

The table consists of four parts as follows:

Environmental Consideration / Impact / issue - This row will identify the issue being addressed, e.g. Materials, site demarcation, heritage, etc.

Mitigation Measure - This column will include all the necessary mitigation measures for each impact / issue'.

Frequency of action - Provides time guidelines for the 'Responsible party' by which he / she is to action or manage the required mitigation

Responsible Party – Provides the details of the responsible team member which should account on the activities highlighted in column 1 to 4.

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The following specific measures mitigation measures for the maintenance and management, monitoring phase (post closure and rehabilitation activities) will apply:

Environmental Consideration	Mitigation Measures	Frequency	Responsible Party
1. Fencing	• The site should be fenced and isolated so that no further development or dumping of additional waste of any kind can be carried out. • The security of the site should be maintained at all times to prevent illegal access and dumping	Ongoing	Developer
2. Biodiversity	• The site must be fully rehabilitated and stabilised (for example, through revegetation • The vegetation that has been established on the landfill needs to be maintained in order to prevent erosion	Ongoing	
3. Water Quality	• Surface and Groundwater Monitoring in accordance with requirements of the Minimum Requirements for Water Monitoring at Waste Management Facilities, 1998 as published by the Department of Water Affairs (This Department is now known as the Department of Water and Sanitation)	Annually	
4. Fire	• A 5 meter fire break must be maintained around the site	Biannually (every two years)	
5. Stormwater	• Discharge points must be inspected for blockages of any kind; these must be removed timeously to ensure the efficient operation of the storm water management system.	Monthly and as when required (especially after storm events)	
6. Illegal dumping of waste	• Monitoring of continuous illegal dumping on the site	Weekly or as and when required	

Appendix1: DECLARATION OF UNDERSTANDING BY THE DEVELOPER/ENGINEER/CONTRACTOR

I, _____

Representing _____

Declare that I have read and understood the contents of the Environmental Management Programme (EMPr) for:

Contract _____

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

Signed: _____

Place: _____

Date: _____

Witness 1: _____

Witness 2: _____

Appendix 2: METHOD STATEMENT: SOLID WASTE MANAGEMENT

METHOD STATEMENT: Solid Waste Management

CONTRACT:…… **DATE**:……..

WHAT WORK IS TO BE UNDERTAKEN? [give a brief description of the works to be undertaken on site that will generate waste (hazardous and non-hazardous wastes)]: * Note: please attach extra pages if more space is required.

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN? (where possible, provide an annotated plan and a full description of the extent of the works): * Note: please attach extra pages if more space is required

*Insert additional pages as required

Appendix 3: INCIDENT AND ENVIRONMENTAL LOG

INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	**Environmental Condition**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

REFERENCES

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