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ENVIRONMENTAL MANAGEMENT PLAN FOR THE:

PROPOSED ECO-TOURISM CAMPSITE WITHIN MAYUNI CONSERVANCY (MASAMBALA ISLAND) ZAMBEZI REGION

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1 Introduction

This Environmental and Social Management Plan (ESMP) provides binding environmental and social management requirements for the construction, operation, and future decommissioning of the proposed Masambala Eco-Tourism Campsite on Masambala Island within the Mayuni Conservancy, Zambezi Region. The ESMP forms part of the documentation required for the Environmental Clearance Certificate (ECC) application to the Ministry of Environment, Forestry and Tourism (MEFT).

2 Project Description

The project entails a low-impact eco-tourism campsite consisting of five semi-permanent tented units, 3–5 self-catering campsites, communal ablutions, staff accommodation, a reception area, solar-hybrid electrification, river and borehole water supply, and bio-digesters for wastewater. The site lies within the sensitive Kwando River floodplain and the Bwabwata National Park.

3 Legal and Policy Framework

The ESMP aligns with the Environmental Management Act (Act 7 of 2007), EIA Regulations (GN 29 & 30 of 2012), Water Act (1956), Water Resources Management Act (2013), Forest Act (2001), Nature Conservation Ordinance (1975), Public and Environmental Health Act (2015), CBNRM Policy, the Namibia Tourism Board Act, Labour Act (2007), and relevant international conventions including CBD, CITES, and Ramsar.

4 ESMP Objectives

- Ensure full compliance with the EMA and associated regulations.
- Avoid, minimise, rehabilitate, or offset negative impacts.
- Protect sensitive wetland, floodplain, and woodland ecosystems.
- Promote equitable community benefits through CBNRM.
- Guide sustainable eco-tourism operations.

5 Impact Assessment Process

During construction, potential impacts may include vegetation clearance, noise and dust generation, soil disturbance, and waste production. In the operational phase, key considerations will include boat activity-related noise, waste generation, wildlife disturbance, and sustainable water use. Decommissioning, though unlikely in the near future, could involve waste disposal and site rehabilitation. The assessment will rate each impact's significance and propose appropriate mitigation measures.

5.1 Impact Assessment Methodology

The impact assessment for the Masambala Project was conducted in accordance with the Environmental Management Act, 2007 (Act No. 7 of 2007) and its 2012 EIA Regulations, as well as the principles outlined in the International Finance Corporation (IFC) Performance Standards and Equator Principles.

The methodology follows a structured process designed to:

1. Identify potential environmental and socio-economic impacts during project construction, operation, and decommissioning.
2. Predict the magnitude, extent, and duration of these impacts.
3. Evaluate their significance using transparent and repeatable criteria.
4. Recommend mitigation and enhancement measures to reduce negative impacts and optimise positive outcomes.

5.2 Impact Identification

Impacts were identified through:

- Review of project design, activities, and schedules.
- Baseline environmental and socio-economic data from Section 7.
- Site visits and stakeholder consultations.

Analysis of similar projects in comparable environments.The following table indicate a summary of the potential impacts associated with this development:

Table 1: Summary of Potential Impacts – Masambala Project

Phase	Impact Category	Description of Potential Impact	Likely Nature	Sensitivity Context
Construction	Land use change & habitat loss	Clearing of riparian woodland, grassland, and wetland vegetation for project footprint, temporary camps, and access routes.	Negative	High biodiversity value area inside Bwabwata NP; several protected plant species present.
	Soil disturbance & erosion	Compaction, topsoil loss, and erosion during site clearing and earthworks.	Negative	Sandy soils on ridges highly erodible; wetland soils vulnerable to compaction.
	Surface water contamination	Sediment runoff, accidental hydrocarbon spills, and waste discharge into the Kwando River system.	Negative	River is lifeline for biodiversity and local communities; downstream transboundary importance.

Phase	Impact Category	Description of Potential Impact	Likely Nature	Sensitivity Context
	Groundwater contamination	Fuel/oil leaks from machinery and improper waste disposal infiltrating shallow aquifer.	Negative	Groundwater levels shallow; high connectivity with surface water.
	Disturbance to fauna	Noise, light, and human activity disrupting wildlife movement and breeding, particularly elephants and waterbirds.	Negative	Kwando floodplain is major migratory corridor and breeding site.
	Waste generation	Solid and liquid waste from construction workforce and camps.	Negative	Potential for pollution and attracting problem animals.
	Cultural heritage disturbance	Possible disturbance to graves, sacred groves, or archaeological sites.	Negative	Several sites of cultural significance in floodplain area.
	Local employment	Creation of short-term construction jobs for local residents.	Positive	Opportunity for skills transfer and income generation.
	Local business opportunities	Demand for goods and services during construction phase.	Positive	Potential for local supply contracts.
Operation	Hydrological changes	Alteration of natural floodplain water flow patterns due to permanent structures.	Negative	Could impact wetland vegetation and fisheries.
	Wildlife mortality & displacement	Increased vehicle movement and human activity causing wildlife collisions and avoidance of area.	Negative	High presence of large mammals and threatened species.
	Waste generation	Improper waste handling from operational activities leading to pollution.	Negative	Potential contamination of wetland and attraction of problem animals.
	Sewage system waste generation	Wastewater, sludge, and screenings from sewage treatment and disposal; risk	Negative	High groundwater table and proximity to sensitive wetland

Phase	Impact Category	Description of Potential Impact	Likely Nature	Sensitivity Context
	and disposal	of nutrient enrichment, pathogen contamination, and groundwater pollution.		habitats; potential public health risk.
	Disturbance from visitors	Tourism activities causing noise, light, and physical disturbance to wildlife.	Negative	High sensitivity due to nesting birds and wetland fauna.
	Tourism enhancement	Improved facilities or access potentially boosting eco-tourism activities.	Positive	Masambala lies within a tourism hotspot in Bwabwata NP.
	Boat game rides – noise and wake disturbance	Boat game rides – noise and wake disturbance	Negative	Kwando River is a core wildlife habitat and migratory route for aquatic and semi-aquatic species.
	Mukolo canoe excursions – wildlife disturbance	Close approach to birds or mammals potentially causing flushing or stress if not properly managed.	Negative	Some species, especially breeding birds, are highly sensitive to disturbance.
	Guided game drives – road disturbance	Soil compaction, dust generation, and disturbance to wildlife from off-road driving or repeated vehicle use.	Negative	Surrounding national parks and conservancies contain sensitive floodplain and woodland habitats.
	Birdwatching – disturbance to nesting areas	Approaching nests or breeding colonies can cause abandonment or reduced breeding success.	Negative	Several species of conservation concern nest along riverbanks and in floodplain vegetation.
	Nature walks – trampling of vegetation	Foot traffic causing damage to ground cover and sensitive wetland plants.	Negative	Localised damage can be significant in fragile riparian zones.
	Catch-and-release fishing – handling stress to fish	Improper handling increasing post-release mortality; potential littering from fishing tackle.	Negative	The Kwando River fishery is an important subsistence and tourism resource.
	Community benefits	Potential revenue sharing through conservancy	Positive	Supports local livelihoods and

Phase	Impact Category	Description of Potential Impact	Likely Nature	Sensitivity Context
		agreements or park fees.		conservation incentives.
	Environmental education opportunities	Increased awareness through visitor engagement and interpretive materials.		

6 Mitigation and Management Measures for Construction and Operational Phases

Mitigation will focus on low-impact site design, minimising vegetation clearance, enforcing strict water conservation, controlling boat speeds near sensitive wildlife, and implementing a rigorous waste management plan. Wildlife-friendly operational protocols will be followed to avoid disturbance to local species. The following mitigation measures are applicable for this project:

6.1 Mitigation Measures – Construction Phase

6.1.1 Land Use Change & Habitat Loss

Objective: Avoid unnecessary clearance and protect protected species such as Baikiaea plurijuga.

- Pre-construction vegetation survey: Engage a qualified botanist to mark all protected trees within the site before clearing begins (Nature Conservation Ordinance No. 4 of 1975).
- Physical boundary demarcation: Install robust temporary fencing (minimum height 1.2 m) with hazard tape to mark "no-go" areas; to be in place 2 weeks before clearing and maintained for the full construction period.
- Vegetation clearance limit: Clearance area to be restricted to the approved site plan; any additional clearing requires written approval from the Environmental Control Officer (ECO).
- Tree protection zone: Establish a minimum 5 m radius around the drip line of retained trees; no excavation, storage, or traffic within this zone.
- Rehabilitation timeline: Begin replanting/rehabilitation within 14 days of works in each section being completed; use locally collected indigenous species only.

6.1.2 Soil Disturbance & Erosion

Objective: Minimise erosion and retain topsoil for post-construction rehabilitation.

- Topsoil management: Strip top 150 mm of soil from all work areas before excavation; store in stockpiles <1.5 m high to prevent compaction; cover with geo-textile or vegetation to prevent erosion.
- Erosion control: Install silt fences (geo-textile fabric, 0.5 m height, anchored 0.2 m below surface) along all drainage lines and at site boundaries adjacent to wetlands before works begin.
- Storm preparation: ECO to inspect and confirm erosion control structures before each rainy season and after major rainfall (>20 mm/24 hrs).
- Access routes: Limit all vehicle access to pre-approved tracks marked with reflective poles at 20 m intervals.

6.1.3 Surface Water Contamination

Objective: Prevent any contamination of the Kwando River and associated wetlands.

- Wetland buffer: Maintain a minimum 50 m buffer between all fuel, oil, and chemical storage and the high-water mark of any waterbody.

- Bunded fuel storage: All fuel tanks (>200 L) to be placed in bunded areas with impermeable lining; bund capacity to be 110% of largest container.
- Refuelling protocol: Only refuel in designated area lined with 200 µm HDPE plastic sheeting and sand bunds; no refueling within 50 m of wetlands.
- Spill kit availability: At least two complete spill kits (absorbent pads, booms, PPE, disposal bags) to be available on site at all times; ECO to train all machine operators in use.

6.1.4 Groundwater Contamination

Objective: Prevent infiltration of pollutants into the shallow aquifer.

- Sanitation facilities: Provide chemical toilets with sealed containment tanks; minimum ratio 1 toilet per 15 workers; waste to be removed weekly by a licensed service provider.
- Hazardous waste storage: Store all oils, lubricants, and hazardous materials on raised pallets over an impermeable drip tray or slab; no direct contact with bare soil.
- Prohibited practices: No washing of vehicles or machinery on unlined ground; all wash areas to have lined collection sumps.

6.1.5 Disturbance to Fauna

Objective: Avoid wildlife injury, displacement, and behavioural disruption.

- Speed restriction: Enforce maximum speed limit of 30 km/h on all access and internal roads; display speed limit signage at 200 m intervals.
- Night work ban: No construction work between 19:00 and 06:00 unless written approval is granted by the ECO; if unavoidable, use downward-facing, shielded LED lights (<3000K) to minimise light spill.
- Wildlife interaction rule: Workers prohibited from feeding, chasing, or photographing wildlife at close range; violations to result in removal from site.
- Fauna crossings: Maintain at least two 20 m-wide undisturbed corridors linking floodplain vegetation during the construction period.

6.1.6 Waste Generation (Construction Workforce)

Objective: Ensure all waste is safely removed and does not attract wildlife.

- Waste storage: Provide clearly marked 240 L wheelie bins with lids for general waste, recyclables, and hazardous waste; lids to remain closed at all times.
- Waste removal frequency: Remove all waste from site at least twice weekly to an MEFT-approved disposal facility.
- Food waste control: Food waste to be stored in wildlife-proof containers and removed daily; no food scraps to be buried or burnt on site.

6.1.7 Cultural Heritage Disturbance

Objective: Protect all archaeological and cultural heritage resources.

- Chance finds procedure: If graves, artifacts, or sacred sites are discovered, immediately halt work in a 50 m radius; notify the National Heritage Council within 24 hrs; resume only after clearance.
- Known sites protection: Any pre-identified sites to be fenced with 1.2 m-high barrier and signposted "Cultural Heritage – No Entry".

6.2 Mitigation Measures – Operational Phase

6.2.1 Hydrological Changes

Objective: Maintain the natural flood regime and prevent obstruction of wetland water flow.

- Infrastructure placement: No permanent structures to be constructed within the 50 m riparian buffer zone unless approved by MEFT and designed with culverts or raised boardwalks to maintain flow.
- Culvert specifications: Minimum culvert diameter 600 mm, positioned to match natural drainage lines; inspect and clear debris monthly during the wet season.
- Flood monitoring: Install flood level gauge adjacent to site; ECO to record flood heights monthly and after major events.
- Annual review: Conduct a hydrological assessment annually to check for altered flow patterns; adjust structures as necessary.

6.2.2 Wildlife Mortality & Displacement

Objective: Minimise wildlife collisions, entanglement, and habitat avoidance.

- Speed limits: Enforce max. 30 km/h on all internal roads and 20 km/h within 500 m of wetland edges; install speed humps at key wildlife crossing points.
- Wildlife corridors: Maintain two unfenced 20 m-wide vegetated strips linking riparian habitat to upland woodland; no construction or parking in these corridors.
- Visitor behavior controls: All visitors to receive an induction briefing on wildlife safety; no feeding or approaching animals closer than 50 m.
- Lighting control: Use low-intensity (<3000K), shielded LED lighting; switch off exterior lights after 22:00 unless for safety patrols.

6.2.3 Waste Generation (General Operations)

Objective: Prevent littering, pollution, and attraction of problem wildlife.

- Segregation: Provide separate, clearly marked wildlife-proof bins for recyclables, general waste, and hazardous waste; lids must remain closed at all times.
- Removal schedule: Waste to be removed from site to MEFT-approved facility at least twice weekly; hazardous waste to be removed monthly or sooner if full.
- Recycling program: Establish agreements with recyclers for glass, plastic, and aluminium; track quantities removed.

6.2.4 **Sewage System Waste Generation and Disposal** *(Key Sensitivity)*

Objective: Prevent nutrient enrichment, pathogen contamination, and groundwater pollution.

- Treatment system design: Sewage treatment plant or septic tanks must comply with Namibian General Effluent Standards (GN 363 of 2012).
- Buffer zone: All sewage infrastructure to be located >100 m from any permanent or seasonal waterbody and outside the 1:50-year floodline.
- System capacity: Design for 150% of peak expected load to prevent overflows during high occupancy.
- **Effluent monitoring:**
    - Monthly testing for E. coli, total coliform, pH, turbidity, nitrates, and phosphates before discharge.
    - Maintain results in a compliance register accessible to MEFT inspectors.
- **Sludge management:**
    - De-sludge tanks every 12–18 months (or sooner if sludge volume exceeds 50% tank capacity).
    - Dispose of sludge only at a licensed landfill; keep disposal receipts.
- Screenings/grit disposal: Remove screenings weekly; store in sealed containers until taken to landfill.
- Flood contingency: Install back-flow preventers to prevent floodwaters entering treatment units; ECO to inspect before every rainy season.
- Emergency response: In the event of a system failure, cease discharge immediately, deploy portable toilets, and notify MEFT within 24 hrs.

6.2.4a Boat Game Rides – Noise and Wake Disturbance

Objective: Minimise disturbance to aquatic and riparian fauna.

- Limit boat trips to daylight hours only (06:00–18:00).
- Use four-stroke outboard engines or electric motors to reduce noise and emissions.
- Maintain minimum distance of 30 m from hippos, crocodiles, and large mammals in the water; 50 m from nesting waterbirds.
- Adhere to max. speed of 5 knots within 200 m of shorelines or islands to reduce wake erosion.
- Establish no-go zones in sensitive breeding areas identified by MEFT and the conservancy.

6.2.4b Mukolo Canoe Excursions – Wildlife Disturbance

Objective: Avoid stress or displacement of sensitive species.

- Guides to undergo wildlife sensitivity training prior to conducting trips.

- Maintain 25 m minimum approach distance to all birds and mammals; never enter reed-beds or nesting colonies.
- Limit group sizes to max. 4 canoes per excursion to reduce disturbance.
- Restrict canoe trips in papyrus channels during peak bird breeding season (Nov–Feb).

6.2.4c Guided Game Drives – Road Disturbance

Objective: Prevent soil degradation and wildlife disturbance.

- No off-road driving unless authorised for specific sightings by park management.
- Limit daily vehicle movements to designated park/conservancy routes.
- Maintain max. speed of 25 km/h inside national parks and 30 km/h in the conservancy.
- Implement dust suppression measures (e.g., scheduling drives when soil moisture is higher) on sandy tracks near settlements or sensitive habitats.

6.2.4d Birdwatching – Disturbance to Nesting Areas

Objective: Protect breeding birds and maintain ecological integrity.

- Identify and map key nesting areas with input from local bird experts.
- Maintain 50 m buffer zone around all active nests and colonies.
- Prohibit use of playback calls or flash photography during breeding season.
- Group size limit: max. 8 people per birdwatching walk or boat trip.

6.2.4e Nature Walks – Trampling of Vegetation

Objective: Minimise physical damage to ground cover and sensitive plant species.

- Use established walking paths; create boardwalks in heavily trafficked or sensitive wetland areas.
- Group size limit: max. 10 guests per guide.
- Avoid nature walks during peak wet season flooding to prevent damage to saturated soils.
- Guides to instruct visitors on avoiding trampling of seedlings and ground nests.

6.2.4f Catch-and-Release Fishing – Handling Stress to Fish

Objective: Ensure sustainability of the Kwando River fishery.

- Only use barbless hooks and approved tackle types.
- Handle fish with wet hands or rubberised nets to reduce slime loss; keep fish out of water for <30 seconds.
- Enforce catch-and-release for all species; no fish to be retained.
- All fishing guides to be trained in species identification, handling techniques, and gear disposal.

- Prohibit fishing in designated spawning areas during breeding season (Dec–Feb).
- Provide sealed bins for discarded fishing line and tackle to avoid wildlife entanglement.

6.2.5 Disturbance from Visitors

Objective: Maintain low-impact tourism presence in a sensitive biodiversity area.

- Noise limits: No amplified music or noisy activities within 500 m of the river; quiet hours from 22:00–06:00.
- Viewing distances: Establish marked wildlife viewing areas; no boat approaches closer than 30 m to hippos, elephants, or nesting birds.
- Visitor group size: Limit guided groups to a maximum of 10 visitors in sensitive wetland areas at any one time.

6.2.6 Tourism Enhancement (Positive Impact Management)

Objective: Maximise local benefits from tourism growth.

- Local employment: Maintain at least 50% of permanent operational staff from local conservancy membership.
- Local sourcing: Source at least 30% of non-perishable supplies from Zambezi Region businesses where feasible.
- Community engagement: Hold quarterly feedback meetings with local community representatives to discuss tourism impacts and benefits.

6.2.7 Community Benefits

Objective: Ensure equitable distribution of benefits to local communities.

- Revenue sharing: Honour and document revenue-sharing agreements with local conservancies; payments to be made quarterly.
- Capacity building: Provide at least two tourism-related training courses per year for local community members.

Table 2: Environmental and Social Management Plan (ESMP) Summary (Construction and Operation)– Masambala Project

Impact	Mitigation Measures	Responsibility	Timing / Frequency	Monitoring Indicators
Land use change & habitat loss	Conduct pre-construction vegetation survey; mark all protected trees; fence "no-go" areas; restrict clearance to approved footprint; maintain 50 m buffer from wetlands; rehabilitate disturbed areas with indigenous plants within 14 days.	Contractor / ECO	Pre-construction & ongoing	Survey report; demarcation in place; rehabilitation records
Soil disturbance & erosion	Strip & store topsoil (max. 1.5 m high, covered); install silt fences along drainage lines; inspect erosion controls before rainy season; limit vehicle access to marked tracks.	Contractor / ECO	Ongoing; inspect before wet season	Stockpile condition; erosion control maintenance
Surface water contamination	Maintain 50 m buffer for fuel/chemical storage; bund tanks (110% capacity); refuel in lined bunded areas; keep 2 spill kits on site; train operators in spill response.	Contractor / ECO	Ongoing	Bund condition; spill kit availability; training records
Groundwater contamination	Provide sealed chemical toilets (1:15 workers); remove waste weekly; store hazardous materials on impermeable surfaces; no unlined wash areas.	Contractor / ECO	Ongoing	Sanitation logs; storage inspection
Disturbance to fauna	Enforce 30 km/h speed limit; ban night works unless approved; use shielded low-intensity lights; prohibit wildlife interaction; retain 20 m-wide corridors.	Contractor / ECO	Ongoing	Speed signage; lighting checks; wildlife incident log
Waste generation (construction)	Provide wildlife-proof bins; remove waste twice weekly; segregate recyclables; remove food waste daily; no burning/burying on site.	Contractor / ECO	Daily & weekly	Waste storage; disposal receipts
Cultural heritage disturbance	Implement chance finds procedure; stop work within 50 m of find; notify National Heritage Council; fence known sites.	Contractor / ECO	Ongoing	Incident reports; fencing in place
Hydrological changes	Keep permanent structures outside 50 m riparian buffer;	Operator / ECO	Monthly (wet	Culvert logs; flood

Impact	Mitigation Measures	Responsibility	Timing / Frequency	Monitoring Indicators
	install ≥600 mm culverts at drainage points; inspect monthly; maintain flood gauge.		season)	records
Wildlife mortality & displacement	Maintain 30 km/h internal, 20 km/h near wetlands; keep 20 m-wide wildlife corridors; visitor induction; limit lighting after 22:00.	Operator / ECO	Ongoing	Road signage; wildlife incident records; induction logs
Waste generation (operations)	Wildlife-proof bins; remove general waste twice weekly, hazardous waste monthly; licensed waste handler; keep receipts.	Operator / ECO	Weekly/monthly	Waste inspection; disposal records
Sewage system waste generation & disposal	Locate >100 m from water; design to 150% peak load; comply with GN 363/2012; test effluent monthly; de-sludge every 12–18 months; dispose sludge at licensed landfill; flood protection; emergency plan.	Operator / ECO	Monthly tests; annual desludging	Effluent results; sludge receipts; inspection logs
Disturbance from visitors	Enforce quiet hours (22:00–06:00); no boats within 30 m of large fauna; limit groups to 10 in sensitive areas.	Operator / Guides	Daily	Visitor logs; guide observation records
Boat game rides – noise/wake disturbance	Daylight hours only; four-stroke/electric motors; 30 m min. from hippos/crocs, 50 m from nesting birds; 5 knots near shore; no-go zones in breeding areas.	Operator / Guides	Daily during tours	Trip logs; GPS track records; wildlife disturbance reports
Mukolo canoe excursions – wildlife disturbance	Wildlife sensitivity training; 25 m min. approach to fauna; max. 4 canoes/trip; avoid papyrus channels in Nov–Feb.	Operator / Guides	Daily	Guide logs; wildlife approach observations
Guided game drives – road disturbance	No off-road driving unless authorised; use designated routes; 25 km/h in parks, 30 km/h in conservancy; dust suppression in dry season.	Operator / Guides	Daily	Vehicle GPS logs; route adherence records
Birdwatching –	Map nesting sites; maintain 50 m buffers; no playback	Operator /	Seasonal & daily	Nest maps; visitor

Impact	Mitigation Measures	Responsibility	Timing / Frequency	Monitoring Indicators
disturbance to nesting	calls/flash; max. 8 people per group.	Guides		group size records
Nature walks – trampling	Use marked trails; boardwalks in sensitive zones; group limit 10; avoid wet season flooding areas.	Operator / Guides	Daily	Trail condition logs; visitor counts
Catch-and-release fishing – fish stress	Use barbless hooks; wet hands/rubber nets; max. 30 sec out of water; enforce release of all fish; guide training; no fishing in spawning areas Dec–Feb; sealed bins for tackle waste.	Operator / Guides	Daily during trips	Fishing logs; tackle disposal checks
Tourism enhancement	Employ ≥50% staff from conservancy; source ≥30% supplies locally; quarterly community meetings.	Operator	Quarterly	Employment records; procurement logs; meeting minutes
Community benefits	Honour revenue-sharing agreements; quarterly payments; at least 2 training courses/year for community.	Operator	Quarterly & annually	Payment receipts; training attendance
Environmental education opportunities	Provide interpretive materials; guided conservation talks; integrate conservation messaging in all tours.	Operator / Guides	Ongoing	Visitor feedback; education materials

In addition to site-specific mitigation measures, the Environmental Management Act (2007) and the EIA Regulations (2012) require consideration of cumulative impacts. The Kwando River floodplain is a sensitive conservation and tourism landscape where multiple facilities operate within the Mayuni Conservancy and Bwabwata National Park.

To address these broader pressures, a standalone cumulative impacts mitigation framework has been developed. This framework focuses on joint management actions, collaborative monitoring, and conservancy-level planning that extend beyond the scale of a single facility. The table below sets out key cumulative impacts, corresponding mitigation and management actions, responsible institutions, and monitoring indicators.

Table 3: Cumulative Impact Mitigation Measures

Cumulative Impact	Mitigation / Management Action	Responsible Party	Monitoring Indicator	Frequency
Tourism pressure and traffic (road & boat)	Develop and enforce a joint code of conduct for boat speeds, wake control, noise reduction, and visitor behavior across all lodges in the Mayuni Conservancy. Limit night boat activities.	Proponent, Mayuni Conservancy, MEFT (Parks & Wildlife)	Adoption of code of conduct; number of compliance checks conducted	Quarterly
Hydrology and floodplain connectivity	Obtain and maintain water abstraction permits; coordinate with other facilities to ensure abstraction levels remain within sustainable limits. Site infrastructure (boardwalks, soakaways) to avoid blocking natural water flow.	Proponent, MAWLR, Conservancy	Valid permits; water level records; evidence of design avoiding hydrological barriers	Annual
Wildlife disturbance and habitat fragmentation	Maintain riparian buffer zones (≥50–100 m where feasible) and avoid clearing of intact woodland. Align site planning with Bwabwata NP and Conservancy zoning plans to retain corridors.	Proponent, MEFT, Conservancy	Buffer integrity; wildlife corridor use (observations, camera traps)	Annual
Wastewater and pollution risks	Install compliant bio-digester or package treatment system; join a collective wastewater monitoring program with neighboring lodges. Share water quality results with MEFT.	Proponent, MEFT (DEA), Conservancy	Water quality test results (nutrients, E. coli, BOD, COD); compliance with GN 363:2012	Bi-annual
Socio-economic pressures	Implement transparent benefit-sharing agreements with the Conservancy. Prioritise local employment and procurement. Collaborate with other lodges to prevent wage/price inflation and exclusion of vulnerable groups.	Proponent, Conservancy Committee	Employment records (gender/youth balance); revenue distribution reports	Annual

7 Monitoring and Reporting Programme

The monitoring program for the Masambala Project aims to ensure that all mitigation measures described in Section 7 are effectively implemented, maintained, and adapted if necessary. The program also provides measurable indicators for evaluating environmental performance, compliance with legal obligations, and the achievement of conservation objectives within Bwabwata National Park.

7.1 Monitoring Objectives

- Verify compliance with the Environmental Management Act, 2007 and EIA Regulations (2012).
- Ensure adherence to site-specific mitigation measures outlined in the ESMP.
- Detect and address any unforeseen environmental or socio-economic impacts at an early stage.
- Provide data for adaptive management and continuous improvement of environmental performance.
- Facilitate transparent communication with regulatory authorities, the park management, and local communities.

7.2 Monitoring Plan

Table 4: Monitoring Plan - Table

Impact / Activity	Monitoring Indicator	Method	Frequency	Responsibility	Reporting
Land use change & habitat loss	No-go areas demarcated; protected trees marked; rehabilitation success	Site inspection; photo records; vegetation survey	Pre-construction & quarterly during construction	ECO / Contractor	ECO monthly report to MEFT & Conservancy
Soil disturbance & erosion	Integrity of topsoil stockpiles; erosion controls functional	Visual inspection	Monthly & before rainy season	ECO / Contractor	ECO monthly report
Surface water contamination	Fuel storage bund condition; spill kit availability; spill incident log	Visual inspection; checklists	Monthly	ECO / Contractor	ECO monthly report

Impact / Activity	Monitoring Indicator	Method	Frequency	Responsibility	Reporting
Groundwater contamination	Sanitation facilities in use; hazardous storage on impermeable surfaces	Visual inspection; record review	Monthly	ECO / Contractor	ECO monthly report
Disturbance to fauna	Wildlife incident log; speed signage in place	Visual inspection; incident reports	Monthly	ECO / Contractor	ECO monthly report
Waste generation (construction)	Waste bins available; waste removal receipts; recycling records	Visual inspection; document review	Weekly	ECO / Contractor	ECO monthly report
Cultural heritage disturbance	Chance find procedure available; fenced heritage sites	Visual inspection	Ongoing	ECO / Contractor	ECO monthly report
Hydrological changes (operation)	Riparian buffer intact; culverts unobstructed; flood gauge readings	Visual inspection; water level logging	Monthly (wet season)	ECO / Operator	ECO quarterly report
Wildlife mortality & displacement (operation)	Wildlife corridors maintained; incident reports	Visual inspection; incident log	Monthly	ECO / Operator	ECO quarterly report
Waste generation (operation)	Waste bin condition; waste removal receipts	Visual inspection; record review	Monthly	ECO / Operator	ECO quarterly report

Impact / Activity	Monitoring Indicator	Method	Frequency	Responsibility	Reporting
Sewage system waste generation & disposal	Effluent quality test results; sludge disposal receipts	Lab analysis; record review	Monthly tests; annual desludging	ECO / Operator	ECO quarterly report to MEFT
Disturbance from visitors	Quiet hours respected; group size compliance	Visual observation; guide logs	Weekly	ECO / Guides	ECO quarterly report
Boat game rides – noise/wake disturbance	Distance compliance; speed compliance; GPS trip logs	Visual observation; GPS review	Daily during tours	Guides / ECO	ECO quarterly report
Mukolo canoe excursions – wildlife disturbance	Wildlife approach distances maintained; group size limit	Visual observation; guide logs	Daily during tours	Guides / ECO	ECO quarterly report
Guided game drives – road disturbance	Route adherence; speed limit compliance	GPS tracking; observation	Monthly	Guides / ECO	ECO quarterly report
Birdwatching – disturbance to nesting	Buffer distances maintained; no playback/flash	Visual observation	Weekly during season	Guides / ECO	ECO quarterly report
Nature walks – trampling	Trail condition; boardwalk maintenance	Visual inspection	Weekly	Guides / ECO	ECO quarterly report
Catch-and-release fishing – fish handling	Barbless hooks; handling time compliance	Observation ; fishing logs	Daily during trips	Guides / ECO	ECO quarterly report
Tourism enhancement	% staff from conservancy; % local procurement	Review HR and procurement records	Quarterly	Operator	Annual sustainability report

Impact / Activity	Monitoring Indicator	Method	Frequency	Responsibility	Reporting
Community benefits	Revenue-sharing payments made; training records	Financial audit; attendance registers	Quarterly & annually	Operator	Annual sustainability report
Environmental education opportunities	Education materials available; visitor feedback	Review materials; survey guests	Annually	Operator	Annual sustainability report

7.3 Reporting Requirements

- Monthly internal site report prepared by the Environmental Control Officer (ECO), covering all monitored parameters and compliance status.
- Quarterly environmental performance report submitted to:
    - Ministry of Environment, Forestry and Tourism (MEFT) – Directorate of Environmental Affairs.
    - Bwabwata National Park Management.
    - Local conservancy committees (for transparency on community benefits).
- Annual environmental audit conducted by an independent environmental practitioner, including review of monitoring data, compliance with the ESMP, and recommendations for improvement.
- Incident reporting: Any significant pollution event, wildlife mortality involving a protected species, or cultural heritage disturbance must be reported to MEFT and relevant authorities within 24 hours.

7.4 Adaptive Management

If monitoring results indicate non-compliance or emerging impacts not previously identified, the Operator must:

1. Investigate the cause of non-compliance.
2. Implement corrective actions within agreed timeframes.
3. Update the ESMP with revised mitigation measures.
4. Inform MEFT and stakeholders of the changes.

8 Conclusion

The ESMP provides a robust framework ensuring environmental protection, regulatory compliance, and community benefit for the proposed Masambala Eco-Tourism Campsite. The project is environmentally acceptable provided the ESMP is fully implemented.