ENVIRONMENTAL MANAGEMENT PROGRAMME FOR S24G APPLICATION – Ref: 14/2/4/2/2/B5/14/0014/19 THE CONSTRUCTION OF A ROAD AND ASSOCIATED BRIDGE INFRASTRUCTURE ON PORTION 1 OF FARM BLOUBANK NO. 52, TULBAGH

5 AUGUST 2019

Prepared for: Bloubank Boerdery Trust

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COMMITMENT AND DECLARATION OF UNDERSTANDING BY CONTRACTOR AND DEVELOPER FOR THE CONSTRUCTION AND MAINTENANCE OF THE BLOUBANK BRIDGE AND SURROUNDS

I, the undersigned ……., as duly authorized by the Contractor, have studied and understand the contents of this document. On behalf of the Contractor, I confirm that the Contractor undertakes to adhere to the conditions as set out herein, unless specifically otherwise agreed to in writing.

Signed at …… on this …….. Day of ……..20……

……..
For Contractor

I, the undersigned ……, as duly authorized by the Developer have studied and approve the contents of this document on behalf of the Developer, for implementation by all Contractors involved at the site.

Signed at …… on this …….. day of ……..20…….

……..
Developer's Representative

DEFINITIONS

Auditing:	A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis based to a (e.g. ISO 19011:2003) standard.
Biodiversity:	The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.
Contractor:	An employer, as defined in section 1 of the Occupational Health and Safety Act 85 of 1993, who performs construction work and includes principal contractors
Environment:	A place where living, non-living and man-made features interact, and where life and diversity is sustained over time.
Evaporation:	The change by which any substance (e.g. water) is converted from a liquid state into and carried off as vapour.
Developer:	One who builds on land or alters the use of an existing building for some new purpose
Independent:	Is independent and has no interest in any business related to the development site, nor will receive any payment or benefit other than fair remuneration for the task undertaken
Groundwater:	Subsurface water in the zone in which permeable rocks, and often the overlaying soil, are saturated under pressure equal to or greater than atmospheric.
Landowner:	Holder of the estate in land with considerable rights of ownership or, simply put, an owner of land
Monitoring:	A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.
Natural vegetation:	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on a site.
Pollution:	The result of the release into air, water or soil from any process or of any substance, which is capable of causing harm to man or other living organisms supported by the environment.
Protected Plants:	Plant species officially listed under the Threatened or Protected Species regulations as well as on the Protected Plants List (each province has such a list), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Red Data Species:	Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.
Rehabilitation:	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat. Rehabilitation does not necessarily re-establish the pre-disturbance condition, but does involve establishing geological and hydro logically stable landscapes that support the natural ecosystem mosaic.
Site:	Property or area where the proposed development will take place

ACRONYMS

DEA&DP:	Department of Environmental Affairs and Development Planning
DWS:	Department of Water and Sanitation
ECO:	Environmental Control Officer
EA:	Environmental Authorisation
EIA:	Environmental Impact Assessment
EM:	Environmental Manager
EMPr:	Environmental Management Programme
FM:	Farm Manager
I&AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
MMP:	Maintenance Management Plan
PM:	Project Manager
SANS:	South African National Standards

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DEVELOPER'S COMMITMENT

Bloubank Boerdery Trust has committed itself to a set of values that include the maintenance of good relations and transparent communications with all stakeholders, and the dynamic engagement of the larger community.

Boubank Boerdery Trust undertakes to implement suitable management systems for all the areas and aspects of this operation. This will ensure that development itself and management of the project will comply with legal, technical, environmental and transformation policies and standards.

Bloubak Boerdery Trust, in drafting this EMPr for implementation, intends to enable continuous improvement in legal compliance and the sustainable operation of the site.

The EMPr intends to change the way in which the owners, the construction process they have commissioned and the contractor plan for and manage resources to achieve sustainability.

The satisfactory implementation of the EMPr on site will require both the full support and commitment of all personnel.

CHAPTER 1

1.1. Executive Summary

This EMPr has been prepared principally in compliance with the requirements of section 24N and Section 34 of the National Environmental Management Act 107 of 1998. This document, together with the conditions in the Environmental Authorisation, Water Use Authorisation and MMP must be adhered to.

The EMPr must be included as part of all contract documentation for all contractors in the construction and maintenance phases of the development.

The Author and Eco Impact Legal Consulting (Pty) Ltd ("Eco Impact")

Nicolaas Hanekom is a registered Professional Natural Scientist (Ecology) with the South African Council for Natural Scientific Professions ("SACNASP") and a qualified Environmental Assessment Practitioner ("EAP") who holds a Masters Technologiae, Nature Conservation ("Vegetation Ecology and Biodiversity Assessment") degree from the Cape Peninsula University of Technology.

He further qualified in Environmental Management Systems ISO 14001:2004, at the Centre for Environmental Management, North-West University, as well as Environmental Management Systems ISO 14001:2004 Audit: Internal Auditors Course to ISO 19011:2003 level, from the Centre for Environmental Management, North-West University qualifying him to audit to ISO/SANS environmental compliance and EMS standards.

Nicolaas has presented lectures in two subjects at the Cape Peninsula University of Technology. He has 26 years of environmental planning experience, working for Free State and Western Cape departments of environmental affairs, where he reviewed and commented on development (EIA) and mine permit or right applications in the West Coast Region.

Hanekom is the son on an Overberg farmer, grew up on the farm and studied at Grootfontein Agricultural College with subjects Soil Science, Botany, Crop Production, Agricultural Engineering, Animal Breeding, Animal Nutrition, Small Stock Production, Animal Health, Large Stock Production and Agricultural Management. He did his first Agricultural Impact assessment in 2009. This Agricultural Impact assessment, together with one other specialist's reports was used by the Department of Agriculture Western Cape to develop guidelines for Agricultural Impact assessment studies.

He has also been involved in the implementation of numerous environmental management programmes and systems, environmental auditing, environmental impacts for environmental authorizations, mine rights and permits, waste licenses, Atmospheric Emissions Licenses, applications for water use authorizations, specialist ecological studies, freshwater specialist studies,

agricultural specialist studies and management and rectification of environmental impacts on sites and facilities.

1.2. Project Description

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

The following has already been constructed for which maintenance activities is proposed:

To facilitate the movement of larger vehicles within this servitude, owners of Portions 1 and 2 of Farm Bloubank No. 52 in the Tulbagh Valley upgraded the road crossing over a small unnamed stream on the property during June 2017. The crossing was constructed in a tributary of Klein Berg River (G10E quaternary catchment) in the Berg River System.

The tributary has been mapped as a South West Shale Fynbos Channelled Valley Bottom wetland in the Freshwater Ecosystem Priority Areas wetland mapping. The wetland area mapped occurs upstream of the site and incorporates the farm dam on the northern bank of the stream. No wetland area was evident within the immediate area of the stream crossing. The area mapped as valley bottom wetland area comprises largely of a relatively steep stream bank. The small wider stream corridor upstream of the site is also mapped as an aquatic Critical Biodiversity Area buffer due to the largely natural vegetation that still occurs along the steep river bank a short distance upstream of the site.

The ecological condition of the stream at the site is considered to be moderately modified within the channel and seriously modified along the riparian areas due largely to the surrounding agricultural activities. The ecological importance and sensitivity of the stream is moderate. Aerial images taken within the past 50 years show that there has been very little alteration to the channel course or the surrounding land cover for this period. The small farm dam on the northern bank of the stream was constructed after 1966 but before 1980. An informal crossing has been used from time to time through the stream at the site.

The works associated with the culvert structure that has been constructed at the road crossing has largely only resulted in limited change to the bed and banks of the unnamed stream at the site. Considering the history of modification of the river channel as a result of the surrounding agricultural activities and the existing ecological state of the stream, this impact is of a low significance. The structure has sufficient capacity that it is unlikely that it will result in any impedance or diversion of flow in the stream.

The main impacts of the works undertaken are thus a modification/loss of aquatic habitat. With some rehabilitation of the site, this impact could be reduced to being of a very low significance with the potential for a positive impact on the existing ecological condition of the watercourse at the site. Recommendations are provided in the maintenance management plan for the rehabilitation as well as the longer term maintenance and management measures for the site, this EMP must be read in conjunction with the Maintenance Management Plan and its requirements must be implemented where applicable during the proposed maintenance activities.

The following maintenance activities are proposed:

- Rubble and debris from construction activities that have been undertaken at the crossing should be removed
- The stream banks should be cleared of exotic and in particular invasive alien plants. The invasive alien kikuyu grass in particular should be kept out of the riparian zone as it destabilises the river banks. It should be replaced by indigenous grasses such as kweek (Cynodon dactylon). This should be undertaken during the dry season but following rainfall events when the soil is moist. Weedy shrubs and small invasive alien saplings occurring along the stream banks within the disturbed area at the crossing should be hand pulled. Should this not be possible for some of the large plants, the plants should be sprayed with a foliar herbicide. Regular follow-up uprooting of new seedlings or follow-up herbicide spraying of coppicing stumps should be undertaken.

- Immediately following the clearing of exotic and invasive alien plants, the banks should be revegetated with local indigenous riparian vegetation such as wild olive trees (Olea europaea subsp africana), Cape willows (Salix mucronata), wild almond (Brabejum stellatifolium), waterwitels (Brachylaena neriifolia), willow karee (Searsia augustifolia), lance-leaved myrtle (Metrosideros angustifolia), kruidjie-roer-my-nie (Melianthus major), fountain bush (Cliffortia strobilifera), water sedge (Isolepis prolifera), spiny rush (Juncus acutus), cobra lilies (Chasmanthes aethiopica), arum lilies and palmiet (Prionium serratum).
- Storm water discharge from along the road should not be discharged into the stream at the structures as it is likely to result in erosion at the bridge. The road should be shaped to ensure that the concentration/intensity of runoff along the road is reduced to dissipate the energy and erosion potential of the flow from the road into the stream at the crossing and all stormwater channels should be kept clear of build-up and blockages to allow free flow of run-off water.
- Clean topsoil (not containing invasive alien plant seed or rubble/waste) should be placed over the dumped bricks at the crossing and vegetated to cover the stabilised area adjacent to the crossing. A ground cover such as hottentot-fig (Carpobrotus edulis) or indigenous grass such as kweek could be planted in this area.
- Ongoing monitoring and management of the disturbed areas within the stream channel and riparian zone should be undertaken to ensure that the area stays clear of eroded areas and invasive alien plant growth.
- The stream channel upstream of the crossing should be kept clear of sediment, cobbles and woody debris that could impede flow through the structure during low and higher flow events.
- Control of alien invasive plant species should be undertaken with a specific focus on the invasive plants such Acacia mearnsii, Sesbania punicea and Pennisetum clandestinum. These species are known to do well in riparian and wet habitats. They should be controlled by manual removal or the application of appropriate herbicides. Manual removal should not be carried out by any machinery larger than a chainsaw. For additional information on alien vegetation clearing management visit the Working for Water website (http://www.dwaf.gov.za/wfw/Control/)

Map 1: Location of the Bloubank Bridge (yellow square) and associated 300m section within the unnamed watercourse to be maintained

CHAPTER 2

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act 107 of 1998.

It deals with issues relating to the implementation of the EMPr.

2.1 Organizational Structure

The organizational structure identifies and defines the responsibilities and authority of the various persons and organizations involved in the project. All instructions and official communications regarding environmental matters must follow the organizational structure.

The Environmental Official (EO), to whom the Engineer's Representative (ER) and/or Environmental Control Officer (ECO) must report and interact, must be the responsible client representative.

The EMPr must be an agenda item at the monthly site and operations meetings and the responsible client representative(s) may attend these meetings in order to provide input with respect to compliance with the EMPr.

2.2 Responsibilities and Functions of the Environmental Control Officer

The ECO will be responsible for monitoring, reviewing and verifying compliance with the EMPr and/or EA by all contractors and site management during the initial and closure inspections.

The ECO duties in this regard will include the following:

With the assistance, where necessary of the Farm Manager ("FM"), to ensure all necessary environmental authorizations and permits have been obtained and are available and visible on site at the Farms - Office located on site.

- monitor and verify that the EMPr and/or EA is adhered to at all times and by taking action if the specifications are not followed;
- monitor and verify that environmental impacts are kept to a minimum;
- review and approve construction method statements, with input as appropriate from the FM;
- assist the contractor in finding environmentally responsible solutions to problems;
- report on the environmental issues at the site meetings and other meetings that may be called regarding environmental matters, if requested by FM;
- inspect the site and surrounding areas regularly with regard to compliance with the EMPr and/or EA;
- monitor the environmental awareness training for all personnel coming onto site;
- advise management on the removal of person(s) and/or equipment not complying with the specifications, after collaboration with the FM
- ensure that activities on site comply with known legislation of relevance to the environment;
- recommend the issuing of penalties via the developer for contraventions of the EMPr and/or EA;
- keep a photographic record of progress on site from an environmental perspective; and
- undertake a continual internal review of the EMPr and/or EA and submit a report to the FM and the responsible DEA&DP Environmental Official according to EA conditions.

2.3 Agreed Work Plan and Site Visit Schedule of ECO

An ECO site visit should be scheduled for the initial pre-construction/maintenance site meeting to discuss and agree upon methods to be used and relevant areas to be rehabilitated etc.

After the initial site meeting it is recommended that an ECO inspection should be conducted three monthly after maintenance activities commenced until the affected areas have been revegetated with the indigenous vegetation species as recommended.

One year after revegetation of affected areas it is recommended that the ECO conduct a closure site visit to determine whether or not rehabilitation has been successful. Upon the closure site visit the ECO must make recommendations on whether or not additional rehabilitation measures need to be implemented etc.

2.4 Site Manager/Farm Manager

The site manager (farm manager) will have the following environmental control responsibilities:

- In conjunction with the ECO will present the environmental education programs to all persons employed on site.
- Consult with the ECO, landowner, developer and any contractor to resolve all environmental issues.
- Issue any instructions from the ECO to the management team.
- Take responsibility for the penalty system. The ECO and developer recommendations must be considered when deciding whether or not to impose a penalty.
- The FM will be accountable for the overall implementation of the Environmental Management Programme.

2.5 Contractors

Should any contractor be appointed for any of the required word the Contractor's representative will have the following responsibilities:

- Ensure that all staff is familiar with the Environmental Management Programme, which explains the environmental policy for the project.
- Allow for sufficient time between surveying the exact locations where services will be intended and actual construction, for the ECO to facilitate and instruct for the removal of plants, seeds and cuttings if necessary.
- The contractor must keep his personnel fully aware of environmental issues and ensure they show adequate consideration to all environmental aspects.
- Establish environmental signs to be erected on the construction site at locations identified by the ECO and approved by the engineer, if necessary.
- Be responsible for the cost of the restoration of any damage caused, in environmentally sensitive areas, as a result of contractor responsibility regarding negligence. This must be done in accordance with the engineer / ECO's specifications.
- Take responsibility and active steps to avoid any increase in the fire hazard.
- The contractor must take responsibility for implementing all the relevant provisions of the EMPr, or if he encounters difficulties with the specifications, he must discuss alternative approaches with the ECO and FM prior to proceeding.

Failure to comply with the EMPr may result in the application of fines as set out, and any reported non-compliance may result in the suspension of work or termination of a contract.

2.6 Record keeping of activities, inclusive of recording of non-compliances and corrective actions

The site must keep a record of all activities relating to environmental matters on site, including:

- meetings attended;
- method statements received and approved;
- issues arising on site;
- cases of non-compliance with the EMPr;
- corrective actions taken and penalties issued.

This information will be recorded in an appropriate manner in a site diary, registers, issues/warning book, etc.

2.7 Compliance with other legislation

It is important that all on site staff are aware of other relevant legislation that may relate to the activities taking place on site, especially local authority required compliances.

CHAPTER 3

Applicable Legislation, Policy and Environmental Principles

3.1 Applicable Legislation Identified

1. ADVERTISING ON ROADS AND RIBBON DEVELOPMENT ACT, 21 OF 1940
2. BASIC CONDITIONS OF EMPLOYMENT ACT, 75 OF 1997
3. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 130 OF 1993
4. CONSERVATION OF AGRICULTURAL RESOURCES ACT, 43 OF 1983
5. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996
6. ENVIRONMENT CONSERVATION ACT, 73 OF 1989, WESTERN CAPE NOISE CONTROL REGULATIONS
7. EMPLOYMENT EQUITY ACT, 55 OF 1998
8. ENVIRONMENT CONSERVATION ACT, 73 OF 1989
9. FENCING ACT, 31 OF 1963
10. HAZARDOUS SUBSTANCES ACT, 15 OF 1973
11. LABOUR RELATIONS ACT, 66 OF 1995
12. NATIONAL HEALTH ACT 61 OF 2003
13. NATIONAL HEALTH ACT 61 OF 2003 REGULATIONS RELATING TO THE MANAGEMENT OF HUMAN REMAINS
14. NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 103 OF 1977
15. NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 107 OF 1998
16. NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 39 OF 2004
17. NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 10 OF 2004
18. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 59 OF 2008
19. NATIONAL FORESTS ACT, 84 OF 1998
20. NATIONAL HERITAGE RESOURCES ACT, 25 OF 1999
21. NATIONAL VELD AND FOREST FIRE ACT, 101 OF 1998
22. NATIONAL WATER ACT, 36 OF 1998
23. OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993
24. TOBACCO PRODUCTS CONTROL ACT, 83 OF 1993
25. WATER SERVICES ACT, 108 OF 1997

CHAPTER 4

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

Compliance

4.1 Monitoring and Auditing

4.1.1 Introduction

In keeping with current environmental and associated legislation, all environmental management procedures and actions must be reviewed and refined on an ongoing basis.

This is in accordance with the dynamic nature of environmental management and allows for the timeous identification and mitigation of issues as they come to light.

The process of review and refinement, built into the requirements of the EMPr, is known as monitoring and auditing.

4.1.2. Roles and responsibilities

Efficient implementation of the performance specifications, effective monitoring and auditing, as well as clear responsibility and accountability allocation requires that various role-players be defined for the construction implementation project.

Depending on the nature and scale of a project, implementing teams could be composed of any number of role-players, each with their own specified responsibilities.

Therefore, for the purpose of this document, the following role-players are defined, based purely on responsibility and accountability allocation. The actual designation of role-players may vary, but the responsibilities will largely remain as stated.

4.1.2.1. Developer/landowner or custodian of the land

The developer/landowner or custodian of the land is the person or organization with decision making capacity for the land in question, and thus ultimately accountable for what takes place on that land. In this case the appointed Farm Manager will be the developer/land owner representative.

4.1.2.2. Contractor

Contractors are appointed to undertake the works as specified in the contract. It is the responsibility of the contractor to do whatever is necessary from their side to ensure that he or an appointed advisor is well versed in environmental studies, so that they may accurately and efficiently carry out the requirements of the environmental specification.

The contractor is liable for any and all remedial work required in terms of the environmental specification, resulting from his environmental negligence, mismanagement and / or non-compliance.

4.1.2.3. Environmental Control Officer

An ECO site visit should be scheduled for the initial pre-construction/maintenance site meeting to discuss and agree upon methods to be used and relevant areas to be rehabilitated etc.

After the initial site meeting it is recommended that an ECO inspection should be conducted three monthly after maintenance activities commenced until the affected areas have been revegetated with the indigenous vegetation species as recommended.

One year after revegetation of affected areas it is recommended that the ECO conduct a closure site visit to determine whether or not rehabilitation has been successful. Upon the closure site visit the ECO must make recommendations on whether or not additional rehabilitation measures need to be implemented etc.

The contractors or line management are answerable to the ECO and FM for non-compliance. Issues of non-compliance raised by the ECO must be taken up by the farm manager, and resolved as per the

conditions of the contract.

Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation and not allowed for in the performance specification) must be endorsed by the FM.

4.2 The Monitoring Procedure

Environmental monitoring is the continuous evaluation of the status and condition of environmental elements. Its purpose is to detect change that takes place in the environment over time and involves the measuring and recording of physical, social and economic variables associated with development impacts.

Many techniques for environmental monitoring have been proposed, each detailing a specific protocol. Regardless of which technique is used, the ultimate aim is that each environmental management specification be checked by means of a system in which a score may be allocated for:

- Full compliance;
- Satisfactory performance;
- Unsatisfactory performance; and
- No action taken.

ECO monitoring reports will be submitted to the farm manager, who will attend to issues. These reports must be kept on file and be made available upon request by any environmental authority requesting such.

All persons employed, the contractor or his sub-contractors, must abide by the requirements of these performance specifications as they apply to the works. Any employees, the contractor or his sub-contractors found to be in breach of any of the environmental specifications, may be ordered to vacate the site forthwith and/or be subject to a disciplinary process.

The order may be given orally or in writing by the ECO. Confirmation of an oral order will be given as soon as practicable, but lack of confirmation in writing must not be a cause for the offender to remain on site, or not be subject to a disciplinary process. Supervisory staff, the contractor or his sub-contractor may not direct any person to undertake any activities which would place such person in contravention of the EMPr, legislation and specifications.

The contractor/landowner and staff are deemed not to have complied with the performance specifications if:

- There is evidence of wilful or accidental contravention of any specification included in the specification;
- There is evidence of the contractor carrying out activities not permitted in terms of the EMPr, contract and / or the specification;
- There is evidence of environmental negligence and / or mismanagement resulting in negative impacts on the environment;
- Has failed to meet with the requirements of the approved schedule.

The contractor and developer/landowner will be informed via ECO reports, as well as by means of direct instruction (if necessary) as to what corrective actions are required in terms of environmental compliance.

Disregard for an instruction, and failure to respond adequately to complaints from the public will be construed as non-compliance. Non-compliance may lead to parties being penalised.

In more serious cases, the ECO may give notice, and halt operations until such a time that the corrective action is taken and the site complies with the performance specifications.

In cases of persistent non-compliance, the contractor or staff may be evicted from site after disciplinary process is followed. Only the developer/landowner may issue such instruction, retaining any costs required to remedy situations perpetuated by environmental negligence, mismanagement and / or non-compliance.

4.3 The Auditing Procedure

Environmental auditing is the process of comparing the impacts predicted with those which have actually occurred during implementation.

An environmental performance audit examines and assesses practices and procedures which, in the event of failure, would cause an environmental impact or result in an environmental risk. During each of the lifecycle phases, various issues will be monitored. The performance audit will ensure that the monitoring was correctly undertaken and that compliance was best achieved.

To these ends the project will be audited versus this EMPr for effectiveness. ISO/SANS 19011:2011 auditing standards will be applied.

A audit will be undertaken by the ECO one year after revegetation of the impacted areas, and a copy of the report will be provided to the farm manager and the Department.

These reports must be kept on record and be made available upon request by the developer/landowner/custodian of the land and any environmental authority or I&AP requesting such.

4.4 Retentions and Penalties

It is recommended that a penalty retention system be combined with the penalty system to both motivate and compel the contractor to adhere to the EMPr for the duration of the contract.

In this way incentives may be created to perform (i.e. in the form of the retention amounts that will only be paid to the contractor at the end of the contract), without creating the misunderstanding that adherence to the EMPr is optional.

Persistent non-compliance will not only result in the contractor forfeiting any retention amount, but he will also be fined.

Of importance is that the contract specifies exactly how the penalty and retention system will operate, as well as how any funds resultant from retentions and penalties will be utilised.

All such funds must be used to improve environmental conditions on the site in general.

4.4.1. The Retention System

For this system, a percentage value for each of the sections priced for in the environmental bill of quantities is retained until the full completion of the contract works.

If the monitoring process reveals persistent and/or wilful non-compliance with any aspect of the environmental performance specifications, then the full retention associated with that particular item will be withheld.

The project may then apply these retained funds to rectify the problem on site possibly making use of other or alternate resources at his disposal.

At the end of the contract or action, all remaining environmental retention amounts will be paid out to the contractor or staff pending approval by the ECO, after having confirmed full compliance with the relevant performance and rehabilitation specifications.

4.4.2. Penalty System

A system of penalties will be introduced to reinforce environmentally sensitive and prudent behaviour. The maximum penalties that will be fined per incident that may be enforced are listed below. The penalty amount will be determined (inter alia) by the severity of the offence.

Non-compliance	R 5 000.00 (ex VAT) per non-compliant act, per day until compliance is achieved
Casual Litter on site resulting from operation	R250 / offence / day

Disposal of any litter or construction material in non-specified area or by non-compliant means	R5000 / m^3 / per day
Dumping of cement, concrete, fuel or oil in an area or other than that authorised and suitable	R10 000 per offence / day
Failure to use portable / toilets	R100 / observed incident or evidence of human excrement on site

In addition to the above, all costs incurred by the client / developer to remedy any damage will be the responsibility of the offender.

Should the monitoring process reveal acts of persistent and / or wilful non-compliance with the environmental performance specifications, then the contractor or staff member will be fined according to the specified value of that item.

4.5 Method Statements

Contractors/landowner must provide written statements for discussion with the ECO on environmentally sensitive aspects of the project if requested by the ECP. Environmentally sensitive aspects include by example excavations, work close to sensitive areas, collection and storage of top soil and vegetation, erosion control, wash water control, waste control, etc.

CHAPTER 5

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act 107 of 1998.

5.1. Good Housekeeping

The developer/landowner will ensure the maintenance of “good housekeeping” practices during operations.

This will help avoid several disputes regarding responsibility and will allow for the smooth running of the operation as a whole.

Good housekeeping extends beyond the environmentally sensitive construction methods to include the care for and preservation of the surrounding environment.

5.2 Record Keeping

The developer/landowner will ensure that a filing system, identifying all documentation related to the EMPr, is established.

A list of reports likely to be generated during the project is set out below.

All applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Approved EMPr, MMP, authorizations, licenses or permits;
- Final design documents and diagrams issued;
- All communications detailing changes of design/scope that may have environmental implications;
- ECO reports
- Complaints register;
- Environmental training manual;
- Environmental training attendance registers;
- Incident and accident reports;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- Permits and legal documents as part of emergency preparedness teams e.g. fire teams, etc.;
- Material data sheets of all chemicals utilised on site;
- Crisis communication manual;

- Disciplinary procedures;
- Monthly site meeting minutes during construction;
- All relevant permits;
- All method statements for all phases of the project.

All registers and records should be kept on site and must be made available to the department on request.

5.3 Document Control

The developer/landowner will be responsible for establishing a procedure for document control.

The document control procedure must comply with the following requirements:

Documents must be identifiable by organisation, division, function, activity and contact person;
Every document must identify the person and their positions, responsible for drafting and compiling the document, for reviewing and recommending approval, and final approval of the document for distribution;

All documents must be dated, provided with a version number and reference number, filed systematically, and retained for a specified period.

The owner will ensure that documents are periodically reviewed and revised where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMPr are performed. All documents will be made available to the external auditor.

5.4 Reporting Requirements

All advice and recommendations made by the ECO must with the farm managers compliance be recorded on site in the site instruction book/ suitable register for his attention.

All spills will need to be documented and reported to DWS, Department of Waste and other relevant authorities.

CHAPTER 6

6.1. Public Communication Protocols

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act, 107 of 1998.

The developer/landowner must be responsible for regulating public access to information and compliance reporting.

The developer/landowner must respond to third party or public queries and complaints.

The developer/landowner must also be responsible for maintaining the compliance register to record complaints received and action taken. All complaints receive by the facility must be documented.

CHAPTER 7

This section of the report is included in compliance with Section 24 N 2 (d - g) and 3 (a - b) of the National Environmental Management Act, 107 of 1998.

Goal for Planning and Design (PD)

Overall Goal for Planning and Design:
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of any landowner concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the project.

- In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE PD1: PRE-CONDITIONS

The following pre-conditions must be fully met before any further construction or maintenance activities commence.

A site meeting between the contractors (if applicable) and the representatives of the developer/landowner and the appointed ECO must take place at least 5 days prior to commencement of construction/maintenance work to:

- Demarcate micro construction sites, services routes, access routes, working boundaries and **no-go areas**;
- Discuss proposed maintenance methods and applicable areas;
- Check required toilets and fire-fighting facilities to be in place;
- Discuss and agree restricted access to construction site;
- Sign the Declaration of Understanding (Contractors);
- Discuss and agree communication channels including contact details;
- Discuss and agree areas of responsibility;
- Discuss and agree the demarcation and control of construction/maintenance sites.

Minutes of this site meeting must be kept, and are to be distributed to all parties.

The following equipment must be on (or within close proximity i.e. 500m) every micro or sub site before any construction/maintenance work is due to start (***as and when required***):

- Sufficient and suitable ablution facilities.
- Sufficient refuse bins, which are weather and wind proof, with proper lids.
- 1 x type ABC (all purpose) 12.5 kg fire extinguisher

This will be monitored by the ECO during site visits and recorded, reported and proof included in the ECO reports.

OBJECTIVE PD2: LAYOUT PLAN CONTROLS

The contractor must ensure that a copy of the signed approved layout plan is available at the office on site at all times for inspection by the developer or his representative(s). Any variation to the approved layout plan must be submitted to the developer for signed approval and may only be implemented once the approved variation is available to the contractor and available on site at the office. The variation of changes to the layout must be approved by the competent authority as per the EA conditions.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD3: ADVERTISING

The contractors may place no advertising material on the property unless prior formal written permission has been obtained from the landowner.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit report to be submitted once construction is completed.

OBJECTIVE PD4: ENSURE THE DESIGN OF THE BRIDGE RESPONDS TO THE IDENTIFIED ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES

Project Component/s	Storm water structures; Access roads; Bridge; No-go areas.
Potential Impact	Design fails to respond optimally to the environmental consideration.
Activities/Risk Sources	Poor planning and design of bridge, storm water and drainage structures. Poor consideration of the natural landscape features.

Mitigation: Target/Objective	Ensure that the design of the bridge and associated infrastructure responds to the identified environmental constraints and opportunities.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Plan and conduct pre-construction/maintenance activities in an environmentally acceptable manner as per EMP recommendations.	Developer/ Landowner	Pre-construction/ maintenance
Access roads to be carefully planned to minimise the impacted area and prevent unnecessary over compaction of soil.	Developer/ Landowner	Design and maintenance phase
As far as possible, existing roads must be used.	Developer/ Landowner	Design and maintenance phase
The holder of an environmental authorisation has the responsibility to notify the competent authority of any alienation, transfer and, change of ownership rights in the property on which the activity is to take place.	Developer/ Landowner	Design, maintenance. operations and closure phase
Fourteen (14) days written notice must be given to the Department that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number.	Developer/ Landowner	Pre-construction/ maintenance
ECO to be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to the DEA&DP.	Developer/ Landowner	Pre-construction/ maintenance

Performance indicator	Design meets objectives and does not degrade the environment. Design responds to the mitigation measures and recommendations in the impact assessment report. Minimal impact on the surrounding agricultural land and watercourse area.
Monitoring	Ensure that the design implemented meets the objectives and mitigation measures in the impact assessment report through review of the design.

CONSTRUCTION, MAINTENANCE AND OPERATIONAL PHASES

The bridge has already been constructed therefore the maintenance activities as proposed is considered as an ongoing combined construction, maintenance and operational phase and all recommendations as per this EMP and the Maintenance Management Plan must be adhered to during the implementation of the maintenance activities during the entire lifespan of the development.

Overall Goal for Construction/Maintenance/Operational Phase (C):
Undertake the maintenance of the drainage line crossing and affected surrounds in a way that:

- ensures that construction/maintenance activities are properly managed in respect of environmental aspects and impacts;
- enables construction/maintenance activities to be undertaken without significant disruption to other land uses in the area, in particular concerning noise impacts, dust, farming practices, traffic and road use, and effects on local residents;
- minimises the impact on the surrounding area;
- minimises impacts on avifauna and other fauna using the site; and
- minimises the impact on the heritage and historical value of the site
- minimise possible health impacts.

Objectives
In order to meet this goal, the following objectives have been identified, together with the necessary actions and monitoring requirements.

OBJECTIVE C1: CONTRACTOR'S CAMP / LAYDOWN AREA

Project Component/s	Development site;

	Access roads.
Potential Impact	Degradation of the natural environment inside/outside of the development area.
Activities/Risk Sources	Setting up and operation of the contractor's camp.
Mitigation: Target/Objective	Construction camp must not have a significant negative impact on the site and surrounds i.e. especially farming operations and the hydrological functioning of the drainage line.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Due to the bridge already being built it is not foreseen that a construction camp will be required for the proposed maintenance activities, however should one be needed the area to be use by the contractor/landowner must ne within the current far yard area nearby and must not impact on farming activities. The specific area to be used must be indicated by the ECO upon discussion with the Farm Manager.	Developer/ Landowner	Construction/ maintenance/ operational phase

Performance indicator	ECO in conjunction with the landowner will approve construction camp area.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C2: ALIEN/INVASIVE PLANTS

Project Component/s	Drainage line and surrounding areas.
Potential Impact	Alien/invasive plant species spread within and around disturbed areas
Activities/Risk Sources	Drainage line crossing and all areas disturbed during previous construction and proposed maintenance activities
Mitigation: Target/Objective	To protect and mitigate impacts on the environment. Eradicating and preventing the spread of weeds / alien invasive species.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
No on-site burying, dumping or stockpiling of any weeds and aliens or invasive species shall occur. Such should be removed from the site to a suitable dumping site from which seed cannot escape.	Developer/ Landowner	Construction/ maintenance/ operational phase
According to Conservation of Agricultural Resources Act, (Act 43 of 1983), Regulation 15E methods of controlling weeds and alien plants are as follow: • Uprooting; felling; cutting or burning • Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such • Biological control carried out in accordance with the stipulations of the Agricultural Pests Act,(Act no 36 of 1983) Combination of one or more methods mentioned above, and any action taken to control alien plants shall be executed with caution and in a manner that will cause least possible damage to the environment.	Developer/ Landowner	Construction/ maintenance/ operational phase
Removal of the invasive and alien plants should be according to the appropriate invasive alien plant clearing guidelines/methods provided by the Working for Water Programme.	Developer/ Landowner	Construction/ maintenance/ operational phase
The stream banks should be cleared of exotic and in particular invasive alien plants. The invasive alien kikuyu grass in particular should be kept out of the riparian zone as it destabilises the river banks. It should be replaced by	Developer/ Landowner	Construction/ maintenance/ operational phase

indigenous grasses such as kweek (Cynodon dactylon). This should be undertaken during the dry season but following rainfall events when the soil is moist. Weedy shrubs and small invasive alien saplings occurring along the stream banks within the disturbed area at the crossing should be hand pulled. Should this not be possible for some of the large plants, the plants should be sprayed with a foliar herbicide. Regular follow-up uprooting of new seedlings or follow-up herbicide spraying of coppicing stumps should be undertaken.		
Control of alien invasive plant species should be undertaken with a specific focus on the invasive plants such Acacia mearnsii, Sesbania punicea and Pennisetum clandestinum. These species are known to do well in riparian and wet habitats. They should be controlled by manual removal or the application of appropriate herbicides. Manual removal should not be carried out by any machinery larger than a chainsaw. For additional information on alien vegetation clearing management visit the Working for Water website (http://www.dwaf.gov.za/wfw/Control/)	Developer/ Landowner	Construction/ maintenance/ operational phase

Performance indicator	All possible introduction and spreading of alien invasive plant species are controlled.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C3: STORM WATER MANAGEMENT

Project Component/s	Storm water management.	
Potential Impact	Erosion resulting in excessing soil loss due to poor storm water management, especially in the areas cleared for construction and maintenance.	
Activities/Risk Sources	Drainage line crossing and surrounds	
Mitigation: Target/Objective	Prevent excessing soil loss as a result of erosion through the action of water (storm water runoff).	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
Storm water discharge from along the road should not be discharged into the stream at the structures as it is likely to result in erosion at the bridge. The road should be shaped to ensure that the concentration/intensity of runoff along the road is reduced to dissipate the energy and erosion potential of the flow from the road into the stream at the crossing and all stormwater channels should be kept clear of build-up and blockages to allow free flow of run-off water.	Developer/ Landowner	Construction/ maintenance/ operational phase
Regular monitoring of the effected site and surrounds for signs of erosion and if any is detected immediate rectification and preventative measures must be implemented according to rehabilitation methods as described in the maintenance management plan.	Developer/ Landowner	Construction/ maintenance/ operational phase
Ensure no pollution of any water resources, including surface water, storm water and ground water takes place as a result of any activities on the site.	Developer/ Landowner	Construction/ maintenance/ operational phase
Ensure that no water other than storm water be discharged in the storm water system.	Developer/ Landowner	Construction/ maintenance/ operational phase
Corrective and preventative measures taken will depend upon the type and extent of erosion and/or degradation	Developer/ Landowner	Construction/ maintenance/

occurring.			operational phase
Performance indicator	Protection against excessive soil loss and erosion.		
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule		

OBJECTIVE C4: ARCHAEOLOGY AND PALAEONTOLOGY MANAGEMENT

Project Component/s	Drainage line and surrounding areas	
Potential Impact	The loss of cultural or heritage resources.	
Activities/Risk Sources	Activities associated with the drainage line crossing and its recommended maintenance activities	
Mitigation: Target/Objective	To protect and mitigate the potential loss of cultural and heritage resources.	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
Should any heritage or fossil remains be exposed during any excavation or related activities, these must immediately be reported to the provincial heritage resource authority of the Western Cape, Heritage Western Cape (in terms of the National Heritage Resources Act, 1999 (Act No.25 of 1999) via the ECO. Heritage remains uncovered or disturbed during earthworks must not be disturbed until inspection and verified by the professional.	Developer/ Landowner	Construction/ maintenance/ operational phase
Performance indicator	Protection of heritage resources.	
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule	

OBJECTIVE C5: ANTI-EROSION MEASURES

Project Component/s	Drainage line crossing.
Potential Impact	Wind/water erosion as a result of construction/clearing activities.
Activities/Risk Sources	Activities associated with facility construction.
Mitigation: Target/Objective	Reduce the impact of erosion by implementing anti-erosion measures.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
The contractor/landowner shall take all appropriate and active measures to prevent erosion, especially wind and water erosion, resulting from operations and activities, specifically of storm water control measures to the satisfaction of the ECO. All areas susceptible to wind and water erosion shall be protected, by installing all the necessary temporary and/or permanent works. Measures can include brush packing, anchovy net stabilisation, etc. Where required erosion protection measures must be installed.	Developer / Contractor	Construction/ maintenance/ operational phase
The disturbance of aquatic habitats associated with the maintenance works should be limited (both temporal and spatial extents) as far as possible.	Developer / Contractor	Construction/ maintenance/ operational phase
Work should preferably be undertaken by hand with no machinery driven into aquatic habitats.	Developer/ Landowner	Construction/ maintenance/ operational phase
Activities associated with the maintenance work should be undertaken during the low flow period before the onset of the high flows.	Developer/ Landowner	Construction/ maintenance/ operational phase
Storm water discharge from along the road should not be discharged into the stream at the structures as it is likely	Developer/ Landowner	Construction/ maintenance/

to result in erosion at the bridge. The road should be shaped to ensure that the concentration/intensity of runoff along the road is reduced to dissipate the energy and erosion potential of the flow from the road into the stream at the crossing and all stormwater channels should be kept clear of build-up and blockages to allow free flow of run-off water.		operational phase
Regular monitoring of the effected site and surrounds for signs of erosion and if any is detected immediate rectification and preventative measures must be implemented according to rehabilitation methods as described in this report.	Developer/ Landowner	Construction/ maintenance/ operational phase

Performance indicator	All possible erosion impacts are controlled and appropriately rehabilitated.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C6: HERBICIDES, PESTICIDES AND FERTILIZERS

Project Component/s	Adjacent property/land/farming activities.
Potential Impact	Adjacent land/property, cultivated areas or natural environments contaminated by the application of herbicides, fertilizers and pesticides.
Activities/Risk Sources	Drainage line crossing and surrounds
Mitigation: Target/Objective	To protect and mitigate impacts on the environment and surrounding land users.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
The contractor/landowner must make sure of, and allow, all legal requirements regarding herbicide application procedures. It is vital that the contractor becomes familiar with all the information detailed on every herbicide label before using it. The instructions on the label must be strictly followed throughout. The contractor shall take all necessary precautions to prevent overspray of herbicides outside of the demarcated construction areas and onto natural veld. All personnel working with any herbicide, pesticide or fertilizer must be registered and comply with the requirements set in these registrations. The contractor must put a system in place to control the use of herbicides and pesticides. **Disposal of equipment associated to herbicides and pesticides:** All equipment associated to herbicides and pesticides must be maintained in accordance to the set standards. The disposal of all redundant and empty containers of herbicides and pesticides must be controlled and disposed of at a waste management facility licensed under the National Environmental Management: Waste Act to accept this type of waste (i.e. hazardous waste disposal facility). Disposal of all redundant and empty containers may not be disposed of at a WDF licenced to receive general waste, and may not be burned, or buried. Such containers should rather be returned to the supplier for processing, or triple rinsed and delivered to a licenced recycling company in the vicinity (further information is provided	Developer/ Landowner	Construction/ maintenance/ operational phase

here: http://www.avcasa.co.za/index.php?layout=edit&id=10). If this is not possible, the containers may be disposed of at the Vissershok WDF in the City of Cape Town, which is licenced to receive hazardous waste.		
Only herbicides, pesticides or fertilisers as approved by the Department of Water Affairs may be used for alien vegetation control etc. and the use there of may not lead to surface- or underground water pollution.	Developer/ Landowner	Construction/ maintenance/ operational phase

Performance indicator	Herbicide, pesticides and fertilizer use is controlled to prevent impacts on the environment and surrounded land uses.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C7: MEASURES TO PROTECT HYDROLOGICAL FEATURES OF THE WATERCOURSE AND SURROUNDS

Project Component/s	Affected watercourse and surrounds
Potential Impact	Destruction of natural hydrological systems and the pollution of water resources.
Activities/Risk Sources	Drainage line crossing and affected surrounds
Mitigation: Target/Objective	To protect and mitigate impacts on the environment and hydrological features of the drainage line.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Undertake regular inspections to ensure that: • The river channel, drainage line crossing and associated areas do not become blocked with sediment, debris or nuisance vegetation growth; • No erosion of the upgraded drainage line crossing and associated areas occurs; • The areas remain clear of invasive alien plants and nuisance plant growth should it serve to block the channel or associated areas. • All waste within the drainage channels must be removed regularly. • Sandy areas and riffles must be maintained for frog habitat. • .All rubble and waste debris in the river channel should be removed out of the river channel and banks by hand. Particular attention should be given to upstream of the structure in the drainage line. • Clearing of nuisance growth of plants within the channel if necessary should also be undertaken by hand during the low/no flow period.	Developer/ Landowner	Construction/ maintenance/ operational phase
Remove all accumulated sediment, cobble, waste and woody debris by hand which may cause flooding or lead to blockage of river flow.	Developer/ Landowner	Construction/ maintenance/ operational phase
Remove all alien vegetation as per the relevant method statement provided in the MMP.	Developer/ Landowner	Construction/ maintenance/ operational phase
Rectify erosion immediately and implement preventative measures if any is detected	Developer/ Landowner	Construction/ maintenance/ operational phase
The disturbance of aquatic habitats associated with the maintenance works should be limited (both temporal and spatial extents) as far as possible.	Developer/ Landowner	Construction/ maintenance/ operational phase
Care should be taken to minimize the sedimentation that	Developer/	Construction/

would be caused downstream of the works.	Landowner	maintenance/ operational phase
Work should preferably be undertaken by hand with no machinery driven into aquatic habitats.	Developer/ Landowner	Construction/ maintenance/ operational phase
Activities associated with the maintenance work should be undertaken during the low flow period before the onset of the high flows.	Developer/ Landowner	Construction/ maintenance/ operational phase
Soil, debris and nuisance plant growth removed from the river channel and associated areas should not be dumped within the immediate areas surrounding the aquatic habitats or any indigenous vegetation removed from the site. Removed soil could be used to fill eroded areas	Developer/ Landowner	Construction/ maintenance/ operational phase
Remove all the building rubble and debris caused by previous construction activities preferably by hand to minimise potential impact on the watercourse and surrounds, but it vehicles is require to assist the vehicles must be used in such a manner that it does not cause significant negative impacts on the watercourse i.e. the riverbed and banks must not be excavated mechanically.	Developer/ Landowner	Construction/ maintenance/ operational phase
All activities must be controlled and restricted to the proposed maintenance area only	Developer/ Landowner	Construction/ maintenance/ operational phase
Maintenance activities must be monitored by a appointed Environmental Control Officer as per the monitoring schedule provided.	Developer/ Landowner	Construction/ maintenance/ operational phase
Work within the stream channel should be limited as far as possible and rehabilitated immediately afterwards, where the banks are reshaped as according to surrounding contours and rubble is removed from the stream and banks.	Developer/ Landowner	Construction/ maintenance/ operational phase
All disturbed areas should receive ongoing monitoring and management of erosion and invasive plant growth	Developer/ Landowner	Construction/ maintenance/ operational phase
Care should be taken that any soil used for rehabilitation or stabilisation purposes that is brought onto the site does not contain the seeds of alien invasive plants	Developer/ Landowner	Construction/ maintenance/ operational phase
Proper on-site management should be implemented for the storage and use of materials, waste and pesticides/weed killers to prevent any potential pollution of the drainage lines, wetlands and dams	Developer/ Landowner	Construction/ maintenance/ operational phase

Performance indicator	Impacts on hydrological features minimized and mitigated.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C8: DIESEL FUEL AND LUBRICANT HANDLING PROGRAMME

Project Component/s	Drainage line and surrounding areas
Potential Impact	Contamination of soil, storm and ground water resources as a result of an oil/diesel/lubricant spill/leak.
Activities/Risk Sources	Refuelling of equipment. Accidental spill.
Mitigation: Target/Objective	To protect and mitigate impacts of contaminants on the environment and hydrological features.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Servicing of construction vehicles and machinery to take place off site. All vehicles must be in a good condition with no leakages leading to possible contamination of soil or	Developer/ Landowner	Construction/ maintenance/ operational

water supplies. The following conditions related to the temporary fuel tanks (if applicable) must be implemented: The fuel tanks must be designed and installed in accordance with relevant Oil Industry standards and SANS codes where applicable for the aboveground storage tanks. The tanks must be located within a bund (110 % of the tanks capacity) in order to contain potential spills. During fuel tanker delivery, the tanker driver must be present at all times during product offloading. Should an incident occur the supply vehicle emergency cut-off switch must be activated to immediately stop fuel delivery. Flexible hoses with dry-break couplings and emergency isolation must be used. All spillage incidences and actions taken consequent thereto must be reported to the ECO and recorded in the site register. All fuel and flammable liquids should be stored under secure and fenced conditions and in a bunded site with the volume of the bunding capable of holding 110% of the liquid. The applicant must ensure that effective stock inventory monitoring and regular auditing take place for the early identification of possible leaks. The requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), must be adhered to. Within three months of the tanks ceasing to be used the tanks must be removed at the expense of the applicant, and the site, including all associated infrastructure must be rehabilitated to the satisfaction of the relevant authority. **Refuelling:** Refuelling of equipment must be conducted from the bunded fuel tank and pump at the contractor's camp. Fuel tanks must be bunded and supplied with a concrete apron. The concreted refuelling apron will be constructed with a drain along its extremities to collect any diesel contaminated run-off and channel it to the oil trap where separated oil will be collected and disposed of in the oil recycling container and process. Any spills on the concrete apron of floor below the tank are to be treated with OT8 or Spillsolve or equivalent as per the product instructions. A 500 litre drawn trailer to convey diesel to the equipment for re-fuelling may also be used. Such trailer will be drawn by a specified vehicle and driver, with alternate nominated as approved by the Project Engineer. Such tow vehicle may travel at 20kms per hour maximum at any time, be clearly identifiable as such, and may only tow the diesel cart should the pre requisite drip trays and emergency equipment be on the vehicle at the time. In situ refuelling activity may only take place during a standard specified daily time slot as displayed in the construction office, unless specific per day permission has been given to refuel at any other time by the ECO. This must be pre-recorded in the site record book. Staff will require instruction in the identification of diesel and oil leaks and the use of Spillsolve (or equivalent) products.		phase

On-Site emergency repairs: Only small mobile plant and emergency repairs are to take place on site. These will require the provision of drip trays and funnels to ensure that no oil or fuel leakages occur onto the ground. Should such spill take place, then the oil saturated soil is to be placed in suitable containers and disposed of at a hazardous waste disposal site. Any contamination of soil is to be treated with Spillsolve or similar product. Contaminated water as a result of an oil or fuel spillage on the area should similarly be treated in appropriate way, and the polluted water should not be specifically removed and not allowed to merge with run-off water collected in the trap collecting all run offs from the slab. **Collection of contaminated spares and waste oils:** Contaminated spares, oil filters, gaskets, water, etc. will be collected in separate holders at the designated storage facility for disposal at a licensed H:h site. Staff will require instruction in: • Deleterious effects of oil / fuel on the environment • Identification of oil leaks • Handling of oil / fuel leaks into soil • Location and method in storage of contaminated spares • Fire prevention and emergency drills in case of an accident		

Performance indicator	Ensure that no spillages occur and if it does occur that it is handled and cleaned up accordingly.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

OBJECTIVE C9: INTEGRATED WASTE AND HAZARDOUS MATERIALS MANAGEMENT PLAN

Project Component/s	Drainage line and surrounding areas
Potential Impact	Potential pollution
Activities/Risk Sources	Activities associated with site construction, maintenance and operation
Mitigation: Target/Objective	Protect and mitigate impacts on the environment and hydrological features Ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons Ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons Comply with waste management guidelines Minimise production of waste Ensure appropriate waste storage and disposal

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Developer/ Landowner	Construction/ maintenance/ operational phase
Spillage of oils and fuels must be minimized with the use of drip trays in the garage/workshop areas.	Developer/ Landowner	Construction/ maintenance/ operational phase

An integrated waste management approach that is based on waste minimisation must be used and must incorporate reduction, recycling, re-use and disposal where appropriate. Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Developer/ Landowner	Construction/ maintenance/ operational phase
Please note that section 28 (1) of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended (NEMA) states: "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 authorized by law or cannot reasonable be avoided or stopped, to minimize and rectify such pollution or degradation of the environment". Failure to adhere to section 28(1) of NEMA is an offence and thus particular care of the environment must be taken.	Developer/ Landowner	Construction/ maintenance/ operational phase
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and disposal at appropriately licensed waste disposal sites	Developer/ Landowner	Construction/ maintenance/ operational phase
The National Information Systems Regulation must be adhered to in terms of registering and reporting of hazardous waste generated on site via the Integrated Pollutant Waste Information System (IPWIS).	Developer/ Landowner	Construction/ maintenance/ operational phase
All stored fuels to be maintained within a sealed bund and on a sealed surface. The bund must be at least 110% of the volume of the total containers adhering to the requirements of SABS 089:1999 Part 1	Developer/ Landowner	Construction/ maintenance/ operational phase
Fuelling areas situated around fuel tanks must be provided with an impervious layer or drip trays must be used during refuelling;	Developer/ Landowner	Construction/ maintenance/ operational phase
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function	Developer/ Landowner	Construction/ maintenance/ operational phase
Oily water from bunds at the substations must be removed from site by licensed contractors	Developer/ Landowner	Construction/ maintenance/ operational phase
The storage of any flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with MSDS files	Developer/ Landowner	Construction/ maintenance/ operational phase
Any storage and disposal permits/approvals which may be required for hazardous substances must be obtained, and the conditions attached to such permits and approvals will be compiled with and copies kept on site in the environmental file	Developer/ Landowner	Construction/ maintenance/ operational phase
Transport, storage and disposal of all hazardous substances must be in accordance with the relevant legislation and regulations	Developer/ Landowner	Construction/ maintenance/ operational phase
Washing of construction vehicles and equipment will only be allowed at the construction camp in bunded areas.	Developer/ Landowner	Construction/ maintenance/ operational phase
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. Corrective action must be undertaken immediately if a complaint	Developer/ Landowner	Construction/ maintenance/ operational phase

is received, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.		
Implement an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems. Leakage of fuels must be avoided at all times and if spillage occurs, it must be remediated immediately.	Developer/ Landowner	Construction/ maintenance/ operational phase
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents Spilled cement, fly ash and concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Developer/ Landowner	Construction/ maintenance/ operational phase
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area. Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal and copies of the safe disposal slips must be kept in the environment file on site.	Developer/ Landowner	Construction/ maintenance/ operational phase
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Developer/ Landowner	Construction/ maintenance/ operational phase
An incident/complaints register must be established and maintained on-site.	Developer/ Landowner	Construction/ maintenance/ operational phase
The sediment control and water quality structures used on-site must be monitored and maintained in a fully operational state at all times	Developer/ Landowner	Construction/ maintenance/ operational phase
Upon the completion of construction, the area must be cleared of potentially polluting materials	Developer/ Landowner	Construction/ maintenance/ operational phase
Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site	Developer/ Landowner	Construction/ maintenance/ operational phase
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Developer/ Landowner	Construction/ maintenance/ operational phase
The storage of waste must comply with the National Environmental Management: Waste Act, (Act No. 59 of 2008) National Norms and Standards for Storage of Waste, 2013	Developer/ Landowner	Construction/ maintenance/ operational phase
Waste may not be stored for a period exceeding 90 days during construction and operations of the proposed development without adherence to the National Norms and Standards for the Storage of Waste in terms of Government Notice (GN) No.926 of 29 November 2013, if the volumes stored exceed	Developer/ Landowner	Construction/ maintenance/ operational phase

80m3 of hazardous waste or 100m3 of general waste. If these thresholds are triggered, the Facility must also be registered on the Department's Integrated Pollutant and Waste Information System (http://ipwis.pgwc.gov.za/ipwis3/public) and the information must be updated regularly thereafter.		
Vegetation removed during the construction phase must be chipped for composting or be disposed of appropriately and may not be disposed of on the adjacent land.	Developer/ Landowner	Construction/ maintenance/ operational phase
All waste oils, fuels and lubricants are considered hazardous waste to be stored separately in bunded areas and disposed of at a licensed hazardous waste handling facility and for which safe disposal certificates must be kept.	Developer/ Landowner	Construction/ maintenance/ operational phase
It is the responsibility of each landowner, lease holder or developer to ensure that they are aware of and adhere to the requirements of the NEM:WA as it pertains to their operations.	Developer/ Landowner	Construction/ maintenance/ operational phase
The disposal of waste should be considered as a last resort after having considered waste minimization, such as avoidance, reuse and recycling of waste.	Developer/ Landowner	Construction/ maintenance/ operational phase
Performance indicator	Limited chemical spills outside of designated storage areas No water or soil contamination by spills No complaints received regarding waste on site or indiscriminate dumping Provision of all appropriate waste manifests for all waste streams. No construction waste outside of designated waste storage areas. No overflowing waste storage areas	
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule	

OBJECTIVE C10: REHABILITATION

Project Component/s	Constructed bridge and surrounds
Potential Impact	Rehabilitation of affected sites and surrounds
Activities/Risk Sources	-
Mitigation: Target/Objective	Successful rehabilitation and stabilisation of the affected site and surrounds with indigenous vegetation

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Immediately following the clearing of exotic and invasive alien plants, the banks should be revegetated with local indigenous riparian vegetation such as wild olive trees (Olea europaea subsp africana), Cape willows (Salix mucronata), wild almond (Brabejum stellatifolium), waterwitels (Brachylaena neriifolia), willow karee (Searsia augustifolia), lance-leaved myrtle (Metrosideros angustifolia), kruidjie-roer-my-nie (Melianthus major), fountain bush (Cliffortia strobilifera), water sedge (Isolepis prolifera), spiny rush (Juncus acutus), cobra lilies (Chasmanthes aethiopica), arum lilies and palmiet (Prionium serratum).	Developer/ Landowner	Construction/ maintenance/ operational phase
Clean topsoil (not containing invasive alien plant seed or rubble/waste) should be placed over the dumped bricks at the crossing and vegetated to cover the stabilised area adjacent to the crossing. A ground cover such as hottentot-fig (Carpobrotus edulis) or indigenous grass such as kweek could be planted in this area.		
Should any additional disturbances occur due to		

maintenance activities and/or erosion etc. these areas must be rehabilitated with indigenous vegetation as described above.		
The disturbance of aquatic habitats associated with the maintenance works should be limited (both temporal and spatial extents) as far as possible.		
Work should preferably be undertaken by hand with no machinery driven into aquatic habitats.		
Activities associated with the maintenance work should be undertaken during the low flow period before the onset of the high flows.		

Performance indicator	Successful stabilisation and rehabilitation of disturbed sites with indigenous vegetation and no erosion of riverbed and banks.
Monitoring	This will be monitored by the ECO during site visits and recorded in the ECO reports to be submitted to the landowner/farm manager and competent authority as per recommended ECO site visit schedule

CHAPTER 8

ENVIRONMENTAL REPORTING

In order to ensure that the necessary environmental issues are adequately addressed and recorded, the following environmental reporting shall be undertaken:

- Incident reporting; and
- Compliance reporting

See below for a template of an Incident Report to serve as a guideline for the recording and addressing of emergency incidents as and when they occur.

ENVIRONMENTAL INCIDENT REPORT

DATE:	**File Ref:**
NAME:	**Copy to:**
EXACT LOCATION OF INCIDENT:	

SECTION 1 : DESCRIPTION OF INCIDENT

SECTION 2 : REMEDIAL ACTION REQUIRED

Remedial Action Due Date:
Confirmation of implementation: **Name:** **Date:**

SECTION 3 : RELEVANT DOCUMENTATION

SECTION 4 : SIGNATURES

Municipal Engineer:

.....

Name:
Date:

ECO:

.....

Name:
Date:

SECTION 5: DRAWING/SKETCH

CHAPTER 9

DECOMMISSIONING PHASE

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased.

The decommissioning phase EMPr provides specific guidance with respect to the management of the environmental risks associated with the decommissioning stage of a project.

Closure and decommissioning impacts are likely to be similar to the construction phase impacts. The management actions and control under the construction phase EMPr need to be implemented to mitigate the negative impacts on the environment and to restore the property to its natural state.

A decommissioning phase is where a structure is removed or otherwise modified to make it incapable for re-use for the original design purpose.

The results of environmental monitoring during the decommissioning phase will be used to assess the impact of the decommissioning on the surrounding environment and demonstrate compliance with regulatory requirements.

The actual scope of the decommissioning environmental monitoring will be established following consultation with the regulatory authorities. The format of decommission management strategy will probably be similar to that of earlier development phases and consist of the following:

- Management Principles
    - Develop monitoring procedures in accordance with standard protocols and the requirements of the environmental legislation.
    - Undertake environmental monitoring during the decommissioning phase as shown below.

Environmental monitoring during the decommission phase will include terrestrial and aquatic flora and habitat rehabilitation monitoring.

CHAPTER 10

ENVIRONMENTAL AWARENESS INDUCTION COURSE MATERIAL

This section of the report is included in compliance with Section 24N (3) (c) of the National Environmental Management Act 107 of 1998.

WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe

WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A Policy and System will be signed

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP

WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times

RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream

ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site

TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission

PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed

DUST

Try to avoid producing dust

NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles

TOILETS

- Use the toilets provided
- Report full or leaking toilets

EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins

RUBBISH

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly

TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers – check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill

EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance:
- Fire:
- Police: 10111

FINES AND PENALTIES

- Spot fines of between R20 and R2000
- Your company may be fined
- Removal from site
- Construction may be stopped

PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

ATTENDANCE REGISTER FOR ……	
PLACE ……..	TRAINER……
NAME & SURNAME	SIGNED
SIGNED ……..	DATE & TIME ……

CHAPTER 11

COMPLIANCE WITH THE ENVIRONMENTAL AUTHORISATION

All conditions of the Environmental Authorisation must be adhered to onsite during the construction-, operational-, decommissioning- and rehabilitation phases of the proposed project. A copy of the Environmental Authorisation must be available on site together with the EMPr, MMP and all contractors on site must sign the Declaration of Understanding as proof of awareness and understanding of all the conditions to be adhered to on site in terms of the EA, EMPr and MMP.

CHAPTER 12

UPDATING/ADAPTING THE EMPr

Although care has been taken to address all known relevant environmental issues for the development, it will become necessary to add or amend certain procedures or instructions to improve the efficiency of the EMPr. Only those additions to, or amendments of, this EMPr that will either improve environmental protection or can be proven not to have any negative effects would be considered to be included, and any amendments to the EMPr must first be approved by the ECO and competent authority/ies i.e. DEA&DP.

REFERENCES

City of Cape Town (2002) Environmental Management Programme (Version 5) for Civil Engineering Construction Activities.

DEA&DP: Environmental Management Programme. Version 5 (04/2002). Guideline Document for the ECO / ESO and the ER

Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.