



## ONGAVA GAME LODGE

### ENVIRONMENTAL MANAGEMENT PLAN

2021



Prepared for the renewal of Environmental Clearance by Ongava Game Reserve (Pty)  
Ltd

Environmental Assessment Practitioner: Henriette Potgieter  
May 2021

## INFORMATION SHEET

### PROJECT

**Renewal of Environmental Clearance: Ongava Game Lodge**

### PROPONENT

**Ongava Game Reserve (Pty) Ltd**

CONTACT                    Stuart Crawford  
DESIGNATION            General Manager: Operations, Ongava Game Reserve  
TEL                         081 – 286-1110  
EMAIL                     [sc@ongava.com](mailto:sc@ongava.com)  
ADDRESS                 Private Bag 12041, Suite 10, Ausspannplatz, Windhoek

### ENVIRONMENTAL ASSESSMENT PRACTITIONER

**Potgieter Consultancy CC**

NAME                      Henriette Potgieter  
TEL                         +264 - 81 - 312-1606  
EMAIL                     hoenspotgieter@gmail.com  
ADDRESS                 PO Box 11867, Klein Windhoek  
EAP                         EAPAN member  
QUALIFICATIONS        MSc (Environmental Sciences)  
                                  BSc Honours, B.Sc, BA

### DISCLAIMER

This document was prepared by Potgieter Consultancy CC with all reasonable skill, care and diligence, utilising resources devoted to the project by agreement with the client. Information contained herein is based on the interpretation of data collected and data provided by the client, accepted in good faith as being accurate and valid.

No warranties or guarantees are expressed or should be inferred by any third parties.

This report may not be relied upon by other parties without written consent from Potgieter Consultancy CC.

Potgieter Consultancy CC disclaims any responsibility to the client and others regarding any matters outside the agreed terms of reference.

PROJECT	<b>Ongava Game Lodge: Environmental Management Plan and application for Environmental Clearance</b>
CLIENT	<b>Ongava Game Reserve (Pty) Ltd</b>
DOCUMENT NAME	<b>Environmental Management Plan</b>
DOCUMENT STATUS	Final
DATE	10 June 2021
AUTHOR	Henriette Potgieter

## Table of contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>6</b>
1.1	BACKGROUND .....	6
1.2	SCOPE OF THIS DOCUMENT .....	6
<b>2</b>	<b>PROJECT DESCRIPTION .....</b>	<b>7</b>
2.1	LOCATION.....	7
2.2	WILDLIFE.....	7
2.3	ACTIVITIES .....	7
2.4	INFRASTRUCTURE .....	8
2.4.1	<i>Main area .....</i>	<i>8</i>
2.4.2	<i>Back of house .....</i>	<i>8</i>
2.4.3	<i>Guest rooms .....</i>	<i>9</i>
2.4.4	<i>Staff accommodation .....</i>	<i>9</i>
2.4.5	<i>Support infrastructure.....</i>	<i>10</i>
2.5	SERVICES .....	10
2.5.1	<i>Water supply and reticulation.....</i>	<i>10</i>
2.5.2	<i>Wastewater and sewage.....</i>	<i>11</i>
2.5.3	<i>Solid waste .....</i>	<i>11</i>
2.5.4	<i>Energy.....</i>	<i>11</i>
2.5.5	<i>Roads and tracks.....</i>	<i>11</i>
2.6	DESIGN AND LANDSCAPING .....	11
<b>3</b>	<b>IMPACTS AND MITIGATION .....</b>	<b>12</b>
3.1	OBJECTIVES.....	12
3.2	TOOLS.....	12
3.3	EMP IMPLEMENTATION .....	12
3.4	CONSTRUCTION PHASE .....	13
3.5	OPERATIONS PHASE .....	13
3.6	CLOSURE & DECOMMISSIONING PHASE .....	17
<b>4</b>	<b>ENVIRONMENTAL MONITORING .....</b>	<b>18</b>
4.1	WATER MONITORING.....	19
4.2	ENERGY MONITORING .....	19
4.3	ENVIRONMENTAL PERFORMANCE ASSESSMENT .....	19
<b>5</b>	<b>ENVIRONMENTAL EMERGENCY PROCEDURES .....</b>	<b>20</b>
5.1	SEWAGE OR WASTE WATER SPILLS .....	20
5.2	HYDROCARBON OR CHEMICAL SPILLS .....	20
<b>6</b>	<b>CONCLUSION .....</b>	<b>21</b>

## Table of figures

FIGURE 1. LOCATION OF ONGAVA PRIVATE GAME RESERVE (GREEN AREA) NEAR ANDERSSONS GATE.....	7
FIGURE 2. AERIAL PHOTO OF ONGAVA GAME LODGE.....	8
FIGURE 3. THE MAIN AREA OF THE LODGE WITH BRAAI DECK VISIBLE ON THE LEFT. ....	9
FIGURE 4. A GUEST UNIT. ....	9
FIGURE 5. ACCESS CONTROL AT THE ENTRANCE TO ONGAVA GAME RESERVE.....	10

## List of tables

TABLE 1. RESPONSIBLE PERSONS AND TEAMS.....	13
TABLE 2. IMPLEMENTATION PLAN.....	13
TABLE 3. MITIGATION COMPONENTS TO BE MONITORED. ....	18

## Abbreviations

<b>EC</b>	Environmental Clearance
<b>EMA</b>	Environmental Management Act, 2007
<b>EMP</b>	Environmental Management Plan
<b>Etosha</b>	Etosha National Park
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>The lodge</b>	Ongava Game Lodge
<b>Ongava</b>	Both the company (Ongava Game Reserve (Pty) Ltd, and the reserve (land)

## **1 INTRODUCTION**

### **1.1 Background**

Ongava Game Lodge is located on Ongava Game Reserve, a 30,000 Ha private game reserve wholly owned by Ongava Game Reserve (Pty) Ltd. The company was registered in 1991 and owns the land, infrastructure and business, including four upmarket lodges on the reserve.

Ongava Game Lodge (the lodge) opened in 1993, before the Environmental Management Act 7 of 2007 came into effect. It received Environmental Clearance (EC) in December 2017. COVID, the closure of lodges and the resulting lack of income is the reason that this application for renewal was not submitted before December 2020.

### **1.2 Scope of this document**

This document contains the Environmental Management Plan (EMP) that is used by the management and staff of Ongava Game Lodge. It has been reviewed and updated to reflect the most current protocols and practices in use, but no significant changes were made to the infrastructure or operational protocols in the past three years.

It is submitted to MEFT in support of an application for renewal of EC.

The EMP consists of a description of the current infrastructure and activities of the lodge, followed by a table identifying potentially negative environmental impacts and suggesting management actions that aim to prevent or mitigate each potential impact.



## 2 PROJECT DESCRIPTION

### 2.1 Location

Ongava Game Reserve is located 90 km north of Outjo on the C38, with its main entrance 50 m from the Anderson Gate of Etosha National Park. The northern boundary of the reserve is formed by the Etosha border fence (Figure 1).

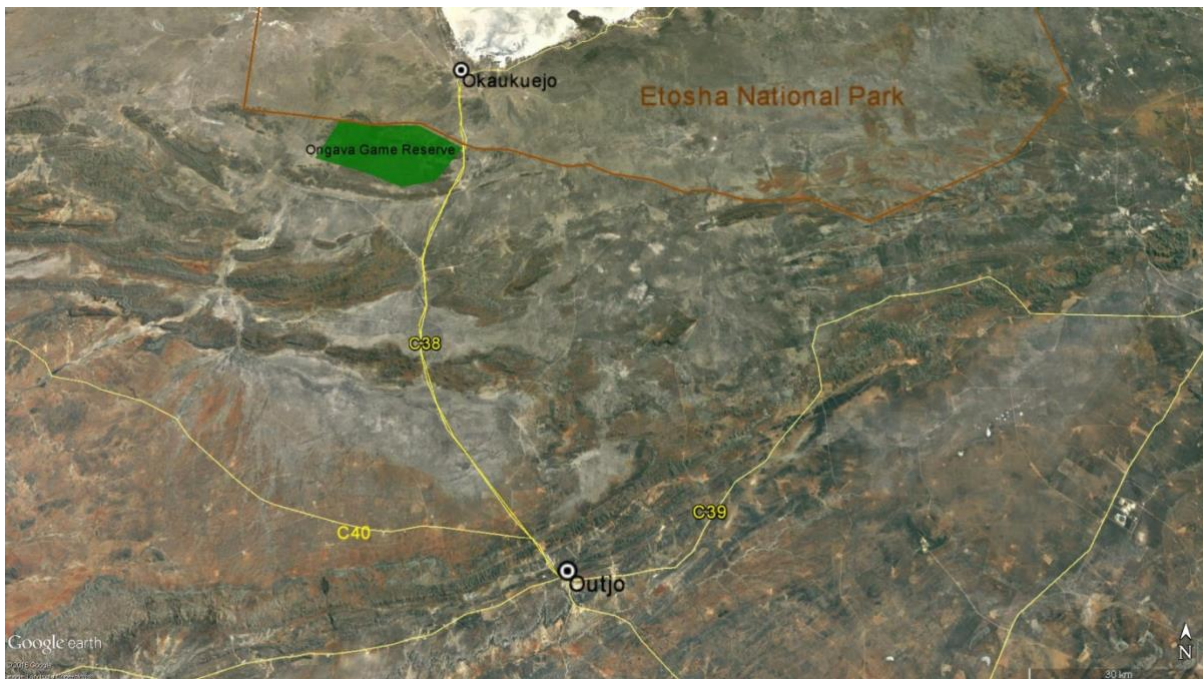


Figure 1. Location of Ongava Private Game Reserve (green area) near Anderssons gate.

### 2.2 Wildlife

With Etosha forming the northern border and healthy populations of prey species present on the reserve, lions abound on Ongava and elephants occasionally break through the fence. All game species that occur naturally in the geographical area are present, including the endemic black-faced impala and predators such as leopard and jackal.

The protection and conservation of rhinos is a core value of the business. Ongava provides an environment in which both white and black rhino populations breed successfully. Security is ensured by a professional anti-poaching unit with the sole duty of protecting fauna and flora on the reserve.

A game fence of 2.3 m high encloses Ongava Game Reserve along its entire border. The game fence is electrified with five strands on the southern, eastern and western sides. On the northern boundary (bordering Etosha), there are four strands of electrification on a cattle fence.

### 2.3 Activities

Game drives on the reserve and into Etosha are conducted in open game viewing vehicles, driven by qualified guides. Guided walks on the reserve are led by qualified, firearm-proficient guides.

Self-drive guests may choose to do their own excursions into Etosha, using Game Lodge as their base.

## 2.4 Infrastructure

### 2.4.1 Main area

Guests arrive at the car park, walk up the hill through the reception/curio shop (C in **Error! Reference source not found.**), down the other side of the hill to the main area where they check in.

The main area consists of a bar, dining and lounge areas under thatch, partially enclosed by stone walls and with gumpole supports (Figure 3). Floor is paved stone and wooden deck. Slightly downhill and to the side is a wooden deck with braai for al fresco dinners (Figure 3). The swimming pool is surrounded by stone paving and has a wooden deck.

### 2.4.2 Back of house

The kitchen is in a separate building from the main area: brick and cement with corrugated iron roof and concrete floors (B in Figure 2). It consists of a walk-in fridge/freezer and two store rooms, and is connected to the main area by a concrete walkway. Adjacent to the kitchen is an eating area for staff: cement floor and thatched roof supported by gumpoles.

Five store rooms are housed in a brick and cement building with concrete floors: laundry, housekeeping, maintenance and general store rooms. Also located on the back-of house side of the lodge are three pilot/guide rooms and seven management houses.



Figure 2. Aerial photo of Ongava Game Lodge.

A: main area, B: kitchen, C: reception & curio shop, D: guest units)





Figure 3. The main area of the lodge with braai deck visible on the left.

### 2.4.3 Guest rooms

The 15 guest units are freestanding buildings, connected to the main area by a concrete walkway (Figure 4 and D in Figure 2). They are built of rock (sourced on the farm) and have thatched roofs and concrete floors. All the units are en suite.

After dark, guests are accompanied by armed guide to and from their rooms, as the camp is not fenced and lions and other dangerous game roam freely between the units.

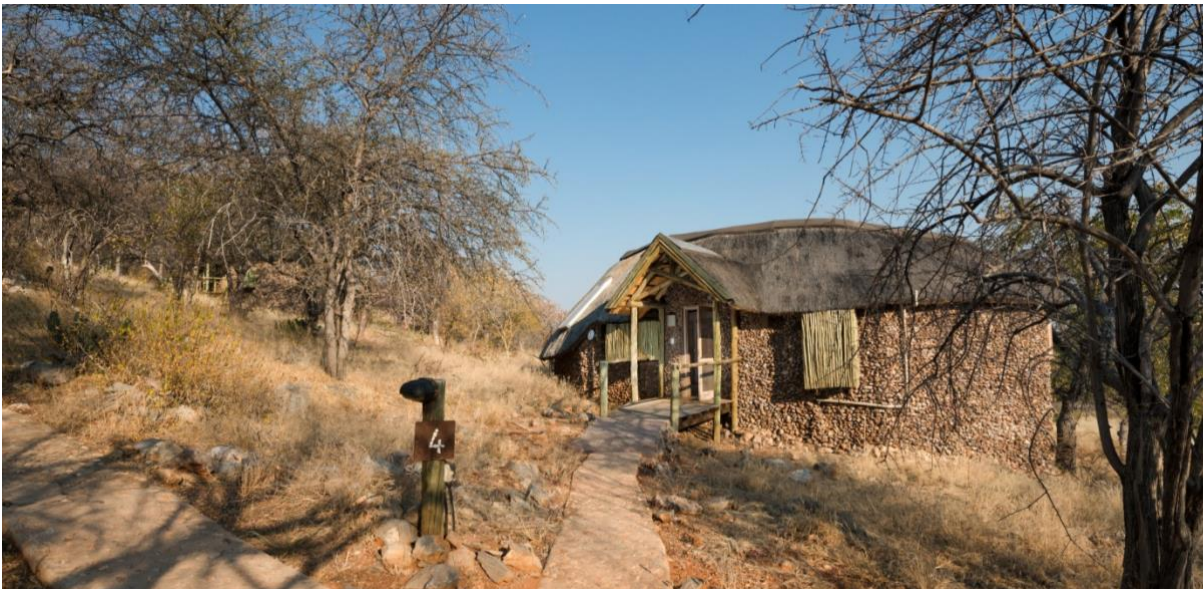


Figure 4. A guest unit.

### 2.4.4 Staff accommodation

Staff members from both Ongava Game Lodge and Little Ongava (E in Figure 2) are accommodated in the same staff village, located 500 m from the lodge. There is a combined total of 53 employees: 39 at the lodge and 14 at Little Ongava.

The staff village has 12 double rooms for junior staff, sharing ablution facilities consisting of 4 showers and 4 toilets. There are 24 en suite single rooms for guides, chefs and senior staff. Other facilities include a kitchen and lounge area. All buildings in the staff village are of brick and mortar. One management house, brick and mortar with a corrugated iron roof, is in the staff village.

Safety of the staff is paramount. The staff village is surrounded by a 2.3 m high diamond mesh fence, necessitated by the regular presence of lions in the camp. A staff vehicle is allocated for the transportation of staff coming on and going off shift.

Management accommodation is located behind the kitchen, west of the main area. Three units with two rooms, and four units with bedrooms only. All have en suite bathrooms. Building materials: canvas wrapped gumpoles with thatched roof.

#### **2.4.5 Support infrastructure**

There is no workshop or maintenance facility at Game Lodge because vehicle maintenance is done at the Reserve headquarters, called Tiervlei. Material for general lodge repairs and maintenance is kept in a store room behind the kitchen complex. One 6,000 litre diesel tank is mounted on a bunded cement floor. Vehicle parking is a compacted dirt area in front of the lodge.

Access to the reserve is strictly controlled with a permit system, and only possible via the entrance gate on the C38 road (Figure 5).

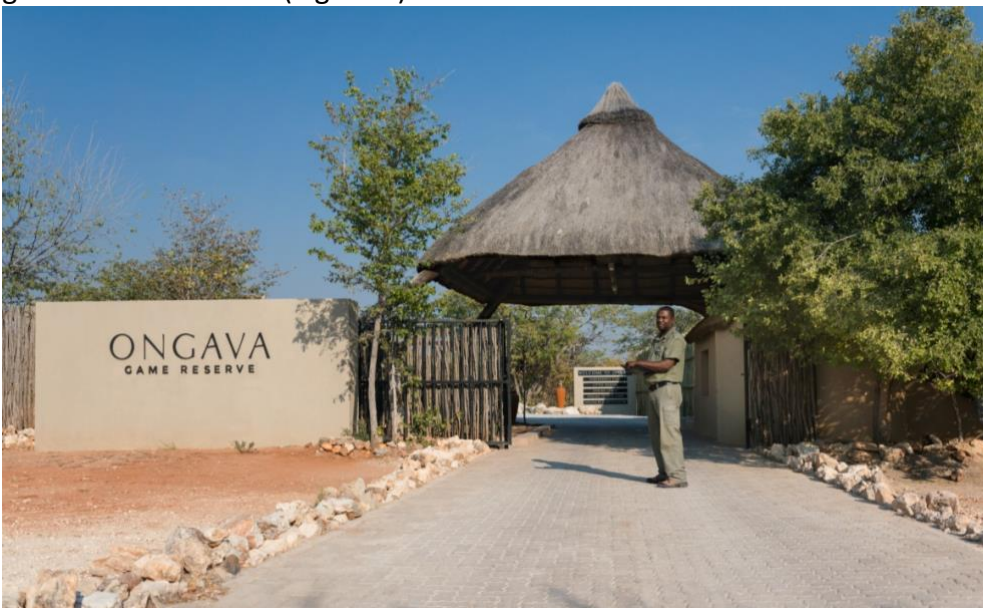


Figure 5. Access control at the entrance to Ongava Game Reserve.

## **2.5 Services**

### **2.5.1 Water supply and reticulation**

Water supply is from two boreholes, 17 m and 19 m deep. The main borehole is located approximately 150 m west of the lodge and the back-up borehole is approximately 50 m south of the main borehole, also west of the lodge. The boreholes are fitted with submersible low-volume pumps to ensure a stable water level, and pumping is alternated between the two.



### **2.5.2 Wastewater and sewage**

Sewage is managed with a variety of systems. The kitchen, laundry, all guide and management units' sewage is routed to a trickling plant. The trickling plant processes the water, producing grey water which is fed into holding tanks. When the holding tanks are full, water is routed into a reed bed positioned 1 km north of the lodge. Staff village sewage goes into a Clarus Fusion water processing plant which produces grey water, routed to the same reed bed.

Collected grey water from the trickling system is tested annually for fitness for animal consumption. It is used for road maintenance: a tanker disperses the water weekly on the Reserve gravel roads for compaction and dust control.

The guest units' sewage is routed into a 3-chamber French drain.

### **2.5.3 Solid waste**

Solid waste is taken to a contained enclosure at Tiervlei. Recyclable waste is separated on site and the remaining solid waste is collected weekly and taken to an official landfill in Outjo.

### **2.5.4 Energy**

Electricity supply is main grid with a back-up generator, used only in case of grid outage. The generator is a six-cylinder engine in a self-contained metal unit, mounted on a cement floor. Geysers are a solar hybrid system, with a PV unit at each guest room and a unit at the main lodge area.

Staff village and management accommodation get electricity via main grid, including their geysers.

### **2.5.5 Roads and tracks**

Ongava Reserve has a well-established road network, consisting of constructed gravel roads with camber and drainage ditches. The roads are graded by the Reserve maintenance team and they also repair and maintain speed bumps and culverts.

## **2.6 Design and landscaping**

A sense of place is maintained by paint in muted natural colours, and the use of materials such as thatch and locally sourced rocks.

Staff are trained to actively preserve naturally occurring vegetation. Paved walkways ensure that guests and staff walk in designated areas only.

## 3 IMPACTS AND MITIGATION

### 3.1 Objectives

The Environmental Management Plan (EMP) has two main objectives:

- identify potential negative impacts associated with the project.
- propose measures to prevent or mitigate negative impacts.

Implementation actions aim to minimise negative impacts and enhance positive impacts that originate from the Project. The EMP is a living document that is updated as new information, policies, authority guidelines and technologies are developed and become available.

### 3.2 Tools

Ongava Game Lodge adhere to the following guidelines and procedures that govern their management actions:

- Guiding Protocol
- Ongava Management Plan
- HR guidelines
- Standard Operating Procedures
- Health & Safety annual audit

### 3.3 EMP Implementation

Management measures to mitigate each potential negative impact are proposed in an implementation plan in Table 2. The three headings of the implementation plan are discussed here.

#### **Nature of impact**

Possible impacts on a feature or function of the environment are identified. Description of potential risk sources (impacting activities) and the mechanisms through which an impact may occur are described.

#### **Mitigation**

Mitigation measures are proposed for each identified impact. These measures consist of specific management actions that need to be carried out in order to avoid, minimise or remedy negative impacts, together with adjustments to respond to unforeseen impacts.

#### **Responsible person**

Successful implementation of an EMP relies on defined roles and responsibilities. Ongava has allocated duties to individuals and teams, and they are responsible for carrying out the required management actions (

Table 1).



Table 1. Responsible persons and teams

Individuals and teams in charge of carrying out the management actions are given, with a description of their responsibilities.

Person/Team	Responsibilities
General Manager Operations (GO)	Overall responsibility for implementation of EMP. Support to the construction team and Ongava staff for implementation of environmental management measures.
Maintenance & Asset Manager (MM)	Day to day supervision of other role players. Maintenance of buildings, vehicles, machinery, sewage and waste systems at Ongava Game Lodge.
Lodge Management (LM)	Overall management of Ongava Game Lodge.
Human Resource Manager (HR)	Employment of staff
Farm Manager (FM)	Maintenance of reserve infrastructure and living assets
Guides	Transport of guests. Ensuring appropriate human-wildlife interactions.
Contractor	Construction

### 3.4 Construction phase

No construction is planned at Ongava Game Lodge in the foreseeable future.

### 3.5 Operations phase

Table 2. Implementation plan

NATURE OF IMPACT	MITIGATION	RESPONSIBLE PERSON
<b>Soil damage</b>		
Compaction of and damage to soil	Only existing roads are used for driving. Making tracks next to a road is not allowed. Taking shortcuts is not allowed.	All
	New roads and tracks have to be authorised and are developed according to the road plan.	GO & MM
	No off-road driving.	All
	Vehicles may be parked only in designated parking areas.	LM
	Plains with sensitive, compactable soils should be avoided (vehicle damage to soil is irreversible).	Guides
Damage to roads and tracks	Low tyre pressure on all operational vehicles.	Guides, MM, FM
	Operational vehicles are 4-wheel drive and of standard width.	GO & MM
Soil erosion	Implement measures to disperse concentrated water flow and repair erosion at such locations.	FM
Contamination of soil by hydrocarbons	Oil pans are used in vehicle parking areas. Fuel dispensing takes place over impervious, bunded surfaces or drip trays.	GO & MM
	Vehicle servicing is done on impervious, bunded surfaces or over oil pans	GO & MM

NATURE OF IMPACT	MITIGATION	RESPONSIBLE PERSON
	Used oil is stored in appropriate receptacles and despatched to appropriate waste facility.	GO & MM
	Fuel is stored in appropriate receptacles and on bunded surface.	GO & MM
	Fuel is dispensed on bunded surface	MM
Contamination of soil by sewage & waste water	Discussed under "Sewage and waste water"	
<b>Disturbance of animals, their behaviour and habitats</b>		
Impacts associated with human-wildlife interaction	Guests and employees are made aware that they are in a sensitive environment.	LM & Guides
	Guests and employees are made aware of the appropriate way to interact with wildlife.	LM & Guides
	Driving on Ongava Game Reserve is strictly regulated by permit system. Self-drive is allowed only between main gate and lodge.	LM & Guides
	Game drives and walking activities are always led by qualified guides.	LM & Guides
	Guides are trained in conservation and cultural/historical aspects relevant to the local area. Guide training includes appropriate protocols and behaviour guidelines for the activities offered by the lodge.	HR, LM & Guides
Protected species are disturbed or destroyed by operational activities.	Avoid sites with nests, burrows, dens, etc. of protected species.	GO & Guides
Poaching by staff or contractors	The greater area around the site is searched regularly for snares.	FM
	Foot traffic is virtually non-existent on Ongava Game Reserve due to a high concentration of free-roaming lions.	All
	Unauthorised driving on tracks is virtually non-existent: patrols by the anti-poaching unit, and the constant presence of farm management staff and guides on roads and tracks are effective control measures.	FM & Guides
Damage to animal habitats	No picking of plants, collection of firewood or any other damage-inducing activity is permitted.	All
	Employees are educated on the need to refrain from the destruction of plants and animals, as well as from indiscriminate defecation, waste disposal and pollution of soil and water resources.	LM
<b>Disturbance of and damage to vegetation</b>		
Protected species are affected by operational activities	No protected, rare or endangered plants may be disturbed, damaged or removed.	GO & Guides
Damage to plants and habitats	Driving on Ongava is strictly regulated by permit system. Self-drive allowed only between main gate and lodge. Unaccompanied walking is allowed only in lodge area, within electrified fence.	LM & Guides

NATURE OF IMPACT	MITIGATION	RESPONSIBLE PERSON
	Game drives and walking activities are always led by qualified guides employed by the lodge.	LM & Guides
	No plants or other natural resources may be disturbed, violated, mutilated, destroyed or removed.	All
Firewood collection disturbs microhabitats	Fires are used only for ambience for guests, not for cooking or heating. Firewood is brought in from reputable, renewable resources, such as bush-clearing projects.	All
Spread of invasive vegetation	The lodge and surrounding area are kept free of alien and invasive vegetation.	FM
<b>Hydrological impacts</b>		
Disruption of surface water hydrology	No driving in seasonally inundated areas when they are flooded or moist. Drainage lines are entered and exited only at designated points.	FM & Guides
	Eroded roads and roads traversing wet areas are closed for vehicle traffic and alternative routes are used until such time as the areas are deemed suitable for traffic.	GO & FM
Contamination of surface and ground water	The use of biodegradable and eco-friendly guest amenities, soaps and detergents in kitchen and laundry should be enforced.	LM
	Oil pans are used in vehicle parking areas. Fuel dispensing takes place over impervious, bunded surfaces or drip trays.	LM & MM
	Vehicle servicing is done on impervious, bunded surfaces or over oil pans.	MM
	Used oil is stored in appropriate receptacles and despatched to an appropriate waste facility.	MM & FM
	Fuel is stored in appropriate receptacles and on an impermeable bunded surface.	MM
	Fuel is dispensed on an impermeable bunded surface.	LM
Water conservation measures	Water conservation is actively promoted among guests and staff. Guests are informed of water scarcity and encouraged to participate in water conservation.	LM
	Measure and record water use. Compare usage with targets.	LM
	Repair leaks in the water reticulation system within 24 hrs of detection.	LM & MM
Water saving devices	Dual-flush toilets with small capacity cisterns.	LM & MM
	Low-flow showers; bucket in shower to collect pre-warm water; garden irrigation only at night; reverse osmosis system for drinking water	LM & MM
Contamination of groundwater by sewage & waste water	Discussed under "Sewage and waste water"	
<b>Air quality</b>		
Air pollution caused by emissions	No burning of rubbish takes place on the reserve.	MM
	Vehicles are serviced regularly and monitored for excessive exhaust emissions.	MM
	Generator is used only in case of grid outage.	LM & MM

NATURE OF IMPACT	MITIGATION	RESPONSIBLE PERSON
<b>Noise pollution</b>		
Generator noise	Generator is housed in noise-limiting container and used only in case of grid outage.	LM & MM
Other equipment	Graders, diggers, tractors, road-building equipment, power tools are used during daylight hours only.	FM
<b>Visual impact</b>		
Negative visual impacts	Buildings and other structures are designed and located so as to maintain a sense of place.	All
	Motorised accessibility is limited to existing roads and tracks.	All
	Only subdued or directional lighting is used.	LM & MM
<b>Solid Waste</b>		
Prevention of pollution through proper waste management	Solid waste is collected weekly from the Reserve holding facility and transported to official landfill in Outjo.	MM
	Waste bins are provided at the point of source. All waste bins are covered and secured to be animal proof.	LM & MM
	Solid waste is stored in a bird- and animal proof holding cage at the lodge, then taken to the Reserve holding facility at Tiervlei.	LM & MM
	No burning or burying of waste takes place on the reserve, it is removed to appropriate facilities.	FM
	Used hydrocarbons are stored in sealed drums and despatched to an appropriate waste facility.	LM & MM
<b>Sewage and waste water</b>		
Contamination of soil, as well as surface and groundwater, due to sewage and waste water discharge	All sewage is restricted to a closed system that terminates at a water purification plant. Purified water is used for dust suppression on the main roads of the reserve.	LM & MM
Ecological impacts	Fat traps at kitchen outlets are cleaned and maintained regularly.	LM
	Purification system, septic tanks and evaporation pond are maintained.	MM
Unpleasant odours	Qualitative monitoring of odours.	All
	Should unpleasant odours be identified, the source of the odours is identified and repaired within 1 week of identification.	MM
<b>Energy</b>		
Excessive use of non-renewable sources of energy	Energy use (electricity, diesel, petrol, paraffin, gas) is metered and monitored. Readings are compared with target usage to ensure optimum efficiency.	LM
Energy saving measures	Generator is used only as back-up when main grid is off.	LM
	Solar geysers provide hot water.	MM
	Cooking on gas; laundry washed in cold water; fridges and freezers are energy-efficient, insulated and sealed.	LM
	Energy-efficient light bulbs are used throughout the lodge.	LM

NATURE OF IMPACT	MITIGATION	RESPONSIBLE PERSON
<b>Health and safety</b>		
Labour policies	The company is in compliance with all national legislation and regulations governing workplace equity and diversity.	GO & HR
Staff and guest health and safety	The company is in compliance with all national legislation and regulations governing health and safety measures.	GO & LM
	Protective clothing, as appropriate to operations, is provided to employees.	LM
	Adequate first aid kits are available and regularly maintained. A suitable number of employees is trained in first aid.	LM
	On-site staff housing is large enough, secure, clean, and provided with water, sanitation and energy.	LM & MM
	Employees and guests are made aware of procedures to follow in the event of an emergency, e.g. which person to contact, how to contact him/her during the night; evacuation routes.	LM
	Employees responsible for guest transport have valid licences and public driving permits.	LM
Fire	All precautions are taken to prevent the outbreak and spread of fires. Employees are aware of the necessary precautions.	LM
	Fire fighting equipment is available, regularly maintained, and employees are trained in fire safety.	LM
	Gas canisters are stored in Bureau of Standards approved structures.	LM
	Fire extinguishers are strategically located throughout the developed area.	LM

### 3.6 Closure & decommissioning phase

There is no intention to cease operations or decommission Ongava Game Lodge in the foreseeable future. Since tourism has an indefinite projected lifespan, and since the land, immovable assets and business are privately owned and the owners have a vested interest in the success of the operation, there is currently no decommissioning plan.

Should closure and decommissioning of any of the Ongava assets be required, an extensive decommissioning plan will be drawn up and meticulously followed according to the highest standards of environmental management best practices. The priority for closure will be to return the land as closely as possible to the pre-construction condition. Measures will be taken to prevent soil erosion and provide protection so that plants can re-colonise. A site assessment will be carried out after closure to ensure that no structures remain and that site rehabilitation has been fully achieved.

#### Rehabilitation and Closure objectives

There are three primary closure objectives.

1. Protect public health and safety, as well as health and safety of fauna and flora.
2. Alleviate or eliminate environmental damage.
3. Return the site to its original, pre-development condition.



## 4 ENVIRONMENTAL MONITORING

Compliance with the EMP is monitored regularly. Key aspects to monitor are given in Table 3 but the lodge manager and owner may add to these and may delegate specific tasks as required by the lodge operations.

Table 3. Mitigation components to be monitored.

Headings give the measurable unit that is monitored, the frequency of monitoring, and the person responsible.

To be monitored	Measurable	Frequency	Person
Water consumption	Usage in litres per total bednight *	Monthly	LM
Groundwater quality	Fitness for human consumption	Annually	MM
Sewerage system	Septic tanks	Monthly	MM
Sewerage pipes	Leaks	Monthly	MM
Grey water pipes	Leaks	Monthly	MM
Fat traps	Functioning equipment, clean filter	Weekly	LM, MM
Water installations	Functioning of purification equipment	Weekly	LM, MM
Trickle filter plant	Functioning equipment	Weekly	LM, MM
Solid waste	Secure storage of solid waste	Daily	LM
Solid waste	Removal of waste from site and secure storage of waste	Daily, weekly	LM, MM
Soak-aways	Drainage	Weekly	MM
Tracks & roads	Erosion	Weekly	FM
Wildlife	Wildlife sightings	Every game drive	Guides
Wildlife	Species of special interest	On-going	LM, guides
Grid electricity	Nampower records: usage per total bednight *	Monthly	LM
Diesel	Records at source tanks and generator	Daily. Monthly summary	LM
Gas	Usage	Monthly	LM
Vehicles	Oil leaks, emissions, tyres	Daily	Guides, MM

\* Total bednights include every person using lodge resources: guests, staff, managers, scientists, contractors

## 4.1 Water monitoring

The aim of the water monitoring programme is to assess the consumption and impact of water use on groundwater quality and availability. The Maintenance and Asset Manager carries out the monitoring programme.

### Groundwater

- Groundwater usage is metered and recorded monthly in order to monitor and manage water consumption.
- Groundwater quality is monitored at point of use (lodge kitchen) and tested annually for mineral and bacterial content to ensure that it is fit for human consumption (Test: *Evaluation of drinking water for human consumption, DWA, Namibia, July 1991*).

## 4.2 Energy monitoring

Electricity: grid source is monitored monthly

PV energy is used for hot water in a geyser hybrid system

Gas: monitored monthly

Diesel: recorded daily and monthly summaries are made

Firewood: only dead wood is collected and sourced from de-bushing operations. Fires are used only for ambience in the evenings and no cooking or heating is done with fire, either in the lodge or in the staff village.

## 4.3 Environmental Performance Assessment

Environmental auditing is aimed at ensuring continual improvement in environmental performance. The lodge keeps records of environmental monitoring data, which is included in an annual report to the Board of Ongava. The annual report contains details of all changes and new projects. Monthly summaries of data are used to assess the level of compliance with environmental legislative requirements and the commitments made in the EMP.

## **5 ENVIRONMENTAL EMERGENCY PROCEDURES**

### **5.1 Sewage or waste water spills**

Should leaks in the sewerage or waste water system be detected, the following actions will be taken:

- The spillage will be contained and the source turned off if possible. Depending on the amount of spillage, it will be remediated in situ or in the case of a large spillage that is contained, it will be removed.
- The reason for the spillage will be rectified.

### **5.2 Hydrocarbon or chemical Spills**

The objective is to contain and remediate spillages of hydrocarbons (petrol, diesel, oil, lubricants) or chemicals (pool cleaners, housekeeping chemicals).

- Contact management in the event of a spill.
- The spillage is contained and the source turned off if possible.
- Management organises a team to assist with cleaning.
- Demarcate the spilled area where practicable.
- Move the spill kits to the area.
- Scoop up the spilled substance along with contaminated soil or any absorbent material using the spill kit shovel. Place the scooped up substance into plastic bags.
- The waste bags must be marked as hazardous waste and disposed of as hazardous waste.
- The leakage must be stopped and reason for spill must be rectified.
- Diesel bulk storage tanks are mounted on bunded concrete floors to contain spills.

## **6 CONCLUSION**

This Environmental Management Plan describes the management measures that are implemented with the aim of preventing or mitigating negative environmental impacts and enhancing positive impacts that the lodge activities may have. It is a legal document that commits Ongava Game Reserve (Pty) Ltd to comply with all the management measures, monitoring programmes and other plans as presented in this document.

The EMP is intended as a practical, working protocol to be used in accordance with the principles of adaptive management. As new information, technologies and methods become available, the management measures set out in this document may be adjusted to conform with current best practice guidelines, while staying within the economic means of the business.

Since EC was granted to the lodge in December 2017, there has been no significant change to the infrastructure or procedures and no new or altered negative impacts on the environment have been identified.