
# ENVIRONMENTAL SCOPING Assessment REPORT

## - Upgrading of Tourist Road (C38) to a Low-Volume Sealed Road in Etosha National Park -

**Etosha National Park, Oshikoto Region**

**October 2023**

Application Reference No. **APP-002464**

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|---|---|
| Project Engineers : | TULIPAMWE consulting engineers |
| EIA Consultants: | Ekwao Consulting |

| PROJECT TITLE NAME |
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| Environmental Scoping Assessment Report<br><br>Upgrading of Tourist Road (C38) to a Low-Volume Sealed Road in Etosha National Park |
| **APPLICATION REFERENCE NO.** |
| **APP-002464** |
| **PREPARED FOR** |
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| **DATE PREPARED** |
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## ABBREVIATIONS AND ACRONYMS

| | | |
|---|---|---|
| BAT | - | Best Available Technology |
| CIP | - | Consumer Installation Permit |
| dBA | - | Decibels |
| DPTS | - | Department of Planning and Technical Services |
| EC | - | Environmental Commissioner |
| ECC | - | Environmental Clearance Certificate |
| ECO | - | Environmental Control Officer |
| EIA | - | Environmental Impact Assessment |
| EMP | - | Environmental Management Plan |
| ENP | - | Etosha National Park |
| ERP | - | Emergency Response Plan |
| GPS | - | Global Positioning System |
| GRN | - | Government of the Republic of Namibia |
| ha | - | hectare (1 ha = 10 000 $m^2$) |
| HPP | - | Harambee Prosperity Plan |
| IAPs | - | Interested and Affected Parties |
| KNG | - | King Nehale Gate |
| LDV | - | Light Duty Vehicle |
| $m^2$ | - | square meters |
| MAWLR | - | Ministry of Agriculture, Water and Land Reform |
| MC | - | Main Contractor |
| MEFT | - | Ministry of Environment, Forestry and Tourism |
| MHSS | - | Ministry of Health and Social Services |
| MME | - | Ministry of Mines & Energy |
| NCCI | - | Namibia Chamber of Commerce and Industries |
| NHC | - | National Heritage Council |
| NSI | - | Namibia Standards Institute |
| PE | - | Project Engineers |
| PPE | - | Personal Protective Equipment |
| RFA | - | Road Fund Administration |
| SHE | - | Safety, Health & Environment |
| SME | - | Small and Medium Enterprises |
| TCE | - | Tulipamwe Consulting Engineers |
| WAP | - | Water Abstraction Permit |

## DEFINITION OF TERMS

| | |
|---|---|
| **Alien Species** | A plant or animal species introduced from elsewhere: neither endemic nor indigenous |
| **Alien Vegetation** | Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared and listed invader species as set out in the Conservation of Agricultural Resources Act regulations |
| **Alternatives** | Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, processes or technology alternatives, temporal alternatives or the 'do nothing' alternative. |
| **Construction Activity** | Any action taken by the contractor, his/her subcontractors, suppliers or personnel during the construction process. |
| **Construction Phase** | The phase of a project which precedes the Operational Phase, during which project facilities and infrastructure are assembled and installed on their foundations, and connected and tested, to ensure that they operate as designed. |
| **Cumulative Impacts** | Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impact of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect. |
| **Direct Impacts** | Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable. |
| **Ecosystem** | Is a dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. |
| **Emergency Plan** | An emergency plan is a plan in writing that, on the basis of identified potential incidents at the installation together with their consequences, describes how such incidents and their consequences should be dealt with, both on site and off site. |
| **Environment** | The surroundings within which humans exist and that are made up of:<br>(a) The land, water and atmosphere of the earth;<br>(b) Micro-organisms, plant and animal life;<br>(c) Any part or combination of (a) and (b) and the interrelationships among and between them; and<br>(d) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being |
| **Environmental Component/Aspect** | An attribute or constituent of the environment (i.e. air quality; waste management, seismicity, soil, groundwater; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project. |
| **Environmental Management Plan (EMP)** | A working document which contains site specific plans to ensure that environmental management practices to eliminate and control environmental impacts are followed during the developmental phases of that site, project and or facility and would normally consist of construction phase, operational phase and decommissioning phases. |
| **Environmental Monitoring** | Means collection, evaluation and summarization of environmental data by continuous or periodic monitoring of certain qualitative and quantitate indicators characterizing the state of environmental components and their modification as a result of the impact of natural and anthropogenic factors. |
| **General Waste** | Waste that does not pose an immediate threat or hazard to health or the environment: domestic waste; business waste and inert waste. |

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|---|---|
| **Habitat** | The place in which a species or ecological community occurs naturally |
| **Hazardous Waste** | Waste that has the potential to cause a negative threat/impact to humans and/or the environment. It includes, but is not limited to, batteries, neon lights, fluorescent lights, printer cartridges, oil, paint, paint containers, oil filters, IT equipment etc. |
| **Indirect Impacts** | Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity. |
| **Industrial Waste** | Means waste generated as a result of business, commerce, trade, wholesale, retail, professional, manufacturing, maintenance, repair, fabricating, processing or dismantling activities, but does not include domestic waste, garden or bulky waste, builders' waste or health care risk waste. |
| **Interested and Affected Parties (IAPs)** | Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public. |
| **Major Incident** | A major incident is an occurrence of catastrophic proportions, resulting from the use of a plant or machinery or from activities at a workplace. When the outcome of a risk assessment indicates that there is a possibility. |
| **Mitigation** | Measures designed to avoid, reduce or remedy adverse impacts. |
| **Non-compliance** | Issues that are in direct non-compliance with the requirements, commitments and/or management measures as approved in the EMP. |
| **Pollution** | A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances. |
| **Sensitive Area** | A sensitive area or environment is described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists or where there is high potential for ecotourism |
| **Significant Impact** | An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment. |
| **Waste** | Means<br>(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or<br>(b) disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered.<br>(c) (c) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste.<br>(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks. |
| **Watercourse** | Means -<br>(a) a river or spring;<br>(b) a natural channel in which water flows regularly or intermittently;<br>(c) a wetland, lake or dam into which, or from which, water flows; and |

# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

The responsibility to manage and to maintain infrastructure within Etosha National Park (ENP) and all other national parks in Namibia is vested in the Ministry of Environment, Forestry and Tourism (MEFT), specifically with the Directorate Planning and Technical Services (DPTS). According to DPTS, the tourist road network within ENP is in excess of 1 260 km. The bulk of this road network is graded gravel roads which provide access to areas of interests within the park - to the resorts and water springs where animals congregate to drink water.

Generally, the maintenance and upkeep of gravel roads is much higher when compared to sealed roads. More often, gravel roads in the park are washed away during the rainy season with maintenance costs running into millions of Namibia Dollars each year. This situation is increasingly becoming unsustainable and has compelled MEFT to consider alternative options that, in the long term, will reduce road maintenance costs in the park. A decision was therefore made to upgrade the main route (C38) through the park to a low-volume sealed road.

Ekwao Consulting (**Ekwao**) has been appointed by Tulipamwe Consulting Engineers (**Tulipamwe**, or **TCE**) for short) who are the consulting engineers and project manager for the upgrade, to undertake the environmental services required in order to obtain an Environmental Clearance Certificate (ECC) to permit the road construction. This report, therefore constitutes the environmental scoping assessment conducted by **Ekwao** in terms of the Environmental Management Act (Act No. 7 of 2007) (EMA) and related EIA Regulations

## 1.2 RATIONALE TO UPGRADE C38

C38 is the tourist road which starts from the town of Outjo up to the bitumen-surfaced B1 highway just outside Omuthiya, passing through ENP connecting the oldest three resorts of Okaukuejo, Halali and Namutoni (Fig: 3). The rationale to only upgrade C38 is because this road is mostly used by park personnel and service providers and therefore carries a higher percentage of daily traffic in the park. All fuel and food consumed in the park resorts is transported on this route.

With the financial support from the Road Fund Administration ('**RFA**'), MEFT intends to upgrade C38, starting from Okaukuejo up to the King Nehale Gate ('**KNG'**) including the detours to the park resorts of Halali and Namutoni (Fig: 2). The upgrading will be conducted in phases and covers the entire C38 length of approximately 215 km.

## 1.3 OBJECTIVES OF THE EIA

In order to fulfil the requirements of EMA, a Scoping has been carried out and focused specifically on the impacts that the project will have on the receiving environment. The overall objective of the proposed project is to upgrade the entire C38 length through the park. This will enhance park accessibility, make travelling in the park a more pleasant experience to the guests, park employees and service providers including minimal wear and tear on vehicles.

The objective of the Scoping was also to analyse and evaluate the anticipated impacts of the proposed road upgrade on the physical, biological, socio-cultural and socio-economic environment based on the various project phases namely pre-construction, construction, rehabilitation post-construction and operation and maintenance.

The assessment study was conducted during the months of September and October – the driest period when ENP receives the bulk of its guests. The specific objectives of the study have included the following:

- Identifying and assess all potential environmental and social impacts of the proposed project;
- Identifying all potential significant adverse environmental and social impacts of the project and recommend measures for mitigation;
- Verify compliance with environmental regulations and relevant standards;
- Identify problems (non-conformity) and recommend measures to improve the environmental management system;
- Generate baseline data that will be used to monitor and evaluate the mitigation measures;
- Recommend cost effective measures to be used to mitigate against the anticipated negative impacts;

- Conduct a Public Consultation Process during which stakeholders and Interested and Affected Parties (IAPs) are provided with information on the envisaged development;
- Formulate an Environmental Management Plan (EMP) in which mitigation measures to identified impacts are recommended;

### 1.4 PROJECT JUSTIFICATION

The upgrade of the tourist road to low-volume sealed roads has both positive and negative benefits. Some of positive benefits are:

- enhanced park accessibility,
- improve drive-ability within the park,
- give tourists a pleasant touring experience possibly spotting lions sunbathing on tarmac,
- reduced wear and tear to vehicles including breakdowns which can be very unpleasant,
- eliminate dust pollution which impacts the vegetation along the park routes,
- improve service delivery both by park officials and third parties doing business with the park,
- no dust clouds which reduces visibility especially during windy conditions.

Some of the negative impacts of having paved roads in the park are:

- driving on tarmac in the park takes away that intimate bush/wildlife experience;
- possibly over speeding by ill-disciplined and insensitive drivers especially service providers;
- increased road accidents and killing of wild animals,
- possible delays caused by lions/elephants lying on tarmac.

When the positive and negative benefits are compared, the positive of having sealed roads by far outweigh the negative of dirt roads. Overall, the upgrading of tourist roads is intended to boost economic activities within the tourism subsector by encouraging more tourists to visit ENP, both local and foreign. The development of road projects often brings significant economic and social improvements to a location. However, the development of physical infrastructure in a national park have to be approached with extreme caution and executed in a manner that avoid destruction of the functioning of the ecosystem which the park was created to protect.

As a part of the larger project, the Scoping Assessment is used for the purpose of guiding the incorporation of the various environmental management considerations in the planning and development process of the project. The implementation of the findings from the scoping are intended to enhance the project proposal to be implemented in sustainable manner.

### 1.5 SCOPE OF THE WORK AND LIMITATIONS OF THE STUDY

The scope of this study is based on general Terms of Reference (ToR) for the EIA study as provided to Ekwao by Tulipamwe. The ToR requires Ekwao to encompass undertaking of the following:

- Consultation with Government agencies including ENP Management;
- Review of policies, legislation and administrative framework applicable to the proposed development;
- Establish an environmental baseline for the project area and description of the proposed road upgrade;
- To assess the potential environmental and socio-economic impacts resulting from the road upgrading, especially within the zone of influence of the project;
- To identify key stakeholders and review on the adequacy of participatory approaches suggested;
- To develop an Environmental Management Plan (EMP) detailing actions and responsibilities for impacts mitigation and monitoring.

The main limiting factor in fulfilling the scope of work lies in identifying an alternative route that shall avoid impacting on the natural ecosystems. However, the fact that an existing road is being upgraded, the best alternative was to stick with the existing road without considering any new route alternatives.


**Figure 1**: Project Location – National Context

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**Figure 2:** C38 Passing Through the Park

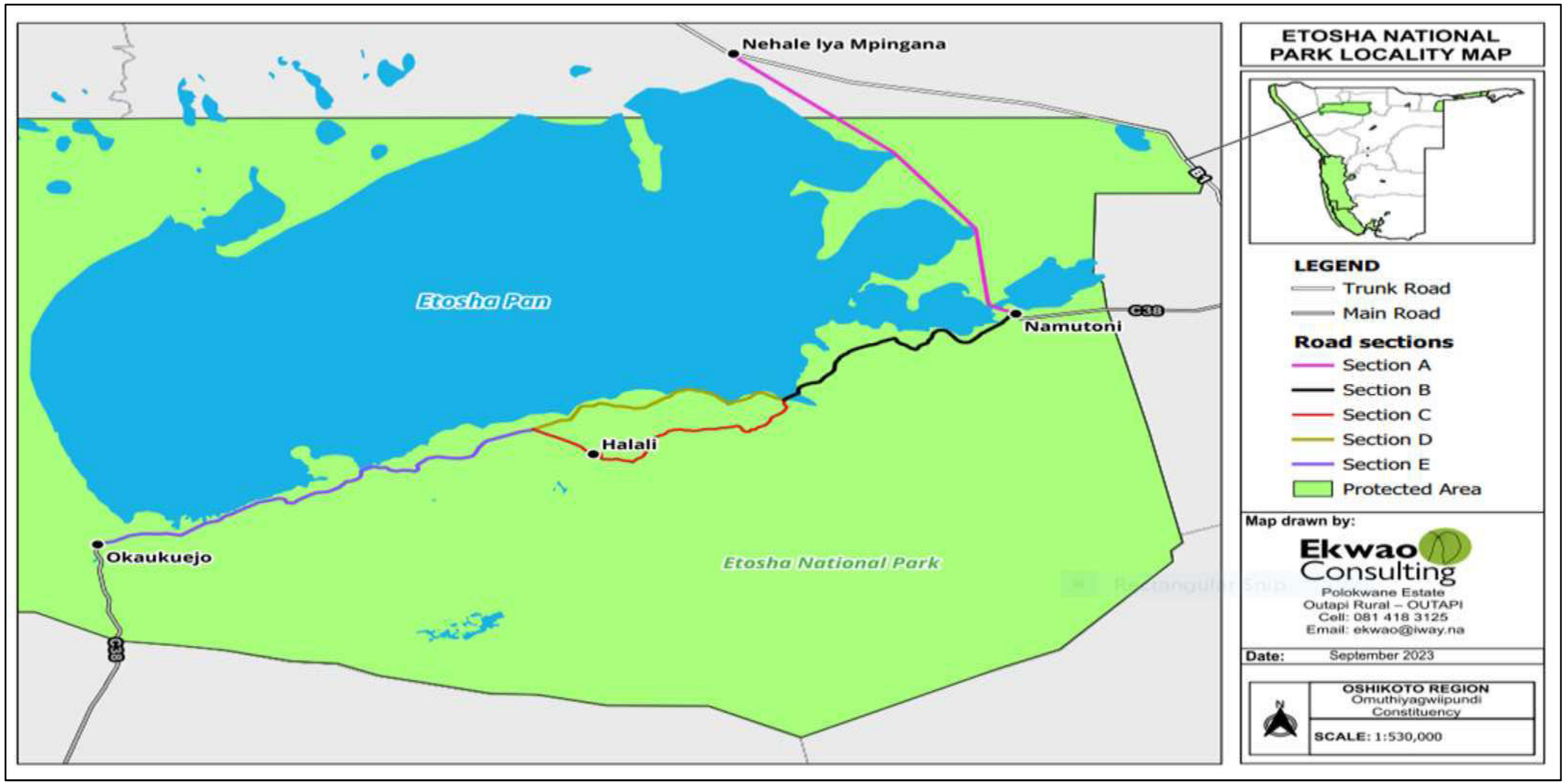


**Figure 3:** Project Site – with sections of the road to be upgraded

# 2 EIA APPROACH AND METHODOLOGY

## 2.1 APPROACH

The approach adopted for this EIA has been intended to:

- subject the upgrading of tourist roads within ENP to an impact and risk assessment process, focusing on the bio-physical, socio-economic, heritage and cultural aspects of the environment;
- determine the policy and legislative context within which the activity is located and to document how the proposed road upgrading complies with and responds to the policy and legislative context;
- outline the need and desirability of the proposed activity, including considerations for alternatives on how such needs could possibly be met as well as due consideration of the envisaged activity in the context of preferred options.
- ascertain the:

  (i) nature, significance, consequence, extent, duration and probability of the impact occurring during the pre-construction, construction, post-construction rehabilitation, operational and maintenance phases of the project and to inform identified preferred alternatives, and

  (ii) degree to which these impacts:

    - can be reserved,
    - may cause irreplaceable loss of resources, and
    - can be avoided, managed or mitigated.

- conduct a public participation process during which stakeholders were engaged and provided with information on the envisaged project. Furthermore, the stakeholders were invited to participate in the EIA process, to make comments, inputs or to voice any concerns with respect to the mining operation.

## 2.2 METHODOLOGY

In order to properly address the environmental issues related to the proposed activity, several site visits to the project site, i.e. in ENP were undertaken. The purpose of such field visits were to conduct the Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA). The two assessments were then combined to produce one single Scoping Assessment Report. In performing the said report, the provisions of the EMA as well as all applicable national laws and regulations were adopted.

Several approaches were used in order to gather impacts that are associated with all the facets of the envisaged tourist roads upgrading to low-volume sealed roads as presented in this section.

## 2.3 BACKGROUND INFORMATION DOCUMENT

The starting point was to prepare a Background Information Document (BID) on the proposed project by providing as much information as possible. The BID was prepared and made available to everyone contacted for the purpose of impact assessment as well as to those who responded to the public adverts placed in local newspapers as described below. A copy of the BID is attached to this report as **Annexure A**.

### 2.3.1 Meetings

Several formal and informal consultative meetings were held as described below. The specific objectives of the consultation process were to:

- create awareness of the project;
- involve the stakeholders in identifying and predicting the project impacts which are likely to happen during the road upgrading and operational phase and to propose mitigation measures, and

- exchange addresses and contacts between the EIA Consultant and stakeholders for future communication, particularly during the construction phase.

### 2.3.2 ENP and NWR Officials

Consultative meetings were held with the officials in the employment of ENP and NWR (who are managing the resorts within the park) based at Okaukejo, Halali and Namutoni as well at the three park entrance gates. The purpose of the meetings were to gather relevant information related to the impact of the proposed road upgrading.

During the discussions, the EIA Consultant was able to establish perceived positive and negative impacts of the proposed road upgrading within the park. In fact, all officials spoken expressed their desire to have the roads upgraded saying that the project has been spoken about for many years and nothing was forthcoming.

### 2.3.3 Daily Tour Operators

There are a number of loges developed on commercial farms neighbouring ENP who drive their guests into the park on a daily basis. Discussion were held with several tour guide operators at Okaukuejo and Namutoni on the proposed upgrading of the main tourist road in ENP. BIDs were also handed over to such tour operators. Most operators welcomed the development while others received the news with a measure of sceptism some spectism  with sceptism cs. The tour operators were encouraged to give their opinions and perceptions regarding possible positive and negative impacts of the proposed project.

### 2.3.4 Desk Study

A desk study was done through an extensive review of various literatures that contain information about the study area. This included previous studies made by other consultants for similar projects. These included the development of new resorts (Dolomite and Onghoshi) built At the district levels, large quantities of information were collected from the district profiles that were found in planning departments of the respective districts.

### 2.3.5 Park /Field Driving and Observation

A visual inspection (critical observations) was carried out along the proposed project area to get impression of the current conditions of the gravel road (C38), physical features, vegetation cover along the route, condition of existing infrastructure, any rivers crossed by the roads, etc.

### Public Consultation Process

The EIA was advertised in the local newspapers on the dates as indicated in **Table 1**, below:

**Table 1:** EIA Adverts in Local Newspapers

| Date | Publication | Distribution | Language | Publication Rate |
|---|---|---|---|---|
| 25 - 31 August 2023 | Confidante | Nationwide | English | Weekly, Friday to Thursday |
| 01- 07 September 2023 | Confidante | Nationwide | English | Weekly, Friday to Thursday |
| 25 August 2023 | E-Villager | Nationwide | English | Daily, Mon to Fri |
| 1 September 2023 | E-Villager | Nationwide | English | Daily, Mon to Fri |

A Background Information Documents (BID) on the project was prepared is attached to this report as **Annexure A.** The adverts and site notices are attached as **Annexure B.** It must be said that only one person responded to the adverts and asked to be registered for the EIA

Superimposing the project elements or activities onto the existing social and environmental natural conditions has identified the potential environmental impacts of the proposed road upgrading. The checklist method has been used to identify the impacts. Further, the environmental impact correlation matrix method has been adopted to predict impacts of major concern.

A key guiding assumption in this study is that the project has been designed and will be constructed, operated and maintained with due care to safety and environmental matters using current and engineering practices and or best available technology (BAT).

**Figure 4:** A Corrugated Section of C38

**Figure 5:** A view of C38 via the Woodland

**Figure 6**: View of C38 via a Section of the Saline Pan

**Figure 7**: View of Road Through Shrubland

# 3 PROJECT DESCRIPTION

The project has been described in terms of its location, technical details, project activities and project alternatives.

## 3.1 PROJECT LOCATION

The C38 planned to be upgraded to low-volume seal roads is located in ENP, starting from the resort of Okaukuejo to the south of the park all the way up to KNG at the northern side of the pan. The upgrading includes the detour routes to the resorts of Halali and Namutoni and has a total length of about 215 km.

From Okaukuejo to KNG, C38 (Fig. 2) passes through all vegetation types found in the park. Some of the vegetation types through which the road navigates are presented in Figures: 5, 6 & 7.

## 3.2 TECHNICAL DETAILS

The entire gravel road to be upgraded to low-volume seal roads has a total length of approximately 215 km and has been divided into five sections as shown in **Table 1**, below. The road travel width of C38 is about 8 m in width. Generally, both wide and narrow gravel roads can pose safety problems. A gravel road with a travel width greater than 10 m will result in unnecessary excessive surfacing gravel and grader maintenance being required and rapid loss of shape of the road.

On the other hand, excessively narrow gravel roads result in deep rutting, poor safety standards and high gravel losses. For most unpaved roads carrying between 50 and 200 vehicles per day, the total gravelled with is eight meters. At this width the construction activities will have a total footprint of about 172 ha.

**Table 2**: Sections of C38 Running Through the Park

| Road Sections | Length (km) | Duration | Remarks |
|---|---|---|---|
| Section A | 42.2 | 60 months | Upgrading will start from Okaukuejo and proceed in a northern easterly direction towards the King Nehale Gate |
| Section B | 38.0 | | |
| Section C | 39.5 | | |
| Section D | 34.3 | | |
| Section E | 60.6 | | |
| **Total** | **214.5** | | |

### 3.2.1 Low-Volume Sealed Roads

It is understood that the upgrading will be eco-friendly in the sense that bitumen will be used rather than tar. Both bitumen and tar look similar, but bitumen is a residue created when oil is refined and is therefore relatively inert. Tar, on the other hand, is made from coal and contains hydrocarbon compounds which can leach into the ground water if poorly handled.

The process involves mixing bitumen and sand together without the addition of crushed stones (aggregates). Hot bitumen is brought to the road construction site in road tankers. A coat of hot bitumen is then sprayed onto the old gravel road surface and immediately covered by a layer of sand This activity is followed by compacting the surface with a wheeled roller which gives the surface a smooth finish. Another advantage with this method is that the road is ready to use as soon as the rolling is done.

The other environmental benefits with using bitumen is that, as the road degrades over the years, the sand is eventually washes back into the river stream.

### 3.2.2 General Road Upgrade Works

Amongst the general road works will be:

- Temporary widening (1.5 m wide) of the existing road to accommodate traffic movements around the active construction sites.

- Possible relocation or protection of trees that are too close to the road surface and pose a safety risk to motorists.

- Removal of vegetation in excess of 1 ha outside the road reserve for possible stockpile areas of construction materials, i.e. gravel, sand, etc. required for mixing with bitumen.

- Erecting adequate signage to warn tourists and service providers using the road of the current construction activities taking place.

### 3.2.3 Drainage Requirements

Any drainage requirements across the road has to consist of concrete pipe structures of suitable diameters based on anticipated water flow, but at same time able to allow for easier of maintenance and cleaning purposes.

Side drains will be constructed in all cuttings and are mainly gravel lined. Concrete lining of the side drains are expected where the slope is steeper than 6%. Side drains with slopes steeper than 4% will be protected against erosion with energy dissipaters. The erosion potential of the soil in which the side drain is excavated will ultimately govern the protection required. Where the side drains cross through side access roads a concrete pipe with a suitable diameter needs to be installed.

Subsoil drains are normally installed where the ground water could influence the road pavement structure. Generally, groundwater is quite shallow in ENP especially on the northern side bordering the saline pan.

### 3.2.4 Access Management

All intersections and accesses onto the main road being upgraded must be assessed in terms of sight distances and access spaces and adequate warning signs provided. It is expected that all motorists driving on tourists road within ENP will comply with the speed limit of 60 km/hr. Effective access management should aim to reduce congestion and to allow for better overall traffic flow at the constriction sites and at all intersections.

### 3.2.5 Construction Materials

The main construction materials required for the road upgrade include sand, gravel, limited crushed stones (aggregates), reinforcement iron bars, water and bitumen. Most of the required materials with the exception of iron bars and bitumen are obtainable within the park.

Investigation for road material constructions and their suitability is beyond the scope of the EIA Consultant. However, several borrow pits, sand pits and construction water sources are available within ENP. Material investigation have been made with the aim of identifying sources for suitable construction materials including borrow pits, sand pits, construction water sources and quarry sites.

#### 3.2.5.1 Borrow Pits

Several borrow pits are available within the park where suitable materials for road maintenance are being sourced. Generic mitigation measures have been provided in the EMP on sourcing, managing and rehabilitation of borrow pits. It is proposed that where feasible, materials should be sourced from the borrow pit closest to the construction site in order to avoid long haulage of materials and related costs.

Ideally, a careful assessment should be made during which access to a particular borrow pit is ascertained and any work that needs to be carried out to clear the access route, the cost of re-establishing extraction activities at a particular borrow pits should be determined, etc. Borrow pits closest to the breeding areas of wildlife should be avoided.

**Figure 8:** Unrehabilitated Borrow Pits in the Park

**Figure 9:** Natural water spring on the periphery of ENP

**Figure 10:** Water infrastructure at some water springs inside the park

**Figure 11**: Dust Generated at Permitted Speed in the Park

#### 3.2.5.1 Hard Rock Quarry

In the event that large volume of surfacing stones is required, this should be sourced from outside the park. It is not recommended to operate a hard rock quarry inside the park and to conduct associated quarrying activities of drilling and blasting.

#### 3.2.5.2 Concrete Sand

Sand for purposes of making concrete can be sourced from borrow pits within the park. Any potential new source of sand with good quality sand materials should be subjected to a screening process prior to extraction. The consent of ECO and ENP Management must be sought and obtained.

#### 3.2.5.3 Construction Water Requirements

There are natural water springs throughout the park, but their yield differ from time to time and is depending on the amount of rainwater received in the specific area. Naturally, a water abstraction permit is required when sourcing water from a natural source. The appointed contractor must to discuss their water requirements with ENP Management as well as where to source such water.

At the campsite, ENP Management is expected to provide access to potable water to the staff and personnel of the contractor.

#### 3.2.5.4 Fuel Requirements

The appointed contractor is expected to have an aboveground fuel storage with a suitable capacity installed on the construction campsite for the purpose of storing bulk fuel for its construction plants and vehicles. A Consumer Installation Permit (CIP) is required from MME while an ECC is required for an aboveground fuel storage tank with a capacity of 10 000 litres. The Road Fund Administration does not entertain inquires for fuel rebates to a bulk fuel consumer without a valid ECC for the storage facility.

### 3.2.6 Waste Management

The following type of waste will be generated which, given the location of the project within a national park, and must be correctly handled and carefully disposed of.

#### 3.2.6.1 Solid Waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar containers for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area. Each resort has a landfill site and this where solid must be disposed of.

All solid waste (inert earth material) or construction camp wastes (domestic wastes) will be collected at a central location and will be stored temporarily (less than 90 days) (storage for greater than 91 days will incur waste licence activities. Waste will not be stored for longer that) until it can be removed to an appropriately permitted landfill site near the construction site. The contractor must make all attempts to follow the waste hierarchy in dealing with wastes produced (i.e. landfilling should be the final option and not the first response to treatment of any material).

#### 3.2.6.2 Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities. During the construction period, the various contractor's facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.

#### 3.2.6.3 Hazard Waste

Hazardous waste such as oils shall be disposed of at an approved landfill site. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water. Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed.

Unused or rejected bituminous products shall be returned to the supplier's production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of Tulipamwe.

#### 3.2.6.4 Construction and Demolition Waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'. The contractor is encouraged to actively engage with the ECO, Tulipamwe and ENP Management to identify where such 'waste' materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

#### 3.2.6.5 Noise and Vibrations

Noise is defined as 'unwanted sound'. Response to noise is not an empirical absolute, but often a psychological concept, and noise does not need to be loud to be considered 'nuisance'. Generally, people are tolerant to noise up to a certain level of up to 65 dBA. Anything above that level is considered an unacceptable and annoying.

The project site is located in a typical national park setting environment where conditions are naturally quiet at all times. Industrial noise and vibrations should be expected which has the potential to increase the ambient noise level especially in the vicinity of the project site. This is likely to happen during the peak operational hours.

Noise generated will be typical construction noise as a result of the movement of construction plants, vehicles and equipment. The noise nuisance will be localised, experienced in the area in which construction activities are taking place and of a short duration. Employees working in areas were noise levels are considerable above the permitted threshold should be provided with suitable PPEs at all times.

Normal road construction equipment (trucks, graders, bulldozers, compactors etc.) will be used primarily. Noise levels may reach between 80-85 dBA per 15 m at an anticipated maximum. In the rural setting environment, such noise levels are expected to be negligible.

#### 3.2.6.6 Dust and Air Emissions

Dust is expected to be generated during the time when dry construction materials aggregates are handled. Excavation, loading and hauling of construction materials from the borrow pits are activities susceptible to dust generation. Adequate measures to minimise dust pollution are provided in the EMP section of the EIA report.

Emissions will include nuisance dust as a result of construction activities and general smoke emissions from construction plants and vehicles. These levels are not anticipated to exceed acceptable norms, taking into account the relatively short term of the construction period and the existing use of the site, which accommodated vehicular traffic with similar emissions, albeit the low traffic flow.

Management measures to deal with any items of cultural interests or archaeological items which may be unearthed during the envisaged mining operation have been provided in the EMP.

### 3.3 PROJECT ACTIVITIES

Four major activities are entailed in the project execution of the project. These are:

- Pre-construction or Mobilisation
- Construction,
- Operational and
- Decommissioning or Rehabilitation

#### 3.3.1 Mobilisation or Pre-Construction

This phase entails mobilization of labour force, plant, equipment and construction of offices/campsite as well as acquisition of various permits as required by the law. The implementation of the project's design and construction phase will start with a thorough investigation of the sites' biological and physical resources in order to develop a baseline data bank that shall guide in impact monitoring.

The activities involved in the pre-construction phase include:

- Familiarization of the road network to be upgraded;
- Land survey to align the road;
- Geo-technical investigation of borrow pits and analysis of construction materials (sand, gravel, water, etc.);
- Identification of suitable site where to erect a campsite in conjunction ENP Management;
- Clearing of the area for the installation of water tanks, workshop, site office, ablution facilities, etc.
- Design of the proposed road, based on recommended standards and site conditions;
- Mobilisation of the labour and equipment's to the construction campsite;
- Obtaining of the necessary permits, CIP, WAP, etc.
- Material storage and material preparation.

##### 3.3.1.1 Construction Campsite

The appointed contractor must be given a suitable land portion where to establish its construction campsite. The site allocated must ideally be on the resort land (Okaukuejo, Halali or Namutoni) and it must be big enough to accommodate the present and future requirements of the contractor. The basic requirements are parking area for its plants, machinery and equipment, a workshop, accommodation and ablution facilities for the employees, site office, etc. Ideally, the site should be a distance away from any sensitive environmental areas

##### 3.3.1.2 Transportation

Materials (fine and course aggregates) from borrow pits are transported by trucks to the construction site while consumable such as diesel is procured in bulk and delivered to a storage tank installed on the campsite premises. From the campsite, diesel is transported by means of suitable bowser to the construction site where heavy plants which remain at the site are refuelled. Oil and grease will be stored steel drums at the workshop.

##### 3.3.1.3 Storage

Some of the materials such as sand from borrow pits will be used directly after delivery and as such no piling up is expected. Bitumen is procured and delivered by road tankers directly to the construction site. Other materials like cement and reinforced steel bars will be stored at the backyard of the campsite where it is drawn when needed. ready for use. Timber will directly be used at the required areas and consequently there will be no stockpiling of timber at the camp sites. Fuel will be stored in drums at bund areas.

#### 3.3.2 Construction Activities

The overall objective of the road construction works is to upgrade the existing tourist gravel graded road (C38) in ENP to low-volume sealed road.

The construction phase to be undertaken by a successful bidding civil contraction company shall commence after an ECC has been approved by the EC in the MEFT. The project implementation activities undertaken by the civil construction company shall be supervised by **Tulipamwe**.

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The main activities to be undertaken during the construction phase will include the following:

- Filling and shaping of the road section;
- Cutting of earth section to facilitate widening of the road;
- Upgrading or construction of longitudinal and cross drainage structures; and
- Provision of sub-base, base course and asphalt concrete.

The actual works that shall be undertaken during this phase are amongst others the following:

- Earth works including cutting of the earth sections to facilitate widening of the roads;
- Vegetation clearing of areas to pave way for the construction works; excavation of the existing roads and the construction of fill embankments, filling and reshaping of the road section to sub-grade level;
- Provision of sub-base, base course and bitumen;
- Provision of temporary crossings and traffic diversions.
- Quarrying of gravel/sand from borrow pits and haul to the construction site for sub-base and base.
- Transportation of building materials like cement, reinforcement bars and bitumen from suppliers outside the park to the construction site inside the park;
- Pouring of bitumen on a well compacted base and covering with sand followed by rolling with a roller compactor to a smooth surface;
- Extraction of water from surface sources inside the park and transportation to construction site.
- Installation of road signs (speed limit signs, stop, road marking, etc.) and sign boards.
- Effective management of traffic around the construction site during working hours; and
- Operation of its campsite including the general labourers and staff personnel.

#### 3.3.2.1 Detours

Detours will be required to maintain a usable road during the upgrading period. This should be accomplished by construction a section of 1.5 m to the shoulder of the road. Construction of detour on virgin land outside the road reserve should be avoided at all costs. The construction and maintenance of the detour should be an expected standard that ensures road safety. On completion of the road section, the detour or temporary road should be rehabilitated by covering it with topsoil so as to reinstate it to its pre-construction state.

Road construction is a labour intensive activity and requires skilled and unskilled manpower consisting of management and technical personnel and general labourers who can be sourced locally. Sourcing of local labour is considered to be a major mitigation measure for social impacts on the local community.

#### 3.3.2.2 Sourcing of Construction Materials

The bulk of the road building materials to be used in the upgrading of the tourist roads to low-volume sealed roads will be sourced from within the project site with bitumen, steel bars, cement and crushed stones sourced outside the park. Water will be moved with suitable water bowsers. Materials such as sand and base course gravel from borrow pits will be transported by trucks to the construction site.

Greater emphasis should be laid on procurement of road building materials from sites located closer to the construction site being worked on; this will make both economic and environmental sense as it will reduce negative impacts of transportation of the materials to the project site through reduced

distance of travel by the transportation vehicles. Excavated materials from the road can be reprocessed and reused as construction material for the same or other projects

#### 3.3.2.3 Storage of Road Building Materials

Road building materials will be stored on site though some of the materials from borrow pits will be used directly after delivery and as such no piling up is expected. Wind direction should be taken into account when selecting sites where to temporarily store bulky materials such as sand, base course or aggregates that are susceptible to wind erosion. Cement and reinforcement bars will be stored in special storage rooms.

Hazardous products such as diesel, oil, grease, paint and solvents shall be stored at the campsite in tanks/drums that are adequately bunded to control contamination of natural resources in case of spillage. Transport of hazardous products to the construction sites shall be done by using suitable devices and handled by trained personnel to avoid unintended spillage and leaks.

#### 3.3.2.4 Landscaping

To improve the aesthetic value and visual quality of the newly constructed road sites, once construction activities are completed at a section of the road, the contractor will be required to carry out landscaping that will include planting of indigenous trees that might have been destroyed during the construction activities as well as backfilling of an open excavated trenches.

### 3.3.3 Demobilisation Phase

Upon successful completion of the contracted work, the contractor shall remove all of its tools, materials and other articles from the construction area. Should the contractor fail to take prompt action to this end, ENP Management has an option and without waiver of such other rights as it may have, upon ninety (90) calendar days' notice, to treat such items as abandoned property. In Figures :12 & 13 are construction vehicles which have been removed from the construction site inside the park and dumped outside.

The contractor shall also clean areas where he worked, remove foreign materials and debris resulting from the contracted work and shall maintain the site in a clean, orderly and safe condition. Materials and equipment shall be removed from the site as soon as they are no longer necessary to minimize the demobilization work after completion of the project.

Before the final inspection, the site shall be cleared of equipment, unused materials and rubbish so as to present a satisfactory clean and neat appearance.

All the campsites will be built as temporary structures and these will also include the use of movable structures such as movable containers. All the temporary structures will be demolished after accomplishing the contracted jobs.

### 3.3.4 Operational Phase

The actual usage of the upgraded tourist roads is expected to commence immediately after the construction works. The project road will be directly managed by ENP Management. During this time, ENP is expected to carry out routine maintenance work by attending to cracks, pot holes, clearance of vegetation within the road reserve area and general monitoring of the road conditions.

Other activities will include installation of adequate road signs, thermoplastic road marking, installation of traffic calming humps, control of litter accumulation on road sides, awareness rising on proper road use and road management to all road users, carry out monitoring and evaluation of road misuse, endeavour to reduce pollutant concentrations in runoff, disposal of waste from road maintenance activities, storage and management of maintenance materials and equipment. Additionally, ENP Management will be expected to enforce speed limit compliance by all park road users.

Given the low traffic volume on the upgraded road, the duration of the operational phase is expected to be 20 years.

**Figure 12**: Redundant Construction Vehicles and Old Tyres at King Nehala Gate

**Figure 13:** Old and Scrapped Construction Vehicles Just Outside the Park Entrance

### 3.3.5 Decommissioning Phase

The project will be done in phases and over a period of at least sixty months (60) Decommissioning shall therefore occur at various stages of the proposed road upgrade. This will include the decommissioning of the campsite which entails amongst others the following:

- Removal of temporary structures, installations and equipment's from the workshop, quarry sites and camp sites;
- Rehabilitation of the stockpile areas, borrow pits, workshop, etc to at least its original state.
- Clearance of all sorts of waste including used oil, sewage and solid waste and depositing them at authorised dumping sites; and
- Landscaping the area with suitable vegetation that can adapt in the area preferably indigenous plant species.
- The demobilization of the temporary structures will result mainly into solid wastes such as iron sheets and rubbles from demolitions. Iron sheets will be sold to people in the nearby communities for reuse while the rubbles will be used in backfilling at the borrow pits.

Given that the upgraded roads will have a lifespan in excess of 20 years, it is not possible to provide for the decommissioning of the road at this stage as laws, policies and regulations might have changed by that time.

## 3.4 PROJECT ALTERNATIVES

The definition of the 'alternatives' as outlined in the EIA Regulations refers to the different means of generally meeting the same purpose and requirement of a proposed activity, which may include alternatives to the:

- type of the activity to be undertaken;
- design or layout of the activity;
- technology to be used in carrying out the activity;
- property on which or location where it is proposed to undertake the activity, and
- operational aspects (or modus operandi) of the activity.

The purpose of considering alternatives is therefore to ensure that the EIA process is not simply reduced to the defense of a single project proposal, but that an opportunity for unbiased considerations of options is provided to determine the most optimal course of action from an environmental perspective. The alternatives considered were:

- The 'no-go action' alternative;
- Consideration for a new route;
- Use of Bitumen or Tar;
- Working hours.

### 3.4.1 The 'No-Go Action Alternative

This alternative implies that the status quo remains, and nothing happens, i.e. the C38 road network in ENP remains a gravel road and MEFT and by extension the taxpayers continue to fork out millions of Namibia Dollars in annual maintenance and upkeep of the gravel road. Given competing national priorities and limited revenue, the ongoing maintenance of gravel roads in the park will not be sustainable.

The limited resources has the potential to lead to a situation where the conditions of current gravel roads deteriorate to a point where it affects the operations of the national park and ultimately its sustainability. This option is therefore not supported.

### 3.4.2 Consideration for a New Route

The existing road is in the national park, a conservation area and a priceless asset of the Namibia people. Construction of a new main route elsewhere within the National Park will impact and interfere with the large-scale ecosystem functioning of the park where the predominant land use is dependent upon the maintenance of such functions. The impacts on the ecosystem, disturbance to wildlife (habitats, movement patterns, etc.), destruction to vegetation and loss of sense of place (visual) will have major significances. The existing tourist road is depicted on all park maps. This option is therefore is fatal and will not be supported.

What has been considered during the pre-construction phase of the project are the alternative sites where to erect the contractor's construction campsite – whether inside the park or outside the park premises.

### 3.4.3 Use of Bitumen or Tar

In section 3.2.1 – the benefits of using bitumen over tar for road construction with low volume traffic have been described with the use bitumen considered as eco-friendly compared to the use of tar. This alternative has been supported.

### 3.4.4 Working Hours

Since the project site is within a national park, working hours for road construction have to be aligned to those of park operations. In this regard road work is confined to day-light hours of between 07h00 and 18h00 on the basis seven days a week including public holidays. Work on Sundays and public holidays will natural attract overtime which are regulated by the Labour Act and should be complied with.


**Figure 14:** Road kills on tar roads within parks (source : Kruger National Park)

**Figure 15**: Lions 'sunbathing' on tarmac (Source : Kruger National Park)

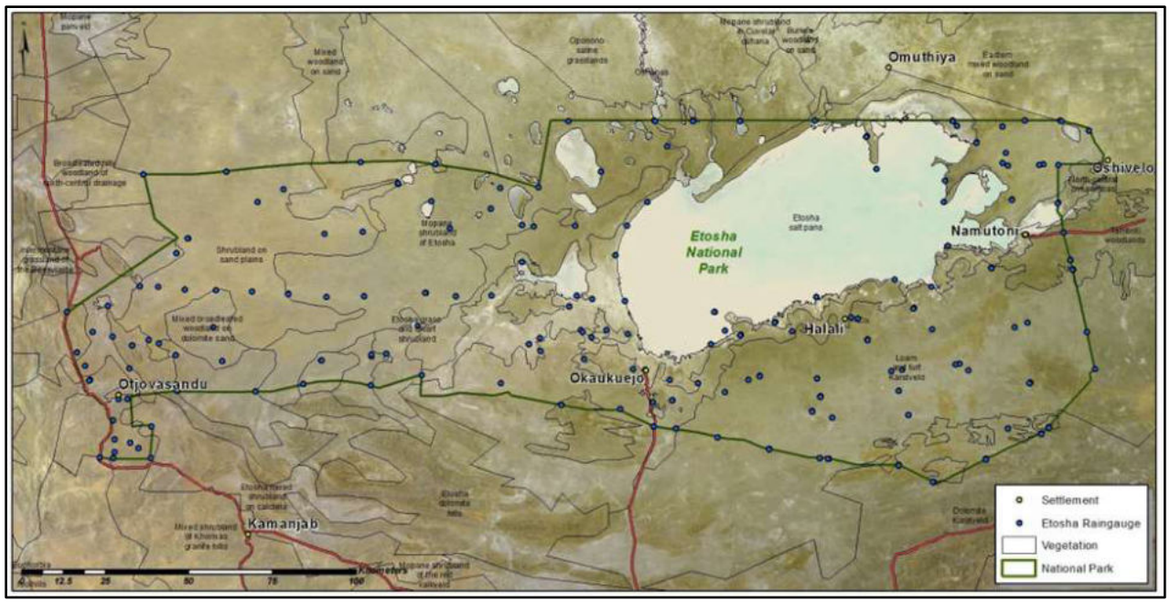


**Figure 16**: Aerial View of the Salt Pan in Etosha

# 4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The Republic of Namibia has five tiers of laws and a number of policies relevant to environmental assessment and protection which include the following:

- The Namibia Constitution
- Statutory law
- Common law
- Customary law, and
- International law

This section outlines the legal and institutional framework applicable to the proposed road upgrading activities.

## 4.1 SPECIFIC LEGAL INSTRUMENTS

The following regulations have a direct bearing of the proposed development:

**Table 3**: Specific National Statutes

| Statutes | Main Aspects | Applicability /Relevance |
|---|---|---|
| **Environmental Management Act** (EMA)<br>Act No. 7 of 2007 | • Defines the environment<br>• Encourages sustainable management of the environment and the use of natural resources<br>• Provides a process of scoping assessment of all developmental projects with possible significant effect on the environment.<br>• Lists activities that may not be undertaken without an Environmental Clearance Certificate (ECC)<br>• Provides for Environmental Impact Assessment Regulations | Road construction is a listed activity. The proposed has triggered listed activities |
| **Nature Conservation Ordinance**<br>No. 4 of 1974<br>(as amendment) | • Provides for the conservation and management of wildlife and fishing in inland waters.<br>• Deals with establishment of new conservations in communal areas.<br>• Provides mechanism to deal:<br>o with dangerous wild animals<br>o Indigenous plants | |
| **Road Ordinance**<br>17 of 1972 | • Regulates and allows for the proclamation of roads into trunk road, main roads, district roads and farm roads.<br>• Regulates the width of proclaimed roads.<br>• Maintains control and supervision of proclaimed roads and other roads in Namibia<br>• Controls traffic on proclaimed roads, on urban trunk and main roads as well as at temporary or deviation thereof. | The proposed road is proclaimed as a farm road or tourist road |
| **Roads Authority Act**<br>(Act 17 of 1999) | • Manages the national road network and promotes a safe and efficient road sector in Namibia.<br>• Plans, designs and oversees the construction and maintenance of roads that part of the national road network.<br>• Approved the quality of materials used in the construction and maintenance of national roads.<br>• Designs, implements and operates road management systems.<br>• Devices mechanisms to prevent damage to national road network. | The proposed road is being upgraded to a low-volume sealed road. |
| **Road Fund Administration** | • Manages a road user charging system in such away so as to secure and to allocated sufficient funding for road maintenance and construction. | Fuel rebates for diesel bulk users. |

| | | |
|---|---|---|
| **Act,**<br>(Act 18 of 1999) | • Collects levies from road users, license fees, etc.<br>• Provides funding for the planning, designing and construction of all national roads.<br>• Provides funding for road maintenance and construction of arterial roads in urban areas. | Permits to transport heavy equipment on public roads<br>Licensing of all vehicles used on public roads. |

## 4.2 OTHER APPLICABLE LEGAL INSTRUMENTS

Listed in Table below are other laws and regulations which have a bearing to the subject project.

**Table 4**: Applicable Legal Instruments

| Legislation | Main Aspects and Relevance | Applicability to Project |
|---|---|---|
| **Constitution of the Republic of Namibia** | The supreme law in Namibia and hailed as one the best in the world.<br>• Provides for the establishment of the main organs of the state (Executive, Legislative and Judiciary).<br>• CHAPTER 3 – Fundamental human rights and freedoms.<br>• CHAPTER 11 – Promotion of the welfare of the people<br>• ARTICLE 95 (I) - Eensures that workers are paid a living wage adequate for the maintenance of a decent standard of living and the enjoyment of social and cultural opportunities.<br>• ARTICLE 95(J) - Maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future, in particular, the government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibia territory. | Developmental projects must be implemented in a manner that promotes, protects and safeguards the environment for the present and future generations. |
| **Namibia Tourism Board Act**<br>Act 21 of 2000 | • Provides for the registration and grading of accommodation establishments.<br>• Provides for declaration of any sector of the tourism industry as a regulated sector and for the registration of businesses falling within a regulated sector.<br>• Provides regulations and minimum requirements pertaining to levies payable. | |
| **Minerals (Prospecting & Mining) Act**, Act No. 33 of 1992 | Provides for the reconnaissance, prospecting and mining of, and disposal of, exercise of control over, minerals in Namibia, including for matters incidental thereto. The relevant applicable to this project are listed here below: | The project requires constructions materials that are quarried (sand, stones, etc). Extraction of such materials is permitted and regulated under the Act. |
| **The Petroleum Products & Energy Act**<br>(Act No.13 of 1990 as amended) | • The Act makes provision for the procurement, handling, storage and distribution of petroleum products.<br>• Empowers the line Minister to increase/decrease pump fuel prices in the country as well as for the imposition of levies on energy sources.<br>• Also provides for the issuing of various permits including Consumer Installation Certificate | Diesel procured in bulk will be required for plants, machinery and equipment used in the operation. |
| **Public and Environmental Health Act**<br>(Act No. 1 of 2015) | • Provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto.<br>• Deals and provides guidelines on noise generation and control thereof within an urban environment.<br>• Deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc. | Health and safety of employees and the general public.<br>Dust and noise pollution |
| **Hazardous Substances Ordinance**<br>(No. 14 of 1974) | • Provides for the control of hazardous substances with potential to cause harm, injuries and even death.<br>• Provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances. | Bitumen, fuel, oil, paints, solvents, etc. are some of the hazardous products that will be handled. |

| Legislation | Main Aspects and Relevance | Applicability to Project |
|---|---|---|
| **Atmospheric Pollution Prevention Ordinance** (No. 11 of 1976) | • Provides control of noxious or offensive gases and matters incidental thereto.<br>• Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process. | Noxious emissions by construction machinery & equipment used during the project implementation. |
| **Water Resource Management Act** (2004) | The following permits are required in terms of the Water Act:<br>• water abstraction permits;<br>• domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits;<br>• water use for dust suppression; and water reticulation permits (pipelines).<br>(Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.) | Water will be used in the operation and must obtained in a lawful manner. |
| **The Soil Conservation Act** No. 76 of 1969 | • The act makes provision for combating and prevention of soil erosion and promotes the conservation, protection and movement of soil, vegetation, sources and resources.<br>• Fuel storage and handling is more often associated with spillages which could end up contaminating the soil. | Project will involve soil handling and disturbances. |
| **National Heritage Act** No. 27 of 2004 | • No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated.<br>• Section 48 sets out the procedure for application and granting of permits**,** such as the permit required in the event of damage to a protected site occurring as an inevitable result of development.<br>• Part VI, Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council | There are heritage sites within the park. |
| **Atomic Energy and radiation Protection Act** (Act No. 5 of 2005) | • The Hazardous Substance Ordinance No. 14 of 1974 was repealed and amended by the Atomic Energy and Radiation Protection Act.<br>• The Act provides for the control of substances which may cause injury or ill-health or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature.<br>• Whilst the environmental aspects are not really explicitly stated, the Act provides guidelines with respect to importing, handling and storage, etc. of hazardous substances. | |

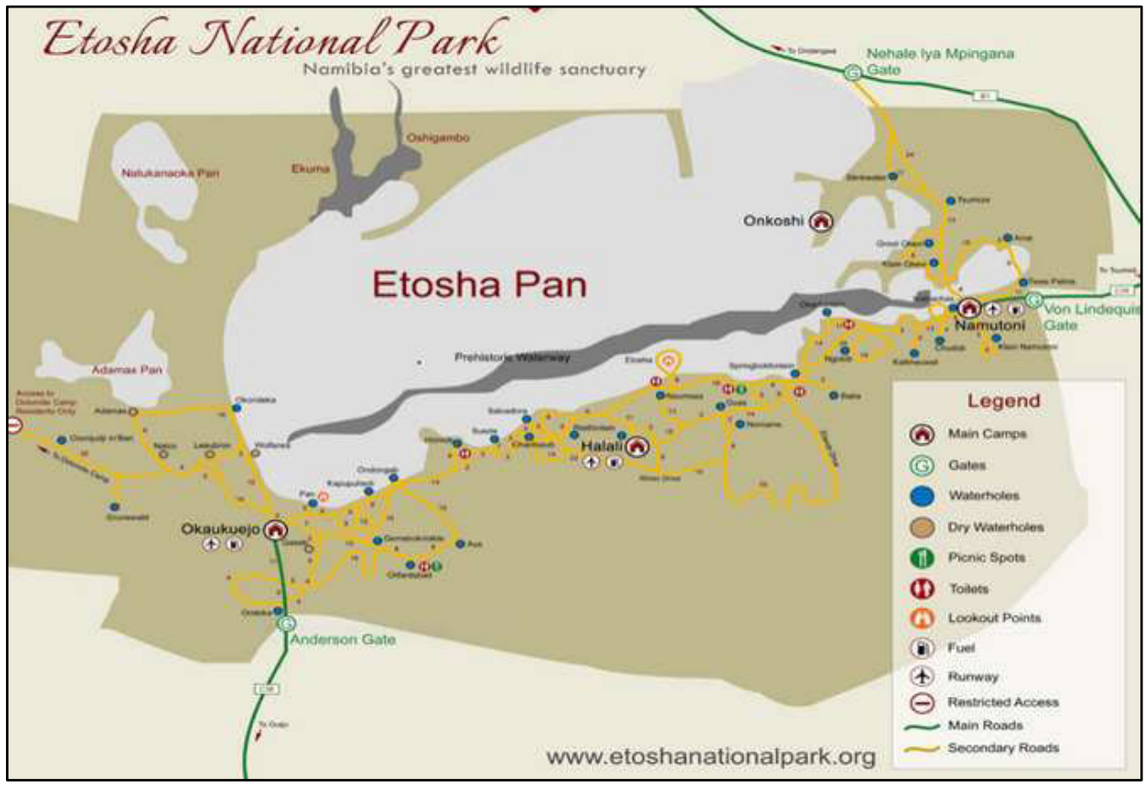


**Figure 17**: Road Networks in ENP

## 5 BASELINE ENVIRONMENT ANALYSIS

An analysis of the baseline environment is present in Table below. The information presented was compiled from a number of sources, various publications on ENP, desk study, and visual observation during field visits.

**Table 5:** Baseline Environmental Analysis

| Particulars | Brief Description | Potential Impacts from Proposed Project |
|---|---|---|
| Project Site Location | Etosha National Park | |
| Region | Part of the park lies in Oshikoto, Omusati and Kunene | |
| Land Use | Nature conservation - promotion of biodiversity conversation through sustainable utilization of wildlife and tourism development for the benefits of citizens. | |
| Land Size | 22 935 km$^2$ or 2.78% of total geographical area of Namibia | |
| Year Established | 1907 - hence 116 years old, making it one of the oldest national parks in Africa. | |
| Project Start Point<br>Longitude/Latitude<br>Elevation | <br>19º 13' 3'' S 16º 2' 54'' E<br>1 109 m | |
| Project End Point:<br>Longitude /Latitude<br>Elevation | <br>18º 30' 4'' S 16º 44' 39'' E<br>1 030 m | |
| Topography and Drainage | The veld is fairly flat and open with some dolomitic hills around the Halali Rest Camp and to the extreme west.<br><br>The natural drainage from all higher lying areas is towards the salt pan. | Construction activities over the open savannas will have some visual impacts – but the exposure is of a shorter duration. |
| Prominent Features | The saline pan to the north and NW is the dominant feature in the park and covers about 4 760 km$^2$ (about 21% of the park). Numerous water springs are found all over the park which serve as sources of water sustaining the wildlife in the park. | The road crosses several animal footpaths leading to water holes and grazing areas. Construction activities have the potential to alter movement patterns albeit temporarily. |
| Rainfall | Average annual rainfall is 418 mm with precipitation occurring between November and April. Generally, the rainfall intensity tends to decrease from east to west. | The rainfall season coincides with breeding of wildlife in the park |
| Temperature | • 24 ºC is the annual mean average temperature. | |

| | | |
|---|---|---|
| | • ±10 C is the mean night time temperature in the winter months (May to October).<br>• ±40 ºC is mean daytime temperature in summer months (November to April). | |
| Humidity | Above 50% during the months of December to April peaking at 58%. | |
| Wind Conditions | The windiest months in ENP are July to October with average speed of 25 km/hr for over 290 hours per year.<br>The predominant wind direction is ENE and NE<br>The calmest months are January to March with wind average speed 10 km/hr. | Wind conditions are critical when stockpiling and handling dry construction materials (sand, gravel, cement, etc) that are prone to wind erosion. |
| Evaporation | 2600 – 2800 mm per year | |
| Vegetation | About six vegetation communities are found in the park (Nakanyala, el at. 2015):<br>• Shrubland<br>• Saline Pan<br>• Grassland<br>• Bushveld<br>• Scrubland<br>• Woodland | The road works passes through all vegetation communities. Wildlife (herbivorous) graze on these vegetation. |
| Faunal Diversity | The park boosts the following:<br>• 114 mammal species<br>• 340 bird species<br>• 110 reptiles<br>• 16 amphibian species<br>• 49 fish species<br>• An unspecified number of black and white rhinos. (Sadly, 46 white and black rhinos were poached in 2022) | |
| Road Networks | The park has in excess of 40 water holes (water points or springs) where wildlife came to drink water. These water holes are accessed via a road network totaling over 2000 km. All roads within the park are gravel roads with the expectation of roads from Anderson Gate to Okaukuejo Rest Camp (20 km) and Von Lindequist Gate to Namutoni Rest Camp (2 km). | |
| Nearest railway siding | The Oshivelo Railway Siding | |
| Surface waterbodies | The salt pan has standing water throughout the year as well as most of the 40+ water holes. | |
| Archaeologically important sites | There are several sites in the park with items of heritage and cultural resources. The fort at Namutoni was built in 1904 and WAS declared as a heritage structure 1950.<br>The museums at Namutoni & Okaukuejo have numerous artifacts on display covering a history of over 100 years. | |
| Communication | All modern telecommunication services are available at the rest camps in the park. | |
| Soils | The demonian soil type to the south and south-west of the pan is a karstveld with calcrete rubble on the surface. To the west of the pan, there is an extensive area with calcareous loamy soils while to the north the pan is covered with aeolian Kalahari-type sands. | Sources of soil materials suitable for road construction are available in the park. |

# 6 IMPACT ASSESSMENT

The assessment of impacts has adhered to the minimum requirements in the EIA Regulations and has taken applicable official guidelines into account. The issues raised by interested and affected parties have been addressed in the easements of impacts.

Furthermore, the proposed impact mitigation measures are in line with the Etosha National Management Plan, and tying in with its mission of maintaining biodiversity in all its natural facets and fluxes, to provide human benefits and build a strong constituency and preserve as far as possible the wildness qualities and cultural resources associated with the Park.

## 6.1 THE SIGNIFICANCE MATRIX FOR THE IMPACTS ASSESSMENT

The methods and format of the impact are presented in Table below. tables used in this section are in accordance to the requirements of the EIA Regulations.

**Table 6:** Impact Assessment Criteria

| | |
|---|---|
| **Nature of Impact** | An explanation on how the environment will be affected by specific activities is provided. The impact can have one of three effects:<br>**Positive** (+ve) – the environment will benefit from the impact (employment, etc.)<br>**Neutral** (0) – the environment will not be affected or altered by the impact.<br>**Negative** (-ve) - the environment will be adversely affected by the impact |
| **Mitigation** | What measures could be applied to reduce negative impacts or to enhance positive impacts. |
| **Spatial Extent of the Impact** | The **EXTENT (E)** refers to the geographical extent of the impact and is described in terms of, and values of 1 to 5 are assigned with 1 being low and 5 the highest:<br>• **Site Specific:** Confined within the project site – assign a score of 1<br>• **Local:** Confined to immediate environment within 5 km of the site – assign a score of 2.<br>• **Regional:** Extends beyond the project boundary over the national park – assign a score of 3.<br>• **National:** Extends beyond the regional boundaries, i.e. beyond Oshikoto – assign 4.<br>• **Nationwide** – Extends beyond the boundaries of the region – assign a score of 5. |
| **Duration** | The **Duration (D)** refers to the time period over which the impact could persist:<br>• **Short term** : Impact endures between 0 and 1 years – assign a score of 1.<br>• **Short term :** Impact endures between 2 and 5 years – assign a score of 2.<br>• **Medium term** : Impact endures between 5 and 10 years – assign a score of 3.<br>• **Long term** : Impact endures has between 10 and 20 years – assign a score of 4.<br>• **Permanent:** Impact endure beyond 20 years – a score of 5 is assigned. |
| **Intensity or Magnitude** | The **Magnitude (M)**, is quantified on a scale from 0-10,<br>Where:<br>• 0 is small and will have no effect on the environment,<br>• 2 is minor and will not result in an impact on processes,<br>• 4 is low and will cause a slight impact on processes,<br>• 6 is moderate and will result in processes continuing but in a modified way,<br>• 8 is high (processes altered to the extent that they temporarily cease), and<br>• 10 is very high and the results in complete destruction of patterns and permanent cessation of processes. |
| **Probability** | The **Probability (P)** of occurrence describes the likelihood of the impact actually occurring and is estimated on a scale of 1- 5: , where:<br>• 1 = **Very Improbable -** the impact will not happen;<br>• 2 = **Improbable -** some possibility, but low likelihood;<br>• 3 = **Probable -** distinct possibility that the impact will occur;<br>• 4 = **Highly Probable** – the impact will most likely occur<br>• 5 = **Definite** - impact will occur regardless of preventive measures |
| **Confidence** | The level of confidence that can be placed on this assessment in terms of:<br>• **Low** : implies that further investigation may be required if the impact could potentially be significant.<br>• **Medium** : Further investigation may be required if impact could be significant<br>• **High**: Impact well understood. Further investigations may be required to determine the effectiveness of possible mitigation measures. |
| **Significance** | The **Significance Rating** of the impact is determined as a synthesis of the above assessment criteria and has the following formua:<br>**Significance Rating = (Sum of Magnitude + Duration + Intensity) x Probability** where:<br>• **A Low Significance** implies that the impact will not have an effect on the decision to approve the project<br>• **A Medium Significance** implies that the assessed impact should have an effect on the decision unless the impact is effectively mitigated |

| | |
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| | • **A High Significance** implies that the decision would be influenced regardless of the mitigation<br><br>**The significance will be calculated for the Direct Impact of the aspects**<br><br>• The **Status**, which will be described as either positive, negative or neutral.<br>• The degree to which the impact can be reversed.<br>• The degree to which the impact may cause irreplaceable loss of resources.<br>• The *degree* to which the impact can be *mitigated* |

## 6.2 IMPACTS ON THE ENVIRONMENT

Impacts on the environment as a result of the upgrading of tourist roads to low-volume sealed roads have been assed using the criteria presented in the above and are presented in the following table where: impact that is:

- **Negligible:** Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
- **Low:** Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a slightly modified way and maintains original integrity (no/limited impact on integrity).
- **Moderate:** Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity
- **High:** Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

### 6.2.1 Pre-Construction Impact Assessment

**Table 7**: Assessment of Impacts Related to the Planning and Design Phase

| **PLANNING AND DESIGN PHASE**<br><br>A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Planning and Design Phase of the proposed upgrading of gravel roads from Okaukuejo to KNG. | | | |
|---|---|---|---|
| **Activity** | **Impact Summary** | **Significance (post mitigation)** | **Suggested Mitigation Measures** |
| Planning and Designing | **Direct impacts**:<br><br>The haphazard implementation of the proposed upgrading of the main road through ENP without an Environmental Management Plan (EMP) may result in higher significance impacts to vegetation, fauna and avifauna and watercourses (dry streams) traversed by the said road. | **Low** | • The road planning and design parameters must take into account the sensitive nature of the project location - Etosha National Park.<br><br>• The road upgrading to low-volume seal of the main dirt road through ENP should be carefully planned and the construction executed in a manner that results in minimal construction of temporary roads in order to accommodate traffic. |
| | **Indirect Impacts:**<br><br>The upgrading of the dirt road linking all major resorts within the ENP will improve park accessibility, reduce wear & tears breakdowns and enhance service delivery giving tourists an overall tourism experience | **Positive Impact** | **Proposed enhancement:**<br><br>• The development should go ahead as planned with due regard to the mitigation measures presented in the EMP. |
| | **Cumulative Impacts**<br><br>Dust build-up on plants next to busy game viewing dirt road in ENP is a cumulative impact which was aesthetically | **Positive Impacts** | The upgrading should proceed as planned with due compliance to the mitigation measures as proposed in the EMP. |

| | | | |
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| | unpleasing and perhaps detrimental to the animals. | | |

### 6.2.2 Assessment of Construction Induced Impacts

Construction entails the upgrading of dirt road to a low-volume seal road. The process is called sand sealing and involves mixing sand and bitumen without the addition of surfacing stones. Silt-free sand is sieved and mixed with hot bitumen which is sprayed onto a well compacted dirt road surface. The sand-bitumen coat is immediately covered with a layer of sand from a sand spreader. A roller machine is then used to compact the surface and to give it a smooth finish. The road is ready to be driven on as soon as the roller finishes compacting. As the road degrades over the years, the sand eventually washes back into the rivers.

**Table 8:** Assessment of Construction Induced Impacts

**CONSTRUCTION PHASE:**

Upgrading of Tourist Roads to Low-Volume Seal Roads in Etosha East National Park (starting from Okaukuejo to KNG). The total length of the road to the upgraded is 214.5 km. The road does not pass through any significant rivers and therefore the upgrading does not involve construction of bridges.

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the Construction Phase is as follows:

<table>
<tr><th>Impact Summary</th><th>Significance (Post Mitigation)</th><th>Suggested Mitigation Measures</th></tr>
<tr><td colspan="3">Vegetation</td></tr>
<tr><td>Direct Impacts:<ul><li>This will result in the loss of indigenous species, disturbance of plant species and the fragmentation of plant communities.</li><li>Although limited, some large trees including some protected tree species may be in the way of the road, especially on the sections where clearing will be conducted.</li></ul>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Definite</td><td>Definite</td></tr>
<tr><td>Duration</td><td>Short-term</td><td>Short-term</td></tr>
<tr><td>Extent</td><td>Limited to existing road</td><td>Limited to existing road</td></tr>
<tr><td>Magnitude</td><td>Low</td><td>Low</td></tr>
<tr><td>Significance</td><td>35 (Medium)</td><td>30 (low)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table></td><td>Low</td><td rowspan="2"><ul><li>The clearing of vegetation must be kept to a minimum and remain within the footprint alignment of the road.</li><li>Disturbed areas on the road shoulder must be rehabilitated immediately after construction has been completed in that area.</li><li>During the construction phase, workers must be confined to areas under construction and access to the undeveloped areas must be strictly controlled.</li><li>Ongoing alien plant control must be undertaken.</li><li>Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.</li><li>No large trees, particularly protected trees, may be removed, woody plants should only be cut shorter if absolutely necessary.</li><li>The clearing of vegetation must be kept to a minimum and remain within the footprint of the road being constructed – erosion of the sensitive area must be avoided at all times.</li></ul></td></tr>
<tr><td>Indirect Impacts:<ul><li>The removal of vegetation will also expose soil and increase the risk of erosion.</li><li>Expected to reduce the natural mopane savanna along the transect of the existing gravel road. In context with the Mopane veld in general this impact is considered to be minimal.</li></ul></td><td>Low</td></tr>
<tr><td>Cumulative Impacts<ul><li>Provided the management measures in the EMP are implemented, no impacts are anticipated.</li></ul></td><td>None</td><td>Not Applicable</td></tr>
<tr><td colspan="3">FAUNA AND AVIFAUNA</td></tr>
<tr><td>Direct Impacts:<ul><li>The modest compounds for the light footprint proposed road upgrade will spatially be insignificant relative to the overall extent of the park, and their impact will be fractional.</li><li>Some areas used by birds for foraging and breeding will be destroyed.</li><li>The presence of construction machinery and equipment and workers will cause disturbance to avifauna, with the movement and activities of</li></ul></td><td>Moderate</td><td><ul><li>All staff and contractors must undergo an environmental induction training workshop prior to commencing with the upgrading.</li><li>The spatial extent of construction activities must be minimized, and as far as possible restricted to the area on which the road is being upgraded.</li><li>The boundaries of the development footprint areas are</li></ul></td></tr>
</table>

<table>
<tr>
<td>personnel on site and the associated noise, pollution and litter all having a negative effect on birds.<br><br>• The increase in construction machinery, equipment and vehicles along the road will result in an increased risk of mortality for mammals, birds, reptiles and amphibians<br><br>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Probable (3)</td><td>Probable (3)</td></tr>
<tr><td>Duration</td><td>Short term (3)</td><td>Short term (3)</td></tr>
<tr><td>Extent</td><td>Site (1)</td><td>Site (1)</td></tr>
<tr><td>Magnitude</td><td>Minor (2)</td><td>Minor (2)</td></tr>
<tr><td>Significance</td><td>18 (Moderate)</td><td>18 (Moderate)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table>
</td>
<td></td>
<td rowspan="3">to be clearly demarcated and it must be ensured that<br>all activities remain within the demarcated footprint area.<br><br>• Provide adequate briefing for site personnel and<br>and any third parties (subcontractors) doing business with the main contractor.<br><br>• Any bird nests that are found during the construction<br>period must be reported to the Environmental Control<br>Officer (ECO).<br><br>• Movement of construction machinery and equipment and the workers beyond the construction site must be minimised.<br><br>• No hunting or picking up bones of dead wild animals is allowed and offenders will be prosecuted.<br><br>• Schedule construction activities in such a manner that breeding areas are avoided during the breeding season.<br><br>• The normal rules applicable to visitors to ENP must be strictly enforced at the campsite and construction sites.<br><br>• Driving at night within the park by contractor crew is not allowed. The crew returning to the campsite from working sites that are far away must leave such sites early to avoid having to travel at night.<br><br>• Speed limits must be strictly enforced. It is recommended that a speed limit of 60 km/hr be applied to anyone using the new upgraded road. It is the opinion</td>
</tr>
<tr>
<td>Indirect Impacts:<br><br>• The construction phase of the road upgrade will result in the negligible loss of mammal, reptile and amphibian habitats. Within the context of the park, this impact relates to the limited destruction /disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have negligible impact on foraging and breeding ecology.<br><br>• Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors; these will be limited to the footprint of the road upgrade and where loss will in any case exclude mature trees</td>
<td>Low</td>
</tr>
<tr>
<td>Cumulative Impacts<br><br>• No cumulative impacts are expected should the mitigation measures recommended in the EMP are implemented.</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td colspan="3">GROUND AND SURFACE WATER (WATERCOURSES)</td>
</tr>
<tr>
<td>Direct Impacts:<br><br>• The compaction of soil adjacent to watercourses during road upgrading activities.<br><br>• The removal of vegetation and surface redirection of water during the road construction activities.<br><br>• Loss and disturbance of watercourse habitat and fringe vegetation as a result of those road sections crossing watercourses (dry river streams) as well as changes in management, fire regime and habitat fragmentation.<br><br>• Disturbance of slopes through creation of detour roads to redirect traffic during the construction activities.<br><br>
<table>
<tr><th>ASPECTS</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Highly Probable (4)</td><td>Highly Probable (3)</td></tr>
<tr><td>Duration</td><td>Long term (4)</td><td>Short term (3)</td></tr>
<tr><td>Extent</td><td>Regional (4)</td><td>Local Area (2)</td></tr>
<tr><td>Magnitude</td><td>High (8)</td><td>Moderate (6)</td></tr>
<tr><td>Significance</td><td>64 (High)</td><td>33 (Moderate)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table>
</td>
<td>Moderate</td>
<td rowspan="2">• Where possible, schedule construction of the road upgrade over those sections of the road crossing watercourses to take place during the dryer winter months. This will help to reduce impacts on watercourses.<br><br>• Retain vegetation and soil in position as long as possible , removing it only immediately ahead of earthworks.<br><br>• Remove vegetation only where it is absolutely essential for road upgrading and avoid causing undue disturbance to adjoining natural vegetation cover.<br><br>• Where construction occurs in demarcated watercourse, extra precaution should be taken to minimise watercourse loss.<br><br>• Other than approved and authorised structure, no other development or maintenance infrastructure is allowed within delineated watercourse or associated buffer zones.<br><br>• Demarcate the watercourse areas and buffer zones.<br><br>• Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark those zones as no go areas.<br><br>• Disturbed areas must be rehabilitated immediately upon completion of construction activities in that specific site location after the construction has been completed.</td>
</tr>
<tr>
<td>Indirect Impact<br><br>• Changing the quantity and fluctuations characteristics of the watercourses by for example restricting the water flow.</td>
<td>Moderate</td>
</tr>
</table>

| | | |
|---|---|---|
| • Changes in sediments entering and exiting the system.<br>• Introduction and spread of alien vegetation in the project area.<br>• Loss and disturbance of watercourse habitat and fringe vegetation habitats<br>• Possible changes in water quality as a result of foreign materials and increased nutrients impact ratings. | | • Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.<br>• Monitor the establishment of alien invasive species within the areas affected by the construction.<br>• Consider the various methods and equipment available and select the method and equipment which will have the least impact on the watercourses. |
| **Cumulative Impacts**<br>• Construction activities may result in cumulative impact to the watercourses within the local catchments and beyond.<br>• Change made to the bed or banks of watercourses unstable channel conditions may result causing erosion meandering, increased potential for flooding and movement of bed materials, which will result in property damage adjacent to and downstream of the site. | **Low** | • Water may seep into trenching and earthworks. It is likely that such water will be contaminated within these earthworks and should thus be cleaned or dissipated into a structure that allows for additional sediment input and slows down the movement of the water thus reducing the risk of erosion.<br>• Rehabilitation plans must be submitted for approval for the rehabilitation of damage during the construction. The rehabilitation must be effected immediately upon completion of construction.<br>• Areas that are being rehabilitated must be cordoned off as 'no-go' areas using danger tape and wood droppers.<br>• Protect all areas susceptible to erosion resultant from activities within and adjacent to the construction camp and working areas.<br>• Runoff from the construction area must be managed to avoid erosion and pollution related problems.<br>• Implement the best management practices including source-directed controls.<br>• Make use of buffer zones to trap sediments.<br>• Water-wise education and information progarmmes must be incorporated into construction plans.<br>• Water saving procedures must be introduced during the construction period.<br>• Water saving procedures must be introduced during the construction period.<br>• For energy dissipation and erosion protection at the inlets and outlets of drains, culverts and mitre drains, the following protective measures could be considered:<br>o Grass cover<br>o Different levels of stone pitching<br>o A stilling basin with baffles (in case of culverts)<br>o Concrete<br>o Gabions<br>o Rip-rap<br>• Where grass covers are used the outlets should be above ground level, to prevent deposits of sediment from blocking the outlets. |
| **POTENTIAL INCREASE IN ALIENS** | | |
| **Direct Impacts**<br>• Disturbance of indigenous vegetation during the construction phase could result in disturbed areas, making suitable habitats for invasive plants, these proliferate in disturbed areas.<br>• Through movements of people (employees) and construction vehicles, seeds and other propagates of plants especially alien invasive plant species are brought to the site. | **Low** | • Ongoing alien plant control must be undertaken during construction.<br>• Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing and eradication of any alien species during the operational phase. |

| | | |
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| <table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Definite (4)</td><td>Probable (3)</td></tr><tr><td>Duration</td><td>Medium term (4)</td><td>Medium term (2)</td></tr><tr><td>Extent</td><td>Local Area (4)</td><td>Local Area (4)</td></tr><tr><td>Magnitude</td><td>High (8)</td><td>Low (4)</td></tr><tr><td>Significance</td><td>64 (High)</td><td>30 (Moderate)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table> | | • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. |
| **Indirect Impacts**<br>• Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity, change ecosystem services and processes, i.e. change nutrient cycling and productivity, and modify food web. Allowing invasive plant species to establish and expand their distribution range without control may have vast accumulative effects.<br>• Fragmentation of local vegetation, increased bush fires as these plants are highly prone to fire. | **Low** | |
| **Cumulative Impacts**<br>• Increase of woody alien species pose an ecological threat. | **Low** | |
| **VISUAL IMPACTS** | | |
| • Some vegetation will be removed to get to the required servitude width.<br>• Construction activities and the presence of construction equipment will cause a disturbance to the existing landscape character.<br>• The road upgrade will disturb the remote and tranquil sense of place during its construction phase.<br>• Park visitors and staff of various resorts within the park who are travelling on the same road being upgraded may be exposed to construction activities for a brief moment.<br><table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Highly Probable (4)</td><td>Probable (3)</td></tr><tr><td>Duration</td><td>Short term (2)</td><td>Short term (2)</td></tr><tr><td>Extent</td><td>Site Specific (1)</td><td>Site Specific (1)</td></tr><tr><td>Magnitude</td><td>Low (4)</td><td>Minor (2)</td></tr><tr><td>Significance</td><td>28 (Low)</td><td>15 (Low)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table> | **Low** | • Locate construction camps within a section of the resort (Okaukuejo, Halali, Namutoni, etc.) in areas that are already disturbed to avoid additional disturbance.<br>• Stringent restrictions should be put in place to contain the footprint of the construction campsite by having a temporary fence erected around the campsite premises, clearly demarcating the entire construction area to minimise disturbance of area outside the construction site.<br>• Keep the construction campsite and construction sites neat and tidy at all times. Remove any waste products from th sites or contain it in an enclosed area to avoid wind blowing waste into the bush/park.<br>• No structure may exceed the height of the surrounding vegetation.<br>• Implement dust suppression measures during earthworks to minimise the impact of dust clouds.<br>• All signae should be non-intrusive but clear. No signboards should be placed on separate frameworks higher than 2 m bove the natural ground level to avoid it exceeding the height of the vegetation. |
| **Indirect Impacts**<br>• The impact will only affect the natural character of the visual resource | **Negligible** | |
| **Cumulative Impact**<br>• None | **None** | N/A |
| **HERITAGE IMPACTS** | | |
| **Direct Impacts**<br>• The construction of the road upgrade could result in significant discovery of artifacts. | | • Should any heritage artefacts be exposed during the operation of the area where the artefacts were discovered, officials of ENP shall be notified as soon as possible.<br>• No artefacts may be removed off site unless authorised by the appropriate authority. |

| ASPECT | WOM | WM |
|---|---|---|
| Probability | 2 | 2 |
| Duration | 2 | 2 |
| Extent | 2 | 2 |
| Magnitude | 4 | 4 |
| Significance | **16 (Low)** | **16 (Low)** |
| Status | Negative | Negative |

| | | |
|---|---|---|
| **Indirect Impacts**<br>None | None | N/A |
| **Cumulative Impacts**<br>None | None | |
| **NOISE IMPACTS** | | |
| **Direct Impacts**<br>• Noise emissions from construction activities resulting in fauna migrating from noise emissions areas.<br>• Flight patterns of avifauna changing.<br><br>**ASEPCT / WOM / WM**<br>Probability: Probable (3) / Improbable (2)<br>Duration: Short term (2) / Short term (2)<br>Extent: Site Specific (1) / Site Specific (1)<br>Magnitude: Moderate (7) / Moderate (5)<br>Significance: **30 (Medium)** / **16 (Low)**<br>Status: Negative / Negative | **Low** | • The usage of low noise generators or better still solar system is encouraged.<br>• Establish noise attenuation structures around high noise activities, e.g. metal fabrication activities, concrete mixers, etc.<br>• Establish noise level threshold consistent with ENP policies and guidelines.<br>• Construction work should be conducted during ENP mandated day hours.<br>• Speed limits must be strictly enforced.<br>• Noise reduction signs must be put up around the constrictor's campsite and construction sites.<br>• Employees working in areas were noise level is high should be provided with suitable PPEs.<br>• Ensure that construction vehicles are well maintained and regularly serviced with defective silencers replaced. |
| **Indirect Impacts**<br>A potential change in the ecological cycle of the immediate area. | **Negligible** | |
| **Cumulative Impacts**<br>No significant cumulative impacts expected. | **None** | |
| **TRAFFIC IMPACTS** | | |
| **Direct Impacts**<br>Construction vehicles used in the operation are likely to lead to an increase on park roads especially along those sections which are being upgraded.<br><br>**ASPECT / WOM / WM**<br>Probability: Improbable (2) / Improbable (2)<br>Duration: Short term (2) / Short term (1)<br>Extent: Site Specific (2) / Site Specific (1)<br>Magnitude: Moderate (6) / Moderate (5)<br>Significance: **20 (Medium)** / **14 (Minor)**<br>Status: Negative / Negative | **Low** | • When operated on park roads, all construction machinery and vehicles must have their headlights switched on at all times.<br>• Traffic speed signs must be established at sufficient intervals along the construction footprint.<br>• Establish speed reduction awareness campaign for the contractors.<br>• No construction vehicles allowed on the park roads between the hours of 18h00 to 06h00.<br>• Implement penalty fines to speed violations.<br>• All vehicles of the contractor used in construction activities and operated on park roads must be licensed, roadworthy and driven by operators with valid drivers and third party public licence permits.<br>• All drivers must be given an induction training workshop on driving practice in the national park. |
| **Indirect Impacts**<br>The number of vehicles could lead to increased chances of road kills | **Negligible** | |
| **Cumulative Impacts** | **None** | |

<table>
<tr><td>No significant cumulative impacts expected.</td><td></td><td></td></tr>
<tr><td colspan="3">AIR QUALITY IMPACTS</td></tr>
<tr><td>Direct Impacts<br><br>• Dust fallout from speeding construction vehicles and construction activities.<br><br>• General construction vehicle emissions. These emissions can be considered as insignificant.<br><br><table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Local (1)</td><td>Local (1)</td></tr><tr><td>Duration</td><td>Long term (4)</td><td>Long term (4)</td></tr><tr><td>Extent</td><td>Minor (2)</td><td>Small (1)</td></tr><tr><td>Magnitude</td><td>Highly Probable (4)</td><td>Improbable (2)</td></tr><tr><td>Significance</td><td>10 (Low)</td><td>7 (Low)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table></td><td>Low</td><td>• A daily inspection checklist must be conducted on all construction vehicles by the operator before starting to operate the machine or vehicle.<br><br>• Construction vehicles and equipment must sufficiently maintained and serviced.<br><br>• Water spraying dust suppression must be conducted on areas prone to excessive dust fallout at required intervals.<br><br>• Staff vehicles must be sufficiently maintained and serviced.</td></tr>
<tr><td>Indirect Impacts<br><br>No indirect impacts are anticipated</td><td>None</td><td></td></tr>
<tr><td>Cumulative Impacts<br><br>No significant cumulative impacts are anticipated</td><td>None</td><td></td></tr>
<tr><td colspan="3">SOCIO-ECONOMIC POSITIVE IMPACTS</td></tr>
<tr><td>Direct Impacts<br><br>• Job opportunities created during the construction phase.<br><br>• Local suppliers & construct actors to be contractors.<br><br><table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Local & Regional (2)</td><td>Local & Regional (3)</td></tr><tr><td>Duration</td><td>Long term (1)</td><td>Long term (1)</td></tr><tr><td>Extent</td><td>Small (2)</td><td>Low (3)</td></tr><tr><td>Magnitude</td><td>Probable (3)</td><td>Probable (3)</td></tr><tr><td>Significance</td><td>12 (Low)</td><td>21 (Low)</td></tr><tr><td>Status</td><td>Positive</td><td>Positive</td></tr></table></td><td>Low Positive Impact</td><td>Enhancement:<br><br>• Local employment should be used for construction as far as possible.<br><br>• Contract local suppliers and contractors for construction work to be commissioned.<br><br>• The development should implement a training and skill development enhancement training for locals during the construction phase.</td></tr>
<tr><td>Indirect impacts:<br><br>• Stimulation of the region’s economic activities.<br><br>• Local employed people during the construction phase may learn new skills thereby making them more employable in the future.<br><br>• Improvement of the quality of life for family and community.</td><td>Low Positive Impacts</td><td>.</td></tr>
<tr><td>Cumulative Impacts<br><br>General acceptance of the development by the community cooperation.</td><td>Low Positive Impacts</td><td>Enhancement:<br><br>Continued involvement of the local neighbouring communities must take place by way of beneficiation initiatives.</td></tr>
<tr><td colspan="3">SOCIO-ECONOMIC NEGATIVE IMPACTS</td></tr>
<tr><td>Direct Impacts<br><br>• People may flock to ENP in search of employment resulting in squatting around the fence of the park.<br><br>• Increased risk of stock theft from surrounding farms, poaching and damage to park infrastructure associated with job seekers and construction workers.<br><br>• Construction workers using nearby bushes for ablution.<br><br>• Improper conduct by construction workers.</td><td>Negative Impacts</td><td>Negative Impacts Mitigation Measures:<br><br>• Implement mitigation measures to monitor and control<br>the activities of construction workers and for the control of nuisance impacts.<br><br>• Access to the construction site must be strictly controlled and monitored by 24 hour security.<br><br>• Adequate sanitary and ablution facilities must be provided for construction workers both at the campsite and the construction sites.</td></tr>
</table>

| | | |
|---|---|---|
| <table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Probable (3)</td><td>Probable (3)</td></tr><tr><td>Duration</td><td>Short term (2)</td><td>Short term (1)</td></tr><tr><td>Extent</td><td>Local Area (2)</td><td>Local Area (1)</td></tr><tr><td>Magnitude</td><td>Moderate (6)</td><td>Small (0)</td></tr><tr><td>Significance</td><td>30 (Medium)</td><td>6 (Low)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table> | | • Mechanisms should be implemented to deal with people seeking employment in order to minimise any issues related to the influx of people into the park.<br>• The Contractors shall provide sanitation and ablution facilities in the form of chemical toilets, at the campsite, offices, workshops and construction sites for staff and visitors. A minimum of one toilet per 15 people or within 100 meters of the work site in order to encourage the use of these toilets.<br>• Ensure that toilets are not located within sensitive areas such as drainage lines or river banks.<br>• Burning of vegetation including tree trunks and stumps cut during site clearing and establishment shall not be permitted.<br>• Smoking is only permitted in designated safe smoking areas that are clearly signposted.<br>• No open fires for warming or cooking area allowed outside secured areas in the construction campsite. |
| **Indirect Impacts**<br>• Potential protest to the neighbouring indigenous communities due to the construction not providing employment to them.<br>• Migrant and local construction workers engaging in unsafe sexual activities with local women. | **Low negative Impacts** | |
| **Cumulative Impacts**<br>Local community instability and resistant to the development.<br>In cases where unplanned /unwanted pregnancies occur to members of the community are infected by an STD/or AIDS the impacts may be permanent and have long term cumulative impacts on the affected individuals and/or community. effects. | **Low Negative Impact** | **Negative Impacts Mitigation**<br>• Local employment should as far as possible be used for construction.<br>• Contract local suppliers and contractors for the construction work to be commissioned.<br>• Attention should be given to the awareness of HIV/AIDS and STD in the form of toolbox talks.<br>• Educate workers on the dangers of alcohol and drug abuse.<br>. |

### 6.2.3 Assessment of Operational and Road Maintenance Impacts

**OPERATIONAL PHASE:**

This phase starts from the time whenever a completed section of the upgraded C38 is handed over to ENP Management.

A summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur during the Operational Phase is provided in this Table as follows:

| Impact Summary | Significance (Post Mitigation) | Suggested Mitigation Measures |
|---|---|---|
| **Vegetation** | | |
| **Direct Impacts:**<br>• Limited direct impacts are expected during routine road maintenance activities.<br>• Traffic using the new road has the potential to bring and propagate plants particulars alien invasive plant species into the park.<br>• Should further disturbance occur, an increase in alien species may be expected within the disturbed areas of the park. | **Low** | • Confine clearing of vegetation during routine road maintenance within the road reserve and on the road shoulders.<br>• Do not plant any non-indigenous trees or shrubs within the park unless permitted by ENP Management.<br>• Ongoing alien plant control must be undertaken during the operational phase of C38.. |

| | | |
|---|---|---|
| <table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Definite (5)</td><td>Probable (3)</td></tr><tr><td>Duration</td><td>Permanent (5)</td><td>Short-term (2)</td></tr><tr><td>Extent</td><td>Limited to park (2)</td><td>Limited site (3)</td></tr><tr><td>Magnitude</td><td>Moderate (2)</td><td>Small (1)</td></tr><tr><td>Significance</td><td>45 (High)</td><td>18 (Low)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table> | | • Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas. |
| **Indirect Impacts:**<br><br>Possible propagation of alien species within the park. | **Low** | |
| **Cumulative Impacts**<br><br>• Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity, change ecosystems services and processes.<br><br>• Allowing invasive plant species to establish and expand their distribution range without control may vast accumulative effects. | **Low** | |
| **FAUNA AND AVIFAUNA** | | |
| **Direct Impacts:**<br><br>Spatially insignificant relative to the overall extent of the park, the impact will be fractional, wildlife movement pattern disrupted temporarily during the road upgrading will be re-established as well as any habitat loss.<br><br><table><tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr><tr><td>Probability</td><td>Probable (3)</td><td>Probable (3)</td></tr><tr><td>Duration</td><td>Long term (4)</td><td>Long term (4)</td></tr><tr><td>Extent</td><td>Site (1)</td><td>Site (1)</td></tr><tr><td>Magnitude</td><td>Minor (2)</td><td>Minor (2)</td></tr><tr><td>Significance</td><td>21 (Moderate)</td><td>21 (Moderate)</td></tr><tr><td>Status</td><td>Negative</td><td>Negative</td></tr></table> | **Moderate** | • The normal rules applicable to visitors to ENP must be strictly enforced.<br><br>• The standard 60 km/hr ENP speed restriction is deemed adequate if it is enforced.<br><br>• Visitors are only allowed on the between sunrise and sunset to avoid night-time fatalities.<br><br>• Normal precautionary measures included in the ENP operational modus operandus would suffice viz, unwarranted use of natural resources (poaching, trapping, harvesting plant materials, etc.)<br><br>• Residents and guests must be made aware of the value of faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.<br><br>• Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.<br><br>• No feeding of wild animals in the park. |
| **Indirect Impacts:**<br><br>• Potential for increased road kills<br><br>• Possible over speeding by ill-disciplined service providers (drivers)<br><br>• Delays due to wildlife sleeping on tarmac (Fig. 15) | **Low** | • The standard speed limit of 60 km/hr is deemed adequate if it is enforced.<br><br>• Guests are only allowed on road between sunrise and sunset to avoid night-time fatalities. |
| **Cumulative Impacts**<br><br>Very minimal provided that the mitigation measures are implemented correctly and the rehabilitation of the site is undertaken. complied with. | **None** | N/A |
| **GROUND AND SURFACE WATER (WATERCOURSES)** | | |
| **Direct Impacts:**<br><br>• Encroachment of alien invasive species. | **Low** | • Do not allow surface water or storm water to canalize or be concentrated.<br><br>• Runoff from roads must be managed to avoid erosion and pollution problems. |

<table>
<tr><td>

- Uncontrolled vegetation clearing and access by staff and guests.
- Unmanaged storm water runoff.
- Litter and uncontrolled waste.
- Discharge and spill of hazardous products (fuel, oil, etc) from vehicle breaking down on the road.
- Potential sedimentation and siltation from erosion due to rehabilitation work poorly executed.

| ASPECT | WOM | WM |
|---|---|---|
| Probability | Probable (3) | Probable (3) |
| Duration | Long term (5) | Medium term (3) |
| Extent | Regional (4) | Limited to site (2) |
| Magnitude | Moderate (6) | Low (4) |
| Significance | **45 (High)** | **27 (Low)** |
| Status | Negative | Negative |

</td><td></td><td rowspan="4">

- Place and maintain erosion control barriers as appropriate to prevent sedimentation.
- Control waste discharges and do not allow dirty water from maintenance activities to enter the watercourse.
- Ensure that road maintenance activities do not impact on the watercourse or buffer area.
- Regular independent water quality monitoring should form part of operational procedures in order to identify pollution.
- Treatment of pollution identified should be prioritized accordingly.
- Road operational activities should not impact on rehabilitated or naturally vegetated areas.
- Effective storm water management should be a priority during construction, maintenance and operational phases. This should be monitored as part of the EMP.
- High energy storm water input into the watercourses should be prevented at all cost.
- Possible changes to natural flow of water (surface water as well as water flowing within the soil profile) as a result of road construction and maintenance activities should be taken into account.

</td></tr>
<tr><td>

**Indirect Impact**

- Changing the quantity and fluctuation properties of the watercourse by for example restricting water flow.
- Changes in sediment entering and exiting the system.
- Introduction and spread of alien vegetation.
- Loss and disturbance of watercourse habitat and fringe vegetation impact ratings.
- Changes in water quality due to foreign materials and increased nutrients impact ratings.

</td><td>Low</td></tr>
<tr><td>

**Cumulative Impacts**

- Construction activities may result in cumulative impact to the water courses within the local catchments and beyond.
- Changes made to the bed or banks of watercourses unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site

</td><td>Low</td></tr>
<tr><td colspan="3">POTENTIAL INCREASE IN ALIENS</td></tr>
<tr><td>

**Direct Impacts**

- The unconsidered and haphazard upgrading of tourist road to low-volume sealed roads may result in higher significance impacts in areas indicated as watercourse buffer areas

| ASPECT | WOM | WM |
|---|---|---|
| Probability | Improbable (2) | Very Improbable (1) |
| Duration | Permanent (5) | Permanent (5) |
| Extent | Limited to road shoulders (1) | Limited to road shoulders ocal Area (1) |
| Magnitude | Low (2) | Low (1) |
| Significance | **16 (High)** | **7 (Moderate)** |
| Status | Negative | Negative |

</td><td>Low</td><td>

- An alien invasive management programme must be incorporated into the Environmental Management Plan.
- Ongoing alien plant control must be undertaken during construction and operational phases.
- Areas which have been disturbed will be quickly colonised by invasive alien species. An ongoing management plan must be implemented for the clearing/eradication of alien species during the operational phase.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge.

</td></tr>
<tr><td>

**Indirect Impacts**

Propagation of alien vegetation with the surrounds.

</td><td>Very Low</td><td></td></tr>
<tr><td>Cumulative Impacts</td><td>None</td><td></td></tr>
</table>

<table>
<tr><td>None</td><td></td><td></td></tr>
<tr><td colspan="3">VISUAL IMPACTS</td></tr>
<tr><td>
<ul>
<li>The road upgrade will improve the current condition of the tourist road and will form a seamless part of the existing road network in ENP. No negative impact on any observers are expected after the road is completed.</li>
<li>The presence of new infrastructure along the road (road signs, speed humps, road markings, etc.) that ensures safety, are unfamiliar to the site, but compatible in appearance to the national roads. It should not affect the secluded sense of place and pristine natural character of the park.</li>
</ul>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Highly Probable (4)</td><td>Probable (3)</td></tr>
<tr><td>Duration</td><td>Short term (2)</td><td>Short term (2)</td></tr>
<tr><td>Extent</td><td>Site Specific (1)</td><td>Site Specific (1)</td></tr>
<tr><td>Magnitude</td><td>Low (4)</td><td>Minor (2)</td></tr>
<tr><td>Significance</td><td>28 (Low)</td><td>15 (Low)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table>
</td><td>Low</td><td>
<ul>
<li>The road upgrade and related infrastructure should be planned and laid out in such a way that the total footprint areas are minimised.</li>
<li>Avoid installing reflectors on the upgraded road to limit disturbance of nocturnal species in the park.</li>
<li>Materials used for road traffic signs erected along the upgraded new road should blend in well with the natural environment so as to limit visual nuisance.</li>
</ul>
</td></tr>
<tr><td>Indirect Impacts<br><br>The impact on observers will be neutral as the upgraded road would look exactly the same as the public tarmac roads used by guests to reach the park.<br><br>To a limited extent, park personnel and returning guests would possibly notice the difference when entering the park</td><td>Negligible</td><td></td></tr>
<tr><td>Cumulative Impact<br><br>None</td><td>None</td><td>N/A</td></tr>
<tr><td colspan="3">HERITAGE IMPACTS</td></tr>
<tr><td>
Direct Impacts<br><br>There is a small likelihood of unearthing artefacts of significance during the operation and maintenance of the upgraded road.
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>2</td><td>2</td></tr>
<tr><td>Duration</td><td>2</td><td>2</td></tr>
<tr><td>Extent</td><td>2</td><td>2</td></tr>
<tr><td>Magnitude</td><td>4</td><td>4</td></tr>
<tr><td>Significance</td><td>16 (Low)</td><td>16 (Low)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table>
</td><td></td><td>
<ul>
<li>Should any heritage artifacts be exposed during the operation or maintenance activities of the road, the area where the artefacts are discovered should be demarcated and officials of ENP notified as soon as possible.</li>
<li>No artefacts may be removed from any site unless authorised by the appropriate authority.</li>
</ul>
</td></tr>
<tr><td>Indirect Impacts<br><br>None</td><td>None</td><td rowspan="2">N/A</td></tr>
<tr><td>Cumulative Impacts<br><br>None</td><td>None</td></tr>
<tr><td colspan="3">NOISE IMPACTS</td></tr>
<tr><td>
Direct Impacts
<ul>
<li>Noise emissions from construction activities resulting in fauna migrating from noise emissions areas.</li>
<li>Flight patterns of avifauna changing.</li>
</ul>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Probable (3)</td><td>Improbable (3)</td></tr>
<tr><td>Duration</td><td>Short term (2)</td><td>Short term (2)</td></tr>
<tr><td>Extent</td><td>Site Specific (1)</td><td>Site Specific (1)</td></tr>
<tr><td>Magnitude</td><td>Moderate (7)</td><td>Moderate (4)</td></tr>
<tr><td>Significance</td><td>30 (Medium)</td><td>21 (Low)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table>
</td><td>Low</td><td>
<ul>
<li>The usage of low noise generators or better still solar system is encouraged.</li>
<li>Establish noise attenuation structures around high noise activities, e.g. metal fabrication activities, concrete mixers, etc.</li>
<li>Establish noise level threshold consistent with ENP policies and guidelines.</li>
<li>Construction work should be conducted during ENP mandated day hours.</li>
<li>Speed limits must be strictly enforced.</li>
<li>Noise reduction signs must be put up around the constrictor’s campsite and construction sites.</li>
</ul>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>• Employees working in areas were noise level is high should be provided with suitable PPEs.<br>• Ensure that construction vehicles are well maintained and regularly serviced with defective silencers replaced.<br>• Any complainants with respect to noise that may be received from any stakeholder must be investigated and corrective measures taken.</td></tr>
<tr><td>Indirect Impacts<br><br>A potential change in the ecological cycle of the immediate area.</td><td>Negligible</td><td rowspan="2"></td></tr>
<tr><td>Cumulative Impacts<br><br>No significant cumulative impacts expected.</td><td>None</td></tr>
<tr><td colspan="3">TRAFFIC IMPACTS</td></tr>
<tr><td>Direct Impacts<br><br>Construction vehicles used in the operation are likely to lead to an increase on park roads especially along those sections which are being upgraded.<br><br>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Improbable (2)</td><td>Improbable (2)</td></tr>
<tr><td>Duration</td><td>Short term (2)</td><td>Short term (1)</td></tr>
<tr><td>Extent</td><td>Site Specific (2)</td><td>Site Specific (1)</td></tr>
<tr><td>Magnitude</td><td>Moderate (6)</td><td>Moderate (4)</td></tr>
<tr><td>Significance</td><td>20 (Medium)</td><td>16 (Minor)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table></td><td>Low</td><td>• When operated on park roads, all construction machinery and vehicles must have their headlights switched on at all times.<br>• Traffic speed signs must be established at sufficient intervals along the construction footprint.<br>• Establish speed reduction awareness campaign for the contractors.<br>• No construction vehicles allowed on the park roads between the hours of 18h00 to 06h00.<br>• Implement penalty fines to speed violations.<br>• All vehicles of the contractor used in construction activities and operated on park roads must be licensed, roadworthy and driven by operators with valid drivers and third party public licence permits.<br>• All drivers must be given an induction training workshop on driving practice in the national park.</td></tr>
<tr><td>Indirect Impacts<br><br>The number of vehicles could lead to increased chances of road kills</td><td>Negligible</td><td></td></tr>
<tr><td>Cumulative Impacts<br><br>No significant cumulative impacts expected.</td><td>None</td><td></td></tr>
<tr><td colspan="3">AIR QUALITY IMPACTS</td></tr>
<tr><td>Direct Impacts<br><br>• General visitor and staff vehicle emissions. These emissions can be considered as insignifican<br><br>
<table>
<tr><th>ASPECT</th><th>WOM</th><th>WM</th></tr>
<tr><td>Probability</td><td>Local (3)</td><td>Local (2)</td></tr>
<tr><td>Duration</td><td>Long term (4)</td><td>Long term (3)</td></tr>
<tr><td>Extent</td><td>Minor (2)</td><td>Small (1)</td></tr>
<tr><td>Magnitude</td><td>Highly Probable (4)</td><td>Improbable (2)</td></tr>
<tr><td>Significance</td><td>30 (Low)</td><td>12 (Low)</td></tr>
<tr><td>Status</td><td>Negative</td><td>Negative</td></tr>
</table></td><td>Low</td><td>• Staff vehicles must be sufficiently maintained and serviced.<br>• Delivery vehicles coming to the park must be well serviced and well maintained.</td></tr>
<tr><td>Indirect Impacts<br><br>No indirect impacts are anticipated</td><td>None</td><td></td></tr>
<tr><td>Cumulative Impacts<br><br>No significant cumulative impacts are anticipated</td><td>None</td><td></td></tr>
<tr><td colspan="3">SOCIO-ECONOMIC POSITIVE IMPACTS</td></tr>
<tr><td>Direct Impacts</td><td>Low Positive Impact</td><td>Enhancement:</td></tr>
</table>

- An upgraded road through ENP has the potential to attract and stimulate tourists from the local community.
- Namibians travelling to the northern regions from the coastal and central areas have the choice to drive through the park because C38 through ENP is shorter than going via Tsumeb-Oshivelo.
- The upgraded road will give a new 'feel-good' explorative feeling to non-first time visitors to ENP.
- Local businesses, especially from the SME sector would have the opportunity to supply their produce to the resorts in the park which they could not do previously due to the nature of the road.
- The upgrading has the potential to contribute to an increase in tour operators which further boosts economic activities.

| ASPECT | WOM | WM |
|---|---|---|
| Probability | Local & Regional (2) | Local & Regional (3) |
| Duration | Long term (1) | Long term (1) |
| Extent | Small (2) | Low (3) |
| Magnitude | Probable (3) | Probable (3) |
| Significance | **12 (Low)** | **21 (Low)** | |
| Status | Positive | Positive |

- Run a good marketing campaign about the upgraded roads linking the newly created KNG which provides access to the park from the northern regions.
- Introduce educational materials for all age groups with tips on how to keep the park neat and tidy.

**Indirect impacts:**

- A good productive tourism destination that is in sync with the local community and surroundings.
- Local employed people during the construction phase may learn new skills thereby making them more employable in the future.
- Impacts on family and community relations

**Positive Impacts**

.

**Cumulative Impacts**

- Improved service delivery and possibly positive response from tour guides who have been complaining about deteriorating gravel roads in the park.
- Effective and smooth response by law enforcement agents responsible for curbing poaching activities in the park of mostly rhinos.

**Positive Impacts**

**Enhancement:**

**SOCIO-ECONOMIC NEGATIVE IMPACTS**

**Direct Impacts**

- People such informal traders may flock to ENP in search of new trading opportunities resulting in squatting around the fence of the park.
- Increased levels of poaching because poachers can get away quickly using the upgraded road.
- Transgression by ENP staff and personnel.

| ASPECT | WOM | WM |
|---|---|---|
| Probability | Probable (3) | Probable (3) |
| Duration | Short term (2) | Short term (1) |
| Extent | Local Area (2) | Local Area (1) |
| Magnitude | Moderate (6) | Small (0) |
| Significance | **30 (Medium)** | **6 (Low)** | |
| Status | Negative | Negative |

**Negative Impacts**

**Indirect Impacts**

**Negative Impacts**

| | | |
|---|---|---|
| **Cumulative Impacts** | **Negative Impact** | . |

### 6.2.4 Impacts Associated with Rehabilitation & Decommissioning

Rehabilitation for this road project entails activities to be conducted during closure of construction activities before the completed road is handed over to ENP Management. The rehabilitation process will include:

- demolition of all temporary structures erected by the contractor,
- removal of temporary infrastructure, i.e. water supply, ablution facilities,
- removal of all fixtures and equipment from the workshop and campsite,
- rehabilitation of the workshop and stockpiles with unused concentration materials;
- clearing of all sorts of waste including used oil, sewage, solid waste (plastics, wood, scrap metals, etc.)
- termination of temporarily employment contracts;

The campsite should be rehabilitated at least to its original condition and all waste should be disposed of in a responsible manner and to approved landfill site. Restoration of borrow pits should also be done before the contractor vacates the park.

The upgraded road is expected to have a lifespan of over 20 years. At this point, decommissioning of the road is therefore not anticipated in the foreseeable future. In view of this, specific mitigation measures pertaining to environmental impacts of decommissioning works cannot be proposed at the moment with a reasonable degree of certainty because policies and legislation might have changed by then.

## 6.3 ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, an environmental impact statement that summarises the impact that the proposed activity may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Table 9: Environmental Impact Statement

| Element/Factor | Observation/Comments |
|---|---|
| **Vegetation Impact** | Although most plant communities along the proposed roads were in a good condition, representing natural, close to pristine vegetation, most are widespread throughout the park – those are not rare and not threatened. Furthermore, only limited vegetation will have to be removed in order to broaden the roads, and road reserves.<br>Limited numbers of nationally protected trees do occur within the park, however, there distribution is widespread and not limited to a specific location. Even though some vegetation will be destroyed during the construction activities, the impact of the proposed development on the vegetation is considered to be low after mitigation. |
| **Fauna and Habitat Impact** | The conservation status of the study area to be affected by the road upgrading is rated as Medium, i.e. land where sections have been disturbed already, but still ecologically sensitive to disturbance.<br>The numerical significance (impact) values for the entire upgraded road would fall within the Moderate Environmental Significance class. As such the proposed development will have a Low vegetation impact on the overall site footprint provided that the recommended mitigation measures are implemented. |
| **Surface and groundwater (watercourse impacts)** | There are no perennial rivers in the park and the C38 tourist road proposed for upgrading to low-volume sealed road had been laid out in a such a way that major dry river streams are avoided obviating the need for the construction of bridges and or culverts.<br>The majority of the water channels crossed by C38 are those that have active water flow only for a few hours after a heavy downpour which occasionally happens during the rainy |

| | |
|---|---|
| | season. Naturally, all water streams are draining towards the salt pan or to natural water springs in the park.<br>During the construction activities, care should be taken that all natural water channels over which the road passes, are not blocked but remain open to allow rainwater to flow towards the pan and or replenish the springs. Should these measures be followed, the impact on such sensitive area and its vegetation should be fairly moderate after mitigation measures have been implemented during the construction period. |
| **Heritage and Cultural Impacts** | The main cultural feature of the study area consists of a single component being the Etosha pan. It is the most distinctive and significant landscape spanning about 4 800 $km^2$ and believed to have been formed over 100 million years ago. The pan is known as the massive breeding ground for Flamingos in Southern Africa where around one million flamingos congregate to breed.<br>Fort Namutoni was declared a national heritage site in 1950 and is one of the prominent cultural structures in the park. The Hai\|\|om people are indigenous of the area and considered marginalised people who should be given preference for employment during the construction.<br>The upgrading of C38 is not expected to have any impact on known heritage and cultural sites. In the event of such any unknown sites unearthed during construction activities 'the chance find' procedure outlined in the EMP must be followed. |
| **Visual and or aesthetic elements** | The project is located inside the park and therefore in an area that is secluded and not visible to the general public. The only people who are likely to experience some visual nuisance during the construction phase are ENP personnel and guests to the park.<br>Intrusive views may only be experienced during the construction phase when earthworks and construction equipment are active on the road. The duration of exposure is expected to be short and significance minor. |
| **Social and socio-economic impacts** | The total project cost is upwards of one billions Namibia dollars, and most of such funds will be spent in the local economy. Total impact includes direct, indirect as well as induced effects. If the proposed upgrades were not to occur, the socio-economic benefits in terms of additional business sale, employment as well as rates and taxes payable to national fiscus would be lost to the regional economy. |
| **Possible degradation and long term effects on environment** | No long term effect after mitigation on the environment is expected. Mitigation measures should be employed to ensure no significant degradation of the environment takes place. |
| **Pollution released into the environment** | The proposed development is not expected to result in long term pollution of the environment. Mitigation measures are proposed to ensure pollution is restricted to short term localised effects. |

# 7 CONCLUSIONS AND RECOMMENDATIONS

## 7.1 CONCLUSIONS

This Environmental Scoping has provided a comprehensive assessment of the potential environmental impacts associated with the upgrading of tourist road C38 to low-volume sealed road. The existing road links the Okaukuejo Rest Camp with KNG via the Rest Camps of Halali and Namutoni and has a total length of about 215 km.

The proposed road upgrading will generally have great positive environmental and socio-economic impacts – elimination of dust and reduced expenditure on the maintenance of gravel roads in the park, hence improving service delivery and enhancing a pleasing tourism experience in the park. The implementation of the proposed project will not have detrimental impacts provided that the recommended mitigation measures in the EMP are adequately and timely put in place.

The Scoping report has demonstrated that the limited significant adverse environmental and social impacts as outlined in the relevant sections of the port can be eliminated or reduced to acceptable levels by implementing the proposed mitigation measures. It is concluded that the impact of the upgrading will be generally low if the recommended mitigation measures are implemented. The subsequent rehabilitation of disturbed areas should be monitored against the approved EMP.

It is therefore the conclusion of Ekwao Consulting that all significant impacts identified during the environmental scoping assessment can be effectively mitigated if the management actions recommended in the EMP are effectively implemented during the execution of the project.

## 7.2 RECOMMENDATIONS

The findings of the Scoping assessment did not find any fatal environmental flaws with the proposed upgrading of C38 to low-volume sealed road in ENP. It is therefore recommended that an Environmental Clearance Certificate (ECC) for the upgrading be approved subject to the conditions which the Environmental Commissioner may wish to attach in addition to the following proposals:

- The successful contractor hired to upgrade the road should be allowed to establish a construction campsite on the land premises of the rest camps of Okaukuejo, Halali and Namutoni.

- Road construction activities should be limited to day-light hours of 06h00 to 18h00.

- Construction materials such as gravel, base course and sand should be sourced from existing borrow pits in close proximity to the road to avoid long hauling and associated impacts. No new borrow pits should be made unless permitted by Tulipamwe and ENP Management.

- No hard rock quarry may be established within the park for the purpose of sourcing surfacing stones. Associated quarrying activities of drilling, blasting and crushing are undesirable. Any surfacing stones that may be required should be sourced from outside the park.

- The upgraded road could lead to increased road kills of wild animals. In order deal with this situation, ENP Management must develop a traffic management plan which addresses the following:

    - the speed limit to impose on the tarred road;
    - road signs that blend in well with the natural environment and of the type and quality that elephants will not be able to uproot;
    - speed control devices like humps, especially along sensitive areas, i.e. breeding colonies;
    - safe driving campaigns for park personnel and third party drivers making deliveries to the park;
    - installation of speed control signs for day and night;
    - identification of wildlife crossing hotspots and to mark those with respective signs;
    - the use of rumble strip is not recommended;
    - what do in the event of an accident or incident;

- The marginalised indigenous residents of Etosha (Hai||om) should be given preference when hiring people for road upgrading especially for low-skilled jobs.

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**ANNEXURE A**

# A Background Information Document

# (BID)

# ENVIRONMENTAL IMPACT ASSESSMENT

Upgrading of Tourist Roads to Low-Volume Seal Roads in Etosha East National Park (Starting from Okaukuejo to King Nehale Entrance Gate)

## Background Information Document

September 2023

**INTRODUCTION:**

The Ministry of Environment Forestry and Tourism (MEFT) would like to upgrade the tourist roads within Etosha National Park, to low-volume seal roads and has appointed Tulipamwe Engineering Consultants (TCE, for short) to attend to the required road engineering designs and subsequent supervision of construction work.

In terms of the Environmental Management Act (EMA) and Environmental Impact Assessment (EIA) Regulations, provision of infrastructure (*section 10.1 (b) – construction of public roads*) is a listed activity which may not be undertaken without an EIA having been undertaken and an Environmental Clearance Certificate (ECC) obtained from the Environmental Commissioner (EC).

In this regard, Ekwao Consulting has been appointed by TCE to attend to the ECC authorisation process for the upgrading and all aspects related to environmental compliance monitoring during the construction phase.

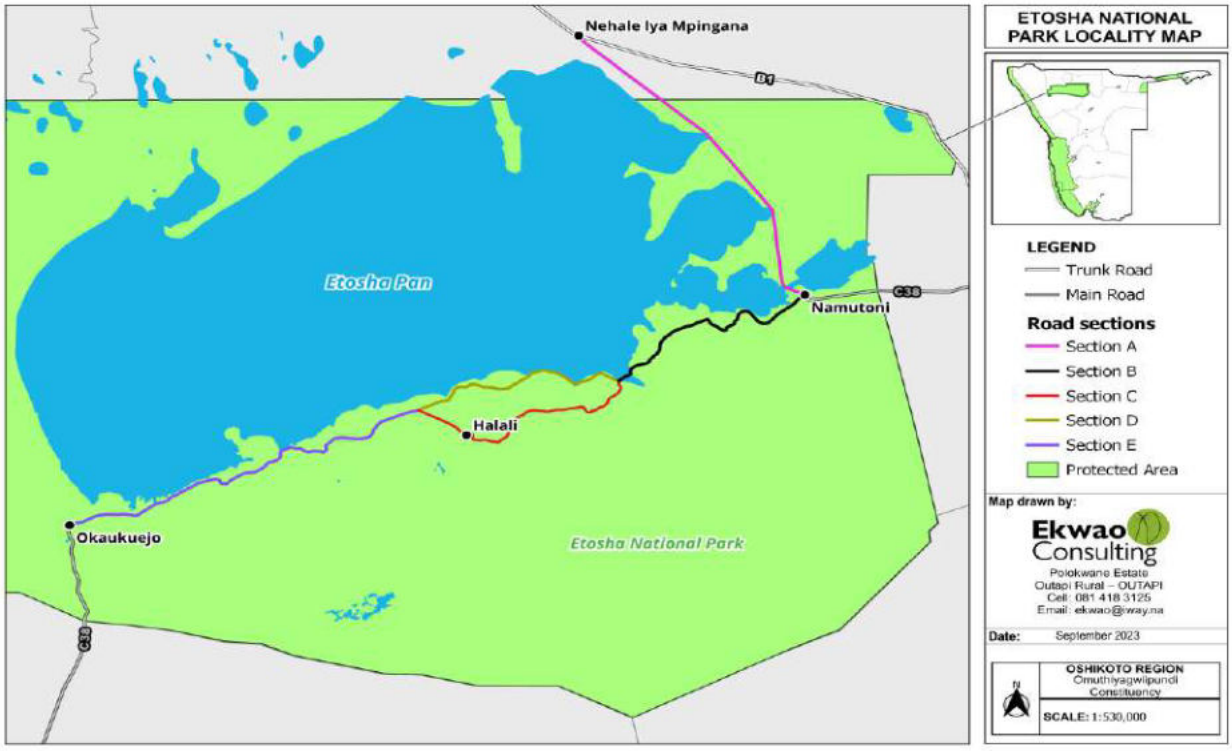


**Figure 1**: Project Location

**SCOPE OF WORK:**

The tourists roads to be upgraded to low-volume seal roads have a total length of about 214 km and starts from Okaukwejo to King Nehale entrance gate including the detours to the resorts of Halali and Namutoni as more or less depicted in **Fig. 1.** The road sections, lengths and project duration, etc. are as presented in **Table 1,** below:

**Table 1:** Sections of the Roads to be Upgraded

| Road Section | Length (km) | Duration | Remarks |
|---|---|---|---|
| Section A | 42.2 | 60 months | Upgrading will start from Okaukwejo and proceed in a northern easterly direction towards King Nehale Gate |
| Section B | 38.0 | | |
| Section C | 39.5 | | |
| Section D | 34.3 | | |
| Section E | 60.6 | | |
| Total | **214.5** | | |

**EIA OBJECTIVE**

The objective of the EIA is to identify potential positive and negative social, economic and biophysical impacts associated with the proposed activities and to provide management measures on how significant negative impacts may be eliminated, avoided or minimised to acceptable levels. Special attention will be paid to borrow pits from where road construction materials are sourced. The EIA will be conducted in full compliance of the provisions of EMA and EIA regulations as gazetted.

**NEED FOR THE PROJECT**

Etosha National Park covers a geographical area of 22 270 km$^2$ and is one of the largest parks in Africa. Prior to the outbreak of Covid-19, international tourists who visited the park were averaging 300 000 per year with nationals from Europe and United States making up over 90% of visitors to the park. The park has a road network in excess of 2 000 km providing access to areas of interests within the park, i.e. resorts/camps and numerous water points where wildlife congregates to quench their thirsty. It is at these water points where tourists see and observe the wildlife up close in their natural environment.

All roads within the park are gravel roads which require millions of Namibia Dollars in ongoing repairs and maintenance annually. Given government's competing national priorities combined with limited resources, the conditions of some roads have deteriorated and became heavily corrugated making travelling on such roads very unpleasant and a safety hazard Several complainants have been lodged with the MEFT over the poor road conditions in the part. The long term solution to this challenge is to upgrade such roads to low-volume seal roads in a phased in approach. The project is therefore needed and vital to the long term sustainability of the tourism economic sector in Namibia

**PURPOSE OF THIS DOCUMENT**

This BID is intended to provide information related to the upgrading of tourist roads to all Interested and Affected Parties (IAPs) and, in the same vein, to extend an invitation to IAPs to register and to participate in the EIA process. Since the tourist roads planned for upgrading to low-volume seal roads are situated within the national park, it is not intended to hold any public meetings. Therefore, IAPs are required to make their comments, inputs, concerns and or contributions to the EIA Consultant in writing, using the contact details provided below.

## The ECC

The EIA process in order to obtain an ECC for the proposed project is presented in **Fig. 2**.

**CONTACT DETAILS OF THE EIA CONSULTANT:**

**Ekwao Consulting**
Polokwane Estate
Outapi Rural – OUTAPI
Northern Namibia

Box 157
OUTAPI
Namibia

M: 081 418 3125
F: 088 645 026
Email: ekwao@iway.na

Closing date for inputs, comments and or contributions:
**22 September 2023**

## The EIA Process

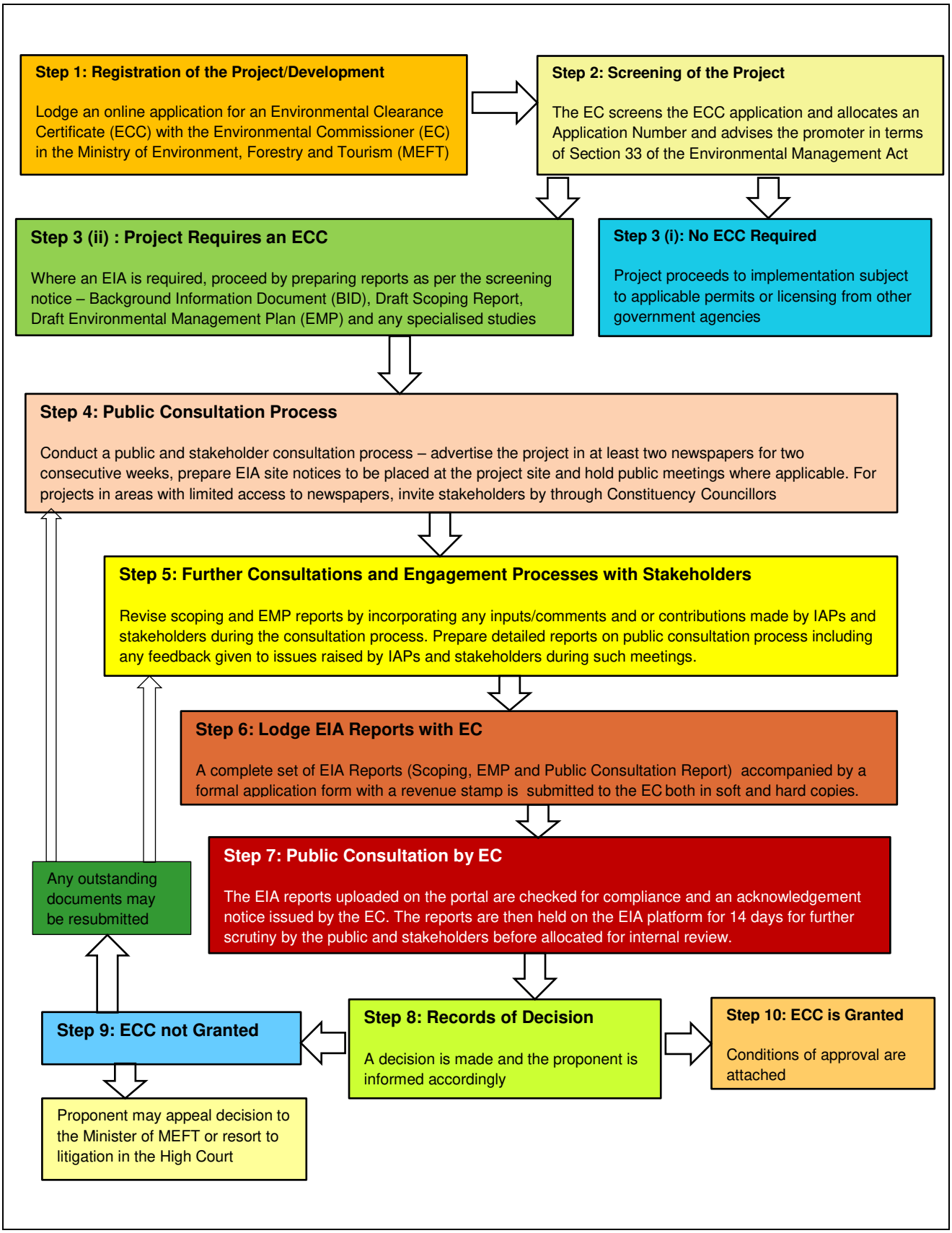


**Figure 2:** A Schematic Diagram of the EIA Process

# ANNEXURE B

Newspaper Adverts and Site Notices

# CLASSIFIEDS



## PUBLIC NOTICE - ENVIRONMENTAL ASSESMENTS AND PUBLIC CONSULTATION PROCESS

Notice is hereby given that **Environmental Impact Assessements** (EIAs) and **Public Participation Processes** (PPPs) are being conducted in terms of the Environmental Management Act (Act No. 7 of 2007) and related EIA regulations to allow for mineral exploration activities on four (4) **Exclusive Propecting Licences** (EPLs) located as indicated below.

On completion of the aforesaid EIAs and PPPs, four formal applications will be submitted to the Environmental Commissioner (EC) in the Ministry of Environment, Foretsry and Tourism (MEFT) for consideration to grant an **Environmental Clearance Certificate** (ECC) for each EPL so as to allow the commencement of exloration activities.

| | |
|---|---|
| **Proponent** | Transcend Mining (Pty) Ltd |
| **Listed Activity** | Mineral Prospecting and Exploration |
| **EPLs & Locations** | EPL7583 - covers partilly Otjozondujupa & Omahake Regions<br>EPL7584 - covers partially Otjozondjupa & Omaheke Regions<br>EPL7752 - Otjozondjupa Region<br>EPL8013 - Otjozondupa Region |
| **Mineral Groups Targetted** | Base and Rare Metals, Dimensions Stones, Industrial Minerals, Non-nuclear Fuel Minerals, Precious Metals and Precious Metals |
| **Intereted and Affected Parties (IAPs)** | All AIPs are hereby invited to register for the EIA and to submit written comments, inputs, objections and or concerns with respect to the envisaged activities. A Background Information Document (BID) on each EPL is available upon request on registration. |
| **Consultation Period** | The duration to receive written submissions from IAPs starts from 28 August 2023 to 30 September 2023 |
| **EIA Consultant:** | Ekwao Consulting<br>Fax: 088 645 026<br>Cell: 081 418 3125<br>Email: ekwao@iway.na<br>(Joel Shafashike) |

## PUBLIC NOTICE - ENVIRONMENTAL ASSESMENTS AND PUBLIC CONSULTATION PROCESS

Notice is hereby given that an **Environmental Scoping and Impact Assessement** (ESIA) and **Public Consultation Process** (PCP) are being conducted in terms of the Environmental Management Act (Act No. 7 of 2007) and related EIA regulations for the activity listed below:

On completion of the aforesaid ESIA and PCP, a formal application will be submitted to the Office of the Environmental Commissioner for consideration to grant an **Environmental Clearance Certificate** (ECC) allowing the commencement of the listed activity.

| | |
|---|---|
| **Activity** | The upgrading of tourist roads to low-volume seals roads in Etosha East National Park (from Okaukuejo to King Nehale entrance gate including the Halali de-tours and via Namutoni Resort. Total length of roads to be upgraded is 214 km. |
| **Proponent** | Ministry of Environment Forestry and Toruism |
| **Consultant** | Tulipamwe Consulting Engineers (Pty) Ltd |
| **Intereted and Affected Parties (IAPs)** | AIPs are hereby invited to register for the EIA and to submit written comments, objections and or concerns with respect to the envisaged activity. A Background Information Document (BID) is available upon request on registration. No public meetings will be held. |
| **Consultation Period** | The duration to receive written submissions from IAPs starts from 28 August 2023 to 22 September 2023 |
| **EIA Consultant:** | Ekwao Consulting<br>Cell: 081 127 3027<br>Fax: 088 645 026<br>Email: ekwao@iway.na<br>(Joel Shafashike) |

# CLASSIFIEDS



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The power structure draws its legitimacy, validity and strength solely from faith that the general population believes in its operational system.

This is what Mahatma Gandhi meant when he said,

> **"There is a higher court than courts of justice and that is the court of conscience. It supersedes all other courts"**

Even the illiterate people in our communities know and can see that there is injustice and unfairness when it happens.

One will conclude that Amushelelo's fate is not about being a constitutional delinquent. It is the nature of politics that is dominated by powerful classes that use state institutions and structure to suppress dissent. This calls for collective interest and solidarity to all peace-loving Namibians, in particular, the youth to stand up, to demand for an independent and impartial judiciary that is free from political influence, and capture which is paramount for peace, order and harmony.

Chief Hosea Katjikururume Komombumbi Kutako's words still echo: "You must never be fearful about what you are doing when it is right. The reality is that when the judiciary system collapses, we will all consequently be massacred.

**"Parents cannot afford it because we know that things are now expensive," she explained, adding that the school still requires 295 more mattresses.**

**According to Kahevee Kavari, Principal of Okorosave Primary School, the mattresses will allow them to accommodate at least a few boarders while they solicit for further donations.Though insufficient, he believes the donation will have an impact.**

Okorosave Primary School has 223 pupils and nine teachers. Jockbeth Kahambundu, Principal of Orumana Combined School, also expressed her thanks, saying that the efforts of Otjipupa Investment Group and the two traditional authorities should not be go unnoticed.

Recently, the Orumana Combined school hostel was featured on different social media sites, with students sleeping on the floor and beds without mattresses. Kahambundu said the donation has helped them in their time of need.

"Parents cannot afford it because we know that things are now expensive," she explained, adding that the school still requires 295 more mattresses.

Orumana CS has 733 learners, 661 of them are hostel boarders, including 26 staff members.