

Application for Environmental Authorization for the
Proposed Expansion of Infrastructure at River Lodge and Drakensig Staff Village
in Kapama Private Game Reserve, Limpopo Province

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

Compiled by:



NULEAF PLANNING AND ENVIRONMENTAL PTY LTD

On behalf of:

Kapama Private Game Reserve

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ACRONYMS AND ABBREVIATIONS

BA:	Basic Assessment
BAR:	Basic Assessment Report
CDF:	Conservation Development Framework
CMP:	Construction Management Plan
DEA:	South African National Department of Environmental Affairs
DWS:	South African National Department of Water and Sanitation
EA:	Environmental Authorisation
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EMPr:	Environmental Management Programme
EMS:	Environmental Management System
EO:	Environmental Officer
I&AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
LED:	Local Economic Development
NCR:	Non-conformance Report
NEMA:	National Environmental Management Act, Act No. 107 of 1998
NEMPAA:	National Environmental Management: Protected Areas Act, Act No. 57 of 2003
OMP:	Operational Management Plan
SAHRA:	South African Heritage Resources Agency
WHO:	World Health Organisation

GLOSSARY OF TERMS

Alien Vegetation:	Alien vegetation defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations.
Alien Species:	A plant or animal species introduced from elsewhere: neither endemic nor indigenous.
Alternatives:	<p>In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:</p> <ul style="list-style-type: none">(a) The property on which or location where it is proposed to undertake the activity;(b) The type of activity to be undertaken;(c) The design or layout of activity;(d) The technology to be used in the activity; and(e) The operational aspects of the activity.
Applicant:	Any person who applies for an authorization to undertake an activity or to cause such activity to be undertaken as contemplated in the National Environmental Management Act (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 20010.
Buffer zone:	Is a collar of land that filters out inappropriate influences from surrounding activities, also known as edge effects, including the effects of invasive plant and animal species, physical damage and soil compaction caused by trampling and harvesting, abiotic habitat alterations and pollution. Buffer zones can also provide more landscape needed for ecological processes, such as fire.
Construction Activity:	Any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.
Construction Camp:	is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;
Ecology:	The study of the inter relationships between organisms and their environments.
Environment:	All physical, chemical and biological factors and conditions that influence an object and/or organism.
Environmental Impact:	An Impact or Environmental Impact is the degree of change to the environment, whether desirable or undesirable, that will result from the effect of a defined activity. An Impact may be the direct or indirect consequence of an activity and may be simple or cumulative in nature.

Environmental Impact Assessment:	Assessment of the effects of a development on the environment.
Environmental Management Programme:	A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.
Indigenous:	Means a species that occurs, or has historically occurred, naturally in a free state within the borders of South Africa. Species that have been introduced to South Africa as a result of human activity are excluded (South Africa (Republic) National Environmental Management: Biodiversity Act, 2004: Chapter 1).
Interested and Affected Party:	Any person, group of persons or organization interested in or affected by an activity contemplated in an application, or any organ of state that may have jurisdiction over any aspect of the activity.
Invasive vegetation:	Plant species that show the potential to occupy in unnatural numbers, any disturbed area, including pioneer species.
Public Participation:	The legislated process contemplated in terms GN R543, in which all potential interested and affected parties are informed of the proposed project and afforded the opportunity to input, comment and object. Specific requirements are listed in terms of advertising and making draft reports available for comment.
Road Reserve:	The road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.
Road Width:	The area within the Road Reserve including all areas beyond the Road Reserve that are affected by the continuous presence of the road i.e. the verge.
Mitigate:	The implementation of practical measures to reduce adverse impacts Public Participation Process: is a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.
Non-conformance Report:	A Non-Conformance Report is a construction related document issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr.
Red data plant species:	Are fauna and flora species that require environmental protection based on the World Conservation Union (IUCN) categories and criteria.
ROD:	Record of Decision pertaining to the Application for Environmental Authorisation issued by the Competent Authority. The RoD is legally binding on the Applicant and may contain a positive or negative decision on the Application as well as conditions and provisions for each.

Soil Compaction:	Mechanically increasing the density of the soil, vehicle passage or any other type of loading. Wet soils compact easier than moist or dry soils.
Species:	Means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind. The term "species" include any sub-species, cultivar, variety, geographic race, strain, and hybrid or geographically separate population (South Africa [Republic] National Environmental Management: Biodiversity Act, 2004: Chapter 1).
The Contractor:	The contractor, as the developers agent on site, is bound by the ROD and EMP conditions through his/her contract with the developer, and is responsible for ensuring that conditions of the EMP and ROD are strictly adhered to at all times. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site agent in terms of the EMPr.
The Developer:	Remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP and the conditions of the Environmental Decision throughout all phases of the project.
The Environmental Control Officer (ECO):	The ECO is appointed by the developer as an independent monitor of the implementation of the EMP i.e. independent of the developer and contractor.
The Environmental Officer (EO):	The Contractor shall submit to the Site Agent a nominated representative of the Contractor as an EO to assist with day to day monitoring of the construction activities for the contract.
Vegetation:	Is a collective word for plants occurring in an area.
Vulnerable:	A taxon is 'Vulnerable' when it is not 'Critically Endangered' or 'Endangered' but is facing a high risk of extinction in the wild in the medium term future.
Watercourse:	A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may by notice in the Government Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks" (South Africa [Republic] National Water Act, 1998).

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APPENDICES

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SECTION A: GENERAL

1. INTRODUCTION

A key requirement of the National Environmental Management Act (NEMA) of 1998 is compliance with the principles of Integrated Environmental Management (IEM). Chapter Five of NEMA deals with IEM and its objective to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities.

Among these tools are Environmental Impact Assessments (EIAs) and Environmental Management Programmes (EMPr's). In compliance with the above mentioned environmental legislation, the Department of Environmental Affairs (DEA) requires that the Applicant undertake a Basic Assessment (BA) for the proposed development, and that the Basic Assessment Report (BAR) includes a detailed EMPr.

The EMPr typically becomes part of the Environmental Authorization (EA) prepared by the relevant environmental authority and becomes the basis for monitoring compliance with the recommendations of the EIA both during the Construction and Operational Phases.

The Environmental Management Programme (EMPr) addresses the construction and operational phases of the project. It serves as a stand-alone document to be disseminated to and used by the contractor, lodge manager and others involved in the construction and/or operational phases of the development.

It should be noted that the guidelines listed hereunder are not to be considered finite. Experience has shown that additional environmental issues are bound to arise as the project unfolds. When this happens, the Environmental Management Programme (EMPr) must be updated accordingly.

The Environmental Management Programme will ensure that the environmental commitments sketched as mitigation measures in the BA are adhered to. In addition, the EMPr can be used to evaluate the effectiveness of mitigation measures.

2. DETAILS AND EXPERTISE OF EAP

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Expertise	Environmental Assessment Practitioner, EAPASA Registered 2019/655

Please refer to Appendix A for EAP curriculum vitae.

3. BACKGROUND

The proposed development entails the expansion of various infrastructure at River Lodge and Drakensig Staff Village within Kapama Private Game Reserve. The expansion at River Lodge will consist of the construction of the following:

- A low impact walkway from the existing complex to the new dining room and kitchen
- Additional staff accommodation
 - Single storey
 - 18 rooms sleeping 28 staff members
- Laundry room

The infrastructure at Drakensig will comprise of

- Additional staff accommodation
 - Double storey building consisting of 24 rooms sleeping 24 staff
 - Four cluster 3 bedroom houses sleeping 24
- A solar plant with a 750 kW output

4. ROLES AND RESPONSIBILITIES

4.1 Parties responsibilities

Party	Responsibility
Applicant	<ul style="list-style-type: none"> • Ensure adherence to, and compliance with, the EMPr in a legal and timely manner. This relates to all phases of the project lifecycle. • Appoint an Independent Environmental Control Officer (ECO) during both Construction and Operation Phases. • Ensure that a monitoring programme is drafted and implemented to assess compliance with the EMPr during the construction phase. • Ensure that contractors and operators undertake to adhere to the provisions of the EMPr as part of their respective contracts. • Ensure that independent Environmental Audits, including a Post Construction Close-Out audit is undertaken. The results of all audits must be forwarded to the Environmental Authority within 30 days after completion of the audit. • Ensure that all monitoring and audit reports are submitted to the Environmental Authority and that the contractor and operator implement recommendations. • Ensure that the EMPr is included as part of the tender documentation and / or included within any service level agreements made, thereby making it part of the enquiry document to make the recommendations & constraints as set out in this document, enforceable under the general conditions of contract.
Contractor	<ul style="list-style-type: none"> • Development of an Environmental Method Statement to be submitted and approved by the ECO. See point 4.2 below for more information. • Ensure adherence to, and compliance with, the Construction EMPr in a legal and timely manner. • Ensure that all staff members, sub-contractors and suppliers have a comprehensive understanding of the EMPr and adhere to the provisions for the duration of the construction phase. • Designate a permanent Environmental Officer (EO) to monitor environmental compliance on a day-to-day basis on the construction site.

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	<ul style="list-style-type: none"> • Ensure that all staff members, sub-contractors and suppliers are aware of the environmental issues relating to the construction activities that they are undertaking on site and of all mitigating and precautionary measures that must be implemented. • Ensure that training is undertaken for construction supervisors and crews to recognise environmental 'red flags' and ensure that these will: <ul style="list-style-type: none"> ○ not be disturbed, damaged or removed and ○ Be brought to the immediate attention of the EO or ECO to determine an action plan and way forward. • Develop a layout of the operations of the construction site indicating the position of all construction activities, including but not limited to: offices, ablution facilities, storage areas, workshops, batching plant, stockpile areas, waste disposal facilities, hazardous substance storage area, access routes, etc. This layout plan is to be submitted to the ECO for acceptance prior to site establishment. Any changes to this plan will need to be reviewed in conjunction with the ECO. • Ensure that all recommendations made in monitoring and audit reports are implemented throughout the construction phase. • Accept liability for any and all Work required in terms of the environmental specifications, resulting from environmental negligence, mismanagement and / or non-compliance.
Operator	<ul style="list-style-type: none"> • Ensure adherence to, and compliance with, the Operational EMPr in a legal and timely manner. • Ensure that all staff members and suppliers have a comprehensive understanding of the EMPr and adhere to the provisions for the duration of the operational phase. • Designate an Environmental Officer (EO) to monitor environmental compliance on a day-to-day basis. • Ensure that all staff members and suppliers are aware of potential environmental issues and of all mitigating and precautionary measures that must be implemented. • Ensure that staff members and suppliers are able to recognise environmental 'red flags' and ensure that these will: <ul style="list-style-type: none"> ○ Not be disturbed, damaged or removed; and ○ Be brought to the immediate attention of the EO or ECO to determine an action plan and way forward. • Ensure that all recommendations made in monitoring and audit reports are implemented throughout the operational phase. • Accept liability for any and all Work required in terms of the environmental specifications, resulting from environmental negligence, mismanagement and / or non-compliance.
Environmental Officer (EO)	<ul style="list-style-type: none"> • Manage the day-to-day on-site implementation of the environmental specifications during the construction and operational phases, and provide support and input where required. • Compile regular (usually weekly) monitoring reports for submission to the contractor / operator, and copied to the ECO. • Act as liaison and advisor on all environmental and related issues, and seek advice from the ECO where required. • Understand the provisions and limitations of the project in terms of the EMPr and relevant regulations (such as NEMA and NEMWA) and provide advice accordingly. • Respond to incidents and keep records and reports as required.
Environmental Control Officer (ECO)	<ul style="list-style-type: none"> • Understand, interpret, monitor, audit and implement the EMPr from the "cradle to grave" stage. • Retain independence and report on environmental compliance in an objective manner. • Explain the contents of the EMPr to the Contractor, the site staff, supervisors,

	<p>operators and any other relevant personnel or I&A's as required.</p> <ul style="list-style-type: none"> • Undertake environmental audits for the duration of the construction and operational phases as required. • Act as quality controller regarding all environmental concerns by conducting periodic site inspections, attending regular site meetings, pre-empting problems, suggesting mitigation and being available to advice on incidental issues that arise. • Submit audit reports to the applicant, contractor / operator and the Environmental Authority, including performance rating, recommendations and reports of non-compliance.
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4.2 Contractors Environmental Method Statement

Method Statements are written submissions to the ECO by the Contractor in collaboration with the assigned EO, in response to a request by the ECO. The Method Statements should set out the plant, materials, labour and method that the contractor proposes using to carry out the intended construction activities. The Method Statement should contain the appropriate detail such that the ECO is able to assess whether the Contractor's proposal is in accordance with the requirements of this EMP. The contractor must sign the Method Statement along with the ECO to formalize the approved Method Statement.

The Method Statements must be submitted to the ECO for approval at least one month prior to the commencement of the any construction activity, including clearing. Any changes to the method of works must be reflected by amendments to the original approved Method Statement as is needed. Any changes in this regard must be approved by the ECO, understanding that such changes are environmentally acceptable and in line with the requirements of this EMP.

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, the Method Statement should briefly detail how and when a process will be carried out, the possible dangers/risks, and the methods of control required. This should be detailed for the following:

- Type of construction activity;
- Timing and location of the activity;
- Construction procedures for the following specific activities;
 - Bunding;
 - Blasting;
 - Construction site and office/yard establishment;
 - Cement mixing / concrete batching/bentonite mixing;
 - Contaminated water;
 - Dust management;
 - Environmental awareness course(s);
 - Environmental monitoring;
 - Erosion control;
 - Fire, hazardous and/or poisonous substances including their storage;
 - Personnel, public and animal safety;
 - Rehabilitation of modified environment(s);
 - Solid and liquid waste management;
 - Sources of materials (including MSDSs);
 - Top-soil management;
 - Storm water Management.
- Materials and equipment to be used;
- Transportation of the equipment to / from site;

- How equipment/material will be moved while on site;
- Location and extent of construction site office and storage areas;
- Identification of impacts that might result from the construction activity;
- Methodology and/or specifications for impact prevention / containment;
- Methodology for environmental monitoring;
- Emergency/disaster incident and reaction procedures; and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statement and this EMP.

5. COMPLIANCE

Compliance involves actions and programmes designed to ensure that all relevant environmental laws, legislation, standards and other requirements such as permits are followed and adhered to.

5.1 Environmental monitoring and auditing

Environmental monitoring is the continuous evaluation of the status and condition of environmental elements, whereas, environmental auditing is the process of comparing the impacts predicted with those which have actually occurred during implementation.

The key to a successful Environmental Management System (EMS) is regular monitoring to identify and implement corrective measures in a timely manner and independent auditing to evaluate successful compliance with environmental specifications and outcomes. The ultimate purpose of environmental monitoring and auditing is to confirm that all relevant programmes, legislation, laws and policies are adhered to and abided by and that the environmental specifications are being implemented in an effective and correct manner. Monitoring and auditing is intended to promote environmental best practice, ensure protection of resources and support sustainable development.

5.2 Monitoring Methods

In order to ensure that the above objectives are met, the following monitoring methods will be employed:

- Aspect monitoring (such as water quality);
- Incident reporting;
- Site inspections;
- Site monitoring and reporting;
- Independent external auditing.

5.3 Timeframes/ Frequency

Site monitoring should be undertaken daily on an on-going basis throughout the project lifecycle. External auditing should take place every 4-6 weeks during the construction period, every 3 months during the rehabilitation period and annually during the operational period.

The completed monitoring reports should be submitted to all relevant parties, including the ECO who will conduct audits at regular intervals. Audit reports will, in turn, be submitted to all relevant parties, including the EO, who will drive the implementation of recommendations.

5.4 Non-compliance

Failure by the contractor, operator and their staff and suppliers to comply with all relevant programmes laws, legislation, policies and mitigation measures laid out in this EMPr will result in the following actions and consequences:

- Notifications will be issued in monitoring and auditing reports advising of failure to adhere to the measures stipulated in the BA/EIA/EMPr.
- Failure to comply / respond to notifications and recommendations within a specified timeframe will result in written warning being issued.
- Failure to comply / respond to warnings within a specified timeframe will result in fines being issued.
- Continued and wilful failure to comply / respond will result in a Non-conformance Report being issued to the Contractor.

5.5 Non-conformance

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the non-conformance issues.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account;
- Agreed timeframe by which the actions documented in the NCR must be carried out; and
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor should sign the Close-Out portion of the Non-conformance
- Form and file it with the contract documentation.

5.6 On-site documentation

An Environmental File including the following documentation (if applicable) must be kept on site during construction:

- EMPr;
- Environmental Authorization;
- Licenses/permits related to any other legislation;
- Specialist rehabilitation plans;
- Storm Water Management Plan;
- Flood Assessment Plan;

- Environmental Method statements compiled by the Contractor;
- Site Layout Plan
- Letter of appointment of ECO
- Written Notice of Commencement of construction
- Non-conformance Reports;
- Environmental register, which must include the following, but not limited to such:
 - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR); and
 - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
 - Safe disposal certificate for all types of waste disposed off-site;
 - Environmental training records;
 - Waste disposal receipts from a registered landfill site;
 - Material Safety Data Sheets for all hazardous substances;
 - Method Statements; and
 - Notification of Emergencies and Incidents

6. ENVIRONMENTAL AWARENESS

An environmental awareness plan must be implemented for both the construction and operational phases. The approved EMPr will provide the basis of the information to be supplied, as well as any other relevant documentation, including any specialist reports.

All construction and operational staff, as well as, suppliers and regular out-sourced contractors will be required to attend a general orientation session prior to the commencement of any activities. All impacts that could potentially arise and affect the environment will be discussed and explained in detail, as well as required mitigation measures. The consequences of not following the mitigation measures as stipulated in the EMPr (i.e. non-compliance) will also be addressed.

All permanent staff must receive detailed training relative to their specific job description. This training will focus on the environmental issues and impacts that are directly linked to their activities. Staff will be briefed on the correct protocol and procedures to follow in the event of an incident or accident (spill, fire etc.) in order to minimize and contain the damage.

In addition, staff will be required to report all incidents so that the appropriate mitigation measures can be implemented in a timely manner.

Contractor to provide the ECO with proof of environmental training records upon the commencement of construction.

SECTION B: MANAGEMENT PLANS

The mitigation and recommendations contained in the Management Plans that follow have been based on best environmental practice and have been supplemented with specialist recommendations extracted from specialist reports developed in support of the Environmental Impact Assessment process for this project.

7. PLANNING AND DESIGN MANAGEMENT PLAN

The Planning Management Plan (PMP) addresses all aspects of the planning and design phase, such as the detailed architectural, infrastructural and engineering services layout and design. All members of the planning and design team are to be in possession of this Management Plan and must be aware of the environmental aspects, risks and mitigation measures.

7.1 Hydrology

7.1.1 Ground water

To ensure protection of ground water resources via legislative requirements.

Mitigation:

- All boreholes to be used for potable water extraction will be registered as per DWS requirements.
- The Water Use license for the property will be in place and up to date for the lifetime of the development.
- All overland discharge of excess purified effluent (if required) will be undertaken in a controlled manner that does not cause erosion.
- Water saving devices such as low flow shower heads and taps, and the use of grey water for activities such as road wetting and irrigation should be installed

Timeframes and Deliverables:

- i. All above mitigations measures to be in place prior to commencement of construction activities.*

7.1.2 Surface water

To ensure protection of all surface hydrology (rivers, streams, drainage lines, wetlands etc.) in terms of ecological and hydrological function through careful planning.

Mitigation:

- Buildings and other hardened surface infrastructure (including storm water attenuation measures) will be located outside of buffered watercourses with the exception of the walkway.
- The sensitivity map must be used as a decision tool to guide the layout design for the staff accommodation, solar facility, laundry room and walkway. Development in areas of high environmental sensitivity must be avoided.
- No purified effluent will be discharged directly into any watercourse without the appropriate Water Use Licence in place.
- All permanent structures and infrastructure must be located outside/above of the 1:100 year floodline if possible.
- If development within the riparian zone is unavoidable due to terrain, access or substrate, the proposed infrastructure must comply with the following mitigation measures and recommendations:
 - No canopy (tall) trees to be removed. All infrastructure to be designed around them;
 - Access to the construction site within the riparian zone will only be from the terrestrial side, not from the drainage line / river bed itself;
 - All lay-down and stockpile areas and equipment storage to be situated outside the riparian zone;
 - All reasonable measures to be taken during construction to stabilise steep banks in the riparian zone against erosion and collapse;

- An ECO must be appointed to supervise and guide construction workers.

Timeframes and Deliverables:

- i. All above mitigations measures to be in place prior to commencement of construction activities.

7.2. Biodiversity Management

7.2.1 Soil

To prevent undue erosion via careful planning and design.

Mitigation:

- All overland discharge of excess purified effluent (if required) will be undertaken in a controlled manner that does not cause erosion.
- Remove only vegetation essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.
- Measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.
- The accumulation of water on the surface must be prevented. The drainage of the surface should be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
- Surface water or storm water is not permitted to canalize or be concentrated.
- Dissipate concentrated storm water flows through energy dissipaters or vegetated areas.

Timeframes and Deliverables:

- i. All above mitigations measures to be in place prior to commencement of construction activities.

7.2.2 Biodiversity (Flora): Loss of vegetation and CBAs and disturbance of sensitive habitats

To prevent the loss of Granite Lowveld Vegetation (LT) and critical biodiversity areas, as well as, disturbance to sensitive habitats (riparian vegetation) owing to the placement of infrastructure.

Mitigation:

- The development of the additional staff accommodation, laundry room, solar facility and walkway will not commence until a walk-through inspection has been undertaken by a qualified ecologist to identify any protected plants or plants species of conservation concern.
- Buildings and other hardened surface infrastructure (including storm water attenuation measures) will be located outside of buffered watercourses.
- The sensitivity map must be used as a decision tool to guide the layout design for the staff accommodation, solar facility, laundry room and walkway. Development in areas of high environmental sensitivity must be avoided.
- The location of structures and infrastructure will be consolidated so as to localise and contain the development footprint as much as possible. All areas beyond the development footprint will be retained as natural / conservation landscape.
- No construction camps should be allowed in or within 20m of riparian areas.
- The final layout of roads, buildings and infrastructure will be refined so these are located within natural bush clearings rather than removing vegetation to make way for infrastructure. This will allow the development to blend in with the receiving environment to a greater extent both visually and ecologically.
- No manicured landscape or gardening is permitted. All areas beyond the development footprint are to be rehabilitated as natural bush using appropriate endemic species.

- The internal road network will be developed as gravel tracks that allow for faunal dispersal and minimize fragmentation of ecologically sensitive areas.
- Leave as much of the natural vegetation intact as possible.
- All permanent structures and infrastructure must be located outside/above of the 1:100 year floodline if possible.
- If development within the riparian zone is unavoidable due to terrain, access or substrate, the proposed infrastructure must comply with the following mitigation measures and recommendations:
 - No canopy (tall) trees to be removed. All infrastructure to be designed around them;
 - Access to the construction site within the riparian zone will only be from the terrestrial side, not from the drainage line / river bed itself;
 - All lay-down and stockpile areas and equipment storage to be situated outside the riparian zone;
 - All reasonable measures to be taken during construction to stabilise steep banks in the riparian zone against erosion and collapse;
 - An ECO must be appointed to supervise and guide construction workers.

Timeframes and Deliverables:

- i. *All above mitigations measures to be in place prior to commencement of construction activities.*
- ii. *The walk-through inspection by a qualified ecologist will take place one month prior to the start of construction, including any clearing.*

7.2.3 Biodiversity (Flora): Conservation important species

To prevent the destruction and damage to conservation important species and protected trees i.e. Elaeodendron transvaalense, Dalbergia melanoxylon, Sclerocarya birrea subsp. Caffra and Balanites maughamii subsp. Maughamii, Combretum imberbe, Ansellia Africana, Spirostachys africana through careful planning and design.

Mitigation:

- Prior to any construction at any of the sites, an experienced botanist must conduct a walk-through, marking each plant species of conservation concern to be avoided or that may need to be relocated prior to any site clearance activity taking place.
- The trees *Elaeodendron transvaalense*, *Sclerocarya birrea subsp. caffra* and *Balanites maughamii subsp. maughamii* are nationally protected and *Spirostachys africana* is protected under provincial legislation. All development must take place around these trees and that they be left untouched. If this is unavoidable then destruction permits from the relevant authorities will have to be applied for.
- The sensitivity map must be used as a decision tool to guide the layout design for the staff accommodation, solar facility, laundry room and walkway. Development on areas of high environmental sensitivity must be avoided.
- The location of structures and infrastructure will be consolidated so as to localise and contain the development footprint as much as possible. All areas beyond the development footprint will be retained as natural / conservation landscape.
- The final layout of roads, buildings and infrastructure will be refined so these are located within natural bush clearings rather than removing vegetation to make way for infrastructure. This will allow the development to blend in with the receiving environment to a greater extent both visually and ecologically.

Timeframes and Deliverables:

- i. *All above mitigations measures to be in place prior to commencement of construction activities.*
- ii. *The walk-through inspection by a qualified ecologist will take place one month prior to the start of construction, including any clearing.*

7.2.4 Biodiversity (Fauna): Habitat fragmentation and injury/mortality

To prevent faunal habitat fragmentation due to removal and alteration of the habitat.

Mitigation:

- The location of structures and infrastructure will be consolidated so as to localise and contain the development footprint as much as possible. All areas beyond the development footprint will be retained as natural / conservation landscape.
- The final layout of roads, buildings and infrastructure will be refined so these are located within natural bush clearings rather than removing vegetation to make way for infrastructure. This will allow the development to blend in with the receiving environment to a greater extent both visually and ecologically.
- No manicured landscape or gardening is permitted. All areas beyond the development footprint are to be rehabilitated as natural bush using appropriate endemic species.
- The internal road network will be developed as gravel tracks that allow for faunal dispersal and minimize fragmentation of ecologically sensitive areas.
- Leave as much of the natural vegetation intact as possible.
- Solar facilities should ideally be situated in areas that are already degraded or transformed.
- The use of Photovoltaic (PV) systems is preferred over Concentrated Solar Power (CSP) systems as their impact on avifauna is far less.
- All infrastructure should be designed to minimise the impact on birds. This could include constructing solar infrastructure in areas that are already disturbed, minimising the use of lights that may attract insects (and therefore insectivorous birds) and marking of fences and powerlines to minimise collisions.
- Adequate bird deterrents should be employed, such as fencing off the solar facility and clearly marking powerlines

Timeframes and Deliverables:

- i. All above mitigations measures to be in place prior to commencement of construction activities.*

7.2.5 Visual impact

To prevent a visual impact on the visual quality of the surrounding area due to development in an otherwise natural environment.

Mitigation:

- Earth tones and natural materials must be used rather than primary colours and high-tech finishes.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Suitable paint colours on steel roofs will be used reduce the impact of glare from sunlight.
- Earthy, muted colours will be used and avoid pastel and primary colours.
- Natural, non-reflective, earthy materials will be used rather than high-tech reflective materials.
- Large expanses of glass will be avoided. Where glass is used, ensure that this is tilted and tinted to reduce glare.
- No manicured landscape or gardening is permitted. All areas beyond the development footprint are to be rehabilitated as natural bush using appropriate endemic species.
- Sources of light must be shielded by physical barriers (walls, vegetation, or the structure itself).
- Limit mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights.
- Use only minimum lumen or wattage in fixtures.
- Use only down-lighters, or shielded fixtures.
- Low Pressure Sodium lighting must be used or other types of low impact lighting.
- Motion detectors must be used on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

Timeframes and Deliverables:

- i. *All above mitigations measures to be in place prior to commencement of construction activities.*

8. CONSTRUCTION MANAGEMENT PLAN

The Construction Management Plan (CMP) addresses the environmental risks and impacts associated with the construction phase. This plan must be adhered to at all times during the construction phase.

It is the responsibility of the contractor, in conjunction with EO and ECO, to educate, inform and foster a sound understanding of the CMP in all staff, sub-contractors, suppliers etc. Strict adherence to the CMP must be enforced and monitored.

An 'Environmental Site Book' should be supplied and kept on site. This site book should be in the form of a file and will house all environmental status reports as compiled by the ECO. All issues and proposed actions as noted by the ECO during site visits will also be documented in the site book. The EMP, as well as, a copy of the environmental sensitivity plans and construction layout plan must be available onsite.

8.1 Site establishment

8.1.1 Planning and preparation

To prevent environmental damage during pre-construction activities

Mitigation:

- An independent Ecological Control Officer (ECO) will be appointed to oversee construction.
- A permanent Environmental Officer (EO) will be designated to monitor environmental compliance on a day-to-day basis on the construction site.
- The ECO must be consulted to identify possible suitable construction site camps (to be verified by a qualified botanist).
- Based on the ECO's recommendations for preferred sites, the contractor will develop a plan of the operations of the construction site indicating the position of all construction activities, including but not limited to: offices, ablution facilities, storage areas, workshops, batching plant, stockpile areas, waste disposal facilities, hazardous substance storage area, access routes, etc. This layout plan is to be submitted to the ECO for acceptance prior to site establishment. Any changes to this plan will need to be reviewed in conjunction with the ECO.
- No construction camps are allowed in or within 20m of riparian areas.
- Operation and storage of equipment in the riparian and/or wetland areas is not permitted.
- Prior to any construction at any of the sites, an experienced botanist must conduct a walk-through, marking each plant species of conservation concern to be avoided or that may need to be relocated prior to any site clearance activity taking place.
- The contractor will develop a management and monitoring programme for alien and invasive species detailing basic ID information, actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- The contractor will ensure that his construction staff are briefed as to the provisions of the EMP.
- An Environmental Awareness Plan must be presented before the commencement of any construction activities. All construction staff must be aware of the biodiversity importance of the area (pertaining to all development areas);

- The contractor must comply at all times with the Occupational Health and Safety Act and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
- Construction activities will only commence once the Contractors method statement has been approved by the ECO.
- The contractor is to provide the scheduling for construction to the ECO prior to commencement of construction. Should this schedule change, the contractor is to send a revised schedule to the ECO.

Timeframes and Deliverables:

- All above mitigations measures to be in place prior to commencement of construction activities.*
- Independent ECO to be appointed at least 3 months prior to the commencement of construction. Appointment letter to be submitted to the Department with the 14 day notification of intent to construct.*
- Name and details of EO to be provided to the ECO at least a month prior to commencement of construction.*
- Layout plan of operations of the site to be submitted to the ECO for approval at least a month prior to the commencement of construction.*
- The alien plant control plan to be developed and adopted within 6 months of the EA being approved prior to the commencement of construction. All mitigations as recommended in the ACP are to be adhered to throughout the construction period.*
- Contractor to submit construction schedule to ECO for approval at least a month prior to commencement of construction.*
- Intended construction hours are to be submitted to the ECO at least one month prior to commencement of construction.*

8.1.2. Site demarcation

To prevent site facilities, structures and infrastructure imposing on the surrounding environment ensuring that the construction footprint is kept to a minimum in order to conserve and protect plant and animal species, as well as, habitats.

Mitigations:

- Minimize the construction footprint and where possible, restrict all construction related activities to previously disturbed areas or transformed vegetation.
- A perimeter fence or suitable perimeter demarcation (such as steel droppers and hessian rope) must be erected around the construction works areas.
- Identified sensitive environments will be demarcated as No-go zones, where no construction activities or staff are permitted.
- Demarcate vegetation and other site features to be retained with danger tape and / or fencing as required. This barrier to be at least 2m from the stem of the specimen / feature.
- Establish and maintain site demarcations for the duration of the construction phase. Ensure that materials do not blow or move outside of the demarcation line.
- Clearly indicate which activities are to take place in which areas within the site e.g. the mixing of cement, stockpiling of materials etc. Limit these activities to single sites wherever possible.

Timeframes and Deliverables:

- All above mitigations measures to be in place prior to commencement of construction activities.*
- Site perimeter fencing, demarcation of no-go zones, vegetation and other site features to be in place prior to the pre-site inspection and commencement of any clearing activities. These are to be inspected by the ECO during the pre-site inspection.*

8.1.3. Staff management

To ensure that all construction staff and contractors are aware of what is expected of them in terms of conduct and environmental performance.

Mitigations:

- The contractor must ensure that his construction staff is briefed as to the provisions of the EMP.
- An Environmental Awareness Plan must be presented before the commencement of any construction activities. All construction staff must be aware of the biodiversity importance of the area (pertaining to all development areas).
- The contractor must comply at all times with the Occupational Health and Safety Act and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
- Construction activities may only commence once the Contractors method statements have been approved by the ECO.
- All construction staff need to be accommodated off-site and driven to site each day. No construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.
- Should the accommodation of staff off-site not be possible then approval first needs to be obtained from the ECO. Should approval be granted then the following needs to be implemented:
 - A plan showing the layout of the construction camp and associated infrastructure must be developed by the contractor and submitted to the ECO for approval prior to the commencement of construction.
 - The construction camp must be located, where possible, in a previously disturbed area, at least 100m away from any water course/drainage lines and must not be situated on a floodplain or slopes greater than 1:3.
 - No permanent infrastructure will be erected in the construction camp.
 - Vegetation and trees to be retained must not be damaged or felled.
 - Accommodation of personnel is to include both kitchen and sanitary facilities.
 - Approval to make fires in camp need to be first approved by the ECO and Management Authority. Should approval be obtained, fires will only be allowed in facilities especially constructed for the purpose and no trees may be specifically felled for obtaining firewood. All fires are to be extinguished properly following use.
 - Adequate ablution should be supplied to the site staff. The location of these must be approved by the ECO. Under no circumstances may open areas or surrounding bush be used as a toilet facility.
 - Regular inspections must be carried out to ensure toilets are kept clean.
 - Portable water must be supplied. This will be utilized for drinking, cooking and ablution. Great care is required and should be taken to ensure that the water supply is not contaminated in any way.
 - All waste water, as a result of showing facilities and kitchen clean-up areas, etc. needs to be directed into a temporary soak away. The soak away needs to be located at least 100m away from any wetland, watercourse or drainage line. Under no circumstances is waste water allowed to be discharged overland.
 - Bins and/or skips must be provided at convenient intervals for disposal of waste within the construction camp. Refuse generated from the campsite, construction area, storage area or any other area must be collected and placed in a suitably closed container daily. Once full, the refuse container must be emptied and contents disposed of at a licensed facility.
 - The affected area needs to be fully rehabilitated following completion of construction.
- Staff can be transported in open vehicles, as long as the vehicles have built up sides, with a cover or roof of some sort.
- Designate an area for food preparation and consumption and ensure that facilities are available to properly store, prepare and consume food, as well as to wash up afterwards.
- Food and utensils must be properly stored away, and may not be left lying around.

Timeframes and Deliverables:

- i. All above mitigations measures to be in place prior to commencement of construction activities.*
- ii. Contractor to provide ECO with proof of environmental awareness training records upon the commencement of construction.*

- iii. *The Method Statements must be submitted to the ECO for approval at least 1 month prior to the commencement of the any construction activity, including clearing.*
- iv. *All required on-site documentation (if applicable) as listed in Section 5.5 must be located on site at all times. ECO to inspect during pre-site inspection and at every audit.*

8.1.4. Access roads

To prevent site access routes from creating or impacting unnecessary damage on the surrounding environment and existing surrounding road networks ensuring that the construction footprint is kept to a minimum.

Mitigations:

- Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
- Construction access roads should not be wider than necessary with a maximum width of 3m.
- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes only.
- Damage caused to public roads by the construction related activities, including heavy vehicles, must be repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor.

Timeframes and Deliverables:

- i. *All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.2 Hydrology

8.2.1 Groundwater

To ensure that measures are put in place to prevent the waste of water during the construction phase and prevent/reduce the pollution and contamination of ground water owing to unmanaged storm water runoff, sewage leaks, spills and discharge, as well as, discharge and spills of solvents, paints ,chemicals, fuel etc.

Mitigations:

- The Water Use license for the property will be in place and up to date for the lifetime of the development.
- All construction staff will be trained in water wise principles, and prudent use of water will be practiced at all times for the construction of the development.
- Water saving measures will be implemented where possible an practical.
- Leak detection systems will be installed during routine maintenance and upgrades and any leaks promptly attended to.
- Water consumption will be monitored on a monthly basis to ensure that there is no undue waste. Keep up to date records of water monitoring.
- Clearly indicate which activities are to take place in which areas within the site e.g. the mixing of cement, stockpiling of materials etc. Limit these activities to single sites wherever possible.
- The Contractor must take reasonable precautions to prevent the pollution of the ground and / or water resources on and adjacent to the site as a result of his activities.
- A drainage diversion system will be installed to divert clean runoff around areas of potential pollution, e.g. batching areas, workshops, etc.
- Polluted runoff and waste water emanating from the construction site will be diverted into a collection system (e.g. sump, attenuation dam, PVC porta-ponds, etc.) for treatment or collection and disposal.
- Collected contaminated runoff / wastewater is to be pumped out of the final collection point and disposed of at an appropriate waste disposal site. Sump liners are to be treated in the same manner.

- The Contractor is encouraged to recycle dirty wash water to minimise the amount to be removed off-site.
- The Contractor may discharge 'clean' silt laden water overland and allow this water to filter into the ground. However, he shall ensure that he does not cause erosion as a result of any overland discharge.
- Concrete and cement works will be undertaken in specified areas only.
- All operations that involve the use of cement and concrete will be carefully controlled. Water and slurry from concrete mixing operations must be contained to prevent pollution of the ground surrounding the mixing points.
- Plastic trays or liners will be used when mixing cement and concrete: Do not mix cement and concrete directly on the ground.
- Excess concrete from mixing must be deposited in a designated area awaiting removal to an approved landfill site.
- All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.
- A storm water management plan will be compiled and adopted within 6 months of the EA being approved.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- All hazardous substances will be used and handled by qualified personnel on bunded surfaces.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by KPGR.
- No smoking is allowed inside the stores or within 3m of a bund.
- The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores.
- Fuels and chemicals may not be stored under trees.
- Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is minimised.
- A spills containment kit must be kept on site at all times for the duration of the construction phase.
- Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place only within properly equipped, bunded maintenance areas or workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented continuously throughout the duration of construction.
- ii. Water consumption monitoring records are to be provided to the ECO on a monthly basis.
- iii. Waste disposal receipts from a registered hazardous waste disposal site must be onsite at all times for all hazardous waste removed from the site. These are to be provided to the ECO on a monthly basis.
- iv. Waste disposal receipts from a registered landfill site must be onsite at all times for all construction waste removed from the site. These are to be provided to the ECO on a monthly basis.
- v. A list of all hazardous substances and Material Safety Data Sheets for all hazardous substances to be stored on site is to be provided to the ECO at the commencement of construction.
- vi. Spill containment kit to be on site prior to the commencement of construction.

8.2.2 Surface water: : Ecological and hydrological Function

To ensure that measures are put in place to prevent disturbance and loss of ecological and hydrological functions along the dam, drainage lines due to clearing of riparian vegetation, loss of fringing vegetation, invasion by alien species, destabilization of banks.

Mitigation:

- The construction footprint will be minimized and where possible, restrict all construction related activities to previously disturbed areas or transformed vegetation.
- Vegetation disturbance and removal must be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever.
- Do not create additional drainage line crossings without the express permission of the ECO. The ECO will ensure that the crossing is permitted in terms of DWS's General Authorisations, Construction and rehabilitation of the crossing must be as per the ECO's instruction.
- Construction within or near drainage lines will take place outside of the rainy season when the flow of the non-perennial rivers is at a minimum.
- All existing and proposed roads should contain adequate stormwater drainage and erosion control measures.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented continuously throughout the duration of construction.

8.2.3 Surface water: Pollution and Contamination

To ensure that measures are put in place to prevent the pollution and contamination of surface water owing to unmanaged runoff of grey water, cement slurry, unmanaged sewage discharge and leaks, litter and inert construction material, sewage leaks and spills, discharge and spills of solvents, fuel etc.

Mitigations:

- The Contractor must take reasonable precautions to prevent the pollution of the ground and / or water resources on and adjacent to the site as a result of his activities.
- A drainage diversion system will be installed to divert clean runoff around areas of potential pollution, e.g. batching areas, workshops, etc.
- Polluted runoff and waste water emanating from the construction site will be diverted into a collection system (e.g. sump, attenuation dam, PVC porta-ponds, etc.) for treatment or collection and disposal.
- Collected contaminated runoff / wastewater is to be pumped out of the final collection point and disposed of at an appropriate waste disposal site. Sump liners are to be treated in the same manner.

- No polluted water may reach the watercourses.
- Washing of plant / equipment / concreting equipment etc. may only be washed in dedicated areas and the dirty water is not allowed to discharge into a watercourse or surrounding natural vegetation
- The Contractor is encouraged to recycle dirty wash water to minimise the amount to be removed off-site.
- No natural watercourse is to be used for the cleaning of tools or any other apparatus. This includes for purposes of bathing, or the washing of clothes etc.
- The Contractor may discharge 'clean' silt laden water overland and allow this water to filter into the ground. However, he shall ensure that he does not cause erosion as a result of any overland discharge.
- Trucks delivering concrete shall not be washed on site or anywhere inside the Reserve.
- Concrete and cement works will be undertaken in specified areas only.
- All operations that involve the use of cement and concrete will be carefully controlled. Water and slurry from concrete mixing operations must be contained to prevent pollution of the ground surrounding the mixing points.
- Plastic trays or liners will be used when mixing cement and concrete: Do not mix cement and concrete directly on the ground.
- Excess concrete from mixing must be deposited in a designated area awaiting removal to an approved landfill site.
- All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.
- All hazardous substances will be used and handled by qualified personnel on bunded surfaces.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by KPGR.
- No smoking is allowed inside the stores or within 3m of a bund.
- The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores.
- Fuels and chemicals may not be stored under trees.
- Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is minimised.
- A spills containment kit must be kept on site at all times for the duration of the construction phase.
- Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place only within properly equipped, bunded maintenance areas or workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing.

Timeframes and Deliverables:

- i. *All above mitigations measures to be implemented continuously throughout the duration of construction.*
- ii. *Proof of weekly maintenance and servicing of the portable toilets by a registered service provider is to be provided to the ECO on a monthly basis.*

8.3 Biodiversity Management

8.3.1 Soil: Contamination and pollution

To ensure that measures are put in place to prevent contamination and pollution owing to unmanaged storm water runoff, unmanaged sewage discharge, leaks and spills, Discharge and spill of solvents, paints, chemicals, Discharge and spill of hydrocarbons and fuel and litter and other inert construction material.

Mitigation:

- As per Waste Management Plan (refer to Section 10).
- Concrete and cement works will be undertaken in specified areas only.
- All operations that involve the use of cement and concrete will be carefully controlled. Water and slurry from concrete mixing operations must be contained to prevent pollution of the ground surrounding the mixing points.
- Plastic trays or liners will be used when mixing cement and concrete: Do not mix cement and concrete directly on the ground.
- Excess concrete from mixing must be deposited in a designated area awaiting removal to an approved landfill site.
- All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.
- All hazardous substances will be used and handled by qualified personnel on bunded surfaces.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by KPGR.
- No smoking is allowed inside the stores or within 3m of a bund.
- The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores.
- Fuels and chemicals may not be stored under trees.
- Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is minimised.
- A spills containment kit must be kept on site at all times for the duration of the construction phase.

- Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.
- Construction vehicles will be maintained in an acceptable state of cleanliness when leaving site. Sand, dust and spillages from these vehicles that inevitably fall on the main roads must be cleared on a regular basis.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place only within properly equipped, bunded maintenance areas or workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*
- Waste disposal receipts from a registered hazardous waste disposal site must be onsite at all times for all hazardous waste removed from the site. These are to be provided to the ECO on a monthly basis.*
- Waste disposal receipts from a registered landfill site must be onsite at all times for all construction waste removed from the site. These are to be provided to the ECO on a monthly basis.*

8.3.2 Soil: Erosion

To ensure that measures are put in place to prevent erosion owing to removal of stabilizing vegetation, compaction by movement of construction vehicles and equipment, increase of water runoff in construction areas.

Mitigation:

- The construction footprint will be minimized and where possible, restrict all construction related activities to previously disturbed areas or transformed vegetation.
- Vegetation disturbance and removal must be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever.
- Do not excavate until all required materials / services are on-site, to facilitate immediate laying of services / construction of subsurface infrastructure.
- In general, excavations remaining open overnight must be fenced or equipped with escape ramps to allow trapped animals to escape.
- Preferably undertake clearing activities during the dry season in order to prevent erosion and siltation.
- Excavation of sand to solid ground to be done carefully and appropriate drainage incorporated i.e. sand and debris need to be removed and solid rock preferably exposed to ensure proper binding with concrete material.
- Construction must preferably be extended over rocky substrate to give maximum anchoring opportunity.
- Progressively reinstate of disturbed areas to topsoil profile on an on-going basis, immediately after selected construction activities (e.g. backfilling of a trench) are completed. This allows for passive rehabilitation (i.e. natural re-colonisation by vegetation) to commence.
- Deficiency of backfill material shall not be made up by excavation within the protected area.
- Excavated material is to be stockpiled along a pipeline trench within the working servitude, unless otherwise authorised.
- Subsoil backfill to be followed by topsoil. Compact backfilled trenches to prevent erosion. Subsoil to be compacted to engineer's specification.

- Consider using any excess rocks and boulders that were excavated from the construction site for any erosion protection work, which is required on site. Consider removing the rocks for the packing of gabions at other soil erosion sites.
- Removed soil is to be used to backfill areas where required and excess is to be landscaped into natural looking banks that fit the surrounding topography.
- Monitor backfilled areas for erosion and remediate as required.
- Progressively rehabilitate (rip, scarify and plant) areas as soon as works have been completed.
- Construction of proposed roads may not be wider than necessary with a maximum width of 3m.
- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes only.
- All road rules and speed limits must be adhered to at all times.
- Construction staff will only use authorised paths and roads.
- Movement of heavy vehicles and machinery will be limited wherever possible, and construction noise reduced wherever possible.
- Vehicles used during construction or to transport material or staff on site, will have the minimum impact on the environment (trees, roads or other) or other road users. The size, height and weight of vehicles must be kept in mind; the access route will determine the type of vehicle that can be used.
- The contractor must maintain all access and site roads and repair these as required. Damage caused to roads by the construction related activities, including heavy vehicles, must be repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor.
- Upon completion of the construction period, the Contractor shall ensure that the access roads are returned to a state no worse than prior to construction commencing.
- All disturbed areas along the fringes of access roads must be rehabilitated once the road is complete.
- All existing and proposed roads will contain adequate stormwater drainage and erosion control measures.
- All measures detailed in the storm water management plan (section 11.1) inclusive of the following:
 - The accumulation of water on the surface will be prevented. The drainage of the surface will be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
 - Surface water or storm water will not be allowed to canalize or be concentrated.
 - Runoff from roads will be managed to avoid erosion and pollution problems.
 - Concentrated storm water flows will be dissipated through energy dissipaters or vegetated areas.
 - Proactively protect steep access roads, cuttings against and other areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent surface water being concentrated in water sources and from scouring the slopes, banks or other areas.
 - All erosion damage will be repaired as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.3.3 Soil: Stockpiles, storage and handling

To ensure that all materials are handled and stored in the correct manner so as to protect the materials and the environment

Mitigation:

- Topsoil will be conserved through pre-emptive stripping and stockpiling prior to the commencement of works in any area, pending reapplication during rehabilitation.

- Strip topsoil together with grass / groundcover from all areas where permanent or temporary structures are located, construction related activities occur, and access roads are to be constructed.
- Topsoil will to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.
- Works will be coordinated to limit unnecessarily prolonged exposure of stripped areas and stockpiles. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area.
- Do not strip topsoil when it is wet.
- Topsoil stockpiles must be positioned/ stored in approved locations only.
- Topsoil stockpiles may not exceed 2 m in height and should be protected from erosion
- Do not disturb, compact or disrupt topsoil stockpiles, and ensure that nothing is stored on them;
- Regular weeding of stockpiles must occur to ensure that no invasive or alien plant species are established.
- Topsoil stockpiled for extended periods of time must be revegetated with indigenous grasses.
- Topsoil is to be replaced along the contour.
- Topsoil is to be replaced by direct return where feasible (i.e. replaced immediately on the area where construction is complete), rather than stockpiling it for extended periods

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.3.4 Air Quality

To ensure that measures are put in place to prevent air pollution by emissions from construction vehicles and equipment, dust liberated and smoke from open fires.

Mitigation:

- Retain vegetation and soil within construction areas in position for as long as possible, removing it immediately ahead of construction / earthworks in that area.
- Site vehicles and equipment will be maintained in an acceptable state of repair and serviced regularly.
- All road rules and speed limits must be adhered to at all times.
- Construction vehicles transporting materials to and from the construction site must be covered to reduce the formation of dust.
- A dust abatement programme will be used. Standard dust abatement measures include watering or otherwise stabilising soils, covering haul trucks, employing speed limits on unpaved roads, minimising vegetation clearing, and promptly re-vegetated after construction is completed.
- Dust suppression measures must be implemented such as wetting of the site and access roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- Long-term stockpiles of soil and fine spoil material will be vegetated or covered to minimise the sources of dust pollution.
- All disturbed areas, construction areas, roads, slopes etc. will be rehabilitated immediately after the completion of construction works.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.3.5 Biodiversity (Flora): Removal of alien invasives

To ensure that measures are put in place to maximize the positive benefits of removing all identified alien invasive plant species during the construction phase.

Mitigation:

- The contractor must develop a management and monitoring programme for alien and invasive species detailing basic ID information, actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- In order to comply with the Conservation of Agricultural Resources Act (Act 43 of 1983), all listed invasive exotic plants as indicated in the Ecology report will be targeted and immediately removed and controlled. This is especially applicable to **Lantana camara*, **Datura stramonium*, **Ricinus communis*, **Xanthium spinosum*, **Salvinia adnata*, **Sesbania punicea* and **Opuntia stricta*.
- Alien invasive species within the site will be removed prior to construction-related soil disturbances.
- All sites disturbed by construction activities must be monitored for colonization by invasive alien plant species.
- All alien seedlings and saplings must be removed as they emerge or become evident for the duration of construction.
- Manual / mechanical removal is preferred to chemical control.
- Manufacturer's instructions will be followed when using chemical methods, especially in terms of quantities, time of application etc.
- Only properly trained people will handle and make use of chemicals.
- Herbicide and pesticide use will be limited to non-persistent, immobile products and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- All construction vehicles and equipment, as well as, construction material must be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access to the Reserve.

Timeframes and Deliverables:

- All above mitigation measures to be implemented continuously throughout the duration of construction.*
- The APCP to be developed and adopted within 6 months of the EA being approved prior to the commencement of construction.*

8.3.6 Biodiversity (Flora): Loss of vegetation and CBAs and disturbance of sensitive habitats

To ensure that measures are put in place to prevent/minimize the loss of Granite Lowveld Vegetation (LT) and critical biodiversity areas, as well as, disturbance to sensitive habitats (riparian vegetation) owing to site clearing, general construction activities and movement of construction vehicles, litter and waste, unmanaged sewage discharge and solvent, paint, and chemical spills.

Mitigation:

- Vegetation disturbance and removal must be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever.
- No material storage or lay down is permitted under trees.
- A perimeter fence or suitable perimeter demarcation (such as steel droppers and hessian rope) must be erected around the construction works area to prevent access to adjacent bush and sensitive environs. Buffer areas and identified sensitive environments must be demarcated as No-go zones, where no construction activities or staff are permitted.
- Vegetation and other site features to be retained will be demarcated with danger tape and / or fencing as required. This barrier will be at least 2m from the stem of the specimen / feature.

- Site demarcations will be established and maintained for the duration of the construction phase. Materials must not blow or move outside of the demarcation line.
- Vehicular or pedestrian access will be prohibited into all natural areas beyond the demarcated boundary of the construction site.
- Construction activities must be carefully planned and implemented in such a way that facilitates and aids in the rehabilitation and establishment of plant communities.
- Progressively rehabilitate (rip, scarify and plant) areas as soon as works have been completed.
- Fines will be implemented for the damage or destruction of marked and protected specimens. It is the contractor's responsibility to ensure that these are retained.
- No natural feature may be marked or defaced.
- No large tree (with a trunk diameter exceeding 200mm) may be felled without the permission of the ECO.
- Consider the selective trimming of branches before opting to remove any trees.
- Workers will not tamper or remove flora and neither may anyone collect seed from the plants without permission from the local authority.
- Only wood from trees felled as part of the construction contract may be sold / made available for firewood. No dead wood may be gathered from the surrounding veld.
- A Plant Rescue Plan for protected species will be implemented within the construction areas. Where feasible, these will be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation plan.
- Alien vegetation will not be allowed to colonise the disturbed riparian areas.
- All road rules and speed limits must be adhered to at all times.
- Construction staff will only use authorised paths and roads.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.3.7 Biodiversity (Flora): Conservation important species

*To ensure that measures are put in place to prevent/minimize the destruction and damage to conservation important species and protected trees i.e. *Elaeodendron transvaalense*, *Dalbergia melanoxylon*, *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *Maughamii*, *Combretum imberbe*, *Ansellia Africana*, *Spirostachys africana* due to vegetation clearing and general construction activities and movement of construction vehicles.*

Mitigation:

- An experienced botanist will conduct a walk-through prior to any construction taking place, marking each plant species of conservation concern to be avoided or that may need to be relocated prior to any site clearance activity taking place.
- The trees *Elaeodendron transvaalense*, *Sclerocarya birrea* subsp. *caffra* and *Balanites maughamii* subsp. *maughamii* are nationally protected and *Spirostachys africana* is protected under provincial legislation. All development must take place around these trees and they will be left untouched. If this is unavoidable then destruction permits from the relevant authorities will have to be applied for.
- Wherever possible, trees taller than 5 m or with a diameter at breast height of 30 cm will be left unharmed, whether protected by law or not.
- Vegetation disturbance and removal must be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever.
- No material storage or lay down is permitted under trees.

- A perimeter fence or suitable perimeter demarcation (such as steel droppers and hessian rope) must be erected around the construction works area to prevent access to adjacent bush and sensitive environs. Buffer areas and identified sensitive environments must be demarcated as No-go zones, where no construction activities or staff are permitted.
- Vegetation and other site features to be retained will be demarcated with danger tape and / or fencing as required. This barrier will be at least 2m from the stem of the specimen / feature.
- Site demarcations will be established and maintained for the duration of the construction phase. Materials must not blow or move outside of the demarcation line.
- Vehicular or pedestrian access will be prohibited into all natural areas beyond the demarcated boundary of the construction site.
- Construction activities must be carefully planned and implemented in such a way that facilitates and aids in the rehabilitation and establishment of plant communities.
- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes only.
- Construction staff will only use authorised paths and roads.
- Movement of heavy vehicles and machinery will be limited wherever possible, and construction noise reduced wherever possible.
- Vehicles used during construction or to transport material or staff on site, will have the minimum impact on the environment (trees, roads or other) or other road users. The size, height and weight of vehicles must be kept in mind; the access route will determine the type of vehicle that can be used.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*
- All plant species of conservation concern are reflected on the final planting plan and are to be demarcated and protected throughout the duration of construction.*
- Demarcation of no-go zones, vegetation and other site features to be in place prior to the pre-site inspection and commencement of any clearing activities. These are to be inspected by the ECO during the pre-site inspection and maintained throughout the duration of construction.*

8.3.8 Biodiversity (Flora): Alien invasive species

To ensure that measures are put in place to prevent/minimize an increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas owing to unmanaged cleared and disturbed areas and stockpiles, unrehabilitated areas cleared and disturbed during construction and construction vehicles carrying material and seed onto site.

Mitigation:

- The contractor must develop a management and monitoring programme for alien and invasive species detailing basic ID information, actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- In order to comply with the Conservation of Agricultural Resources Act (Act 43 of 1983), all listed invasive exotic plants as indicated in the Ecology report will be targeted and immediately removed and controlled. This is especially applicable to **Lantana camara*, **Datura stramonium*, **Ricinus communis*, **Xanthium spinosum*, **Salvinia adnata*, **Sesbania punicea* and **Opuntia stricta*.
- Alien invasive species within the site will be removed prior to construction-related soil disturbances.
- All sites disturbed by construction activities must be monitored for colonization by invasive alien plant species.
- All alien seedlings and saplings must be removed as they emerge or become evident for the duration of construction.
- Manual / mechanical removal is preferred to chemical control.

- Manufacturer's instructions will be followed when using chemical methods, especially in terms of quantities, time of application etc.
- Only properly trained people will handle and make use of chemicals.
- Herbicide and pesticide use will be limited to non-persistent, immobile products and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- All construction vehicles and equipment, as well as, construction material must be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access to the Reserve.
- Regular weeding of stockpiles must occur to ensure that no invasive or alien plant species are established.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented continuously throughout the duration of construction.

8.3.9 Biodiversity (Fauna): Faunal habitat and connectivity

To ensure that measures are put in place to prevent/minimize the loss of faunal habitat and ecological connectivity due to vegetation clearing, general construction activities, dust and construction material, litter and inert construction waste.

Mitigation:

- Vegetation disturbance and removal must be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever.
- A perimeter fence or suitable perimeter demarcation (such as steel droppers and hessian rope) must be erected around the construction works area to prevent access to adjacent bush and sensitive environs. Buffer areas and identified sensitive environments must be demarcated as No-go zones, where no construction activities or staff are permitted.
- All disturbed areas, construction areas, roads, slopes etc. will be rehabilitated immediately after the completion of construction works.
- Rehabilitation must be implemented immediately upon completion of construction.
- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.
- All disturbed areas must be levelled and cleared of any foreign material. It is unacceptable to leave foreign material behind with the knowledge that it will become hidden amongst the rejuvenating vegetation with time.
- Construction areas, disturbed sites and obsolete roads should be rehabilitated by breaking the surface crust and erecting earth embankments to prevent erosion, while vegetation should be re-established.
- The construction site will be rehabilitated using appropriate indigenous vegetation. Salvaged vegetation, rather than new planting or seeding, will be used to the extent possible.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented continuously throughout the duration of construction.

8.3.10 Biodiversity (Fauna): Mortality and injury

To ensure that measures are put in place to prevent injury and mortality of fauna due to trenches and excavations, persecution and extermination, Solvents, paints, chemicals (poisoning), construction material, litter and inert construction waste and collisions with construction vehicles.

Mitigation:

- Construction personnel will be briefed on the potential occurrence of protected faunal species, what they look like, and where they are likely to be found. Personnel will be instructed that these species are not to be hurt or destroyed if encountered. This applies specifically to the snakes, lizards and spiders, as these are often perceived to be vermin and pests.
- Personnel must be instructed to report the presence of protected species to the contractor or EO so that arrangements may be made to relocate these to adjacent bush areas.
- A procedure for dealing with animals encountered on the site will be developed, including dangerous animals and vermin. Where necessary, call in professionals to remove the animals.
- Personnel will be instructed on the presence of dangerous game and the appropriate behaviour and safety upon encountering such game.
- All personnel will be made aware of what the procedures for dealing with animals are. It is the contractor's responsibility to ensure that proper procedures are followed.
- No faunal species may unnecessarily be handled, killed, hunted or harassed.
- Pets and livestock are not allowed on site.
- No poaching or snaring of any game is permitted. The contractor must regularly undertake checks of the surrounding natural vegetation and along game paths to ensure no traps have been set. Remove and dispose of any snares or traps found on or adjacent to the site. The contractor must implement fines in this regard.
- Poaching could be a significant threat. If any external labour teams are used during construction, then these teams must preferably be accommodated off site; if this is not possible then teams must be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place.
- Trenching for pipes and cables around the solar plant should be kept to a minimum.
- Do not excavate until all required materials / services are on-site, to facilitate immediate laying of services / construction of subsurface infrastructure.
- In general, excavations remaining open overnight must be fenced or equipped with escape ramps to allow trapped animals to escape.
- Preferably undertake clearing activities during the dry season in order to prevent erosion and siltation.
- Excavation of sand to solid ground to be done carefully and appropriate drainage incorporated i.e. sand and debris need to be removed and solid rock preferably exposed to ensure proper binding with concrete material.
- Progressively reinstate of disturbed areas to topsoil profile on an on-going basis, immediately after selected construction activities (e.g. backfilling of a trench) are completed. This allows for passive rehabilitation (i.e. natural re-colonisation by vegetation) to commence.
- Deficiency of backfill material shall not be made up by excavation within the protected area.
- Excavated material is to be stockpiled along a pipeline trench within the working servitude, unless otherwise authorised.
- Subsoil backfill to be followed by topsoil. Compact backfilled trenches to prevent erosion. Subsoil to be compacted to engineer's specification.
- Consider using any excess rocks and boulders that were excavated from the construction site for any erosion protection work, which is required on site. Consider removing the rocks for the packing of gabions at other soil erosion sites.
- Removed soil is to be used to backfill areas where required and excess is to be landscaped into natural looking banks that fit the surrounding topography.
- Monitor backfilled areas for erosion and remediate as required.
- Progressively rehabilitate (rip, scarify and plant) areas as soon as works have been completed.
- All hazardous substances will be used and handled by qualified personnel on bunded surfaces.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.

- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- No smoking is allowed inside the stores or within 3m of a bund.
- The Contractor must ensure that there is adequate fire-fighting equipment at the fuel stores.
- Fuels and chemicals may not be stored under trees.
- Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is minimised.
- A spills containment kit must be kept on site at all times for the duration of the construction phase.
- Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place only within properly equipped, bunded maintenance areas or workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing.

8.3.11 Biodiversity (Fauna): Poaching and Smuggling

To ensure that measures are put in place to prevent the poaching and snaring of fauna on site by construction staff and preventing any opportunity to smuggle poached items out of KPGR.

Mitigation:

- No poaching or snaring of any game is permitted. The contractor must regularly undertake checks of the surrounding natural vegetation and along game paths to ensure no traps have been set. Remove and dispose of any snares or traps found on or adjacent to the site. The contractor must implement fines in this regard.
- Poaching could be a significant threat. If any external labour teams are used during construction, then these teams must preferably be accommodated off site; if this is not possible then teams must be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.4 Heritage and Cultural Management

8.4.1 Heritage: Discovery of new artefacts

To ensure that measures are put in place to maximize the positive aspects for the possible discovery of new artefacts.

Mitigation:

- If archaeological or historical 'chance finds' are encountered, then work in the area must be halted, and a heritage specialist must be called to assess the situation and make recommendations.
- If any fossils are discovered during the construction then a palaeontologist must be called to assess their importance and rescue them if necessary.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*
- All work is to be halted immediately and the findings are to be reported to the ECO immediately.*

8.4.2 Heritage: Damage to and destruction of archaeological artefacts

To ensure that measures are put in place to prevent the damage to and destruction of archaeological, paleontological or historical artefacts unearthed during construction owing to site clearing and general construction activities.

Mitigation:

- Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (cf. NHRA (Act No. 25 of 1999), Section 36 (6)).
- If archaeological or historical 'chance finds' are encountered, then work in the area must be halted, and a heritage specialist must be called to assess the situation and make recommendations.
- If any fossils are discovered during the construction then a palaeontologist must be called to assess their importance and rescue them if necessary.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*
- All work is to be halted immediately and the findings are to be reported to the ECO immediately.*

8.5 Visual Impact Management

To mitigate the socio-economic impacts associated with the construction staff and visual impacts.

8.5.1 Visual

To ensure that measures are put in place to mitigate the visual impact of construction, lighting and dust on sensitive visual receptors and conservation areas in the region.

Specific mitigation:

- Reduce the construction period through careful logistical planning and productive implementation of resources.
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. No after hour's construction work or work on weekends or public holidays is permitted.
- A dust abatement programme will be used. Standard dust abatement measures include watering or otherwise stabilising soils, covering haul trucks, employing speed limits on unpaved roads, minimising vegetation clearing, and promptly re-vegetated after construction is completed.
- Vegetate or cover long-term stockpiles of soil and fine spoil material to minimise the sources of dust pollution.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works

- Ensure that existing indigenous vegetation is not unnecessarily cleared or removed during the construction period.
- Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Long-term stockpiles of soil and fine spoil material will be vegetated or covered to minimise the sources of dust pollution.

Timeframes and Deliverables:

i. All above mitigations measures to be implemented continuously throughout the duration of construction.

8.6 Socio-economic Management

8.6.1. Socio-economic: Stimulation of the Economy and creation of employment opportunities

To ensure that measures are put in place to maximize the positive benefits during the construction phase of the development in terms of the local economy, the creation of short term employment opportunities, ensuring community beneficiation via job creation and skills transfer.

Mitigation:

- Clear criteria for identifying and funding projects and initiatives should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.
- The Contractor should appoint local employees and implement a 'locals first' policy, especially for semi and low-skilled job categories.
- The local authorities, community representatives, and organisations on the interested and affected party database will be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the Applicant intends following for the construction phase of the project.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- Where feasible, efforts will be made to employ local employees that are compliant with Black Economic Empowerment (BEE) criteria.
- Where feasible, training and skills development programmes for locals will be initiated and maintained throughout the construction phase.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*
- ECO to include proof of notification of final decision to all I&AP's together with notification of intent to construct.*

8.6.2. Socio-economic: Noise, safety and presence of construction workers

To ensure that measures are put in place to mitigate any undue noise, dust and safety impacts on adjacent landowners, and to address an increase in the number of construction workers in the local community.

Mitigation:

- No staff may be housed on the project site. The operator is responsible for making the necessary arrangements for transporting staff to and from site on a daily basis.
- All Contractors must take all the necessary precautions to ensure that fires are not started as a result of activities on site.
- As per the mitigation mentioned in the Fire Protection Management Plan (Section 12) inclusive of the following:
 - No open fires will be permitted anywhere on site.
 - No incineration or burning of waste will be permitted anywhere on site.
 - Personnel and staff will be provided with gas for cooking purposes in demarcated, safe areas within the construction camp.
 - A fire break will be established and maintained around the perimeter of all construction sites prior to the commencement of construction activities.
 - All Contractors will ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.
 - Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, winter months.
 - All Contractors shall supply all site offices, kitchen areas, workshop areas, material stores and any other areas identified with suitable, tested and approved fire-fighting equipment.
 - All Contractors to provide fire-fighting training to selected construction staff.
 - In the event of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate private landowners for any damage caused by the fire. The contractor should bear the costs associated with fighting the fire.
 - All Contractors to ensure that the necessary firefighting equipment is on site in accordance with relevant legislative requirements.
- A no employment at the gate policy will be implemented.
- The movement of construction workers on and off the site will be closely managed and monitored by the contractor.
- The contractor must make the necessary arrangements for allowing workers from outside the area to return home over weekends. This would reduce the risk posed by construction workers to local family structures and social networks.

Timeframes and Deliverables:

- i. *All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.6.1. Socio-economic: Services and traffic

To ensure that measures are put in place to prevent any undue traffic on the local roads and to ensure there is no undue noise, dust and safety concerns as a result thereof.

Specific mitigation:

- All road rules and speed limits must be adhered to at all times.
- All drivers employed during the construction phase must be briefed and notified of the potential safety risks posed by construction vehicles to members of the local community.
- Contractors will be required to submit a delivery timetable. Strict control is to be exercised over entering and exiting traffic and delivery procedures.
- All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits (50km on surfaced road and 40km on gravel road in the Reserve).
- A dust abatement programme will be used. Standard dust abatement measures include watering or otherwise stabilising soils, covering haul trucks, employing speed limits on unpaved roads, minimising vegetation clearing, and promptly re-vegetated after construction is completed.

- Dust suppression measures must be implemented such as wetting of the site and access roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- Long-term stockpiles of soil and fine spoil material will be vegetated or covered to minimise the sources of dust pollution.

Timeframes and Deliverables:

- All above mitigations measures to be implemented continuously throughout the duration of construction.*

8.7. POST-CONSTRUCTION MANAGEMENT

8.7.1. Rehabilitation

To ensure that the site is restored to a better natural state than prior to any construction activities

Mitigations:

- Rehabilitation must be implemented immediately upon completion of construction.
- If the riparian areas are disturbed during construction it will be re-vegetated using site-appropriate indigenous vegetation and/or seed mixes.
- After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to construction.
- Excess topsoil is to be spread evenly over the area in a manner that blends in with the natural topography.
- Excess stockpiled building material is to be removed completely and the areas levelled.
- All disturbed areas must be levelled and cleared of any foreign material. It is unacceptable to leave foreign material behind with the knowledge that it will become hidden amongst the rejuvenating vegetation with time.
- Construction areas, disturbed sites and obsolete roads should be rehabilitated by breaking the surface crust and erecting earth embankments to prevent erosion, while vegetation should be re-established.
- Ensure that the construction site is rehabilitated using appropriate indigenous vegetation.
- Specifications for soil preparation, endemic plant/seed mixes, fertilizer, and mulching (as guided by the Wetland Rehabilitation and Monitoring Plan) should be provided for all areas disturbed by construction activities.
- With the permission of the local authority, seed from appropriate indigenous species may be harvested for later use during rehabilitation. An ecologist should be consulted in this regard.
- Plants that are removed / propagated during construction may be maintained on site and used to re-vegetate the disturbed soil.
- All harvested seeds and seedlings, as well as plants removed for transplanting which are not immediately re-planted, are the responsibility of the Contractor and must be kept under approved nursery conditions.
- Cordon off rehabilitated areas and do not allow grazing or access into these areas until such time that re-vegetation was found to be successful.
- Rehabilitated areas must be monitored regularly to ensure that revegetation is successful, plants are maintained, weeds and invaders are removed, and that areas where replanting is unsuccessful are replaced.

Timeframes and Deliverables:

- All above mitigations measures to be implemented following the completion of construction.*

9. OPERATIONAL MANAGEMENT PLAN

The Operational Management Plan (OMP) identifies and addresses the environmental risks and impacts associated with the day-to-day operation of the development. This plan must be adhered to at all times during the operational phase.

It is the Operators responsibility to ensure the implementation of all mitigation measures contained in the OMP in order to prevent/minimize the environmental impacts associated with the operations.

9.1 Hydrology

9.1.1 Ground water protection

To ensure that measures are put in place to prevent the waste of water during operational phase and prevent the pollution and contamination of ground water owing to unmanaged storm water runoff, sewage leaks, spills and discharge, as well as, discharge an spills of solvents, paints ,chemicals, fuel etc.

Mitigation:

- The Water Use license for the property will be in place and up to date for the lifetime of the development.
- All facility staff will be trained in water wise principles, and prudent use of water will be practiced at all times for the lifetime of the development.
- During maintenance water saving devices such as low flow shower heads and taps, and the use of grey water for activities such as road wetting and irrigation will be installed.
- Water saving measures will be implemented where possible an practical. The use of draught resistant species in landscaping is encouraged.
- Leak detection systems will be installed during routine maintenance and upgrades and any leaks promptly attended to.
- Water consumption will be monitored on a monthly basis to ensure that there is no undue waste. Keep up to date records of water monitoring
- A storm water management plan will be compiled and adopted within 6 months of the EA being approved.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, banded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, banded areas. The banded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by KPGR.

- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- Potable water monitoring will be undertaken on a monthly basis to ensure that the output quality of the water complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*
- Up to date WUL to be provided to the ECO annually during the operational audits.*
- Monthly water consumption monitoring reports are to be provided to the ECO annually during the operational audits.*

9.3.5 Surface water: Ecological and hydrological Function

To ensure that measures are put in place to prevent disturbance and loss of ecological and hydrological functions along the dam, drainage lines due to alien invasives and vegetation clearing.

Mitigation:

- In order to comply with the Conservation of Agricultural Resources Act (Act 43 of 1983), all listed invasive exotic plants as indicated in the Ecology report will be targeted and immediately removed and controlled. This is especially applicable to **Lantana camara*, **Datura stramonium*, **Ricinus communis*, **Xanthium spinosum*, **Salvinia adnata*, **Sesbania punicea* and **Opuntia stricta*.
- KPGR will develop a management and monitoring programme for alien and invasive species 6 months from the date of the EA being granted. This programme will detail basic ID information, actions to prevent the establishment of invasive plants and methods of removal.
- All disturbed sites will be monitored every 3 months for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- KPGR will implement an alien plant control program 6 months from the date of the EA being approved to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program will include regular inspections and follow-ups.
- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to construction.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.
- Flood debris will not be permitted to build up against structures, plinths and columns and will be removed on every 3 months or more frequently if required.
- Erosion of river banks will be monitored every 3 months. Should any erosion or destabilization of banks be noted, this will be rectified immediately utilizing gabion baskets, reno mattresses or the like.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.1.3 Surface water: Pollution and Contamination

To ensure that measures are put in place to prevent the pollution and contamination of surface water owing to unmanaged storm water runoff, litter and waste, sewage leaks and spills, discharge and spills of solvents, fuel etc..

Mitigation:

- Quality tests on the waste water will be undertaken on a monthly basis to ensure that the output quality of the effluent complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request.
- All existing and proposed roads should contain adequate stormwater drainage and erosion control measures.
- All vehicles will be regularly serviced so that oil/fuel leaks are limited. Undersides of vehicles will be kept free of oil to limit wash from rivers during use of basic crossings.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel will have lids, which will remain firmly shut.
- Gas and liquid fuel will not be stored in the same storage area.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- All recyclables and non-recyclables will be stored in waste cages to prevent spread into the natural environment.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*
- ii. Water quality monitoring reports undertaken every three months are to be provided to the ECO annually during the operational audits.*

9.2 Biodiversity management

To ensure the continued integrity of the natural environment and the conservation of fauna and flora.

9.2.1 Soil: Contamination and Pollution

To ensure that measures are put in place to prevent contamination and pollution owing to unmanaged storm water runoff, Litter and uncontrolled waste, Sewage leaks and spills, Herbicides, pesticides and fertilisers, Discharge and spill of solvents, paints, chemicals and cleaning products, Discharge and spill of hydrocarbons and fuel.

Mitigation:

- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be removed by a private contractor as employed by KPGR.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel will have lids, which will remain firmly shut.
- Gas and liquid fuel will not be stored in the same storage area.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- All recyclables and non-recyclables will be stored in waste cages to prevent spread into the natural environment
- A storm water management plan will be compiled and adopted within 6 months of the EA being approved.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*
- Operational SMP to be implemented immediately following the completion of construction.*
- All timeframes and deliverables as per the SMP are to be adhered to.*

9.2.2 Soil: Erosion

To ensure that measures are put in place to prevent erosion owing to compaction by uncontrolled movement of staff and visitors, runoff over exposed or cleared areas that have failed to rehabilitate.

Specific mitigation:

- A storm water management plan is to be compiled and adopted within 6 months of the EA being approved and adopted and measures implemented to avoid erosion such as:

- The accumulation of water on the surface will be prevented. The drainage of the surface will be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
- Surface water or storm water will not be allowed to canalize or be concentrated.
- Runoff from roads will be managed to avoid erosion and pollution problems.
- Concentrated storm water flows will be dissipated through energy dissipaters or vegetated areas.
- Proactively protect steep access roads, cuttings against and other areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent surface water being concentrated in water sources and from scouring the slopes, banks or other areas.
- All erosion damage will be repaired as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- All existing and proposed roads should contain adequate stormwater drainage and erosion control measures.
- All disturbed areas will be rehabilitated with indigenous vegetation. Rehabilitation will commence immediately following construction.
- Storm water management plan to be compiled within the next 6 months
- Rehabilitation of disturbed sites to be undertaken in the next growing season (August/September)
- Movement over the site will be regulated and controlled. Personnel, vehicles and equipment will only move along designated routes.

Timeframes and Deliverables:

- i. *All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.2.3 Air quality

To ensure that measures are put in place to prevent air pollution by emissions from vehicles.

Mitigation:

- Site vehicles and equipment will be maintained in an acceptable state of repair.
- Carpools and lift clubs will be encouraged and staff picked up at a central point. Staff will be discouraged from travelling to site in private vehicles.
- Speed control measures will be implemented on site and in the surrounding area to reduce air pollution and animal mortality.
- No waste will be incinerated on site.
- All non-recyclables will be stored at the waste sorting site in waste cages prior to collection from a private contractor and transportation to a licenced landfill.

Timeframes and Deliverables:

- i. *All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*
- ii. *Proof of waste collection and disposal at a registered landfill to be provided to the ECO annually during the operational audits.*

9.2.4 Biodiversity (flora): Loss of vegetation and CBAs and disturbance of sensitive habitats

To ensure that measures are put in place to prevent loss of Granite Lowveld Vegetation (LT) and critical biodiversity areas, as well as, disturbance to sensitive habitats (riparian vegetation) owing to uncontrolled vegetation clearing, encroachment of alien invasives, litter and waste.

Mitigation:

- No large tree (with a stem diameter exceeding 200mm) will be felled without the permission of the ECO.

- All conserved species and specimens will be suitably protected for the duration of the operational phase.
- All conserved species and specimens will be suitably protected for the duration of the operational phase.
- Staff will not tamper or remove flora and neither will anyone collect seed from the plants without permission from the local authority.
- Fines will be implemented for the damage or destruction of marked and protected specimens.
- No bush clearing is allowed, either to enhance game viewing, for firewood or for any other purpose (with the exception of the clearing of invasive species and the control of unnatural bush encroachment)
- Maintenance workers will not trample natural vegetation and work will be restricted to dedicated roads, paths and gardens within the development footprint.
- No unauthorised access is permitted to buffer areas or any natural areas outside of the facility footprint.
- No wood will be collected for firewood or any other purpose.
- In order to comply with the Conservation of Agricultural Resources Act (Act 43 of 1983), all listed invasive exotic plants as indicated in the ecology report will be targeted and immediately removed and controlled. This is especially applicable to **Lantana camara*, **Datura stramonium*, **Ricinus communis*, **Xanthium spinosum*, **Salvinia adnata*, **Sesbania punicea* and **Opuntia stricta*.
- KPGR will develop a management and monitoring programme for alien and invasive species 6 months from the date of the EA being approved. This programme will detail basic ID information, actions to prevent the establishment of invasive plants and methods of removal.
- All disturbed sites will be monitored every 3 months for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- KPGR will implement an alien plant control program 6 months from the date of the EA being approved to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program will include regular inspections and follow-ups.
- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to construction.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.
- All recyclables and non-recyclables will be stored in waste cages to prevent spread into the natural environment prior to being collected by outside contractors

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.2.5 Biodiversity (flora): Conservation important species

*To ensure that measures are put in place to prevent the destruction and damage to conservation important species and protected trees i.e. *Elaeodendron transvaalense*, *Dalbergia melanoxylon*, *Sclerocarya birrea* subsp. *Caffra* and *Balanites maughamii* subsp. *Maughamii*, *Combretum imberbe*, *Ansellia Africana*, *Spirostachys africana* due to uncontrolled vegetation clearing and access by staff and visitors.*

Mitigation:

- No large tree (with a stem diameter exceeding 200mm) will be felled without the permission of the ECO.
- Selective trimming of branches will be considered before opting to remove any trees.

- All conserved species and specimens will be suitably protected for the duration of the operational phase.
- No protected trees or plants will be removed without the relevant permits from the local authority.
- Staff will not tamper or remove flora and neither will anyone collect seed from the plants without permission from the local authority.
- Fines will be implemented for the damage or destruction of marked and protected specimens.
- The picking of flowers or removal of plants will be prohibited in the Guest Rules.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.2.6 Biodiversity (flora): Alien plant control

To ensure that measures are put in place to prevent an increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.

Mitigation:

- In order to comply with the Conservation of Agricultural Resources Act (Act 43 of 1983), all listed invasive exotic plants as indicated in the ecology report will be targeted and immediately removed and controlled. This is especially applicable to **Lantana camara*, **Datura stramonium*, **Ricinus communis*, **Xanthium spinosum*, **Salvinia adnata*, **Sesbania punicea* and **Opuntia stricta*.
- The recommendations as per the A&ICP developed for the site are to be adhered to at all times.
- All disturbed sites will be monitored every 3 months for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Manufacturer's instructions will be followed when using chemical methods, especially in terms of quantities, time of application etc.
- Only properly trained people will handle and make use of chemicals.
- Herbicide and pesticide use to non-persistent, immobile products will be limited and applied in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to construction.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.
-

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.2.7 Biodiversity (Fauna): Faunal Habitat

To ensure that measures are put in place to prevent the loss of faunal habitat due to Uncontrolled vegetation and bush clearing and access by staff, Encroachment of alien invasive species, Litter and waste.

Mitigation:

- KPGR will maintain connectivity between ecologically important habitats by retaining natural corridors for the movement of fauna.
- No unauthorised access will be permitted to buffer areas or any natural areas outside of the facility footprint.
- The internal road network will be maintained as gravel tracks that allow for faunal dispersal and minimize fragmentation of ecologically sensitive areas.
- A game / security fence or suitable equivalent will be maintained around the perimeter of the infrastructure. These fences will allow access by small mammals, tortoises etc.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan.*

9.2.8 Biodiversity (Fauna): Faunal disturbance

To ensure that measures are put in place to prevent faunal disturbances, displacement of taxa and changes in distribution and abundance due to Uncontrolled vegetation and bush clearing and access by staff and visitors, General operations (activities) of the facility, Noise from staff and vehicles, Night drives, Perimeter safety fences

Mitigation:

- No unauthorised access will be permitted to buffer areas or any natural areas outside of the facility footprint.
- No bush clearing is allowed, either to enhance game viewing, for firewood or for any other purpose.
- Maintenance workers and guests will not trample natural vegetation and work should be restricted to dedicated roads, paths and gardens within the development footprint
- Noise will be kept to a minimum at night.
- Personnel, vehicles and equipment will move along designated routes.
- Lights around the solar plant to be kept to a minimum to reduce the potential collision of nocturnal migrating birds into the panels, cables, fence etc.
- Yellow light bulbs will be utilized as they attract fewer insects and arachnids.
- Outside lighting will be directed away (or "inland") from the riparian zone.
- Internal lights will be shielded by blinds/curtains.
- Control measures will be implemented (e.g. limit the number of individuals access to the riparian zone)
- No feeding of any animals is permitted anywhere.

9.2.9 Biodiversity (Fauna): Injury and mortality

To ensure that measures are put in place to prevent injury and mortality of fauna due to Persecution and extermination, Solvents, paints, chemicals and cleaning products (poisoning), Litter and waste (suffocation).

Mitigation:

- The solar plant site must be fenced off to prevent access and potential injury of fauna from the panels. The fence must be electrified with at least two strands to repel larger mammals such as elephant and giraffe and must contain visible markers to deter fauna.
- A game / security fence or suitable equivalent will be maintained around the perimeter. These fences will allow access by small mammals, tortoises etc.
- Personnel will be briefed on the potential occurrence of protected faunal species, what they look like, and where they are likely to be found. Personnel will be instructed that these species are not to be hurt or destroyed if encountered. This applies specifically to the snakes, lizards, chameleons and spiders, as these are often perceived to be vermin and pests.

- Personnel will be instructed to report the presence of protected species to the Operator or EO so that arrangements may be made to relocate these to adjacent bush areas.
- A procedure for dealing with animals encountered on the site, including dangerous animals and vermin will be developed within 6 months from the date of the EA approval. Where necessary, call in professionals to remove the animals.
- All personnel will be aware of what the procedures for dealing with animals are. It is the operator's responsibility to ensure that proper procedures are followed. In this regard, Environmental awareness training will be conducted annually
- No poaching or snaring of any game is permitted. Reserve Management must implement fines in this regard.
- Staff will be briefed on the dangers of feeding wildlife, and will be discouraged from feeding any animal. Guests will also be informed of recommended measures to secure food and food waste from animal scavengers.
- All food and waste storage areas will be properly secured against animal scavengers at all times.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

9.2.10 Biodiversity (Fauna): Poaching

To ensure that measures are put in place to prevent in the poaching and snaring of faunal species by staff.

Specific mitigation:

- No poaching or snaring of any game is permitted. Reserve Management will implement fines in this regard.
- KPGR will undertake bimonthly checks of the surrounding natural vegetation and along game paths to ensure no traps have been set. Remove and dispose of any snares or traps found on or adjacent to the site. Must implement fines in this regard.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

9.3. Visual impact management

To mitigate the socio-economic impacts associated with the operation of the facility, specifically pertaining to visual and noise impacts

9.3.1 Visual

To ensure that measures are put in place to mitigate the visual impact on sensitive visual receptors in close proximity and within the region, as well as, the visual impact due to safety and security lightening.

Mitigation:

- Natural vegetation will be retained and maintained in all areas outside of the development footprints.
- The general appearance of all of the sites as a whole will be maintained, including roads and servitudes.
- Down lighting will be utilized.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc.
- Apply anti-reflective / antiglare coating on the PV panels to reduce the glint and glare.

- Maintain a natural buffer of approximately 50 m from the boundary line to screen the solar plant from the R40

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

9.4. Socio-economic Management

To mitigate the socio-economic impacts associated with the operation of the facility, specifically pertaining to job creation, employment and noise.

9.4.1 Socio-economics: Stimulation of the Economy and creation of employment opportunities

To ensure that measures are put in place to maximize the positive benefits of the development in terms of the local economy, the creation of long term employment opportunities and opportunities for SMME's

Specific mitigation:

- The Operator is responsible for making the necessary arrangements for transporting staff to and from site on a daily basis.
- Where feasible, efforts will be made to employ local employees that are compliant with Black Economic Empowerment (BEE) criteria.
- Where feasible, training and skills development programmes for locals will be initiated and maintained throughout the operational phase.
- The recruitment selection process will seek to promote gender equality and the employment of women wherever possible.
- Clear criteria for identifying and funding projects and initiatives will be identified. The criteria will be aimed at maximising the benefits for the community as a whole and not individuals within the community.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

9.4.2 Socio-economics: Land uses

To ensure that measures are put in place to ensure that adjacent land uses and activities are not negatively impacted upon.

Mitigation:

- Noisy activities will be conducted during daylight hours only.
- All neighbours will be notified ahead of time of any noisy activities that are to take place.
- Speed limits on all roads are to be strictly adhered to at all times. Fines are to be implemented in this regard.
- KPGR must regularly undertake checks of the surrounding natural vegetation and along game paths to ensure no traps have been set. Remove and dispose of any snares or traps found on or adjacent to the site. The contractor must implement fines in this regard.
- Vehicles of outside contractors should be checked when entering and existing KPGR.

Timeframes and Deliverables:

- All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

9.4.3 Socio-economic: Services and Traffic

To ensure that measures are put in place to prevent any undue traffic on the local roads and to ensure there is no undue noise, dust and safety concerns as a result thereof.

Specific mitigation:

- Speed limits on all roads will be strictly adhered to at all times. Fines will be implemented in this regard.
- All vehicles will be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits (50km on surfaced road and 40km on gravel road in the Reserve)
- Carpools and lift clubs must be encouraged and staff picked up at a central point. Staff must be discouraged from travelling to site in private vehicles.

Timeframes and Deliverables:

- i. All above mitigations measures to be implemented throughout the duration of the developments operational lifespan*

SECTION C: SPECIAL MANAGEMENT PLANS

10. WASTE MANAGEMENT PLAN

A Waste Management Plan (WMP) outlines measures and procedures for the appropriate handling, storage and disposal of wastes generated during the entire project lifecycle (pre-construction, construction and operational phases).

The objectives of the WMP are to:

- Formalise waste handling, transfer and disposal activities associated with waste from the resort;
- To prevent inappropriate management of waste and associated risk of pollution of the environment;
- To facilitate waste minimisation entailing avoidance, reduction, reuse, recycling or treatment before disposal;
- To streamline waste segregation, storage, and disposal and promote resource recovery from waste;
- To contain, control and dispose of waste in accordance with the required waste management practices (e.g. waste segregation);
- To define responsibility for waste management at the various levels of operation associated with the development;
- To provide a framework for the selection of waste management service providers in line with cradle to grave principles.
- To provide actions and guidelines to ensure that waste management is undertaken in line with:-
 - Existing South African waste management legislation, waste management guidelines and policies; and international best practise (Waste Hierarchy).

In accordance with international trends, the management of all waste streams that will be generated at the lodges should demonstrate support for the Hierarchy of Waste Management (HWM), which aims to promote the re-use and recycling of wastes, giving effect to the concept of 'cradle-to-cradle' waste management. The aim of the Waste Management Plan is to minimize the amount of waste disposed of, and as such, a waste hierarchy is followed: Prevent, Minimise, Reuse, Recycle, Recover and then Dispose.

As this section forms part of the EMP, the overall responsibility of ensuring compliance with the Waste Management Plan ultimately lies with the Applicant.

10.1. Planning phase

10.1.1. Permits and permissions

- In order to comply with legislation, the following storage volumes may not be exceeded without a Waste Management License
 - General Waste: - 100m³
 - Hazardous Waste: - 35m³
- Finalize agreements and programmes with the Local Municipality regarding the disposal of domestic waste at the nearest landfill, particularly in terms of initial cleanup volumes (existing dumping) required for this rehabilitation project.

10.2. Construction Phase

10.2.1. Good management practices

- Ensure that all personnel are familiar with waste management requirements on site;

- An adequate number of 'scavenger proof' refuse bins must be provided at the construction sites. Receptacles must be equipped with a closing mechanism to prevent their contents from blowing out and from scavenging animals.
- Ensure that personnel make use of the receptacles provided;
- Empty receptacles for disposal at least once per week, but more often if required;
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- If there is a shortage of space and not enough room for multiple skips the principal contractor should employ a licensed waste management company to deal with waste,
- Onsite recycling containers and/or areas must be clearly marked.
- The working areas and storage sites must be cleared of litter on daily basis. The contractor will maintain 'good housekeeping' practises as ensure that all work sites and construction camp are kept tidy and litter free.
- Dispose of solid waste at the nearest, applicably licensed recycling centre, salvage yard or landfill site;
- All waste must be transported in an appropriate manner (e.g. plastic rubbish bags) to the approved waste site.
- The contractor may not dispose of any waste and / or construction debris by burning, or by burying.
- Safe disposal waybills for all waste and material loads removed from the site must be kept on file.
- Complete waste transfer notes before any waste leaves the site.
- Ensure all waste service providers have a valid waste carrier's registration certificate.

10.2.2. Non-hazardous construction waste

- Segregate different types of waste as they are generated using different skips where possible (General wastes, non-hazardous wastes and hazardous wastes). At a minimum there should be skips for wood, metals, inert and mixed materials,
- Collect maintenance and domestic refuse (scrap metal, packaging materials etc.) in appropriate bins for recycling or send to landfill for disposal in an approved manner.
- Recycle suitable spoil, demolition materials, all pruning, and surplus construction material arising from the works on site to avoid the need to transport materials.
- Metal waste has commercial value and is to be sold on to a scrap metal contractor for recycling purposes.
- Wood waste includes oversized cable reels, wooden packaging boxes, palletes and other wood materials. Palletes in good condition may be reused and are to be returned to materials suppliers on a return system – this will need to be negotiated with the relevant suppliers. Damaged wood waste is to be donated to local communities.

10.2.3. Hazardous construction waste

Hazardous waste can be defined as waste, which can, even in low concentrations, have significant adverse effects on public health and/ or the environment.

- The disposal of hazardous waste must comply with all relevant Regulations, Norms and Standards pertaining to waste classification in order to ensure disposal at the correct landfill class.
- Avoid the generation of hazardous waste wherever possible through procurement processes e.g. purchasing of less toxic / environmentally friendly products.
- Petroleum, chemical, harmful and hazardous waste must be stored in enclosed, bunded areas. The bunded areas shall be clearly marked. Such waste shall be disposed of off-site at a licensed hazardous waste disposal site.
- Forecast and prevent potential situations in which accidents and spills can mitigate against unwarranted waste emissions.

- Hazardous waste may be temporarily stored on site in vessels equipped with secondary containment structures to prevent contamination of soil, groundwater and surface waters due to accidental spills or releases.
- Hazardous waste must be separated at source from the general waste stream. Where possible, all hazardous wastes, including hydrocarbon wastes such as oils, should be recycled either by a recognized recycling company or returned to the supplier.
- All hazardous wastes that cannot be reused or recycled should be labelled correctly and stored in the designated waste storage area until collected for correct disposal.
- Load and unload any solid hazardous materials in a manner that reduces potential spills.
- Ensure that a spills containment kit is available on site and that personnel are trained in spills clean up procedures.
- No spills may be hosed down into a storm water drain or sewer, or into the surrounding natural environment.
- Immediately clean leaks and spills of hazardous substances and dispose of as hazardous waste. The EO and ECO should be notified immediately if a hazardous waste spill occurs, to ensure proper clean-up and disposal.
- Any contaminated soil / substrate must be removed and stored in a skip until it can be disposed of at a permitted disposal site.
- Report major spills to the regional DWS office.
- Hazardous waste disposal must be undertaken by an approved waste contractor, and waste must be disposed of at a permitted hazardous waste disposal facility on a regular basis (H:H or H:h – landfill operator to be contacted for verification). Ensure that all transportation and disposal / recovery permits and licenses are held by the service provider.
- All hazardous waste transported from the site must be reconciled with safe disposal certificates to be issued by the waste management service provider. These should be kept on file for inspection by the environmental authorities if required.

10.2.4. Sewage and effluent

- Ensure that sufficient numbers of mobile toilets are available on site and that these are located beyond the buffer zones.
- The location of chemical toilets or soak-aways should be put as far as possible from any wetland, watercourse or drainage line.
- Ensure that mobile toilets are maintained in a sanitary and operational state. Service slips need to be kept on file for verification
- Waste from ablution facilities must be regularly removed and care must be taken to ensure that there is no spillage.

10.3. Operational Phase

10.3.1. Waste management areas

- Waste must be transported from the point of generation directly to the centralised waste storage area where it can be safely stored prior to offsite disposal.
- The operator must obtain consent / confirmation from the nearest landfill (or similar) to dispose their non-recyclable waste at the facility.
- Duty of care obligations should be adopted and enforced, meaning that only reputable waste transport companies and permitted waste disposal facilities are used.
- Recordkeeping of the waste types and quantities must be as accurate as possible. Landfill waybills must be obtained and kept on file.
- Arrangements must be in place for the regular maintenance and cleaning of waste/recycling storage areas.

10.3.2. Landscape and organic waste

- Develop a comprehensive system for waste separation at the relevant generation points.
- Separate waste into items, which can be reused, composted, or recycled, and send the remaining portion to the general waste stream for disposal at landfill.

10.3.3. General waste

- Adopt waste reduction procurement philosophy, also known as "Greener purchasing", "Pre-cycling", or "eco/green procurement".
- Staff should be made aware of the aim to recycle waste by means of posters, training and staff meetings.
- Visitors/residents should be made aware of the recycling programmes by means of recycling in strategic locations.
- Implement a 'sort-at-source' approach to waste management, and separate recyclable waste from non-recyclable waste;
- Separate viable recyclable components from the general waste stream prior to disposal. Recyclables that are typically recovered from general waste include metals, plastics, glass, and paper / cardboard.
- Waste storage receptacles must be covered or lidded to prevent scavenging by wild animals and vermin, and to prevent waste from being windblown into the adjacent sensitive areas.
- Undertake regular clean-ups and litter removal across the entire site;
- Skips / receptacles should be emptied on a weekly basis to prevent the formation of odour.
- Ensure that the waste is removed by a suitably qualified waste service provider and that the relevant documentation with proof of proper waste disposal is available.
- A manifest indicating the volume (monthly) of disposed general waste should be kept on file.
- A community group could be tasked with the continuous cleaning of the rehabilitated area.

10.3.4. Hazardous waste

- Not relevant

10.3.5. Sewage and effluent

- Not relevant.

11. STORM WATER MANAGEMENT PLAN

The purpose of the Storm Water Management Plan is to provide general guidelines and principles for the management of storm water during both the construction and operational phase. This is done to ensure minimal erosion and ecological damage as a result of increased volumes of storm water and runoff from hard surfaces (roofs, roads, paving etc.).

As this section forms part of the EMP, the overall responsibility of ensuring compliance with the Storm Water Management Plan ultimately lies with the applicant.

11.1 Construction Phase

Implement and maintain a storm water management system for the facility. In general, the following measures are recommended:

- The protective buffer around the watercourses must be respected as it acts as a trap for sediment and contaminants. Measures must be put in place around sensitive areas to protect these from sediment and contaminants.
- Erosion control measures must be put in place to minimise erosion at excavation / clearing sites or aggregate storage sites. Earth moving construction activities to take place in dry season as far as possible.
- Vegetation essential for construction must only be removed and do not allow any disturbance to the adjoining natural vegetation cover.
- Measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation.
- The accumulation of water on the surface must be prevented. The drainage of the surface must be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
- Surface water or storm water is not permitted to canalize or be concentrated.
- Storm water outflows must not be allowed to enter directly into watercourses.
- Runoff from roads must be managed to avoid erosion and pollution problems.
- Erosion control barriers must be put in place and maintained as appropriate to prevent sedimentation.
- Storm water or contaminated water is not allowed to directly enter any watercourse.
- Waste traps will be installed to catch litter conveyed by surface runoff.
- All waste traps within the storm water system will be emptied / cleaned regularly to ensure their efficient functioning.
- Concentrated storm water flows must be dissipated through energy dissipaters or vegetated areas.
- Proactively protect steep access roads, cuttings against and other areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent surface water being concentrated in water sources and from scouring the slopes, banks or other areas.
- All erosion damage will be repaired as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- The stabilisation of disturbed areas, access roads and / or steep cuttings is very site specific and could include reno mattresses, mitre drains, drainage pipes, benches, gabions; scarifying (ripping) areas along the natural contours or packing branches and rocks.
- All rehabilitated areas will be monitored for at least a year following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.

11.2 Operational Phase

Maintain the storm water management system for the facility on an ongoing basis and ensure that this is always in good working order. The following is of relevance:

- All activities that affect surface drainage will be designed so as to ensure that storm water runoff does not lead to excessive surface erosion problems on the site.
- Porous paving surfaces must be used in place of hard paved surfaces in order to promote and encourage the infiltration of storm water.
- The protective buffer around the watercourses must be respected as it acts as a trap for sediment and contaminants. Measures must be put in place around sensitive areas to protect these from sediment and contaminants.
- Measures must be in place to control the flow of excess water so that it does not impact on the surface vegetation.
- The accumulation of water on the surface must be prevented. The drainage of the surface must be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
- Surface water or storm water is not permitted to canalize or be concentrated.

- Runoff from roads must be managed to avoid erosion and pollution problems.
- Erosion control barriers must be established and maintained as appropriate to prevent sedimentation.
- Prevent storm water or contaminated water directly entering any watercourse.
- Waste traps will be installed to catch litter conveyed by surface runoff.
- All waste traps within the storm water system will be emptied / cleaned regularly to ensure their efficient functioning.
- Dissipate concentrated storm water flows through energy dissipaters or vegetated areas.
- All erosion damage will be repaired as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- All rehabilitated areas will be monitored for at least a year following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required

12. FIRE PROTECTION MANAGEMENT PLAN

The National Veldt and Forest Fire Act (Act No. 101 of 1998) deals with the prevention and combat of veld, forest and mountain fires throughout South Africa, and should be adhered to at all times. This Act provides guidelines regarding fire break preparation and maintenance, the equipment needed for fighting fires and availability of personnel during fire emergencies, the roles and responsibilities of persons and officials during fire emergencies, the offences and penalties, as well as the powers of registered fire protection officers and law enforcement.

In terms of the National Veldt and Forest Fire Act 101 of 1998 there is a restriction on the making of fires, in that no fires may be made without a permit.

Both the National Environmental Management (NEMA): Protected Areas Act, 57/2003 and National Veld Forest Fire Act are very clear on the penalties (fines, imprisonment or both) and/or disciplinary action which may be imposed on persons who are found guilty of not complying with the laws stipulated.

12.1 Construction Phase

The following is applicable during the construction phase:

- All Contractors must take all the necessary precautions to ensure that fires are not started as a result of activities on site.
- No open fires will be permitted anywhere on site.
- No incineration or burning of waste will be permitted anywhere on site.
- Personnel and staff will be provided with gas for cooking purposes in demarcated, safe areas within the construction camp.
- A fire break must be established and maintained around the perimeter of all construction sites prior to the commencement of construction activities.
- All Contractors will contact all of the adjacent farm owners prior to the commencement of the construction phase and ensure that he/she has the contact numbers so that they can be contacted in the event of a fire.
- All Contractors to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.
- Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, winter months.
- All Contractors shall supply all site offices, kitchen areas, workshop areas, material stores and any other areas identified with suitable, tested and approved fire-fighting equipment.
- All equipment shall be maintained in good operating order.

- All Contractors will provide fire-fighting training to selected construction staff.
- In the event of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate private landowners for any damage caused by the fire. The contractor should bear the costs associated with fighting the fire
- All Contractors to ensure that the necessary firefighting equipment is on site in accordance with relevant legislative requirements.

12.2. Operational Phase

The following general fire management actions apply throughout the operational phase of the facility:

- No incineration or burning of waste is permitted within the Reserve.
- A fire break around the perimeter of River Lodge must be established and maintained.
- Lines of communication must be maintained with all of the adjacent farm owners so that they can be contacted in the event of a fire.
- Fire-fighting training is to be provided to selected operational staff.
- Management is to ensure that the necessary firefighting equipment is on site in terms of relevant legislative requirements.
- Staff members or the persons who give the instruction to light a fire without complying with the abovementioned regulations will be subjected to disciplinary action and may also face criminal charges in terms of the Veld and Forest Fire Act 101 of 1998.

REFERENCES

Cultural Heritage Impact Assessment: Phase 1 Investigation for Proposed Extensions to River Lodge in Kapama Private Game Reserve, Maruleng Local Municipality, Mopani District Municipality, Limpopo Province. FP Coetzee, 2018.

Cultural Heritage Impact Assessment: Phase 1 Investigation for the Development of Lodges, Roads and other Tourist Infrastructure in Kapama Private Game Reserve, Maruleng Local Municipality, Mopani District Municipality, Limpopo Province. FP Coetzee, 2019.

Environmental Best Practice Specifications: Construction for Construction Sites, Infrastructure Upgrades and Maintenance Works. Department of Water Affairs and Forestry, 2005.

Kapama Game Reserve: Terrestrial Ecological Assessment. Ecorex Consulting Ecologists CC, 2019, amended 2021.

APPENDICES

Appendix A: Curriculum Vitae of the Environmental Assessment Practitioner

APPENDIX A: CURRICULUM VITAE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Curriculum Vitae
BRYONY PAIGE VAN NIEKERK

PERSONAL INFORMATION

Full Name:	Bryony Paige van Niekerk
Date of Birth:	1987-06-21
Gender:	Female
Nationality:	South African
Race:	White
Language(s):	English and Afrikaans (written and spoken)
Marital Status:	Single
Dependents:	0
Drivers License:	Code EB
Residential Address:	The Globe, Paramount Estate, Silverlakes
Postal Address:	The Globe, Paramount Estate, Silverlakes
Telephone number:	074 818 9788
Email address:	bryony@nuleafsa.co.za

FORMAL EDUCATION

Date	Qualification	Institution
2005	Grade 12	Pretoria High School for Girls
2012	Bachelor of Science in Natural Sciences: Chemistry and Zoology Stream	University of South Africa
2015	Bachelor of Science Honours in Environmental Management	University of South Africa

MEMBERSHIPS & AFFILIATIONS

- Professional member: Environmental Assessment Practitioners Association of South Africa (EAPASA) No. 2019/655

TECHNICAL SKILLS

Software	Skill level
MS Word	proficient
MS Excel	proficient
MS Outlook	proficient
MS PowerPoint	proficient
Corel DRAW	proficient
Corel PHOTOPAINT	proficient
Global Mapper GIS	proficient
Locus Maps	proficient

BRIEF SUMMARY OF CORE COMPETENCIES

Bryony is a registered Environmental Assessment Practitioner (EAPASA) with an Honors Degree in Environmental Management, and 8 years of experience. Bryony has specialized in Environmental Planning and Management, with specific expertise in Bioregional Planning, Environmental Impact Assessments and Environmental Management Planning.

CAREER HISTORY

Date	Company / Organization	Position
2015 - present	NuLeaf Planning and Environmental (Pty) Ltd	Environmental practitioner
2013 - 2014	Ecotourism Solutions	Project Administrator

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

RELEVANT WORK EXPERIENCE (KEY PROJECTS)

(All projects in South Africa unless otherwise stated)

COMPANY	YEAR	PROJECT NAME	CLIENT	DESCRIPTION OF DUTIES
Nuleaf Planning & Environmental	2021	Development of a walkway and expansion of infrastructure at River Lodge and Drakensig Village	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2020-2021	Proposed Expansion to River Lodge and WWTW Upgrades in Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2020-21	Tenbosch Resort and Residential Estate BAR (EIA)	Automotive Window Manufacturer CC	Basic Assessment (EIA) process for development of a resort and residential estate, Komatipoort, Mpumalanga.
Nuleaf Planning & Environmental	2020-2021	Proposed Expansion to Ngwenya Lodge	Quality Time Marketing (Pty) Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2020	Proposed Amendment to the Vredenburg Landfill site (VIA)	JG Afrika	Review and amend visual impact assessment.
Nuleaf Planning & Environmental	2019-2020	Proposed Expansion to River Lodge and WWTW Upgrades in Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2019-2020	Proposed Expansion to the Runway in Lapalala Wilderness Reserve and the construction of an access road.	Lapalala Wilderness Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the Report and management of specialists
Nuleaf Planning & Environmental	2019	Proposed Expansion to Pestana Kruger Lodge.	Pestana Lodge	Preparation of a basic assessment report for the expansion of the existing Pestana Lodge, near Kruger National Park.
Nuleaf Planning & Environmental	2019	Proposed relocation of the Sabie Sands Wildtuin Shaw's Head Quarters, Mpumalanga	Sabie Sands	Visual Impact Assessment
Nuleaf Planning & Environmental	2019	Application for Environmental Authorization in terms of S24G for Tourist Lodges and Management Infrastructure within Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Preparation and submission of a Section 24(g) rectification application for NEMA non-compliant development on Kapama Game Reserve.
Nuleaf Planning & Environmental	2019	Ngwenya Lodge and WWTW Basic Assessment Process	Quality Time Marketing (Pty) Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2018-2020	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure	Lapalala Wilderness Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2018-2019	Proposed Expansion to Founders Lodge in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Nuleaf Planning & Environmental	2018-2019	Sekhukhune District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the Bioregional Plan
Nuleaf Planning & Environmental	2018-2019	Capricorn District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the Bioregional Plan
Nuleaf Planning & Environmental	2018-2019	Proposed Amendment to the Custodian Sites in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Responsible for compilation of various Amendment Reports and overall project management
Nuleaf Planning & Environmental	2018	Proposed Establishment of a Staff Village in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2018	Proposed Expansion to River Lodge, Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017-2018	Proposed Establishment of an Aquaculture Development Zone in Amatikulu, KZN	Department of Agriculture, Forestry and Fisheries	Preparation and submission of a Full Scoping and EIR.
Nuleaf Planning & Environmental	2017-2018	Amendment: Hans Hoheisen Wildlife Research Station	University of Pretoria	Environmental Practitioner
Nuleaf Planning & Environmental	2017	Ngwenya Lodge and WWTS Basic Assessment Process	Quality Time Marketing (Pty) Ltd	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017	Tenbosch Lodge / Resort Basic Assessment Process	Roosmaryn Boerdery (Edms) Bpk	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017	Vhembe District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the bioregional plan, project management and hosting of workshops
Nuleaf Planning & Environmental	2017	Application for Proclamation as Protected Area: Lapalala Wilderness Private Game Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Compilation of application and motivational report.
Nuleaf Planning & Environmental	2017	Application for Proclamation as Protected Area: Kapama Private Game Reserve	Kapama Private Game Reserve	Environmental Practitioner. Compilation of application and motivational report.
Nuleaf Planning & Environmental	2017	Moses Kotane District Municipality: -Integrated Environmental Management Plan	Moses Kotane District Municipality	Environmental Practitioner & Project Leader. Compilation of the IEMP
Nuleaf Planning & Environmental	2017	Egoli Gas Waste Management License	Egoli Gas	Environmental Practitioner.
Nuleaf Planning & Environmental	2016	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2016	Monate Game Reserve Application for Proclamation	Monate Game Reserve	Application for Proclamation as a Protected Area
Nuleaf Planning & Environmental	2016	Makolo mine: Appeal		Review of EIA documents and compilation of appeal for submission.

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Nuleaf Planning & Environmental	2015-2016	Mopani District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Compilation of the bioregional plan, project management.
Nuleaf Planning & Environmental	2015-2016	Section 24G Application for the Lapalala Private Game Reserve	Lapalala Private Game Reserve	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2015-2016	Basic Assessment for the proposed Sebele Game Lodge	Barokologadi Community Property Association	Environmental Practitioner. Responsible for compilation of the Report and management of specialists.
Nuleaf Planning & Environmental	2015	Spa at Bakubung Lodge	Pilanesberg Resorts Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2015	Various VIAs	Exheredo	Visual impact assessment
Nuleaf Planning & Environmental	2015	Basic Assessment for the proposed Bhundu Inn Hotel	Paul Mojapelo	Environmental Practitioner. Responsible for compilation of the Report.
Nuleaf Planning & Environmental	2015	AIR Resource Mapping and Management Planning	CESVI / European Commission	Compilation of reports.
Nuleaf Planning & Environmental	2014-2015	EIA for the proposed Malelane Safari Lodge near the Malelane gate, Kruger National Park	Marakele Safari Resort Investments Pty Ltd	Environmental Practitioner. Compilation and submission of reports.
Nuleaf Planning & Environmental	2014-2015	EIA for proposed upgrades to the Maropeng Interpretation Centre	GAPP	Environmental Practitioner. Compilation and submission of reports.
Nuleaf Planning & Environmental	2014	Basic Assessment for the proposed spa at Bakubung Lodge, Pilanesberg Game Reserve	Pilanesberg Resorts Pty Ltd	Environmental Practitioner. Compilation and submission of reports.