Proposed Expansion to Pestana Kruger Lodge outside the Kruger National Park, in Mpumalanga Province

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

Compiled by:

NULEAF PLANNING AND ENVIRONMENTAL PTY LTD

On behalf of:

Pestana Kruger Lodge

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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:	In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to: (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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Appendix A: Curriculum Vitae of the Environmental Assessment Practitioner
Appendix B: Layout Map

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

Please refer to Appendix A for EAP curriculum vitae.

3. BACKGROUND

The proposed development entails the expansion of the existing Pestana Kruger Lodge located outside the Kruger National Park. The expansion will entail the construction of an additional 35 luxury chalet blocks, comprising of 1016 beds in total. Two new recreational areas will also be constructed, as well as, a refuse handling area, maintenance/ workshop, a pedestrian bridge and staff quarters. All associated civil infrastructure (water, electricity and waste treatment) will be included.

The proposed extension will consist of the following:

- 35 chalet blocks totalling 136 units:
    - 27 blocks x 4 chalets = 108 chalets x 8 beds = 864 beds
    - 1 block x 2 chalets = 2 chalets x 8 beds = 16 beds
    - 6 blocks x 4 chalets = 24 chalets: 12 chalets x 4 beds, 12 chalets x 6 beds = 120 beds
    - 1 block x 2 chalets = 2 chalets x 8 = 16 beds
- 3 x Viewpoints/ bird hides
- 2 x Recreational areas e.g. swimming pools, jungle gyms, ablution facilities, braai areas.
- New reception area located in the existing building over the dam
- A kiosk with a coin operated laundromat
- A refuse sorting and storage area
- Maintenance store and workshop
- Staff quarters
- Pedestrian bridge
- The existing single lane vehicle river crossing to be expanded to a double lane
- Additional viewing deck to the main restaurant

Please note that the following infrastructure will be located within 32 m of a watercourse:

- 5 Chalet blocks
- 2 x Bird hides

Refer to Appendix B for an example of a typical layout of the proposed infrastructure.

4. ROLES AND RESPONSIBILITIES

4.1 Parties responsibilities

Party	Responsibility
Applicant	• 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	• 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. • 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: o not be disturbed, damaged or removed and o 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	• 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: o Not be disturbed, damaged or removed; and o 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)	• 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)	• 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, operators and any other relevant personnel or I&A's as required. • 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.

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 EMPr. 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 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 EMPr.

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 EMPr.

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 once a month 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.

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 Planning and compliance

To comply with regulations pertaining to surface water, ground water and protected species.

7.1.1 Ground water

General mitigation:

- Register boreholes to be used for potable water extraction as per DWS requirements.
- Obtain a Water Use License for listed activities (water abstraction, irrigation with purified effluent and overland discharge of purified effluent) if required.
- Ensure that overland discharge of excess purified effluent (if required) is undertaken in a controlled manner does not cause erosion.
- No purified effluent may be discharged directly into any watercourse without the appropriate Water Use Licence in place.
- Specify water saving devices and technologies wherever possible. Measures include the specification of low flow shower heads and taps, and the use of grey water for on potable activities such as irrigation.

7.1.2 Surface water

General mitigation:

- Buildings and other hardened surface infrastructure (including storm water attenuation measures) should try to be located outside of buffered watercourses.
- Buffer zones around any wetlands should be established and regarded as No-Go areas for the development.

Specialist mitigation:

- A minimum buffer zone of 25 m should be adhered to around the two riparian zones located along the centre of the site.
- A minimum buffer zone of 25 m should be adhered to around the wetland located in the north east section of the site.
- A minimum buffer zone of 62 m should be adhered to around the Crocodile River located to the west of the site.
- All activities should stay out of the 1:100 year flood line area.
- All activities should stay out of the riparian areas area and its recommended buffer zones;
- All storm water should be diverted to a point from where the water must be released in a controlled manner that will not initiate or enhance any erosion, the way storm water enters a natural waterway is important because high-energy flows can cause serious damage (especially to riparian zones).
- Energy dissipaters and smaller permeable gabion-structures covered with reeds can be constructed at the effluent points of all stormwater.

- Debris and sediment trapping, as well as energy dissipation control structures, should be put in place where storm-water may enter riparian areas

7.1.3 Protected species

General mitigation:

- The sensitivity map must be used as a decision making tool to guide the layout design. Development on areas of high environmental sensitivity must be avoided.

Specialist mitigation:

- No development to take place in the Disturbed Riparian Forest community, particularly in nodes A & D. Here, a conservation buffer of at least 25m is recommended. This will extend into Disturbed Closed Woodland in places. The exclusion here is node C which is already partly transformed and most of the Riparian Forest community is situated on a steep bank.
- No development to take place within the 200m conservation buffer for *Caesalpinia rostrata*, irrespective of vegetation community, as recommended by SANBI.
- All protected succulents (such as *Aloe spp*. and *Stapelia gigantea*) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.

7.1.4 Storm water management

General mitigation:

- As per the Storm Water Management Plan (refer to section 11.1).

Specialist mitigation:

- All storm water should be diverted to a point from where the water must be released in a controlled manner that will not initiate or enhance any erosion, the way storm water enters a natural waterway is important because high-energy flows can cause serious damage (especially to riparian zones).
- Energy dissipaters and smaller permeable gabion-structures covered with reeds can be constructed at the effluent points of all stormwater.
- Debris and sediment trapping, as well as energy dissipation control structures, should be put in place where storm-water may enter riparian areas
- Storm water drainage inlets to be fitted with litter catchers to avoid polluting the Crocodile River and its tributaries.

7.1.5 Waste management

General mitigation:

- As per the Waste Management Plan (refer to section 10.1).

7.1.6 Heritage

General 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)).

7.2 Development footprint planning

To ensure the development footprint is kept to a minimum and that sensitive environments are taken into consideration

General mitigation:

- Consolidate the location of structures and infrastructure so as to localise and contain the development footprint as much as possible. Retain all areas beyond the development footprint as natural / conservation landscape.
- Refine the final layout of roads, buildings and infrastructure 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.
- Plan to leave as much of the natural vegetation intact as possible.
- Refine the final layout so that disturbance of sensitive environments is avoided / minimized. Adjust the location of facilities so as to minimise impact on the riparian zone.
- Combine access roads with power line servitudes, firebreaks etc. wherever possible.
- Combine bulk service infrastructure (electricity, water, sewage) into single trenches or alignments wherever possible.
- Plan to leave as much of the natural vegetation intact as possible.
- Ensure that all permanent structures and infrastructure is located outside of the 1:100 year floodline of the Crocodile River.
- If development within the riparian zone is unavoidable due to terrain, access or substrate, the proposed infrastructure should 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 should 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 should be appointed to supervise and guide construction workers.

Specialist mitigation:

- Minimize the removal/damage to vegetation in riparian areas.
- The construction of pathways (disturbance zones) in or adjacent to the riparian areas is to be closely managed and strictly controlled to minimize damage to riparian areas.
- No construction camps should be allowed in or within 20 m of riparian areas.
- No stockpile areas should be located in or within 20 m of riparian areas.
- Stockpiling of soil and of supplies for the construction camps must take place clearly away (at least 20 m where possible) from the edge of riparian areas to prevent soil being washed into the habitat of the riparian area
- A minimum buffer zone of 62 m should be adhered to around the Crocodile River located to the west of the site.

- All activities should stay out of the 1:100 year flood line area.
- All activities should stay out of the riparian areas area and its recommended buffer zones;
- To cater for the present and the proposed developments in above mentioned riparian areas on site and off site mitigation is recommended to mitigate the negative effects thereof.

7.3 Visual environment planning

To ensure that the visual impact on the surrounding area and sense of place will be kept to a minimum

7.3.1 General planning and design

General mitigation:

- Make use of earth tones and natural materials rather than primary colours and high-tech finishes.
- Make use of light, shallow gradient roofs.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Make use of thatched or timber clad roofs and / or suitable paint colours on steel roofs reduce the impact of glare from sunlight.
- Make use of earthy, muted colours and avoid pastel and primary colours.
- Make use of natural, non-reflective, earthy materials rather than high-tech reflective materials.
- Avoid large expanses of glass. Where glass is used, ensure that this is tilted and tinted to reduce glare.

Specialist mitigation:

- Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.
- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.

7.3.2 Lighting

General mitigation:

- No directional spotlights or floodlights will be permitted.
- No coloured lights will be permitted, only 'cool white' lighting.
- Minimum wattage and lumen in all light fixtures.
- Exterior lights - make use of down-lighters, or shielded fixtures;
- Limit the mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights.
- Make use of Low Pressure Sodium lighting or other types of low impact lighting (spotlights).
- Tilt spotlight luminaires to direct the light to the intended spot, instead of allowing it to light areas outside its purpose;
- Mount outdoor spot lights on the appropriate pole height. Higher mounting heights allow lower main beam angles which can reduce glare.
- Utilise control systems to reduce light levels during inactive periods or at predetermined times while maintaining sufficient lighting for safety and security (NEMA, 2000).
- Do not over illuminate areas. Use the correct illuminance intensity for the purpose intended.

Specialist mitigation:

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7.4 Socio-economic planning

To ensure community beneficiation via job creation and skills transfer

General mitigation:

- The local authorities, community representatives, and organisations on the interested and affected party database should 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.
- Where reasonable and practical, the applicant should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories.
- The NLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.
- Before the construction phase commences the applicant should meet with representatives from the NLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
- The applicant should liaise with the NLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.
- The applicant should identify local companies, specifically BEE companies, that qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.
- Where possible the applicant should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.

Specialist mitigation:

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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 EMPr, as well as, a copy of the environmental sensitivity plans and construction layout plan must be available onsite.

8.1 Pre-construction

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

8.1.1 Planning and preparation

General mitigation:

- An independent Ecological Control Officer (ECO) must be appointed to oversee construction.
- A permanent Environmental Officer (EO) must 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 must 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.
- 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.
- The contractor must ensure that his construction staff is briefed as to the provisions of the EMPr.
- 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 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.

Specialist mitigation:

- The contractor must develop a Code of Conduct to specify what types of behaviour and activities are and are not permitted by construction workers. Both the applicant and the contractor should sign the Code of Conduct before the contractor moves onto site.
- All workers are to be informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences relating to trespassing, stock theft and poaching.
- The applicant should enter into an agreement with the affected landowners whereby the contractor will compensate farmers for any stock losses and/or damage to farm infrastructure, as well as any damage incurred to hospitality facilities that can be linked to construction workers. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities.
- Construction workers that breach the code of good conduct should be disciplined / dismissed. All dismissals must comply with the South African labour legislation.

8.2 Site establishment

To ensure that the construction footprint is kept to a minimum in order to conserve and protect plant and animal species and habitat and to ensure that site facilities, structures and infrastructure do not impose on the surrounding environment

8.2.1 Site demarcation

General mitigation:

- 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 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.
- 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.
- Prohibit vehicular or pedestrian access into all natural areas beyond the demarcated boundary of the construction site.
- 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 ECO's details should be displayed on a notice board at the entrance to the site so members of the public can report perceived transgressions of conditions.

Specialist mitigation:

- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.
- All protected succulents (such as Aloe spp. and Stapelia gigantea) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- A suitably experienced botanist should be present on site at the time of pegging so as to identify sensitive plants or habitats.
- The nationally protected trees to be protected (*Sclerocarya birrea subsp. cafra, Combretum imberbe* and *Philenoptera violacea*), *Aloe marlothii* and *Crinum stuhlmannii* protected under provincial legislation and any other identified subsequent to the initial survey, should be clearly marked prior to construction.

8.2.2 Accommodation

General mitigation:

- 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.
- 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.

8.2.3 Pollution control

General mitigation:

- 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.
- Install a drainage diversion system to divert clean runoff around areas of potential pollution, e.g. batching areas, workshops, etc.
- Direct polluted runoff and waste water emanating from the construction site 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.
- Prevent polluted water from reaching 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.

8.2.4 Access roads

General mitigation:

- Construction of proposed 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.
- Formalize access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
- 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 for the Staff Accommodation, 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.

Specialist mitigation:

- All existing and proposed roads to contain adequate stormwater drainage and erosion control measures.
- The construction of pathways (disturbance zones) in or adjacent to the riparian areas is to be closely managed and strictly controlled to minimize damage to riparian areas.

8.2.5 Protection of flora

General 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.
- 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.
- Implement fines for the damage or destruction of marked and protected specimens. It is the contractor's responsibility to ensure that these are retained.
- Do not mark or deface any natural feature.
- 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.
- No material storage or lay down is permitted under trees.

- 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.
- Retain vegetation and soil within construction areas in position for as long as possible, removing it immediately ahead of construction / earthworks in that area.
- Workers may 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.
- Implement a Plant Rescue Plan for protected species within the construction areas. Where feasible, these should be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation plan.

Specialist mitigation:

- If infrastructure is planned within any natural vegetation, the areas should be checked by a suitably experienced botanist to locate all conservation-important species. These plants should be marked and the relevant permits applied for before removal and translocated to nearby suitable habitat prior to vegetation being cleared.
- No development to take place within the 200m conservation buffer for *Caesalpinia rostrata*, irrespective of vegetation community, as recommended by SANBI.
- Destruction of trees during construction to be kept to an absolute minimum. Permits will be required for the removal of protected trees.
- All protected succulents (such as *Aloe* spp. and *Stapelia gigantea*) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.
- New infrastructure should not impact any large indigenous trees, wherever possible
- Where possible, all future development to take place over existing transformed areas to preserve the remaining natural vegetation on the site.

8.2.6 Protection of the riparian system

General mitigation:

- 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 should take place outside of the rainy season when the flow of the non-perennial rivers is at a minimum.

Specialist mitigation:

- Plan and develop outside riparian areas;
- Create the recommended buffer around riparian areas (likely, a buffer of <20 m may adequately fulfill several functions and values such as biotic movement, protecting the edge of the riparian areas, and some water quality functions, etc.) (MacFarlane, Dickens, & Von Hase, 2009);
- Minimize the removal/damage to vegetation in riparian areas;
- The construction of pathways (disturbance zones) in or adjacent to the riparian areas is to be closely managed and strictly controlled to minimize damage to riparian areas;
- Operation and storage of equipment in the riparian areas to be prevented;

- If the riparian areas is disturbed during construction it should be re-vegetated using site-appropriate indigenous vegetation and/or seed mixes;
- Alien vegetation should not be allowed to colonize the disturbed riparian areas;
- Rehabilitation of disturbed riparian areas habitat should commence immediately after construction is completed;
- No construction camps should be allowed in or within 20 m of riparian areas;
- No stockpile areas should be located in or within 20 m of riparian areas;
- Construction should preferably take place during the low flow/winter months in order to minimize the risk of sediment and debris being washed into riparian areas;
- Stockpiling of soil and of supplies for the construction camps must take place clearly away (at least 20 m where possible) from the edge of riparian areas to prevent soil being washed into the habitat of the riparian area;
- During the construction and operation phases erosion and siltation measures should be implemented (e.g., the use of temporary silt traps downstream of construction areas);
- Slope/bank stabilization measures should be implemented where necessary to prevent erosion during the operation;
- Debris and sediment trapping, as well as energy dissipation control structures, should be put in place where storm-water may enter riparian areas;
- No development to take place within the 200m conservation buffer for *Caesalpinia rostrata*, irrespective of vegetation community, as recommended by SANBI.
- Destruction of trees during construction to be kept to an absolute minimum. Permits will be required for the removal of protected trees.
- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.
- All protected succulents (such as *Aloe* spp. and *Stapelia gigantea*) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.
- Turbidity, sedimentation and chemical changes to the composition of the water must be limited; and
- Where vegetation removal has occurred adjacent to the pathways, monitoring should take place to ensure successful re-establishment of natural vegetation. Alien vegetation should be removed from these disturbed areas on an ongoing basis to ensure successful re-vegetation by indigenous species.

8.2.7 Protection of fauna

General mitigation:

- Ensure that construction personnel are briefed on the potential occurrence of protected faunal species, what they look like, and where they are likely to be found. Personnel are to 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.
- Develop a procedure for dealing with animals encountered on the site, including dangerous animals and vermin. Where necessary, call in professionals to remove the animals.
- Personnel are to be instructed on the presence of dangerous game and the appropriate behaviour and safety upon encountering such game.
- Ensure that all personnel are aware of what the procedures for dealing with animals are. It is the contractor's responsibility to ensure that proper procedures are followed.

- 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.

Specialist mitigation:

- The contractor should enter into an agreement with the Kruger National Park whereby the loss of wildlife during the construction phase will be compensated for. The agreement should be signed before the construction phase commences
- The contractor must ensure that construction workers found guilty of poaching are dismissed and charged. All dismissals must be in accordance with South African labour legislation

8.2.8 Protection of cultural heritage

General 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.

Specialist mitigation

- In the unlikely event that fossils are uncovered during construction then construction must cease within the immediate vicinity, a buffer of 30 m must be established, and a palaeontologist called in to inspect the finds. The palaeontologist must obtain a section 35(4) permit in terms of NHRA and Chapter IV NHRA Regulations, before any fossils are collected.
- If there are any new heritages resources are discovered during construction and operation phases of the proposed development, then a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer.
- If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer. Mitigation will only be carried out after the archaeologist or palaeontologist obtains a permit in terms of section 35 of the NHRA (Act 25 of 1999).
- If any unmarked human burials are uncovered and the archaeologist called in to inspect the finds and/or the police find them to be heritage graves, then mitigation may be necessary and the SAHRA Burial Grounds and Graves (BGG) Unit must be contacted for processes to follow (Thingahangwi Tshivase/Mimi Seetelo 072 8021251).
- A palaeontological Chance Find Protocol must be followed as a monitoring programme during construction. This procedure is only required if fossils are seen on the surface and when excavations commence. The following monitoring Programme for Palaeontology is to commence once the excavations begin:
    - When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, and coal) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
    - Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (See Appendix J). This information will be built into the EMP's training and awareness plan and procedures.
    - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
    - As required and to be agreed upon by the developer and the qualified palaeontologist sub-contracted for this project, the palaeontologist should visit the site to inspect the selected material and check the samples where feasible. The frequency of inspections should be

determined by the finding of interesting material. However, if the onsite designated person is diligent and extracts the fossil material then inspections can be less frequent.

- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then the site inspections by the palaeontologist can be reduced to annual events until construction has ceased. Annual reports by the palaeontologist must be sent to SAHRA.
- If no fossils are found and the excavations have finished then no further monitoring is required.

8.3 Materials management

To ensure that waste management activities on site are undertaken in the correct manner and that staff are aware of the procedures

8.3.1 Solid, liquid and hazardous waste

General mitigation:

- As per Waste Management Plan (refer to section 10.2).

8.3.2 Concrete and cement work

General mitigation:

- Ensure that concrete and cement works are undertaken in specified areas only.
- Ensure that all operations that involve the use of cement and concrete are carefully controlled. Water and slurry from concrete mixing operations must be contained to prevent pollution of the ground surrounding the mixing points.
- Use plastic trays or liners 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.

8.3.3 Fuel and hazardous material

General mitigation:

- Provide the ECO with a list of all petroleum, chemical, harmful and hazardous substances and materials on site, together with storage, handling and disposal procedures for these materials.
- Ensure that all hazardous substances (chemicals, oils, etc.) are stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials must be stored in enclosed, bunded areas. The bunded areas shall be clearly marked.
- The bund must 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 must be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump shall be disposed of as hazardous waste.
- Ensure that all hazardous substances are used and handled by qualified personnel on bunded surfaces.
- Ensure that no oil, petrol, diesel etc. is discharged onto the ground.

- All hazardous products to be dispensed from 200 litre drums shall be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel must have lids, which are to remain firmly shut.
- Gas and liquid fuel may not be stored in the same storage area.
- 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.

8.4 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

General mitigation:

- Conserve topsoil though 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 is to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.
- Co-ordinate works 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.

Specialist mitigation:

- No stockpile areas should be located in or within 20 m of riparian areas

8.5 Erosion control

To reduce the erosive effects of surface water runoff on exposed soils

8.5.1 Water management

General mitigation:

- Monitor water consumption to ensure that there is no undue waste. Keep records of water monitoring and make these available to the ECO upon request.
- Ensure that consumption does not exceed permitted quantities. Take action to reduce consumption if necessary.
- Ensure that all construction personnel are trained in water wise principles, and that they practise prudent use of water during the construction phase.

Specialist mitigation:

- Turbidity, sedimentation and chemical changes to the composition of the water must be limited.

8.5.2 Storm water management

General mitigation:

- As per the Storm Water Management Plan (refer to section 11.2).

Specialist mitigation:

- Debris and sediment trapping, as well as energy dissipation control structures, should be put in place where storm-water may enter riparian areas.
- All storm water should be diverted to a point where the water must be released in a controlled manner that will not initiate or enhance any erosion.
- Storm water drainage inlets be fitted with litter catchers to avoid polluting the Crocodile River and its tributaries.

8.5.3 Excavation, backfilling and trenching

General mitigation:

- 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

Specialist mitigation:

- Construction should ideally be scheduled to take place during the dry season when rainfall and associated erosion potential is at its least. For longer construction periods of more than six months, construction should be scheduled such that exposure of soils (before addition of hardstanding or rehabilitation) occurs mostly within the dry season as far as possible.
- All disturbed areas must be rehabilitated (as soon as possible) to represent the previous undisturbed environment (soil, land-cover, slope) as closely as possible to limit the impact on receiving water resources (by limiting soil erosion).

- The construction of roads may create large areas prone to erosion due to soils being exposed. Roads should therefore be constructed in a manner to rapidly stabilise soils, while road side drainage should be included where necessary. For more information, please refer to the SANRAL (2013) 6th Edition Drainage Manual.

8.6 Alien plant control

To prevent the spread and establishment of alien invasive plant species owing to exposed soils.

General mitigation:

- Alien invasive species within the site should 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.
- Follow manufacturer's instruction when using chemical methods, especially in terms of quantities, time of application etc.
- Ensure that only properly trained people handle and make use of chemicals.
- Limit herbicide and pesticide use 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 should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access to the Reserve.

Specialist mitigation:

- Alien vegetation should not be allowed to colonize the disturbed riparian areas.
- All listed invasive exotic plants as indicated in the Ecology Report should be targeted and controlled. This may necessitate the compilation of an alien plant control plan.
- Developers should implement an alien plant control program to combat the infestation present around the riparian zones. This program should include regular inspections and follow-ups.
- An alien vegetation clearing project is recommended especially along water courses and drainage lines. The removal of alien vegetation should be promoted amongst the residences of the existing infrastructure and houses in a phased approach.
- Weeds will inevitably establish around the proposed construction sites and it is important that weed control, if involving herbicides, be managed correctly so as to reduce the impact on the adjacent natural vegetation. Regular inspections should be made to determine if any additional alien plants have established.
- The proposed extension should plant only indigenous vegetation. The KNP should be consulted for a species list.

8.7 Vehicles and equipment management

To ensure that all construction vehicles and equipment are in good working order and condition

General mitigation:

- Maintain site vehicles and equipment in an acceptable state of repair. All vehicles must be road-worthy and regularly serviced.
- All road rules and speed limits must be adhered to at all times.
- Construction staff should only use authorised paths and roads.

- 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.
- 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 are to 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 should be cleared on a regular basis.
- Construction vehicles transporting materials to and from the construction site must be covered to reduce the formation of dust.
- Ensure that the maintenance of all vehicles and equipment, including oil and lubricant changes, takes 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 shall be placed on drip trays. The drip trays shall be watertight and shall be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays shall be cleaned before any possible rain events that may result in the drip trays overflowing
- Movement of heavy vehicles and machinery to be limited wherever possible, and construction noise reduced wherever possible.
- Contactors will be required to submit a delivery timetable. Strict control is to be exercised over entering and exiting traffic and delivery procedures.
- Vehicles used during construction or to transport material or staff on site, should 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.
- Adjacent landowners must be given due warning ahead of any particularly loud construction works.
- All vehicles leaving and entering the site should be searched on a daily basis for poached fauna and flora.
- All drivers must be qualified and made aware of the potential road safety issues and the need for strict speed limits.

Specialist mitigation:

- Ensure vehicles are regularly serviced so that oil/fuel leaks are limited and keep undersides of vehicle free of oil.

8.8 Socio-economic management

To ensure community beneficiation via job creation and skills transfer and to mitigate the visual and noise impact of the construction works

8.8.1 Staff

General mitigation:

- Implement a policy that no employment will be available at the gate.
- The movement of construction workers on and off the site should be closely managed and monitored by the contractor and Reserve Management. In this regard the contractor is responsible for making the necessary arrangements for transporting workers to and from site on a daily basis, specifically construction workers who are not from the local municipality.
- 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.
- Where feasible, training and skills development programmes for locals should be run throughout the construction period.

- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

8.8.2 Visual

General 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 should 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

Specialist mitigation:

- 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.
- Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
- Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

8.9 Fire management

To safe guard and protect the environment from any potential fire hazards

General mitigation:

- As per the Fire Protection Management Plan (refer to section 12.1).

8.10. Rehabilitation

To ensure that the site is restored to its natural state prior to any construction activities

General mitigation:

- 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.
- 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. Salvaged vegetation, rather than new planting or seeding, should be used to the extent possible.
- Specifications for soil preparation, endemic plant/seed mixes, fertilizer, and mulching 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.

Specialist mitigation:

- All rehabilitation should make use of indigenous plant species, and preferably of species native to the study area and immediate surroundings. The species selected should strive to represent habitat types typical of the ecological landscape prior to 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 Biodiversity management

To ensure the continued integrity of the natural environment and the conservation of fauna and flora, particularly in rehabilitated areas.

9.1.1 Access roads

General mitigation:

- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes.
- Maintain all roads in good condition to prevent dust and erosion.
- Runoff from roads must be managed to avoid erosion and pollution problems.
- No drainage line crossings may be developed without the express permission of DWS.
- The internal road network should be maintained as gravel tracks that allow for faunal dispersal and minimize fragmentation of ecologically sensitive areas.

9.1.2 Resource management

General mitigation:

- Ensure that the Water Use license for the property is in place and up to date.
- Monitor water consumption to ensure that there is no undue waste. Keep up to date records of water monitoring and make these available to the ECO upon request.
- Ensure that consumption does not exceed permitted quantities. Take action to reduce consumption if necessary.
- Install a leak detection system, and promptly attend to leaks as required.
- Undertake monthly potable water monitoring to ensure that the output quality of the water complies with the minimum standards as prescribed by DWS. Ensure that these records are kept up to date and are available upon request.
- Ensure that all facility staff is trained in water wise principles, and that they practise prudent use of water at all times.
- Post a Code of Conduct in guest rooms and other relevant advising guests of relevant Reserve rules and regulations.

9.1.3 Protection of flora

General mitigation:

- Ensure that all conserved species and specimens are suitably protected for the duration of the operational phase.
- No protected trees or plants may be removed without the relevant permits from the local authority.
- Implement fines for the damage or destruction of marked and protected specimens.
- Guests and staff may not tamper or remove flora and neither may anyone collect seed from the plants without permission from the local authority.
- The picking of flowers or removal of plants should be prohibited in the Guest Rules.
- No bush clearing is allowed, either to enhance game viewing, for firewood or for any other purpose.
- Maintenance workers and guests may not trample natural vegetation and work should 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 may be collected for firewood or any other purpose.
- No large tree (with a stem diameter exceeding 200mm) may be felled without the permission of the ECO.

Specialist mitigation:

- Remove all dumped and refuse material in the riparian area
- Rehabilitation of disturbed riparian areas habitat should commence immediately after construction is completed

9.1.4 Alien plant control

General mitigation:

- The operator 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.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Follow manufacturer's instruction when using chemical methods, especially in terms of quantities, time of application etc.
- Ensure that only properly trained people handle and make use of chemicals.
- Limit herbicide and pesticide use to non-persistent, immobile products and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.

Specialist mitigation:

- Management measures to eradicate and control alien plants need to be informed by a invasive species management program.
- Grounds staff should be trained to recognize and eradicate potential invasive plants.
- Undertake yearly removal of aliens within the area (done in summer) until equilibration is reached. This may take several years.
- Developers must implement an alien plant control program to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program should include regular inspections and follow-ups.

9.1.5 Protection of fauna

General mitigation:

- The development should maintain connectivity between ecologically important habitats by retaining natural corridors for the movement of fauna.
- No unauthorised access is permitted to buffer areas or any natural areas outside of the facility footprint.
- Maintain a game / security fence or suitable equivalent around the perimeter of the site. This fence should, however, be designed to allow access by small mammals, tortoises etc.
- Ensure that personnel are briefed on the potential occurrence of protected faunal species, what they look like, and where they are likely to be found. Personnel are to 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 must 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.
- Develop a procedure for dealing with animals encountered on the site, including dangerous animals and vermin. Where necessary, call in professionals to remove the animals.
- Ensure that all personnel are aware of what the procedures for dealing with animals are. It is the operator's responsibility to ensure that proper procedures are followed.
- Pets and livestock are not allowed on site.
- No poaching or snaring of any game is permitted. Management must implement fines in this regard.
- Guests should be briefed on the dangers of feeding wildlife, and must be discouraged from feeding any animal. Guests should also be informed of recommended measures to secure food and food waste from animal scavengers.
- All food and waste storage areas must be properly secured against animal scavengers at all times.

Specialist mitigation:

- Management should periodically search the natural bush in the general vicinity of the Lodge site in order to detect whether snaring is taking place
- Yellow light bulbs should be utilized as they attract fewer insects and arachnids.
- Outside lighting should preferably be directed away (or "inland") from the riparian zone.

- Internal lights should be shielded by blinds/curtains.
- Control measures should be implemented (e.g. limit the number of individuals) access to the riparian zone
- No feeding of any animals is permitted anywhere.
- Noise should be kept to a minimum at night.

9.1.6 Protection of heritage resources

General mitigation:

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9.2 Materials management

To ensure proper waste storing, handling and disposal of materials and waste

9.2.1 Solid, liquid and hazardous waste

General mitigation:

- As per the Waste management Plan (refer to section 10.3)

9.2.2 Fuel and hazardous material

General mitigation:

- Ensure that all hazardous substances (chemicals, oils, etc.) are stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials must be stored in enclosed, bunded areas. The bunded areas shall be clearly marked.
- The bund must 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 must be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump shall be disposed of as hazardous waste.
- Ensure that all hazardous substances are used and handled by qualified personnel on bunded surfaces.
- Ensure that no oil, petrol, diesel etc. is discharged onto the ground.
- All hazardous products to be dispensed from 200 litre drums shall be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel must have lids, which are to remain firmly shut.
- Gas and liquid fuel may not be stored in the same storage area.
- No smoking is allowed inside the stores or within 3m of a bund.
- The Operator 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.

9.3 Erosion control

To ensure that areas cleared of vegetation are protected and allowed to restabilize

General mitigation:

- As per the Storm Water Management Plan (refer to section 11.1).

9.4 Vehicles and equipment management

To maintain air quality standards and limit soil and water contamination and pollution

General mitigation:

- Maintain site vehicles and equipment in an acceptable state of repair.
- Personnel, vehicles and equipment to move along designated routes.
- No off-road driving is permitted.
- Speed control measures must be implemented on site and in the surrounding area to reduce air pollution and animal mortality.
- Maintenance activities should be limited to daylight hours and vehicles should remain on the designated roads at all times.
- Carpools and lift clubs must be encouraged and staff picked up at a central point. Staff must not be discouraged from travelling to site in private vehicles.

Specialist mitigation:

- 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.
- Ensure vehicles are regularly serviced so that oil/fuel leaks are limited and keep undersides of vehicle free of oil to limit wash from rivers during use of basic crossings.

9.5 Socio-economic management

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

9.5.1 Staff management

General mitigation:

- The Operator is responsible for making the necessary arrangements for transporting staff to and from site on a daily basis.
- Where feasible, efforts should be made to employ local employees that are compliant with Black Economic Empowerment (BEE) criteria.
- Where feasible, training and skills development programmes for locals should be initiated and maintained throughout the operational phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- 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 operator of the facility should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.
- Where reasonable and practical, the Operator should appoint local employees and implement a 'locals first' policy, especially for semi and low-skilled job categories.

Specialist mitigation:

- A flood management/evacuation plan should be made known to all staff to be implemented during flood events or prior to flood events (due to heavy storms with an expected onset of flooding).

9.5.3 Visual impact management

General mitigation:

- Retain and maintain natural vegetation in all areas outside of the development footprints.

- Maintain the general appearance of all of the sites as a whole, including roads and servitudes.

9.6 Fire management

To prevent any unplanned and uncontrolled fires from occurring

General mitigation:

- As per the Fire Protection Management Plan (refer to section 12.2).

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:

- Reduce the overall environmental footprint of Pestana Lodge by implementing measures that will focus on preventing, reducing, reusing, recycling, composting, treatment and disposal of waste products.
- Implement formal and accountable approaches, that are of an environmentally conscience manner, to the handling, storage, transferring and disposal of waste products off Pestana Lodge premises.
- To prevent inappropriate management of waste and associated risk of pollution of the environment;
- Provide guidelines to Pestana Lodge and its contractors that will ensure waste management actions are in line with current policies and legislations.
- Define roles and responsibilities for all involved in the waste management process.
- Educate employees on wise waste management practices.
- Ensure feasible and achievable targets for waste management are set.
- Prevent avoidable mismanagement of waste and the associated risks.

In accordance with international trends, the management of all waste streams that will be generated at the lodge 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 EMPr, the overall responsibility of ensuring compliance with the Waste Management Plan ultimately lies with the Applicant.

10.1 Waste Types

Pestana Lodge is expected to generate the following predominant waste streams:

- General Waste
  This is classified as waste that is generated as a result of daily operations, that is not directly harmful to humans or the environment. Products falling into this group include paper, plastic, glass etc.
- Kitchen Wastes
  Kitchen waste will be one of the largest waste generating components. It includes all food products whether it be during the preparation stage (e.g. vegetable peels) or the final stage (e.g. leftovers); however, products that will not naturally be included into the environment, such as oils and greases, will not be classified in this category.
- Sewage Waste
  This is classified as grey (showers, baths etc.) and black (toilet) water and is made up of "contaminated" water. The possibility of harmful bacteria is probable and so can be harmful to humans and the environment if left untreated or adequate systems are not in place.
- Landscaping
  Landscaping waste will take into account most vegetation waste which will predominantly be generated from the gardens surrounding the lodges and staff residence, this will include grass cuttings, leaves, weeds as well as trimmings from hedges and bushes.
- Hazardous Waste

This is classified as any product that can have adverse impacts on the environment due to its chemical, toxicological and/or physical properties. Cleaning detergents, certain office supplies such as batteries, flammable material (gas, petrol, etc.), fluorescent lights as well as oils/grease/fat used for cooking are considered as hazardous waste.

10.2 Waste Management Plan Principles

10.2.1 Waste management hierarchy

The Hierarchy of Waste Management (HWM) (Figure 1) is the backbone of any Waste Management Plan (WMP) and provides the basic principles for an organization to sufficiently manage its waste streams while complying with their legal duty towards the environment.

The hierarchy provides different waste management strategies according to their importance and the desirability of their outcomes – the most desirable strategy is placed on the top while the strategy that is least desirable is at the bottom (Figure 1). The overall objective of the HWM is to create an IWMP where the least amount of waste product possible is generated and maximum practical benefits from the product is achieved.

Below are the waste management strategies:

- Avoid/Prevent
  Avoidance/prevention focuses on not creating any type of waste and promotes the reduction of virgin materials extracted and used. This strategy usually targets the design and the manufacturing stage of the item and so requires a change in mind set and behaviour in order for it to be successful (i.e. selecting items with less or recycled packaging). This is ranked first as it is the best and most cost effective strategy.

- Reduce/Minimize
  In most cases avoidance of waste is not possible. In such cases reduction of waste is the next most preferred option. Reduction of waste consists of the efficient and educated use of resources that lead to less waste production. The fewer products that generate waste that are brought onto the property will result in fewer waste products that need to be removed from the property.

- Reuse
  The reuse of materials involves using an existing item in its original form before disposing of it. If the lodges themselves can't reuse the item then it is advised that the possibility of donating or selling the material to an individual/organization that can use it be looked into.

- Recycle/Compost
  This strategy should only be implemented once the company has reduced and reused as much of the waste products as possible. Recycling and composting of items are more difficult for a lodge to implement than the previous strategies. This strategy involves converting an existing item into a new item that may have a different use/purpose. Waste segregation and management is essential in correctly implementing a successful recycling or compost program on the lodges.

- Dispose/Treat
  Disposal and treatment of waste is the least desirable strategy and should therefore only be used where the alternatives are not possible or when the alternatives would create a safety concern (i.e. when dealing with hazardous materials).

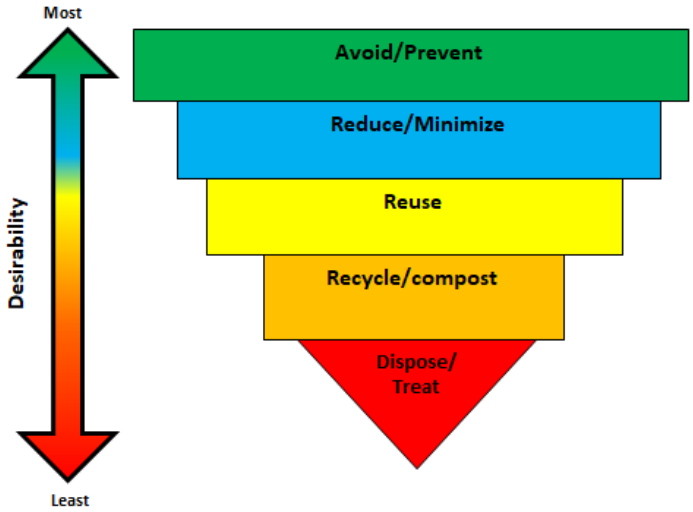

Figure 1 – Waste Management Hierarchy

10.3 Construction Phase

10.3.1 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 contactor 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.

10.3.2 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, palettes and other wood materials. Palettes 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.

10.3.3 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.

10.3.4 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 at least 100m 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.

10.4 Operational Phase

10.4.1 General waste:

General waste should be separated at source into recyclables and non-recyclables and stored safely onsite. The waste should then be transported to onsite storage areas where it can be kept until it can be transported to an approved re-cycling depot or landfill site.

The following is recommended:

- Waste is to be separated at source into recyclables and non-recyclables and wet waste
- Waste needs to be sorted according to the licensed waste contractor's requirements.
- Waste sorting and storage to occur at designated areas throughout the property.
- Recyclables are to be separated into the various categories namely, paper, plastic, cans and glass
- All sorted waste to be stored in marked 240 liter wheeled bins inclusive of wet waste and non-recyclables
- Marked bins are to be placed in strategic waste holding areas in back of house in a shaded, caged off area to prevent waste being blown into the surrounding environment and accidental ingestion by animals. These areas need to be well organized and maintained in order to prevent pests and scavengers from entering.
- All external bins throughout the lodge need to be animal proof and these bins need to be maintained and serviced on a regular basis.
- Wet waste to be collected two (2) time per week.
- Recyclables and non-recyclables to be transported to main waste holding area within Pestana at least once per week, or as and when necessary.
- Recyclables and non-recyclables are to be transported via a caged tractor-trailer
- Storage and transportation of waste needs to be done in such a way that natural elements leave the waste unaffected.
- Recyclables are to be collected once a week by a local contractor and transported in a waste cage to the local recycling center.
- All non-recyclables are to be collected once a week by a local contractor and transported in a waste cage to the local licensed landfill site.
- When separating general waste; containers must be emptied and cleaned, all ancillary items must be removed from the material (paper clips, plastic covers etc.)
- Safe disposal certificates must be kept on file for record.
- Adopt waste reduction procurement philosophy, also known as "Greener purchasing", "Pre-cycling", or "eco/green procurement".
- Guests and staff should be made aware of the aim to recycle waste by means of posters, training and staff meetings.
- Guests should be made aware of the Pestana's recycling programmes by means of recycling instructions in rooms and in strategic locations.
- Recycling bins should be placed in strategic and convenient locations throughout the resort, and in sizes suitable to their location. They should be lidded and appropriately labelled or colour coded.

The following general guidelines are also recommended:

- The less waste brought onto the property = the less waste to remove. The lodge should purchase materials/items in such a way that they keep this in mind. Pestana Lodge can look into drafting a purchasing policy for the lodges. This policy can look at;
    I. Buying products with less packaging
    II. Buying products that are more environmentally friendly
    III. Purchasing recycled, durable and reparable products
    IV. Purchasing biodegradable bags for waste bins
    V. Avoid purchasing one-use, disposable items
    VI. Minimize the use of products that produce hazardous waste
- Educate staff on waste management and Pestana's aim to reduce, reuse and recycle waste. This can be done through posters hung up in various areas or through regular staff meetings.
- Avoid and reduce the use of paper use. This can be done by trying to completely go online and eliminate the need for printing. Where this cannot be avoided use less paper by printing on both sides and using smaller fonts.
- Avoid replacing toilet rolls before they are finished where possible. If the lodges do replace toilet rolls before they are finished then these should be given to staff.
- Where possible donate useful items to staff or surrounding areas.
- Raise awareness surrounding recycling for staff and guests. This can be done through hanging posters in strategic places.

10.4.2. Kitchen waste:

Kitchen waste will be one of the largest waste generating components at the lodge and staff housing areas..

The following is recommended for the non-hazardous kitchen waste products generated at Pestana Lodge:

- Kitchen waste to be separated into the following waste streams:
    - Organic waste that is not classified as hazardous.
    - Recyclable items –nonfood items that are generated in the kitchen. This will essentially be made up of the packaging of the food items (see requirements for general waste above)
    - Hazardous waste – This will include food sources classified as hazardous (oils, fats and greases) as well as chemical cleaning products.
- Waste sorting and storage to occur at designated areas at lodge and staff housing area.
- All sorted waste to be stored in marked 240 liter wheeled bins inclusive of wet waste and non-recyclables
- Marked bins are to be placed in strategic waste holding areas in back of house in a shaded, caged off area to prevent waste being blown into the surrounding environment and accidental ingestion by animals. These areas need to be well organized and maintained in order to prevent pests and scavengers from entering.
- All external bins throughout the lodges need to be animal proof and these bins need to be maintained and serviced on a regular basis.
- Non-hazardous organic kitchen waste could be collected by a neighbouring pig farmer or composted.
- Grease traps need to be installed in kitchens for the reliability of the system and adequate separation of hazardous materials.
- Look into the feasibility of using more environmentally friendly cleaning products.
- Freeze and preserve fresh produce where possible and use certain left-overs such as vegetable peels and meat scraps to make stocks and soups.
- Avoid purchasing large amounts of fresh produce that cannot be frozen or preserved.

10.4.3. Hazardous waste:

Hazardous waste can be detrimental to an environment and therefore disposal of such needs to be done with the utmost care. Hazardous waste can be divided into; chemical waste, used oil waste, oil contaminated waste, used cooking oils, fats and greases, paint waste, fluorescent bulb waste, battery waste and e-waste.

The following recommendations are provided for the lodge operators to choose the best practicable option:

- Ideally hazardous waste needs to be reduced as much as possible. This can be done by;
    I. Educating staff on Pestana's aim to reduce hazardous waste production.
    II. Avoid contamination of the surrounding environment. This should be done through insuring adequate, durable containers, fitting the required description are used and that these containers are routinely inspected and maintained.
    III. Looking into drafting a purchasing policy to try purchase non-hazardous alternatives where possible. Housekeeping, pool products and paint products can all be replaced with organic certified, eco-friendly products.
    IV. Battery use should be limited and where possible solar-powered items should be used.
    V. When looking at fluorescent lighting; use bulbs with the longest lifespan, encourage all to use natural lighting wherever possible, make sure all lights can be switched off manually, look into presence detectors for lights in areas that aren't used a lot. Pestana should investigate replacing all bulbs with LEDs.
- Hazardous waste should be separated at the source from the general waste stream. This will prevent the chance of cross contamination therefore decreasing the risk to staff and the environment.
- If possible contaminated equipment should be appropriately cleaned of all hazardous materials in order for equipment to be recycled with non-hazardous waste.
- Liquid hazardous waste to be stored in enclosed, bunded areas.
- The bund must 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 must be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump shall be disposed of as hazardous waste.
- All hazardous waste containers should be clearly labeled with the product within the container as well as the volume the container can hold. Personal protective equipment (PPE) required during handling the product should also be clearly stated on the container.
- Hazardous waste containers should be stored in an area where they are protected from the elements but can be reached with the transport vehicle.
- Used oil and oil contaminated materials should be stored away from any watercourse in an impermeable bunded container that is sealed with a roof.
- Sufficient absorbent spill cleanup kits should be placed nearby the used oil waste storage area.
- Hazardous waste such as oil, batteries and light bulbs can and should be recycled through a reputable licensed agent or returned to supplier.
- Pestana needs to continuously evaluate its waste production streams and identify any new waste product that may be classified as hazardous and then implement a system for the safe disposal of it.
- Hazardous waste should be handled in such a way that it does not become an environmental, health or safety hazard.
- Hazardous material storage areas must be constructed of an impermeable bund.
- Used cooking oil must be kept separate from fats and greases that are extracted from kitchen fans and filters as used cooking oils can be recycled.
- The recommended personal protective equipment (PPE) should always be utilized by those handling hazardous waste.
- All service providers handling hazardous waste (transportation and disposal) must be suitably qualified and hold the relevant permits and licenses.
- A safe disposal certificate should be issued by the waste management service provider to the lodge when hazardous waste is removed from the premises. This certificate should be kept on record for if it is needed by environmental authorities.
- When disposing hazardous waste it is essential to comply with all regulations and standards regarding it.
- Vehicles transporting hazardous waste must comply with all regulations.

10.4.4. Landscaping:

Landscaping waste takes into account most vegetation waste which will predominantly be generated from the landscaping surrounding the lodge and staff housing which includes grass cuttings, leaves, weeds as well as trimmings from hedges and bushes.

The following recommendations can be used with regard to landscape waste:

- Landscaping waste should be shredded/cut up and onsite compost facilities should be considered.
- Composting activities will reduce the organic waste stream and also reduce the maintenance costs of the gardens (no need to buy fertilizers and mulch).

10.4.5. Waste storage areas:

Pestana must maintain the intermediate waste storage areas so that they comply with all safe storage requirements and in doing so, allowing for adequate and safe storage of waste prior to the removal offsite.

The following is recommended:

- Where possible the generated waste should be directly transported from the point of generation to a designated waste storage area i.e. initially to storage areas at the back of house and then at the larger storage area from where collection takes place.
- Waste storage areas should be of a sufficient size and be able to comfortably accommodate all waste produced by Pestana.
- Waste storage containers must be intact and in good condition.
- The floors of the waste storage areas should be designed in such a way that water is directed away from the waste containers.
- Waste storage containers should be clearly marked with what should go into them.
- Durable walls/fences should enclose the waste storage areas. These should be at least the height of the containers, with gates/doors of the same size that open from both sides.
- The storage and transportation of waste should be done in such a way that the intervention from natural elements (such as wind) is planned for and avoided.
- Waste cages should be used for all transportation and storage of waste areas as this will limit the impact caused by natural elements as well as minimizing the chances of animals getting into the sights.
- A separate designated area should be used for storage of hazardous waste. This area should comply with the following requirements:
    I. Surrounded by an impermeable bund capable of containing 110% of the total volume of waste stored at any given time. One side of the bund should comprise a ramp to allow vehicle access.
    II. Should be clearly labelled with “Hazardous Waste”, the capacity of the bund storage area as well as the personal protective equipment (PPE) that should be used when handling the material.
- Regular maintenance and cleaning of waste storage areas is essential.

Pestana should continually assess waste production and ensure no new requirements are required for handling and storage of waste. Currently the legal compliance for waste storage areas:

- Storage volumes for General Waste should not exceed 100m3 unless a Waste Management License has been granted.
- Storage volumes for Hazardous Waste should not exceed 35m3 unless a Waste Management License has been granted.

10.4.6. Off-site (landfill) disposal:

The IWMP aims to reduce the total amount of waste generated by Pestana, particularly that of the waste that will be disposed of to landfills, however, there will still be a portion that will need to be disposed of in a permitted landfill site. The closest permitted landfill site to KPGR is in Malalane.

When dealing with landfill disposal it is detrimental to adhere to the following principles:

- Ensure the legal requirements and policies regarding waste transportation and storage are met. This means that only reputable waste transport companies should be used and that the waste disposal facilities all have permits.
- Waste types and quantities need to be recorded as accurately as possible, this will allow for future improvements as well as for reporting purposes. Pestana lodge should adopt a system of recording and filing this information.
- If a contractor is involved with the transportation of waste, this contractor needs to be suitably qualified and a letter stating agreement needs to be kept on file.

10.4.7 Sewage and effluent

- Ensure that the facility sewage system is maintained in a sanitary and operational state.
- Ensure that the facility sewage system is not overloaded, and that it functions within its design capacity. Take action to reduce output or increase capacity if necessary.
- Ensure that measures are put in place to prevent all leaks and spills.
- Repairs to the sewage system must be done immediately.
- In the event of a failure or overflow situation at the waste water treatment plant, implement a back-up system which will ensure that no sewage is discharged into the environment.
- Regular removal of sludge from the septic tanks by a licenced contractor (if required).
- Ensure that all treated effluent meets or exceeds South African water quality regulations prior to discharge or reuse.
- Undertake monthly wastewater monitoring to ensure that the output quality of the water complies with the minimum standards as prescribed by DWS. Ensure that these records are kept up to date and are available upon request.
- Ensure that the waste water treatment plant is operated and maintained by suitably qualified personnel, in strict accordance with the operating procedures.

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 EMPr, 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.
- Make use of erosion control measures 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.

- Remove only vegetation essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.
- Ensure that measures are 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 should 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.
- Do not allow surface water or storm water to canalize or be concentrated.
- Storm water outflows should not be allowed to enter directly into watercourses.
- Runoff from roads must be managed to avoid erosion and pollution problems.
- Place and maintain erosion control barriers as appropriate to prevent sedimentation.
- Prevent storm water or contaminated water directly entering any watercourse.
- Install waste traps 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.
- 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.
- Repair all erosion damage 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.
- Monitor all rehabilitated areas 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.

Specialist mitigation:

- Storm water management approaches should include the addition of sustainable drainage systems (SuDS) which capture runoff from roads and promote infiltration, such as grassed swales.
- The need for grassed swales (or alternative approaches to road side storm water management) can be assessed on a case by case basis for areas where runoff becomes concentrated.

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 should be designed so as to ensure that storm water runoff does not lead to excessive surface erosion problems on the site.
- Porous paving surfaces should 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.
- Ensure that measures are 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 should 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.

- Do not allow surface water or storm water to canalize or be concentrated.
- Runoff from roads must be managed to avoid erosion and pollution problems.
- Place and maintain erosion control barriers as appropriate to prevent sedimentation.
- Prevent storm water or contaminated water directly entering any watercourse.
- Install waste traps 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.
- Repair all erosion damage as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- Monitor all rehabilitated areas 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 Veld 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.
- Provide personnel and staff with gas for cooking purposes in demarcated, safe areas within the construction camp.
- Establish and maintain a fire break around the perimeter of all construction sites prior to the commencement of construction activities.
- All Contractors should 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 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.

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 at any of the sites.
- Establish and maintain a fire break around the perimeter of the sites.
- Lines of communication should 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

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

Pestana Hotel: Terrestrial Ecological Assessment. Ecorex Consulting Ecologists CC, 2019.

Pestana: Wetland and Riparian Zone Identification and Assessment. Wet-earth eco-specs, 2019.

APPENDICES

Appendix A: Curriculum Vitae of the Environmental Assessment Practitioner
Appendix B: Layout Map

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
Identity number:	8706210115089
Nationality:	South African
Race:	White
Language(s):	English and Afrikaans (written and spoken)
Marital Status:	Single
Dependents:	0
Drivers License:	Code 08
Residential Address:	207 The Globe, Paramount Estate, Monroe Close, Silver lakes, Pretoria
Postal Address:	PO Box 1456 Garsfontein, Pretoria, 0081
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

TECHNICAL SKILLS

Software	Skill level
MS Word	proficient
MS Excel	proficient
MS Outlook	proficient
MS PowerPoint	proficient
Internet operation and navigation	proficient
CorelDRAW	proficient

BRIEF SUMMARY OF CORE COMPETENCIES

Bryony has an Honors Degree in Environmental Management, and 5 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 / Organisation	Position
2015 - present	Nuleaf Planning and Environmental (Pty) Ltd	Environmental Practitioner
2013-2014	Ecotourism Solutions	Project Administrator

RELEVANT WORK EXPERIENCE (KEY PROJECTS)
(All projects in South Africa unless otherwise stated)

COMPANY	YEAR	PROJECT NAME	CLIENT	DESCRIPTION OF DUTIES
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	Environmental practitioner. Responsible for compilation of the Report and management of specialists
Nuleaf Planning & Environmental	2018-2019	Proposed Expansion to Founders Lodge in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Responsible for compilation of the Report and overall project management
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	Lapalala Custodians	Various	Environmental Control Officer. Compilation of construction audit reports submitted to LEDET
Nuleaf Planning & Environmental	2018	Proposed Expansion to River Lodge, Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2018	Proposed Amendment to the Custodian Sites in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner
Nuleaf Planning & Environmental	2018	Proposed Establishment of a Staff Village in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2018	Expansion to Ngwenya Lodge	Ngwenya Lodge (3&4) C/O Vacation Recreational Services	Environmental Practitioner. Responsible for compilation of the Report and overall project management

Nuleaf Planning & Environmental	2018	Ngwenya Waste Water Treatment Facility	Ngwenya Lodge (3&4) C/O Vacation Recreational Services	Environmental Practitioner. 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	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	Amendment: Hans Hoheisen Wildlife Research Station	University of Pretoria	Environmental Practitioner
Nuleaf Planning & Environmental	2016	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2016	Monate Game Reserve Application for Proclamation	Monate Game Reserve	Environmental Practitioner
Nuleaf Planning &	2016	Section 24G Application for the Lapalala Private	Lapalala Private Game Reserve	Environmental Practitioner

Environmental		Game Reserve		
Nuleaf Planning & Environmental	2016	Basic Assessment for the proposed Sebele Game Lodge	Barokologadi Community Property Association	Environmental Practitioner
Nuleaf Planning & Environmental	2015	Basic Assessment for the proposed Bhundu Inn Hotel	Paul Mojapelo	Environmental Practitioner
Nuleaf Planning & Environmental	2015	Mopani District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Project coordinator
Nuleaf Planning & Environmental	2014	Basic Assessment for the proposed spa at Bakubung Lodge, Pilanesberg Game Reserve	Pilanesberg Resorts Pty Ltd	Environmental Practitioner
Nuleaf Planning & Environmental	2014	Basic Assessment for the proposed Malelane Safari Lodge, Kruger National Park	Malelane Safari Resort Investments Pty Ltd	Environmental Practitioner
Nuleaf Planning & Environmental	2014	Basic Assessment for the proposed upgrades to the Maropeng Interpretation Centre	GAPP	Environmental Practitioner

APPENDIX B: LAYOUT MAP