

APPENDIX 7

THE ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROPOSED ACCESS ROAD CONSTRUCTION WITHIN THE MADIBENG LOCAL MUNICIPALITY, BOJANALA PLATINUM DISTRICT, NORTH WEST PROVINCE

For

ESTATE d`AFRIQUE

Located on:

**HARTBEESTPOORT 482 JQ & WELGEGUND 491 JQ
NEAR HARTBEESPOORT DAM, NORTH WEST PROVINCE**

Report completed: 13 November 2019

Submitted by:



P.O. Box 2544

Montana Park

0159

Tel: 012 543 3808

Fax 086 621 0294

E-mail: info@prescali.co.za

**DOCUMENT CONTROL**

	Name	Signature	Date
Compiled:	Gregory Netshilindi (<i>Cand. Nat Sci</i>)		2019-11-12
Checked:	Elaine van der Linde (<i>Pr.Sci.Nat</i>)		2019-11-13
Authorized:	Dr Petro ERASMUS(<i>Pr.Sci.Nat</i>)		2019-11-13

Distribution List

Agency, Organisation, Person etc.	Address	Number of Soft Copies	Number of Hard Copies
Department of Economic Development, Environment, Conservation and Tourism	80 Kerk Street Rustenburg 0300	0	3
Estate d'Afrique	R104 Hartbeespoort 0216	1	0

Revision and Amendments

Description of Revision / Amendment	No	Date
Draft Environmental Management Programme	0	2019-11-13



Title:

Proposed development of a new access road from Estate d'Afrique to James Road in Meerhof, within the jurisdiction of the Madibeng Local Municipality, Bojanala Platinum District, North West Province.

Client:

Estate D`Afrique
R104
Hartbeespoort
0216

Report no:

EMPR/EDAFRQ/2019/11/13

Consultant:

Prescali Environmental Consultants (Pty) Ltd
P.O. Box 2544
Montana Park
0159

Telephone No: 012 - 543 3808

Fax No: 086 - 621 0294

Date:

Report: 13 November 2019

COPYRIGHT WARNING

This document is privileged and confidential in nature and unauthorised dissemination or copying is prohibited. This document will be updated as required. Estate d'Afrique claims protection of this information in terms of the Promotion of Access to Information Act, 2002 (Act No. 2 of 2002) and without limiting this claim, especially the protection afforded by Chapter 4.



Table of Contents

1	INTRODUCTION	1
1.1	Environmental Management Programme	1
1.2	Contents of the EMPr	1
2	DEFINITIONS	3
3	BACKGROUND INFORMATION	5
3.1	The EAP who prepared the report.	5
3.2	The expertise of the EAP	5
3.2.1	The qualifications of the EAP	5
3.2.2	Summary of the EAP`s past experience	6
3.3	Project Introduction	6
3.4	Locality of Activity	6
3.5	Locality Maps	7
3.6	DESCRIPTION OF THE SCOPE OF WORK	8
3.7	Description of the activities to be undertaken including associated structures and infrastructure.....	8
3.8	Construction Methodology	8
3.9	The Environmental Policy	9
3.10	Environmental Objectives and Targets	9
3.11	Environmental Legislation and Guidelines	10
4	ORGANISATION AND MANAGEMENT STRUCTURE	12
4.1	Contractual obligation	12
4.2	The Developer.....	13
4.2.1	Role	13
4.2.2	Responsibilities	13
4.2.3	Reporting structure.....	13
4.3	Project Management	13
4.3.1	Role	13
4.3.2	Responsibilities	13
4.3.3	Reporting structure.....	14
4.4	Environmental Control Officer (ECO).....	14
4.4.1	Role	14
4.4.2	Responsibilities	14
4.4.3	Reporting Structure	15
4.4.4	Reporting Frequency and Audit Reports.....	15
4.5	Contractor.....	15
4.5.1	Role	15
4.5.2	Responsibilities	16



4.5.3	Reporting Structure	16
4.6	Sub-contractors	16
4.6.1	Role	16
4.6.2	Responsibilities	17
4.6.3	Reporting Structure	17
5	ENVIRONMENTAL MANAGEMENT SYSTEM	17
5.1	Preamble	17
5.2	Planning	17
5.2.1	Environmental Principles for the construction work	17
5.2.2	Compliance with environmental legislation	18
5.2.3	Permits and permissions	18
5.2.4	Construction Method Statement.....	18
5.2.5	No working times.....	18
5.2.6	Safety at the construction site	18
5.2.7	Social disruption	19
5.2.8	Existing services and infrastructure	19
5.2.9	Traffic congestion	19
5.2.10	Unpleasant visual impact at the construction site	19
5.3	Site Establishment	20
5.3.1	Site and Contractor`s Camp.....	20
5.3.2	Site Identification	20
5.3.3	Site Demarcation.....	20
5.4	Site Housekeeping	21
5.4.1	Site Housekeeping	21
5.4.2	Workshop	21
5.4.3	Equipment Maintenance and Storage.....	21
5.4.4	Light pollution	21
5.4.5	Security	21
5.4.6	General Materials Handling, Use and Storage	21
5.4.7	Fuels, oils, hazardous substances and other liquid pollutants.....	22
5.4.8	Solid Waste Management	23
5.4.9	Sanitation	23
5.4.10	Wastewater and contaminated water management.....	24
5.4.11	Stormwater management and erosion control	24
5.4.12	Air Emissions and Odour Control.....	25
5.4.13	Noise Control.....	25
5.4.14	Dust Control	25
5.4.15	Fire Prevention and Control	25



5.4.16	Emergency Procedures	25
5.5	Construction activities	26
5.5.1	Vegetation Clearance.....	26
5.5.2	Alien Invasive Control	27
5.5.3	Topsoil Management.....	27
5.5.4	Vehicle Movement.....	28
5.5.5	Community matters	28
5.5.6	Work stoppage and temporary site closure	28
5.5.7	Heritage Resources	28
5.5.8	Decommissioning of the construction site.....	28
5.5.9	Rehabilitation.....	28
5.6	Monitoring.....	29
5.6.1	Obligations of the parties	29
5.6.2	Audit schedule.....	29
5.6.3	Compliance with the EMPr.....	30
5.6.4	Fauna and flora monitoring	30
5.6.5	Tolerances.....	30
5.6.6	Penalties.....	30
5.7	Completion of contract	31
5.8	Operational phase	31
5.8.1	Accident prevention.....	31
6	IMPACT ASSESSMENT AND MITIGATION SUMMARY	32
6.1	Basic Assessment Issues and Mitigation Measures	44
7	ENVIRONMENTAL AWARENESS.....	44
8	CONCLUSION	45

Table of figures

Figure 3-1: 1:12 000 Map indicating the location of the Estate D`Afrique road extension. **Error! Bookmark not defined.**

Figure 3-2: 1: 5 000 Aerial photograph showing an overview of the proposed Estate D`Afrique road extension..... **Error! Bookmark not defined.**

List of Tables

Table 1-1: Contents of EMPr.....	2
Table 3-1: Project Location	6
Table 3-2: Legislative Framework.....	10
Table 6-1: Shows the significance of the impacts before and after mitigation is taken into account.	Error! Bookmark not defined.
Table 6-2: Summary of possible mitigation measures.....	36





1 INTRODUCTION

An Environmental Management Programme (EMPr) must consist of a set of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The programme also includes the actions needed to implement these measures.

1.1 Environmental Management Programme

An EMPr can be defined as, "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced".

EMPr are very important tools in the sound environmental management of projects, provided the specifications are implemented and the user understands the contents of the report and the reasons for the implementation of certain specifications.

The EMPr has the following objectives:

- To state standards and guidelines which are required to be achieved in terms of environmental legislation;
- To set out the mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts and where possible to improve the condition of the environment.
- To provide guidance regarding method statements which are required to be implemented to achieve the environmental specifications.
- To define corrective actions, this must be taken in the event of non-compliance with the specifications.
- To prevent long-term or permanent environmental degradation.

The following principles have been used in the preparation of the EMPr:

- Compliance with relevant legislation, standards, codes, and practices in the application of safe technologies;
- Minimisation of impacts on the environment and human beings;
- Performance of all activities in a safe and effective manner and maintenance of all equipment in good operating condition for the protection of the health and safety of all persons and to conserve the environment and property;
- Focus on environment risk prevention;
- Focus on occupational and public health, safety; and
- The undertaking of all necessary precautions to control, remove, or otherwise correct any leaks and/or spills of hazardous materials, or other health and safety hazards.

1.2 Contents of the EMPr

The contents of the EMPr, as it is defined in the Amended Environmental Impact Assessment (EIA) Regulations 2014 (as amended) published as Government Notice (GN) No R. 326 of 7 April 2017 in terms of Chapter 5 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended), must be consistent with requirements included in Appendix 4 of the Regulations Table 1-1.

Table 1-1: Contents of EMPr

EMPr REQUIREMENTS ACCORDING TO APPENDIX 4 OF GNR 982 OF 2014, AS AMENDED IN GNR 326 OF 2017	SECTION OF REPORT
An EMPr must comply with section 24N of the Act and include-	Section 3.1 and 3.2
a. Details of:	
i. the EAP who prepared the EMPr; and	
ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Section 3.6 and 3.7
b. a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	
c. a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 3.5
d. a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Section 6
i. Planning and design	
ii. Pre-construction activities	
iii. Construction activities	
iv. rehabilitation of the environment after construction and where applicable post closure; and	
v. where relevant, operation activities;	
f. description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -	Section 5
i. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	
ii. comply with any prescribed environmental management standards or practices;	
iii. comply with any applicable provisions of the Act regarding closure, where applicable; and	
iv. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
g. the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.6
h. the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f)	Table 6-2
i. an indication of the persons who will be responsible for the implementation of the impact management actions;	Error! Reference source not found. and Table 6-2
j. the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	
k. the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5
l. a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 4
m. an environmental awareness plan describing the manner in which-	Section 7
i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	
ii. risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
n. any specific information that may be required by the competent authority.	Section 8

Provided in the chapters that follow, is the EMPr for the proposed Estate d'Afrique access road development, based on the requirements of Appendix 4 of the 2014 EIA Regulations (as amended in 2017 as detailed above).



2 DEFINITIONS

For the purpose of this EMP, the following definitions and abbreviations shall apply:

Alien Vegetation: Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable. This includes plant species identified as Alien and invasive species in the National environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), Alien and Invasive Species Regulations, 2014.

Cement laden water: Means water containing cement or concrete arising from the Contractor's activities.

Contaminated water: Means water contaminated by the Contractor's activities such as with hazardous substances, hydrocarbons, paints, solvents and runoff from plant, workshop or personnel wash areas but excludes water containing cement/ concrete or silt.

Construction Camp: Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities and other areas required undertaking construction activities.

Environment: Environment means the surroundings within which humans exist and that could be made up of: -

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

Environmental Aspect: An environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

Environmental Authorisation (EA) (formerly known as, Record of Decision): A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned undertaking to construct the proposed infrastructure and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

Environmental Control Officer (ECO): A suitably qualified and experienced person or entity appointed for the construction works, to perform the obligations specified in the EA.

Environmental Site Officer (ESO): An ESO is the site-based designated person responsible for implementing the environmental provisions of the construction contract and is appointed by the service provider that carries-out construction activities.

Environmental Impact: An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment: The process of examining the environmental effects of a development. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental scoping.

Environmental Management Programme: An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.



Environmental Management System: The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001:2015 and EMS is defined as, *“that part of the overall management system includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy.”*

Environmental Policy: A statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.

External Auditor: A suitably qualified and experienced independent expert as per the required auditor qualifications (ISO 14012).

His: Means his or her, as applicable.

Independent Environmental Consultant: A suitably qualified and experienced independent environmental consultant (IEC) appointed by the Engineer to perform the obligations specified in the Contract. The IEC shall provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.

Interested and Affected Party (I&AP): Refers to an I&AP party contemplated in section 24(4)(d) of the NEMA (1998, Act No. 107) and which, in terms of that section, includes –

- a) *Any person, groups of persons, organisation interested in or affected by an activity, and;*
- b) *Any organ of state that may have jurisdiction over any aspect of the activity.*

ISO 14001 Environmental Management System (ISO 14001:2015): The internationally accepted and recognised Environmental Management System as reflected in the document SABS ISO 14001:2015.

Method Statement: Is a written submission by the Contractor to the ECO in response to the EMPr or to a request by the ECO, setting out the plant (construction equipment), materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the ECO when requesting the Method Statement. The Method Statement shall be in such detail that the ECO is able to assess whether the Contractor's proposal is in accordance with the EMPr and/or will produce results in accordance with the EMPr.

Mitigate: The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.

No-Go Area: Areas where construction activities are prohibited.

Pollution: According to the NEMA, 1998 (Act No. 107 of 1998), pollution can be defined as, *“Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future”.*

Potentially hazardous substance: Is a substance, which, in the reasonable opinion of the ECO, can have a deleterious effect on the environment. Hazardous Chemical Substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act.

Reasonable: Means, unless the context indicates otherwise, reasonable in the opinion of the ECO, after he has consulted with ESO.

Rehabilitation: To re-establish or restore to a healthy, sustainable capacity or state.



Silt laden water: Means water containing sand and silt arising from the Contractor's activities and/or as a result of natural run-off.

Site: The area in which construction is taking place.

Solid waste: Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Species of Special Concern: Those species listed in the rare, indeterminate, or monitoring categories of the South African Red Data Books, and/or species listed in globally near threatened, nationally threatened or nationally near threatened categories (K.N, 1998).

Threatened species: Threatened species are defined as: a) species listed in the endangered or vulnerable categories in the revised South African Red Data Books or listed in the globally threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).

Topsoil: The top 100 mm of soil and may include top material e.g. vegetation and leaf litter.

3 BACKGROUND INFORMATION

3.1 The EAP who prepared the report.

Name of the practitioner: Prescali Environmental Consultants.

This report was compiled by Mr. Gregory Netshilindi and reviewed by Ms. Elaine van der Linde and Dr. Petro Erasmus.

- Tel No.: 012 543 3808
- Fax No. :086 621 0294
- e-mail address: info@prescali.co.za /gregory@prescali.co.za

3.2 The expertise of the EAP

3.2.1 The qualifications of the EAP

(With evidence as attached in Appendix 1 of the Draft Basic Assessment Report (DBAR))

- Ms. E. van der Linde has qualifications in Geology, Engineering Geology and Environmental Management and experience in Water and Environmental Management. She is registered as a Pri Sci Nat. (SACNASP), Natural Professional Scientist, Registration number 400219/05. Her qualifications are provided in the DBAR.
- Dr. P. Erasmus has qualifications in Zoology and Biochemistry and further studied in Zoology and Marine pollution. She is registered as a Pri Sci Nat. (SACNASP), Natural Professional Scientist, for Ecological Sciences, Registration number 116207. Her qualifications are provided in the DBAR
- Mr G. Netshilindi has qualifications in Geology, Environmental & Geographical Sciences and Introduction in Project Management. He is a Candidate Natural Scientist and a member of the Geological Society of South Africa. His qualifications are provided in the DBAR

3.2.2 Summary of the EAP's past experience

(Attached the EAP's curriculum vitae as attached in Appendix 2 of the DBAR)

- Mr G. Netshilindi has 4 years applicable experience (a short resume with a list of projects is attached in Appendix 2 of the DBAR) and has been employed by:
 - Minmet Services (Pty) Ltd;
 - Tshikovha Green and Climate Change Advocates (Pty) Ltd;
 - Prescali Environmental Consultants (Pty) Ltd;
- Ms. E. van der Linde has 19 years of applicable experience (a short resume with a list of projects is attached in Appendix 2 of the DBAR) and has been employed by:
 - Department: Water Affairs and Forestry (DWAF);
 - Groundwater Consulting Services CC;
 - M2 Environmental Connections CC;
 - Prescali Environmental Consultants (Pty) Ltd;
- Dr. P. Erasmus has 9 years of applicable experience (a short resume with a list of projects is attached in Appendix 2 of the DBAR) and has been employed by:
 - Department: Water Affairs and Forestry (DWAF);
 - M2 Environmental Connections (Pty) Ltd;
 - Prescali Environmental Consultants (Pty) Ltd.

3.3 Project Introduction

Estate d'Afrique has proposed the development of a new access road that will link the estate with James road in the Meerhof area towards the north western side situated in ward 29 of the Madibeng Local Municipality which falls under the greater Bojanala Platinum District, North West Province. Currently the estate has one entry and one exit point located southwards on the R104 in accordance with the township establishment conditions. The proposed construction of the access road and associated structures requires an Environmental Authorisation (EA) to be applied in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended). Prescali Environmental Consultants (Pty) Ltd (Prescali) has been appointed by Estate d'Afrique to undertake the Basic Assessment (BA) process required in terms of NEMA and the Environmental Impact Assessment (EIA) Regulations (2014, as amended in 2017) for the development.

3.4 Locality of Activity

Table 3-1: Project Location

District Municipality	Bojanala Platinum District Municipality	
Local Municipality	Madibeng Local Municipality	
Ward	Ward 29	
Area/Town/Village	Hartebeespoort	
Co-ordinates:	Latitude (S)	Longitude (E)
Start point	25° 45' 55.50"	27° 53' 47.78"
Mid- point	25° 45' 55.59"	27° 53' 42.11"
End point	25° 45' 48.84"	27° 53' 44.48"
Property Description	Portion 4 of Farm Welgegund 491 JQ	
	Portion 107 of Farm Welgegund 491 JQ	
	Remainder of portion 9 of Farm Hartebeespoort 482 JQ	
	Portion 29 of Farm Hartebeespoort 482 JQ	
	Portion 46 of Farm Hartebeespoort 482 JQ	
21-digit General	Surveyor code	of
T O J Q 0 0 0 0 0 0 0 0 0 0 0 4 9 1 0 0 0 0 4		
T O J Q 0 0 0 0 0 0 0 0 0 0 0 0 4 9 1 0 0 1 0 7		
T O J Q 0 0 0 0 0 0 0 0 0 0 0 0 4 8 2 0 0 0 0 9		



each farm name	T	O	J	Q	0	0	0	0	0	0	0	0	0	0	0	4	8	2	0	0	0	2	9
	T	O	J	Q	0	0	0	0	0	0	0	0	0	0	0	4	8	2	0	0	0	4	6

3.5 Locality Maps

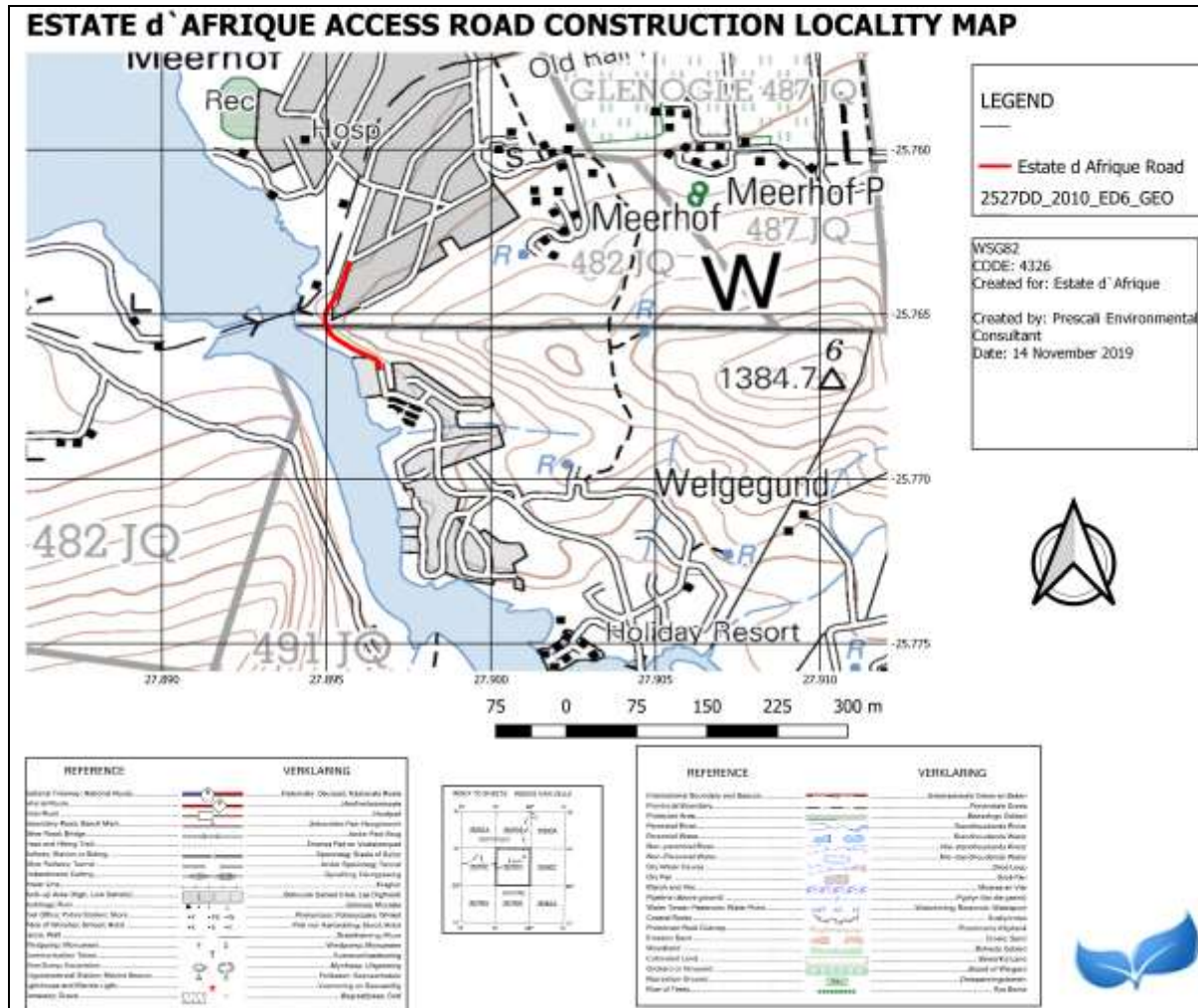


Figure 3-1: 5 000 Topographical map showing an overview of the proposed Estate D'Afrique road extension



Figure 3-2: Aerial photograph showing an overview of the proposed Estate D'Afrique road extension

3.6 DESCRIPTION OF THE SCOPE OF WORK

3.7 Description of the activities to be undertaken including associated structures and infrastructure.

Estate d'Afrique Master Association (the “**estate**”) proposes to construct an access road from the Estate d'Afrique connecting to James road in Meerhof in the Hartbeespoort area, in ward 29 of the Madibeng Local Municipality which falls under the greater Bojanala Platinum District, North West Province. Currently the estate has one entry and one exit point located southwards on the R104 in accordance with the township establishment conditions.

The proposed access road will be sealed and will extend about 460 metres long and about 6 metres wide in a servitude area not exceeding 13.6 m which will include both lanes and associated embankments. The road will fall into properties owned by Manpark (Pty) Ltd, Transnet Limited and the Republic of South Africa.

The proposed access road will include the installation of stormwater infrastructure along the length of the road to facilitate the movement of storm water runoff and drainage from one side of the road to the other without damaging the structural integrity of the road itself. The road will also include the estate's new access-controlled gate at location: 25°45'55.56"S; 27°53'42.10"E. The proposed road route is situated across the foot of a ridge of the Witwatersberg, adjacent to the Hartbeespoort Dam.

3.8 Construction Methodology

The proposed construction methodology can be summarised as follows:



- Conventional construction methods will be used for the construction of the proposed road. The entire site will be surveyed and pegged out to determine the road reserve.
- Clearing of vegetation from the road reserve.
- Earthworks will take place along the route of the road. Depressions will be filled and excess material will be excavated.
- Once the desired levels are met, gravel material of various grades will be brought onto site and layered onto the road using a grader.
- Curbs and V-drains will be installed adjacent to the road surface.
- Soil reinforcement will be implemented at steep slopes - Primary Reinforcement will be done by using the Maccaferri Terramesh™ System.
- The final surface material (refer to option analyses in Section 4.2.2) will be laid and compacted to form the road surface.
- Backfilled soil and disturbed areas will be shaped to resemble the surrounding topography.
- The proposed construction methodology has been developed in an attempt to minimise both the environmental impact and social impact of the project.

3.9 The Environmental Policy

The contractor is required to compile an Environmental Management Policy, which must consider the following:

- The contractor's mission, vision and core values;
- Guiding principles;
- Requirements of, and communication with I&APs;
- The environmental specifications and intentions of the specifications must be upheld;
- The need to work towards continual improvement;
- The obligation to prevent pollution and ecological degradation;
- The importance of coordination with other organisational policies (e.g. quality, occupational health and safety, etc.);
- Site activities will be conducted in a manner that does not create a nuisance, risk or hazard to the natural environment;
- Reference to specific local and/or regional conditions;
- Employee and public health and safety must be considered a priority;
- A commitment to compliance with relevant environmental laws, regulations, by-laws and other criteria to which the contractor subscribes.

The contractor (contractor is defined as principal contractor, sub-contractors and any employees retained on this project) is required to be familiar with the environmental policy (to be developed by the applicant) and all that it implies, and to adopt and implement the policy throughout the course of construction. The policy must be communicated to all employees (and sub-contractors) of the contractor, and made available to the public, if requested.

3.10 Environmental Objectives and Targets

In order to meet the commitments detailed within the Environmental Management Policy, as well as those included within the environmental specifications of this EMPr, the contractor shall develop environmental objectives and targets. The objectives and targets must conform to, and comply with, the following criteria:

- The objectives and targets shall constitute the overall goals for environmental performance identified in the environmental policy and strategy;



- When establishing objectives and targets, the contractor shall take into account the identified environmental aspects and associated environmental impacts, as well as the relevant findings from environmental reviews and audits; The targets must be set to achieve objectives within a specified timeframe;
- Targets should be specific and measurable;
- When the objectives and targets are set, the contractor must establish measurable Key Performance Indicators (KPIs). The latter will be used by the contractor as the basis for an Environmental Performance Evaluation System, and can provide information on both the environmental management and the operational systems;
- Objectives and targets need to apply broadly across the contractor's operations, as well as to site-specific and individual activities;
- Objectives and targets must be reviewed from time to time in view of changed operational circumstances and/or changes in environmental legal requirements, and need to take into consideration the views of the I&APs.

3.11 Environmental Legislation and Guidelines

The contractor must ensure that South African Legislation concerning the natural environment, pollution and the build environment are strictly enforced. Such legislation must include but not limited to the following:

Table 3-2: Legislative Framework

Legislation	Compliance of Activity
National Environmental Management Act 1998	<p>The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) is South Africa's overarching environmental legislation. It includes a set of principles that govern environmental management and against which all Environmental Management Programmes (EMPs) and actions are measured. These principles include and relate to sustainable development, protection of the natural environment, waste minimisation, public consultation, the right to an environment that is not harmful to one's health or wellbeing, and a general duty of care.</p> <p>The Environmental Impact Assessment (EIA) Regulations, 2014: GN R.324, R.325, and R.327 (as amended in 2017) under Section 24 of the NEMA define the activities that require Environmental Authorisation and the processes to be followed to assess environmental impacts and obtain Environmental Authorisation.</p> <p>Environmental authorisation is required for the construction of the Estate d'Afrique access road. Therefore, this application is in line with the requirements of NEMA.</p>
Section 28 of the National Environmental Management Act, Act 107 of 1998 Duty of Care and remediation of the environmental damage	Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.
National Water Act 1998	<p>The purpose of the National Water Act, 1998 (Act No. 36 of 1998) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which takes into account amongst other factors:</p> <ul style="list-style-type: none"> • Meeting the basic human needs of present and future generations, • Promoting equitable access to water;



Legislation	Compliance of Activity
	<ul style="list-style-type: none"> • Redressing the results of past racial and gender discrimination; • Promoting the efficient, sustainable and beneficial use of water in the public interest; • Facilitating social and economic development. <p>It is unlikely that any activities carried out by the development will trigger a Water Use Licence.</p>
National Environmental Management: Waste Management Act, 2008	<p>The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) is Act was amended on 1 July 2009 and it aims to consolidate waste management in South Africa.</p> <p>On the 29th of November 2013, the Minister of Water and Environmental Affairs amended the list of waste management activities that might have a detrimental effect on the environment. Please take note of the other amendments/ publications since 29 November 2013:</p> <ul style="list-style-type: none"> • 2 June 2014 – NEM: Waste Amendment Act, 2014 (Act No. 26 of 2014) • 2 May 2014 – Remediation of contaminated land and soil • 2 May 2014 – Amendment List of Waste Management Activities that have or are likely to have detrimental effect on the environment <p>The NEMWA provides reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. One of its main objectives is to protect health, wellbeing and the environment by providing reasonable measures for securing ecologically sustainable development while promoting justifiable economic and social development.</p> <p>It is unlikely that any activities carried out by the development will trigger a Waste Management Activity.</p>
Environmental Conservation Act, 1989	<p>The Environmental Conservation Act, 1989 (Act No. 73 of 1989) makes provisions for the application of general environmental principles for the protection of ecological processes, promotion of the environment. This Act has mostly been repealed by NEMA</p>
National Environmental Management Biodiversity Act 2004	<p>National Environmental Management Biodiversity Act, 2004 (act No. 10 of 2004) aims to provide the framework, norms, and standards for the conservation, sustainable use and equitable benefit-sharing of South Africa's biological resources. Section 52 allows for the publication of a list of threatened ecosystems in need of protection. The list was published in Government Gazette No. 34809 Notice No. 1002 dated 9 December 2011.</p> <p>Locally, in terms of the North West Conservation Plan, the site is categorised as falling within areas characterised as Ecological Support Area 1 (ESA1) and Critical Biodiversity Area 2 (CBA2). Therefore, the proposed project requires an Environmental Authorisation to clear an area of 300 square metres or more of indigenous vegetation being within a sensitive area.</p>



Legislation	Compliance of Activity
National Forests Act, 1998	<p>The National Forest Act, 1998 (Act No. 84 of 1998) promotes the sustainable management and development of forests for the benefit of all; provide special measures for the protection of certain forests and protected trees; promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes and promotes community forestry.</p> <p>In terms of section 15(1) of the National Forests Act of 1998, forest trees or protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the Department of Agriculture, Forestry and Fisheries (DAFF).</p> <p>Relevant Authorisation needed for all protected species, in terms of NEMBA (TOPS List) and the National Forests Act, 1998, will be necessary if any of the listed species need to be relocated during any phase of the development.</p>
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	For the protection of South African Heritage to nurture and conserve community's legacy. No archaeological significant artefacts will be disturbed during this project therefore no permits will be required from the provincial heritage authority, AMAFA.
Mineral & Petroleum Resources Development Act 28 of 2002	<p>To provide for the sustainable development of the nation's mineral and petroleum resources which includes activities carried out for the winning of any mineral on, in or under the earth (i.e. the use of borrow pits).</p> <p>Material used in the construction of the road must be obtained from a licensed borrow pit</p>
The Polluters Pay Principle	The 'polluters pays' principle is the commonly accepted practice that those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment. The contractor and applicant will be responsible for any pollution on site.
Municipal Planning Framework	
Madibeng Local Municipality IDP	The proposed project is for a private road and therefore does not fall in line with the Madibeng Local Municipality IDP's goal to promote sustainable development.
Magaliesberg Environmental Management Framework and Plan.	The project does not disregard the objectives of the Municipality's EMF and C-Plan.

4 ORGANISATION AND MANAGEMENT STRUCTURE

4.1 Contractual obligation

In order to ensure that the EMPr and/or derivatives are enforced and implemented, these documents must be given some form of legal standing. This shall be achieved through incorporating the EMPr and/or derivatives documents as an addendum to the contract documents for the particular project and specifying under particular conditions of the contract for the tender that the requirements of the EMPr and/or derivatives apply and must be met. This will ensure that the obligations are clearly communicated to Contractors and that submitted tenders have taken into account, and budgeted for the environmental requirements specified in the EMPr and/or its derivatives. The successful tender ultimately becomes the signed contract, thereby ensuring that the included EMPr is legally binding.



4.2 The Developer

Estate d'Afrique is the developer and has overall responsibility for ensuring that the construction and development of the project is undertaken in an environmentally sound and responsible manner, and in particular, reflects the requirements and specifications of the EMPr and recommendations from the relevant authorities.

4.2.1 Role

Estate d'Afrique will be required to assume overall responsibility for the environmental aspects of the construction and development of the project.

4.2.2 Responsibilities

The responsibilities of the developer will include the following:

- Establish and maintain regular and proactive communications with EAP, Resident Engineer, Contractor and ECO;
- Review and comment on environmental reports produced by the ECO; and
- Ensure that the EMPr is reviewed and updated as necessary.

4.2.3 Reporting structure

The developer will liaise with and/or take instruction from the following:

- Competent authorities.

4.3 Project Management

The developer may appoint a designated Project Manager (PM) or use an in-house PM. The PM will ensure that the approved EMPr is included in the contract documentation issued to prospective contractors.

4.3.1 Role

The success of environmental compliance is determined to a large degree by the continual presence of the technically responsible party.

Specific to the implementation of the EMPr, the role of the PM will be to:

- Review and approve Method Statements produced by the Contractor in connection with the EMPr;
- Oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications; and
- Liaise between and with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences.

4.3.2 Responsibilities

The PM's responsibilities will include:



- Be familiar with the contents of the EMPr;
- Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports;
- Request for, review and approve the Method Statements prepared by the Contractor in consultation with the ECO;
- Review and approve drawings produced by the Contractor or professional team in connection with, for example, the construction site layout, access/haul roads and so on;
- Issue site instructions giving effect to the ECO requirements where applicable;
- Review complaints received and make instructions as necessary;
- Maintain a record of complaints from the public and communicate these to the Contractor and the ECO;
- Discuss with the ECO the application of penalties for the infringement of the Environmental Specifications, and other possible enforcement measures when necessary;
- Issue penalties as and when necessary;
- Implement temporary work stoppages as advised by the ECO, where serious environmental infringements and non-compliances have occurred; and
- Facilitate proactive communication between all role-players in the interests of effective environmental management.

4.3.3 Reporting structure

The PM will report to the developer, as and when required.

4.4 Environmental Control Officer (ECO)

4.4.1 Role

Estate d'Afrique must appoint a suitably qualified person as an ECO, who is comprehensively briefed on site management and environmental issues. The ECO will monitor, review and verify the implementation of the EMPr. The ECO will be an ongoing appointment for the duration of the construction process. The ECO must be independent from the Contractor and Sub-Contractors, and must have appropriate authority to ensure that the EMPr is fully implemented and that appropriate actions are undertaken to address any discrepancies and non-compliances.

4.4.2 Responsibilities

The ECO will have the following responsibilities, at a minimum:

- Pre-construction site visit;
- To advise the PM on the interpretation and enforcement of the Environmental Specifications (ES), including discussions on non-compliances;
- To supply environmental information as and when required;
- To review and approve the Method Statements produced by the Contractor with the PM;
- To demarcate particularly sensitive areas (including all "No-go" areas) and to pass instructions through the PM concerning works in these areas;
- To monitor any basic physical changes to the environment as a consequence of the construction works – e.g. evidence of erosion, dust generation and silt loading in runoff;
- Attend regular site meetings between engineers and Contractors;
- To undertake regular monthly audits of the construction works and to generate monthly audit reports;



- Reports are to be forwarded to the PM, the Developer, and the responsible Environmental Authority (DEA);
- To communicate frequently and openly with the Contractor and the PM to ensure effective, proactive environmental management, with the overall objective of preventing or reducing negative environmental impacts and/or enhancing positive environmental impacts;
- To advise the PM on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities;
- Review complaints received and make instructions as necessary;
- Identify and make recommendations for minor amendments to the EMPr as and when appropriate;
- Ensure that the Contractor, his employees and/or Sub-Contractors receive the appropriate environmental awareness training prior to commencing activities;
- Train the contractor staff on the contents of the EMPr; and
- Post-construction site visit.

4.4.3 Reporting Structure

The ECO will report to the PM and relevant competent authority.

4.4.4 Reporting Frequency and Audit Reports

- Weekly audits must be undertaken in the first month;
- Thereafter monthly audits must be undertaken throughout the duration of the construction period;
- A post construction audit must be undertaken when the contractor has moved off site; and
- Reports must be submitted within one week of undertaking the on-site audit.

4.5 Contractor

The developer will appoint a contractor/s to undertake construction for the construction of the access road. The contractor will be required to undertake their activities in an environmentally responsible manner, as described in the EMPr.

4.5.1 Role

Specific to the EMPr, the role of the Contractor/s will be to:

- Implement, manage and maintain the EMPr for the duration of his/her contract;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the EMPr;
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties;
- Ensure that all Sub-Contractors and other workers appointed by the Contractor/s are aware of their environmental responsibilities while on site or during the provision of their services off site;
- Ensure that all Sub-Contractors and other workers appointed by the Contractor/s are complying with and implementing the EMPr during the duration of their specific contracts; and



- Provide appropriate resources including budgets, equipment, personnel and training for the effective control and management of the environmental risks associated with the construction.

4.5.2 Responsibilities

The Contractor/s will have the following responsibilities:

- Appoint a competent Environmental Representative, who is familiar with Environmental Legislation and the impacts and mitigation associated with construction activities;
- Be familiar with the contents of the EMPr;
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions;
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities;
- Prepare Method Statements, programme of activities and drawings/plans for submission to the PM (and ECO);
- Review the site inspection reports and take cognisance of the information and implement recommendations contained therein;
- Notify the ECO and PM, verbally and in writing, immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- Notify the ECO and PM, verbally and in writing at least 10 working days in advance of any activity he/she has reason to believe may have significant adverse environmental impacts, so that mitigatory measures may be implemented timeously;
- Ensure environmental awareness among employees, Sub-Contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them;
- Maintain a register of environmental training for site staff and Sub-Contractor's staff for the duration of the contract;
- Undertake the required works within the designated working areas;
- Rehabilitating services, utilities, private/public property and other areas adversely affected by construction activities outside of demarcated areas in accordance with the PM's instructions; and
- Communicate and liaise frequently and openly with the PM and ECO to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts.

4.5.3 Reporting Structure

The contractor/s will receive instructions from the PM.

4.6 Sub-contractors

4.6.1 Role

The Contractor may from time to time appoint Sub-Contractors to perform certain services and/or provide certain products in association with the construction and development of the project.



4.6.2 Responsibilities

Sub-Contractors shall comply with the Environmental Specifications in the EMPr and associated instructions issued by the Contractors to ensure compliance. Sub-Contractors and their staff will be required to take part in the environmental awareness training as instructed by the Main Contractor.

4.6.3 Reporting Structure

The Sub-Contractor will receive instructions from the main Contractor/s.

5 ENVIRONMENTAL MANAGEMENT SYSTEM

5.1 Preamble

The EMPr has been compiled to ensure a proactive rather than reactive 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 an EMPr is to provide management measures that must be implemented by Developers, Engineers and Contractors alike to ensure that the potential impacts of a proposed development are minimised. It must also be ensured that the EMPr is maintained and upheld as a dynamic document for the project team to add or improve on issues that might be considered irrelevant to the project. In such instances, the approving authority may authorize the ECO to make such changes.

The following tables form the core mitigation measures appropriate to the planning, pre-construction, construction and operation phases. The tables represent the objectives to be achieved and the management actions that must be implemented to mitigate the negative impacts and enhance the benefits of the project. Associated responsibilities, criteria/targets and timeframes are clearly specified.

5.2 Planning

5.2.1 Environmental Principles for the construction work

- a) The environment is considered to be composed of both biophysical and social components.
- b) Construction is a disruptive activity and all due consideration must be given to the environment, including the social environment during the execution of a project to minimise the impact on affected parties.
- c) Minimisation of areas disturbed by construction activities (i.e. the 'footprint' of the construction area) should minimise many of the construction related environmental impacts of the sub-project and reduce rehabilitation requirements and costs.
- d) All relevant standards relating to international, national, provincial and local legislation, as applicable, should be adhered to. This includes requirements relating to waste emissions, waste disposal practices, noise regulations, road traffic ordinances, etc.
- e) All relevant permits and permissions shall be obtained from the relevant authorities to undertake construction activities as necessary.
- f) Every effort should be made to minimise, reclaim and/or recycle waste materials.
- g) The Contractor will be required to prepare an Environmental Policy Statement that will state their commitment to achieving the basic principles for environmental protection and control for the duration of their contract. This statement will be displayed at the site as part of the Environmental Information Poster display.



5.2.2 Compliance with environmental legislation

- a) The Contractor shall ensure that all pertinent legislation concerning the protection of the natural environment are kept in a site file and prevention of pollution is strictly enforced.
- b) The ECO/PM shall maintain a database of all pertinent legislation, regulations and guidance pertinent to the environmental management of the activities being undertaken.

5.2.3 Permits and permissions

- a) The Contractor shall ensure that all pertinent permits, certificates and permissions have been obtained prior to any activities commencing on site and are strictly enforced/adhered to.
- b) The Contractor shall maintain a database of all pertinent permits and permissions required for the contract as a whole and for pertinent activities for the duration of the contract.

5.2.4 Construction Method Statement

- a) The Contractor shall submit written Method Statements to the PM for the activities identified by the PM and/or the ECO.
- b) Method Statements indicate what will be done to comply with relevant environmental specification as set out in the EMPr.
- c) Method Statements shall be submitted at least ten working days prior to the proposed commencement of work on an activity to allow the PM (and/or ECO) time to study and approve the method statement.
- d) The Contractor shall not commence work on that activity until such time as the Method Statement has been approved in writing by the PM.
- e) The Contractor shall carry out the activities in accordance with the approved Method Statement.
- f) Under certain circumstances the PM may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the PM, and appropriate records retained.
- g) Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel.
- h) Approval of the Method Statement shall not absolve the Contractor from any of their obligations or responsibilities in terms of the contract.

5.2.5 No working times

- a) No noisy construction works shall be executed except between 08h00 and 17h00 on Monday to Saturday, inclusive, of any week, unless work is necessary for the saving of life or property or for the safety of the work.
- b) In cases where construction works are required after hours, the approval of the PM must be obtained before such works commence.
- c) In cases where construction works are required after hours, the registered I&APs must be notified.

5.2.6 Safety at the construction site

Extra safety precautions must be taken to ensure that residents and pedestrians residing in the area do not come to harm.

- a) Construction areas, open sewers/storm water, and other potential construction related danger areas must be clearly demarcated with hazard tape and/or be fenced if appropriate.



- b) The construction site shall be off limits to the general public at all times during the construction period and site clean-up.
- c) The Contractor should ensure that hazard and warning signs are erected in the relevant languages at appropriate positions warning traffic of construction activities ahead and at problem sites, and that they are maintained in good condition.
- d) The Contractor must ensure that all staff is compliant with the relevant safety regulations on site and wears applicable safety clothing and gear at all times while on site.

5.2.7 Social disruption

- a) The Contractor's staff shall in no way be a nuisance to residents, consumers or clients seeking the services of the established businesses in the area. Any complaints received by the PM will be investigated, addressed and, if deemed necessary, the relevant persons will be suspended from the project.
- b) The Contractor shall give at least seven days' notice to the residents in the vicinity of the construction activities of their intention to begin construction activities in their area.
- c) The PM may request a representative of the Contractor to be available to discuss issues raised by residents and make information available to them on construction activities.

5.2.8 Existing services and infrastructure

- a) It is the Contractor's responsibility to familiarise themselves with the position of existing services and infrastructure that may get damaged due to construction activities.
- b) The Contractor shall ensure that existing services (e.g. pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the PM.
- c) The Contractor shall be responsible, at their own cost, for the repair and reinstatement of any infrastructure that is damaged or services that are interrupted.
- d) Such repair or reinstatement will be to the Contractor's cost and shall receive top priority over all other activities.
- e) A time limit for the repairs may be stipulated by the PM in consultation with the Contractor.

5.2.9 Traffic congestion

- a) The movement of trucks to and from the construction site must be well coordinated by the PM or their representative at all times, so as to cause the least disruption to the residents in the area during the morning and afternoon rush hour traffic.
- b) Large trucks and other heavy-duty machinery may not be left unattended in any of the access roads.
- c) Appropriate signage indicating road works ahead, narrowing of the road and relevant detours must be erected at strategic locations, clearly observable by all road users by day and night.

5.2.10 Unpleasant visual impact at the construction site

- a) The Contractor shall ensure that the construction site is kept neat and tidy at all times during the design and planning, and construction phase of the project.
- b) General and construction related waste shall, upon approval by the PM, be contained and stored in the appropriate manner as prescribed by relevant governing regulations.
- c) Where appropriate, boundaries of the construction and/or Contractor's camp site shall be cordoned off with appropriate material, e.g. wood/plywood boards, to minimise unpleasant visual impacts of the construction site.



5.3 Site Establishment

5.3.1 Site and Contractor's Camp

- a) The site for the Contractor's Camp shall be determined in collaboration with the PM and ECO before the Contractor moves on site, such that it is effectively isolated from the surrounding environment and takes into consideration:
 - The need to be more than 100 meters from a water body in a position that will facilitate the prevention of storm water runoff from the site from entering a water body;
 - The risk of public nuisance through for example, noise generation, visual intrusion, light pollution or disruption to access, is reduced;
 - Security implications are reduced.
- b) The Contractor's Camp should also be of sufficient size to accommodate the needs of all Sub-Contractors that may work on the project.
- c) Utilities and other Service Providers such as Telkom and Eskom shall be advised of the construction activities. The Contractor will be responsible for any damage to these services/utilities.

5.3.2 Site Identification

- a) A demarcated area or site camp at or close to the site must be provided by the Contractor for the storage of machinery and trucks as necessary.
- b) The Contractor will produce a plan illustrating the proposed site camp and proposed working areas. The plan must be approved by the PM.
- c) The site camp shall be fenced and provided with a lockable access gate to prevent vandalism, theft and unauthorised entry by the public.
- d) If the proposed site camp is to be situated on private land, approval must be obtained from the landowner.
- e) It will be the responsibility of the Contractor to reinstate the site camp to its original condition once the project has been completed, which includes ripping all hardened surfaces and re-seeding the site camp with indigenous grasses.
- f) The working areas shall be kept to a minimum to reduce the total physical 'footprint' of the construction site thereby reducing environmental damage.
- g) The Contractor shall not use the land for the site camp for any purpose other than for the proper carrying out of the works under the contract.

5.3.3 Site Demarcation

- a) Prior to construction commencing, the Contractor, PM and ECO shall inspect the site and identify any sensitive environments (as defined in the Environmental Specification).
- b) Where necessary, the "No-go" areas shall be demarcated using materials as specified by the PM. These may include fencing, snow melting, hazard tape wound between two wire strands, wire mesh, or other approved materials or means.
- c) The Contractor will be required to maintain all demarcation fencing and other demarcating materials for the duration of construction activities or as otherwise instructed by the PM.
- d) The Contractor shall ensure that, insofar as he has the authority, no person, plant equipment or material enters the "No-go" areas at any time.



5.4 Site Housekeeping

5.4.1 Site Housekeeping

- a) The Construction Site and surrounds are to be maintained in a clean orderly and presentable condition at all times.
- b) Monthly inspections by the ECO of all facilities will be undertaken using checklists to ensure a minimum standard of orderliness is maintained.

5.4.2 Workshop

- a) All routine maintenance of equipment and vehicles shall be performed in the Contractor's workshop off site.
- b) If it is unavoidable to do maintenance on site, the Contractor shall obtain the approval of the PM prior to commencing activities and confine maintenance activities to an area identified and approved by the PM or ECO.
- c) The Contractor shall ensure that there is no contamination of the soil or surface water from any unavoidable emergency maintenance activities. Each Contractor must have a spill control kit and staff appropriately trained to utilise it.

5.4.3 Equipment Maintenance and Storage

- a) All vehicles and equipment shall be kept in good working order and shall be stored in the site camp or an area approved by the PM.
- b) All stationary plant must be supplied with drip trays to prevent soil contamination.
- c) Leaking equipment shall be repaired immediately or removed from the site.
- d) Washing of equipment shall only be undertaken at the site camp in an area approved by the PM and ECO.

5.4.4 Light pollution

- a) The Contractor shall ensure that any lighting installed on site for their activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other uses or the area – particularly during the night time.
- b) Where the Contractor has been authorised to undertake night work, low glare lighting shall be used.

5.4.5 Security

- a) Appropriate fencing, security gates, shelter, signage and/or security guards are to be provided at the construction site to ensure the security of all equipment and materials, as well as to secure the safety of site staff.
- b) The entrance gates to the site camp shall be locked after hours to discourage theft and vandalism.

5.4.6 General Materials Handling, Use and Storage

- a) Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them from spilling from the vehicle during transit.
- b) Delivery drivers informed of procedures and restrictions, and supervised during offloading.



- c) Laydown areas are to be approved by the Engineer.
- d) The Contractor shall be responsible for any clean-up resulting from the failure by their staff or supplier to properly secure transported materials.
- e) Strip and stockpile herbaceous vegetation, overlying grass and other fine organic matter along with the topsoil.
- f) Do not strip topsoil when it is wet.
- g) Stockpile topsoil stripped from different sites separately, as reapplication during rehabilitation must preferably be site specific. If necessary, keep a stockpile register.
- h) Do not mix topsoil obtained from different sites, unless approved by the ECO.
- i) Do not stockpile topsoil in drainage lines.
- j) Do not stockpile topsoil in heaps exceeding 2 m in height.
- k) Remove exotic / invasive plants and broad leaf weeds that emerge on topsoil stockpiles.

5.4.7 Fuels, oils, hazardous substances and other liquid pollutants

- a) All potentially hazardous raw and waste materials are to be handled by the Contractor's trained staff and stored on site in accordance with manufacturer's instructions and legal requirements.
- b) Appropriate training for the handling and uses of such materials is to be provided by the Contractor as necessary. This includes providing for any spills and pollution threats that may occur.
- c) Products should be clearly labelled and symbolic safety/hazard warning signs should be provided.
- d) Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations.
- e) The location of the fuel and chemical depot(s) shall be located at least 100 m from any surface water body.
- f) See also the Environmental Specification for the handling and storage of materials.
- g) Fuels (Petrol and Diesel) and Oil:
 - Unless specifically authorised, fuel shall not be stored on site, but shall be transported to the site as and when required.
 - Where fuel is to be stored on site, all necessary approvals regarding storage and dispensing shall be obtained from the appropriate authorities.
 - The location of the fuel storage area shall be approved by the PM and ECO.
 - The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids and that these are kept firmly shut and locked at all times. The design and construction of the storage tanks shall be in accordance with a recognised code and as approved by the PM.
 - The tanks shall be situated in a bunded area that has a volume of at least 110% of the volume of the largest tank. The floor of the bunded area shall be constructed as per the Environmental Specification.
 - All storage tanks are to be designed and constructed in accordance with a recognised code.
 - Storage tanks are to be removed on completion of the works.
 - No smoking shall be allowed in the vicinity of the fuel storage area.
 - There shall be adequate firefighting equipment at the fuel storage and dispensing area or areas. Fuel shall be kept under lock and key at all times.
 - Where reasonably practical, equipment shall be refuelled at a petrol station. If it is not reasonably practical then the surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the PM prior to any refuelling activities, as per the Environmental Specification.
 - The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/break down any spilled fuel and where possible is designed to



encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill. This material must be approved by the PM prior to any refuelling or maintenance activities.

- In the case of a spill, contaminated material is to be immediately removed from the site and disposed of at the appropriate hazardous waste facility.

h) Hazardous Substances

- If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.
- Hazardous chemical substances used during construction shall be stored in secondary containers.
- The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.
- Preference must be given for utilising chemicals with a lower hazardous rating.

5.4.8 Solid Waste Management

- a) The site is to be kept clean, neat and tidy at all times.
- b) No burning, burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted.
- c) The Contractor will be required to prepare and submit a Method Statement on waste control and management at the site. At a minimum, the Contractor shall include the following in the Method Statement:
 - The provision of sufficient bins (preferably vermin and weather proof) at the camp and work sites to store the solid waste produced on a daily basis.
 - The collection of refuse and waste generated by their staff on a daily basis.
 - The final disposal of the site waste at an approved landfill site, or at a site as approved by the PM and ECO.
 - Wherever possible, materials used or generated by construction shall be recycled.
 - Provision for responsible management of any hazardous waste generated during the construction works.
 - Hazardous waste must be stored in a sealed container or stored in a covered area protected from rain.

5.4.9 Sanitation

- a) Adequate washing and toilet facilities are to be provided at the construction site camp.
- b) Portable chemical toilets at a ratio of one toilet per 15 workers shall be provided at the site camp.
- c) Portable toilets must be at least 50 meters from any water bodies.
- d) All temporary/portable toilets shall be secured to the ground to the satisfaction of the PM to prevent them from toppling over or being blown over.
- e) The type and exact location of the toilets must be approved by the PM prior to establishment. No septic tanks or pit latrines are to be established.
- f) The Contractor shall ensure maintenance of all toilets in a clean sanitary condition to the satisfaction of the PM. Toilets are to be serviced once a week and water, soap and toilet paper shall be provided.
- g) The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site to an appropriate location/facility. The toilet Contractor is to provide proof that the toilet contents are disposed of at an appropriate facility.



- h) Discharge of waste from toilets into the environment and burial of toilet waste is strictly prohibited.

5.4.10 Wastewater and contaminated water management

- a) No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent watercourses and/or water bodies will be permitted.
- b) The Contractor shall prepare a Method Statement on the control and management of wastewater and/or contaminated water on site – including providing for the appropriate disposal of contaminated water (particularly where this may be contaminated by hydrocarbon and hazardous materials).
- c) Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. This particularly applies to water emanating from concrete batching plants and concrete swills.
- d) The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or stormwater infrastructure.
- e) Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained.
- f) Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted.
- g) The Contractor shall notify the PM and ECO of any pollution incidents on site.

5.4.11 Stormwater management and erosion control

- a) Any evidence of water related erosion should be addressed as per the Environmental Specification.
- b) The Contractor shall take reasonable measures to control storm water and the erosive effects thereof and shall provide a Method Statement for approval by the PM.
- c) During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking measures to prevent the surface water from being concentrated in streams and from scouring slopes, banks or other areas.
- d) Areas affected by construction related activities and/or susceptible to erosion must be monitored regularly for evidence of erosion.
- e) On any areas where the risk of erosion is evident, special measures may be necessary to stabilise the areas and prevent erosion. These may include, but not be restricted to:
- Confining construction activities.
 - Using cut-off berms.
 - Using mechanical cover or packing structures such as geofabric to stabilise steep slopes or hessian, gabions and mattress and retaining walls.
 - Straw stabilising.
 - Brush cut packing.
 - Constructing anti-erosion berms.
- f) The erosion prevention measures must be implemented to the satisfaction of the PM and ECO.
- g) Where erosion does occur on any completed work/working areas, the Contractor shall reinstate such areas and areas damaged by the erosion at their own cost and to the satisfaction of the PM and ECO.
- h) Traffic and movement over stabilised areas shall be restricted and controlled. Any damage to the stabilised areas shall be repaired and maintained to the satisfaction of the PM and ECO.



- i) The Contractor shall be liable for any damage to downstream property caused by the diversion of overland storm water flows.

5.4.12 Air Emissions and Odour Control

- a) The Contractor will be required to ensure that all vehicles and plant used are maintained in good working order to help reduce air emissions.
- b) Exhaust emission control devices are to be installed on vehicles and/or machinery where practical.

5.4.13 Noise Control

- a) The Contractor shall keep noise level within acceptable limits. The Contractor shall comply with all relevant guidelines and regulations.
- b) All vehicles and machinery shall be fitted with appropriate silencing technology that shall be properly maintained.
- c) The use of all plant and machinery shall be appropriate to the task required in order to reduce noise levels and/or environmental damage.
- d) Any complaints received by the Contractor regarding noise will be recorded and communicated to the PM and ECO.

5.4.14 Dust Control

- a) The Contractor shall be responsible for the control of dust arising from their operations and activities.
- b) Control measures shall include regular spraying of working/exposed areas with water at an application rate that will not result in soil erosion or runoff. The frequency of spraying will be agreed with the PM.
- c) The excavation, handling and transport of erodible materials shall be avoided under high wind conditions.
- d) Soil stockpiles shall be wetted and/or sheltered from the wind with a cover.

5.4.15 Fire Prevention and Control

- a) The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of their activities on site.
- b) The Contractor shall ensure that there is basic fire-fighting equipment available on site.
- c) Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires.
- d) Smoking shall not be permitted in those areas where there is a fire hazard. These areas shall include:
 - Fuel storage areas.
 - Any areas where vegetation or other material is such as to make likely the rapid spread of an initial flame.
- e) The contractor shall hold fire prevention talks with staff to create awareness of the risks of fire.

5.4.16 Emergency Procedures

- a) Specific to accidental leaks and spillages:



- The Contractor shall ensure that their employees and sub-contractors on site are aware of the procedure for dealing with spills and leaks.
 - The Contractor shall also ensure that the necessary materials and equipment for dealing with the spills and leaks are available on site at all times.
- b) Specific to hydrocarbon spills:
- The site shall have a supply of absorbent material readily available to absorb any emergency hydrocarbon spills, and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such material shall be able to deal with a minimum of 200 litres of spill.
 - The Contractor shall contain the spill using sand berms, sandbags, pre-made booms, sawdust or absorbent materials.
 - The area shall be cordoned off and secured.
 - The Contractor shall notify the ECO, PM and relevant authorities of any spills that occur.
 - The treatment and remediation shall require method statements.
- c) The Contractor shall assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures. These contact details shall be listed in Tswana and English in the site office, construction camp and any other suitable areas.
- d) The treatment and remediation of areas affected by emergencies shall be undertaken to the reasonable satisfaction of the PM and ECO at the cost of the Contractor where their staff have been proven to be responsible for the emergency.

5.5 Construction activities

Construction activities must be restricted to defined area.

5.5.1 Vegetation Clearance

- a) Prior to the start of construction, woody vegetative matter shall be stripped from all works areas, and temporary roads. This material shall either be taken to the nearest licensed landfill site for disposal, or it may be stockpiled for later redistribution over the re-instated top soiled surface or for use in combating soil erosion.
- b) During clearing of woody vegetation, no ground cover or grass and topsoil shall be removed and damage to this layer shall be minimised as far as possible. The EO shall ensure that all works are undertaken in a manner that minimizes the impact on vegetation outside of the site area.
- c) Burning of vegetation is not permitted under ANY circumstances.
- d) Only the trees that are a real problem in terms of causing damage to the road surface/construction are to be removed.
- e) No trees outside of the 13.5 m servitude area of the road should be removed.
- f) Where trees are removed, the soil should be stabilized especially where the tree was situated on the side of the ridge.
- g) The following provisions shall apply with respect to the protection of areas of vegetation adjacent to or within the site.
 - No tree or shrub within close proximity of the road reserve shall be cut or pruned without prior approval from the EO.



- No tree or shrub within close proximity of the road reserve shall be cut or pruned until it has been clearly marked for this purpose by the EO.
- No tree within close proximity to the road reserve shall be felled or burnt for any reason.
- Trees or shrubs, which have been selected for preservation by the EO within or adjacent to the site, shall be fenced around their drip line with danger tape. No open fires shall be allowed within these fenced areas, nor shall vehicles be parked underneath these trees. The area shall also not be used for materials storage or as allocation for temporary buildings.

5.5.2 Alien Invasive Control

- a) Alien invasive vegetation shall be removed from the working areas for the duration of the project.
- b) In general, clearance of invasive vegetation shall be undertaken by hand, using chainsaws and hand held implements, with vegetation being cut off at ground level, and not uprooted.
- c) To prevent re-growth, cut stumps of re-sprouting alien invasive species and treat with Chopper herbicide, at the application rate specified by the manufacturers.
- d) Topsoil that is contaminated with seeds of alien invasive species shall not be used for rehabilitation purposes.
- e) The use of herbicides shall be in compliance with the terms of the Municipal bylaws (if applicable) and the Fertilisers Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947). In terms of this Act, a registered pest control operator shall apply herbicides, or shall supervise the application of herbicides.

5.5.3 Topsoil Management

- a) Topsoil shall be stripped from all areas that are to be utilized during the construction period and where permanent structures and access is required.
- b) These areas will include temporary and permanent access roads, lay down areas and vehicle yards. Topsoil shall be stripped after clearing of woody vegetation and before the excavation or construction commences.
- c) Soil shall be stripped to a maximum depth of 300 mm or to the depth of bedrock where soil is shallower than 300 mm. Herbaceous vegetation shall not be removed from the stripped soil.
- d) Topsoil which has been stripped shall be protected from compaction and stored for use in future rehabilitation.
- e) Soil stockpiles shall preferably not be higher than 2.5 m or stored for long periods. The slopes of soil stockpiles shall preferably not be steeper than 1 vertical to 2.5 horizontal. No vehicles shall be allowed access onto the stockpiles after they have been placed.
- f) Soil stockpiles shall be protected and should not be contaminated with oil, diesel, petrol, garbage or any other material that may inhibit the later growth of vegetation in the soil. After topsoil stockpiling has been completed, soil conservation and dust control measures should be applied where directed by the EO. This may include the use of erosion control fabric or grass seeding.



5.5.4 Vehicle Movement

- a) All vehicle movement will be along existing roads and access tracks.
- b) Vehicles will be driven at moderate speeds and special care will be taken (especially in wet weather) to avoid eroding tracks.
- c) All movement of vehicles will take place on the established servitude roads or on private roads as agreed in advance. No movement will take place through the veld. If any vehicle should get stuck, the damage must be repaired immediately so that no deep ruts remain.

5.5.5 Community matters

- a) Site infrastructure and equipment should be positioned in such a way as to limit visual intrusion on neighbours.
- b) Lighting should be positioned so as not to interfere with road traffic or disturb the surrounding community.
- c) A Community complaints register should be made available on site.
- d) Fence removal and re-instatement should be conducted in close consultation with the land owners to prevent damage to property and potential loss of live-stock.

5.5.6 Work stoppage and temporary site closure

- a) The Engineer shall have the right to order work to be stopped in the event of significant infringements of the Project Environmental Specifications until the situation is rectified in compliance with the specifications. In this event, the Contractor shall not be entitled to claim for delays or incurred expenses.

5.5.7 Heritage Resources

Caution during construction must be ensured to not impact on fenced graves and cemeteries situated adjacent to the study site.

Where heritage resources are discovered (e.g. burial sites, archaeological and paleontological artefacts) during construction the following will apply:

- a) Work at the point of the discovery is to cease, and may not recommence until such time as guidance from the South African Heritage Resources Agency (SAHRA) has been received.
- b) The point of discovery is to be clearly demarcated.
- c) The SAHRA is to be informed within 24 hours of the discovery.

5.5.8 Decommissioning of the construction site

- a) Camp and office facilities will be removed after completion of the contract.
- b) Once an area has been vacated by a contractor and is no longer required, the affected area will be rehabilitated to its original condition or to the satisfaction of the client.

5.5.9 Rehabilitation

- a) Rehabilitation shall be required for all specified areas disturbed by the works and site camp.
- b) Rehabilitation shall ensure that all specified areas disturbed by the works are returned to a similar or better state than before the construction works commenced.



- c) The Contractor shall rehabilitate all disturbed areas to the satisfaction of the PM and the ECO.
- d) The Contractor shall implement a programme of progressive rehabilitation, ie. once works are complete in particular areas, rehabilitation and/or re-vegetation could begin.
- e) A programme of progressive rehabilitation will provide an opportunity to assess whether or not the methods employed are suitable and successful. Where rehabilitation of an area is not successful, the Contractor will rehabilitate these areas at no additional cost to the Developer.
- f) Rehabilitation includes, but is not limited to, the following activities:
 - i. Clearance of rubble associated with construction, including removal of surplus materials, excavation and disposal of consolidated waste concrete and concrete wash water, litter etc.
 - ii. Removal of all soil/sand contaminated by hydrocarbons by excavation to the depth of contaminant penetration and removal to an appropriate landfill site.
 - iii. Backfilling and contouring using stockpiled subsoil removed during site clearing.
 - iv. Finishing and grading of final levels of all disturbed areas shall be consistent with the master plan for the site.
 - v. Rehabilitation of all drainage lines affected by construction to approximately their original profile. Where this is not feasible due to technical constraints, the profile is to be agreed upon by the PM.
 - vi. Ripping along the contour of compacted disturbed areas, including stockpile areas, to a depth of 150 mm prior to the replacement of top soils, except where otherwise specified by the PM.
 - vii. The eradication of young invasive/alien species that may have grown up during the construction period in impacted and rehabilitated areas.

5.6 Monitoring

5.6.1 Obligations of the parties

- a) The Contractor shall inspect the site on a daily basis to ensure that the environmental specifications are adhered to.
- b) The Contractor must establish a monitoring programme for early detection of alien invasive species and establish an alien invasive eradication and control programme as part of the flora objectives.
- c) The Contractor shall provide the PM with a written report, on a weekly basis, detailing both compliance with the EMPr as well as environmental performance.
- d) The Contractor shall maintain a record of incidents (spills, impacts, complaints, legal transgressions, etc,) as well as corrective and preventive actions taken, for submission to the PM at the scheduled project meetings.
- e) The ECO shall conduct audits to ensure that the system for implementation of the EMPr is operating effectively. The audit shall check that a procedure is in place to ensure that:
 - o The EMPr and the Method Statements being used are the up to date versions.
 - o Variations to the EMPr, Method Statements and non-compliances and corrective actions are documented.
 - o Emergency procedures are in place and effectively communicated to Personnel.

•

5.6.2 Audit schedule

The audit programme shall consist of the following at a minimum:

- a) A pre-construction audit.



- b) Weekly audits during the first month of construction
- c) Thereafter audits at monthly intervals
- d) A post construction audit within 1 week after the Contractor has declared the completion of works.

5.6.3 Compliance with the EMPr

The Contractor and/or their agents are deemed not to have complied with the EMPr and remedial action if:

- a) Within the boundaries of the site or extensions there is evidence of contravention of the EMPr clauses.
- b) Environmental damage ensues due to negligence.
- c) The Contractor fails to comply with corrective or other instructions issued by the PM, within a time period specified by the PM.

5.6.4 Fauna and flora monitoring

Monitoring of the ecological aspects should be done on a continual basis to assess whether there are any concerns regarding the flora. Monitoring of the biodiversity should start as soon as the construction phase of the development commences. Monitoring should be undertaken annually.

The monitoring of biodiversity should include the following:

- Annual visual assessment of surrounding areas to determine if vegetation in undisturbed areas is being impacted. The visual assessment can be undertaken by the ECO.
- Continue with alien invasive monitoring, eradication and control programme.
- Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase.

5.6.5 Tolerances

- a) Environmental management is concerned not only with the final results of the Contractor's operations to carry out the works, but also with the control of how those operations are carried out.
- b) Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operation required to complete the Works.
- c) It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on their part to do so will entitle the PM to certify the imposition of a penalty subject to the details set out.

5.6.6 Penalties

- a) Penalties will be issued for the transgressions and non-compliances where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications. The Contractor shall be liable to pay penalty over and above any other contractual consequence.
- b) Penalties may be issued per incident at the discretion of the PM. The exact value of the penalty imposed shall be at the discretion of the PM and enforcement shall be at the discretion of the Developer. The Contractor will also be responsible for remediation costs.
- c) Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the EMPr. The PM will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.



- d) The PM shall be the judge as to what constitutes a transgression in terms of this clause subject to the provisions of the General Conditions of Contract. In the event that transgressions continue, the Contractor's attention is drawn to the provisions of the General Conditions of Contract, under which the PM may cancel the Contract.
- e) For each subsequent similar offence, the penalty may, at the discretion of the PM be doubled in value to a maximum value to be determined by the PM.
- f) Payment of any penalty in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

5.7 Completion of contract

The Contractor is to timely notify the PM of the impending completion of the works to provide an opportunity to identify work outstanding or incomplete. The PM is to timely inform the ECO of contract completion so that a final audit can be arranged.

5.8 Operational phase

5.8.1 Accident prevention

- a) All traffic calming infrastructure, signage and road markings must be marked and erected before any road lane is opened for traffic.
- b) The Contractor shall ensure that the road is swept clean of debris before any road lane is opened for traffic.
- c) The Contractor shall ensure that manhole covers and grids of the newly constructed stormwater infrastructure are in place and secured to prevent harm for road users before any road lane is opened for traffic.



6 IMPACT ASSESSMENT AND MITIGATION SUMMARY

This section provides an assessment of the pre-mitigation significance as well as the post-mitigation significance of the environmental and social impacts that may result from the major activities associated with the development.

Table 6-1: Shows the significance of the impacts before and after mitigation is taken into account.

Impact	Description	Phase	Significance		Mitigation efficiency		Significance with mitigation	
Soil	Potential disturbances include compaction, physical removal and potential pollution;	C	Medium	48	Medium to High	0,4	Low	19,2
	The exposed soil surfaces have the potential to erode easily if left uncovered;	C, O	Low to Medium	27	Medium	0,6	Low	16,2
	Potential loss of stockpiled topsoil and other materials if not protected properly;	O	Low	4	Low	1	Low	4
	Insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding drainage lines;	O	Low to Medium	22	Low to Medium	0,8	Low	17,6
	Drainage line bank instability could cause erosion;	C,O	Low	8	Low to Medium	0,8	Low	6,4
	Increased erosion could result in increased sedimentation which could impact on ecological processes;	C,O	Medium	42	Low to Medium	0,8	Low to Medium	33,6
	The additional hardened surfaces created during construction and operation will increase the amount of stormwater runoff, which has the potential to cause erosion;	C,O	Low	11	Medium to High	0,4	Low	4,4
	If not properly managed, there may be damage to surrounding structures, such as existing dwellings etc;	C	Low	8	Low to Medium	0,8	Low	6,4
	Physical disturbance of the soil and plant removal may result in soil	C	Low to	26	Medium	0,6	Low	15,6



	erosion/loss; and		Medium					
	Erosion and potential soil loss from cut and fill activities	C	Low to Medium	28	Medium	0,6	Low	16,8
Vegetation and fauna	Vegetation clearance will likely destroy habitats and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding new road;	C	Medium to High	60	Low	1	Medium	60
	Sensitive areas may become vulnerable to Alien Invasive species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat	C,O	Low to Medium	30	Medium to High	0,4	Low	12
	Fragmentation of habitat areas by the linear development (access road): this activity will fragment ranges that certain animals may need to sustain adequate foraging area and breeding grounds;	C,O	Low to Medium	20	Medium	0,6	Low	12
	Continuous human activity over a longer-term period may further impact on the faunal communities within the area;	O	Low	10	Medium to High	0,4	Low	4
	Flora could be damaged by staff, residents and contractors if they are allowed to access certain natural area that should be indicated as no-go zone;	O	Low	7	Medium to High	0,4	Low	2,8
	Potential off-site pollution as a result of accidental spillages of petrochemicals or concrete; and	C	Low	8	Medium	0,6	Low	4,8
	Loss of land which has been identified as Critical Biodiversity Area as part of the Magaliesberg Environmental Management Framework	C,O	Low to Medium	36	Low to Medium	0,8	Low to Medium	28,8
	Potential dust generation from soil stripping, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality;	C	Low	10	Medium to High	0,4	Low	4
Air quality and noise pollution	Blasting of large boulders may result in increased vibration, dust and noise during construction.	C	Medium	39	Low to Medium	0,8	Low to Medium	31,2



	Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and	C,O	Low	14	Medium to High	0,4	Low	5,6
	Dust and noise will be created during the construction phase, which may impact on the local community	C	Low	9	Medium to High	0,4	Low	3,6
Waste	There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (eg oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc); and	C	Low	9	Medium to High	0,4	Low	3,6
	Waste generation could be created by the following: - Solid waste - plastics, metal, wood, concrete, stone; - Chemical waste- petrochemicals, resins and paints; and - Sewage as may be generated by employees	C	Low	8	Low to Medium	0,8	Low	6,4
Socio-economic	Creation of job opportunities for skilled personnel (eg engineers, specialists etc) and non-skilled personnel (eg labourers);	C	Low to Medium	33	high	0,2	Low	6,6
	Road construction will improve access in the area and will alleviate congestion;	O	Low to Medium	28	High	0,2	Low	5,6
	Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and	C,O	Low	16	Medium	0,6	Low	9,6
	Possible economic benefits to suppliers of building materials in the surrounding area as goods and services may be purchased from these entities during the construction phase	C	Low to Medium	30	High	0,2	Low	6
	There is potential for construction labour to trespass onto neighbouring properties (Meerhof and Estate D'Afrique);	C,O	Low	7	Low to Medium	0,8	Low	5,6
	Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users; and local residents	C	Low	7	Low to Medium	0,8	Low	5,6
	Undulating slope of the proposed site may lead to unsafe working environment during construction if not managed properly	C	Low	7	Medium	0,6	Low	4,2



Noise	Disruption to residents through increased activity and noise in the area	C	Low	6	Medium to High	0,4	Low	2,4
Water resource	Contamination of ground and surface water and soil;	C	Low to Medium	28	Low	1	Low	28
	Careless operation by contractor near the Hartebeespoort dam resulting in damage to the banks and riparian zones within the construction footprint and adjacent areas;	C	Low	8	Low to Medium	0,8	Low	6,4
	Drainage lines may be polluted due to accidental spillages of petrochemicals from vehicles and equipment, or concrete from road construction; and	C	Low	10	Medium to High	0,4	Low	4
	The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity in surrounding drainage lines	C	Low to Medium	36	Low to Medium	0,8	Low to Medium	28,8

**Table 6-2: Summary of possible mitigation measures.**

Impact	Description	Mitigation	Responsible Party	Frequency
Soil	Potential disturbances include compaction, physical removal and potential pollution;	Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. The site should be monitored weekly for any signs of off-site siltation. All areas impacted by earth-moving activities should be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth should be rehabilitated promptly with suitable vegetation to stabilize the soil;	ECO, Engineer, Contractor	On going
	The exposed soil surfaces have the potential to erode easily if left uncovered;	The area surrounding the drainage lines must be regularly checked for signs of erosion. If erosion is evident, corrective action must be taken;	ECO, Engineer	On going
	Potential loss of stockpiled topsoil and other materials if not protected properly;	The road alignments are to be surveyed prior to construction to prevent damage to existing infrastructure; and	Engineer	Before construction
	Insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies, which may lead to decreased water quality in surrounding drainage lines;	Any exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note, that the use of fertilisers, must be undertaken with caution and must not be allowed, in any circumstances, to run into drainage lines, to avoid any possible eutrophication impacts.	Contractor, Engineer	Post construction
	Drainage line bank instability could cause erosion;			
	Increased erosion could result in increased sedimentation which could impact on ecological processes;			
	The additional hardened surfaces created during construction and operation will increase the amount of stormwater runoff, which has the potential to cause erosion;			
If not properly managed, there may be damage to surrounding structures, such as existing dwellings etc.;				
Physical disturbance of the soil and plant removal may result in soil erosion/loss; and				



Impact	Description	Mitigation	Responsible Party	Frequency
	Erosion and potential soil loss from cut and fill activities.			
Vegetation and fauna	Vegetation clearance will likely destroy habitats and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding new road;	Identify sensitive fauna and flora prior to construction works;	ECO,	Prior construction
	Sensitive areas may become vulnerable to Alien Invasive species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum;	ECO, Contractor	On going
	Fragmentation of habitat areas by the linear development (access road): this activity will fragment ranges that certain animals may need to sustain adequate foraging area and breeding grounds;	Ensure adequate stormwater management as to ascertain that potentially polluted water do not enter the natural environment surrounding the footprint area, specifically the Hartbeespoort dam, which is already impacted by various nutrient enrichment impacts;	Contractor, Engineer	Weekly
	During operational phase continuous human activity over a longer-term period may further impact on the faunal communities within the area;	Alien plant encroachment must be monitored and prevented as outlined in this EMPr;	ECO, Contractor	Weekly
	Flora could be damaged by staff, residents and contractors if they are allowed to access certain natural area that should be indicated as no-go zone;	Appoint an ECO to oversee the activities and ensure that ecological aspects are kept in mind;	Project Manager	Prior construction
	Potential off-site pollution as a result of accidental spillages of petrochemicals or concrete; and	Keep activities (transport etc.) to the smallest area possible, as shown on the civil designs approved for the road. This is to prevent other unintended fragmentation that may have irreversible changes to faunal communities. It also increases the invasion of alien/foreign species. At all times keep to the road as approved and prevent unauthorized access into other surrounding areas;	Contractor	On going
	Loss of land which has been identified as Critical Biodiversity Area as part of the Magaliesberg Environmental Management Framework	A management plan for the control of invasive and exotic plant species needs to be implemented and since the development likely already has an AIP	ECO, Contractor	On going



Impact	Description	Mitigation	Responsible Party	Frequency
		Programme, this should extend to the area where the road is proposed;		
		It is vital that if any endemic, rare or vulnerable species occurs on the proposed site that these species should be protected and/or left undisturbed. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. Threatened species are not allowed to be disturbed in any way. If at any point any red listed species is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required;	ECO, Contractor	On going
		All exposed earth should be rehabilitated promptly with suitable vegetation to protect the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. Necessary rehabilitation measures (e.g. burning, seeding, removing alien plants etc.) should be introduced to ensure species composition reverts to a more natural state (with regards to affected areas). Indigenous vegetation with deep set root systems is advisable to limit soil loss on site. Alternatively, water dissipating mechanisms such as gabions or reno-mattresses may be implemented on- site to help stabilize the surrounding soil and provide a platform for the growth of vegetation;	ECO, Contractor	On going
		No hunting is permitted on-site or the surrounding areas;	ECO, Contractor	On going
		No animals required for hunting e.g. dogs, under the supervision of construction workers, should be allowed into the site. All construction personnel on the property should be informed of this ruling; and	ECO, Contractor	On going



Impact	Description	Mitigation	Responsible Party	Frequency
		Any construction camps or stockyard areas should be located on already impacted areas within the Estate, such as at the beginning of the road footprint. Do not establish additional construction related areas on the ridge.	PM, Contractor	Prior construction
Air quality and noise pollution and vibrations	Potential dust generation from soil stripping, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality;	All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of this EMP; and Road dampening should be undertaken to prevent excess dust during construction. Construction activities will only take place between 08h00 and 17h00.	Contractor, Engineer	On going
	Blasting of large boulders may result in increased vibration, dust and noise during construction.			
	Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and			
	Dust and noise will be created during the construction phase, which may impact on the local community			
	Blasting of large boulders may result in increased vibration, dust and noise during construction.	Implement blasting using chemical means to reduce dust, noise and vibrations.	Contractor, Engineer	When needed
Waste	There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil spills, litter from personnel on-site, sewage from ablutions etc.); and	All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported;	Contractor	On going
	Waste generation could be created by the following: - Solid waste - plastics, metal, wood, concrete, stone; - Chemical waste- petrochemicals, resins and paints; and - Sewage as may be generated by employees.	All solid wastes should be disposed of at a registered landfill site and records maintained to confirm safe disposal;	Contractor	On -going
		Adequate scavenger-proof refuse disposal containers should be supplied to control solid waste on-site;	Contractor	Once off
		It should be ensured that existing waste disposal facilities in the Madibeng area are able to accommodate the increased waste generated from the proposed construction;	Contractor	Weekly
	Chemical waste/material should be stored in appropriate containers and disposed of at a licensed	Contractor	Weekly	



Impact	Description	Mitigation	Responsible Party	Frequency
		disposal facility;		
		Portable sanitation facilities should be erected for construction personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly so as to prevent contamination of the water resources;	Contractor	On going
		The construction site should be inspected for litter on a daily basis and extra care should be taken on windy days. Precautions should be taken to avoid litter from entering drainage lines; Soil that is contaminated with, e.g. cement, petrochemicals or paint, should be disposed of at a registered waste disposal site and is NOT to be deposited into any drainage lines; and	Contractor	Daily
		It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100 m of the dam or within the 1:100-year floodline; and Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality etc.) and must be remediated.	Contractor	Daily
Socio-economic	Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers);	Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety. Such notification can be conducted through the Public Participation Process;	PM	Prior construction
	Road construction will improve access in the area and will alleviate congestion;	Local people should be employed where possible; and	PM, Contractor	Prior construction



Impact	Description	Mitigation	Responsible Party	Frequency
	Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity; and Possible economic benefits to suppliers of building materials in the surrounding area as goods and services may be purchased from these entities during the construction phase.	A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community to the Construction Team.	PM, Contractor	On going
Safety and security	There is potential for construction labour to trespass onto neighbouring properties (Meerhof and Estate D'Afrique); and	Any construction personnel found to be trespassing must be subjected to a disciplinary hearing;	Contractor	On going
	Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and local residents.	Construction workers / construction vehicles should take heed of normal road safety regulations; thus, all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and	Contractor	On going
	· Undulating slope of the proposed site may lead to unsafe working environment during construction if not managed properly.	A designated speed limit should be set by the developer to limit possible road strikes.	Contractor PM	On going
Noise	Disruption to residents through increased activity and noise in the area.	All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of this EMP; and	Contractor	Weekly
		Operational Hours: No works shall be executed between 08h00 and 17h00 and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and Contractor; and	Contractor, Engineer PM	Daily
		Construction personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting.	ECO, Contractor	On going
Water resource	Contamination of ground and surface water and soil;	Appropriate stormwater / surface water management measures must be put in place before construction	Contractor, Engineer	On going



Impact	Description	Mitigation	Responsible Party	Frequency
		<p>commences and maintained throughout the lifetime of the development;</p> <p>An appropriate number of toilets (1 toilet for every 15 workers) must be provided for labourers during the Construction Phase. These must be maintained in a satisfactory condition and a minimum of 100 m away from any water resources and outside of the 1:100-year floodline;</p>		
	Drainage lines may be polluted due to accidental spillages of petrochemicals from vehicles and equipment, or concrete from road construction; and	Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or waterproof drums, and must not be allowed to enter into drainage lines;	Contractor	On going
	The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity in surrounding drainage lines.	The Construction Camp should be positioned on previously disturbed areas (if possible) and outside of the 1:100 yr floodline;	Contractor, Project Manger	Prior construction
		Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site should be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;	Contractor	Weekly
		Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering drainage lines;	Contractor	On going
		Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use; and	Contractor	On going
		All recommendations noted in the fauna and flora assessment and Heritage Impact Assessment	ECO Contractor	On going



Impact	Description	Mitigation	Responsible Party	Frequency
		(Appendix 6 in DBAR) must be adhered to.		

6.1 Basic Assessment Issues and Mitigation Measures

The identification and significance of identified project related impacts (before and after mitigation is presented in the Basic Assessment Report (BAR). The BAR identified potential impacts and risks associated with the proposed development and these, contained in this EMP, presents the preliminary actions, specifications and management commitments that need to be adhered to in order to mitigate or enhance the impacts of significance.

7 ENVIRONMENTAL AWARENESS

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the EMP, as well as regarding environmental legal requirements and obligations. Training shall be conducted by an independent person where necessary. Environment and health awareness training programmes should be targeted at two distinct levels of employment, i.e. management and labour. Environmental awareness training programmes shall contain the following information:

- The names, positions and responsibilities of personnel to be trained;
- The framework for appropriate training plans;
- The summarised content of each training course;
- A schedule for the presentation of the training courses.

The person conducting training shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMP. The training records shall verify each of the targeted personnel's training experience.

The developer shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the EMP. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:

- The importance of conformance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations;
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the development, main access roads, or approach roads;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water sparingly;
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible; and
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

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. If necessary,

a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear.

8 CONCLUSION

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental standards that are required to minimise the negative impacts and maximise the positive benefits of the proposed development as detailed in the BAR. The EMPr is a "live document", and if continuously reviewed and managed correctly can result in successful construction and operation of the proposed development.

All attempts should be made to have this EMPr available, so that the contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr. Further guidance should also be taken on any conditions contained in the Environmental Authorisation, if the project is granted approval, and that these conditions must be incorporated into the final EMPr.

9 References

- DEAT. (2002). *Impact Significance, Integrated Environmental Management, Information series 5*. Pretoria.
- Haartbeespoort. (2014). *Haartbeespoort Area Precint Plan*. Brits.
- K.N, B. (1998). *The important bird species of Southern Africa*. South Africa: Birdlife .
- Municipality, M. L. (2015). *Madibeng Local Municipality Spatial Development Framework*. Brits, North West Province.
- Municipality, M. L. (2018). *Madibeng Local Municipality 2017/2018 Annuala report*. Madibeng: Madibeng Local Municipality.
- Pesler, A. (2019). *A PHASE 1 HIA REPORT FOR THE ESTATE D'AFRIQUE*. Pretoria, Gauteng: Apelser Archeological Consulting.
- Red Kid Environmental Solutions. (2019). *Ecological Assessment Report for Estate D'Afrique for the proposed development of Access Road, Madibeng North West Province*. Pretoria: Red Kite.
- Republic of South Africa. (2019). *Municipalities.co.za*. Retrieved from Municipality of South Africa: <https://municipalities.co.za/demographic/1188/madibeng-local-municipality>