FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION FOR THE NEW ALIWAL NORTH OFFICES FOR DRPW/DRDAR –

PHASE 1

ENVIRONMENTAL MANAGEMENT PROGRAMME

May 2016

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May 2016

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IVQS	Mr. I. Vanqa	April 2016
Appointed Contractor(s)		April 2016
Moira Cloete Environmental Consulting	Moira Cloete	April 2016

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

1.1 GENERAL

Erf 3102, on the southern urban edge of Aliwal North, has been earmarked for the development of a four storey office building for use by the Department of Roads and Public Works (DRPW) and the Department of Rural Development and Agrarian Reform (DRDAR). The gross floor area of the proposed buildings is approximately 7200m^2. The building structure will consist of four wings connected by a semi-circular central core, with a single storey canteen and assembly area. The forward wings will be three storey's high while the building blocks in the rear will be two storey high (See **Appendix A** for the site layout plan).

Erf 3102 is situated adjacent to the Aliwal North show grounds and has the N6 national road between East London and Johannesburg forming the eastern boundary. A Concentration Camp Memorial lies to the north of the site. The site is currently used as a thoroughfare between the neighbouring communities and consists mostly of fairly flat, overgrazed Aliwal North Dry Grasslands vegetation type, with a gentle slope tapering off to the north eastern corner. There are no drainage lines or sensitive wetland features in the proposed building area.

The internal construction process comprises:

- bulk earthworks,
- a reinforced concrete structure,
- brick walls and partitioning,
- plaster and paint

The external construction process comprises:

- A combination of facebrick, plaster and paint,
- Timber roof structure with metal sheeting,
- Suspended ceilings,
- Ablution facilities,
- Electrical and mechanical installations.

Site works will comprise of:

- paved walkways, internal roads and parking areas (6400m^2 total paved area),
- work to the N6 intersection,
- new "clear vu" perimeter fencing,
- storm water reticulation,
- potable water reticulation,
- fire water reticulation,
- sewer water reticulation.

No new services will required for the project, due to the proposed site's location on the urban edge of Aliwal North. The local electricity supplier, Eskom, will be utilized for providing energy where required,

should the preferred solar power need supplementing. A generator will also be supplied and installed on site for backup during power outages.

A six-phase project is currently underway in Aliwal North, whereby the old, dilapidated sewage system comprising vitreous clay pipes and pitch fibre is being upgraded to newer specifications using new plastic upvc pipes of varying diameters. The planned upgrade project has commenced and will run until end November 2016.

The upgrading of the East Outfall Sewer line is the first phase of a planned development during which parts of the Aliwal North Sanitation System will be upgraded. The existing sewer line to the east of Aliwal North, was constructed in the 1940's and has deteriorated to such an extent that raw sewage and waste water is leaking into the surrounding environment creating a major environmental impact to the wetland reed area, golf course and surrounds as well as a health risk to the residents in this area. The line is also taking in excessive groundwater from the two natural mineral springs situated to the south of the town, which is polluting the Aliwal Spa and rendering the famed tourist attraction a serious health risk which has led to a decline in the amenities.

The existing sewer line starts at the mineral springs to the south of Aliwal North, and runs in a northerly direction towards the east outfall sewer line on the banks of the Orange River, along the eastern urban edge. A new pipeline will be inserted within an excavated trench running alongside the existing sewer line, with a few new connections made into it at various points.

The existing east outfall sewer line, which is currently being upgraded by the Joe Gqabi District Municipality, will receive the planned waste water and air conditioner condensate from the new office block. The pipe diameters leading from the ablution facilities to the manhole on site start at a diameter of 160mm ending with a 315mm diameter pipeline. The collected sewage gravitates from Erf 3102 to the new east outfall sewer line. From there it leads to the recently upgraded Nursery Pump Station which pumps the sewage to the Polar Park pump station. From there it is pumped across the Orange River to the waste water treatment works (WWTW) on the Orange Free State side.

There will be sufficient capacity for the new sewage volumes as the upgraded system has been designed to transport additional sewage loads taking into account the office block development as well as planned future development around Aliwal North.

Potable water will be sourced from the local water supply source used by the Maletswai Municipality. However, the four storey office building is higher than the municipal header tank therefore a new header storage tank and pump station has been designed.

The project has been registered with the Green Building Council of South Africa and is aiming to achieve a four star rating for using efficient and sustainable design measures. The aim is to try to achieve a five star rating during the operational phase, including:

- sustainable measures such as a grey water recycling system will be included, to save water;

- a stormwater attenuation pond will be constructed to capture sedimentary rich runoff from site and to provide additional water storage;
- Solar panels will be installed on the parking lot roof structures to provide green energy on site;
- The use of locally sourced and supplied SABS and green rating approved materials will be specified;
- To recycle at least 70% of the construction waste i.e. through the reuse of the topsoil for landscaping etc.;
- All paints, adhesives, carpets etc. to have low volatile organic compounds (VOC's) which are less harmful to the environment;
- Efficient light fittings and motion sensors to be used to prevent energy wastage;
- Water efficient hand wash basins and urinals to be installed;
- Low ozone depleting potential refrigerants and insulating products will be used.

The Principal Agent responsible for overseeing and co-coordinating the proposed project is Inga Vanqa Quantity Surveyors and Project Managers.

Moira Cloete Environmental Consulting (EAP) completed this Environmental Management Programme (EMPr). The EMPr covers the pre-construction planning and design, construction, operational and decommissioning phases of the Project and ensures that all environmental impacts are mitigated where possible. (See **Appendix B** for a detailed curriculum vitae).

The EMPr must be considered during pre-construction planning and design; incorporated in all the contractor documents; and be fully implemented prior to commencement of any construction activities. The EMPr may also require further amendments as the Project unfolds.

1.2 STRUCTURE OF THE EMPR

This EMPR is structured as follows:

Chapter 1	Provides the introduction and details of the proponent, EAP(s) that undertook the and the authorities that dealt with the application for Environmental Authorisation
Chapter 2	Provides the objectives and scope of the EMPr
Chapter 3	Presents the Glossary and Definition of Terms
Chapter 4	Provides a brief project overview, including the project motivation and description, the study area and environmental impact assessment
Chapter 5	Provides the Legislative and Policy context of the Project

Chapter 6	Provides details on the roles and responsibilities; compliance monitoring and reporting; and penalties with regard to planning and implementation of the EMPr.
Chapter 7	Provides details on requirements, procedures and content of specific method statements and standard operating procedures to be developed for the Project.
Chapter 8	Defines the environmental specifications to be adhered to during the pre-construction, construction, operational and decommissioning phases of the Project.
Chapter 9	Conclusion.

The structure of the EMPr has been based on the current Environmental Impact Assessment (EIA) Regulations, 2014 GNR 982 (Appendix 4). Specifically, the EMPr contains the following:

Table 1.1: NEMA 2014 EIA Regulations, Appendix 4: Content of Final Environmental Management Programme Report

Requirement according to Appendix 4 of GNR 982	Reference in the EMPr
(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 1.5.2 Appendix B for curriculum vitae
b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 4
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;	Appendix A
d) a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the EIA process for all phases of the development including- 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;	Section 4.2 & 4.3
e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 4.3 & Chapter 8

Requirement according to Appendix 4 of GNR 982	Reference in the EMPr
f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include options to- 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 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;	Section 4.2 & 4.3 Chapter 5 Aggregate will be sourced from a commercial source. A closure plan is required for an application that involves mineral or petroleum resources; or closure of a facility. Neither of these conditions applies to this project and therefore a closure plan is not included
g) the method of monitoring the implementation of the impact management actions contemplated in paragraph	Section 8
h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f)	Section 8:
i) the indication of the persons who will be responsible for the implementation of the impact management actions	Chapter 8
i) the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity;	Chapter 8
j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Chapter 8
k) where appropriate, closure plans, including closure objectives.	N/A
l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 6.4
m) an environmental awareness plan describing the manner in which- 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	Appendix C
n) any specific information that may be required by the competent authority.	Basic Assessment Report unless exemption has been obtained by Applicant.

Additional information produced and/or obtained in support of the main text has been included in the Appendices at the back of this document, including the Site Layout plan **(Appendix A),** an Environmental Awareness Plan (**Appendix C**) and a method statement example **(Appendix D).**

1.3 Applicable Documentation

The following documentation is applicable for the Project, and should be read in conjunction with this EMPr:

- Architectural Design Report by Songo Design Lab.
- Survey Report by Hansen Land Surveyors.
- Geotechnical Report by Simlab (Pty) Ltd.
- Traffic Study by Emonti Consulting Engineers.
- Civil and Structural Design Report by SKCM.
- Wet Services Design Report, Lifts Design Report, Fire Protection Services Design Report, HVAC Design Report and Electronic Security by DFR Engineers.
- Electrical Services and Specifications Design Report by Hamsa Consulting Engineers.
- Green Star Report

1.4 CONDITIONS OF AUTHORISATION

Applicant to include conditions of authorization here once received from DEDEAT.

1.5 REVISIONS OF THE EMPr

Revisions and updates to the EMPr must be recorded. Table 2 provides a list of revisions to the EMPr to date and must be updated accordingly. All EMPr revisions with substantial changes must be submitted to DEDEA for approval prior to implementation. Note that Appendices may require more frequent updating and it is therefore assumed that these revisions do not need to be sent to DEDEA for approval.

Table 1.2: EMPR Revisions

Document name and version	Date	Author(s)
Draft EMPr Rev 1 – generic empr with no supporting documentation included.	13 April 2016	Moira Cloete
Draft EMPr Rev 2- expanded on Impacts tables and environmental mitigation measures.	19 April 2016	Moira Cloete
Final EMPr – incorporates elements of supporting documentation received.	25 April 2016	Moira Cloete
Final EMPr – expanding on the Aliwal North Sewage Upgrade project	10 May 2016	

1.5 Project Team Details

1.5.1 The Applicant: Department of Roads and Public Works

The Department of Roads and Public Works (DRPW) is the primary Applicant for this project. Inga Vanqa Quantity Surveyors and Project Managers, is the Principal Agent responsible for the co-ordination of the project.

1.5.2 The Environmental Assessment Practioner (EAP): Moira Cloete Environmental Consulting

The EMPR has been prepared by Moira Cloete of Moira Cloete Environmental Environmental Consulting. Ms Cloete is a self-employed Independent Environmental Assessment Practitioner (EAP) based in Elliot in the Eastern Cape. Ms Cloete holds a BSc (Hons) degree in Environmental Management, has extensive experience in all spheres of Environmental Management, and has worked on a number of Projects within the Eastern Cape ranging from EIA's for the construction of landfill sites through to onsite monitoring for road, forestry and dam Projects. Ms Cloete has gained substantial experience, mostly in the United Kingdom, in conducting and completing on site environmental assessments, audits, environmental management programmes and waste management Projects. Recent Projects include successfully completing the Basic Assessment Environmental Processes for a number of Projects in the North Eastern Cape as well as assisting Applicants with the Water Use Licensing process in accordance with DWA's requirements for mainly new dams and water abstraction Projects. See Appendix A for Curriculum Vitae.

1.6 Assumptions and Limitations

Assumptions and limitations are listed below:

- The EAP was appointed at the end of the Design Co-ordination phase of the project, prior to the construction tender being awarded and was thus not a part of the initial project team.
- It is assumed that ***all*** the relevant project information known to the Applicant has been provided to the EAP by the Applicant. Should there be any information lacking from this EMPr, it is because it was not known at the time to the EAP.
- It is assumed that exemption has been obtained from DEDEAT from fulfilling the requirements as set out in the EIA Regulations, 2014, by the Applicant.

2. PURPOSE OF THE EMPR

The purpose of an EMPr is to help control those activities that can have potentially adverse environmental implications on the project site and surrounding areas. In short, an EMPr describes good environmental practice principles which must be applied for the duration of a specific stage of the project development (e.g. planning and design, construction and operation). Specific to this Project, the

EMPr focuses on controlling the potential impacts associated with the construction and operational activities associated with the project.

The NEMA legislation states that an EMPr is to be implemented by the Applicant and appointed Contractor of the Project which will ensure that environmental impacts associated with the proposed project are mitigated as required. It is imperative that the remedial and mitigation requirements identified are effectively implemented during pre-construction site investigations, construction, operation, through to the decommissioning of the project (where applicable). Accordingly, the EMPr plays a key role in the implementation of consistent and continued environmental management for the duration of the development life cycle.

The Environmental Control Officer (ECO), acting on behalf of both the Applicant and the Environmental Authorities, will monitor the implementation of the EMPr during construction. The EMPr will form part of the contractual agreement between the Applicant and the appointed construction Contractor. Compliance with the EMPr must therefore form part of all the construction contactor's working tender documentation and be endorsed contractually.

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

2.1. Objectives of the EMPr

The objectives of the EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- To identify measures that could optimize beneficial impacts.
- To create management structures which address the concerns and complaints of I&APs with regards to the construction and operational phases.
- To establish a method of monitoring and auditing environmental management practices during all phases of the construction.
- Ensure that the construction and operational phases of the Project continues within the principles of Integrated Environmental Management.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the proposed development.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the environmental management plan must be implemented, where appropriate.

2.2. Emphasis of the EMPR

- Avoiding negative environmental impacts by not performing certain actions.
- Minimising environmental impacts by limiting aspects of an action.
- Rectifying environmental impacts through rehabilitation, restoration, etc. of the affected environment.
- Compensating for environmental impacts by providing substitute resources or mitigation measures
- Minimising environmental impacts by optimising processes, structural elements and other design features.
- Provide ongoing monitoring and management of environmental impacts and documenting any digressions /good performances.
- The EMPr is a legally binding document that all parties involved in the Project must be made aware of.

It is important to recognise the EMPr as a dynamic document and provision must be made to ensure the Environmental Specifications evolve and respond to changing design details, construction activities on site, operations and decommissioning activities at a minimum.

The EMPr will be implemented during the construction and operational phases of the Project. The implementation of the EMPr is to be monitored and audited.

3. GLOSSARY OF DEFINITIONS & ABBREVIATIONS USED IN THE EMPR

Alien vegetation	all undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the Conservation of Agricultural Resources Act (43 of 1983) (CARA) amended regulations 15 and 16 as promulgated in March 2001.
BAR	Basic Environmental Assessment Report
BEAT	Basic Environmental Awareness Training
CBA	Critical Biodiversity Area
Construction activity	refers to any action taken by the Contractor, his subcontractors, suppliers or personnel in undertaking the construction work.
Construction area(s)	refers to all areas used by the Contractor in order to carry out the required construction activities. This includes all offices, accommodation facilities, testing facilities/laboratories, batching areas, storage & stockpiling areas, workshops, spoiling areas, access roads, traffic accommodation (e.g. bypasses), etc.
Contractor	is a person or company appointed by the Applicant to carry out construction activities.
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DRDLR	Department of Rural Development and Land Reform
DRPW	Department of Roads and Public Works
DWS	Department of Water and Sanitation
ECBCP	Eastern Cape Biodiversity Conservation Plan
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report

Emergency	is an undesired event that does result in a significant environmental impact and requires the notification of the relevant statutory body, such as a Local Authority.
Environment	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 of combination of the aforementioned 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 wellbeing.
Environmental Control Officer	is an individual appointed to monitor and audit the implementation and of the EMPr.
Environmental Impact	The change to the environment, whether desirable or undesirable, that will result from the rehabilitation, mitigation and/or use of the Project. An impact may be the direct or indirect consequence of the Project.
Environmental Management Plan:	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.
ES	Environmental Specifications
GNR 983 & 985	EIA Regulations 2014, Listing Notices 1 and 3.
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act 107 of 1998 (as amended).
No-Go Areas	Generally those areas outside the designated working areas.
NWA	National Water Act, 1998
PPE	Personal Protective Equipment
OHSA	Occupational Health and Safety Act, 1993.
Working Areas	Working areas are those areas required by the Applicant/ to undertake the repair works, as approved by the Resident Engineer (where applicable).
Project Manager	The person appointed by the Applicant to act as required for the duration of the proposed Project.
Environmental Control Officer	An independent individual appointed by the Applicant, to monitor and report on compliance to the commitments stated in the approved EMPr and the Environmental Authorisation conditions.

Applicant	The person who has applied for Environmental Authorisation for the proposed Project.
SANBI	South African National Biodiversity Institute.
SAHRA	South African Heritage Resources Agency.
Site Manager	The person, representing the Applicant/, responsible for all the Applicant's/'s activities on the site including supervision of the project staff and activities with the Principal Agent in order to ensure that the project is conducted in accordance with the Environmental Management Plan.
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.
WULA	Water Use License Authorisation, NWA, 1998

4. PROJECT DESCRIPTION

4.1 PROJECT ACTIVITIES

The scope of works for the proposed development include the construction of a four storey office block (7900m^2 gross floor area), consisting of a ground, first, second and third floor office offices space for the Department of Roads and Public Works (DRPW) and the Department of Rural Development and Agrarian Reform (DRDAR).

4.1.1 Design Phase

The project design phase commenced during 2015 with various role players. An important design element is that the office block is registered with the Green Building Council of South Africa with the aim of achieving a four star rating.

The Green Building Council South Africa leads the transformation of the South African property industry to ensure that buildings are designed, built and operated in an environmentally sustainable way. Buildings are one of the main contributors to climate change. Building green is an opportunity to use resources efficiently and address climate change while creating healthier and more productive environments for people and communities.[1]. A prescribed points system is used to calculate the overall

[1] The Green Building Council SA website

rating depending on the use of sustainable and eco-friendly methods such as solar/wind energy use, grey/black water harvesting/recycling on site, efficient lighting mechanisms etc.

4.1.2 Construction Phase

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within construction phase are specified in see chapter 8. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfaction of the Project Manager and Environmental Control Officer. The pre-construction/design and planning, construction and site establishment activities which would typically take place on site are summarized below:

During the Construction Phase, copies of this EMPr shall be kept at the construction site office and must be distributed to all senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document and will further be required to sign a register confirming their understanding of the document.

If necessary, the Environmental Control Officer (ECO) must conduct a training session with senior personnel regarding the implementation of the EMPr.

During the construction phase, senior personnel will be required to educate their workers regarding the contents of this document and how to comply with its requirements. This register shall be continuously updated as changeover of senior personnel takes place.

4.1.1.1 Pre-Construction and Site Establishment Activities

- *Compliance with Legislation, Permits and Permissions*
- *Protection of Existing Services and Infrastructure*
- *Working and No-Go Areas and Special or Sensitive Environments*
- *Access Roads/Haul Roads and Traffic Control*
- *Use of Local Labour and Local Material Acquisition*
- *Basic Environmental Awareness Training*
- *Health and Safety*
- *Incident/Accident Prevention, Preparedness and Response*
- *Method Statements*
- *Site Photographs*

4.1.3 Operational and Maintenance Phase

This section of the EMPr provides management principles for the operation and/or maintenance phase of the project.

During the Operational Phase, a copy of this EMPr must be maintained by the Applicant. All senior operational and maintenance staff (including those sub-contracted by the Applicant) will be required to familiarise themselves with the contents of the document and will have to sign a register to the effect that they have read and understood the contents of the document.

If necessary the ECO can conduct a training session with senior personnel regarding the implementation of the EMPr during the operational phase.

Senior staff will be required to educate their operational staff as to the contents of this document and how to remain compliant.

4.1.1.2 Environmental Management & Good Housekeeping

- *Managing Soil Erosion*
- *Controlling Visual and Aesthetic Impacts*
- *Controlling Water Use, Sanitation and Stormwater*
- *Controlling Ecological Impacts.*
- *Managing Noise and Air Quality Impacts*
- *Waste Management*
- *Controlling Public Nuisance and Safety Risks*
- *Controlling Cultural Heritage/Historical and Archaeological Impacts*
- *Maintenance activities*

4.1.4 Specific Engineering Activities

For the purposes of this Project, the following activities will take place at the proposed development site.

4.1.4 Specific Engineering Activities

- *Cement and concrete batching*
- *Bulk earthworks*
- *Excavation, hauling and placement*
- *Power tools and generators*

- *Site clearance – including management of alien invasive plant species*
- *Storage, handling and use of non-hazardous materials*
- *Storage, handling and use of hazardous materials*
- *Topsoil stockpiles and spoil sites*

4.1.5 Construction Site Closure and Decommissioning Phase

This section includes principles for the decommissioning of the development site and closure phase of the Project. The proposed new office block has been built with an indefinite life span, thus no physical decommissioning will take place.

- **Site specific activities – decommissioning phase**
    - *Site closure and rehabilitation*
    - *Grass seeding or hard landscaping (whichever is applicable)*

4.2 POTENTIAL ENVIRONMENTAL IMPACTS

4.2.2 Brief overview of environmental characteristics of the area

A summary of the existing environmental characteristics of the affected environment is provided below:

- The study area occurs in the Northern Eastern Cape Province, on the southern perimeter of Aliwal North, adjacent to the N6 national road leading from Jamestown, on Erf 3102.
- Erf 3102 currently comprises an open stretch of overgrazed Aliwal North Dry grasslands, and is situated adjacent to Erf 3101, the neglected ruins of a cultural village[2].
- The proposed office development will cover 14 300m^2 or roughly 1.4ha.
- The proposed office development is situated within the Upper Project Water Management Area and Kraai Sub-Water Management area[3].
- The soils in the study area, are categorized as soils with negligible to weak profile development, usually occurring on deep alluvial deposits and sandstone.

[2] Musina and Rutherford: Vegetation types of Southern Africa, 2006.

[3] SANBI: BGIS database for the Eastern Cape

4.3 IDENTIFIED ENVIRONMENTAL IMPACTS

The construction phase for the proposed new office development is regarded as the primary transformation of the current land cover for the purposes of the Project. The construction activities will last for approximately 28 months. See Table 4.3 below.

The remaining activities that will follow after the construction phase, i.e. office block maintenance activities, are regarded as occurring in the operations phase. These impacts will be of lesser significant importance overall, and will be episodic in nature, occurring over the proposed office block lifespan.

Decommissioning of the proposed office block is unknown at this stage and is not deemed likely for the foreseeable future.

Overall, it is expected the environmental impact of the construction phase for the proposed office block will be of moderate to low negative impact provided the EMPr continues to be rigorously implemented.

Some positive impacts may result from the construction phase, primarily new employment and skills opportunities and the increased socio-economic spin off for Aliwal North businesses with the additional staff working in the office block.

Further positive impacts should occur, related to the level of employment and association with the Municipality's strategic development plans for the areas; this is expected to be of moderate positive to high impact.

By implementing the EMPr through the Environmental Specifications (ES) described in **Chapter 8**, the significance of the associated construction- and operations related negative impacts on the surrounding biophysical and human environment would largely be reduced, avoided or at the very least, minimised accordingly.

The impact prediction tables have been developed by expanding on the anticipated project environmental impacts using the methodology below:

An "aspects" based approach has been utilised in the identification of potential impacts. "Environmental Aspects" are the mechanisms by which an activity interacts with the environment. Environmental aspects refer to an element of an activity, product or service which can have a beneficial or adverse impact on the environment. For example, it could involve a discharge, an emission, the consumption or re-use of a material, or noise. A number of environmental aspects have been determined for the proposed operations. These are presented in Table 4.4 below.

Table 4.4:

MAIN CATEGORY		SUB-CATEGORIES	EXAMPLE
INPUTS	**Resource Consumption**	Raw Materials Manufactured Products Energy	Electricity, Diesel Materials for the construction of the services (roads, power supply etc.) and the buildings. Natural materials used in construction, such as gravel and sand.
		Water	Water for construction works Potable water for domestic purposes. sanitation
OUTPUTS	**Releases to Water**	Point sources (piped source) Diffuse sources (seepage/run-off)	Stormwater runoff – possibly polluted. Spillage / seepage of sewage from pipes.
	Releases to Air	Dust Gasses and fumes	Dust generated from construction. Gasses and fumes generated from exhaust emissions during construction and operation.
	Other Releases	Noise Solid waste Spillages Light Vibrations	Construction noise General urban noise Solid waste from development and operation, Spillages from bulk fuel supplies and from construction activities. Light pollution from development (streetlights etc.)
Land Transformation		Surface disturbance Topographical change	Removal of vegetation. Leveling of plots for development. Digging of trenches, foundations Building of infrastructure Impeding water courses.
Social Aspects		Employment & Training	Staff Subcontractors
		Changes in Land use / zoning	Change of land use and zoning to residential/commercial/amenity development.
		Provision of facility	Supply of residential and commercial erven.
CRITERIA		**Categories**	Explanation
Overall nature		**Negative**	Negative impact on affected biophysical or human environment.
		Positive	Benefit to the affected biophysical or human environment.

Spatial Extent	**Site**	Immediate area of activity, incorporating the 500m study area.
	Local	Area within 5km of the site/study area.
	Regional	Entire community, drainage basin, landscape etc.
	National	South Africa.
Duration	**Short-term**	Impact would last for the duration of the activity or of the construction works – between 0 to 5 years. Quickly reversible.
	Medium-term	Impact would dissipate within 5 to 10 years of the Project activity. Reversible over time.
	Long-term	Impact would persist for longer than 15 years.
	Permanent	Impact would continue beyond decommissioning.
Probability	**Unlikely**	-
	Possible	-
	Probable	-
	Definite	-
Mitigation Potential [I.e. the ability to manage or mitigate an impact given the necessary resources and feasibility of application.]	**High**	Relatively easy and cheap to manage. Specialist expertise or equipment is generally not required. The nature of the impact is understood and may be mitigated through the implementation of a management plan or through 'good housekeeping'. Regular monitoring needs to be undertaken to ensure that any negative consequences remain within acceptable limits. The significance of the impact after mitigation is likely to be low or negligible.
	Moderate	Management of this impact requires a higher level of expertise and resources to maintain impacts within acceptable levels. The significance of the impacts after mitigation is likely to be low to moderate. May not be possible to mitigate the impact entirely, with a residual impact(s) resulting.
	Low	Will not be possible to mitigate this impact entirely regardless of the expertise and resources applied. The potential to manage the impact may be beyond the scope of the Project. Management of this impact is not likely to result in a measurable change in the level of significance.
Significance of Impact (preliminary only)	**Slight**	High mitigation potential.
	Moderate	Moderate mitigation potential.
	Substantial	Low mitigation potential.

Environmental "aspects" (or mechanisms) provide the link between activities and impacts. Significant impacts will only result where there is a significant "aspect". Potential impacts associated with the proposed activities were identified during the scoping phase using an activity/aspect/impact matrix. The matrix illustrates the interactions between the activities, aspects and the affected environment.

4.3.1 Methodology

4.3.3.1 Impact Prediction

The methodology of the Impact Prediction is presented below. The results are presented in the detailed Impact Tables (Table 4.7).

Nature and significance

Once potential impacts have been identified, further investigation is required to predict the nature and significance of an impact. The nature of the impact is essentially the type of impact which may occur from undertaking an activity. The impacts may be positive or negative and may be categorised as being direct (primary), indirect (secondary) or cumulative impacts.

Where significant environmental aspects are present significant impacts may result. The significance of the impact is a function of probability and consequence. The consequence is determined by considering the severity, spatial extent and duration of the impact. The severity of the impact is determined by qualitative or quantitative criteria as well as by community response (not confirmed for this project as a BAR has not been done). Criteria for the ranking of Severity are presented in Table 4.5 below.

Table 4.5

RANK		CRITERIA
NEGATIVE	HIGH-	• Substantial, Measurable deterioration, Death, illness or injury • Recommended Level always exceeded • Widespread complaints from community • Complete loss of land capability • Soil alteration resulting in a high level impact in one of the other environments • Disturbance to areas that are pristine, have conservation value or are an important resource to Humans • Destruction of rare or endangered species • Deterioration of water quality/quantity, resulting in a high negative impact on one of the other environments • Is difficult to manage • May require an alternative course of action. • May affect the viability of the project.
	MEDIUM-	• Moderate, measurable deterioration and discomfort • Recommended level will occasionally be violated • Widespread complaints from community • Partial loss of land capability • Soil alteration resulting in a moderate impact on one of the other environments • Disturbance of areas that have some conservation value or are of some potential use to humans • Complete change in species variety or prevalence • Deterioration of water quality/quantity, resulting in a moderate negative impact on one of the other environments • May be managed. • Is low or medium only if managed according to a management programme. • Does not affect the viability of the project.

	LOW-	• Minor, deterioration, nuisance or minor irritation. Change not measurable • Recommended level will never be violated • Sporadic community complaints • Minor deterioration in land capability • Disturbance of areas that are degraded, have little value or are unimportant to humans as a resource. • Minor changes in species variety or prevalence • Deterioration of water quality/quantity, resulting in a low negative impact on one of the other environments
POSITIVE	LOW+	• Minor Improvement in quality • Change not measurable • Sporadic complaints
	MEDIUM+	• Moderate improvements • Measurable improvements • Will be within or better than recommended level • No observed reaction from public
	HIGH+	• Substantial improvements • Measurable improvements • Will be within or better than recommended level • Favourable publicity

Potential impacts are furthermore assessed according to spatial extent, duration and probability as follows:

CRITERIA	CATEGORIES	EXPLANATION
Spatial Extent	Site (S)	*Immediate area of activity*
	Local (L)	*Area within 500m of the site.*
	Regional (R)	*Entire municipality, drainage basin, landscape etc*
	National (N)	*South Africa*
Duration	Short-term (S)	*Less than the construction/ operation period*
	Medium Term (M)	*Construction / operation period*
	Long-term (L)	*Less than 5 years post construction / operation*
	Permanent (P)	*Permanent change*
Probability	Unlikely (U)	
	Possible (P)	
	Likely (L)	
	Definite (D)	

4.3.3.2. Mitigation Potential

The significance rating provided in the impact tables is the significance WITH mitigation and WITHOUT mitigation. Mitigation potential describes the ability to manage or mitigate an impact given the necessary resources. Some impacts, by their very nature, are extremely difficult to mitigate, while others may be managed to an acceptable level with the implementation of a sound environmental management plan. Mitigation potential is described in Table 4.6 below:

MITIGATION POTENTIAL	DESCRIPTION	EXAMPLE
HIGH:	• The impact is relatively easy and cheap to manage. Specialized expertise or equipment is generally not required. • The nature of the impact is understood and may be mitigated through the implementation of a managed plan, with regular monitoring undertaken to ensure that any negative consequences remain within acceptable limits. • The significance of the impact after mitigation is likely to be LOW to Non-Significant. • These impacts are normally mitigated by "good housekeeping".	Noise Dust Soil contamination from accidental spillages and leakages Litter
MEDIUM:	• Management of this impact requires a higher level of expertise and resources in order to maintain within acceptable levels • The significance of the impact after mitigation is likely to be LOW to MEDIUM depending on the level of management applied. • May not be possible to mitigate the impact entirely – may result in a residual impact (e.g. topographical change)	Visual Impacts Changes to landscape form and functioning Alteration of stream flow patterns Soil Erosion
LOW:	• Will not be possible to mitigate this impact entirely regardless of the expertise and resources applied. • The potential to manage the impact may be beyond the scope of the Project • Management of this impact is not likely to result in a measurable change in the level of significance.	Change of land use

It should be noted that a LOW mitigation potential does not necessarily imply that the impact is highly significant. An impact with a low significance rating may be extremely difficult to mitigate, such as noise generated by earthmoving machinery during construction, while a highly significant impact may be relatively simple to mitigate with the implementation of the correct management measures. Concern naturally arises when an impact with a HIGH significance has a LOW mitigation potential. In some instances this may present a fatal flaw, and motivation for rejecting the development.

Table 4.7: Potential Impacts Associated with the Pre-Construction, Construction, Operational and Abnormal Operational aspects of the proposed new office block development, Aliwal North.

ACTIVITY			Energy Consumption	Water Consumpton	Materials consumption	Releases to Water (point)	Releases to Water (diffuse)	Emissions to air (gaseous)	Emissions to air (particulate)	Light emissions	Noise disturbance	clearing of vegetation	Change in landform/topography	Solid Waste generation and disposal	ground disturbance	Access creation / disruption	Changes in landuse/zoning	Employment and training	Provision of services
	Pre-con	Survey																	
		Design																	
		Rezoning (if required)																	
	Construction	Access, transport and storage of materials																	
		Workshop & site offices (maintenance and refueling + washbays)																	
		Site preparation (clearing of vegetation and grubbing)																	
		Bulk Earthworks																	
		Installation of services: stormwater, potable water, fire water, sewer and fencing																	
		Construction of new office block, walkways & parking bays																	
	Operation	Occupation/Use of new office block, walkways and parking bays																	
		Generation of solid waste & sewage																	
		Access to residential/business units																	
		Ops abnormal: overflowing of VIP's																	
ASPECT (the mechanism by which an activity can interact with the environment and lead to environmental impacts)																			
AFFECTED ENVIRONMENTS - IMPACTS	PHYSICAL	Soil compaction / erosion																	
		Soil Pollution																	
		Air pollution																	
		Landscape and visual impacts																	
		Surface water pollution																	
		Groundwater pollution																	
	BIOLOGICA	Habitat degradation and loss																	
		Spread of invasive alien species																	
		Impacts on aquatic flora and fauna																	
	HUMAN	Public Nuisance - Traffic																	
		Public Nuisance - odour and / or dust generation																	
		Public Nuisance - Noise																	
		Public Nuisance - Light																	
		Environmental health risks																	
		Degradation or loss of features of cultural, historical or archeological importance																	
		Support/conflict with existing /proposed landuse																	
		Economic development																	
		Income generation and increased quality of life																	

ACITIVITY / ASPECT INTERACTION	
POTENTIAL NEGATIVE IMPACT OF ASPECT ON ENVIRONMENT	
POTENTIAL POSITIVE IMPACT OF ASPECT ON ENVIRONMENT	

Table 4.4: Project Environmental Impact Assessment

The anticipated environmental impacts, using the above methodology for the project are summarised below:

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION (Refer to Environmental Specifications (ES) – Chapter 8)	
CONSTRUCTION RELATED IMPACTS ON THE PHYSICAL ENVIRONMENT												
Soil compaction/erosion.	-	P	S	M I	L-	Y	L	**H**	**LOW**	These issues are common to construction sites by definition of needing to clear and prepare the site. The site is generally quite flat and not considered to be particularly vulnerable to erosion. The foundations will be constructed using the soil raft method. G6 rock fill material will be used and compacted upon a sandstone layer of rock.	**LOW**	The construction related impacts can be mitigated through the implementation of an Environmental Management Programme (EMPr). Only SABS/SANS approved design, construction methods and products to be used. **Refer to ES: 8.6.1 & 8.7.9**
Soil and/or groundwater pollution.	-	P	S	M I	L-	Y	P	**H**	**MOD**	Contamination of soil and hence any groundwater sources may take place through the accidental or negligent spillage of hazardous substances on site during the construction period such as hydrocarbons, oils or sealants et.		The appointment of an independent environmental control officer (ECO) to implement the EMPr will further help to control the occurrence and significance of construction related impacts. **Refer to ES: 8.5.10 & 8.6.3**
Air pollution.	-	P	L	M C	L-	N	L	**H**	**MOD**	Construction activities will generate dust and gaseous emissions (exhausts from vehicles and other mechanical equipment). Low odour paints will be used as well as The existing community facilities such as the Aliwal North High School, N6 road etc. may be most likely affected by dust generation. These properties are at least 500m from the edge of the site which should help to reduce the significance of any dust deposition.		Provided the EMPr is implemented properly, there should be no significant adverse impacts or significant residual impacts resulting from the construction activities on the physical environment. **Refer to ES: 8.6.5**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE	
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION	WITH MITIGATION (Refer to Environmental Specifications (ES) – Chapter 8)
Surface water pollution.	-	P S	S	M I	L-	Y	P	**H**	**MOD** Accidental or negligent spillage of hazardous and other substances (such as cement residue) and or silt loading from runoff into water bodies. There are no existing wetlands on the site .All surface water runoff will be directed and integrated into the existing 600 mm diameter pipeline stormwater reticulation system. A detention pond has been designed to attenuate surface water runoff and forms part of the grey water recycling system to be used on site.	Incorporate indigenous aquatic plant and reed species within the landscape specifications and rehabilitation plan to act as natural filters within the attenuation pond. **Refer to ES: 8.5.10 & 8.6.3**
Landscape and visual impacts.	-	P	L	L C	L-	N	D	**M**	**MOD** The site is surrounded by urbanisation in the form of informal settlements, residential areas, schools and the N6 national road. The addition of a four storey office block will be highly visible.	The additional landscaping component which includes tree avenues and the planting of indigenous gardens will help to minimise the visual impact to an extent. **Refer to ES: 8.8.2**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
CONSTRUCTION RELATED IMPACTS ON THE BIOPHYSICAL ENVIRONMENT												
Habitat /vegetation degradation or loss. Loss of biodiversity	-	P	S	P I	L-	N	D	**M**	**LOW**	The removal of natural vegetation across the site will impact on the natural habitat. The site has already been transformed and degraded by grazing and other human activities. Plant and animal biodiversity is low.	**LOW**	The loss of some habitat is inevitable with this type of activity. The areas to be established as open space need to be protected during the construction phase to reduce the overall loss of habitat and any indigenous plants to be directly affected by the construction works, transported to these areas. Landscape/aesthetic planting, using indigenous plants and trees, should be undertaken as part of the design of the development and implemented with the completion of the construction activities. **Refer to ES: 8.6.4**
Spread of alien invasive species	-	PS	S	M I	L-	Y	P	**H**	**LOW**	Eucalyptus tree species, weeds and invasive grasses due to overgrazing are present on site.	**LOW**	Indigenous vegetation should be planted as part of the landscaping features where applicable).**Refer to 8.7.5 & 8.8.2**
Impacts on terrestrial & aquatic fauna & flora	-	PS	S	MI	L-	Y	P	**H**	**MOD-LOW**	Site clearance will more than likely result in loss of bird nests etc., which will impact on field mice, birds etc. Sedimentary runoff during the construction phase could affect wetlands below the site through the stormwater reticulation system.	**LOW**	The stormwater attenuation pond will assist with trapping sediment runoff and preventing erosion during the construction phase. The site should be rehabilitated according to a rehabilitation plan to encourage re-habitation of the site surroundings. **Refer to ES: 8.8.1 & 8.8.2**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
OPERATION RELATED IMPACTS ON THE BIOPHYSICAL ENVIIRONMENT												
Increased traffic	-	P	L	P	L-	N	D	**M**	MOD	An increase in people, activities and traffic will result in decreasing ground cover and vegetation loss. The traffic impact study has specified one access point off the N6 road with one entrance lane and two departure lanes.	LOW	The area is already fairly degraded. A sufficient access road is required. **Refer to ES: 8.9.1**
Additional buildings & infrastructure & occupation thereof	-	P	L	L C	L-	N	U	**M**	MOD	An increase in people, activities and traffic will result in decreasing ground cover and vegetation loss. The proposed office block will connect into the east outfall sewer line which is currently being upgraded.	LOW	Services such as roads, pathways etc. should be installed to reduce pressure on the natural environment. **Refer to ES: 8.9.1**
Waste generation	-	P	L	L C	M-	N	L	**L**	HIGH-MOD	An increase in the waste produced by additional people is a definite impact	MOD	Sufficient waste removal and disposal systems will be required and have been made provision for in the design report. **Refer to ES: 8.9.1**
Abnormal event such as a natural disaster, fire, flood etc.	-	T	R	L C	H-	Y	U	**H**	HIGH-MOD	The occurrence of an abnormal event such as a fire, a type of natural disaster e.g. earthquake/severe storm or flooding could more than likely lead to the collapse of the infrastructure, water/sewage/stormwater systems etc.	MOD	The site is located well above the 1:100 year flood line. The building structure will be constructed in such a manner that the walls/foundations etc. will be solid and should withstand unnatural events. Should an abnormal event occur, the District Municipality's Disaster Management Protocol should be implemented. **Refer to ES: 8.9.1**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
CONSTRUCTION RELATED IMPACTS ON THE HUMAN ENVIRONMENT												
Public nuisance – proximity to residents and traffic disruption along N6	-	P	L	P	M-	Y	L	**L**	**MOD**	The development of the site will affect the existing residents across the 6, road users and attendees of the Aliwal North High School.	**LOW**	The construction related impacts can largely be mitigated through the implementation of this EMPr. The appointment of an independent ECO to implement the EMPr will further help to control the occurrence and significance of construction related impacts. **Refer to ES: 8.5.6.**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
Public nuisance – odour & dust generation.	-	P	L	M I	L-	Y	D	**H**	**MOD**	The construction activities will involve fairly extensive bulk earthworks and the stripping of vegetation and topsoil from across much of the site. In high wind and dry conditions, a significant amount of dust may be generated which may impact on surrounding residents, particularly to the east of the site.	**LOW**	Provided the EMPr is implemented properly, there should be no significant adverse impacts or significant residual impacts resulting from the construction activities on the human environment. Some short-term residual construction impacts are expected to remain despite the implementation of the EMPr particularly with respect to road users, noise, light and dust generation. **Refer to ES: 8.5.9, 8.6.5 & 8.6.7.**
Public nuisance – noise and light disturbance.	-	P	S	M C	L-	Y	L	**H**	**MOD**	Vehicles, earth moving machinery (especially reverse beepers) and other machinery will generate noise and light disturbance during the construction period.		
Public safety (health and safety risks).	-	P S	S	M I	L-	Y	P	**H**	**MOD**	Risk to public health and safety from traffic accidents and from criminal activity which may be exacerbated during the construction phase.		
Degradation of landscape value	-	P	L	P	M-	N	U	**L**	***Low***	The addition of the office block will detract from the landscape value of the current area, particularly to the west of the site.	***Low***	Existing dwellings, townships and businesses already degrade the landscape value to some extent. **Refer to ES: 8.5.2.**

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
Degradation or loss of features of cultural/historical or archeological importance	-	P	S	P	M-	N	U	**L**	***Low***	There is no building or item of heritage significance on the actual proposed site, however there are unidentified ruins within 60m and the Aliwal North Commerative Gardens within 150m, situated to the north of the proposed office block.	***Low***	No construction activities to take place or impede on the adjacent erf's containing the unidentified ruins and the commerative garden. Should any items of heritage significance be found during the site clearance and excavation stages, the works are to cease immediately and the ECO/SAHRA notified. The area is to be cordoned off and avoided. **Refer to ES: 8.6.8**
Economic development.	+	P S	R	M C	L+	Y	L	**H**	**HIGH**	The local community and businesses in Aliwal North and the Maletswai Municipal area should benefit from job opportunities and through the purchase of materials to be used during construction. The provision of jobs and/or training will serve to uplift the local community which experiences high unemployment.	**HIGH**	Use of local labour and the sourcing of local materials can be promoted during the construction phase. **Refer to ES: 8.5.7.**
Income generation/job creation and social upliftment.	+	P S	R	M C	L+	Y	L	**H**				

IDENTIFIED IMPACT	IMPACT CRITERIA								COMMENTARY ON POTENTIAL SIGNIFICANCE			
	NATURE	TYPE	EXTENT	DURATION	SEVERITY	REVERSIBILITY	PROBABILITY	MITIGATION POTENTIAL	WITHOUT MITIGATION		WITH MITIGATION	
Support/conflict with existing/proposed land use	-	P	L	P	L-	N	D	L	LOW	The site is currently zoned as an "Authority Zone" by the Maletswai Municipality. The existing site will be left as is and further socio-economic development will be non-existent. An existing "green open space" will be lost and the communal grazing area reduced.	LOW	The Maletswai Municipal Area will more than likely encourage additional employment opportunities, skills transfers and the associated social upliftment of the Aliwal North area. Roaming livestock would be restricted to the remaining identified communal grazing area thus reducing potential traffic accidents along the N6 and health risks to residents in the area.

5. LEGISLATION

All legislation applicable to the development must be strictly enforced both during the pre-construction, construction and operational phases, irrespective of whether it is covered in the Environmental Specification Section **(Section 8)** or not. The Applicant, Contractor, Subcontractor and Maintenance Managing Agent, of the new office block development must be acquainted with the relevant environmental legislation, including Provincial and Local Government regulations, which are in place to ensure the protection of the environment. The environmental legislation applicable to the Project, includes, but is not limited to, the following:

Table 5.1 Applicable Legislation

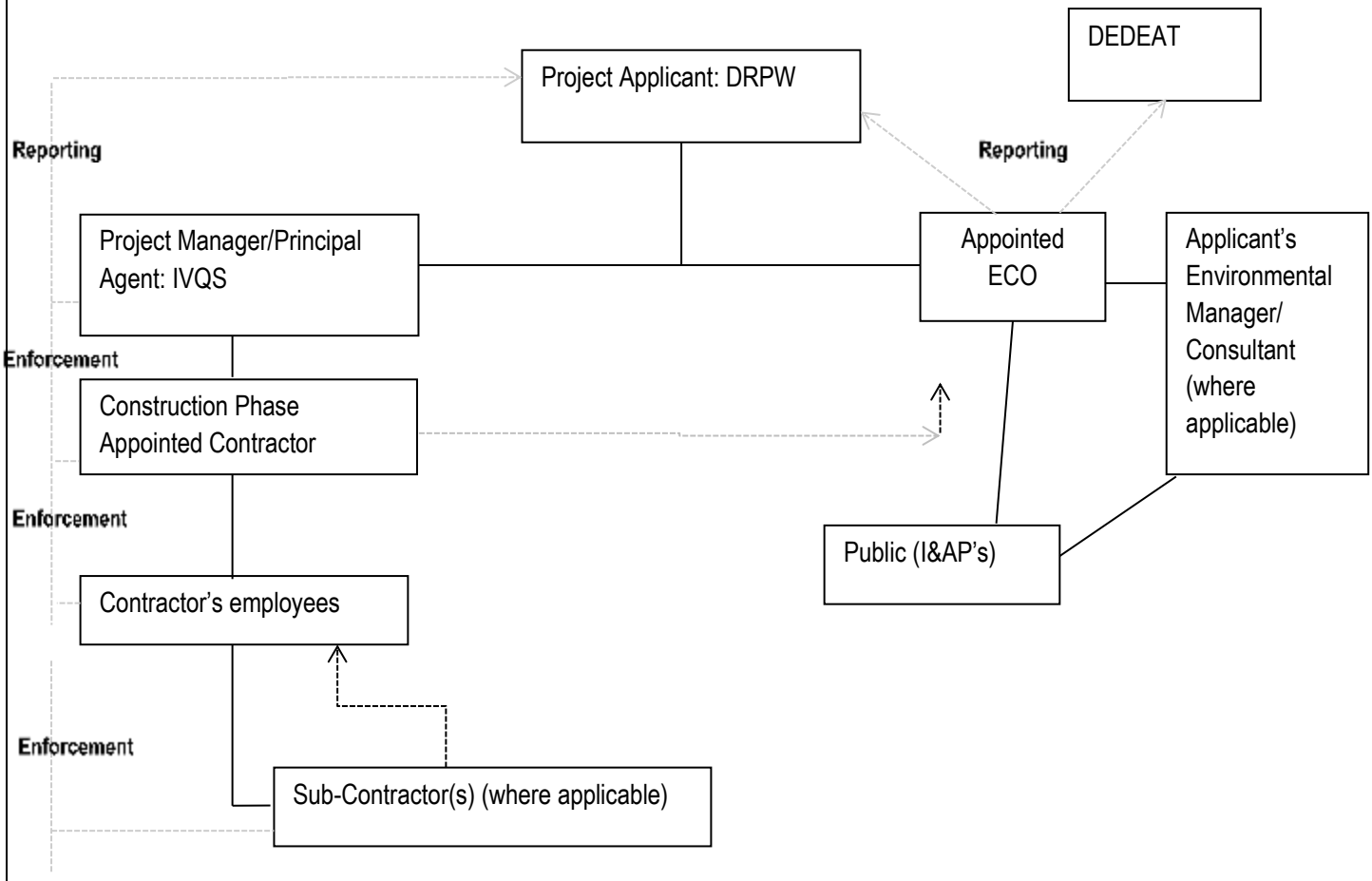
Title of legislation, policy or guideline:	Administering authority:	Date:
Constitution Act 108 of 1996.	-	1996
National Environmental Management Act 107 of 1998.	DEA/DEDEAT	1998
EIA Regulations, 2014.	DEA/DEDEAT	2010
GNR 792. Final Guideline on Need and Desirability in terms of the Environmental Impact Assessment Process 2010. Integrated Environmental Management Guidelines Series No. 9.	DEA	2012
Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005. Integrated Environmental Management Guidelines Series.	DEA	2005
National Heritage Resources Act 25 of 1999.	SAHRA	1999
Eastern Cape Biodiversity Conservation Plan, Second Edition, 2008.	DEDEAT	2008
National Water Act 36 of 1998	DWA	1998
Water Systems Services Act 107 of 1997	DWA	1997
Municipal Systems Act	CoGTA	1998
Spatial Planning and Land Use Management Act	DRDLR	2013

6. ORGANIZATION, ROLES AND RESPONSIBILITIES

6.1 Organizational Structure

In order to ensure sound development and effective implementation of the EMPr, it is necessary to identify and define the responsibilities and authority of the various persons and organizations that will be involved in the proposed project (see organogram below).

Figure 6.1 Organisational Structure for the implementation of the EMPr.



Several professionals will form part of the Project team including the Applicant, Employers Representative (ER), Project Manager (PM), the Environmental Control Officer (ECO), and the Contractor/Sub-contractor(s) where applicable.

The ER/PM is responsible for the implementation of the EMPr on the site during the **construction** phase of the Project. The ECO is responsible for monitoring the implementation of the EMPr during the **construction** phase of the project.

The Contractor is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the **construction** phase. The Applicant is responsible for the implementation of the EMPr during the **construction**, **operational** and **decommissioning** phases of the project.

The EMPr will be an item to be discussed at the monthly site meetings, and the ECO shall attend these meetings in order to provide input with respect to compliance with the EMPr. Copies of the minutes will be sent to the Applicant. Key roles and responsibilities of each party are outlined in more detail in **Section 6.2**.

It is important to note that, while parties are assigned various environmental roles and responsibilities, parties are severally and jointly responsible to ensure compliance with all environmental legislation and best practice.

6.2 Roles and Responsibilities

6.2.1 Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)

The DEDEAT is the designated authority responsible for authorising the environmental application and the EMPr related to the project. The DEDEAT has overall responsibility for ensuring that the Applicant complies with the conditions of the Environmental Authorisation (EA) and this EMPr

6.2.2 Inqa Vanqa Quantity Surveyors and Project Managers (IVQS)

Under South African environmental legislation, the Applicant/Employer is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. IVQS, as the Applicant/Employer therefore has the overall environmental responsibility to ensure that the implementation of this EMPr complies with the relevant legislation and the conditions of the EA (not obtained for this project). The Employer will appoint a Contractor to undertake the construction and operation of the proposed development, but will still ultimately be responsible for any environmental impacts

6.2.3 Project Manager (PM)

The Project Manager is responsible for overall management of Project and EMPr implementation. The following tasks will fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

6.2.4 Employers Representative (ER)

The appointed Civil and Consulting Engineers, as the Employer's Representative (ER) would act as the Employer's on-site implementing agent, together with the appointed Contractors during the construction and operational phases, and will have the responsibility to ensure that the Employer's responsibilities are executed in compliance with the relevant legislation, the EA and the EMPr.

In addition to general project management, the ER, together with the Applicant has the responsibility to appoint the Environmental Control Officer (ECO). Any on-site decisions regarding environmental management, however, are ultimately the responsibility of the ECO.

The on-site ER shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMPr:

- Ensuring that the necessary environmental authorisation and permits have been obtained;
- Reviewing and approving the Contractor's Method Statements with input from the ECO where necessary;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary;
- Ordering the removal of person(s) and/or equipment not complying with the EMPr specifications. Issuing fines for transgressions of site rules and penalties for contravention of the EMPr; and
- Providing input into the ECO's on-going internal review of the EMPr which is submitted as a report to the Employer.

6.2.5 Environmental Control Officer (ECO)

The independent Environmental Control Officer (ECO) appointed to the project will monitor and review the on-site environmental management and implementation of this EMPr by the Contractor during both the construction and operational phases. This will be done by conducting site audits for the duration of the contract and supply monthly audit reports for submission to the Project Team. The ECO's duties will include the following:

- Assisting the ER in ensuring that the necessary environmental authorisations and permits have been obtained prior to construction and operation commencing;
- Maintaining open and direct lines of communication between the ER, Employer and Contractor with regard to environmental matters;
- Reviewing the Contractor's construction method statements together with the ER;
- Site inspections of all construction areas with regard to compliance with the EMPr;
- Monitoring and verifying adherence to the EMPr, the EA and approved method statements at all times;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Taking appropriate action if the specifications are not followed, this includes reporting the transgressions to the ER;
- Monitoring the undertaking by the Contractor of environmental awareness training for all staff and new personnel coming onto site;
- Advising on the removal of person(s) and/or equipment not complying with the specifications of the EMPr (via the ER);
- Recommendations regarding the issuing of fines for transgressions of site rules and penalties for contraventions of the EMPr (via the ER);
- Auditing the implementation of the EMPr and compliance with the EA on a monthly basis;
- Compiling a audit report regarding the EMPr and its implementation during the construction period after completion of the contract and submitting this report to the Employer and the authorising authority;
- The ECO will continue to conduct audits throughout the operational phase.

6.2.3 Contractor (including Sub-contractor where applicable)

The Contractor is responsible for the implementation and compliance with recommendations and conditions of the EMPr. Ensure compliance with the EMPr at all times during construction activities. Maintain an environmental/site register which keeps a record of all incidents which occur on the site during the Construction and Operation phase of the project.

These incidents include:

- Public involvement / complaints
- Health and safety incidents
- Incidents involving Hazardous materials stored on site
- Non-compliance incidents

6.2.4 Contractor's Environmental Liaison Officer

The Contractor referred to is appointed by the Employer to undertake the construction activities for the project.

The appointed Contractor will be required to appoint a competent individual as the Contractor's onsite Environmental Liaison Officer (ELO). The selected ELO must be at least at Foreman level appointment and must fully familiarise him-/herself with the contents of this EMPr. He/she will be required to sign the register confirming his/her familiarity with the document. The ELO must furthermore possess the necessary skills to action environmental management to all personnel involved in the contract.

The ELO will be responsible for overseeing the Contractor's internal compliance with the EMPr requirements and ensuring that the environmental specifications are adhered to.

The ELO will be responsible for keeping detailed records of all site activities that may pertain to the environment and include all these aspects in an environmental register. This register must be presented at each site meeting and be made available to the ECO during his/her fortnightly audits. In addition to the environmental register the ELO must keep a register of complaints from any community members on environmental issues. ly, the ELO will be required to keep a record of all on-site environmentally related incidents and how these incidents were dealt with.

6.2.5 Applicant's Environmental Manager/Consultant (where relevant)

The Applicant's Environmental Manager/Consultant is responsible for developing and monitoring the implementation of the Applicant's project requirements to ensure compliance, not only for their internal EMS (should one exist), but for any environmental Project non-conformances . Responsibilities include but are not limited to:

- Review the EMPr and any revision thereof and ensure that it fully aligns with any Environmental Assessment Reports and associated Environmental Authorization(s), where applicable.
- Review method statements that are prepared for the project.
- Comment, advise and provide instructions for any additional environmental requirements for the project or any project activity to conform to the EMPr.
- Advise on specific environmental requirements for protected areas, including areas of special interest, pollution prevention etc.
- Liaise with other environmental authorities as and when required.
- Report any serious environmental incidents/spillages to the relevant environmental authorities (DEDEAT, DWS, Joe Gqabi District Municipality etc.).

6.2.6 Public and authorities acting on their behalf

The public, as well as the authorities responsible for acting on behalf of the public and/or DEDEA external auditors, may be 'observing' the Project and may 'blow the whistle' on any non-compliances with the Environmental Authorization (where applicable) and EMPr. IAP's may:

- Monitor EMPr compliance.
- Register complaints on any EMPr or Method Statement non-conformances.

6.3. Environmental Compliance Monitoring and Reporting

6.3.1 Compliance with the EMPr

A copy of the EMPr must be kept on site during the construction phase. The EMPr will be binding on all contractors operating on the site and must be included within the *Contractual Clauses of Tender Documentation*. It should be noted that in terms of the Environment Conservation Act, and the National Environmental Management Act No 107 of 1998 (Section 28) those responsible for environmental damage must pay the repair costs both to the environment and human health and

the preventative measures to reduce or prevent further pollution and/or environmental damage (The 'polluter pays principle').

6.3.2 Monitoring of the EMPr

A monitoring programme will be implemented for the duration of the construction of the proposed pump station reconstruction activities. This programme will include:

- Monthly audits, which will be conducted by the Environmental Control Officer to ensure compliance to the EMPr conditions, and where necessary make recommendations for corrective action.
- The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the Landowner or community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

6.3.3 Environmental Site Meetings

Regular site meetings will take place to facilitate the transfer of information and to update all parties on the environmental compliance of the project as a whole. The ER/PM will present a summary report outlining the main construction activities that relate to the environment, at this meeting. These meeting will be chaired by the ER/PM. The minutes of these meetings will form part of the EMPr records. The ER/PM will be responsible for the minutes and their distribution. These minutes will reflect environmental queries, agreed actions and dates of eventual compliance by the Contractor. The following people must attend these meetings:

- Employers Representative and/or;
- Project Manager;
- Contractor(s) representative and Relevant Authority/ies.
- ECO

6.3.4. Training of Construction Workers

The Construction Workers must receive basic training in Basic Environmental Awareness (BEAT), including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas e.g. sensitive areas such as wetlands, management of waste, and prevention of water pollution etc. An environmental awareness plan is presented in Appendix C.

6.3.5. Contractor Performance

The Contractor must ensure that the conditions of the EMPr are adhered to. Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the ECO for advice.

6.3.6. Environmental Register

The Environmental Register/Site Register comprises the following documents which must be kept on site in order to record compliance with the EMPr:

- Record of Complaints
- Compliance monitoring results
- Notification of emergencies and incidents

6.4 Non Compliance and Penalties

The Contractor shall effectively address and/or remedy all EMPr non-compliances. The ER/PM, in consultation or on the advice of the ECO, shall issue penalties ('spot fines') if the Contractor infringes any environmental specifications set out in this EMPr. The decision on when to impose a penalty will be at the discretion of the ER/PM or ECO and will be .

The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant worker or sub-contractor. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. In addition to the spot fine, the Contractor shall be required to make good, any damage caused as a result of the infringement at his own expense.

Spot fines shall be between R100.00 and R20 000.00, depending upon the severity of the infringement. For each subsequent similar offence, the penalty may, at the discretion of the ER/PM be doubled in value to the maximum value to be determined by the ER/PM.

Examples of infringements for which spot fines will be imposed on the Contractor are as follows:

- Using any areas outside the working areas without permission
- Clearing and/or leveling areas outside of the working areas without permission
- Spillage of fuels and other hazardous materials onto the ground or water bodies (wetlands)
- Picking/damaging plant material
- Injuring/killing or poaching animals/birds
- Untidiness and litter at the construction site
- Poor waste management on site
- Making fires on site
- Discharging effluent and/or contaminated stormwater onto the ground or into surface water
- Repeated contravention of the specifications or failure to comply with site instructions
- Damage to public or private property or any identified heritage sites.

The ECO and PM shall retain records of all spot fines issued. Money for the spot fines will be deducted from the Contractors monthly certificate.

7. GENERAL ON-SITE MANAGEMENT

7.1. Site establishment

Site establishment for the purposes of this project will take place at the commencement of the project and will be in place for the duration of the project term viz 28 months. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site where required.

The construction camp shall have the necessary ablution facilities with chemical toilets during construction activities. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.

The Contractor shall supply waste collection bins where applicable and all solid waste collected shall be disposed of at the Municipal landfill site in Aliwal North. The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt on site.

Potable water will be delivered to site in water tanks as and when required from a suitable supply source. Alternatively, arrangements can be made to connect into a municipal supply source on site.

7.2. Site Clearing

Site clearing will be confined to the project footprint. This must take place in phased matter, as and when required. The area to be cleared must be clearly demarcated and this footprint strictly maintained.

7.3 Method Statements

Method Statements (MS) are written submissions by the Contractor to the ER in response to the requirements of this EMPr or to a request by the ER. The Contractor shall be required to prepare Method Statements for several specific construction activities and/or environmental management aspects. A method statement should be written using the following analogy:

- What – a brief description of the work to be undertaken;
- How – a detailed description of the process of work, methods and materials;
- When – The sequencing of actions with due commencement date and completion date estimates.

The Contractor shall not commence the activity for which a Method Statement is required until ER/PM has approved the relevant Method Statement.

Method Statements must be submitted at least 20 working days prior to date on which approval is required to the ER/PM. The ER/PM must in turn accept or reject the Method Statement within 10 working days of receipt.

Failure to submit a Method Statement may result in suspension of the activity concerned until such time as a Method Statement has been submitted and approved.

An approved Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved Method Statement shall be rehabilitated at the Contractor's expense.

The Method Statements shall cover relevant details with regard to:

- Construction procedures and location of the construction camp
- Start date and duration of the procedure;
- Materials, equipment and labour to be used;
- How materials, equipment and labour would be moved to and from the site as well as on site during construction;
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure;
- Emergency procedures in case of any reasonably potential accident/incident which would occur during the procedure; and
- Compliance/non-compliance with the EMPr specifications and motivation if non-compliant.

Method statements (MS) required: Based on the specifications in this EMPr, the following Method Statements (MS) are required as a minimum:

MS1: Site layout and establishment

MS2: Site clearing (terrestrial environments)

MS3: Handling, storage and disposal of hazardous substances (if applicable)

MS4: Solid waste (general and hazardous) control system

MS5: Erosion control, remediation and stabilisation

MS6: Stormwater control

MS7: Alien vegetation clearing programme

MS8: Rehabilitation procedures

Note that a Method Statement is a starting point for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment. Changes to, and adaptations of, Method Statements can be implemented with the prior consent of all parties.

All Method Statements are to be to the satisfaction of the RE and, where practical, should be endorsed as being acceptable to the environmental representative of the Relevant Authority see **Appendix D** for an example of a method statement.

7.4 Document Control and Record Keeping

It is important to maintain appropriate documentation and records relating to the implementation of the EMPr. Documentation should cover the following:

- The operating procedure that deals with environmental management (e.g. EMPr and Method Statements);
- The emergency response plan;

- The records relating to the measurement of environmental performance such as monitoring and auditing records (e.g. minutes, site memos, site diary).

The following documentation control procedures with respect to the EMPr must be fulfilled:

Each section Manager or Manager of a particular activity or component of construction must maintain copies of the Method Statements and other instructions (e.g. site memos) that are specifically applicable to these activities. These can be extracted from the EMPr and placed in a separate file for ease of reference.

Each section Manager is responsible for ensuring that the latest version of the Method Statement or other instructions is kept on file and implemented. Hence Method Statements and other instructions must be dated.

The PM must maintain a full schedule/database of the instructions relating to environmental matters. This information can be stored electronically and either an electronic or hard copy back up must be maintained.

7.5 Maintenance of Records

It is important to maintain records that are relevant to the implementation of the EMPr. These records must be made available for auditing purposes. The following records should be maintained:

1. Environmental legislation;
2. Meetings and complaints records;
3. Training records;
4. Monitoring records (including dumping receipts, etc.);
5. Incident records;
6. Operating and emergency response procedures and materials safety data sheets;
7. Audit results/reports.

7.6 Auditing

It is necessary for the ECO to audit compliance with the EMPr at regular intervals, for the purposes of this project, audits will be carried out monthly. The purpose of the audit is not only to check compliance, but also to identify aspects where environmental management procedures can be improved or where procedures are not operating effectively and corrective action is required.

External DEDEA audits may also take place during the project construction phase.

8. SPECIFIC ENVIRONMENTAL SPECIFICATIONS

This chapter comprises the design measures or environmental specifications for the project (construction, operation and construction decommissioning phases), the programme for implementation and the approach to monitoring the implementation of these specific measures for the duration of each pertinent stage.

8.1 Environmental Specifications for Design

This section contains a list of design recommendations for consideration during the design of the new pump station and/or for inclusion in the Environmental Authorisation (where relevant).

These recommendations have been presented in the form of a checklist for future use. The checklist can be used to demonstrate the incorporation of the recommendations in the design, even if to confirm they have been discarded. The completed checklist can be submitted to the Authorities as necessary and if required.

RECOMMENDED OPERATIONS SPECIFICATION	✓, x or N/A	COMMENTARY WHERE OMITTED
1 Ensure all aspects of the civil design report are adhered to:		
2 Ensure all aspects of the Green Star Rating Report are adhered to as required by the Green Building Council of South Africa. A minimum 4 star rating is required for this project.		

8.2 Environmental Specifications for Construction

8.2.1 Scope of Application for the Environmental Specifications

The physical application and 'jurisdiction' of the EMPr will incorporate all areas that will be directly affected by the project activities.

8.3 Environmental Principles for the Project

The following core environmental principles will apply to the project:

- Environmental impacts must be avoided and/or minimised where possible, at all times.

- Activity footprints should be kept to a minimum to reduce the occurrence, duration, magnitude or significance of land clearing impacts through to maintenance inspections and activities. (See **Appendix B**).

- All relevant legislation will be adhered to and all relevant permits and permissions will be complied with at all times.

- Environmental management and/or awareness training (BEAT will be provided to all pertinent Contractors and sub-contractors that will be involved in all activities. (See **Appendix C**).

- The Contractor shall continue to foster collaborative and cooperative relationships between all pertinent stakeholders, including DEDEAT, the Applicant, neighbouring land users etc. and promote timely communications with these parties as and when required.

8.4 Environmental Specifications for Operations

The physical application and jurisdiction of the environmental recommendations for the operation phase of the proposed new office block will incorporate the immediate area around Erf 3102, including the access and egress road(s) off the N6.

The purpose of these specifications will be to promote the environmentally responsible management and use of the new pump station to: ensure the longevity of benefits associated with the Project; and ensure all relevant legislation, authorisations, permits and licences are complied with at all times These specifications will need to be applied by the Applicant directly or through appointed agents and/or service providers as appropriate.

The mitigation measures identified for the operations phase of the project include the following, at a minimum:

RECOMMENDED OPERATIONS SPECIFICATION	**✓, x or N/A**	**COMMENTARY WHERE OMITTED**
1. The office block occupants, DRPW and DRDAR, must commit to the management mitigation measures and recommendations described in the EMPr.		
2. The office block occupants, DRPW and DRDAR, must commit to the Green Star Rating Report management objectives and ensure sustainable use of the facilities services to be provided.		

8.5 Environmental Specifications (ES) Tables

The ES tables have been listed as per the following key construction stages/activities:

- **Pre-Construction and Site Establishment Activities** **ES 8.5.1 to ES 8.5.12**

  - ***8.5.1*** *Compliance with Legislation, Permits and Permissions*
  - ***8.5.2*** *Protection of Existing Services and Infrastructure*
  - ***8.5.3*** *Contractor's Camp*
  - ***8.5.4*** *Working and No-Go Areas and Special or Sensitive Environments*
  - ***8.5.5*** *Workshop, Equipment Maintenance and Storage*
  - ***8.5.6*** *Access Roads/Haul Roads and Traffic Control*
  - ***8.5.7*** *Use of Local Labour and Local Material Acquisition*
  - ***8.5.8*** *Basic Environmental Awareness Training*
  - ***8.5.9*** *Health and Safety*
  - ***8.5.10*** *Incident/Accident Prevention, Preparedness and Response*
  - ***8.5.11*** *Method Statements*
  - ***8.5.12*** *Site Photographs*

- **Environmental Management & Good Housekeeping** **ES 8.6.1 to ES 8.6.8**

  - ***8.6.1*** *Managing Soil Erosion*
  - ***8.6.2*** *Controlling Visual and Aesthetic Impacts*
  - ***8.6.3*** *Controlling Water Use, Sanitation and Storm water*
  - ***8.6.4*** *Controlling Ecological Impacts.*
  - ***8.6.5*** *Managing Noise and Air Quality Impacts*
  - ***8.6.6*** *Waste Management*
  - ***8.6.7*** *Controlling Public Nuisance and Safety Risks*
  - ***8.6.8*** *Controlling Cultural Heritage/Historical and Archaeological Impacts*

- **Site Specific Activities – Construction Phase** **ES 8.7.1 to ES 8.7.10**

MANAGEMENT FOCUS	ENVIRONMENTAL SPECIFICATION (ES)	RESPONSIBILITY & IMPLEMENTATION	MONITORING FREQUENCY REQUIRED	METHOD	√/x Or N/A
8.5 PRE-LAND CLEARING ACTIVITIES					
8.5.1 Compliance with Legislation, Permits and Permissions	• All pertinent national, provincial and local government **legislation** concerning the protection of the natural environment and the prevention of pollution is to be strictly enforced by the Contractor. • All pertinent **approvals, permits and permissions** must be obtained before activities commence on site: the conditions of which are to be strictly enforced by the Applicant (e.g. NEMA Environmental Authorisation, SAHRA permits where relevant). • The requirements of the EMPr are to be enforced by the Contractor and regularly audited by an Independent Auditor.	**Responsibility**: Applicant/ECO **Implementation:** Contractor/Project Manager	Project duration	Site Inspection	
8.5.2 Protection of Existing Services and Infrastructure	• The Contractor shall ensure **existing services** are not damaged or disturbed unless required by the contract and with the permission of the PM. • The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted, and prioritising and completing such repairs as soon as possible. • Due notice of activities commencing on site shall be given to the immediate adjacent/affected landowners, businesses and community to help reduce public nuisance and disruption.	**Responsibility**: Contractor **Implementation:** Contractor/Project Manager	Monthly	Site Inspection	
8.5.3 Contractor's Camp	• All servitudes and existing services must be verified prior to establishment, and avoided. • The Contractors Camp site must be fenced before construction commences. • Site establishment shall not take place on steep slopes, within 100 m of wetland areas and watercourses or sites declared as no-go areas. • The Contractor's Camp and the storage and works areas must incorporate appropriate infrastructure and facilities to minimise any potential environmental impacts. • The 'footprint' of the Contractor's Camp, storage and working areas is to be kept to a	**Responsibility**: Contractor **Implementation:** Contractor/Project Manager	Prior to construction	Site inspection	

	minimum at all times. MS1: o Before construction can begin, the Contractor shall submit to the ER for approval a Method Statement detailing: o A layout plan and the method of establishment of the construction camp, i.e. all offices, storage and stockpiling areas and all other areas/facilities required for the undertaking of activities required for completion of the project. o The plan shall include the location and layout of waste storage facilities, ablution facilities, stockpiling and spoil areas (if applicable), no go areas and hazardous material storage areas (if applicable). The demolition and removal of these facilities on completion of construction works shall also be detailed. o The Contractor shall restrict all his activities, materials, equipment and personnel to within the area specified. The Contractor shall ensure that the approved construction area will be adequate to cover the project without further space adjustments being required at a later date.		Prior to construction	Method statement inspection	
8.5.4 Working and No-Go Areas and 'Special or Sensitive Environments'	• The Construction Site shall be divided into 'Working Areas' and 'No-Go' areas and shall be marked on appropriate plans for reference (refer to Glossary). Construction activities are to be limited to as small a 'footprint' as possible. • All working areas must be clearly marked and 'No-Go' areas identified and maintained as such. • No-Go sites shall include any 'Special or Sensitive Environments' as identified prior to construction activities commencing, by the Contractor, ER and ECO: e.g. wetland areas. • The 'No-Go' areas will be demarcated on site with fencing, hazard tape/temporary fencing, and the Contractor will ensure these areas are maintained as such for the duration of the works. • No 'creep' of materials, stockpiles or activities into the 'No-Go' areas is permitted. • The 'Special or Sensitive Sites' shall, in particular be protected from potential pollution risks, including runoff from the adjacent working areas, litter etc. • All site personnel shall be regularly made aware of the 'No-Go' areas, including delivery drivers and other 'temporary personnel'.	**Responsibility**: Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

	• The Contractor shall erect temporary fencing along the perimeter of the contractor's site camp and designated no-go areas. • Temporary fencing shall, as a minimum, consist of wooden or metal posts at 3m intervals, with two plain wire strands tensioned horizontally at heights of 300mm and 900mm above the ground, threaded with commercial type danger tape. • The Contractor shall maintain in good order all demarcation fencing and site barriers for the duration of construction activities, or as otherwise instructed. **Ablution Facilities:** • Portable chemical toilets must be provided for the construction workforce. These facilities must be regularly serviced by an appropriate service provider. • Toilets must be no closer than 50m from any natural water body watercourses (Section 1 (24 and 29) National Water Act (36 of 1998)). • The construction of long drop toilets is forbidden. • Under no circumstances may local drainage lines or streams be used as a toilet or cleaning facility by workers on site. • The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the ER/PM. Proof of this will be required by the ECO during site auditing. **Eating areas:** • If none is available, the Contractor shall provide adequate temporary shade within the construction areas to ensure that site personnel do not move off site to eat. • The Contractor shall provide adequate refuse bins at all eating areas to the satisfaction of the ER/PM, in order to minimise littering. • If deemed necessary by the ER/PM, the Contractor shall demarcate designated eating areas **<u>Potable/Drinking Water:</u>** • The Contractor shall make available safe drinking water fit for human consumption at the site offices and all other working areas. • All drinking water must be from a legal source and comply with recognised standards for potable use. The Contractor shall comply with the provisions of the National Water Act,				

	1998 (Act 36 of 1998) and its Regulations pertaining to the abstraction of waters from rivers and streams and the use thereof. • If water is stored on site, drinking water and multi-purposed water storage facilities shall be clearly distinguished and demarcated. • No water for either drinking or construction purposes may be abstracted from local streams, rivers or drainage lines.				
8.5.5 Workshop, Equipment Maintenance and Storage	• No maintenance of equipment and vehicles shall be performed on site. Any maintenance required will require prior approval from the ER. • **No contamination** of the soil, vegetation or surface water from the Camp and storage areas is permitted. • Measures to **prevent spillage and leaks** contaminating the surrounding area must be used, including ground protection, bunds, covers, splash trays, drip trays and the use of proper dispensing equipment. • All **static plant** shall be located within a bunded area. • No vehicles/plant shall be washed on site. • Used oils and lubricants, spent filters, chemicals and similar waste products generated at the workshop are to be disposed. • **Spillages and incidents** associated with the workshop, equipment maintenance and storage areas must be addressed in a Site Pollution Incident Response Plan.	**Responsibility**: Contractor **Implementation:** Contractor/ER	Monthly	Site inspection	
8.5.6 Access Roads/ Haul Roads & Traffic Control	• A detailed Traffic Management Plan should be compiled by the Contractor to ensure that traffic on the local roads is disrupted as little as possible. This plan should include measures for the optimization of the amount of travel on the local roads, thereby reducing impact • The Contractor shall comply with all applicable road safety and transport related legislation and by laws on all affected roads. Access/haul routes (utilising existing roads and tracks) shall be defined and movement beyond the identified access and haul routes is to be restricted. • All construction routes are to be clearly defined • Access of all construction and materials delivery vehicles should be controlled	**Responsibility of Road Management**: Contractor **Responsibility for design and planning of Roads:** Engineer **Implementation of**	Monthly	Site inspection	

		especially during wet weather to avoid compaction and damage to topsoil structure. • Soils compacted by construction by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels. • Planning of temporal access routes to the site for construction purposes shall be done in conjunction between the Contractor and the Applicant. • Speed restrictions are to be in place and enforced on all roads. • Material shall be appropriately secured to ensure safe passage between destinations during transportation. Loads shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials	**Road Management:** Contractor's roads' manager			
8.5.7	**Use of Local Labour and Local Material Acquisitions**	• Wherever possible, the Contractor should endeavour to use **local labour** and **local SABS/SANS approved suppliers**. • Wherever possible and practical, the Contractor should endeavour to source building materials from environmentally responsible and permitted sources.	**Responsibility**: Contractor's procurement manager **Implementation:** Contractor/ER	Monthly	Site inspection	
8.5.8	**Basic Environmental Awareness Training (BEAT)**	• **Awareness training** for Applicant's and Contractor staff shall be required and must be provided prior to work or specific activities commencing and as an on-going programme. Training records should be kept to demonstrate training has been provided. • All personnel working on the construction site must attend BEAT conducted by the PM. The purpose of these workshops is to provide staff with the information they require to enable them to meet the requirements of the EMPr. The Contractor and all staff must attend this presentation. Failure to attend this program will not exempt the Contractor and/or Employee(s) from environmental compliance. • The Contractor shall make allowance for site staff to attend an initial BEAT presentation of approximately one hour, and shall allow approximately half an hour a month thereafter for the duration of the contract for Employees to attend any follow-up lectures. In addition, the Contractor shall ensure that all new staff and sub-	**Responsibility**: Contractor **Implementation:** Contractor/ER/PM	On-going	Site	

	contractors attend the environmental education program within five (5) working days of commencement of work on site. • The Project Management Team must assess the need for additional and refresher training, based on whether the objectives of the EMPr are being achieved or not. Where performance is inadequate additional training must be undertaken as a matter of urgency. This must be based on a comprehensive assessment of training needs; so that training is focused on problem areas and that it addresses the skills and competencies required by staff to fulfil their role in environmental management adequately. • All new staff starting and subcontractors who start work during the course of the contract must attend the training workshops conducted by the ER/PM. • All staff must be trained in emergency response procedures through the conducting of "dry runs" of emergency situations. Records of emergency response training must be maintained and must include an attendance list for each training session. These records must be made available for audit purposes.				
8.5.9 Health & Safety	**<u>Site security</u>** • Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling on site should be prohibited. Any persons found to be engaged in such activities shall receive disciplinary or criminal action taken against them. • No person shall enter the site unless authorised to do so by the contractor, Applicant/Project Manager. • If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing. • Trespassing on private / commercial properties adjoining the site is forbidden. Secure the site in order to reduce the opportunity for criminal activity in the locality of the construction site. **<u>Worker safety</u>** • Implementation of safety measures, work procedures and first aid must be implemented on site.	**Responsibility**: Contractor **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

	• A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety. • Contractors must ensure that all equipment is maintained in a safe operating condition. A record of health and safety incidents must be kept on site. • Any health and safety incidents must be reported to the Applicant/Project Manager immediately. • First aid facilities must be available on site at all times. • Workers have the right to refuse work in unsafe conditions. • Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers. • Safety toolbox talks are to be held weekly. **Worker facilities** • Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness • Fires are not to be allowed. **Protective gear** • Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. • No person is to enter the site without the necessary PPE. **Site safety** • The construction camp must remain fenced for the entire construction period. Potentially hazardous areas such as trenches are to be demarcated and clearly marked • Adequate warning signs of hazardous working areas. • Uncovered manholes and excavations must be clearly demarcated • Emergency numbers for local police, fire department, the Applicant and the Municipality must be placed in a prominent area. • Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.				

	• A speed limit of 40km/h must be adhered to. **Hazardous Material Storage** • Staff that will be handling hazardous materials must be trained to do so. • Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. • All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. • The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practice must be adhered to. This applies to solvents and other chemicals possibly used in the construction time. **Procedure in the event of a petrochemical/oil spill** • The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, ECO or Contractor. • The problem must be assessed and the necessary actions required will be undertaken. • The immediate response must be to contain the spill. **Fire management** • Fire fighting equipment should be present on site at all times as per Occupational Health and Safety Act. • All construction staff must be trained in fire hazard control and fire fighting techniques. • All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. • No open fires will be allowed on site. • Smoking may only be conducted in demarcated areas.				
8.5.10 Incident/Accident Prevention, Preparedness	**MS 3:** If hazardous materials are to be stored on the site, the Contractor shall provide a Method Statement detailing the types of hazardous substances/materials that are to be used, as well as the storage, handling and disposal procedures for each substance/material and emergency procedures in the event of misuse or spillage that might negatively affect people or the environment i.e. a site incident pollution plan.	**Responsibility**: The Contractor **Implementation:** Contractor/Project	Prior to construction	Method statement inspection	

and Response	• The Contractor shall ensure soils, water bodies and their catchments are protected from direct or indirect spillage of pollutants such as refuse, garbage, sewage, chemicals, fuels and oils, and any other potentially polluting products. • The Contractor shall ensure there is no unnecessary destruction of surrounding habitats and property through pollution events or physical damage and degradation. • The Contractor shall develop a Site Pollution Incident Response Plan, including provision for managing spills and preventing pollution entering any watercourses. • The Contractor shall ensure all personnel are aware of the incident procedures and know how to use equipment provided to contain spills and other incidents. • The Contractor shall assemble and clearly display a list of the relevant emergency telephone contact numbers for staff (in English and in Xhosa/Sothu) as necessary. • In the event of any spillage where down-stream impacts are noted, the Contractor shall be liable to arrange for professional service providers to assist with rehabilitation and remediation, as required by the Project Manager. • A Complaints and Incident Register will be maintained by the Contractor. • Should there be a need to store fuel on the site, it shall be stored in a steel tank supplied and maintained by the fuel supplier. • The tanks shall be located in a secure, demarcated area and an adequate bund wall (110% of the total volume of the tank) shall be provided. • The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled/leaked fuel into the soil. • No possible spillages or accumulated stormwater within this bunded area will be allowed to be flushed from the bund into the surrounding area. • All fluids accumulated within the bunded area shall be removed by a registered service provider and disposed of at a DWA approved landfill site which is registered to deal with waste of this nature. • Proof of appropriate disposal must be kept in the Environmental File at the Contractor's Camp. • Material Safety Data Sheets (MSDS's) must be readily available for all chemicals / hazardous substances to be used on site. Where possible and available, MSDS's should include additional information on ecological impacts and measures to minimise and mitigate against any negative environmental impacts in the result of an	Manager	Monthly	Site inspection	

	accidental spill. • Should any significant spills of hazardous substances occur, these must be reported to the Department of Water & Sanitation. • Ensure that any hydrocarbon/chemical/hazardous substance spills are cleaned up as soon as possible. • Provide drip-trays for vehicles that leak hydrocarbons and fix these leaks off site immediately. • Ensure that a proper spill-kit is available at all times where hydro-carbon handling will be undertaken.				
8.5.12 Site Photographs	• The Contractor will be required to take detailed, **electronic colour photographs** of the new areas to be planted and immediately adjacent areas prior to any activities taking place. • These photographs will assist with determining the level of rehabilitation required should any accidental encroachment take place into neighbouring areas.	**Responsibility**: The Contractor **Implementation:** Contractor/Project Manager	Prior to construction	Site inspection	
8.6. ENVIRONMENTAL MANAGEMENT AND GOOD HOUSEKEEPING					
8.6.1 Site Clearance	**Ms 2:** The Contractor shall submit a site clearing method for all areas where the Contractor is required to, or intends to, clear vegetation. The Method Statement will include: o A clear indication of land reference; o Which areas will be cleared; o How these areas will be cleared; and o How the cleared materials will be stored or disposed of. o Vegetation removal must be limited to the construction footprint only. o Vegetation clearing shall take place in a phased manner in order to retain vegetation cover for as long as possible	**Responsibility**: The Contractor **Implementation:** Contractor/Project Manager	Prior to construction	Method statement inspection	

8.6.2 Managing Soil and Land Degradation	**Topsoil** • Topsoil shall be removed, stockpiled and replaced • The Contractor shall ensure that pollution of the soil does not occur as a result of any activities on site • The Contractor will be required to rehabilitate areas affected by soil erosion • Rehabilitation of the areas affected by the construction works will be undertaken at the end of the Project. • Topsoils of different areas should not be mixed, i.e. topsoil removed from the wetland area should be stored separately from topsoil removed from the grassland areas. This is critical because the existing seedbed is important for the preservation of the existing species composition. • Removed polluted topsoil should be transported to a licensed landfill site. **Soil Stripping** • No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. • Subsoil and overburden should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order. • Construction vehicles must only be allowed to utilise existing tracks or pre-planned access routes. **Stockpiles** • Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels. • Stockpiles should not exceed 2m in height. • If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. • Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. **Fuel storage** • Topsoil and subsoil to be protected from contamination. • Fuel and material storage must be away from stockpiles.	**Responsibility**: The Contractor **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

	• Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil, unless ready-mix is used which will be trucked onto site. • Any storage tanks containing hazardous materials must be placed in bonded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. • Contaminated soil must be contained and disposed of offsite at an approved landfill site. **Earthworks** • Soils compacted during the construction of the bridge should be deeply ripped to loosened compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas. **MS 5:** The Contractor shall submit a Method Statement to the ER/PM for approval detailing the methods of stabilisation and erosion prevention and remediation in specific areas, as and when the need arises. • The Contractor shall, as and when necessary, implement erosion control measures to the satisfaction of the ER. • During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes and steep banks. • Any runnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the areas restored to a proper condition similar to the condition before the erosion occurrence. • Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ER. Consideration and provision shall be made for the following methods (or combination thereof): o Brush cut packing; o Mulch or chip cover; o straw stabilising;	Responsibility: The Contractor/ECO		Method statement	

	○ Watering, planting or sodding; ○ Soil binders; ○ Anti-erosion compounds; ○ Mechanical cover; and ○ Packing structures (including the use of geo-fabric and log/pole fencing) • Traffic and movement over stabilised areas shall be restricted and controlled and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ER. • In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and re-vegetation (comprising the replacement of top soil and grass planting) must commence as soon as possible. **Erosion Control** • Soil erosion shall not be tolerated on site. The Contractor should take all reasonable measures to prevent soil erosion and protect areas susceptible to erosion • Wind screening and storm water control should be undertaken to prevent soil loss from the site. • All erosion control mechanisms need to be regularly maintained. • Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. • Retention of vegetation where possible to avoid soil erosion • Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. • Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed. • No impediment to the natural water flow other than approved erosion control works is permitted. • To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly.	Implementation: Contractor/Project Manager	Prior to construction	inspection	

8.6.2	**Controlling Visual and Aesthetic Impacts**	• The site shall be kept neat, clean and tidy at all times. • Regular litter collection patrols will be made.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Daily to Weekly (for litter)	Site inspection	
8.6.3	**Controlling Water Use, Sanitation and Stormwater**	**MS 6:** The Contractor shall submit a Method Statement to the ER for approval detailing the method of stormwater control measures for the entire project area. • The Contractor shall promote responsible water use by personnel. • No grey water runoff or uncontrolled discharges from the Contractor's Camp or works areas shall be permitted. • **Water contaminated by pollutants** such as cements, concrete, lime, chemicals, detergents and fuels shall be discharged into a conservancy tank for removal from site. • No cleaning of vehicles and plant should be undertaken on site: where this is not possible, cleaning should be undertaken in a bunded area and the water collected in a conservancy tank for disposal. • Contaminated water shall not be discharged to the municipal sewer system unless approved by the Project Manager and/or authorisation has been obtained from the municipality.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Prior to construction	Method statement inspection	

	• 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, and surface and groundwater are not placed at risk. Adequate **toilet and washing facilities** for staff shall be provided on site and regularly cleaned and maintained. The type of sewage treatment used on site shall be approved by the Project Manager. • **No use of the spring and any associated water bodies** for vehicle washing, bathing or clothes washing etc. shall be permitted. • **Portable toilets** shall be located on flat ground at least 50m from drainage lines and culverts. The discharge of waste from toilets into the environment or burial of waste is strictly prohibited. Outside toilets must be secured to prevent them from blowing over and must be lockable. • **Spillage** from on-site toilets must be provided for in the Site Pollution Incident Response Plan. • Staff must use the sanitation facilities provided.				
	• The Contractor shall take reasonable measures to control and attenuate **stormwater runoff** across and beyond the Camp and working areas. • Any potentially contaminated stormwater must be separated from uncontaminated stormwater and discharged to a conservancy tank for removal from site or the working area. • Uncontaminated stormwater water may be directed to existing stormwater drainage systems with appropriate **attenuation measures and settlement lagoons** in place as necessary, as approved by the ER. • Diversion drains, with flow attenuation measures as necessary, must be provided to reduce stormwater flows across exposed, unsurfaced areas and stockpiles. • **Runoff loaded with sediment** and other suspended materials from the site/working areas shall be prevented from discharging to any drainage lines and associated water bodies by using settlement lagoons or similar silt control measures.				

8.6.4 Controlling Ecological Impacts	**MS 7:** The Contractor shall submit a Method Statement to the ER for approval detailing the method of alien vegetation control measures for the entire project area. **Protection of Flora:** • Vegetation shall not be removed, damaged or destroyed except to the extent necessary for establishing the construction site and carrying out the construction works. • Any **indigenous vegetation** is to be maintained on site where possible – e.g. trees should be trimmed rather than removed – and appropriate protection from construction activities to be provided. • Where the **use of herbicides, pesticides and other poisonous substances** has been specified the Contractor will be required to prepare a **Method Statement.** • The Contractor shall be responsible for the **removal of alien vegetation** within areas affected by the construction activities e.g. the popular tree on the river bank, including cleared ground and topsoil stockpiles: this responsibility shall extend for the duration of the defects notification period. • The eradication of alien plants must take place before the plants reach maturity. Methods to remove alien plants may involve hand removal, hoeing by hand or the application of herbicides (see below). • Wherever, **alien vegetation** is cut or excavated, the cuttings must be gathered in heaps and not spread around before being removed from site to approved disposal sites. **Protection of Fauna:** • The Contractor shall ensure his employees do not undertake any hunting, trapping, shooting, poisoning or other disturbance of any fauna on-site or in the areas surrounding the site. • The feeding of any wild animals is prohibited.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Prior to construction Monthly	Method statement inspection Site inspection	

	• The use of pesticides is prohibited unless approved by the ER.				
8.6.5 Managing Noise and Air Quality Impacts	• The Contractor shall keep noise levels within acceptable limits (as per government regulations) and activities shall, where possible, be confined to normal working hours. Noise levels exceeding 85dB shall only be permitted where approved and with appropriate advanced warning to adjacent residents (minimum of 5 days) being provided. • Noise that could cause a major disturbance to adjacent landowners should only be carried out during daylight hours and with advance warning provided as above. • No amplified music shall be allowed at the site. • Noisy construction plant is to be located as far as possible from potentially noise-sensitive areas: use noise screens as necessary. • Any complaints received by the Contractor regarding noise will be recorded and reported to the Project Manager. Actions taken to address such complaints shall be approved by the Project Manager. • Construction vehicles and plant to be in good working order. **Dust Control:** • The Contractor shall be responsible for the control of dust arising from the operations and activities on site. • The risk of wind-blown erosion across the construction site must be reduced. Stockpiles to be kept to the minimum practical height and where these will be in place for 6 months or more, the stockpile shall be seeded. • Dust generation from excavations, exposed areas and haul roads must be minimised by damping down by water spraying. • The excavation, handling and transport of erodible materials during high wind conditions should be avoided where practical to reduce dust generation, particularly where the wind direction will blow dust towards the adjacent residential areas. • Vehicle speeds on site must be restricted to reduce the risk of dust generation. • Construction vehicles and plant to be in good working order. • Any complaints received by the Contractor regarding dust will be recorded and reported to the Project Manager. Actions taken to address such complaints shall be	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly		

	approved by the Project Manager.				
8.6.6 Waste Management	**MS 4:** The Contractor shall submit a Method Statement detailing a solid waste control system (minimisation procedures, separation, storage, provision of bins, site clean-up schedule, bin clean-out schedule, recycling options and points of disposal for the various waste types (general and hazardous, as a minimum) to the ER for approval. **Topsoil:** • Topsoil will be utilised on site for rehabilitation purposes. Material: landfilled (if approved by the relevant municipality), spoiled in closed borrow pit (with permission from borrow pit operator and/or landowner). **General Construction rubble:** • Construction rubble shall be disposed of in pre – agreed, demarcated spoil dumps that have been approved by the relevant Municipality. • Must be removed from bins at sufficient intervals to prevent overflow. This waste must be stored in skips within a designated waste storage area in the Contractor's Camp. • General waste must be transported to the local municipal general waste landfill site by the municipality, the Contractor or a private waste disposal contractor. Service agreements in this regard must be obtained by the Applicant / Contractor prior to the commencement of construction activities. It is recommended that general wastes be separated on the site and delivered to appropriate depots for recycling. This would be facilitated by the provision of separate and labelled bins / skips. **Litter management:** • Demarcated and fenced areas where waste can be safely contained and stored on a temporary basis within the Contractors Camp must be established. General waste storage areas must be separate from hazardous waste storage areas. When adequate volumes (not more than 1 month) have accumulated, waste is to be removed from site and disposed of at a licensed facility. • Waste is not to be buried or burned on site. • Sufficient waste bins must be provided at the construction site for different types of waste disposal and for recycling purposes. • Refuse bins must be placed at strategic positions to ensure that litter does not	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Prior to construction Weekly	Method statement inspection Site inspection	

	accumulate within the construction site. • Waste disposal will need to take place in terms of Section 20 if the Environmental Conservation Act (Act No. 73 of 1989). • Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. • Skip waste containers should be maintained on site. • All waste must be removed from the site and transported to a landfill site as approved by the relevant Municipality. **Hazardous waste** • Must be stored in a designated, access controlled, sign posted and bunded storage area. This waste must be collected as and when necessary by an appropriately trained service provider and must be transported to a Hazardous Waste Landfill Site for disposal. • Machinery must be properly maintained to keep oil leaks in check. **Sanitation** • The Contractor shall install mobile chemical toilets on the site. • Staff shall be instructed to use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. • Ablution facilities shall be within 100m from workplaces but not closer than 50m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. Male and females must be accommodated separately where possible. • Toilets shall be serviced regularly and the ECO shall inspect toilets regularly. • Toilets should be no closer than 100m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the ECO. • Potable water must be provided for all construction staff. **Remedial actions** • Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site. • The ECO must determine the precise method of treatment of polluted soil. This could				

	involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. • If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials or a similar suitable material. • Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.				
8.6.7 Controlling Public Nuisance	• All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. • A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings. • No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site. • Road rehabilitation should take place during and once construction is completed. • Construction traffic should only make use of an approved route. • Where possible unskilled job opportunities should be afforded to local community members. • Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions. • Payment should comply with applicable Labour Law legislation in terms of minimum wages.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

8.6.8 Controlling Cultural Heritage/Historical and Archaeological Impacts	• The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. • If any archaeological or paleontological artefacts or remains/graves are uncovered during earthmoving activities, work in the vicinity of the find shall cease immediately. The Contractor shall immediately notify the ER, who shall contact the relevant Competent Authority who will take appropriate steps. • The Contractor will be required to abide by the specifications as set out by the Competent Authority or the heritage specialist appointed to investigate the find. • The Contractor may not, without a permit issued by the relevant heritage resources authority, destroy damage, excavate, alter, deface or otherwise disturb archaeological material.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	
8.7. SITE SPECIFIC ACTIVITIES – CONSTRUCTION PHASE					
8.7.1 Cement and Concrete Batching	• In the event a concrete batching plant is established, the plant shall be located in an impervious flat area of low environmental sensitivity – as far as possible from the nearest stream/river. Concrete shall not be mixed directly on the ground. Topsoil shall be removed from the batching plant site. Unused cement bags are to be stored so as not to be affected by rain or runoff events. • In the event ready mixed concrete is used, the transportation of the concrete shall not result in any spillage. Any spillage during transportation and on site shall be attended to immediately and the affected areas reinstated accordingly. • The flushing and cleaning of equipment used to transport/apply concrete at the site shall not result in the pollution of the surrounding environment. Any waste concrete and cement sludge shall be removed to an approved disposal site. • At the end of each day, any leftover / unused cement is to be removed from the site for appropriate disposal by the concrete supplier. • Washing of the excess concrete into the ground is not allowed.	**Responsibility**: The Contractor **Implementation:** Contractor/Project Manager	Monthly	Site inspection	
8.7.2 Earthworks	• Aim to reuse any spoil rather than disposing to landfill. • Be aware of unexpected contamination revealed during earthworks: work shall be	**Responsibility**: The Contractor/ECO	Monthly	Site inspection	

		stopped immediately and the Project Manager notified. • Be aware of unexpected cultural, historical and/or archaeological finds, including graves. • Manage runoff over unsurfaced areas. • Earth moving plant and vehicles activity to be manage to help reduce nuisance, disruption or unnecessary extension of the construction footprint into the beach area, dunes or coastal forest. • Managed noise and dust generation. • Construction vehicles and plant to be in good working order.	**Implementation:** Contractor/Project Manager			
8.7.3	**Excavation, Hauling & Placement**	• The working areas shall be cleared and prepared. • Wherever practically possible, excavation activities shall be done manually. • The Contractor shall take all reasonable measures to limit dust generation as a result of excavation, hauling and placement activities. • Prevent water entering excavated areas. • Be aware of unexpected contamination revealed during earthworks: work shall be stopped immediately and the Project Manager notified. Specialist advice should be sought as necessary for the disposal/removal of the contaminated material. • Be aware of unexpected cultural, historical and/or archaeological finds, including graves. • Construction vehicles and plant to be kept in good working order. • Manage earth moving plant and vehicles to reduce nuisance & disruption. • Managed noise and dust generation.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

8.7.4	**Power tools and generators.**	• The Contractor shall take preventative measures, such as screening, muffling, dust control and/or providing advance warning, to reduce the level of public nuisance and disruption that may result from the noise and dust levels.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	
8.7.5	**Site Clearance - including management of alien invasive plant species**	• **Clearance of the site, working areas and access road** for construction purposes shall be kept to a minimum. All construction activities are to be confirmed to the designated working areas and haul routes. • Clearance of the site, working areas and access road for construction purposes must be kept within the developmental footprint for the project. Undeveloped areas within the area designated for the project must retain natural vegetation cover. • The removal of vegetation should be avoided until such time as clearance is required to reduce the risk of soil erosion, establishment of alien vegetation and dust generation. Exposed surfaces shall be re-vegetated or stabilised as soon as practically possible. • **No burning** of vegetation to clear areas or to deal with cleared vegetation or alien vegetation is permitted. • The Contractor shall be responsible for the **removal of alien vegetation** within areas affected by the construction activities including cleared ground and topsoil stockpiles: this responsibility shall extend for the duration of the defects notification period. The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the provisions of CARA. • The eradication of alien plants must take place before the plants reach maturity. Methods to remove alien plants may involve hand removal, hoeing by hand or the application of herbicides (see below). Wherever, **alien vegetation** is cut or excavated, the cuttings must be gathered in heaps and not spread around before being removed from site to approved disposal sites.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

		• Topsoil or sand is to be cleared and stockpiled.				
8.7.6	**Storage, Handling and Use of Non-Hazardous Material**	• All **non-hazardous material storage areas** shall be sited on flat ground within the Contractor's Camp or at approved sites in the working area only. • The offloading of materials to the designated storage areas by delivery drivers shall be supervised. • Storage areas are to be appropriately isolated from the surrounding environment using ground protection, bunds, covers, splash trays, drip trays and proper dispensing equipment as necessary to prevent spillage, leaks and contamination of the surrounding area. • Materials are to be stored in appropriate containers and as per legal requirements where specified. • **Spillages and incidents** associated with non-hazardous materials must be addressed in the Site Pollution Incident Response Plan.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	
8.7.7	**Storage, Handling and Use of Hazardous Material**	• All potentially **hazardous raw and waste materials** are to be handled by trained staff and stored on site in accordance with legal requirements, standard fire safety regulations and manufacturer's instructions. • All depot(s) for hazardous materials shall be located at the main contractor's camp only. Appropriate symbolic warning signage and security shall be in place; and relevant MSDS shall be available on site. • **Storage areas** are to be appropriately isolated from the surrounding environment using ground protection, bunds, covers, splash trays, drip trays and proper dispensing equipment as necessary to prevent spillage, leaks and contamination of the surrounding area. • Spill kits, fire extinguishers, medical kits and similar emergency equipment must be in place as required. • Unless otherwise specified, **fuel** shall not be stored on site. • Should a **fuel bowser** be utilised, the Contractor will be required to confirm a site for the bowser and a **Method Statement** will be required for refueling activities and the	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

		management thereof. • Should it be necessary to establish a **temporary fuel storage tank onsite,** the Contractor will be required to confirm permitting requirements with DEDEAT and/or obtain the required permits before commencing with the instalment of the tank. A **Method Statement** will be required for the operation and decommissioning of the fuel storage tank. • The disposal of hazardous waste shall be undertaken as required. • **Spillages and incidents** associated with hazardous materials must be addressed in the Site Pollution Incident Response Plan.				
8.7.8	**Topsoil Stockpiles and Spoil Sites**	• **Topsoil** shall be removed from all areas where physical disturbance of the surface will occur and shall be stockpiled and used for rehabilitation of disturbed areas within the development footprint. Any **subsoil** should be stockpiled separately to topsoil. It shall be replaced in the excavation in the original order it was removed for rehabilitation purposes. • All stockpiles shall be located in previously disturbed/degraded areas wherever possible and/or at least 50m beyond the high-water mark. Stockpiles/spoil sites may not be located where stormwater runoff may result in the sedimentation of water bodies. • Spoil sites are not to exceed 2m in height and must be profiled to fit the natural topography. • Stockpiles shall be protected from wind erosion and/or water erosion, and are to be maintained weed-free. • Stockpiles must not be situated in areas where they will obstruct natural water pathways and drainage lines. • The placement of materials in the stockpiles shall be done in such a manner to minimise the spread or 'creep' of material into the surrounding area, including any 'No-Go' areas. • Areas affected by stockpiling will be re-instated to their original condition after the	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

	material has been removed. No material shall remain on site.				
8.8. SITE SPECIFIC ACTIVITIES – POST CONSTRUCTION DECOMMISSIONING PHASE					
8.8.1 Site Closure and Rehabilitation	• All damaged areas resulting from construction activities must be rehabilitated. • The Contractor shall provide a **Rehabilitation Plan** for approval by the Project Manager. • The Rehabilitation Plan should provide for, but not be limited to, the removal of unused materials, rubble etc., the ripping of compacted ground, spreading topsoil and re-establishing grass cover; the specification of the types of grass seed to be used; the removal of any contaminated soils and re-grading, the removal of the diversion in flow channel/sandbags. • **Rehabilitation** shall be required for all specified areas disturbed by the construction works. Rehabilitation shall ensure that all specified areas disturbed by the works are returned to a similar or better state than before construction commenced – the electronic colour photographic record shall be used to guide this process. The rehabilitation of all disturbed areas is to be undertaken to the satisfaction of the Project Manager. • Where possible, the natural re-vegetation of the disturbed area and a programme of progressive rehabilitation should be encouraged. • Where the rehabilitation of an area is not successful, the Contractor will rehabilitate these areas at no additional cost to the Client. Successful re-vegetation means ≥80% of the seeded area is covered with grass/groundcover. • **Unused materials,** Contractor's Camp infrastructure/services shall be removed at the end of the contract. • Any soils contaminated by hydrocarbons shall be removed to an appropriate landfill site, as necessary. • Removal of equipment • All structures comprising the construction camp are to be removed from site, where applicable.	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Construction completion	Site inspection	

	• The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up. • All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-grassed using the guidelines as set out in the section on Flora and Fauna that forms part of this document. **Temporary services** • The Contractor must arrange the cancellation of all temporary services. Temporary roads must be closed and access across these, blocked. • All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. • Associated infrastructure • Surfaces are to be checked for waste products from activities such as concreting and cleared in a manner approved by the ECO, where applicable. • All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. • All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited. • The site is to be cleared of all litter. • The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. • Fences, barriers and demarcations associated with the construction phase are to be removed from the site. • All residual stockpiles must be removed to spoil or spread on site as directed by the ECO. • All leftover building materials must be returned to the depot or removed from the site. • The Contractor must repair any damage that the construction works has caused to				

		neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.				
8.8.2 Grass seeding		• Grass seeding shall be carried out where specified by the Project Manager– in most cases, the replacement of existing topsoil and original groundcover should be sufficient. • Where grass seeding is deemed to be necessary, the whole of the disturbed area shall be seeded and not only the width of the excavation. **<u>Rehabilitation</u>** • It is important that the re-vegetation activities be planned in advance to ensure that seed and grass plug stockists are able to supply the required volume when required. • Re-vegetated areas may need to be watered to ensure plant growth and development. • The site should be contoured to ensure free flow of runoff and to prevent ponding of water. • Particular reference is made to the sloping of rehabilitation areas; care should be taken to avoid creating areas where slopes exceeds that of the surrounding areas as this will increase the likelihood of erosion; • All areas where topsoil was removed should be landscaped in order to reflect surrounding conditions. Sufficient topsoil should be available for landscaping and sloping purposes. • Rehabilitation of areas affected by construction activities should ideally commence at the start of the raining season (where possible); • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction, as well as areas that were used for alternative or other functions, such as storage areas, parking bays, etc.; • Existing access roads should be left 'as is' for future use during maintenance operations; • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were	**Responsibility**: The Contractor/ECO **Implementation:** Contractor/Project Manager	Monthly	Site inspection	

	eroded. • Re-vegetation of the construction areas will take place in the form of introduction of an annual indigenous grass species, like *Themeda triandra or Eragrostis tef*, this will allow natural succession to establish a layer of pioneer species that will eventually be replaced by a species composition that resembles the original status. This should ideally be done until such time that natural succession has established a permanent cover of vegetation • An invasive species management activity should be implemented at the onset of rehabilitation; and • inspection in order to ensure adherence to EMPr guidelines, completion of localised/ remaining areas of impact, monitoring of rehabilitation success, etc.				
8.9. OPERATIONAL PHASE ACTIVITIES					
8.9.1 Maintenance activities	• All applicable standards, legislation, policies and procedures as well as the design parameters calculated in the Design Report, must be adhered to during the operational phase of the pump station. • Regular inspection of the office facilities must take place to monitor the effects of any spillages, breakages, or malfunctioning. • Any pumps or standby generator(s) must be assessed and rectified when any malfunctioning is noticed. **<u>Water quality management:</u>** • To prevent the contamination of natural water resources, the following must be adhered to: • Hazardous materials utilised at the site must be handled, stored and disposed of appropriately. • Any spills of hazardous materials must be rectified in an appropriate manner so as to minimise environmental impacts. • If any form of contamination (including water or soil) arises as a result of the operational substation, the DWS and DEDEAT must be informed.	**Responsibility:** **The Applicant** **Implementation:** **Applicants representative**	On-going	Site inspection	

	• These Departments will provide input on the appropriate clean-up measures. It may be necessary to appoint an appropriately trained specialist to undertake. **Stormwater management:** • A stormwater management plan must be compiled and implemented on the site to minimise potential erosion and contamination risks to the surrounding environment. • It is recommended that stormwater from all roof areas be harvested and directed into storage tanks for use in cleaning operations. **Alien vegetation :** • Alien vegetation establishment on the site must be controlled for the duration of the project. **Soil Erosion:** • Any erosion which may arise as a result of the development must be remediated and rehabilitated. If deemed necessary, stabilisation measures must be implemented to prevent future erosion from occurring. **Waste Management:** • Regular inspections should be carried out ensure that the certified waste contractor is disposing of waste appropriately and timeously. **Conservancy/septic tanks:** • Conservancy tanks must be emptied on a regular basis by the municipality to minimise the chances of overflow. • The sewer system must be inspected regularly to prevent blockages or spillages.				

9. CONCLUSION

This Environmental Management Programme (EMPr) for the proposed nursery pump station Project has been written to prevent any adverse environmental impacts so far as possible. The EMPr defines roles and responsibilities; and provides procedures and specifications to minimise and mitigate environmental impacts identified during the planning, design, construction, construction phase decommissioning and operational phases of the proposed project.

It is expected that the Contractor /Employers Representative will be responsible for the overseeing and implementation of the EMPr and facilitates compliance with the EMPr. It is recommended that the complete EMPr be incorporated and form part of the construction tender documentation and process. This would allow all potential bidders to consider the cost for all the required specifications and mitigation measures that are applicable to the construction phase with reasonable accuracy. It would also ensure that the document receives the necessary buy-in that it requires right from the outset of any construction work.

APPENDIX A

Site Layout Plan

APPENDIX B
Curriculum Vitae

APPENDIX C
Environmental Awareness Plan

The Contractor shall ensure that adequate basic environmental awareness training (BEAT) of senior site personnel takes place and that all construction and operational phase workers receive an induction presentation prior to commencing work on site.

The presentation shall be conducted, as far as possible, in the employees' language of choice.

As a minimum, training shall include:

- Explanation of the importance of complying with the EMPr;
- Discussion of the potential environmental impacts of construction / operational activities;
- The benefits of improvement personal performance;
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when carrying out their activities;
- Explanation of the specifics of this EMPr and its implementation; and
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The contractor shall keep records of all environmental training sessions, including names, dates and the information presented. These records will be presented at the site meetings and to the ECO on request during his/her audits.

Examples of environmental toolbox talks to cover during the BEAT training are shown below:

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 –
Use water to make ground & soil wet

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

Emergency phone numbers

- Know all the emergency numbers
  - Ambulance
  - Fire
  - Police

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

Fines and penalties

- Spot fines may be issued
- 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!

APPENDIX D:

Example of a method statement:

METHOD STATEMENT NO:

SHORT DESCRIPTION & LOCATION OF ACTIVITY: .....

RESOURCES USED:

Equipment used: .....

Labour used: .....

Materials: .....

CONTROL OF ENVIRONMENTAL IMPACTS:

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIONS – (relevant Environmental Specifications)	FREQUENCY OF APPLICATION
E.g. pollution of surface or groundwater.		e.g. daily, weekly, monthly, once-off

ACTIONS IN CASE OF EMERGENCY:

LIKELY IMPACT	MITIGATION/PRECAUTIONARY ACTIONS – (relevant Environmental Specifications)	FREQUENCY OF APPLICATION
E.g. explosions.		

Responsible Parties for implementing the above:

Checked by: .....

Approved by (Project Manager): .....