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Operational Environmental Management Plan (EMP) for the existing Dolomite Camp in the Etosha National Park

EMP

Final

Namibia Wildlife Resorts

GCS Project Number: 21-1081

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EMP

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1 OVERVIEW

1.1 Project Background

Namibia Wildlife Resorts (NWR) is a state-owned enterprise, mandated to run the tourism facilities within the protected areas of Namibia. NWR has several operations across the country which are owned and managed by NWR. An Environmental Clearance Certificate (ECC) was granted on 7 November 2018 to NWR for the operation and maintenance of the NWR Resorts located in the Etosha National Park (ENP) namely Okaukuejo, Namutoni, Halali, Dolomite, Olifantsrus and Onkoshi.

In accordance with the Environmental Management Act No 7 of 2007 and the Environmental Impact Assessment Regulations of 2012, the ECC is only valid for three years and as such the ECC has expired. As part of the application for the renewal of the expired ECC, an Environmental Management Plan (EMP) Compliance Audit has been conducted and subsequently the EMP for the project has been reviewed and updated. For ease of management, it has been decided that the previous EMP be separated into six (6) individual EMPs so that each of the mentioned resorts have a resort specific EMP to implement as part of the renewed ECC. This document, is the EMP for the activities at Dolomite Camp.

1.2 Dolomite Camp

The Dolomite Camp is located in a previously restricted scenic area in the western region of Etosha National Park. The area is rich in biodiversity due to the absence of mainstream tourism activities. The Dolomite formations in the area give the resort its name and provide a lush vista, with no less than 15 waterholes. The locality of the Dolomite Camp is depicted in **Figure 1-1** and **Figure 1-2** below.

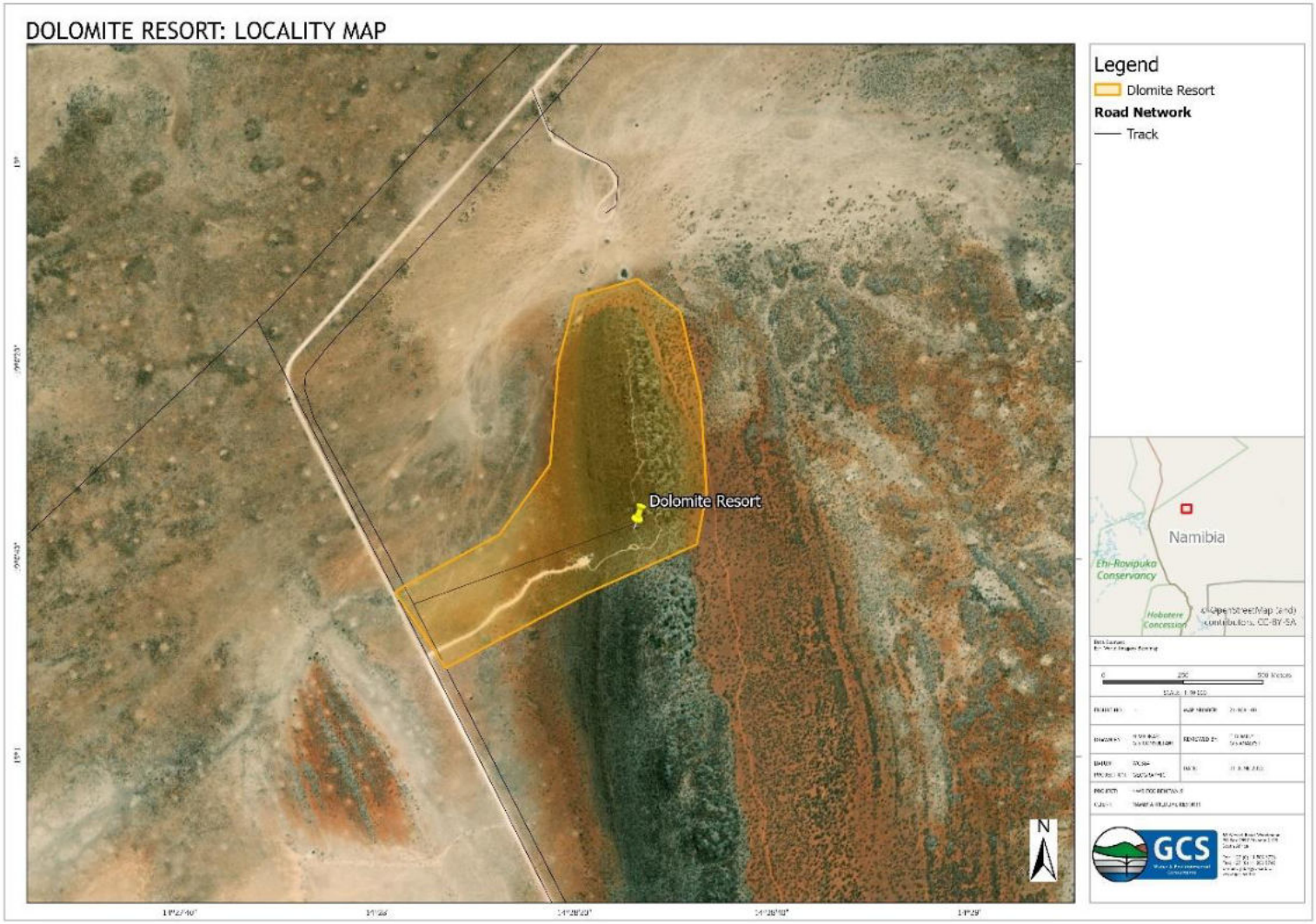

Figure 1-1: Locality map of Dolomite Camp

Figure 1-2: Google Map Dolomite Resort

1.2.1 Accomodation facilities

The Dolomite Camp facilities includes a bar, restaurant, infinity swimming pool and tourist shop. The resort includes the following accomodation facilities:

- 3 Deluxe Chalets with Jaccuzi
- 17 Bush chalets

Figure 1-3: Dolomite Camp

1.2.2 Engineering Services

1.2.2.1 Waste Disposal

The general waste at Dolomite Camp is collected in waste bins in 4 categories by types of waste (glass, plastic, metals, and other) as shown in **Figure 1-4** below. The waste is then loaded on a truck (managed by MEFT) and disposed at the Ombika dumpsite at Okaukuejo.

Figure 1-4: General waste collection on site

1.2.2.2 Water

Dolomite Camp makes use of borehole water for general domestic use and the upkeep of the camp.

1.2.2.3 Electricity

Dolomite Camp uses a generator as a source of electricity (**Figure 1-5**).

Figure 1-5: Generator on site

1.2.2.4 Sewer

Dolomite Camp has self-sufficient toilets which are connected to a septic tank system. The NWR truck collects the sewage and dumps it at the oxidation ponds on site. **Figure 1-6** below depicts the ablution facilities available at the camp.

Figure 1-6: Ablution facilities on site

1.2.2.5 Access

Access to Dolomite Camp is gained through the C35 road from Kamanjab to Omakange at Etosha National park's Galton entrance gate.

1.3 Purpose of the EMP

An Environmental Management Plan (EMP) is defined as:

"*…a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored*."

An EMP is one of the most important outputs of the EA process as it synthesises all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the Environmental Impact Assessment (EIA) Process and the required environmental management on the ground during project implementation and operation. It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to adapt to project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is therefore to guide environmental management throughout the following life-cycle stages of the proposed development, operation, and decommissioning.

The following phases are addressed in this EMP:

- **Operation** - the period during which the facility is operational.
- **Decommissioning** – Should the development be closed; this phase will be implemented.

1.4 Environmental Assessment Practitioner (EAP)

GCS Water Environmental Engineering Namibia (Pty) Ltd ("GCS" hereafter) has been appointed by Namibia Wildlife Resorts (NWR) as independent environmental consultants to update the Environmental Management Plan (EMP) for the proposed development. The initial EMP was developed by Afromach Investment (Pty) Ltd in 2018. The EMP is to be submitted with the supporting documents as part of the application for the renewal of the Environmental Clearance Certificate (ECC) to the Environmental Commissioner at the Department of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT). The EMP will also be used by Contractors as well as the Proponent in guiding them during the operations to ensure that impacts on the environment are limited or avoided altogether.

1.5 Legal Requirements

The contents of the EMP must meet the requirements Section 8 (j) of the EIA Regulations. The EMP must address the potential environmental impacts of the activity on the environment throughout the project life cycle. It must also include a system for assessment of the effectiveness of monitoring and management arrangements after implementation. NWR therefore has the responsibility to ensure that the proposed activity conforms to the principles of the EMA and must ensure that any contractors appointed by them also comply with such principles.

Table 1-1 below lists the requirements of an EMP as stipulated by Section 8 (j) of the EIA Regulations.

Table 1-1: Applicable and relevant Namibian legislations and guidelines for the EA process

Legislation	Permit/Approval/Requirement	Contact Details
Environmental Management Act 2007 Environmental Impact Assessment (EIA) Regulations (EIAR) (GG No. 4878)	Amendments (required every 3 years) to this EMP will require an amendment of the ECC for these developments. Activities listed in Government Notice (GN) No. 29 of GG No. 4878 require an ECC. Activity 6 The construction of resorts, lodges, hotels or other tourism and hospitality facilities	Mr Damian Nchindo Department of Environmental Affairs, Ministry of Environment, Forestry and Tourism Tel: 061 284 2701
Water Act 54 of 1956	Prohibits the pollution of underground and surface water bodies (S23 (1)). Liability of clean-up costs after closure/abandonment of an activity (S23 (2)).	Mr Witbooi (Department of Water Affairs): Tel: (061) 208 7226
Water Resources Management Act No.11 of 2013	The act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:	

Legislation	Permit/Approval/Requirement	Contact Details
	Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).	
Forestry Act 12 of 2001	The Act provides for the management and use of forests and related products / resources. It offers protection to any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse on land that is not a surveyed erven of a local authority area. In such instances, a licence would be required to cut and remove any such vegetation. These provisions are only guidelines.	If there are trees within the proposed footprint of the project area that need to be removed, the proponent should notify the local Forestry Department of the number and/or type of trees to be removed and apply for permit to remove protected tree species.
National Heritage Act (27 of 2004)	Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains. Section 48 ff sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Heritage sites or remains are defined in Part 1, Definitions 1, as “any remains of human habitation or occupation that are 50 or more years old found on or beneath the surface”.	Ms. Erica Ndalikokule National Heritage Council of Namibia erica@nhc-nam.org

Legislation	Permit/Approval/Requirement	Contact Details
Namibia Tourism Board Act 21 of 2000	To establish the Namibia Tourism Board and to provide for its functions; to provide for the registration and grading of accommodation establishments; to provide for the declaration of any sector of the tourism industry as a regulated sector and for the registration of businesses falling within a regulated sector; and to provide for matters incidental thereto.	Namibia Tourism Board info@namibiatourism.com.na +264 61 290 6000
National Policy on Tourism 2008	The National Policy on Tourism for Namibia aims to provide a framework for the mobilisation of tourism resources to realise long term national goals defined in Vision 2030 and the more specific targets of the Third National Development Plan, namely, sustained economic growth, employment creation, reduced inequalities in income, gender as well as between the various regions, reduced poverty, and the promotion of economic empowerment.	Department of Tourism and Gambling, Ministry of Environment, Forestry and Tourism +264 61 284 2178
Water Resources Management Act No 11 of 2013	Provide for the management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. Part 13 of the Act relates to the control of water pollution.	Mr Beajah Wohler Ministry of Agriculture, Water and Land Reform Directorate Water Resource Management Policy and Water Law Administration Beajah.Wohler@mawf.gov.na

1.6 Assumptions and Limitations

This EMP has been drafted with the acknowledgment of the following assumptions and limitations:

- This EMP has been updated based on the existing Operational EMP as prepared by Afromach Investment (Pty) Ltd in 2018 for the proposed development. No detailed specialist studies were included as part of the assessment; and
- The mitigation measures recommended in this EMP document are based on the risks/impacts which were identified based on the provided project description and site investigation. Should the scope of the project change, the risks will have to be reassessed and mitigation measures provided will be revised accordingly.

1.7 Report Structure

This EMP lays out the management actions for the existing operations at the site. The EMP addresses the following phases:

- **Operation phase** - the period during which the facility will be operational and conducted by the proponent and/or their contractors; and
- **Decommissioning phase**: the period during which the Proponent may decide to discontinue the operations and its associated activities.

2 ENVIRONMENTAL AND SOCIAL BASELINE

The environmental and social baseline description has been adopted from the 2018 EMP as developed by Afromach Investment (Pty) Ltd.

2.1 Topography

The landscape of Etosha National Park is predominantly flat with a few small hills and ridges scattered mostly in the south and west. The pans account for almost 25% of the surface area of the Park.

2.2 Geology

Etosha National Park does not have a history of large commercial mining activities and there has not been any significant interest in the underlying geology, although the presence of oil is a possibility. There are a number of quarries within the Park whose environmental impacts could be high. Therefore, mitigation measures have been proposed in order to minimise the impacts of quarries on the Park.

Etosha National Park is entirely located on the quaternary and tertiary age sand calcrete and gravel of the Kalahari Group. This area is also characterised by dolomitic features such as the Ombika Koppie.

2.3 Hydrogeology

Aquifers in Etosha National Park are classified as porous and fractured, fissured or karstified aquifers according to the 1:1 000 000 hydrogeological map of Namibia. The groundwater quality according to the hydrogeological map in the Etosha National Park falls in the Group B but in the calcretes at Okaukuejo the quality is in the Group C class. This means that groundwater is of good quality for human consumption to Low health risk.

2.4 Soils

The soils in the Etosha National Park are shallow, with either bedrock or an evaporite (usually calcrete) hardpan at shallow depth. Substrates in the Etosha National Park, which is a potential constraint to development, may be divided into three groups, calcrete ridges, turf pans and the intermediate area which has medium-sized to small loose calcrete blocks scattered on the surface between the calcrete and turf pans.

2.5 Fauna

Etosha National Park has many of Namibia's largest 'contained' wildlife populations, including Red Data species such as black Rhino. In addition, because of the size of the protected area, most populations are large enough to be self-sustaining in the long-term without management intervention. Management of the fauna is therefore, essentially one of the less rather than more management with only water distribution, fire and human-wildlife conflict being the major issues, except for black rhino which are actively managed for optimum population growth.

103 mammal species, 282 bird species, 106 reptiles and a 135 species of invertebrates have been recorded and can be expected to occur at the study sites. The only invasive alien bird recorded from the study area is the House Sparrow, *Passer domesticus*.

2.6 Flora

The flora of Etosha National Park does not contain any vegetation types which are threatened or require special protection. However, the saline and dwarf shrub savanna and associated salt pans occur almost totally within the boundaries of Etosha National Park. The Moringa forest is also unusual and, if it is threatened, may require special management measures if they will assist and are practical and cost-effective to implement.

Fire management, although it can influence these two issues as well, is more directed at reducing the extent, severity and intensity of fires, especially wildfires and damage to property and life these may pose.

The Mopane Treeveld is relatively widespread, but the Marble Hillock vegetation type is only found here in the park. Turf pans represent one of the smallest vegetation types in the ENP, and the Ombika Turf Pan is the largest one of these. Through widespread, this is the single most important vegetation type in the park in terms of grazing. A total of 395 plant species have been recorded from the study sites.

2.7 Special habitats

The sites in the ENP lack well developed surface drainage systems and result in temporary aquatic habitats or turf pans situated in shallow depressions bottomed with dark clay substrate, and generally vegetated while water-logged. Turf pans are impassable to vehicles when wet. Besides the obvious risk of flooding, building of infrastructure in turf areas is inadvisable due to the presence of heaving clays that result in masonry failure. In the east, a large turf area occurs immediately west of Ombika Koppie, part of the depression that includes Ombika waterhole.

2.8 Socio-Economic

The nomadic Hai//om Bushmen were the earliest human settlers in the Etosha area. Charles Andersson and Francis Galton were the first European explorers to record the existence of the Etosha Pan in 1851, reporting herds of zebra and springbok, as well as cattle belonging to the Oshiwambo people in the north. Although the Hai//om were evicted from the Park several decades ago, large numbers of them remain, and many members of the tribe regard themselves as having continuing rights over the land. The census undertaken in 2010 places the number of Hai//om living in the Park close to 370.

Other tribes that live in the Park include the Oshiwambo, Damara/Nama, Herero and Okavango. Despite the fact that many households in the Park have other homes elsewhere, except the Hai//om Bushmen, most Park residents regard themselves as full-time residents of the Park. The Hai//om and a number of other tribes believe in their inherent rights to land in the Park. Results from the census report show that 8% of Oshiwambo, 12 % of Herero, 25% of Damara/Nama and 9% of Okavango speaking people were born in the Park (Aurecon, 2010). The Oshiwambo speaking people in the Park also express a sense of place with the ENP as this is the place that their forefathers died during the raid of the first fort built by the Germans in Etosha.

The living conditions of residents in the Park are far from ideal. There is inadequate social infrastructure to accommodate and provide services to all its inhabitants, with access to health care and education being particular problems. Social conditions are characterised by a high rate of domestic violence, alcoholism, prostitution and vandalism.

The second group comprises the various ministries and government agencies that are active in the Park. These include the MEFT, Namibia Wildlife Resorts (NWR), the Ministries of Health and Education, NamPost and the Ministry of Works and Transport (MWT). Theoretically, the staff of these ministries should be the only permanent occupants of the Park although many staff villages also house large numbers of people who are not Park employees.

3 ROLES AND RESPONSIBILITIES

NWR (the Proponent) is ultimately responsible for the implementation of the EMP. The Proponent may delegate this responsibility at any time, as they deem necessary, from planning and design to operation and maintenance phase and decommissioning phase (if considered). The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Proponent's Representative; and
- Environmental Control Officer.

3.1 Proponent's Representative

If the Proponent does not personally manage all aspects of the operation and decommissioning activities, referred to in this EMP, they should assign this responsibility to a suitably qualified individual referred to in this plan as the Proponent's Representative (PR). The Proponent may decide to assign the role of a PR to one person for both phases. Alternatively, the Proponent may decide to assign a separate PR for each component i.e., operation, and decommissioning phase. The PR's responsibilities are included in **Table 3-1** below.

Table 3-1: Responsibilities assigned to the Proponent's Representative for the operation and decommissioning phases

Responsibility	Project Phase
Managing the implementation of this EMP and updating and maintaining it when necessary	Throughout the lifetime of the project
Management and monitoring of individuals and/or equipment on-site in terms of compliance with this EMP	Throughout the lifetime of the project
Issuing warnings for contravening EMP provisions	Throughout the lifetime of the project

3.2 Environmental Control Officer

The Proponent should assign the responsibility of overseeing the implementation of the whole EMP on the ground during the life-cycle of the project to a designated person, referred to in this EMP as the Environmental Control Officer (ECO). The Proponent may decide to assign this role to one person for each project phase or may assign separate individual ECOs to oversee EMP implementation during each phase. The ECOs will have the following responsibilities:

- Management and facilitation of communication between the Proponent, PR and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended minimum frequency is bi-annually) of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

4 ENVIRONMENTAL MANAGEMENT PLAN ACTIONS

4.1 Key Potential environmental impacts to be managed

The following key potential impacts have been identified per project phase and are summarised in **Table 4-1** below.

Table 4-1: Summary of key potential environmental impacts per project phase

	Project Phase	Potential impacts identified in the EA
1	Operation	Health and safety, soil, surface and groundwater contamination, wildlife disturbance, dust, noise, environmental degradation, erosion, archaeological and social impacts.
2	Decommissioning	Health and safety, soil, surface and groundwater contamination, wildlife disturbance, dust, noise, environmental degradation, erosion, archaeological and social impacts.

The aim of the management actions of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

Management actions recommended to manage the potential impacts outlined above are presented in the following tables. The management actions were compiled based on the two project phases:

- Operation and maintenance phase management actions (during operation of the facility) (**Table 4-2**).
- Decommissioning phase (**Table 4-3**)

The responsible persons at NWR should assess these commitments in detail and should acknowledge their commitment to the specific management actions detailed in the table of the next subchapters.

4.2 Phase 1: Operational Phase Management Actions

The management actions for the operational phase during which the facility is operational are listed in **Table 4-2**.

Table 4-2: Operation phase management actions

Environmental Feature	Impact	Management Actions
EMP training	Lack of EMP awareness and the implications thereof	• Employees appointed for work (construction, maintenance etc.) must ensure that all personnel are aware of necessary health, safety, and environmental considerations applicable to their respective work. • A copy of the EMP should be available at the facility. • Employees appointed for work (construction, maintenance etc.) should be made aware by the PR of the provisions of the EMP that their work must comply with.
Monitoring	EMP non-compliance	• Appoint a Proponents Representative (PR) or delegate a member of staff to be the PR. • The PR must be a senior person reporting directly to the Resort Manager and NWR Environmental and Compliance Specialist at Head Office. • Establish an Environmental Management Committee (EMC) (which comprises of the PR from each resort in the ENP and the Environmental and Compliance Specialist) which meets regularly to discuss the implementation of this EMP, including water and power use (using figures collected for monitoring purposes during the month), management of litter, wise use of natural resources and adherence to park rules and regulations in this regard, etc. • The Proponent/PR should monitor the implementation of this EMP. • The PR should inspect the site at least on a monthly basis. • Bi-annual audits should be conducted of site activities by an external ECO.
Environmental Awareness	Environmental Education	• NWR to promote environmental awareness through ongoing programmes such as water saving initiatives.

Environmental Feature	Impact	Management Actions
		• Set up incentive programmes to encourage staff, residents, and local community organizations, including schools, to become actively involved in the management of the environment.
Illegal Harvesting of natural resources and poaching	Loss of Biodiversity	• Ensure all staff, residents and local community members are aware of the park rules and regulations relating to the harvesting of natural resources (firewood) and the need for these. • Enforce regulations to prohibit stripping of natural vegetation. • Consider how the use of firewood can be reduced, consider alternatives to firewood as a source of fuel, and consider the sourcing of sustainably harvested fuel wood. • Ensure that poaching in the park or on neighbouring land by staff, residents and local community members is not tolerated and that action is taken against any offenders in collaboration with MEFT.
Groundwater	Groundwater contamination	• Be on the lookout for leaking water pipes and any signs of environmental contamination resulting from the sewage infrastructure (encouraging residents to do the same) and take remedial action to resolve any identified problems as rapidly as possible. • Ensure that all solid waste remains in sealed containers at all times and that any leachate from waste transfer stations is effectively channelled into the sewage treatment works. • Ensure that all bunded areas, e.g., in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility. • Conduct regular checks for water leaks, including taps, toilets, pipes and geysers and encourage residents to fix or report such leaks immediately when they are encountered. • All faulty equipment to be repaired at the workshop and not in situ, where possible. • Set up a Contingency Plan to deal with minor and major pollution incidences e.g., oil spill clean-up kit available at all necessary points.

Environmental Feature	Impact	Management Actions
Waste Management	Visual impact and soil contamination	• Formally adopt and implement the Solid Waste Management Plan (SWMP) for ENP. • Formally assign responsibility for SWMP in Etosha to person/position. • Plan capacity needed for the organisation of SWMP and for contracting and monitoring a waste collection company. • Appoint a collection company to take the recyclable waste to Windhoek. • Set up a Waste Management Programme to include sorting of waste by separate waste streams for recycling wherever possible. • Ensure the provision of sufficient public waste bins and their regular emptying. Encourage all staff and residents to use these bins and to keep their surrounding litter free. • Ensure regular collection of household waste, with immediate transfer to transfer stations. • Ensure that all waste is transported in an environmentally responsible manner (covered and no leakage) to appropriate licensed (if possible) facilities for the type of waste. NB. It is likely that hazardous waste will need to be sent to Windhoek. • Appoint operator of waste transfer station and ensure they are fully acquainted with the services provided and the maintenance thereof. • Check interlocking paving for vegetative growth and prevent roots from establishing by physically removing the vegetation. • Inspect paved areas after heavy rainfall to ensure bedding sand not washed away and blocks out of position. If this is the case then fine-grained sand must be swept into these areas to replace lost sand. • Check the retaining walls for any damages and cracks. If found these need to be repaired as soon as possible to prevent moisture penetrating and corroding the steel reinforcing • All silt must be removed from the concrete drains and channels as soon as it accumulates to prevent vegetative growth in these structures and their joints.

Environmental Feature	Impact	Management Actions
		• Pipe culverts must be cleaned monthly to prevent silt from building up in these structures resulting in blockage of the culverts. These can be flushed with water using the standpipes provided. • The headwall outlet must be examined for erosion after heavy rains. If this is discovered, the eroded areas must be backfilled with boulders and soil to prevent a donga forming. Where possible these areas must be revegetated in order to try to bind the soil.
Hazardous Waste	Soil and groundwater contamination	• Adequate separate waste containers (bins) for hazardous and domestic / general waste must be provided on site. • Hazardous waste should be disposed of at a facility that is able to receive such waste and records of disposal should be kept. • Maintenance and washing of vehicles and machinery on site should take place only at a designated workshop area that is on a bunded, impermeable surface. • Ensure that all bunded areas, e.g. in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility. • Set up a Contingency Plan to deal with minor and major pollution incidences e.g. oil spill clean-up kit available at all necessary points.
Biodiversity	Loss of Biodiversity	• Trees and plants protected under the Forest Act No 12 of 2001 are not to be removed without a valid permit from the local Department of Forestry. • Off-road driving should not be allowed on site. • Ensure that all gardens only make use of indigenous vegetation (with the exception of food gardens) and educate residents in this regard. • Conduct regular checks to prevent alien and/or invasive plants from establishing. • Implement the ENP"s alien and invasive management programme in all areas, especially newly constructed areas.

Environmental Feature	Impact	Management Actions
		• No pets or domestic animals allowed in settlements as per standing park rules.
Noise	Disturbance to fauna	• Noise restrictions should be in place on site to minimise disturbance.
Health and Safety	Health and Safety on site	• Ensure first aid training and environmental awareness training is provided to staff. • Fire extinguisher training should be provided to a designated member of staff who will act a fire marshal during fire events. • Any accidents/incidents occurring on site should be reported to MEFT and other relevant authority within 24 hours. • Ensure that adequate emergency procedures are in place to reduce the magnitude of the impacts in the event of an emergency.
	Tourist, visitors, employees	• Structurally defective buildings must be vacated as rapidly as possible and renovated or demolished as required and as per government process. • Check perimeter fences around the camps, tourists' areas, staff villages (including around strategic infrastructure such as boreholes, evaporation ponds, solid waste dumping sites or transfer stations etc.). • In collaboration with MEFT, maintain fences as required. • Control access into the camps and staff villages. Access should be through one motorized gate. Place a security guard at camp and staff villages' entrances. All residents should have appropriate authorization to allow them to enter the staff villages. • Compile an emergency response plan (fire, flood, intruding animals, disease, etc.) for the village and communicate it to the residents. Make sure each household is provided with a list of emergency contact details and familiar with the emergency response plan.

Environmental Feature	Impact	Management Actions
		• Have well stocked first aid kits / boxes at all critical areas. There must be at least two employees per resort who are well trained in first aid. • Put in place a Sanitation and Hygiene awareness promotion programme to meet the principles set out in the Namibian National Sanitation Strategy for 2010/11 – 2014/15. • Look after the social well-being of the employees and provide sufficient entertainment for the employees when they are off duty. The following are some of the key aspects that should be provided to employees by NWR. o Well-equipped and well-stocked staff shop. Where establishment of staff shop is not possible, employees need to be taken for personal shopping at least once per month. o Entertainment area & facilities e.g. cable TV.
	Fire	• Ensure adequate fire breaks and control of moribund material around and between infrastructures as needed. • Establish emergency procedures to allow for immediate action in the case of accidental fire and ensure that firefighting equipment is on hand and in good working order at all times and that all staff and residents are trained and understand procedures to be followed and how to use equipment.
	Fire or incidents	• Ensure adequate emergency procedures are in place to reduce the magnitude of the impacts in the event of an emergency. • The fuel storage facility should be fitted with the required health and safety warning and information signage that is required and suitable for such installations. • Ensure that there are adequate and appropriate first aid provisions to respond to accidents in the facility. • Routine housekeeping to reduce fire risk -

Environmental Feature	Impact	Management Actions
		○ Install a fire extinguisher. ○ Use a carbon dioxide (CO2) fire extinguisher which is suitable for inflammable and combustible liquids and does not leave a harmful residue after use (as a dry chemical extinguisher does). ○ The fire extinguisher must be easily accessible in case of emergency (i.e. close enough to the fuel facility to be able to use immediately but not so close that the intensity of a fire would prevent it from being accessed). ○ Ensure that any minor spills are cleaned up immediately. ○ Keep the area within 6m of the tanks clear of all vegetation and debris. ○ Check and maintain the extinguisher regularly. ○ Ensure electrical systems, such as pumps, are properly maintained to prevent sparks. ○ Ensure fuel lines, hoses, valves and nozzles are in good repair. ○ Close the valves on tank discharges when they are not in use to prevent leakage through the hose or nozzle. ○ Ensure that gasoline is not used as a cleaning or degreasing agent (has inherent fire risk). ○ Material Safety Data Sheets containing information on the potential hazards and how to work safely with the chemical product which must be obtained from the supplier and should be available on site.
Power and electrical	Evaporative coolers	• It is recommended that an evaporative cooler is regularly maintained. The frequency of maintenance is dependent upon the quality of water, the cleanliness of the air and the frequency of use. Under the current conditions, a three-month maintenance frequency is recommended.

Environmental Feature	Impact	Management Actions
	Liquefied Petroleum Gas (LPG) Storage and Reticulation	• Maintenance procedures are standardised and should be stringently and completely followed by a certified LPG installer. • GAS containers need to be stored safely in the covered and lockable facility.
	Generators	• On-Going maintenance as per supplier specification is required. • O&M Manuals must be consulted during the maintenance. • Weekly Generator tests to be done on standby generators. • Annual Maintenance to be done by specialist • Diesel fuel to be stored in bulk tanks that are stored safely on lockable areas to allow for refilling once a week. • Reasonable precautions to prevent fuel spillage and leakages during refuelling of pumps. • Generators need to be placed and operated on paved, well ventilated, lockable covered facilities which are accessible only by authorized operators. • Portable drip trays to be used to collect waste oil & lubricants
	Lighting	• Attic stock of lamps and fittings to be kept for regular maintenance.
Employment	Recruitment	• Local employment and use of local businesses/suppliers should be encouraged to promote and improve the local economy as far as reasonably possible. • Should the required services and/or goods not be available locally then look to other localities for these services/goods.
Ablution	Sanitation	• Separate ablutions should be available for men and women and should clearly be indicated as such. • Sewage waste needs to be removed on a regular basis to the nearest approved sewage disposal site. • Workers responsible for cleaning the toilets should be provided with latex gloves and masks.

Environmental Feature	Impact	Management Actions
Sewage Management	Environmental pollution and underground water resources contamination from waste water	• Ensure that the shared ablution facilities, septic tanks, sewers, pump stations and evaporation ponds are managed and maintained as per design and engineering specifications. • Ensure that all concerned staff are trained in critical health and safety issues regarding operation and maintenance of the sewage system components • Ensure that all concerned staff are issued with the necessary safety equipment and protective clothing required for them to do their jobs safely and at no risk to their health. • Be on the lookout for leaking water pipes and any signs of environmental contamination resulting from the sewage infrastructure (encouraging residents to do the same) and take remedial action to resolve any identified problems as rapidly as possible. • Ensure that all bunded areas, e.g., in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility. • Ensure that all manhole access covers are firmly closed (may have to assign a certain number of manholes to each caretaker as the whole network may be too large for just one caretaker to patrol) • Visually check for any signs of leaking pipes. • Visually check for any loose fittings.
	Evaporation ponds	• Check that boundary gates are closed and locked. • Ensure that penstocks in chambers/manholes are open as necessary and that sewage is flowing into the correct ponds. • Remove floating debris that may have moved close to the edges by wind/wave action. • Check that weirs are flowing freely. • Remove litter that accumulates.
	Conservancy tanks	• Empty conservancy tanks and transport to nearest evaporation ponds.

Environmental Feature	Impact	Management Actions
	Septic tanks	• Inspect tanks on a continuous bases for potential problems. • Clear all grease traps at least once a month. • The septic tanks should be dislodged at least every two months. • The septic tank must be emptied at least every 5 years of all sludge. NB. If this is not done, the septic tank will fill up and when sewage flows into the tank, it cannot settle and instead passes through the pipes into the percolation trench. It will lead to the percolation trench becoming blocked and if this happens, a new trench must be constructed. • Empty septic tank. NB. If the sewage pipes become backlogged at any of the ablutions, checks must be done on the connections for any blockages, and if these are all clear, then the septic tank must be checked to see if it is full. • Replace blocked percolation trench. NB. A sign of a blocked percolation trench will be the build-up of sewage in the Septic Tank and blocked sewer pipes. When this occurs, the pipes and joins must be checked. If these are clear, then the percolation trench is blocked and must be replaced.
	Pumping Stations	• Check that doors to pump station and boundary gates are closed and locked. • Regularly removes solids, rags, etc., from the baskets (screen cage) • Check electrical control panel to see if any warning lights are showing. This will give an indication of actual or potential problems. For example, if the standby light is on or the high-level alarm has sounded there should be a reason for this, and it may be due to a failed or failing pump. • Listen for unusual noises. These pumps are relatively quiet when operating normally. An unusual noise will probably indicate a problem, such as large solid stuck in impeller, damaged impeller, air trapped in pump, cavitation at suction, damaged casing, bearing failure or vee- belt breaking. • Check that soakaways for overflow in sump well are operating satisfactorily and not saturated. • Same as for daily checks above - Check level of oil in seal cavity.

Environmental Feature	Impact	Management Actions
		• Put all electrically powered pumps onto "manual" setting on the control panel. When there is sufficient sewage in pump, manually start all pumps and check if they are running smoothly and not getting hot. Switch back onto "auto". • Check to see that all pumps are in good working order i.e. visually check all moving components and check for any loose nuts and bolts. • Check oil levels and oil quality and top up or replace if necessary in the bearings and seal cavity. • Cut grass and any other unwanted plants within pump station premises.
Water Management	Water consumption and saving	• Water saving mechanisms should be implemented on site e.g., installation of water saving devices where practical. • Conduct regular checks for water leaks, including taps, toilets, pipes and geysers and encourage residents to fix or report such leaks immediately when they are encountered. • All faulty equipment to be repaired at the workshop and not in situ, where possible. • Set up a Contingency Plan to deal with minor and major pollution incidences e.g., oil spill clean-up kit available at all necessary points.
	Groundwater contamination	• Should any hazardous material and wastes be produced these shall be managed in a safe and responsible manner so as to prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials. • Hazardous and non-hazardous waste shall be stored separately at all times and should be disposed at a facility that is licenced to receive such waste. • In the event of a pipe burst, the burst pipe section must be isolated by closing the nearest valves on either side of the break. • A qualified plumber with water distribution pipeline experience must be contacted to repair such pipe breaks as soon as possible.

Environmental Feature	Impact	Management Actions
		• The plumber must repair the burst pipe by means of an approved method, and the repair must be tested by opening all the valves prior to backfilling of the trench. • Only once the repair is tested and confirmed to be correct may the pipe trench be backfilled. • Replace washers and seals on pipes fittings, taps and toilets when fittings leak.
Archaeology	Archaeological Impacts	• Should a heritage site or archaeological site be uncovered or discovered on site, a "chance find" procedure should be applied in the order they appear below: o If operating machinery or equipment, stop work; o Demarcate the site with danger tape; o Determine GPS position if possible; o Report findings to the construction foreman; o Report findings, site location and actions taken to superintendent; o Cease any works in immediate vicinity; o Visit site and determine whether work can proceed without damage to findings; o Determine and demarcate exclusion boundary; o Site location and details to be added to the project's Geographic Information System (GIS) for field confirmation by archaeologist; o Inspect site and confirm addition to project GIS; o Advise the National Heritage Council of Namibia (NHCN) and request written permission to remove findings from work area; and o Recovery, packaging and labelling of findings for transfer to National Museum.
Traffic	Traffic Impacts	• Introduce speed limits and signage within the facility. • Roads to be clearly demarcated. • No off-road driving to be permitted on site.

Environmental Feature	Impact	Management Actions
Stormwater and Drainage Management	Surface and groundwater contamination	• Inspect the entire drainage system at least once every two months. This can only be done on foot. • Remove all debris from the open drains and dispose of it appropriately. • Ensure that all culverts are de silted and kept clean at all times. Ensure that all culvert inlets and outlets are clear of any debris. • Ensure that all staff and residents (including children) are made aware of the dangers of blocking any of the open drains with domestic refuse etc. • The dumping of oil/grease into the open drains should be prevented through education of the residents. • All vegetation in the unlined open drains should be removed completely if possible or should be trimmed from time to time to ensure free passage of storm water. • In addition to the above, prior to the onset of the rainy season all drains and culverts should be checked to ensure that, there is no debris that is blocking the passage of storm water. It is more important that the culvert outlets are kept clear of debris.
Sense of place	Visual Impact	• Educate staff and residents about the desirability of maintaining housing and residential facilities in good condition and the need for regular and ongoing maintenance activities. It needs to be clear what the responsibilities are of households vs NWR. • Establish an NWR Housing Policy which determine the rules and regulations for the management of the NWR houses. The Housing Policy can call for a Housing Committee. • Check roofs for leaks and undertake repair work needed. • Maintain the exterior walls of houses in good condition and in natural colours as per original design specifications. • Manage the use of existing and any new lighting in dwellings, floodlighting and security lights in order that light pollution does not become a problem. • Treat timber structures as required with (MEFT approved) environmentally friendly products.
Roads	Condition of roads	• Inspect all the roads (within settlement) on foot.

Environmental Feature	Impact	Management Actions
		• Remove or trim any vegetation that is encroaching on the carriageway. • Fill and compact with suitable gravel when potholes appear.
Community relations	Communication	• Establish a forum through which ENP can communicate with its neighbours. This forum can be used to share information and to address operational issues that concern all the parties involved. • Establish an official complaints procedure and communicate the procedure to all stakeholders. Ensure that feedback loops are in place. • Establish a community relations programme to manage interaction with stakeholders.

4.3 Phase 2: Rehabilitation and Decommissioning Management Actions

The facility is expected to be permanent and is not anticipated to be decommissioned. However, the decommissioning impacts have been assessed. The table below (**Table 4-3)** presents the management action for decommissioning phase, should this take place.

Table 4-3: Decommissioning phase management actions

Environmental Feature	Impact	Management Actions
Employment	Loss of employment	• The Proponent should inform the employees well in advance (no less than 6 months), of its intentions to close the facility, and the expected date of such. • The Proponent should raise awareness of the possibilities for work within the tourism sector.
Rehabilitation	Soil and Groundwater contamination	• An inspection of the soil and groundwater contamination must be undertaken to determine the presence, nature and extent of contamination on site. • This will guide the level and kind of remediation to be undertaken on site. • Prior to the infrastructure being destroyed, all residue products must be carefully removed for recycling or safe disposal. • Solid materials must be used for filling. Only clean soil should be used for filling purposes.
Waste Management	Pollution	• Contaminated soil must be removed from site and disposed at a facility that is able to receive such waste. • No waste may remain on site after the closure of the facility. • Waste must be disposed of at an approved waste facility. Proof of disposal certificates must be available.

4.4 Recommendations for Monitoring

In order to prevent and minimize the above-mentioned environmental impacts, the following site monitoring measures need to be done:

- Monitor whether provisions as set out in the EMP has been complied with.
- Non-compliance is to be recorded and discussed at weekly site meetings and timeous remedial actions taken.
- Monitoring feedback is to be recorded using the attached checklist (**Appendix D**).

5 CONCLUSION

Based on the recommendation given in this EMP, GCS is confident that the activities, as described in **Chapter 1** of the EMP may be granted an Environmental Clearance Certificate, provided that the EMP is implemented and that all the legal requirements pertaining to this development are complied with.

6 REFERENCES

Afromach Investment (Pty) Ltd. 2018. *OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN (OEMP) FOR NWR RESORTS IN ETOSHA NATIONAL PARK*.

APPENDIX A: CV OF EAP

APPENDIX B: ECC PREVIOUSLY ISSUED

APPENDIX C: EMP COMPLIANCE AUDIT REPORT

APPENDIX D: GUIDELINE ECO ENVIRONMENTAL MONITORITING REPORT

Reported by: …… Date: ……

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
EMP training	Lack of EMP awareness and the implications thereof	• Employees appointed for work (construction, maintenance etc.) must ensure that all personnel are aware of necessary health, safety, and environmental considerations applicable to their respective work. • A copy of the EMP should be available at the facility. • Employees appointed for work (construction, maintenance etc.) should be made aware by the PR of the provisions of the EMP that their work must comply with.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Monitoring	EMP non-compliance	• Appoint a Proponents Representative (PR) or delegate a member of staff to be the PR. • The PR must be a senior person reporting directly to the Resort Manager and NWR Environmental and Compliance Specialist at Head Office. • Establish an Environmental Management Committee (EMC) (which comprises of the PR from each resort in the ENP and the Environmental and Compliance Specialist) which meets regularly to discuss the implementation of this EMP, including water and power use (using figures collected for monitoring purposes during the month), management of litter, wise use of natural resources and adherence to park rules and regulations in this regard, etc. • The Proponent/PR should monitor the implementation of this EMP.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• The PR should inspect the site at least on a monthly basis. • Bi-annual audits should be conducted of site activities by an external ECO.			
Environmental Awareness	Environmental Education	• NWR to promote environmental awareness through ongoing programmes such as water saving initiatives. • Set up incentive programmes to encourage staff, residents, and local community organizations, including schools, to become actively involved in the management of the environment.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Illegal Harvesting of natural resources and poaching	Loss of Biodiversity	• Ensure all staff, residents and local community members are aware of the park rules and regulations relating to the harvesting of natural resources (firewood) and the need for these. • Enforce regulations to prohibit stripping of natural vegetation. • Consider how the use of firewood can be reduced, consider alternatives to firewood as a source of fuel, and consider the sourcing of sustainably harvested fuel wood. • Ensure that poaching in the park or on neighbouring land by staff, residents and local community members is not tolerated and that action is taken against any offenders in collaboration with MEFT.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Groundwater	Groundwater contamination	• Be on the lookout for leaking water pipes and any signs of environmental contamination resulting from the sewage infrastructure (encouraging residents to do the same) and take remedial action to resolve any identified problems as rapidly as possible. • Ensure that all solid waste remains in sealed containers at all times and that any leachate from waste transfer stations is effectively channelled into the sewage treatment works. • Ensure that all bunded areas, e.g., in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Conduct regular checks for water leaks, including taps, toilets, pipes and geysers and encourage residents to fix or report such leaks immediately when they are encountered. • All faulty equipment to be repaired at the workshop and not in situ, where possible. • Set up a Contingency Plan to deal with minor and major pollution incidences e.g., oil spill clean-up kit available at all necessary points.			
Waste Management	Visual impact and soil contamination	• Formally adopt and implement the Solid Waste Management Plan (SWMP) for ENP. • Formally assign responsibility for SWMP in Etosha to person/position. • Plan capacity needed for the organisation of SWMP and for contracting and monitoring a waste collection company. • Appoint a collection company to take the recyclable waste to Windhoek			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Set up a Waste Management Programme to include sorting of waste by separate waste streams for recycling wherever possible. • Ensure the provision of sufficient public waste bins and their regular emptying. Encourage all staff and residents to use these bins and to keep their surrounding litter free. • Ensure regular collection of household waste, with immediate transfer to transfer stations. • Ensure that all waste is transported in an environmentally responsible manner (covered and no leakage) to appropriate licensed (if possible) facilities for the type of waste. NB. It is likely that hazardous waste will need to be sent to Windhoek.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Appoint operator of waste transfer station and ensure they are fully acquainted with the services provided and the maintenance thereof. • Check interlocking paving for vegetative growth and prevent roots from establishing by physically removing the vegetation. • Inspect paved areas after heavy rainfall to ensure bedding sand not washed away and blocks out of position. If this is the case then fine-grained sand must be swept into these areas to replace lost sand. • Check the retaining walls for any damages and cracks. If found these need to be repaired as soon as possible to prevent moisture penetrating and corroding the steel reinforcing			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• All silt must be removed from the concrete drains and channels as soon as it accumulates to prevent vegetative growth in these structures and their joints. • Pipe culverts must be cleaned monthly to prevent silt from building up in these structures resulting in blockage of the culverts. These can be flushed with water using the standpipes provided. • The headwall outlet must be examined for erosion after heavy rains. If this is discovered, the eroded areas must be backfilled with boulders and soil to prevent a donga forming. Where possible these areas must be revegetated in order to try to bind the soil.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Hazardous Waste	Soil and groundwater contamination	• Adequate separate waste containers (bins) for hazardous and domestic / general waste must be provided on site. • Hazardous waste should be disposed of at a facility that is able to receive such waste and records of disposal should be kept. • Maintenance and washing of vehicles and machinery on site should take place only at a designated workshop area that is on a bunded, impermeable surface. • Ensure that all bunded areas, e.g. in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility. • Set up a Contingency Plan to deal with minor and major pollution incidences e.g. oil spill clean-up kit available at all necessary points.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Biodiversity	Loss of Biodiversity	• Trees and plants protected under the Forest Act No 12 of 2001 are not to be removed without a valid permit from the local Department of Forestry. • Off-road driving should not be allowed on site. • Ensure that all gardens only make use of indigenous vegetation (with the exception of food gardens) and educate residents in this regard. • Conduct regular checks to prevent alien and/or invasive plants from establishing. • Implement the ENP"s alien and invasive management programme in all areas, especially newly constructed areas. • No pets or domestic animals allowed in settlements as per standing park rules.			
Noise	Disturbance to fauna	• Noise restrictions should be in place on site to minimise disturbance.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Health and Safety	Health and Safety on site	• Ensure first aid training and environmental awareness training is provided to staff. • Fire extinguisher training should be provided to a designated member of staff who will act a fire marshal during fire events. • Any accidents/incidents occurring on site should be reported to MEFT and other relevant authority within 24 hours. • Ensure that adequate emergency procedures are in place to reduce the magnitude of the impacts in the event of an emergency.			
Health and Safety	Tourist, visitors, employees	• Structurally defective buildings must be vacated as rapidly as possible and renovated or demolished as required and as per government process.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Check perimeter fences around the camps, tourists' areas, staff villages (including around strategic infrastructure such as boreholes, evaporation ponds, solid waste dumping sites or transfer stations etc.). • In collaboration with MEFT, maintain fences as required. • Control access into the camps and staff villages. Access should be through one motorized gate. Place a security guard at camp and staff villages' entrances. All residents should have appropriate authorization to allow them to enter the staff villages.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Compile an emergency response plan (fire, flood, intruding animals, disease, etc.) for the village and communicate it to the residents. Make sure each household is provided with a list of emergency contact details and familiar with the emergency response plan. • Have well stocked first aid kits / boxes at all critical areas. There must be at least two employees per resort who are well trained in first aid. • Put in place a Sanitation and Hygiene awareness promotion programme to meet the principles set out in the Namibian National Sanitation Strategy for 2010/11 – 2014/15.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Look after the social well-being of the employees and provide sufficient entertainment for the employees when they are off duty. The following are some of the key aspects that should be provided to employees by NWR. o Well-equipped and well-stocked staff shop. Where establishment of staff shop is not possible, employees need to be taken for personal shopping at least once per month. • Entertainment area & facilities e.g. cable TV.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Health and safety	Fire	• Ensure adequate fire breaks and control of moribund material around and between infrastructure as needed. • Establish emergency procedures to allow for immediate action in the case of accidental fire and ensure that firefighting equipment is on hand and in good working order at all times and that all staff and residents are trained and understand procedures to be followed and how to use equipment.			
Power and electrical	Fire or incidents	• Ensure adequate emergency procedures are in place to reduce the magnitude of the impacts in the event of an emergency. • The fuel storage facility should be fitted with the required health and safety warning and information signage that is required and suitable for such installations. • Ensure that there are adequate and appropriate first aid			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		provisions to respond to accidents in the facility. • Routine housekeeping to reduce fire risk - o Install a fire extinguisher. o Use a carbon dioxide (CO2) fire extinguisher which is suitable for inflammable and combustible liquids and does not leave a harmful residue after use (as a dry chemical extinguisher does).			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		○ The fire extinguisher must be easily accessible in case of emergency (i.e. close enough to the fuel facility to be able to use immediately but not so close that the intensity of a fire would prevent it from being accessed). ○ Ensure that any minor spills are cleaned up immediately.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		○ Keep the area within 6m of the tanks clear of all vegetation and debris. ○ Check and maintain the extinguisher regularly. ○ Ensure electrical systems, such as pumps, are properly maintained to prevent sparks. ○ Ensure fuel lines, hoses, valves and nozzles are in good repair.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		○ Close the valves on tank discharges when they are not in use to prevent leakage through the hose or nozzle. ○ Ensure that gasoline is not used as a cleaning or degreasing agent (has inherent fire risk). Material Safety Data Sheets containing information on the potential hazards and how to work safely with the chemical product which must be obtained from the supplier and should be available on site.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Power and electrical	Evaporative coolers	• It is recommended that an evaporative cooler is regularly maintained. The frequency of maintenance is dependent upon the quality of water, the cleanliness of the air and the frequency of use. Under the current conditions, a three-month maintenance frequency is recommended.			
Power and electrical	Liquefied Petroleum Gas (LPG) Storage and Reticulation	• Maintenance procedures are standardised and should be stringently and completely followed by a certified LPG installer. • GAS containers need to be stored safely in the covered and lockable facility.			
Water Management	Generators	• On-Going maintenance as per supplier specification is required. • O&M Manuals must be consulted during the maintenance. • Weekly Generator tests to be done on standby generators. • Annual Maintenance to be done by specialist			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Diesel fuel to be stored in bulk tanks that are stored safely on lockable areas to allow for refilling once a week. • Reasonable precautions to prevent fuel spillage and leakages during refuelling of pumps. • Generators need to be placed and operated on paved, well ventilated, lockable covered facilities which are accessible only by authorized operators. • Portable drip trays to be used to collect waste oil & lubricants			
Archaeology	Lighting	• Attic stock of lamps and fittings to be kept for regular maintenance.			
Employment	Recruitment	• Local employment and use of local businesses/suppliers should be encouraged to promote and improve the local economy as far as reasonably possible. • Should the required services and/or goods not be available locally then look to other			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		localities for these services/goods.			
Ablution	Sanitation	• Separate ablutions should be available for men and women and should clearly be indicated as such. • Sewage waste needs to be removed on a regular basis to the nearest approved sewage disposal site. • Workers responsible for cleaning the toilets should be provided with latex gloves and masks.			
Sewage Management	Environmental pollution and underground water resources contamination from waste water	• Ensure that the shared ablution facilities, septic tanks, sewers, pump stations and evaporation ponds are managed and maintained as per design and engineering specifications. • Ensure that all concerned staff are trained in critical health and safety issues regarding operation and maintenance of the sewage system components			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Ensure that all concerned staff are issued with the necessary safety equipment and protective clothing required for them to do their jobs safely and at no risk to their health. • Be on the lookout for leaking water pipes and any signs of environmental contamination resulting from the sewage infrastructure (encouraging residents to do the same) and take remedial action to resolve any identified problems as rapidly as possible. • Ensure that all bunded areas, e.g., in workshops and around generators, are regularly drained and cleared and that all material is safely stored on site until disposed of as hazardous waste at appropriate facility.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Ensure that all manhole access covers are firmly closed (may have to assign a certain number of manholes to each caretaker as the whole network may be too large for just one caretaker to patrol) • Visually check for any signs of leaking pipes. • Visually check for any loose fittings.			
Ablution	Evaporation ponds	• Check that boundary gates are closed and locked. • Ensure that penstocks in chambers/manholes are open as necessary and that sewage is flowing into the correct ponds. • Remove floating debris that may have moved close to the edges by wind/wave action. • Check that weirs are flowing freely. • Remove litter that accumulates.			
Sewage Management	Conservancy tanks	• Empty conservancy tanks and transport to nearest evaporation ponds.			
	Septic tanks	• Inspect tanks on continuously bases for potential problems. • Clear all grease traps at least once a month.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• The septic tanks should be dislodged at least every two months. • The septic tank must be emptied at least every 5 years of all sludge. NB. If this is not done, the septic tank will fill up and when sewage flows into the tank, it cannot settle and instead passes through the pipes into the percolation trench. It will lead to the percolation trench becoming blocked and if this happens, a new trench must be constructed. • Empty septic tank. NB. If the sewage pipes become backlogged at any of the ablutions, checks must be done on the connections for any blockages, and if these are all clear, then the septic tank must be checked to see if it is full.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Replace blocked percolation trench. NB A sign of a blocked percolation trench will be the build-up of sewage in the Septic Tank and blocked sewer pipes. When this occurs, the pipes and joins must be checked. If these are clear, then the percolation trench is blocked and must be replaced.			
	Pumping Stations	• Check that doors to pump station and boundary gates are closed and locked. • Regularly removes solids, rags, etc., from the baskets (screen cage) • Check electrical control panel to see if any warning lights are showing. This will give an indication of actual or potential problems. For example, if the standby light is on or the high-level alarm has sounded there should be a reason for this, and it may be due to a failed or failing pump.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Listen for unusual noises. These pumps are relatively quiet when operating normally. An unusual noise will probably indicate a problem, such as large solid stuck in impeller, damaged impeller, air trapped in pump, cavitation at suction, damaged casing, bearing failure or vee-belt breaking. • Check that soakaways for overflow in sump well are operating satisfactorily and not saturated. • Same as for daily checks above - Check level of oil in seal cavity. • Put all electrically powered pumps onto "manual" setting on the control panel. When there is sufficient sewage in pump, manually start all pumps and check if they are running smoothly and not getting hot. Switch back onto "auto"			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Check to see that all pumps are in good working order i.e. visually check all moving components and check for any loose nuts and bolts. • Check oil levels and oil quality and top up or replace if necessary in the bearings and seal cavity.- Cut grass and any other unwanted plants within pump station premises			
Water Management	Water consumption and saving	• Water saving mechanisms should be implemented on site e.g., installation of water saving devices where practical. • Conduct regular checks for water leaks, including taps, toilets, pipes and geysers and encourage residents to fix or report such leaks immediately when they are encountered. • All faulty equipment to be repaired at the workshop and not in situ, where possible.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Set up a Contingency Plan to deal with minor and major pollution incidences e.g., oil spill clean-up kit available at all necessary points.			
	Groundwater contamination	• Should any hazardous material and wastes be produced these shall be managed in a safe and responsible manner so as to prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials. • Hazardous and non-hazardous waste shall be stored separately at all times and should be disposed at a facility that is licenced to receive such waste. • In the event of a pipe burst, the burst pipe section must be isolated by closing the nearest valves on either side of the break. • A qualified plumber with water distribution pipeline experience must be contacted to repair such pipe breaks as soon as possible.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• The plumber must repair the burst pipe by means of an approved method, and the repair must be tested by opening all the valves prior to backfilling of the trench. • Only once the repair is tested and confirmed to be correct may the pipe trench be backfilled. • Replace washers and seals on pipes fittings, taps and toilets when fittings leak.			
Archaeology	Archaeological Impacts	• Should a heritage site or archaeological site be uncovered or discovered on site, a "chance find" procedure should be applied in the order they appear below: o If operating machinery or equipment, stop work; o Demarcate the site with danger tape; o Determine GPS position if possible; o Report findings to the			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		construction foreman; o Report findings, site location and actions taken to superintendent; o Cease any works in immediate vicinity; o Visit site and determine whether work can proceed without damage to findings; o Determine and demarcate exclusion boundary; o Site location and details to be added to the project's Geographic Information System (GIS) for field confirmation by archaeologist;			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		○ Inspect site and confirm addition to project GIS; ○ Advise the National Heritage Council of Namibia (NHCN) and request written permission to remove findings from work area; and • Recovery, packaging and labelling of findings for transfer to National Museum.			
Traffic	Traffic Impacts	• Introduce speed limits and signage within the facility. • Roads to be clearly demarcated. • No off-road driving to be permitted on site.			
Stormwater and Drainage Management	Surface and groundwater contamination	• Inspect the entire drainage system at least once every two months. This can only be done on foot. • Remove all debris from the open drains and dispose of it appropriately. • Ensure that all culverts are de silted and kept			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		clean at all times. Ensure that all culvert inlets and outlets are clear of any debris. • Ensure that all staff and residents (including children) are made aware of the dangers of blocking any of the open drains with domestic refuse etc. • The dumping of oil/grease into the open drains should be prevented through education of the residents. • All vegetation in the unlined open drains should be removed completely if possible or should be trimmed from time to time to ensure free passage of storm water. • In addition to the above, prior to the onset of the rainy season all drains and culverts should be checked to ensure that, there is no debris that is blocking the passage of storm water. It is more important that the culvert outlets are kept clear of debris.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
Sense of place	Visual Impact	• Educate staff and residents about the desirability of maintaining housing and residential facilities in good condition and the need for regular and ongoing maintenance activities. It needs to be clear what the responsibilities are of households vs NWR. • Establish an NWR Housing Policy which determine the rules and regulations for the management of the NWR houses. The Housing Policy can call for a Housing Committee. • Check roofs for leaks and undertake repair work needed. • Maintain the exterior walls of houses in good condition and in natural colours as per original design specifications. • Manage the use of existing and any new lighting in dwellings, floodlighting and security lights in order that light pollution does not become a problem.			

Environmental Feature	Impact	Management Actions	Observation	Remedial Action	Compliance (Yes/No)
		• Treat timber structures as required with (MET approved) environmentally friendly products.			
Roads	Condition of roads	• Inspect all the roads (within settlement) on foot. • Remove or trim any vegetation that is encroaching on the carriageway. • Fill and compact with suitable gravel when potholes appear.			
Community relations	Communication	• Establish a forum through which ENP can communicate with its neighbours. This forum can be used to share information and to address operational issues that concern all the parties involved. • Establish an official complaints procedure and communicate the procedure to all stakeholders. Ensure that feedback loops are in place. • Establish a community relations programme to manage interaction with stakeholders.			