

APPENDIX H

ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED LIMPOPO CENTRAL HOSPITAL

ENVIRONMENTAL MANAGEMENT PROGRAMME

FEBRUARY 2020

FINAL

PREPARED FOR: NATIONAL DEPARTMENT OF HEALTH










Environmental, Social and OHS Consultants

P.O. Box 1673 147 Bram Fisher Drive Tel: 011 781 1730
Sunninghill Ferndale Fax: 011 781 1731
2157 2194 Email: info@nemai.co.za

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Prepared By:	Nemai Consulting		
	 +27 11 781 1730		147 Bram Fischer Drive, FERNDALE, 2194
	 +27 11 781 1731		
	 info@nemai.co.za		PO Box 1673, SUNNINGHILL, 2157
	 www.nemai.co.za		
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<p>Author: C. van der Hoven, J. Davis and D. Henning</p>
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Amendments Page

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List of Abbreviations

CA	Competent Authority
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environment, Forestry and Fisheries
DEO	Designated Environmental Officer
DoH	Department of Health
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
FSR	Final Scoping Report
GIS	Geographical Information System
GN	Government Notice
IAPs	Interested and Affected Parties
LM	Local Municipality
LCH	Limpopo Central Hospital
LIHRA	Limpopo Provincial Heritage Resources Authority
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
m	Meter
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
RE	Resident Engineer
S&EIA	Scoping and Environmental Impact Assessment
WUL	Water Use License
WULA	Water Use License Application

Definitions

Auditing	A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis.
Environment	The surroundings in which humans exist and which comprise: <ul style="list-style-type: none"> • The land, water and atmosphere of the earth. • Micro-organisms, plant and animal life. • Any part or combination of a) and b) and the interrelationships among and between them. • The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.
Environmental Aspect	Those components of the company's activities, products and services that are likely to interact with the environment.
Environmental Authorisation	The written statement from the relevant environmental authority in terms of the National Environmental Management Act (Act 107 of 1998), with or without conditions, that records its approval of a planned activity and the implementation thereof and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.
Environmental Feature	Elements and attributes of the biophysical, economic and social environment.
Environmental Impact	The change to the environment resulting from an environmental aspect, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.
Environmental Impact Assessment (EIA)	The process of examining the environmental effects of a development in terms of the National Environmental Management Act (Act 107 of 1998) and the Environmental Impact Assessment (EIA) Regulations.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.
Environmental Objective	Overall environmental goal pertaining to the management of environmental features.
Environmental Target	Performance requirement that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Groundwater	Sub-surface water in the zone in which permeable rocks, and often the overlying soil, are saturated.
Hazardous waste	Waste that are proven to be toxic, corrosive, explosive, flammable, carcinogenic, radioactive, poisonous or classified as such in legal terms.
Heritage Resource	Any place or object of cultural significance including buildings, structures, landscapes, graves and geological, archaeological and palaeontological sites.
Landscape	Land modified for human use and occupation, embracing both the natural (wilderness) environment and the urban.
Management Actions	Practical actions aimed at achieving management objectives and targets.

Management Objectives	Desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources).
Monitoring	A systematic and objective observation of an organization's activities and services conducted and reported on regularly.
Natural Vegetation	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.
Pollution	Any change in the environment caused by substances, radioactive or other waves, or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future. Furthermore, pollution can also be regarded as an undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities.
Protected Plants	Plant species officially listed on the Protected Plants List (each province has one), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Reinstatement	Reinstatement is defined as the return of a disturbed area to a state, which approximates the state (where possible), which it was before disruption.
Runoff	The total water yield from a catchment including surface and subsurface flow.
Sensitive Environmental Features	Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA as sensitive through specialists' findings and input received from Interested and Affected Parties.
Subsoil	The soil horizons between the topsoil horizon and the underlying parent rock.
Topsoil	Topsoil can be regarded as the fertile upper part or surface of the soil.
Transplanting	The removal of plant material and replanting the same plants in another designated position.
Wastewater	Means water contaminated by the project activities.
Watercourse	A geomorphological feature characterized by the presence of a streamflow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water.
Weeds and Invader Plants	Weeds and invader plants are defined as undesirable plant growth that shall include, but not be limited to all declared category 1, 2 and 3 listed invader species as set out in the Conservation of Agricultural Resources Act (No 43 of 1983) regulations. Other vegetation deemed to be invasive should be those plant species that show the potential to occupy in number, any area within the defined construction area.
Wetland	Land where a surplus of water (i.e. waterlogging) is the key factor determining the nature of the soil development as well as the types of plants and animals living at the soil surface.

1 PURPOSE OF THE DOCUMENT

Nemai Consulting was appointed by Sakhiwo Health Solutions as the independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (EIA) Process for the proposed Limpopo Central Hospital in Polokwane, Limpopo Province, in terms of Government Notice (GN) No. R. 982 of 4 December 2014 (as amended).

This document serves as the **Final Environmental Management Programme (EMPr)** for the proposed project. This EMPr provides performance criteria required to address potential environmental impacts during the pre-construction, construction and operational phases of the proposed project. This EMPr must be read in conjunction with the Proposed Limpopo Central Hospital EIA Report.

The scope of the EMPr is as follows:

- ❖ Establish management objectives during the pre-construction, construction and operational phases in order to enhance benefits and manage (i.e. prevent, reduce, rehabilitate and/or compensate) adverse environmental impacts;
- ❖ Provide targets for management objectives, in terms of desired performance;
- ❖ Describe actions required to achieve management objectives;
- ❖ Outline institutional structures and roles required to implement the EMPr; and
- ❖ Provide the legislative framework.

The primary objectives of the EMPr are to:

- ❖ Provide mitigation measures to limit environmental impacts, and improve management of activities thereby reducing the probability of impacts occurring; and
- ❖ Define organisational and administrative arrangements for environmental management and monitoring of the work contract, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures.

2 DOCUMENT ROADMAP

As a minimum, the EMPr aims to satisfy the requirements stipulated in Appendix 4 of Government Notice (GN) No. 982 of the amended 2014 Environmental Impact Assessment (EIA) Regulations (07 April 2017). **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: Document Roadmap

Chapter	Title	Correlation with Appendix 4 of G.N. No. R982	
1	Purpose of the Document	N/A	
2	Document Roadmap	N/A	
3	Project Overview	N/A	
4	Environmental Assessment Practitioners	1(a)	Details of – (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including curriculum vitae.
5	Legislation and Guidelines Considered	N/A	
6	Roles & Responsibilities	1(i)	An indication of the persons who will be responsible for the implementation of the impact management actions.
7	Monitoring	1(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
8	Environmental Training & Awareness Creation	1(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.

Chapter	Title	Correlation with Appendix 4 of G.N. No. R982	
9	Environmental Activities, Aspects and Impacts	1(b)	A detailed description of the aspects of the activity that are covered by EMPr as identified by the project description.
10	Sensitive Environmental Features	1 (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.
11	Impact Management	1(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – (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.
		1(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d)
		1(f)	A description of proposed impact management sections, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions 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 comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		1(j)	(iv) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
N/A		1(n)	Any specific information that may be required by the competent authority

3 PROJECT OVERVIEW

3.1 Project Background and Motivation

Public health infrastructure is a fundamental pillar to building a successful national health insurance programme. However, according to the National Service Delivery Agreement, the current public health infrastructure cannot adequately support the service delivery needs of the country. Health facility planning, including providing new hospitals and clinics and upgrading established facilities, needs to be expedited to increase citizen's access to a high standard of health care facilities. The fact that there is a significant shortage of skilled practitioners and health care workers in South Africa exacerbates the situation. Currently, the existing medical schools are unable to produce the requisite number of health professionals. If the country is to meet the requirements of the National Health Insurance (NHI) goals of more equitable access to high-quality health services for all South Africans, both the academic component and health service provisioning must be improved.

3.2 Project Location

The proposed Electrical and Sewer Services project footprint falls within the jurisdiction of the Capricorn District Municipality (DM), and the Polokwane Local Municipality (LM), in the Limpopo Province. The proposed Limpopo Central Hospital is currently situated between Edupark, the Northern Academy Secondary School and the N1 road (refer to **Figure 1**). The proposed site is approximately 21 ha in extent and is situated on the remainder of Erf 6861 of Pietersburg Extension 30.

3.3 Project Description

The proposed project consists of the building of a new 488 bed central hospital, Limpopo Central Hospital, on a new site in Polokwane that will provide the tertiary care for the province and which will be the major teaching hospital for the University of Limpopo Faculty of Health Sciences and School of Medicine.

Refer to **Section 7** of the EIA Report for more information on the project description.



Figure 1: Location of the proposed Limpopo Central Hospital

4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by Sakhiwo Health Solutions (SHS) as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment for the proposed project.

In accordance with Appendix 4, Section 1(a) of GN No. R 982 of 4 December 2014 (as amended), this section provides an overview of Nemai Consulting and the company's experience with BAs and EIAs, as well as the details and experience of the EAPs that form part of the BA Process team.

Nemai Consulting is an independent, environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The Company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng) and Durban (KZN).

The core members of Nemai Consulting that are involved with the Scoping and EIA Process for the proposed development are captured in **Table 2** below, and their respective Curricula Vitae are contained in **Appendix I3** of the EIA Report.

Table 2: EMPr Core Team Members

Name	Qualification	Responsibility
Mr. D. Henning	MSc. River Ecology	<ul style="list-style-type: none"> • Project Manager • Quality Review
Mrs J. Davis	BSc. Hons – Geography	<ul style="list-style-type: none"> • Project Leader • EIA Process
Mr. C. van der Hoven	BSc. Hons – Environmental Sciences	<ul style="list-style-type: none"> • EIA Process • Public Participation

5 LEGISLATION AND GUIDELINES CONSIDERED

5.1 Overview of Legislation

Activities during the pre-construction, construction and operational phases will be undertaken according to recognised best industry practices and will include measures prescribed within this EMPr. The EMPr shall form part of the contract documents, and informs the Contractor about his duties in the fulfilment of the project objectives, with particular reference to the mitigation of environmental impacts that may potentially be caused by construction activities associated with the project. The Contractor will note that obligations imposed by the EMPr are legally binding in terms of environmental legislation.

All project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Some of the pertinent environmental legislation that has bearing on the proposed development is captured in **Table 3** below.

Table 3: Environmental Legislative Framework

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	<ul style="list-style-type: none"> Chapter 2 – Bill of Rights. Section 24 – Environmental Rights.
National Environmental Management Act (NEMA) (No. 107 of 1998)	<ul style="list-style-type: none"> Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). Section 28 – Duty of care and remediation of environmental damage. Environmental management principles.
GN No. R 982 of 4 December 2014	<ul style="list-style-type: none"> Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.
GN No. R. 983 of 4 December 2014 (Listing Notice 1) as amended	<ul style="list-style-type: none"> Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for

Legislation	Relevance
	which S&EIR must already be applied in respect of any of the activities.
GN No. R. 984 of 4 December 2014 (Listing Notice 2) as amended	<ul style="list-style-type: none"> • Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. • The investigation, assessment and communication of potential impact of activities must follow a Scoping and EIA process, as prescribed in regulations 21 - 24 of GN No. R 982 of 4 December 2014. • Activities under Listing Notice 2 that are relevant to this project are provided in Table 4 of the EIA Report.
GN No. R. 985 of 4 December 2014 (Listing Notice 3) as amended	<ul style="list-style-type: none"> • Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only. • The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014. However, according to Regulation 15(3) of GN No. R 982, S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. • Activities under Listing Notice 3 that are relevant to this project are provided in Table 4 of the EIA Report.
National Water Act (Act No. 36 of 1998)	<ul style="list-style-type: none"> • Chapter 3 – Protection of water resources; • Section 19 – Prevention and remedying effects of pollution; • Section 20 – Control of emergency incidents; and • Chapter 4 – Water use.
National Environmental Management Air Quality Act (Act No. 39 of 2004)	<ul style="list-style-type: none"> • Air quality management; • Section 29 – pollution prevention plans (Notice 172 of 2014: Greenhouse gases as priority air pollutants); • Section 32 – dust control; • Section 34 – noise control; and • Section 35 – control of offensive odours.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<ul style="list-style-type: none"> • Management and conservation of the country's biodiversity. • Protection of species and ecosystems.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	<ul style="list-style-type: none"> • Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.
National Environmental Management: Waste Act (Act No. 59 of 2008)	<ul style="list-style-type: none"> • Chapter 4 – Waste management measures; and • Chapter 5 – licensing requirements for listed waste activities - GN No. R. 921 of 29 November 2013.
National Forests Act (No. 84 of 1998)	<ul style="list-style-type: none"> • Section 15 – Authorisation required for impacts to protected trees.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	<ul style="list-style-type: none"> • Permit required for borrow pits and quarries.

Legislation	Relevance
Occupational Health & Safety Act (Act No. 85 of 1993)	<ul style="list-style-type: none"> • Provisions for Occupational Health & Safety; and • Major Hazardous Installation Regulations.
National Heritage Resources Act (Act No. 25 of 1999)	<ul style="list-style-type: none"> • Section 34 – protection of structure older than 60 years. • Section 35 – protection of heritage resources. • Section 36 – protection of graves and burial grounds. • Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m² in extent, etc.
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	<ul style="list-style-type: none"> • Control measures for erosion. • Control measures for alien and invasive plant species.
Limpopo Environmental Management Act (Act No. 7 of 2003) (LEMA)	<ul style="list-style-type: none"> • Deals with <i>inter alia</i> protected areas, wild and alien animals, professional hunting, aquatic biota and aquatic systems, invertebrates, indigenous plants, preservation of caves and cave-formations, limited development areas, mountain catchment areas, environmental pollution, as well as permits, permissions, exemptions and exclusions.

Refer to **Section 8** of the EIA Report for an overview of the relationship between the proposed project and certain key pieces of environmental legislation.

6 ROLES AND RESPONSIBILITIES

6.1 The Department of Environment, Forestry and Fisheries

The Department of Environment, Forestry and Fisheries (DEFF) is the mandated authority in terms of the National Environmental Management Act (Act No. 107 of 1998) that determines whether authorisation can be issued for the project, following a decision-making process conducted as part of the Scoping and EIA Process. Conditions are included in the Environmental Authorisation, which need to be complied with by the project applicant (National Department of Health).

DEFF also fulfils a compliance and enforcement role with regards to the authorisation. The Department may perform random inspections to check compliance. DEFF will also review the monitoring and auditing reports compiled by the Environmental Control Officer (ECO).

Amendments may be required to the EMPr or the Environmental Authorisation, based on adaptive management to the site conditions and the technical requirements of the project. It will need to be confirmed whether any amendments will require approval by DEFF.

6.2 National Department of Health

The National Department of Health is the applicant in terms of NEMA. The DoH is also the Project Proponent, or Project Developer, for all components of the work related to the development and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the Environmental Authorisation are satisfied. The liability associated with environmental non-compliance thus rests with the DoH.

6.3 The Contractor

The Contractor(s) is appointed by the proponent to undertake construction of the works, as specified in the Contract. In order to carry out the requirements of this EMPr, the Contractor must make sure that he/she has a clear understanding of all environmental matters relating to the project.

The responsibilities of the Contractor will, as a minimum, include the following:

- ❖ The implementation of and adherence to the Contract Specifications in accordance with the requirements of the EMPr;
- ❖ To ensure all sub-contractors under his/her supervision adhere to the applicable environmental contract specifications in accordance with the requirements of the EMPr;
- ❖ Report any non-compliance to the Chief Resident Engineer (CRE) within 12 (twelve) hours of the event occurring;

- ❖ Report any non-compliance event that constitutes an emergency immediately and in line with the protocol applicable to that particular emergency event;
- ❖ To ensure that all employees and sub-contractors attend the Environmental Awareness Training and subsequent refresher training, and are familiar with or made aware of the contents of the Environmental Authorisation and EMPr; and
- ❖ To conduct any remedial work required in terms of the EMPr and Environmental Authorisation as a result of environmental negligence, mismanagement and/or non-compliance.

6.4 Environmental Control Officer

The role of the ECO is primarily to act as an independent monitor on behalf of DEFF for the implementation of the proposed project, in accordance with the requirements of the Environmental Authorisation and the approved EMPr. The ECO must be competent, with a minimum of 5 years' experience.

It is recommended that the ECO undertake monthly inspections of the site, monthly monitoring and monthly compliance audit reporting, including an audit at the end of construction and one at the end of the defects notification period. The aforementioned reports will be submitted to the project proponent, and quarterly submissions to DEFF or other submission interval defined/requested by the Departmental Compliance Official.

The role and function of the ECO is to:

- ❖ Conduct third-party monitoring and auditing;
- ❖ Regularly monitor and review the progress towards achieving the specific strategies, objectives and performance targets of the EMPr;
- ❖ Independently verify that mitigation measures and conditions in the EMPr are being applied.
- ❖ Conduct regular site inspections and issue inspection reports;
- ❖ Review monitoring data and evaluate against performance targets;
- ❖ Provide independent reporting to DEFF on compliance with the Environmental Authorisation and EMPr;
- ❖ After consultation with the proponent, inform DEFF when there is non-compliance with conditions of approval;
- ❖ Undertake periodic formal auditing of the EMPr compliance;

As an independent Consultant, the ECO is not responsible for:

- ❖ EMPr implementation;
- ❖ Primary environmental data collection, monitoring and analysis; and
- ❖ Resolving complaints from Interested and Affected Parties (IAPs).

The ECO is not accountable for the implementation of the Environmental Authorisation and the EMPr and is also not linked to the project authorities, Engineer or Contractor. Therefore, the ECO does not have the authority to:

- ❖ Make project-related decisions;
- ❖ Issue instructions to either the Engineer or the Contractor;
- ❖ Stop the construction works; and
- ❖ Demand the implementation of specific mitigation and/or corrective measures to the Engineer or Contractor.

6.5 The Engineer

The Engineer is appointed to design the works and supervise construction. The Engineer will be represented on site for the duration of construction by the Chief Resident Engineer (CRE). The Engineer carries a direct responsibility for the effective implementation of the environmental management requirements detailed in this EMPr.

6.6 The Chief Resident Engineer

The CRE is a member of the Engineer's staff and responsible for ensuring that the Contractor complies with the construction contract, the design specifications, the Environmental Authorisation and the EMPr. The Contractor may only take instructions from the CRE. All decisions affecting programme or costs which are influenced by the specifications, procedures or protocols must be approved by the CRE. The CRE also has the authority to stop any construction activity which is in contravention of the relevant specifications. The CRE must make the findings of internal audits available to the proponent and the ECO.

6.7 The Contractor's Environmental Officer

The Environmental Officer (EO) is part of the Contractor's staff and is responsible for all activities related to the day-to-day on-site implementation of the EMPr. They are also responsible for the compilation of regular (monthly) Monitoring Reports for the Engineer.

The EO must liaise with the Engineer on all environmental and related issues (when necessary) and ensure that any complaints received from the public are recorded and dealt with appropriately and expeditiously. The Contractor must ensure that all his employees, visitors and sub-contractors receive Environmental Awareness Training as specified.

The EO should:

- ❖ Be well versed in environmental and social matters;
- ❖ Be on site throughout the duration of the project and be dedicated to the project;
- ❖ Assist the Contractor in compiling Method Statements;

- ❖ Understand the relevant environmental legislation, international best practices and processes;
- ❖ Understand the hierarchy of environmental compliance reporting, and the implications of non-compliance;
- ❖ Know the background of the project and understand the implementation programme;
- ❖ Be able to resolve conflicts and make recommendations (to the Contractor) in terms of the requirements of the EMPr;
- ❖ Reporting environmental incidents to the ECO and ensuring that corrective action is taken, and lessons learnt shared;
- ❖ Assist the contractor in investigating environmental incidents and compile investigation reports;
- ❖ Attend the Site Meetings;
- ❖ Follow-up on ECO findings, defects, non-conformance reports;
- ❖ Keep accurate and detailed records of all EMPr-related activities on site and manage an internal compliance management system on behalf of the Contractor;
- ❖ Keep the following on file:
 - Material Safety Data Sheets (MSDSs) for all hazardous material stored;
 - Waste disposal certificates;
 - Training registers;
- ❖ Arrange the presentation of environmental awareness training courses/toolbox talks to all site staff, Contractors and sub-contractors, and monitor the environmental awareness training for all new site personnel employed by the Contractor; and
- ❖ Advise on the rectification of any pollution, contamination or damage to the project site, rights of way and adjacent land.

7 MONITORING

Monitoring is required to ensure that the receiving environment at the study area is suitably safeguarded against the identified potential impacts, and to ensure that the EMPr requirements are adequately implemented and adhered to during the construction phase.

7.1 Baseline Monitoring

Baseline monitoring aims to determine the pre-construction state of the receiving environment and serves as a reference to measure the residual impacts of the project by evaluating the deviation from the baseline conditions and the associated significance of the adverse effects.

7.1.1 Pre-construction Survey

A pre-construction survey needs to be conducted for all areas that are to be affected by construction activities. The survey needs to include the following:

- ❖ Site investigations by appropriate members of the project team and specialists (as relevant);
- ❖ Generate records from survey which include site details, photographs, explanatory notes, etc. (as required);
- ❖ Record the condition of existing structures and infrastructure on the site; and
- ❖ Identify site-specific mitigation measures, where applicable.

The records from the pre-construction survey must be used to establish and inform the reinstatement and rehabilitation requirements for the affected areas. Note that separate provision is made for Specialist Environmental Investigations in **Section 11.2.1** that need to take place prior to construction activities.

7.1.2 Environmental Parameters

The environmental parameters to be included in the baseline monitoring, which is to be undertaken by the Contractor, are shown in **Table 4** below.

Table 4: Baseline Monitoring

Environmental Parameter	Monitoring Locations	Requirements
Air Quality	<ul style="list-style-type: none"> • Dust fallout units to be located taking into consideration significant sources of air pollution, sensitive receptors (adjacent properties and schools), and dominant wind direction. Dust fallout to be measured at / around 	<ul style="list-style-type: none"> • Dust fallout – comply with ASTM D1739; SANS 1929, SANS 69.

Environmental Parameter	Monitoring Locations	Requirements
	<p>the following sites (as a minimum)</p> <ul style="list-style-type: none"> – ○ Batching plant; ○ Aggregate stockpiles; and ○ Sensitive features. 	
Noise	Noise monitoring sampling sites to be located taking into consideration significant sources of noise, sensitive receptors (adjacent properties and schools) and dominant wind direction. Sites to coincide with dust fallout sites (where relevant).	Comply with SANS 10103:2008.

7.2 Environmental Monitoring

Environmental monitoring entails checking, at pre-determined frequencies, whether thresholds and baseline values for certain environmental parameters are being exceeded. The parameters and sampling localities used during the baseline monitoring will form the basis of the environmental monitoring programme.

The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor during the construction phase, include the following (based on receptors and impact sources):

1. Air Quality (dust fallout); and
2. Noise.

The following requirements need to be incorporated into the programme:

- ❖ Monitoring during normal operations, abnormal situations and emergency situations;
- ❖ Measuring equipment must be accurately calibrated;
- ❖ Adequate quality control of the sampling must be ensured;
- ❖ Analysis is to be undertaken at a SANS 17025 certified laboratory;
- ❖ Certified methods of testing must be employed;
- ❖ Where legal specifications exist for testing and sampling methods, these must be taken into account; and
- ❖ Establish a process for identifying and implementing corrective measures.

7.3 Compliance Monitoring and Auditing

Compliance monitoring will commence in the pre-construction phase, where those conditions in the Environmental Authorisation that need to be adhered to prior to project implementation will need to be checked and recorded, as well as to check compliance with the provisions in

the EMPr. Compliance monitoring will be completed at the end of the defects liability period to check the performance of rehabilitation measures and whether the related objectives have been met.

It is recommended that the ECO undertake monthly inspections of the site, monthly monitoring and monthly compliance audit reporting, including an audit at the end of construction and one at the end of the defects notification period.

Auditing of compliance with the Environmental Authorisation and EMPr must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014) in terms of the following:

1. The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid -
 - a. Ensure that the compliance with the conditions of the Environmental Authorisation and EMPr is audited; and
 - b. Submit an environmental audit report to DEFF.
2. The environmental audit report must -
 - a. Be prepared by an independent person with the relevant environmental auditing expertise;
 - b. Provide verifiable findings, in a structured and systematic manner, on-
 - i. The level of performance against and compliance of an organization or project with the provisions of the requisite Environmental Authorisation and EMPr; and
 - ii. The ability of the measures contained in the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
 - c. Contain the information set out in Appendix 7 of GN No. R. 982 of 4 December 2014 (as amended); and
 - d. Be conducted and submitted to DEFF at intervals as indicated in the Environmental Authorisation.
3. The environmental audit report must determine-
 - a. The ability of the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
 - b. The level of compliance with the provisions of Environmental Authorisation and EMPr.

A document handling system must be established to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr. Supplementary EMPr documentation could include:

- ❖ Method Statements;
- ❖ Site instructions;
- ❖ Emergency preparedness and response procedures;

- ❖ Record of environmental incidents (incident register);
- ❖ Non-conformance register;
- ❖ Training records;
- ❖ Waste disposal register and proof of disposal;
- ❖ Site inspection reports;
- ❖ Monitoring reports;
- ❖ Auditing reports; and
- ❖ Public complaints register (single register for maintained for overall site).

The Contractor shall also develop and submit a Site Layout Plan illustrating the planned site layout, access routes, storage facilities, site camp area, parking areas, etc. This Site Layout Plan must first be approved by the Applicant and ECO prior to site establishment activities commencing.

7.4 Method Statements

The Contractor shall provide detailed method statements on how the performance criteria in the EMPr will be met. These methods are to be reviewed and approved by the Engineer to ensure that they are adequate.

The method statements must be project- and site specific and should explain in detail the following:

1. The manner in which the work is to be undertaken;
2. The estimated schedule for the works (timing);
3. The area where the works will be executed (location);
4. The materials and plant / equipment needed for the works;
5. The necessary mitigation measures that need to be implemented to adequately safeguard the environment, construction workers and the public (where applicable);
6. Training of employees;
7. Roles and responsibilities; and
8. Monitoring and reporting requirements.

The list of method statements required to assist in the implementation of this EMPr includes at least the following (where applicable):

- ❖ Method Statement for site clearing;
- ❖ Method Statement for management of access and traffic control measures.
- ❖ Method Statement for establishing the construction camp(s);
- ❖ Method Statement with regard to waste and wastewater management;
- ❖ Method Statement for dust control;
- ❖ Method Statement for the storage and handling of hazardous substances;

- ❖ Method Statement for management of cement and batching plants;
- ❖ Method Statement for managing spoil material;
- ❖ Method Statement for controlling alien invasive species and noxious weeds;
- ❖ Method Statement for the decommissioning of the construction works area;
- ❖ Method Statement for rehabilitation and landscaping of construction footprint; and
- ❖ Method Statement for the management of stormwater and erosion.

Note that the method statements are contractual requirements between the proponent and the Contractor and therefore not subject to approval by DEFF.

8 ENVIRONMENTAL TRAINING AND AWARENESS CREATION

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices.

The various means of creating environmental awareness during the construction phase of the project may include:

- ❖ Induction course on the EA conditions and EMPr requirements for all workers before commencing work on site;
- ❖ Refresher courses (as and when required);
- ❖ Toolbox talks, at least twice a month as a minimum, focusing on particular environmental issues (task- and area specific);
- ❖ Courses must be provided by suitably qualified persons and in a language and medium understood by the workers.
- ❖ Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. identified heritage sites, protected plants and trees); and
- ❖ Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

The Contractor must compile a project-specific Environmental Training and Awareness Programme, taking into consideration the abovementioned factors, to be approved by the Engineer/ECO.

9 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

9.1 Environmental Activities

9.1.1 Pre-construction Phase

The main project activities and high-level environmental activities to be undertaken in the pre-construction phase are listed in **Table 5** below.

Table 5: Activities associated with the Pre-construction Phase

PRE-CONSTRUCTION PHASE	
Project Activities	
1.	Obtain Environmental Authorisation, and other relevant permits
2.	Applicant to appoint Environmental Control Officer (ECO)
3.	Negotiations and agreements with the individual affected landowners and stakeholders
4.	Detailed engineering design
5.	Detailed geotechnical design
6.	Site survey
7.	Procurement of contractors
8.	Mark construction servitude
9.	Registration of the servitude
10.	Pre-construction photographic records
11.	Development and approval of method statements
12.	Development and approval of construction plans
13.	Development of employment strategy
14.	Construction site planning, access and layout
Environmental Activities	
1.	Undertake a pre-construction survey of the project footprint by the relevant environmental specialists to identify sensitive environmental features
2.	Develop Search, Rescue and Relocation Plan
3.	Demarcation of buffers around sensitive areas
4.	Diligent compliance monitoring of the EA, EMPr and other relevant environmental legislation
5.	Barricading and installing barriers around buffer areas identified in specialist studies
6.	Ongoing consultation with landowners and affected parties

9.1.2 Construction Phase

The main project activities and high-level environmental activities to be undertaken in the construction phase are listed in **Table 6** below.

Table 6: Activities associated with the Construction Phase

CONSTRUCTION PHASE	
Project Activities	
1.	Site establishment (including site camp and labour camp)
2.	Fencing of the construction area
3.	Pegging of central line and overall footprint
4.	Site clearing
5.	Delivery of construction material
6.	Transportation of equipment, materials and personnel
7.	Storage and handling of material
8.	Cut and cover activities
9.	Stockpiling (sand, crushed stone, aggregate, etc.)
10.	Stormwater control mechanisms
11.	Management of topsoil and spoil
12.	Waste and wastewater management
13.	Traffic control measures
14.	Bulk earthworks
15.	Site security
16.	Electrical supply
17.	Construction of the proposed infrastructure
18.	Road surface finishes
19.	Concrete works
20.	Landscaping
Environmental Activities	
1.	Reinstatement and rehabilitation of construction domain
2.	Control of invasive plant species
3.	Diligent compliance monitoring of the EA, EMPr and other relevant environmental legislation
4.	Conduct environmental awareness training
5.	Implement EMPr
6.	Ongoing consultation with landowners and affected parties

9.1.3 Operational Phase

The main project activities and high-level environmental activities to be undertaken in the operational phase are listed in **Table 7**.

Table 7: Activities associated with Operation Phase

OPERATIONAL PHASE	
Project Activities	
1.	Operation of Limpopo Central Hospital
Environmental Activities	
1.	Ongoing consultation with IAPs
2.	Erosion monitoring programme
3.	Management of sensitive areas or buffered areas
4.	Management of vegetation clearance
5.	Stormwater management
6.	Pollution control measures
7.	Control of invasive plant species

9.2 Environmental Aspects

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact.

9.2.1 Pre-construction Phase

The environmental aspects listed in **Table 8** below have been identified for the proposed project during the pre-construction phase, which are linked to the project activities (note that only high level aspects are provided).

Table 8: Environmental aspects associated with the Pre-Construction Phase

ENVIRONMENTAL ASPECTS	
Pre-construction Phase	
1.	Inadequate consultation with landowners
2.	Poor construction site planning and layout
3.	Inadequate environmental and compliance monitoring
4.	Inaccurate pre-construction survey (including search and rescue)
5.	Absence of relevant permits (e.g. for protected plants, trees and heritage resources)
6.	Lack of barricading of sensitive environmental features
7.	Poor waste management
8.	Absence of ablution facilities

9.2.2 Construction Phase

The environmental aspects listed in **Table 9** below have been identified for the proposed project during the construction phase, which are linked to the project activities (note that only high level aspects are provided).

Table 9: Environmental aspects associated with the Construction Phase

ENVIRONMENTAL ASPECTS
Construction Phase
1. Inadequate consultation with landowners
2. Inadequate environmental and compliance monitoring
3. Lack of environmental awareness creation
4. Indiscriminate site clearing
5. Poor site establishment
6. Poor management of access and use of access roads
7. Poor transportation practices
8. Poor traffic management
9. Disturbance of topsoil
10. Disruptions to existing services
11. Inadequate storage and handling of material
12. Inadequate storage and handling of hazardous material
13. Erosion
14. Poor maintenance of equipment and plant
15. Poor management of labour force
16. Pollution from ablution facilities
17. Inadequate management of construction camp
18. Poor waste management practices – hazardous and general (solid and liquid)
19. Poor management of pollution generation potential
20. Poor management of water
21. Damage to significant fauna and flora (if encountered)
22. Environmental damage of sensitive areas
23. Disruption of archaeological and culturally significant features (if encountered)
24. Dust and emissions due to construction activities
25. Noise nuisance due to construction activities
26. Poor reinstatement and rehabilitation

9.2.3 Operational Phase

The environmental aspects listed in **Table 10** below have been identified for the proposed project during the operation phase, which are linked to the project activities (note that only high level aspects are provided).

Table 10: Environmental aspects associated with the Operational Phase

ENVIRONMENTAL ASPECTS	
Operational Phase	
1.	Inadequate consultation with landowners
2.	Inadequate environmental and compliance monitoring
3.	Inadequate management of vegetation

9.3 Potentially Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to **Table 11** below for the potentially significant impacts associated with the activities and environmental aspects for the construction and operational phase.

Table 11: Potentially Significant Environmental Impacts

Environmental Feature	Potential Issues / Impacts during the Construction Phase	Potential Issues / Impacts during the Operational Phase
Land Use	<ul style="list-style-type: none"> Permanent loss of land during site clearance. 	<ul style="list-style-type: none"> Permanent loss of land.
Climate	<ul style="list-style-type: none"> Emissions of greenhouse gases during the construction phase. 	<ul style="list-style-type: none"> Emissions of greenhouse gases during the operational phase when emergency generators are in use.
Geology and Soil	<ul style="list-style-type: none"> Unsuitable geological conditions –risks to structural integrity of infrastructure. Soil erosion (e.g. poor management of stormwater); Loss of topsoil; Soil contamination through poor construction practices and inadequate management of dangerous goods (e.g. fuel); and Blasting related impacts (if required). 	<ul style="list-style-type: none"> Soil erosion (e.g. poor management of stormwater). Soil contamination (e.g. poor management of storage and handling of dangerous goods).
Geohydrology	<ul style="list-style-type: none"> Potential disturbance of the aquifer from blasting (if required). Potential contamination of groundwater from construction activities and inadequate management of dangerous goods (e.g. fuel). 	<ul style="list-style-type: none"> Potential pollution of groundwater from poor management of storage and handling of dangerous goods.

Environmental Feature	Potential Issues / Impacts during the Construction Phase	Potential Issues / Impacts during the Operational Phase
Surface Water	<ul style="list-style-type: none"> • Surface water pollution due to inadequate management of dangerous goods and poor construction practices. • Poor stormwater management on site resulting in surface water pollution (erosion and sedimentation) • Poor management of waste generated on site resulting in polluted surface water. 	<ul style="list-style-type: none"> • Poor stormwater management on site resulting in surface water pollution (erosion and sedimentation) • Surface water pollution from the poor management of storage and handling of dangerous goods.
Terrestrial Ecology	<ul style="list-style-type: none"> • Impacts to sensitive terrestrial ecological features; • Potential loss of significant flora and fauna species; • Damage / clearance of habitat of conservation importance in construction domain; • Proliferation of exotic vegetation 	<ul style="list-style-type: none"> • Proliferation of exotic vegetation.
Historical and Cultural Features	<ul style="list-style-type: none"> • Heritage and cultural resources could be destroyed or damaged through construction activities. 	-
Air Quality	<ul style="list-style-type: none"> • Excessive dust levels during construction activities (i.e. site clearing, bulk earthworks, use of construction vehicles on site) 	-
Noise	<ul style="list-style-type: none"> • Localised increase in noise levels during construction activities; • Noise from blasting activities (if required) 	<ul style="list-style-type: none"> • Localised increase in noise from use of generators; • Occasional increase in noise from use of ambulance and helicopter at hospital. • Impacts from noise from adjacent N1 road on hospital operations.
Waste Management	<ul style="list-style-type: none"> • Construction activities will result in the generation of different waste types (solid waste, domestic, general, hazardous and liquid waste). If poorly managed, it may lead to surface and groundwater, air and soil pollution on site. 	<ul style="list-style-type: none"> • Possible pollution from poor management and storage of medical waste, HCRW, general, hazardous and liquid waste.
Traffic	<ul style="list-style-type: none"> • Increase in traffic on the local road networks during construction phase. • Risks to road users. 	<ul style="list-style-type: none"> • Increase in traffic on the local road networks during operational activities of hospital.
Aesthetics	<ul style="list-style-type: none"> • Visual quality and sense of place to be adversely affected by construction activities (mainly Edupark, Northern Academy Secondary School, and residential properties adjacent to construction domain 	<ul style="list-style-type: none"> • High visibility of permanent infrastructure; • Loss of “sense of place” to neighbouring properties due to development of vacant land; • Light pollution caused by hospital.

Environmental Feature	Potential Issues / Impacts during the Construction Phase	Potential Issues / Impacts during the Operational Phase
	<ul style="list-style-type: none"> • Inadequate reinstatement and rehabilitation of construction footprint. 	
<p>Agriculture</p>	<ul style="list-style-type: none"> • Permanent loss of moderate arable land. • Permanent alteration of soils on site. 	<ul style="list-style-type: none"> • Permanent loss of moderate arable land.
<p>Health and Safety</p>	<ul style="list-style-type: none"> • Hazards/accidents related to construction work; • Poor storage and handling of dangerous goods; and • Safety and security. 	<ul style="list-style-type: none"> • Poor storage and handling of dangerous goods.
<p>Socio-Economic Environment</p>	<ul style="list-style-type: none"> • Loss of land within construction domain; • Nuisance from dust and noise; • Influx of people seeking employment • Safety and security; • Use of local road network; • Increase in employment opportunities; • Skills development and transfer; • Impacts on local SMME's. 	<ul style="list-style-type: none"> • Improved access and provision of public healthcare; • Increase in employment; • Skills development.

10 SENSITIVE ENVIRONMENTAL FEATURES

The following sensitive environmental features and aspects that are associated with the project are highlighted for which mitigation measures are included in the EIA Report and appended EMPr:

- ❖ No watercourses will be directly impacted on by the project;
- ❖ Heritage sites as identified through the Heritage Impact Assessment, which are situated on site, are protected in terms of the NHRA and shall be suitably safeguarded;
- ❖ Several protected trees have distributions that fall within the study area. Of note, is the presence of *Sclerocarya birrea subsp. caffra* (Marula) recorded in abundance on site;
- ❖ One plant species of conservation importance was noted, namely *Boophone disticha* (century plant) and this species has a conservation status of Declining.
- ❖ Should existing infrastructure and structures be affected by construction, these services will need to be safeguarded from construction activities until they have been relocated, where avoidance is not possible. This needs to take place in consultation with the owners or custodians of the infrastructure.
- ❖ Measures provided in the EMPr shall be implemented to safeguard all traffic and pedestrians on public roads (Suid and Webster Street) surrounding the site.
- ❖ The safety and security of the public is of paramount importance and shall not be compromised by the activities associated with the construction and operational phases.
- ❖ Sensitive socio-economic receptors surround the proposed site, which include (amongst others) properties and schools (Northern Academy Primary and Secondary School and New Horizon School). In order to prevent construction-related nuisance to these sensitive receptors, monitoring programmes have been recommended (see **Section 7**).

Refer to **Figure 2** for the sensitivity map, which will need to be made available to the implementation team (including the Project Manager, ECO and Contractor) in GIS format to allow for further consideration and adequate interpretation at an appropriate scale.

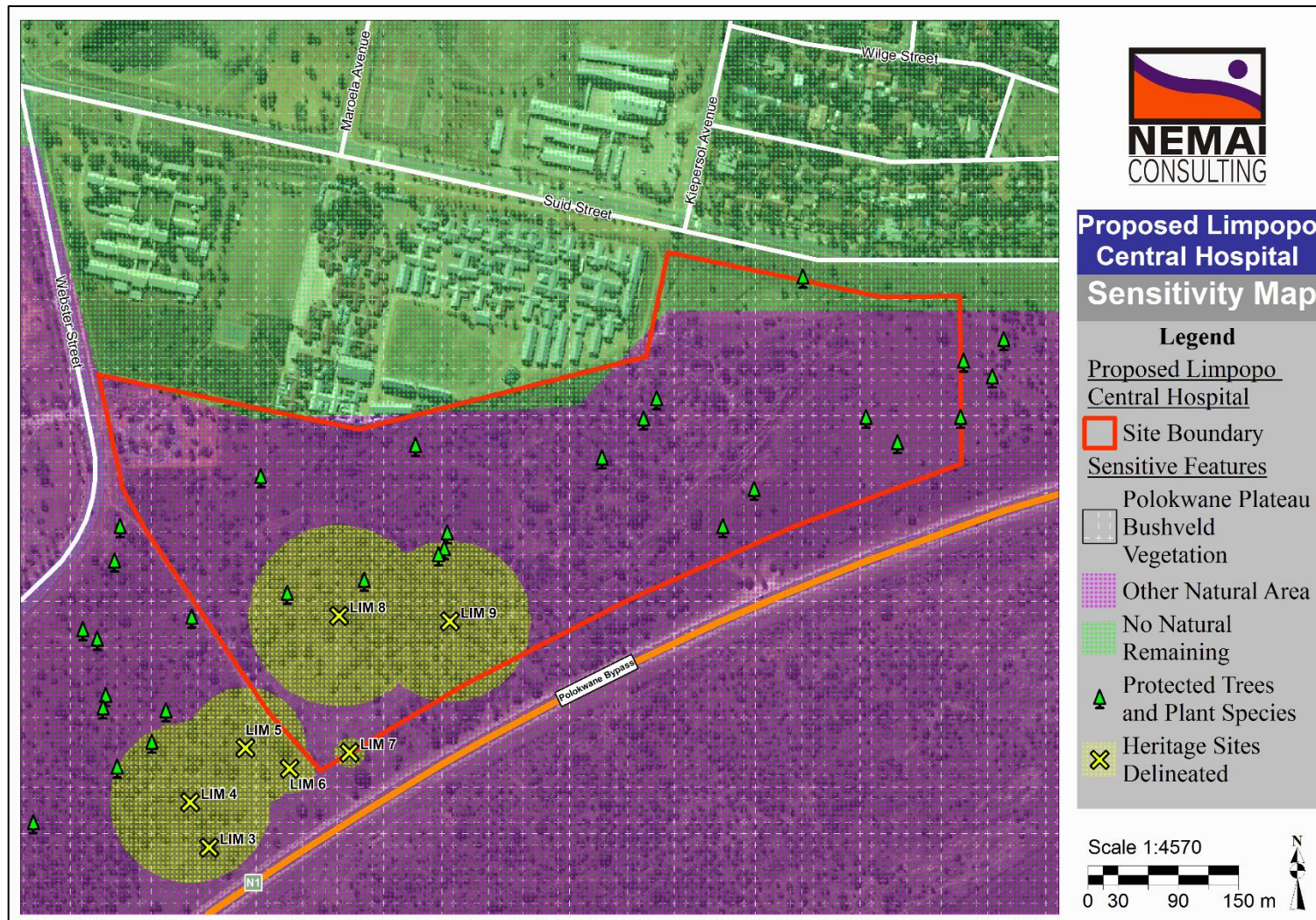


Figure 2: Sensitivity map

11 IMPACT MANAGEMENT

11.1 Introduction

The framework for the subsequent management measures consists of the following:

- ❖ **Management objectives** – i.e. desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources);
- ❖ **Targets** – i.e. level of performance to accomplish management objectives;
- ❖ **Management actions** – i.e. practical actions aimed at achieving management objectives and targets;
- ❖ **Responsibilities**; and
- ❖ **Monitoring requirements.**

11.2 Environmental Principles

The following principles should be considered at all times during the pre-construction, construction and operational phase activities.

The environment is considered to be composed of both biophysical and social components.

- Construction is a disruptive activity and all due consideration must be given to the environment, including the social environment, during the execution of a project to minimise the impact on affected parties.
- Minimisation of areas disturbed by construction activities (i.e. the footprint of the construction area) should minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
- As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinances, etc.
- Every effort should be made to minimise, reclaim and/or recycle “waste” material.

11.3 Pre-construction Phase

The planning or pre-construction phase largely entailed conducting the necessary specialist studies, determining the site layout and carrying out the requisite environmental processes to obtain authorisation. This phase will also include conducting environmental baseline studies for various parameters for management of impacts and record purposes.

11.3.1 Specialist Environmental Investigations

Management Objective:

Identify sensitive and protected environmental features in addition to those that have been identified as part of the EIA process.

Target:

- All sensitive and protected environmental features to be identified in the construction domain.
- All relevant approvals to be obtained prior to relocation of affected red data, protected and endangered flora and fauna species, medicinal plants, and heritage sites.

Specialist Environmental Investigations		
Management Actions	Responsibilities	Monitoring Requirement
<p>A suitably qualified archaeologist must be appointed to undertake mitigation measures for the identified heritage sites that will be impacted by the proposed development. The appointed archaeologist must obtain a section 35(4) permit in terms of NHRA and Chapter IV NHRA Regulations before mitigation commences.</p> <p>The identified heritage sites are rated of having High/Medium Significance as well as being Generally Protected A (GP.A). Mitigation measures and permits are therefore required before they may be affected, moved or destroyed, thus the sites identified are considered as “no go” areas until further mitigation is implemented.</p> <p>Extent of mitigation:</p>	<ul style="list-style-type: none"> • Applicant to appoint suitably qualified specialists • Specialists to execute the management actions 	<p>Approvals, permits and licences shall be in place with due consideration to the project programme;</p>

Specialist Environmental Investigations		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • The extent of the Iron Age site needs to be documented through surveying of the site and the development of site layout maps; • Identified structures must be excavated with the aim of determining age, cultural affinity and utilization areas; • Specific attention must be given to the excavation and documentation of identified middens on the site; • After completion of the excavation, the collected material must be analysed for reporting purposes and then curated in a recognised provincial repository; • A destruction permit must then be applied for with the backing of the mitigation report; • This application for destruction must be lodged with the SAHRA under section 35 of the NHRA. • Upon issuing of the destruction permit construction can commence. 		
<ul style="list-style-type: none"> • It is recommended that search, rescue and relocation be conducted taking into consideration species of conservation concern noted on the study area, namely Boophone disticha. In order to successfully search, rescue and relocate this plant SCC, a Plan of Action/Guideline has been developed and is attached in Appendix A. A rescue and relocation plan must be implemented, and all rescue and relocation activities should be overseen by a suitably qualified specialist. • As far as possible, large specimens of the Marula trees, should be preserved and incorporated into the landscaping around the proposed infrastructure. Where this proves not to be possible, a permit will be required from the LEDET/DAFF to destroy or damage the trees 		

Specialist Environmental Investigations		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Development planning must ensure that loss of vegetation due to clearing is restricted to within the footprint. • Commencement of construction must be preceded by a plant rescue programme which must be conducted only when plant permits and licences have been issued by the relevant authorities. • Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to conservation and importance of plant SCC, no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas etc. • Temporary lay-down areas and construction camps should be located within areas that have been identified as being of low sensitivity. • Environmental Control Officer (ECO) should provide supervision and oversight of vegetation clearing activities. 		
<ul style="list-style-type: none"> • Baseline studies should be undertaken to be completed as soon as possible before implementation commences in order to provide a benchmark against which impacts resulting from the construction and operation of the project can be measured. Aspects to be included are air quality and noise. 		

Implementation Timeframe:

Prior to the commencement of any construction activities.

11.3.2 Construction Site Planning and Layout

Management Objective:

Proper planning and layout of the construction domain to ensure protection of sensitive environmental features. Refer to sensitive features highlighted in **Section 10**.

Target:

- No negative impacts to sensitive environmental features as a result of poor construction site planning and layout.

Construction Site Planning and Layout		
Management Actions	Responsibilities	Monitoring Requirement
Conduct a pre-construction survey of the area to be affected by the development. This must include site investigations with photographic records.	Developer, Contractor	<ul style="list-style-type: none"> Approval by relevant environmental Authorities and Municipal Authorities; Barricading and signage; Approval of site plan; Method Statement
Suitable specialist(s) shall identify sensitive environmental features (including fauna, flora and heritage sites) where special care needs to be taken, and implement the required suitable mitigation measures to safeguard these features (e.g. barricading, signage and awareness creation). Refer to the findings of the specialist studies contained in Appendix E of the EIA Report.	Specialist	
The Contractor shall ensure that existing services (e.g. roads, pipelines, power lines and telephone services) are not damaged or disrupted.	Developer, Contractor	

Construction Site Planning and Layout		
Management Actions	Responsibilities	Monitoring Requirement
During site preparation, organic material and topsoil are to be stripped separately from subsoil and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from contamination from diesel, concrete or wastewater.	Contractor	compilation and approvals; • Environmental File creation; • Plant search and rescue, and protection.
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel.	Contractor	
No access to established no-go areas.	Contractor	
The Contractor to develop method statements to be approved by the Applicant prior to construction taking place.	Contractor	
The Contractor shall produce a site plan for the approval of the Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features. The plan shall show the following (as relevant): <ul style="list-style-type: none"> • Buildings and structures; • Contractors' camp and lay down areas; • Site offices; • Site laboratories; 	Contractor	

Construction Site Planning and Layout		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Batching plants; • Crusher plants; • Access/haul routes; • Gates and fences; • Essential services (permanent and temporary water, electricity and sewage); • Solid waste storage and disposal sites; • Site toilets and ablutions; • Hazardous waste storage and disposal sites; • Firebreaks; • Excavations; • Cut and fill areas; • Topsoil stockpiles; • Spoil areas; • Construction material stores; • Vehicle and equipment stores; • Workshops; • Wash bays; • Fuel stores; • Hazardous substance stores; • Sensitive environmental features; and 		

Construction Site Planning and Layout		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Any other activities, facilities and structures deemed relevant. 		
Compile the Environmental File to manage the environmental documentation during the construction phase.	Contractor	
Project Management shall allocate a laydown area for Contractor-supplied items. At all times, the Contractor shall be responsible for the safe and adequate storage of all materials and equipment on site which he is to install, whether they are supplied by himself or others. The safe handling, unloading and loading of material receipts and dispatches at site or storage areas shall be the Contractors' responsibility.	Developer, Engineer, Contractor	

Implementation Timeframe:

Prior to the establishment of any construction site for the overall project.

11.3.3 Environmental Awareness Creation

Management Objective:

- Ensure that the Contractor, construction workers and site personnel are aware of the relevant provisions of the EA, EMPr, other relevant permits and sensitive environmental features.

Target:

- All construction workers and employees to have completed appropriate environmental training before being allowed on the construction site.
- A record of environmental training undertaken to be kept on site.

Environmental Awareness Creation		
Management Actions	Responsibilities	Monitoring Requirement
The contractor's site staff including foremen and site management staff shall attend an environmental awareness training course on the conditions of the EMPr (and were applicable, any relevant authorisations, licences, or permits) provided by the ECO and a signed attendance register shall be kept available for confirmation. This will be a once off training session.	Contractor, ECO	<ul style="list-style-type: none"> • ECO to conduct once-off environmental Induction; • Contractor to conduct environmental Induction with employees; • Emergency Preparedness and Response Procedure.
The Contractor's EO must provide the induction training received from the ECO to all the employees of the Contractor and all Sub-contractors, and record of communication must be kept on site.	Contractor	
Environmental training (e.g. toolbox talks) provided by the Contractor is compulsory for all employees and structured in accordance with their relevant rank, level and responsibility. Suitable and site relevant toolbox talks should be presented to all employees at least twice a month, but more frequently if motivated by the ECO. Proof of communication of the toolbox talks should be kept on site.	Contractor	
Develop and implement an Environmental Emergency Preparedness and Response Procedure (to include spillages; site fires; community and labour unrest; and emergency contact details). This	Contractor	

Environmental Awareness Creation		
Management Actions	Responsibilities	Monitoring Requirement
procedure must be communicated to all employees, and record of communication must be kept on site.		

Implementation Timeframe:

Throughout the duration of the construction period.

11.4 Construction Phase

11.4.1 Site Clearing

Management Objective:

- Manage environmental impacts associated with site clearing.
- Ensure that only areas that are specifically required for the construction purposes are cleared.

Target:

No damage shall be caused to sensitive environmental features outside of the demarcated construction areas, including marked and barricaded heritage resources, protected plants and trees, existing structures and infrastructure.

Site Clearing		
Management Actions	Responsibilities	Monitoring Requirement
Restrict site clearing activities to construction area / domain.	Contractor, ECO	<ul style="list-style-type: none"> • No clearing outside of construction servitude; • Construction method statement; • Barricading maintenance.
Clearing of vegetation to be conducted in a phased manner (where possible), with due consideration of the search and rescue activities.	Contractor	
Topsoil should be stripped (at least 150 mm) and stockpiled separately and protected from contamination and compaction. The topsoil must be used to reinstate the site camp or for landscaping, depending on the final development plans.	Contractor	

Site Clearing		
Management Actions	Responsibilities	Monitoring Requirement
Method Statement to be developed, which will provide the details of how site clearing will be executed. Where possible, clearing by hand is recommended in order to create employment opportunities.	Contractor	
Maintain barricading around sensitive environmental features until the cessation of construction works.	Contractor	
Avoid any disturbance to demarcated sensitive environmental features.	Contractor	
The contractor has to clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates.	Contractor	
The site shall be cleared of all litter/waste prior to any construction related activities and the waste shall be disposed of at a registered waste disposal facility.	Contractor	
During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater.	Contractor	

Implementation Timeframe:

Prior to and during clearing of any construction site.

11.4.2 Site Establishment

Management Objective:

Minimise negative environmental impacts associated with site establishment.

Target:

- No damage to sensitive environmental features outside demarcated construction areas during site establishment.
- Site layout approved by Engineer.
- No access or encroachment into no-go areas.
- No justifiable complaints regarding general disturbance and nuisance received from affected parties.

Site Establishment		
Management Actions	Responsibilities	Monitoring Requirement
The Contractor shall produce a site plan for the approval by the Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features (based on specialist studies and findings from pre-construction survey).	Contractor	<ul style="list-style-type: none"> • Approved site plan; • Contractor's method statements; • Public complaints register.
Locate construction camps where sensitive environmental features will not be impacted on.	Contractor	

Site Establishment		
Management Actions	Responsibilities	Monitoring Requirement
Facilities and structures shall be located with due cognisance of the terrain and geographical features of the project site.	Contractor	<ul style="list-style-type: none"> Intact fencing of construction domain
Positioning of the storage and laydown areas should aim to minimise visual impacts.	Contractor	
Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.	Contractor	
Maintain barricading around sensitive environmental features until the cessation of construction works.	Contractor	
Ensure noise levels are within their lawfully acceptable limits as per SANS 10103.	Contractor	
The extent of the site should by all means be limited, to avoid any additional clearance of vegetation.	Contractor	
The Contractor shall ensure that the Contractors camp and working areas are kept clean and tidy at all times.	Contractor	
The Contractor shall comply with all safety requirements enforced; these include emergency evacuation procedures, fire preventative measures, etc.	Contractor	

Site Establishment		
Management Actions	Responsibilities	Monitoring Requirement
The Contractor shall supply firefighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities, etc.	Contractor	
The contractor is to provide designated safe smoking areas.	Contractor	
Every precaution should be taken, to prevent pollution of air, soil, ground and surface water as a result of construction or associated activities at the construction site.	Contractor	
Fuel, lubricants, transmission and hydraulic fluids shall only be stored in the designated areas that comply with the OHS Act.	Contractor	
Minimise public disturbance from lighting of the construction camp and site. For example, proper design of the placing (zones), height, type, direction (inward rather than outward) and intensity of floodlights, without compromising safety.	Contractor	
A copy of any EA, Licence, or permit must be kept at the property where the activity will be undertaken. The EA, Licence, or permit must be produced to any authorised official of the Department who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who works or undertakes work at the property.	Contractor	

Implementation Timeframe:

Prior to and during site establishment.

11.4.3 Management of Construction Camp and Eating Areas

Management Objective:

Minimise environmental impacts associated with the construction camp and eating areas.

Target:

1. No environmental contamination associated with construction camp and eating areas.
2. Minimise visual impact associated with construction camp and eating areas.
3. Prevent socio-economic impacts associated with the construction camp.

Management of Construction Camp and Eating Areas		
Management Actions	Responsibilities	Monitoring Requirement
Construction camp to be screened to minimise the visual impact, where practicable.	Contractor	<ul style="list-style-type: none"> • Construction site rules; • Public complaints register.
The Contractor shall provide eating areas for all staff. Eating areas be cleaned on a daily basis and shall provide adequate temporary shade.	Contractor	

Management of Construction Camp and Eating Areas		
Management Actions	Responsibilities	Monitoring Requirement
Open uncontrolled fires will be forbidden at the site camp. Rather, 'contained' cooking mechanisms will be used (e.g. gas stoves or an enclosed braai facility).	Contractor	
Eating areas will be designated and demarcated.	Contractor	
Refuse bins must be placed at all eating areas.	Contractor	
The feeding, or leaving of food for animals, is strictly prohibited.	Contractor	
Sufficient vermin / weatherproof bins will be present in this area for all waste material.	Contractor	
Dishwashing facilities will be provided to ensure that wastewater is disposed of appropriately.	Contractor	
Failure to comply with the general code of conduct, or the rules and procedures implemented at the construction camp will result in disciplinary actions.	Contractor	
Provide safe potable water for food preparation and drinking.	Contractor	
Prohibit the felling of trees for firewood.	Contractor	
Provide medical and first aid facilities at the camp area.	Contractor	

Implementation Timeframe:

Period from when the construction camp is created up to de-establishment.

11.4.4 Management of Ablution Facilities

Management Objective:

- Minimise environmental impacts associated with ablution facilities.

Target:

- No environmental contamination associated with ablution facilities.
- Minimise visual impact associated with ablution facilities.

Management of Ablution Facilities		
Management Actions	Responsibilities	Monitoring Requirement
Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the construction camp which conform to all relevant health and safety standards and codes.	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Disposal slips from ablution services.
No pit latrines, french drain systems or soak away systems shall be allowed. Install and maintain conservancy tanks for any site offices, which must comply with any relevant local by-laws and must be serviced by a suitable contractor, as appropriate. The location of conservancy tanks shall be approved by the Engineer and ECO.	Contractor	

Management of Ablution Facilities		
Management Actions	Responsibilities	Monitoring Requirement
A sufficient number of toilets will be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100 m from any working area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers. There should be separate toilets for men and women.	Contractor	
All staff to use the provided toilets at all times.	Contractor	
All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.	Contractor	
Ablutions are to be cleaned/emptied on a regular basis, before they are full and contaminate the environment.	Contractor	
Informal ablutions within the all riparian areas are prohibited.	Contractor	
The entrances to the toilets will be adequately screened from public view.	Contractor	
Sanitary hygiene bins will be provided for female staff.	Contractor	
The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site.	Contractor	

Management of Ablution Facilities		
Management Actions	Responsibilities	Monitoring Requirement
Proof of safe, legal disposal of ablution waste must be obtained and kept on site in the environmental file for record and monitoring purposes.	Contractor	
The contents of the toilet facilities should be disposed of at an authorised waste water treatment works. An agreements letter between the municipality and the applicant should be forwarded to the DWS Limpopo Regional Offices.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.5 Management of Workshop and Equipment

Management Objective:

- Minimise environmental impacts associated with workshops and equipment use.

Target:

- No environmental contamination associated with workshops and equipment use.

Management of Workshop and Equipment		
Management Actions	Responsibilities	Monitoring Requirement
Vehicles must be maintained and serviced according to the manufacturers' standards. No servicing of vehicles to take place on site.	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Vehicle and equipment checklists; • Waste disposal slips; • Recorded evidence of spillages.
Workshops for grinding, cutting, etc. work to be constructed with hardstanding floor (e.g. cement). Adequate measures should be put in place to prevent contamination of the surrounding environment and soil from activities undertaken in the workshop area.	Contractor	
Workshops should be kept clean and tidy at all times, and all waste must be placed in sealable bins on a daily basis.	Contractor	
Daily checklists must be completed by drivers and operators before the vehicles and equipment are used.	Contractor	
Vehicles and equipment must be turned off when not in use.	Contractor	
Drip-trays must be placed under vehicles and equipment when not in use.	Contractor	
All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.	Contractor	

Management of Workshop and Equipment		
Management Actions	Responsibilities	Monitoring Requirement
Correct storage of hydraulic fluids and other vehicle oils in line with the OHS Act (bund with 110% capacity; signage; ventilation; etc.).	Contractor	
Correct disposal of hydraulic fluids and other vehicle oils as hazardous waste at a registered hazardous waste disposal facility or through the ROSE Foundation. Proof of safe disposal must be obtained and kept on site.	Contractor	
All diesel powered equipment and vehicles used in construction activities must be suitably serviced, maintained and repaired in order to minimise the emission of diesel particulate matter and reduce subsequent worker exposure to this carcinogenic substance.	Contractor	
Emergency on-site maintenance should be done in such a manner so as to avoid any environmental contamination (e.g. use of drip trays) – zero spillage target. All oil or fuel must be disposed of according to waste regulations.	Contractor	
No washing of plant may be undertaken on site. Plant to be washed in dedicated wash bays off site. No wash bays on site.	Contractor	

Implementation Timeframe:

- Period from when the workshop is created up to de-establishment.
- Period during which equipment is utilised.

11.4.6 Fencing and Barricades

Management Objective:

- To ensure and assist with controlled fencing and barricades in the working environment.
- Prevent animals from falling into and being trapped in open excavations.
- Limit the entry to sensitive environments and private property.

Target:

- Provide a clearly demarcated and safe working area.
- No fauna to be trapped in trenches.
- No unauthorised access to private property.
- No impact in buffer zone areas.

Fencing and Barricades		
Management Actions	Responsibilities	Monitoring Requirement
No pedestrian or vehicular access shall be allowed outside fenced off construction work areas.	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Landowner agreements.
No pedestrian or vehicular access shall be allowed within barricaded / fenced off 'no-go' areas.	Contractor	
In places where temporary fencing is required, the Contractor shall erect such fencing when and where required and re-erect and maintain temporary fencing as necessary. Temporary fencing shall remain in position either until it is replaced by permanent fencing or until completion of the works.	Contractor	

Fencing and Barricades		
Management Actions	Responsibilities	Monitoring Requirement
Any private fences or walls damaged by the Contractor shall be repaired as soon as possible at his/her cost, and shall be of the standard of the original fence or wall.	Contractor	
All fences or barricading erected for construction purposes (e.g. around camp sites, trenches, etc.) should be inspected on a daily basis to detect whether any damage has occurred. Damaged fences / barricading to be repaired immediately.	Contractor	

Implementation Timeframe:

- Throughout the duration of the construction period.

11.4.7 Management of Labour Force

Management Objective:

- Ensure suitable management of labour force to prevent security-related issues.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

- No complaints from adjacent landowners and community members regarding trespassing or misconduct by construction workers.

Management of Labour Force		
Management Actions	Responsibilities	Monitoring Requirement
Prevent trespassing of construction workers onto private property.	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Landowner agreements; • Labour-related targets.
Workers should wear identifiable clothing.	Contractor	
Make suitable provision for transport of workforce.	Contractor	
Creating nuisances and disturbances in or near communities / residential areas shall be prohibited.	Contractor	
Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.	Contractor	
Designated and demarcated smoking areas should be provided, with special bins for discarding of cigarette butts.	Contractor	
Create opportunities for the employment of women and the youth in line with national government priorities.	Contractor	

Management of Labour Force		
Management Actions	Responsibilities	Monitoring Requirement
Local SMMEs should be given an opportunity to participate in the construction through the supply of services, material or equipment.	Contractor	
The principles of Expanded Public Works Programme can be used during construction.	Contractor	
Use local labour as far as possible where applicable (e.g. unskilled labour).	Contractor	
Training of labour to benefit individuals beyond completion of the project.	Contractor	
Liaise with Ward Councillor on local employment procedures.	Contractor	
No labour will be prohibited to overnight or live on site during the construction phase.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.8 Management of Health and Safety

Management Objective:

- Provide and maintain a safe and healthy working environment to construction workers and the public.

Target:

- Approved Health and Safety Plan.
- No reportable health and safety incidents.
- Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and other relevant regulations.

Management of Health and Safety		
Management Actions	Responsibilities	Monitoring Requirement
The Contractor must submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for the Health and Safety Agent's approval prior to the commencement of work, where applicable.	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Incident register; • Landowner agreements; • Occupational Health and Safety system audited by the Safety Consultant.
The Contractor shall ensure compliance to the requirements of the Health and Safety Specification and approved Health and Safety Plan throughout construction.	Contractor	
The Construction Regulations (OHS Act 85 of 1993) require that all contractors conduct an initial health risk assessment of their workers activities prior to initiating any work on site.	Contractor	
Ready access to drinking water must be provided at all work locations.	Contractor	
Issuing of appropriate protective wear (jackets, hats and gloves).	Contractor	
First aid officers should be trained on site (levels 1 to 3) to deal with construction related injuries.	Contractor	

Management of Health and Safety		
Management Actions	Responsibilities	Monitoring Requirement
All open excavated trenches and foundations should be clearly marked and secured to keep people and fauna from falling in.	Contractor	
Storage areas, assembling areas where construction material is stored on site should similarly be secured. No stacking and storing of material will be allowed underneath any operational power lines.	Contractor	
The Principal Contractor must establish site access rules and implement and maintain these throughout the construction period. Access control must, amongst other, include the rule that non-employees will not be allowed on site unaccompanied.	Contractor	
Access by non-construction staff into any construction related sites should be restricted and clearly indicated as such by signposts.	Contractor	
Maintain access control, where possible, to prevent access of the public to the construction areas.	Contractor	
The requirements of the Occupational Health and Safety Act (Act 85 of 1993) and related regulations shall be adhered to.	Contractor	
Speed limits shall be enforced in all areas, including public roads and private properties. All drivers of the construction teams shall be sensitised to this effect and courteous behaviour is expected from everybody in this regard.	Contractor	

Management of Health and Safety		
Management Actions	Responsibilities	Monitoring Requirement
Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) and comply with the provisions of the Fencing Act (Act No. 31 of 1963).	Contractor	
Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, and traffic signage).	Contractor	
Emergency contact details will be prominently displayed.	Contractor	
All construction personnel must be clearly identifiable.	Contractor	
All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993).	Contractor	
Appropriate signage must be posted to this effect and all employees on site must be instructed to ensure that non-employees are protected at all times. All non-employees entering the site must receive induction into the hazards and risks of the site and the control measures to be observed.	Contractor	
All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.9 Management of Emergency Procedures

Management Objective:

- Minimise environmental impacts associated with emergency procedures.

Target:

- No site fires to be caused by construction activities and workers.
- Approved emergency response procedures, where relevant.
- Emergency Preparedness.

Management of Emergency Procedures		
Management Actions	Responsibilities	Monitoring Requirement
<p>Fire –</p> <ul style="list-style-type: none"> • Comply with the National Veld and Forest Fire Act (No. 101 of 1998). • Proper emergency response procedure to be in place for dealing with fires. • Burning of waste is not permitted. • Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. • Firefighting equipment to be strategically positioned throughout the site. • All fire control mechanisms (firefighting equipment) shall be serviced annually and inspected monthly. • All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire. 	Contractor	<ul style="list-style-type: none"> • Approved Emergency Preparedness and Response Plan; • Incident register; • Training records; • Signage displayed; • Contractor method statements.

Management of Emergency Procedures		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> No fires are allowed on site, unless in dedicated areas approved by the Engineer and ECO. Dedicated smoking areas to be provided. Cigarette butts may not be disposed of onsite. No internal or external access roads shall be obstructed. 		
<p>Accidental Leaks and Spillages –</p> <ul style="list-style-type: none"> Proper emergency response procedure to be in place and communicated to designated persons for dealing with spills and leaks. Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site in the form of a Spill Kit/s. Remediation of the spill areas will be undertaken to the satisfaction of the Engineer and ECO. In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage. All staff on site will be made aware of actions to be taken in case of a minor or major spillage. Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers). Construction vehicles and mobile plant to be maintained in a safe operating condition to prevent any possible hydrocarbon leakages resulting in spillages. 	Contractor	

Management of Emergency Procedures		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Drip trays to be positioned underneath the hydrocarbon substance containment components of all stationary construction vehicles and mobile plant. 		

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.10 Management of Access and Traffic

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to construction sites.
- Ensure proper access control.
- Prevent unlawful access to construction domain.
- Ensure the safety of all road users by implementing proper signage and traffic control measures.
- Limit construction-related nuisance to service nodes.
- Ensure that measures and recommendations included in the Traffic Impact Assessment are implemented.

Target:

- No reports of construction vehicles using other unauthorised routes.
- No transporting of unsafe loads. Permits are to be obtained for abnormal loads.

- No speeding on site.
- No road accidents at turnoffs from public roads into the site. Also no construction vehicle and mobile plant accidents on site.

Management of Access and Traffic		
Management Actions	Responsibilities	Monitoring Requirement
Ensure appropriate traffic safety measures are implemented.	Contractor	<ul style="list-style-type: none"> • Signage displayed and maintained; • Public complaints register; • Contractor method statements.
The Contractor must comply with all driving, vehicle, licensing and driver ability requirements.	Contractor	
Permission required from the Engineer and ECO for the movement of any vehicles and/or personnel outside of designated working areas.	Contractor	
No new access roads shall be developed by the Contractor other than those determined or approved by the Engineer and ECO.	Contractor	
Existing roads shall be used as far as possible for construction purposes.	Contractor	
Contractor to ensure safe access for landowners on all roads.	Contractor	
The Contractor shall organise the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.	Contractor	
Access roads to be maintained in a suitable condition.	Contractor	

Management of Access and Traffic		
Management Actions	Responsibilities	Monitoring Requirement
Suitable erosion protective measures to be implemented for access roads during the construction phase.	Contractor	
Traffic safety measures (e.g. traffic warning signs, flagmen) to be implemented.	Contractor	
Clearly demarcate all access roads.	Contractor	
Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.	Contractor	
All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.	Contractor	
Before any work can start, the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control and where required relevant way-leaves must be obtained.	Contractor	
Vehicle loads shall be secured such that no loads or part thereof fall from the vehicle and damage other road users.	Contractor	
Construction vehicles travelling on all public roads shall adhere to the posted speed limits and speeds along proposed access route shall be controlled at 40kph to minimise potential conflict.	Contractor	

Management of Access and Traffic		
Management Actions	Responsibilities	Monitoring Requirement
The Contractor shall arrange his activities so that construction traffic and equipment do not unnecessarily obstruct public traffic or force it to a complete standstill. The flow of public traffic shall always take precedence and the Contractor shall not stop or delay public traffic to make way for construction traffic.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.11 Management of Waste

Management Objective:

- Minimise environmental impacts associated with waste.
- Apply waste management principles of prevent, minimise, recycle or re-use, with disposal as a last option.

Target:

- No littering on construction site.
- Maintain a clean and tidy construction site.
- 100% record of all waste generated and disposed at waste disposal facilities.
- Valid disposal certificates for all waste disposed.

- Provision of adequate waste containers that are easily accessible and maintained.
- Waste bins to be removed and cleaned weekly.

Management of Waste		
Management Actions	Responsibilities	Monitoring Requirement
Waste management activities must comply with the National Environmental Management: Waste Act (Act No. 59 of 2008) and Polokwane LM Waste Management By-Law (Local Authority Notice 69 of 2019).	Contractor	<ul style="list-style-type: none"> • Waste register; • Safe disposal slips; • Public complaints register; • Contractor method statements.
Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic (general) waste and hazardous waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overflowing and other associated nuisances.	Contractor	
Where possible, waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).	Contractor	
Provide waste skips at the construction areas, where necessary. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.	Contractor	
Ensure daily site clean-ups to prevent the build-up of litter. The Contractor will be responsible for keeping the working servitude free from litter and waste.	Contractor	

Management of Waste		
Management Actions	Responsibilities	Monitoring Requirement
The Contractor will ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous). An agreement letter between the municipality and the applicant should be forwarded to the DWS Limpopo Regional Offices.	Contractor	
<p>The following requirements shall be incorporated into the waste management programme:</p> <ul style="list-style-type: none"> ○ Solid Waste: <ul style="list-style-type: none"> ▪ Littering on site and the surrounding areas is prohibited. ▪ Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite. ▪ All bins must be cleaned of litter regularly. ▪ All waste removed from site must be disposed at a municipal/permitted waste disposal site. ▪ Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site. ▪ The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment. ▪ Contaminated soil must be removed and disposed of at a permitted waste disposal site, and the area rehabilitated immediately. ▪ Waste must be recycled wherever possible. 	Contractor	

Management of Waste		
Management Actions	Responsibilities	Monitoring Requirement
<p>The following requirements shall be incorporated into the waste management programme:</p> <ul style="list-style-type: none"> ○ Liquid Waste <ul style="list-style-type: none"> ▪ The Principal Contractor must install and maintain mobile toilets at work sites. ▪ The Principal Contractor must provide adequate and approved facilities for the storage of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment. ▪ Any emergency repair to vehicles and machinery must be undertaken in in such a way that they do not drip oil and contaminate the soil or water. ▪ All chemical spills must be contained and cleaned up by the supplier or professional pollution control personnel. 	Contractor	
<p>The following requirements shall be incorporated into the waste management programme:</p> <ul style="list-style-type: none"> ○ Hazardous Waste: <ul style="list-style-type: none"> ▪ No hazardous materials must be disposed of in the veld or any place other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for. ▪ The Principal Contractor must maintain a hazardous material register. ▪ Proof of safe disposal of hazardous waste must be obtained and kept on site. 	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.12 Management of Blasting

Management Objective:

Minimise environmental impacts associated with blasting.

Target:

1. Compliance with blasting-related legislation and standards.
2. No blasting-related impacts to surrounding properties.
3. Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.

Management of Blasting		
Management Actions	Responsibilities	Monitoring Requirement
Prior to commencing with blasting activities, the blasting Contractor should submit a Method Statement which should comply with the Explosives Regulations (2003) and all relevant SANS standards and health and safety standards for mitigating blasting.	Contractor	<ul style="list-style-type: none"> • Noise and vibration levels. • Public complaints register.
The Contractor shall employ industry standard methods to control the impact of blasting and limit the risk of damage to buildings and structures by reducing blast vibrations induced in the rock mass, eliminating fly rock and limiting air-blast and noise to acceptable levels.	Contractor	<ul style="list-style-type: none"> • Contractor's method statement.

Management of Blasting		
Management Actions	Responsibilities	Monitoring Requirement
Blast mats should be used wherever fly-rock may result in damage to any infrastructure or where damage could be caused to sensitive environmental features.	Contractor	
Blasting operations should be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.	Contractor	
All explosives shall be transported, stored and handled in accordance with applicable laws and good design engineering and constructions practices.	Contractor	
Communicate blasting and after-hours construction work on farms where tourism and hunting takes place.	Contractor	

Implementation Timeframe:

Prior to blasting up to safe completion of blasting.

11.4.13 Management of Storage and Handling of Hazardous Substances

Management Objective:

Ensure the protection of the natural environment and the safety of personnel on site, by the correct management and handling of hazardous substances.

Target:

- No pollution due to handling, use and storage of hazardous substances.
- In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills to be cleaned within 24 hours.

Management of Storage and Handling of Hazardous Substances		
Management Actions	Responsibilities	Monitoring Requirement
Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (Act No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards. Where required, the Contractor shall ensure the necessary authorisation/s or permit/s for the storage of hazardous chemical substances, including flammable substances are obtained.	Contractor	<ul style="list-style-type: none"> • Evidence of spillages; • MSDS register; • Waste disposal slips; • Training register; • Contractor method statements.
A copy of the Material Safety Data Sheet (MSDS) for each hazardous chemical substance stored or used on site must be available on site and communicated to the relevant persons who might be exposed to the hazards thereof.	Contractor	
Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination, and must adhere to the requirements stipulated on the MSDS.	Contractor	
Where flammable liquids are being used, applied or stored the workplace must be effectively ventilated.	Contractor	

Management of Storage and Handling of Hazardous Substances		
Management Actions	Responsibilities	Monitoring Requirement
No person may smoke in any place in which flammable liquid is used or stored.	Contractor	
Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.	Contractor	
Where flammable liquids are decanted, the metal containers must be bonded or earthed.	Contractor	
No flammable material (e.g. paper, cleaning rags or similar material) may be stored together with flammable liquids.	Contractor	
Staff that will be handling hazardous materials must be trained to do so.	Contractor	
All hazardous substances must be stored within a lockable store with an impermeable floor. Suitable ventilation to be provided.	Contractor	
All storage tanks containing hazardous substances must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous substance.	Contractor	
Fully stocked spill kits must be available for the clean-up of hazardous substance spillages.	Contractor	
Provide secondary containment where a risk of spillage exists.	Contractor	

Management of Storage and Handling of Hazardous Substances		
Management Actions	Responsibilities	Monitoring Requirement
Drip trays to be placed under parked construction vehicles, equipment and other receptacles of hazardous material to prevent spillages.	Contractor	
In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.	Contractor	
Spill reporting procedures to be displayed at all locations where hazardous substances are being stored.	Contractor	
Hazardous substances will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling.	Contractor	
Proper and timeous notification of any pollution incidents associated with hazardous substances.	Contractor	
Hazardous chemical substances containers must be clearly labelled with the contents and main hazardous category e.g. "Flammable", "Corrosive", etc.	Contractor	

Implementation Timeframe:

Period during which hazardous materials are stored and handled on site.

11.4.14 Management of Pollution Generation Potential

Management Objective:

- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.

Target:

- No complaints regarding pollution.
- No measurable signs of pollution.
- Noise – Comply with SANS 10103:2008.

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<p>General –</p> <ul style="list-style-type: none"> • Accidental pollution incidents shall be reported to the ECO immediately. The pollution incident to be cleaned-up by the Contractor or a nominated clean-up organization immediately. 	Contractor	<ul style="list-style-type: none"> • Evidence of pollution; • Public complaints register; • Waste disposal slips; • Proof of notification of adjacent landowners;
<p>Water –</p> <p>The following requirements for water pollution management shall apply:</p> <ul style="list-style-type: none"> • All fuel, chemical, oil, etc. spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<p>construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a watercourse.</p> <ul style="list-style-type: none"> Oil absorbent fibres must be used to contain oil spilt in water. Water shall not be pumped directly from excavations into municipal stormwater drains. Such water must first be pumped into a filtration structure e.g. silt sock, to filter through prior to release. 		<ul style="list-style-type: none"> Contractor method statements.
<p>Air –</p> <p>The following requirements for air pollution management shall apply:</p> <ul style="list-style-type: none"> Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution. Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off. Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours. No loud music is allowed on site and in construction camps. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> No fires are allowed if smoke from such fires will cause a nuisance to IAPs. Cognisance must be taken of adjacent landowners in terms of the site layout. Ablution facilities or eating areas should ideally not be located directly adjacent to the site boundary where houses/schools are situated in a close proximity where odour or noise may become a nuisance. 		
<p>Soil –</p> <p>The following requirements for soil pollution management shall apply:</p> <ul style="list-style-type: none"> Topsoil should be temporarily stockpiled, separately from subsoil, when areas are cleared. If mixed with subsoil the usefulness of the topsoil for rehabilitation of the site will be lost. Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed. Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and microorganisms in the soil. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized. All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment and containment trays placed underneath immobile equipment. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Soil contaminated with oil must be removed and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods. 		
<p>Noise –</p> <ul style="list-style-type: none"> The provisions of SANS 10103:2008 will apply to all areas at the perimeter of the site, within audible distance of residents. Working hours to be agreed upon with the Engineer, so as to minimise disturbance to landowners and community members. In principle, working hours should be restricted to 7am – 5pm Monday to Friday, and 7am – 2pm Saturdays, with no work permitted on Sundays and Public Holidays (unless stricter hours are noted in Municipal by-laws). Working hours should cater for the Northern Academy Independent School adjacent to the site. No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted unless at a level that does not serve as an intrusion to adjacent land-owners. Construction activities generating output levels of 85 dB or more will be confined to the hours during normal working hours, unless adjacent landowners have been given adequate notice. Proof of landowner acknowledgement of notification must be obtained and kept on site. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> The Contractor will take preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools. Cognisance must be taken of adjacent landowners in terms of the site layout. Ablution facilities or eating areas should ideally not be located directly adjacent to the site boundary where houses/ offices as situated in a close proximity where odour or noise may become a nuisance. Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. Interested and affected parties must be informed of the excessive noise factors. 		
<p>Dust –</p> <ul style="list-style-type: none"> Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area, access roads, site yard, etc. Fine materials must be covered during transportation. Speed limits to be strictly adhered to. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, and pre-notification of affected parties). Where bulk hauling of spoil material is required to or from the site the Contractor must ensure loading bays of trucks used are covered with tarpaulins to prevent dust along driving routes to and from site. 		
<p>Lights –</p> <ul style="list-style-type: none"> Prior to construction the position and type of lighting will be planned to ensure unnecessary light pollution will be eliminated. All lighting installed on site must not lead to unacceptable light pollution to the surrounding community and natural environment (e.g. use of down-lighters). 	Contractor	
<p>Erosion–</p> <ul style="list-style-type: none"> Protect areas of the construction site that are susceptible to erosion through suitable measures (e.g. watering, planting, retaining structures, commercial anti-erosion compounds). Particular care must be taken to prevent carrying of sediment onto roadways and into watercourses. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Any erosion channels caused by construction activities to be suitably stabilised and rehabilitated. All efforts to prohibit ponding on surface and ensure stormwater runoff is channelled from the site must be made. The method used will be appropriate to the expected stormwater flows and the topography and geology of the site. 		
<p>Cement and Concrete Batching –</p> <ul style="list-style-type: none"> Cement mixing to take place on an impervious surface (e.g. cement mixing pit). Batching operations to take place in a designated area, which will be kept clean at all times. Location of batching plant to be approved by the Applicant, with due consideration of the relevant management measures. Ensure separation of clean and dirty water from batching plant. Wastewater from batching operations to be suitably disposed of. Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility. Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement. 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility. • Limit concrete batching to single sites where possible. • Concrete transportation must not result in spillage. • Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water being contained and reused, or allowed to evaporate, or disposed of at a suitably licensed facility. • Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations. • Any spilled concrete to be cleaned up immediately. <p><i>In practice all wastes arising from construction activities are to be handled; transported and disposed of in accordance with the relevant regulations. All efforts should be made to minimise, reclaim or recycle waste, and failing that, dispose of it in a manner licensed by the government for that purpose.</i></p>		
Solid waste –	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<p><i>Definition: "Refuse" refers to all construction waste (such as rubble, cement bags, waste cement, timber, cans, other containers, wire and nails), household and office waste.</i></p> <ul style="list-style-type: none"> • Refuse shall be collected and stored in demarcated, fenced areas in skips and/or bins. The fenced areas or containers should be designed to prevent refuse from being blown out by wind and should be strategically and conspicuously placed throughout the site. • Wherever possible waste that is recyclable is to be recycled. • Refuse which cannot be recycled shall be disposed of at a landfill site approved by the ECO. Refuse may not be burned nor buried on site. • Construction rubble shall be disposed of in demarcated spoil dumps or at disposal sites approved by the ECO. 		
<p>Hazardous substances –</p> <p>The Principal Contractor must ensure that:</p> <ul style="list-style-type: none"> • Employees receive the necessary information and training to be able to use and store hazardous chemical substances safely. • Employees obey lawful instructions regarding: <ul style="list-style-type: none"> ○ The wearing and use of protective equipment ○ The use and storage of hazardous chemical substances 	Contractor	

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> ○ The prevention of the release of hazardous chemical substances ○ The wearing of exposure monitoring and measuring equipment ○ The cleaning up and disposal of materials containing hazardous chemical substances ○ Housekeeping, personal hygiene and the protection of the environment • The risk assessments required in terms of Construction Regulations include employee exposure to hazardous chemical substances and that the necessary measures be taken to protect persons from being detrimentally affected by hazardous chemical substances present or used in the workplace. • Suppliers provide the necessary information in the form of a material safety data sheet regarding a hazardous chemical substances required to ensure the safe use and storage of that substances. • An up-to-date list is kept on site of hazardous chemical substances stored and used together with the material safety data sheet of the hazardous chemical substances. • Hazardous chemical substances containers be clearly marked with the contents and main hazardous category e.g. “Flammable” or “Corrosive” and the reference number of the hazardous chemical substances on the list indicated above. • No person must eat or drink in a hazardous chemical substances workplace. 		

Management of Pollution Generation Potential		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Hazardous chemical substances waste is disposed of safely in terms of hazardous waste disposal requirements. 		

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.15 Management of Topsoil

Management Objective:

- Ensure suitable removal, storage, transportation of topsoil for reuse during rehabilitation.

Target:

- Adequate volume of recovered topsoil from disturbed areas to be stored for future use.
- No visual evidence of erosion from topsoil stockpiles.
- No visual evidence of erosion from areas where topsoil has been reinstated.

Management of Topsoil		
Management Actions	Responsibilities	Monitoring Requirement
Topsoil from the construction camp should be stored for post-construction rehabilitation and landscaping work and should not be disturbed more than is absolutely necessary.	Contractor	<ul style="list-style-type: none"> Contractor method statements.
The Contractor shall calculate the quantity of topsoil required for rehabilitation and landscaping and ensure sufficient topsoil is stored and preserved for such purpose. The depth of topsoil to be replaced shall be approved by the landscape architect.	Contractor	
Topsoil should also be stored in such a way that does not compromise its plant-support capacity.	Contractor	
A minimum of 150 mm of topsoil should be stripped for storage.	Contractor	
Identify suitable areas to store topsoil.	Contractor	
Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.	Contractor	
Remove topsoil from areas to be affected by construction activities. The topsoil should be placed separately on one side of the excavation to be replaced last during backfilling.	Contractor	
Topsoil to be adequately protected from contamination from construction activities and by aggregate, cement, concrete, fuels, litter, oils, and waste.	Contractor	

Topsoil stockpiles should not exceed 1.5 m in height.	Contractor	
Do not store topsoil in drainage lines or areas exposed to strong winds or heavy rain.	Contractor	
Following the construction phase, the topsoil should be used in rehabilitation and landscaping of affected areas and landscaping around the development.	Contractor	
Protect topsoil in order to avoid erosion loss on steep slopes.	Contractor	
An ecologically-sound stormwater management plan must be implemented during construction and appropriate water diversion systems put in place.	Contractor	
Vehicles and construction workers should under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation.	Contractor	
Where possible, natural vegetation must not be cleared and encouraged to grow.	Contractor	
All stockpiles, construction vehicles, equipment and machinery should be situated away from the natural vegetation. Disturbance of vegetation must be limited only to areas of construction.	Contractor	
Prevent contamination of natural grasslands by any pollution.	Contractor	
Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site.	Contractor	
Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread.	Contractor	

Topsoil stockpiles must be kept clear of alien vegetation growth.	Contractor	
Avoid translocating stockpiles of topsoil from one place to sensitive areas in order to avoid translocating soil seed banks of alien species	Contractor	

Implementation Timeframe:

Prior to site clearing up to when topsoil is used for rehabilitation.

11.4.16 Management of Excavations

Management Objective:

- Minimise environmental impacts associated with excavations.

Target:

- No damage to sensitive environmental features outside construction area during excavations.

Management of Excavations		
Management Actions	Responsibilities	Monitoring Requirement
Construction activities to remain within the designated construction areas.	Contractor	<ul style="list-style-type: none"> • Contractor method statements; • Barricading of excavations
Topsoil and subsoil should be stockpiled separately to be returned for backfilling in the correct soil horizon order. Topsoil can be stockpiled on one side of the excavation and subsoil on the other.	Contractor	

Management of Excavations		
Management Actions	Responsibilities	Monitoring Requirement
Suitable barricading to be erected around open excavations as per the Construction Regulations (2014). Provide signage as a warning of open excavations.	Contractor	and maintenance of barricading.
Divert runoff away from excavations, where necessary.	Contractor	
Sub soil drainage system to be in place in order to ensure no seepage of groundwater into the excavations, if required.	Contractor	
De-watering of excavations should be done in such a way as to not cause pollution to the surrounding environment. Water from excavations must not be released into watercourses or stormwater drains. Sediment containment measures must be used to remove sediment from the water, and erosion protection must be in place before the water is released into the environment. Any contaminated water must be removed and disposed of at a suitable disposal facility.	Contractor	

Implementation Timeframe:

Prior to excavations and up to reinstatement.

11.4.17 Management of Visual Aspects

Management Objective:

- Minimise impacts to the aesthetics / visual quality.
- Ensure that the visual appearance of the construction site is not an eyesore the adjacent areas.

Target:

- No complaints regarding impacts to visual quality.

Management of Visual Aspects		
Management Actions	Responsibilities	Monitoring Requirement
Advertising and lighting will be in accordance with relevant standards.	Contractor	<ul style="list-style-type: none"> • Public complaints register.
Lighting must not constitute an eyesore / hazard to users of the road and the surrounding residents.	Contractor	
Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.	Contractor	
The site will be shielded /screened to minimise the visual impact, where practicable.	Contractor	
Where practicable, development designs to compliment the natural surroundings in order to preserve a sense of place.	Contractor	
On-going housekeeping to maintain a tidy construction area.	Contractor	

Management of Visual Aspects		
Management Actions	Responsibilities	Monitoring Requirement
Discourage the unnecessary usage of high voltage lights during through-night construction. Lighting should be kept to an acceptable minimum and designed in position and height to minimise negative impact on surrounding inhabitants.	Contractor	
The extent of unnecessary damage to natural surrounds must be kept to a minimum.	Contractor	
As far as possible, existing roads are to be utilised for construction and maintenance purpose, to limit cumulative impacts from roads and traffic, as well as to limit the extent of the vegetation cleared for the purpose of the project.	Contractor	
The height of any temporary structures such as soil stockpiles should be kept as low as possible.	Contractor	
Where infrastructure is sited within view of visually sensitive areas, it must be placed as far away as possible or within lower-lying areas where it may be screened by topography. Where full screening of infrastructure components is not possible, siting should take advantage of partial screening opportunities.	Contractor	
The use of permanent signage and project construction signs should be minimised and visually unobtrusive.	Contractor	

Management of Visual Aspects		
Management Actions	Responsibilities	Monitoring Requirement
It must be ensured, wherever possible, that existing natural vegetation is to be retained during the construction and operational phases of the project and incorporated into the concurrent site rehabilitation especially in line of sight from sensitive receptors.	Contractor	
Erosion, which may lead to high levels of visual contrast and further detract from the visual environment, must be prevented throughout the lifetime of the project by means of putting soil stabilisation measures in place where required and through concurrent rehabilitation.	Contractor	
Concurrent/ progressive rehabilitation, including reshaping and revegetation must be implemented, with disturbed areas to be vegetated with indigenous veld/grass as soon as areas become available during the construction phase. The replacement of topsoil should allow for natural revegetation to take place.	Contractor	
Indigenous and locally occurring plant species selected for use in re-vegetation and landscaping should be selected taken quick growth rates into consideration in order to cover bare areas and prevent soil erosion.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.18 Management of Flora

Management Objective:

- Preserve protected flora species outside of construction areas.
- Control alien plants and noxious weeds.

Target:

- No unpermitted disturbance to protected flora species.
- Ongoing eradication of alien plants and noxious weeds.

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<p>Destruction of indigenous flora</p> <ul style="list-style-type: none"> • Development planning must ensure loss of vegetation and disturbance is restricted to within the recommended site layout footprint. • All laydown, storage areas, site camps etc. should be restricted to within the project area and should preferably be situated within areas of low sensitivity. • Clearly demarcate the construction footprint prior to clearing of vegetation. Only areas earmarked for site establishment should be cleared during pre-construction stage. Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site. • Rehabilitate all disturbed areas outside of the proposed hospital footprint, which were affected by site clearance, as soon as the construction is completed. 	Contractor	<ul style="list-style-type: none"> • Contractors method statement; • Permits; • Search, Rescue and Relocation Plan; • Rehabilitation / reinstatement. • Stormwater management

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Ensure that all construction personnel have the appropriate level of environmental awareness and competence. • Building material, ablution facilities or construction vehicles should not be stored in areas containing natural vegetation. • Vehicles and construction workers should under no circumstances be allowed outside the construction footprint to prevent impact on the surrounding natural vegetation. • Proliferation of alien invasive plant species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread. • Surrounding areas with indigenous vegetation should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste. • Topsoil removed during site establishment should be not be mixed with subsoil. Wind and water erosion-control measures are to be implemented to prevent loss of this topsoil. • Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of indigenous grasses adapted to the local environmental conditions. The grass seeds should have a variety of grass species including several pioneer species. 		<ul style="list-style-type: none"> • Control of alien invasive plant species.
<p>Potential loss of soil due to fuel and chemical spills (soil contamination)</p> <ul style="list-style-type: none"> • The application of prevention measures, in addition to proper handling of hazardous waste will be mandated to each personnel operating on the site to ensure protection of the environment. • Storage containers must be regularly inspected to enable early detection of leaks. 	Contractor	

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Mixing of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of storm water. • The spillage of harmful or toxic substances can be mitigated by the implementation of best practice management measures for the storage and handling of all hazardous substances as well as through the implementation of a sound emergency spillage containment plan, which can be implemented as soon as the spill of harmful or toxic stance occurs. • Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. • Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use. • Material Safety Data Sheets (MSDSs) shall be available on site for all hazardous substances used on site. • Cement/concrete batching is to be located in an area to be hardened and must first be approved by the ECO and no batching activities shall occur directly on the ground. • The Contractor must ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. • Vehicle maintenance should not take place on site unless a specific lined and bunded area is constructed within the construction camp for such a purpose. 		

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately. • Contaminated water containing cement, fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site. 		
<p>Encroachment, proliferation and spread of weeds and alien invasive plant species.</p> <ul style="list-style-type: none"> • Alien invasive plants (listed in the Terrestrial Ecological Impact Study in Appendix E5 of the EIA Report) can be removed manually or with the help of simple tools. This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, and ring-barking or bark stripping. These control options are only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. It would be preferable to uproot alien vegetation to limit regrowth after cutting. • Topsoil stockpiles, in particular, should be kept free of alien and alien invasive plant species. • A 'Tree Popper' can be used to remove shrubs and smaller trees or alternatively, the top growth can be cut off and then the stem and roots can be removed from the soil. • For large stands of trees on site should they are too large for physical removal, ring-barking the tree should be considered 	Contractor	

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> To prevent unnecessary alien plant infestations, an alien plant monitoring and eradication programme needs to be developed by a suitable person with a botanical expertise of the region. Promote awareness of all personnel. Chemical control should only be used as a last resort, since it is hazardous for natural vegetation. It should not be necessary if regular monitoring is undertaken, which should be effective for controlling alien invasive plants. Regular monitoring for alien invasive plants within the study area as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. An Alien Invasive Plant Eradication Plan, is provided in Appendix B. 		
<p>Loss of topsoil and increased erosion</p> <ul style="list-style-type: none"> The construction activities should be set up in such a way that the area of exposed soil is minimised during times of the year when the potential for erosion is high, e.g. during the summer when intense rainstorms are common in Limpopo province. Stripped topsoil, after removal of vegetation, shall be stockpiled separately in the designated areas and must not be compacted in any way, nor should any object be placed or stockpiled upon it. During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for later use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. 	Contractor	

Management of Flora		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Sediment barriers or sediment traps such as silt fences, sandbags etc. must be established to curb erosion and sedimentation where necessary. • Topsoil stockpiles are not be used as storm water control features. • Storm water runoff from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the surrounding areas. • Stockpiles are to be stabilised if signs of erosion are visible. • Topsoil stockpiles must be monitored for alien invasive plants growth. • All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. • No plant, workforce or any construction-related activities may be allowed onto the topsoil stockpiles. • Topsoil stockpiles must be clearly demarcated as no-go areas. • Stockpiles must not be higher than 2 m in order to avoid compaction, and thereby maintain the soil integrity and chemical composition. • All slopes that are disturbed during construction shall immediately be stabilised to prevent erosion. Where revegetation of slopes is undertaken, this shall be done in consultation with the landscape architect (or appointed landscaper). 		

Implementation Timeframe:

From pre-construction phase up to end of defects liability period (as relevant for specific management actions).

11.4.19 Management of Fauna

Management Objective:

- Ensure the protection of animals

Target:

- No direct / indirect harm to animals from construction activities.

Management of Fauna		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Training of construction personnel to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily. • The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. • Vehicles must adhere to the set speed limit. • All construction and maintenance vehicles must use designated access roads. Off-road driving should be strictly prohibited. • No fires should be allowed at the site 	Contractor	<ul style="list-style-type: none"> • Contractors method statement; • Permits, where required.

Management of Fauna		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Fauna (mammals and reptiles) that become trapped in any excavation or in any construction or operational related activity may not be harmed and must be rescued and relocated by an experienced person. • During site preparation special care must be taken during the clearing of the works area in order to minimise damage or disturbance of roosting and nesting sites. • Ground clearing should preferably take place at the beginning of winter in order to minimise impacts on young of burrowing animals and nesting birds. • Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed area close to their natural territories. • Animals residing within the designated area shall not be unnecessarily disturbed. • During construction, refresher training can be conducted to construction workers with regards to littering and poaching. • The Contractor and his/her employees shall not bring any domestic animals onto site. • Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes. • Caution should be taken to ensure construction footprints are kept to an absolute minimum, including storage of materials, stockpiling etc. 		

Implementation Timeframe:

From pre-construction phase up to end of defects liability period (as relevant for specific management actions).

11.4.20 Management of Archaeological and Cultural Features

Management Objective:

- To have no adverse impact on the historical inheritance of the area.
- To avoid damage to or destruction of previously unknown or excavated archaeological artefacts during construction.
- The preservation and appropriate management of new findings should these be discovered during construction.

Management Target:

- No archaeological and cultural resources or graves to be damaged during construction.

Management of Archaeological and Cultural Features		
Management Actions	Responsibilities	Monitoring Requirement
For any chance finds, all work will cease in the area affected and the Contractor will immediately inform the ECO. A registered heritage specialist must be called to site for inspection. The relevant heritage resource agency must be informed about the finding.	Contractor	<ul style="list-style-type: none"> • Heritage Impact Assessment; • Permits, where applicable. • Protocol for incidental palaeontological finds
Should any remains be found on site that is potentially human remains, the South African Police Service and archaeologist should also be contacted.	Contractor	

Management of Archaeological and Cultural Features		
Management Actions	Responsibilities	Monitoring Requirement
All archaeological, palaeontological and historical sites older than 50 years are protected in terms of the National Heritage Resources Act (NHRA) No 25 of 1999. In terms of this Act it is an offence to disturb any part of such site or material without a permit, should an archaeological or other such discovery be made during any excavations.	Contractor	
Under no circumstances shall archaeological artefacts be removed, destroyed or interfered with by the Contractor, his employees, his sub-contractors or his sub - contractors' employees. Any person who causes intentional damage to archaeological or historical sites and artefacts could be penalised or legally prosecuted in terms on the Act.	Contractor	
If archaeological material is accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the material permit must be applied for from SAHRA under Section 35 of the NHRA.	Contractor	
Upon the accidental discovery of graves, a buffer of at least 50 meters should be implemented.	Contractor	
If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a permit must be applied for from SAHRA (Section 36 of the NHRA) and other relevant authorities (National Health Act and its regulations). The local South African Police Services must immediately be notified of the find.	Contractor	

Management of Archaeological and Cultural Features		
Management Actions	Responsibilities	Monitoring Requirement
Where it is recommended that the graves be relocated, a full grave relocation process that includes comprehensive social consultation must be followed according to the relevant Legislation.	Contractor	
During construction, an archaeologist must monitor the site clearing as the possibility of encountering subsurface cultural and human remains are deemed to be high.	Contractor	
A protocol for incidental palaeontological finds is required. This protocol should include the termination of all development work if any palaeontological finds are discovered on site, and SAHRA and a palaeontologist should be alerted to determine the way forward.	Contractor	
If there are any new heritages resources are discovered during construction and operation phases of the proposed development, then a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer.	Contractor	
If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer. Mitigation will only be carried out after the archaeologist or palaeontologist obtains a permit in terms of section 35 of the NHRA (Act 25 of 1999). You may contact SAHRA APM Unit for further details: (Nokukhanya Khumalo/Phillip Hine 021 202 8654).	Contractor	

Management of Archaeological and Cultural Features		
Management Actions	Responsibilities	Monitoring Requirement
If any unmarked human burials are uncovered and the archaeologist called in to inspect the finds and/or the police find them to be heritage graves, then mitigation may be necessary and the SAHRA Burial Grounds and Graves (BGG) Unit must be contacted for processes to follow (Thingahangwi Tshivase/Mimi Seetelo 072 802 1251).	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.21 Management of Water

Management Objective:

- Minimise environmental impacts associated with storm water as well as water services for construction workers.
- Minimise stormwater runoff from the site onto neighbouring roads.
- Minimise water use through recycling and water efficient practices.

Target:

- No visual evidence of erosion caused by wastewater or stormwater practices.
- No environmental contamination associated with wastewater or stormwater practices.

Management of Water		
Management Actions	Responsibilities	Monitoring Requirement
All construction activities to comply with the National Water Act (Act No. 36 of 1998).	Contractor	<ul style="list-style-type: none"> • Licenses were applicable; • Proof of legal water source.
No water may be abstracted from rivers, streams, wetlands, or other natural water features.	Contractor	
During the construction stage, water will be required for various purposes, such as concrete batching (if required), dust suppression, potable use by construction workers, etc. Water tankers should supply water to the site, and water must be sourced from a legal source. Proof of water source must be obtained and kept on site.	Contractor	
Manage stormwater on the construction site to avoid environmental contamination and erosion.	Contractor	
Measures must be taken to divert unpolluted water and runoff away from the site.	Contractor	
All discharges to comply with legal requirements associated with the National Water Act (Act No. 36 of 1998).	Contractor	
Ensure proper storage of material (including fuel, paint) that could cause water pollution. Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.	Contractor	
Visual inspections for the occurrence of erosion should be undertaken on a weekly basis.	Contractor	

Management of Water		
Management Actions	Responsibilities	Monitoring Requirement
Reduce sediment loads in water from dewatering operations. All dewatering should be done through temporary sediment traps (e.g. straw bales, bidim, etc.). These are to be serviced regularly and removed when no longer in use. Materials can be re-used.	Contractor	

Implementation Timeframe:

Throughout the duration of the construction period.

11.4.22 Management of Reinstatement and Rehabilitation

Management Objective:

- Adequate reinstatement and rehabilitation of construction areas
- Conduct concurrent or progressive rehabilitation of areas affected by construction activities that are situated outside of the construction footprint.

Target:

- Complete site clean-up.
- Reinstatement and rehabilitate areas disturbed by construction activities.

Management of Rehabilitation		
Management Actions	Responsibilities	Monitoring Requirement
<p>Removal of structures and infrastructure</p> <ul style="list-style-type: none"> • After the construction phase, the area disturbed must be rehabilitated by appropriate landscaping, levelling, topsoil dressing, land preparation, alien plant eradication and vegetation establishment. • Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures. • Ensure that all access roads utilised during construction which are outside of the pipeline servitude and not earmarked for use during the operational phase, are returned to a state no worse than prior to construction. 	Contractor	<ul style="list-style-type: none"> • Public complaints register; • Rehabilitation success (monitored by ECO).
<p>Inert waste and rubble</p> <ul style="list-style-type: none"> • Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated. • Remove from site all waste and dispose of in the approved manner at a registered waste disposal site. 	Contractor	
<p>Hazardous waste and pollution control</p> <ul style="list-style-type: none"> • Remove from site all pollution containment structures. 	Contractor	

Management of Rehabilitation		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Remove from site all temporary sanitary infrastructure and wastewater disposal systems. Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner. Comply with relevant provisions under the following EMPr sections: Management of Storage and Handling of Hazardous Material, Management of Water, Management of Waste, Management of Pollution Generation Potential. 		
<p>Landscaping</p> <ul style="list-style-type: none"> Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil. Compact in layers for best results. Do not compact topsoil. Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available topsoil material. Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfill is removed from site and disposed of at a suitable licensed waste disposal site. 	Contractor	
<p>Topsoil replacement and soil amelioration</p> <ul style="list-style-type: none"> Execute top soiling activity prior to the rainy season or any expected wet weather conditions. Execute topsoil placement only after all construction work has ceased. Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes. Replace topsoil to the original depth. 	Contractor	

Management of Rehabilitation		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage. Do not use topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be appropriately treated. Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area. Newly cleared areas will have to be re-instated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasive species. Machines should remove any stone material and transport it to another location for re-use if it is required/possible, alternatively, it should be disposed at a licensed facility. All other foreign material should be removed during rehabilitation. 		
<p>Ripping and scarifying</p> <ul style="list-style-type: none"> Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be determined based on the site conditions and the recommendations of the ECO. 	Contractor	

Management of Rehabilitation		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Rip and/or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the works where topsoil was not stripped. Rip and/or scarify along the contour to prevent the creation of down-slope channels. Do not rip and/or scarify areas under wet conditions, as the soil will not break up. 		
<p>Planting</p> <ul style="list-style-type: none"> Where revegetation of the replaced topsoil has failed to occur naturally, or where topsoil was not adequately removed, stored and replaced by the Contractor, the areas that have been denuded and disturbed as a result of the construction on site must be vegetated with indigenous vegetation as soon as possible. No exotic plants may be used for rehabilitation purposes, only indigenous plants of the area may be utilised. All planting work is to be undertaken by suitably experienced personnel, making use of the appropriate equipment. Establish further specifications for transplanted plants. Where trees, shrubs or other plants were removed and require replacement, plant all trees, shrubs and individual plants in designated positions. Planting should preferably be done during the rainy season. After planting, each plant must be well watered, adding more soil upon settlement if necessary. 	Contractor	

Management of Rehabilitation		
Management Actions	Responsibilities	Monitoring Requirement
<p>Grassing</p> <ul style="list-style-type: none"> • Should the Contractor adequately strip, store, protect, and replace topsoil, the construction footprint should naturally revegetate at no further cost to the Contractor. • In the event that revegetation was unsuccessful (to be determined through ECO monitoring), suitably trained personnel must undertake grassing by making use of the appropriate equipment and grass species as specified by a suitable specialist. Strictly no kikuyu to be used. • Sodding may be done at any time of the year, but seeding must be done during the summer when the germination rate is better. • Hydroseeding with a winter mix will only be specified where re-grassing is urgent, and cannot wait for the summer. • Establish further specifications for sods, runners and hand seeding. 	Contractor	
<p>Maintenance</p> <ul style="list-style-type: none"> • Monitor the re-growth of invasive vegetation, and remove alien vegetation before seed is set, during the defects and liability period. • Revegetation must match the vegetation type, which previously existed, unless otherwise indicated by a suitable specialist. • For planted areas that have failed to establish, replace plants with the same species as originally specified. 	Contractor and Developer	

Implementation Timeframe:

Throughout the duration of the construction period, as relevant to the concurrent or progressive reinstatement and rehabilitation of affected areas.
Up to end of defects liability period.

11.5 Operational Phase

11.5.1 General Environmental Management

Note that where any activity and aspect associated with the operational phase of the project coincides with the receiving environment and activities of the construction phase (see **Section 11.4**), the same management requirements will apply.

11.5.2 Management of Waste, Water Use and Energy

Management Objective:

- Minimise environmental impacts associated with waste.
- Ensure alignment with waste management plan.
- Minimise water use through recycling and water efficient practices.
- Use passive design strategies to minimise energy consumption of the hospital.

Target:

- Efficient use of water and energy.
- Adequate storage and handling of waste, aligned to the waste management hierarchy and approved waste management plan.

Management of Waste, Water Use and Energy		
Management Actions	Responsibilities	Monitoring Requirement
Waste	Applicant/Operator	<ul style="list-style-type: none"> • Health Care Waste

Management of Waste, Water Use and Energy		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> The operator of the hospital shall have a health care waste management plan in place, and the contents of that plan must comply with the Regulations relating to Health Care Waste Management in Health Establishments (GN No. R. 375 of 23 May 2014) and Polokwane LM Waste Management By-Law (Local Authority Notice 69 of 2019). Medical waste of all categories must be temporarily stored securely on site in dedicated rooms, to be collected and disposed of by an accredited service provider and be taken to a licenced hazardous waste disposal facility. Proof of such disposal must be kept on record. The agreement between the company/contractor (that will be responsible for the collection and disposal of medical waste) and the applicant, will need to be submitted to LDEDET. All general and hazardous waste temporarily stored at the waste management facility on site, should be collected, sorted, weighed and placed in skips and recycling containers for removal and disposal by an accredited service provider to an appropriate registered landfill sites (hazardous and general sites, as required). The storage areas will need to comply with the national norms and standards (GN R. 926 of 29 November 2013). Develop and implement a waste management system at the hospital, based on the waste management hierarchy of reduce, re-use, recycle. All documentation and registration on SAWIS must be in order and completed prior to operations commencing; Hospital personnel must be trained according to the hospitals approved Health Care Waste Management Plan; 		<p>Management Plan.</p> <ul style="list-style-type: none"> Waste disposal slips.

Management of Waste, Water Use and Energy		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> Waste management on site must comply with the national norms and standards (GN R. 926 of 29 November 2013) and Polokwane LM Waste Management By-Law (Local Authority Notice 69 of 2019). The operation of the mortuary on site must comply with the requirements as specified in the Regulations relating to the Management of Human Remains (GN No. R. 363 of 22 May 2013) in terms of the National Health Act, 61 of 2003. All staff must be encouraged to apply best practice in terms of waste management. 		
<p>Water Use</p> <ul style="list-style-type: none"> The following measures can be integrated, as far as reasonably possible, in order to minimise water consumption: <ul style="list-style-type: none"> Introduce water recycling methods on site (i.e. such as rainwater harvesting). Buildings to minimise water consumption. Ensure efficient fitting and fixtures for internal water and sewer reticulation networks. Ensure that leaks are fixed and reported immediately. 	Applicant/Operator	
<p>Energy</p> <ul style="list-style-type: none"> The following measures can be integrated in the design of the hospital, where possible, in order to minimise energy consumption: <ul style="list-style-type: none"> Make use of Compact Fluorescent Lamps (CFLs) and energy-efficient fittings for indoor lighting. Outside area lighting can also make use of CFLs in spotlights and floodlights; 	Applicant/Operator	

Management of Waste, Water Use and Energy		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> ○ Minimise light pollution by using luminaires that throw a focused beam or pattern of light in a downward direction; ○ Solar lighting of the interior of the buildings is preferable to electric lighting where possible; and ○ Photovoltaic (PV) cells can be integrated into the building design using PV cells to replace roof sheeting or building cladding, if feasible. 		

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.3 On-going Consultation with IAPs

Management Objective:

- Establish and maintain a record of all complaints and claims against the project and ensure that these are timeously and effectively verified and responded to.
- Adhere to agreements made with individual landowners and community members regarding communication.

Target:

- Complaints and claims are to be acknowledged and a response provided.
- Deviations from agreements made with individual landowners, as well as servitude agreements, need to be documented.

Management of On-going Consultation with IAPs		
Management Actions	Responsibilities	Monitoring Requirement
Establish lines of communications with landowners.	Applicant/Operator	<ul style="list-style-type: none"> Public complaints register; Agreements with landowners.
Establish processes and procedures to effectively verify and address complaints and claims received from IAPs.		
Complaints or liaison with landowners with regard to environmental aspects, compensation, disturbance to activities or animals, or damage to property outside servitude, must be recorded and reported to the correct person and a record of the response is to be entered in the complaints register.		
Provide the relevant contact details to landowners for queries / raising of issues or complaints.		

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.4 Pollution Control Measures

Management Objective:

- Ensure that possible causes of pollution are mitigated as far as possible to minimise environmental and social impacts to the receiving environment.

Target:

- No measurable signs of pollution.
- Approved containment and rehabilitation strategy.

Management of Pollution Control Measures		
Management Actions	Responsibilities	Monitoring Requirement
Containment and Rehabilitation Plan to be in place for pollution related impacts. The approach may require input from the authorities and affected parties.	Applicant/Operator	<ul style="list-style-type: none"> • Containment and Rehabilitation Plan; • Incident Register and Report.
All major incidents to be recorded by the Developer (or the ultimate responsible party for the infrastructure management) and must be reported to DEFF and LDEDET and other relevant authorities.		

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.5 Management of Stormwater

Management Objective:

- Prepare and implement Stormwater Management Plan for the hospital.
- Minimise stormwater runoff from the site.

Target:

- No visual evidence of erosion caused by stormwater practices.
- No environmental contamination associated with stormwater practices.

Management of Stormwater		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • Ensure stormwater infrastructure is managed and maintained in line with the stormwater management plan. • Prevent erosion associated with stormwater runoff. • No illegal discharges into the stormwater system to be allowed. • Routine cleaning, de-silting and removal of debris of stormwater channels, culverts, attenuation ponds and outlet structure to be done in alignment of Stormwater Management Plan. 	Applicant/Operator	<ul style="list-style-type: none"> • Stormwater Management Plan

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.6 Management of Storage of Hazardous Substances

Management Objective:

Ensure the protection of the natural environment and the safety of personnel at the hospital, by the correct management and handling of hazardous substances.

Target:

- No pollution due to handling, use and storage of hazardous substances.
- In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills to be cleaned within 24 hours.
- Ensure safety of personnel at the hospital.

Management of Storage and Handling of Hazardous Substances		
Management Actions	Responsibilities	Monitoring Requirement
Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (Act No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.	Applicant/Operator	<ul style="list-style-type: none"> • Evidence of spillages or leaks; • MSDS register; • Waste disposal slips (if applicable) • Training register.
A copy of the Material Safety Data Sheet (MSDS) for each hazardous substance stored or used must be available and communicated to the relevant persons who might be exposed to the hazards thereof.	Applicant/Operator	
Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination, and must adhere to the requirements stipulated on the MSDS.	Applicant/Operator	
Areas where flammable liquids are being used, applied or stored, must be effectively ventilated.	Applicant/Operator	
No person may smoke in any place in which flammable liquid is used or stored.	Applicant/Operator	

Management of Storage and Handling of Hazardous Substances		
Management Actions	Responsibilities	Monitoring Requirement
Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.	Applicant/Operator	
No flammable material (e.g. paper, cleaning rags or similar material) may be stored together with flammable liquids.	Applicant/Operator	
Staff that will be handling hazardous materials must be trained to do so.	Applicant/Operator	
All hazardous substances must be stored within a lockable store with an impermeable floor.	Applicant/Operator	
All storage tanks containing hazardous substances must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous substance.	Applicant/Operator	
Fully stocked spill kits must be available for the clean-up of hazardous substance spillages.	Applicant/Operator	
In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented. See <i>Management of Emergency Procedures</i> .	Applicant/Operator	
Hazardous substances will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling.	Applicant/Operator	

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.7 Management of Emergency Procedures

Management Objective:

- Minimise environmental impacts associated with emergency procedures.

Target:

- Approved emergency response procedures, where relevant.
- Emergency Preparedness.

Management of Emergency Procedures		
Management Actions	Responsibilities	Monitoring Requirement
<p>Fire –</p> <ul style="list-style-type: none"> • Proper emergency response procedure to be in place for dealing with fires. • Fire extinguishers must be placed in close proximity to any flammable dangerous goods. • All fire control mechanisms (firefighting equipment) shall be serviced annually and inspected monthly. 	Applicant/Operator	<ul style="list-style-type: none"> • Approved Emergency Preparedness and Response Plan; • Incident register;

Management of Emergency Procedures		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> All staff to be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire. Designated staff to have appropriate firefighting training in place. Dedicated smoking areas to be provided. 		<ul style="list-style-type: none"> Training records; Signage displayed.
<p>Accidental Leaks and Spillages –</p> <ul style="list-style-type: none"> Proper emergency response procedure to be in place and communicated to designated persons for dealing with accidental leaks and spillages. Ensure that the necessary materials and equipment for dealing with spills and leaks are available in the form of a Spill Kit/s. In the event of a hydrocarbon spill or leak, the source of the spill or leak will be isolated, contained and cleaned up immediately. All staff to be made aware of actions to be taken in case of a minor or major spillage. Provide contact details of person to be notified in a case of spillages – signage to be displayed at fuel storage areas. 	Applicant/Operator	

Implementation Timeframe:

Throughout the duration of the operational phase.

11.5.8 Management of Flora and Fauna

Management Objective:

- Control alien invasive plant species.
- Ensure the protection of animals.

Target:

- No direct / indirect harm to animals from operation;
- No encroachment of alien invasive plants and noxious weeds on site.

Management of Flora and Fauna		
Management Actions	Responsibilities	Monitoring Requirement
<p>Loss and/or degradation of floral habitat –</p> <ul style="list-style-type: none"> • All alien seedlings and saplings must be removed as they become evident for the duration of operational phase. • Manual / mechanical removal is preferred to chemical control. • Prevent contamination of natural vegetation by any pollution. • All waste generated will be stored in a temporary demarcated storage area, prior to disposal thereof at a licensed registered landfill site. • As much vegetation growth as possible should be promoted post construction activities within the project area in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous 	Applicant/Operator	<ul style="list-style-type: none"> • Encroachment of alien invasive plants and noxious weeds on site. • Successful rehabilitation. • Evidence of erosion.

Management of Flora and Fauna		
Management Actions	Responsibilities	Monitoring Requirement
<p>vegetation species as the first choice during rehabilitation. The plant material to be used for rehabilitation should be similar to what is found in the surrounding area.</p> <ul style="list-style-type: none"> • Entire footprint of area affected to be reinstated and rehabilitated. • Incorporate findings of specialists from walk-down survey (if applicable). • Seedling of many invasive plants appear all the time after construction and when they appear, they must be pulled out as soon as possible to eliminate costly tree felling at a later stage. It is easier to remove seedlings when the soil is moist. • Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment. 		
<p>Disturbance to local fauna populations –</p> <ul style="list-style-type: none"> • Animals residing within the designated area shall not be unnecessarily disturbed. However, any fauna threatened by operation activities should be removed to safety by a suitable qualified person. • Snake handling should be strictly limited to qualified staff or a dedicated external snake handler. • When accessing the facility, vehicles are to utilise the existing roads. • Ensure that no unnecessary clearing of faunal habitat occurs during maintenance activities. • No fires by maintenance personnel are allowed. • No wild animal may be fed on site. • Ensure that the facility is kept clean, tidy and free of rubbish that would attract animal pests. 	Applicant/Operator	

Management of Flora and Fauna		
Management Actions	Responsibilities	Monitoring Requirement
<ul style="list-style-type: none"> • The collection or hunting of any animals at the facility or in the surrounding areas should be strictly forbidden. • All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and small rodents. • Ensure that staff understand that no form of wildlife poaching, killing, collecting or other form of disturbance can be permitted on the construction site or the adjacent areas. • Monitoring impacts of operational activities on fauna so that adaptive management practises can be implemented if and when required. • All waste generated at the facility should be kept in scavenger proof bins and removed from site at regular intervals. • If the facility must be lit at night for security purposes, low-UV type lights (such as most LEDs), should be utilised as they do not attract insects. 		

Implementation Timeframe:

Throughout the duration of the operational phase.

11.6 Decommissioning

Post the economic lifespan of the hospital, decommissioning and rehabilitation will comply with the appropriate environmental legislation and best practices at that time.

APPENDIX A: SEARCH AND RESCUE PLAN

Action	Responsible person
Once the final site development plan has been determined the botanist/ECO will be consulted in order to finalise the plant relocation and vegetation clearing plan.	ECO/Botanist
Areas to be cleared of vegetation will be clearly demarcated before clearing commences.	Contractor
No plants should be removed from areas that will otherwise not be disturbed by the construction activities.	Contractor
All labour involved in the relocation of the plants must attend an awareness training on the significance and importance of the plant species of conservation concern.	ECO/Contractor/ Landscape Architect actor/Landscape Architect
Before the translocation takes place, all the plant species to be relocated must be photographed.	ECO/Contractor/ Landscape Architect
Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting.	ECO/Contractor/ Landscape Architect
In order to successfully remove plant species such as Boophone disticha and Aloes from the site, the soil must be loosened on all sides of the plant, without breaking or damaging the roots and bulbs, and dug out at approximately 20 - 30cm deep. A pickaxe could be used to dig out the plants and store them in potting bags/containers. This process should be supervised by a qualified individual such as a horticulturist and/or the landscape architect.	ECO/Contractor/ Landscape Architect
For each individual plant that is rescued, soil from where this species is found must be used to fill up the container bag. The soil must be packed firmly, but not too tightly to restrict water and oxygen. The plants must be watered before relocation.	ECO/Contractor/ Landscape Architect
Rescued plants must be planted into a container to be kept within a temporary nursery on site or immediately planted into the target habitat. If planted into natural habitat, it must be protected from construction activities and monitored to ensure survival. Monitoring should be undertaken on a monthly basis for two years after transplanting to evaluate the success thereof.	Contractor/ Landscape Architect
In cases where the rescued plants cannot be relocated on the same day, a nursery must be established. The Landscape Architect must inspect all plant materials on a regular basis for rodents, excessive sun, wind, or weeds. If any are identified, appropriate control measures must be applied. The nursery shall be adequately secured to prevent loss or theft of the plant species.	Contractor/Landscape Architect

Action	Responsible person
In the area designated for the replanting of these species, a hole must be dug which is slightly larger and deeper than the plant which must be placed therein. The plant must be placed in the hole and ensure that it is deep enough that the roots are covered. The plants should not be planted in straight lines, but rather randomly as in the natural environment.	ECO/Contractor/ Landscape Architect
Should there be a need to translocate these plant species off site, an agreement should be in place between the receiver and the Contractor concerned. The receiving site must be matched as closely as possible with the origin of the plants and, where possible, be placed as near as possible to where they originated.	Contractor/Receiver site
Post construction monitoring of plants relocated/translocated during search and rescue should be undertaken monthly in order to evaluate as to whether the intervention was successful or not and there should be a proper document of how many plant species were rescued and their survival rate.	ECO/Contractor/ Landscape Architect

APPENDIX B: ALIEN INVASIVE PLANT ERADICATION PLAN

Description of maintenance activity	Alien invasive plant eradication
Actions	<ul style="list-style-type: none"> • Removal of the alien invasive plants should be according to the appropriate invasive plant clearing guidelines/methods provided by the Working for Water Programme. A number of methods are used across the country for alien vegetation clearing and management. These include the following: <ul style="list-style-type: none"> ✓ Mechanical methods - felling, removing or burning invading alien plants. ✓ Chemical methods - using environmentally safe herbicides. ✓ Biological control - using species-specific insects and diseases from the alien plant's country of origin. ✓ Integrated control - combinations of the above three approaches. Often an integrated approach is required in order to prevent enormous impacts. • Alien invasive plant species should be removed manually as far as possible from the construction footprint. All work should be done by hand (manually), either by pulling, using shears, hand saws or chainsaws (depending on the size of the tree). • The use of herbicides should be avoided. • Removed alien plant material should be covered when transported to prevent it from being blown away. • It is recommended that all vegetation that was removed must be transported off-site for disposal to reduce fire hazard. • One should always consider the natural gradient of the area being cleared, all operations should follow the slope. • All manually cleared alien plants must be disposed of carefully and must not be dumped in any areas of indigenous vegetation, even temporarily. • Less dense areas should be targeted to prevent the build-up of species and the development of dense alien clumps. This will also help prevent the build-up of seed banks. • Any soil stockpiles that have become invaded should be cleared through manual control methods (weeding).

Description of maintenance activity	Alien invasive plant eradication
	<ul style="list-style-type: none"> • Introduction of alien plant species to the site should be prevented as far as practicable. Vehicles entering should be inspected, outside sources of soil and sand should be clear of alien invasive plant species. • Surveys of the site for alien invasive plant species must be conducted throughout the life of the project. These include new invasions by recorded species and new species on site.
Impact of actions	It is anticipated that clearing of alien invasive plant species will result improvement in the ecological health of the site.
Time period of maintenance activity & Monitoring	The maintenance management activity should be undertaken on a regular basis by the Contractor/Applicant after initial site clearing in order to monitor and control seedlings and regrowth.