Environmental Management & Rehabilitation Plan (EMRP)

The Proposed Rehabilitation and Dualisation of Road Sections: MR92 – 5km from the traffic light intersection towards Oshikuku, MR92 – 5km from the traffic light intersection towards Ruacana, and MR123 – 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region

ECC Application No.:	**APP-006638**
Proponent:	**Outapi Town Council**
Project Consulting Engineer:	**Tweya Consulting Engineers CC & Shield Force Consulting Engineers CC (Joint Venture)**

February 2026

DOCUMENT INFORMATION

Title: Draft Environmental Management & Rehabilitation Plan (EMRP) - The Proposed Rehabilitation and Dualisation of Road Sections: MR92 – 5km from the traffic light intersection towards Oshikuku, MR92 – 5km from the traffic light intersection towards Ruacana, and MR123 – 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region

Prepared by:

Author / Environmental Assessment Practitioner (EAP):	Fredrika N. Shagama
Qualifications:	Ph.D. Student: Civil Engineering (Geotechnics & Environmental Hydrogeology), VSB - Technical University of Ostrava, Czech Republic; Post Graduate Diploma in Environmental Studies, International University of Management (IUM), Namibia; MSc. Geological Engineering (*cum laude*) with a focus in Hydrogeology, VSB - Technical University of Ostrava, Czech Republic; BSc. Geological Engineering, VSB - Technical University of Ostrava, Czech Republic
Professional Affiliations:	Environmental Assessment Professionals of Namibia (EAPAN) - Practitioner (Membership No. 183); Geoscience Council of Namibia (GSCN) – Geoscientist, Registration No. GSCN/G-057; International Association of Hydrogeologists (IAH) - Full Member, Membership No.139790; Namibian Hydrogeological Association (NHA) – Member
Contact Details:	Mobile No.: +264 81 749 9223; eias.public@serjaconsultants.com Postal Address: P.O. Box 27318, Windhoek, Namibia
Signature:	
Date:	February 2026

SERJA'S STATEMENT OF INDEPENDENCE

As the Appointed Environmental Consultant to undertake the ESIA Study and prepare this Environmental Management & Rehabilitation Plan (EMRP) for the Proposed Rehabilitation and Dualisation of Road Sections: MR92 – 5km from the traffic light intersection towards Oshikuku, MR92 – 5km from the traffic light intersection towards Ruacana, and MR123 – 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region, Serja Hydrogeo-Environmental Consultants cc declares that we:

- do not have, to our knowledge, any information or relationship with the Outapi Town Council (Proponent), nor the Ministry of Environment, Forestry and Tourism (MEFT)'s Department of Environmental Affairs and Forestry (DEAF) that may reasonably have the potential to influence the outcome of this EMRP and the subsequent Environmental Clearance Certificate applied for.
- have knowledge of and experience in conducting environmental assessments, the Environmental Management Act (EMA) No. 7 of 2007, and its 2012 Environmental Impact Assessment (EIA) Regulation, as well as other relevant national and international legislation, guidelines, policies, and standards that govern the project activities as presented herein.
- have performed work related to the ECC application in an objective manner, even if the results in views and findings, or some of these may not be favorable to the Proponent.
- have complied with the EMA and other relevant regulations, guidelines, and other applicable laws as listed in this document.
- declare that we do not have and will not have any involvement or financial interest in the undertaking/implementation of the project, other than remuneration (professional fees) for work performed to conduct the EIA and apply for the ECC in terms of the EIA Regulations' requirement as an Environmental Assessment Practitioner (EAP).

Disclaimer: Serja Hydrogeo-Environmental Consultants will not be held responsible for any omissions and inconsistencies that may result from information that was not available at the time this document was prepared and submitted for evaluation.

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Signature:

Fredrika N. Shagama: Principal Environmental Assessment Practitioner & Hydrogeologist

Date: February 2026

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
BP	Borrow Pit
COLTO	Committee of Land Transport Officials
DEAF	Department of Environmental Affairs and Forestry
DR	District road
DTM	Digital Terrain Model
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EMRP	Environmental Management & Rehabilitation Plan
ESMP/ESMRP	Environmental & Social Management Plan / Rehabilitation Plan
GG	Government Gazette
GN	Government Notice
HSE Officer	Health, Safety & Environmental Officer

Abbreviation	Meaning
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
MAWLR	Ministry of Agriculture, Fisheries, Water, and Land Reform
MIME	Ministry of Industries, Mines and Energy
MWT	Ministry of Works and Transport
NHC	National Heritage Council (NHC) of Namibia
OUTC	Outapi Town Council
PPE	Personal Protective Equipment
PRO / PLO	Public Relations / Liaison Officer
RE	Resident Engineer
Reg, S	Regulation, Section
SADC	Southern African Development Community
SANS	South African National Standards
SATCC	Southern African Transport and Communications Commission
TRH 17	Technical Recommendation for Highways

1 INTRODUCTION

1.1 Project Background and Location

Outapi Town Council (OUTC), herein referred to as the Proponent, intends to rehabilitate and dualise road sections: MR92 (C46): 5km from the traffic light intersection towards Oshikuku, MR92 (C46): 5km from the traffic light intersection towards Ruacana, and MR123 (D3612): 5km from the traffic light intersection towards Tsandi from Outapi Townlands in the Omusati Region (see maps in Figure 1-1 and Figure 1-2). The road rehabilitation works will commence upon completion of the project design by the appointed engineers (Tweya Consulting Engineers in a joint venture with Shield Force Consulting Engineers), who will administer the road rehabilitation contract and supervise the works. Furthermore, other activities associated with road rehabilitation include the abstraction of road construction materials from identified borrow pits and water supply for construction near the road routes. The three road sections are currently single-lane infrastructures. Thus, the rehabilitation and dualisation of roads are necessary to improve infrastructure and safety, enhance economic and regional development, accommodate growing traffic volumes, and align with long-term urban and transport planning goals for Outapi Town Council.

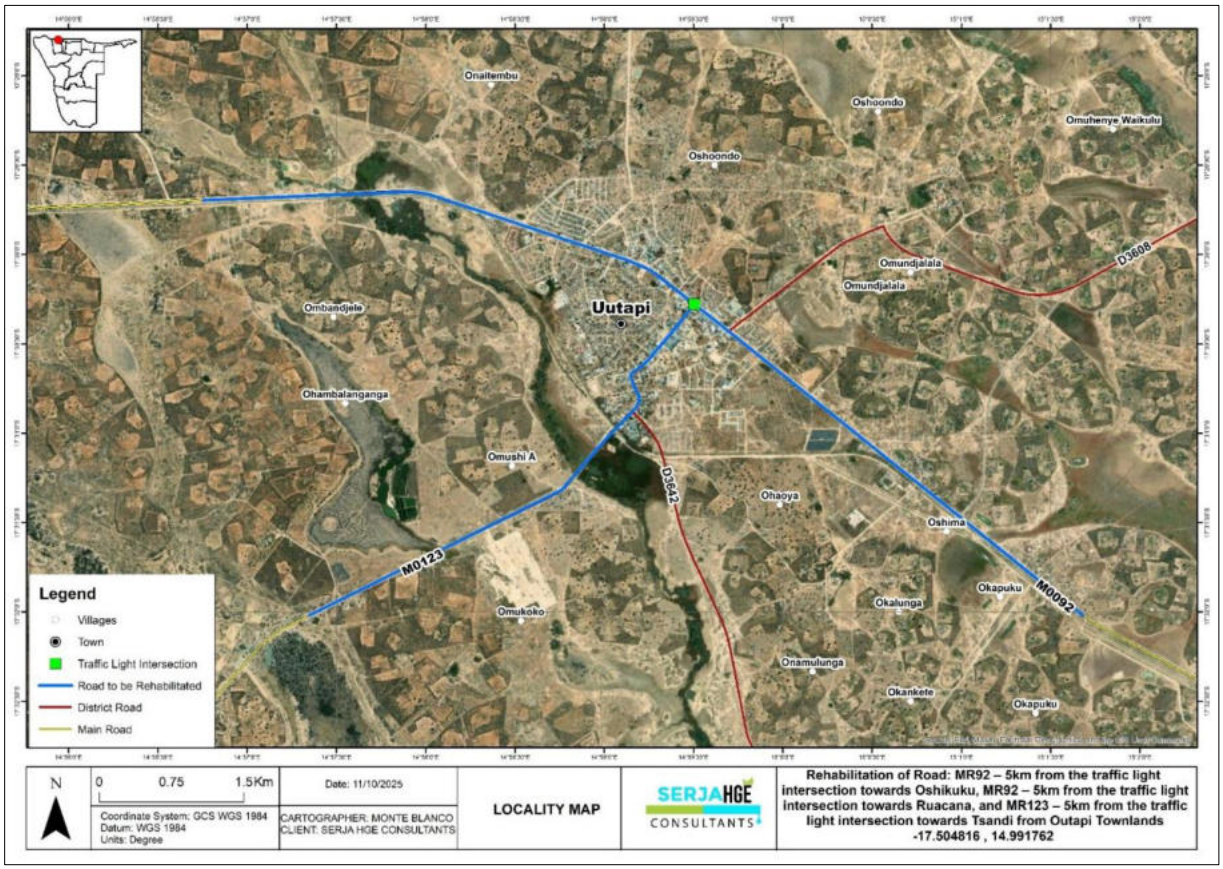


Figure 1-1: Locality map of the three road sections proposed for rehabilitation and dualisation from Outapi Townlands towards Oshikuku (MR92), Ruacana (MR92), and Tsandi (MR123) in the Omusati Region

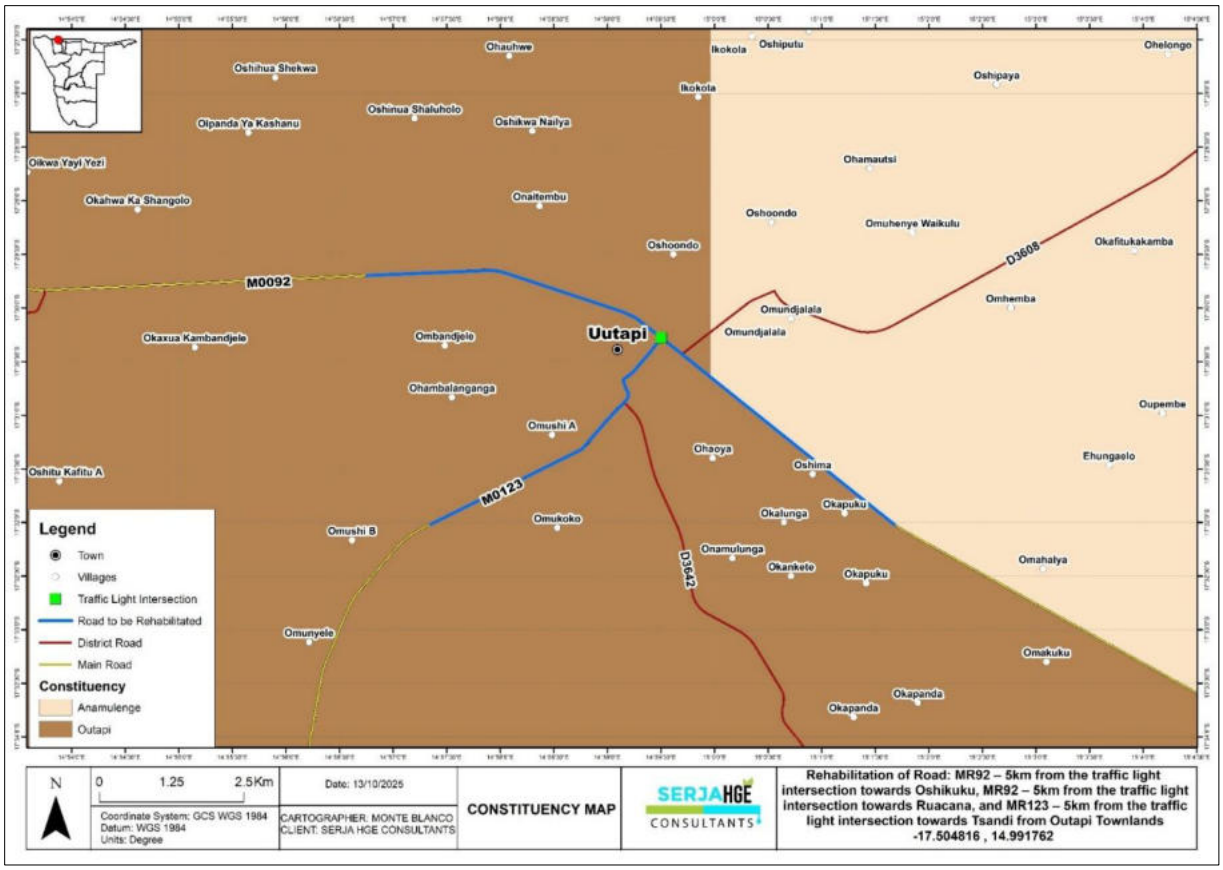


Figure 1-2: The three road sections proposed for rehabilitation and dualisation from Outapi Townlands towards Oshikuku (MR92), Ruacana (MR92), and Tsandi (MR123), with the electoral constituencies

1.2 Purpose of the Draft Environmental Management Plan (EMP)

The Draft EMP was developed following Regulation 8(j) of the EIA Regulations (2012) that it should be included as part of the Environmental Assessment Scoping report. A '**Management Plan**' is defined as:

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

An EMP (herein referred to as an Environmental Management & Rehabilitation Plan (EMRP)) is one of the most important outputs of the EIA process as it synthesizes all the proposed management & mitigation, and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the EIA process and the required mitigation measures to be implemented to manage project impacts. It is important to note that an EMP is a statutory document, and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP/EMRP is a living document and can be amended to adapt to address project changes and/or environmental conditions and feedback from compliance monitoring.

The EMP is therefore aimed at guiding environmental management throughout these phases of the project, namely: planning & design, construction, as well as the post-construction phase (decommissioning of construction works and rehabilitation of disturbed sites).

1.2.1 Planning & design

The planning and design phase of the proposed project is guided by national standards and environmental regulations. This phase involves route selection, topographical surveys, the ESIA Study, and the design of road alignment, drainage systems, and gravel layer thickness. Community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared.

1.2.2 Construction

The construction phase will include clearing of vegetation along the demarcated road route and reserves, particularly the road sections outside the town centre, stripping topsoil, and shaping the roadbed. The gravel material will be sourced from approved borrow pits in the area, transported, spread, and compacted in layers. Culverts and side drains will be installed to manage surface water, and signage and safety features will be added. The environmental management plans (this EMRP) will be implemented and monitored throughout to minimize ecological and social impacts.

It is during this phase that construction material is sourced from the borrow pit near the proposed roadworks, as well as the abstraction of water from the nearest water supply scheme (Calueque canal through NamWater) to supply the project.

1.2.3 Decommissioning and rehabilitation of disturbed site areas (post-construction)

The phase during which construction works are completed, and disturbed sites are rehabilitated. This will include backfilling of construction-related trenches, holes, dismantling of temporary construction supporting infrastructure and structures, as well as the backfilling/levelling of borrow pit sites that are no longer needed in the long term (or complete fencing of pits for safety).

1.2.4 Operational and maintenance phase

This is the phase that succeeds the road rehabilitation phase, when the rehabilitated road sections will be operational with regular maintenance to ensure usability and safety. It is anticipated that maintenance of the road will be done through the Roads Authority of Namibia’s Maintenance Department in the Region.

2 BRIEF DESCRIPTION OF THE PROJECT ACTIVITIES

The planning and design phase of the proposed road rehabilitation is guided by national standards and environmental regulations. This phase involves route selection, topographical surveys, the ESIA Study, and the design of road alignment, drainage systems, and gravel layer thickness. Community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared.

The project phases anticipated for the project operations are presented below.

2.1 Planning and Design

2.1.1 Proposed Road Design Strategies

The project will involve the rehabilitation and dualisation of 5km sections of three (3) roads, namely the MR92 from Outapi Townlands (from the traffic light intersection) towards Oshikuku, the MR92 towards Ruacana, and the MR123 (commonly known as D3612) towards Tsandi in the Omusati Region.

The existing MR123–MR92 corridor is a two-lane single carriageway with narrow or no shoulders, frequent property accesses, intersections, and pedestrian crossings. Current travel speeds vary between 60 km/h in the CBD and 100km/h in peripheral areas. The proposed upgrade targets a 100km/h design speed along the corridor, with context-sensitive operating speeds of 40–60km/h in urban zones (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

In addition to the above, the road construction will also address the erosion aspects through the drainage systems to be designed. Road construction materials from one or two borrow pits with quality material sites (to be identified and sited by materials personnel), as well as sources of nearby raw and fresh water, will be determined.

According to the Consulting Engineers, the following two design strategies are proposed for the roads:

1. Full dualisation: conversion of the entire corridor into a dual carriageway, improving capacity and safety, but requiring additional land acquisition and higher costs.
2. Targeted capacity improvements: dualisation around the Central Business District (CBD), with selective widening, intersection upgrades, passing lanes, paved shoulders, sidewalks, and access management along the remainder of the route

Design standards will follow the Roads Authority (RA) Geometric Manual (2014), Southern African Development Community (SADC), Southern African Transport and Communications Commission (SATCC), and Technical Recommendation for Highways (TRH) 17 (TRH 17) guidelines, ensuring safe horizontal and vertical alignment, adequate lane and shoulder widths, pedestrian and cyclist facilities, and access management. Typical cross-sections adopted include 3.5m lanes, 1.5–2m shoulders, sidewalks, cycle lanes, and integrated drainage channels. Urban facilities include formal parking, centralised bus/taxi ranks, informal trading areas, pedestrian crossings, rest areas, and road furniture such as signage, fencing, guard rails, and road studs.

2.1.2 Pavement Design

The pavement design targets a 20-year service life using the RA Pavement Manual, Materials Manual (2014), and TRH 4. Detailed centreline assessments, borrow pit assessments, and materials evaluations will inform design. A combination of catalogue and mechanistic design methods is to be used to ensure cost-effective and durable pavement structure. Rehabilitation strategies proposed include strengthening overlays, partial reconstruction, or full reconstruction where necessary. Surfacing will replicate the existing 19mm Cape Seal, offering a durable, low-maintenance, and economical solution (Tweya Consulting Engineers & Shield Force Consulting Engineers, 2025).

2.1.3 Drainage and Stormwater Management

Stormwater flows generally from the town centre to a large Oshana on the southwest periphery of the site. The design integrates new and existing open and closed drainage channels, ensuring capacity for a 1:50-year flood event and protecting adjacent properties. Forward actions include hydraulic assessments, channel and culvert design, flood modelling, and alignment with the town masterplan.

2.1.4 Services and Utilities

All existing utilities, including electricity, water, telecoms, and pipelines, will be identified and protected. The Etaka Water Canal crossing requires structural modification to accommodate the dual carriageway. Street lighting will be provided throughout, complying with RA and South African National Standards (SANS) standards. Forward actions include utility verification, relocation/sleeving planning, and integration into construction drawings.

2.1.5 Survey, Mapping, and Services

A high-accuracy Digital Terrain Model (DTM) of the road reserve will inform design and earthworks. Detailed surveys at bridges, intersections, and drainage structures will guide alignment and construction. Encroaching properties and informal structures are to be documented for Town Council engagement. Permanent benchmarks will support construction setting out.

2.1.6 Traffic Accommodation

During construction, traffic will be maintained on half-widths, utilising one lane and shoulder, with sequential programming to reduce disruption. Temporary detours will be provided where necessary. Formal traffic accommodation layouts will be presented to the Town Council for approval, and stakeholder engagement will ensure safe and efficient traffic flow throughout construction.

2.1.7 Bid Documentation and Cost Estimate

A detailed cost estimate, accurate to ±10%, will include construction, contract administration, and supervision costs. Bidding documents will follow Standard Bidding Document formats, supplemented with Committee of Land Transport Officials (COLTO) specifications, and include signed design drawings. Coordination with the Central Procurement Board and RA will ensure compliance with legal and contractual requirements.

2.2 Road furniture

The following road furnishings are considered for the proposed road upgrade:

- Fencing: New fences may be installed in areas impacted by construction and relocated to establish the boundaries of the road reserve. Borrow pit areas will also be fenced for the protection of the public and animals as a once-off, and provision for this will be made in the bill of quantities.
- Road signs: Upgrading of existing road signs and markings, as well as the installation of new signs and markings (traffic calming signs), will be done (where necessary) along the road. The bulk of these signs will be required at major community centres (such as settlements) and intersections. The positioning and the design of all road signs specified will comply with the stipulations contained in the Roads Authority Road Traffic Signs Policy.

Furthermore, community consultation and stakeholder engagement (as part of the ESIA) are also key components to ensure minimal disruption and sustainable development. It is also during this phase that the administrative documentation, including the tendering process for the construction phase, is prepared. Some of the key design aspects are as follows

2.3 Construction Phase

The construction phase will include clearing of vegetation along the demarcated road route and reserves, particularly the road sections outside the town centre, stripping topsoil, and shaping the roadbed. The layers of gravel will be sourced from approved borrow pits in the area, transported, spread, and compacted in layers. Culverts and side drains will be installed to manage surface water, and signage and safety features will be added. The environmental management plans (this EMRP) will be implemented and monitored throughout to minimize ecological and social impacts.

2.3.1 Borrow Pits (BPs) for road construction works

The road rehabilitation (construction) will require materials such as sand and gravel that will be sourced (extracted) from selected localities near the roads, but ultimately determined by the material that meets the quality requirements for constructing roads. Although the locality of borrow pits was not yet determined during consultation meetings held on the 13th and 14th of November 2025, the exploration, establishment, and utilisation of BP sites have been communicated to communities in these meetings. According to the information provided by the consulting engineers, the preferred borrow pit (BP) identified for the project will be the existing Outapi Town Council-operated Ontokolo BP. The BP is located in Ontokolo Village, near the MR92: Oshikuku-Outapi road (within a 2km distance of the road), and about 17km southeast of Outapi Town. The locality map of the project BP (Ontokolo BP) is shown in Figure 2-1.

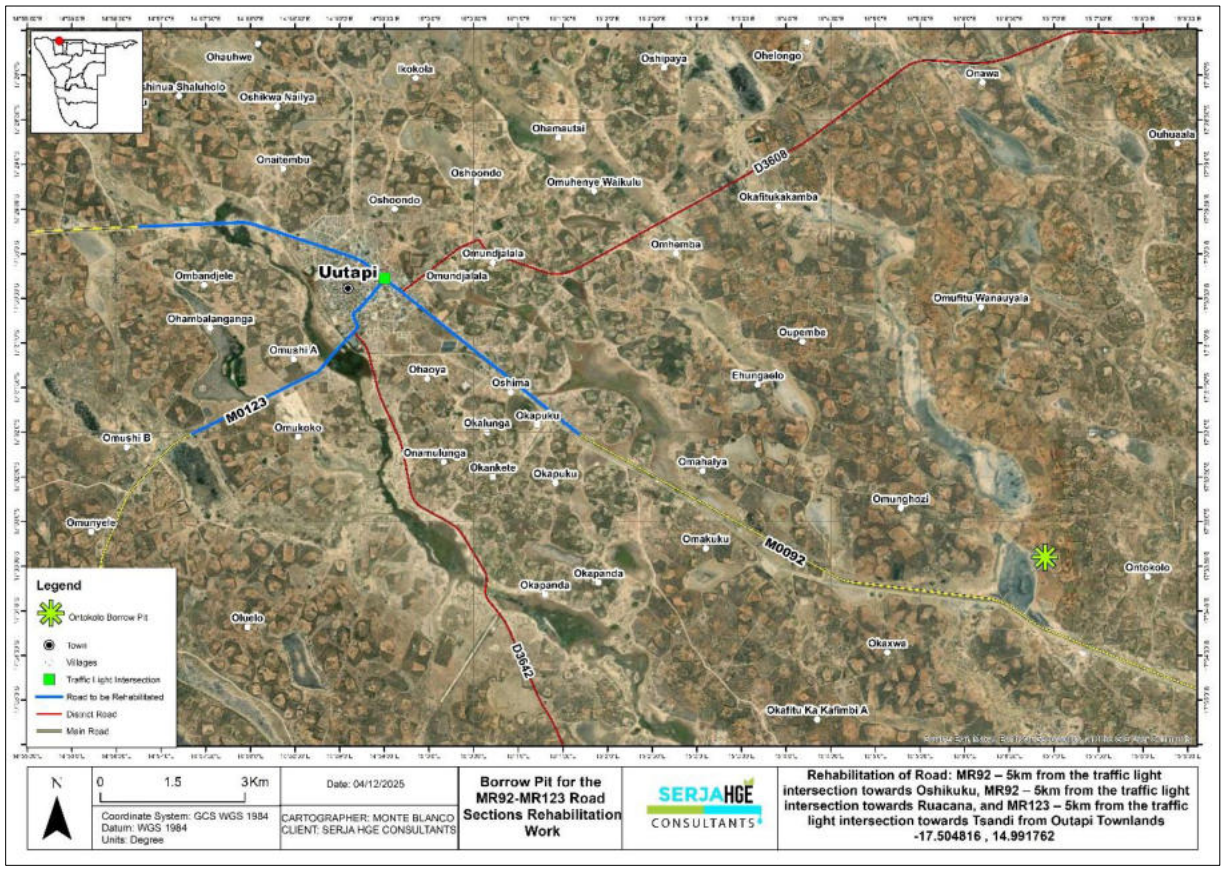


Figure 2-1: The location of the Ontokolo BP site for the rehabilitation of the three road sections: MR92 towards Ruacana, MR92 towards Oshikuku, and MR123 towards Tsandi

It should be noted that if it comes to light at a later stage **during construction that a new BP or BPs would be required, this information will be communicated to the stakeholders and the respective communities in the affected area.**

Added to that, where additional BPs may be required, and they would fall within someone's fence, compensation guidelines, as per the Roads Authority and relevant government policies (National Compensation Policy), will be followed for implementation. This is to ensure that the affected landowners are compensated fairly and that the process and material extraction are done efficiently, safely, and amicably, and ensure environmental sustainability.

2.3.2 Anticipated Resources and Services Infrastructure

2.3.3 Human resources

The road rehabilitation (construction) works will potentially employ 250 people or more. The workforce will likely comprise safety officers, the resident engineer, the contracts manager, the land surveyor, quality control technicians, maintenance artisans, general foremen, operators, laborers, security guards, etc. Priority for employment (semi to unskilled labor) will be given to the locals.

2.3.4 Contractors' accommodation

The road sections are 5km each from Outapi Townlands; therefore, project workers (local laborers) will be commuting from their homes in Outapi and nearby villages to the respective sites by project-provided buses.

Highly skilled workers, such as engineers who may not be from Outapi, will be accommodated in established accommodation facilities in Outapi. However, should it be more economical and necessary, consideration will be made for the project workforce to be accommodated in camps on-site. This is to ensure that workers commence work on time without the need to transport workers from and to their homes daily.

2.3.5 Vehicles and equipment

The project equipment, machinery, and vehicles will be stored at designated areas inside the contractor's campsites. Machinery and vehicles such as excavators, dump trucks, bulldozers, loaders, support vehicles (such as 4x4 wheel drive cars and other maintenance vehicles), etc., will also be parked at a designated site at the campsites.

2.3.6 Water supply

The water supply for the project will be assessed during the ESIA Study, i.e., surface water abstraction or tanked water to work sites along the road.

Given the short distance, the water will likely be stored in industry-standard water tanks along the sites (road sections). The water will be used for the actual road works (concrete) and human consumption (drinking water) on site.

2.3.7 Fuel supply

Diesel will be used for machinery and equipment, and a fuel generator to ensure an uninterrupted fuel supply to the project. The fuel will be stored in a 23,000-litre or smaller temporary fuel tank at selected points on the road sections to ensure an uninterrupted supply during construction. Project vehicles will be refuelled and washed at the service stations and car wash in Outapi, respectively. Therefore, no on-site refuelling and washing of project vehicles.

2.3.8 Occupational health and safety

All project workers will be supplied with appropriate and adequate personal protective equipment (PPE) while carrying out project activities on-site. Each road section will be equipped with a fully furnished first aid kit, and at least 2 project workers will be trained on first aid administration.

2.3.9 Accidental fire outbreaks

The site vehicles, campsites, and machinery will be equipped with fire extinguishers in case of accidental fire outbreaks.

2.3.10 Waste management (solid waste)

All waste generated from the project activities will be sorted, stored on-site in designated waste containers, and transported to an approved solid waste dumping site in Outapi (with the approval and consent of the Outapi Town Council.

2.3.11 Human waste/sanitation

The appointed contractor will establish portable toilets for the workers and project-related visitors. The toilets will be emptied according to the manufacturer's instructions and as regularly as deemed necessary. For the project personnel stationed along the road, portable toilets will be placed/erected at working sites along the road.

2.3.12 Hazardous waste (fuels)

The hazardous waste (waste fuel, grease, and oils) will be properly captured, stored on site in designated waste containers, and transported to the appropriate hazardous waste management facility (in Windhoek). Therefore, no hazardous waste will be disposed of in the project area or any other unapproved waste management facility in the project area or the Omusati Region at large.

2.4 Decommissioning of Construction Works and Site Rehabilitation

After construction works are completed, temporary infrastructure like construction camps and detours will be dismantled. Borrow pits are rehabilitated according to environmental regulations, usually by reshaping and re-vegetating the land. Topsoil is replaced, and disturbed areas are stabilized to prevent erosion and encourage natural regrowth, ensuring long-term environmental sustainability.

Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. Therefore, it is best practice for the Proponent through their contractor to ensure the project and associated activities, mainly the BP sites, are ceased in an environmentally friendly manner, and sites are rehabilitated by:

- Dismantling and removal of campsites and associated infrastructures from the project site areas,
- Carrying away all project equipment and vehicles, and
- Cleaning up of site working areas and transporting the recently generated waste to the nearby approved waste management facility (as per agreement with the waste facility operator/owner),

Further decommissioning and rehabilitation practice at the BPs will include:

- Backfilling of pits and trenches associated with the construction materials sourcing in the area,
- Closing of holes to ensure that they do not pose a risk to both people and animals in the area, and
- Levelling of stockpiled topsoil. This will be done to ensure that the disturbed land sites are left as close to their original state as possible.

2.5 Operations and Maintenance

This is the phase that succeeds the road rehabilitation phase, when the rehabilitated road sections will be operational with regular maintenance to ensure usability and safety. It is anticipated that maintenance of the road will be done through the Roads Authority of Namibia's Maintenance Department in the Region. The maintenance works will include, but not be limited to:

- Routine maintenance: pothole patching, crack sealing, edge repairs, surface cleaning, etc.
- Drainage Maintenance: clearing side drains, culvert cleaning, and repairing erosion
- Pavement surface Maintenance: surface seal replacement, overlaying, skid-resistance improvement.
- Structural repairs of the pavement layers.
- Roadside and safety infrastructure maintenance, and vegetation and shoulder management.

The descriptions of the project activities, resources, services, and infrastructure associated with the borrow pit activities are provided in the ESIA Scoping Report.

3 LEGAL FRAMEWORK: PERMITTING AND LICENSES

The Proponent has the responsibility to ensure that the project activities, as well as the EA process, conform to the principles of the EMA and must ensure that employees act in accordance with such principles. Table 3-1 below presents the requirements of an EMP as stipulated by Section 8 (e) of the EIA Regulations, primarily on specific approvals and permits that may be required for the project activities.

Table 3-1: List of legal requirements and permits for the project activities

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts be subject to an environmental assessment process (Section 27). Details of the principles that are to guide all EAs.	The EMA and its regulations should inform and guide this EA process. Should the ECC be issued to the Proponent, it should be renewed every 3 years, counting from the date of issue. For any amendments to the EMP (and subsequent ECC), an appropriate application should be submitted to the Office of the Environmental Commissioner at the Department of Environmental Affairs (DEAF) and Forestry of the MEFT. The contact details are: **Mr. Timoteus Mufeti:** Environmental Commissioner **Tel: +264 61 284 2701**
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21). Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	
Traditional Authority Act (Act No. 25 of 2000):	The Act also stipulates that Traditional Authorities (TAs) should ensure that natural resources are used on a sustainable basis that conserves the ecosystem.	The road falls within the Ombandjele Village (towards Ruacana), Okapuku and other villages (towards Oshikuku), and Omukoko/Omunyele Villages (towards Tsandi), under the local traditional representatives (headmen and women) of Ombalantu Traditional Authority. Therefore, they should be consulted for the land use consent, and engagement should continue throughout the project.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	The Act implies that TAs must be fully involved in the planning of land use and development for their area. It is the responsibility of the TAs' customary leadership, the Chiefs, to exercise control on behalf of the state and the residents in their designated area.	The respective headmen and one headwoman for the affected villages should be consulted and engaged. The contact details for the village headmen are provided in the EIA's I&APs / stakeholders list. However, the main communication should be done through the Ombalantu Traditional Authority Office in Outapi. **Chief Oswin Shifiona Mukulu** Tel No. +264 (0) 264 (0) 65 251602 **Ms. Agrippine Aule: Secretary:** Mobile No.: +264 81 299 3429
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area."	The Proponent, through their construction contractor, should obtain the necessary authorisation from the MIME for the storage of fuel on-site. This entails the application of a consumer installation certificate. **Mr. Carlo McLeod: Acting Director of Petroleum Affairs** **Tel: +264 61 284 8291**
Forestry Act (Act No. 12 of 2001	The Act provides for the management and use of forests and forest products.	The Proponent will apply for the relevant permit under this Act if it becomes necessary to remove protected trees, such as the protected trees along the route (Mopane (*Colophospermum mopane*) and Makalani Palm (*Hyphaene petersiana*) trees – protected). A vegetation survey to verify the number and type of trees to be removed (where necessary) and to issue a permit will need to be undertaken by personnel of the Forestry Directorate before any site works. Thus, the Contractor's cost will need to make provision for this field verification survey.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
		Contact the MEFT's Forestry Directorate Office in the Omusati Region (Outapi). **Mr. Johnson Ndokosho: Director: Forestry** **Tel: +264 61 208 7666** **Mr. Amon Andreas & Ms. Feliciana Haiduwa Foresters: Forestry Directorate, Omusati Region**
National Heritage Act No. 76 of 1969	Call for the protection and conservation of heritage resources and artefacts.	Should any archaeological material, such as bones, unknown graves, old weapons/equipment, etc., be found onsite, work should stop immediately, and the National Heritage Council of Namibia must be informed as soon as possible. The Heritage Council will then decide whether to clear the area or decide to conserve the site or material. Contact Details at the National Heritage Council (NHC) of Namibia **Mrs. Erica Ndalikokule – Director: NHC** **Tel: +264 61 301 903**
Hazardous Substance Ordinance, No. 14 of 1974: **regulated by the Ministry of Health and Social Services**	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal, and dumping, as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.	The handling, storage, and use of hazardous substances should be managed properly so that they do not harm or compromise the site environment. For better management and handling of waste fuel, the contractor can contact Waste Oil Recyclers (Oiltech Namibia CC, Windhoek, https://oiltech.com.na/) Tel: +264 81 343 5676

4 EMP IMPLEMENTATION RESPONSIBILITIES

The Outapi Town Council (the Proponent) is ultimately responsible for the implementation of the EMRP. However, the Proponent may delegate this responsibility or part of it at any time, as they deem necessary. The roles and responsibilities of all delegates/parties involved in the effective implementation of this EMRP are presented in Table 4-1.

Table 4-1: The EMP implementation responsibilities for the borrow pits activities

Role	Responsibilities
Outapi Town Council (OUTC) (The Proponent)	-Managing the implementation of this EMRP and updating and maintaining it when necessary. -Management and monitoring of individuals and/ or equipment on-site in terms of compliance with this EMRP and issuing fines for contravening EMRP provisions.
Project / Site Manager	This individual will be responsible for ensuring that the project activities are completed on time. The Manager's duties and responsibilities will include: -Ensure that relevant commitments contained in the EMRP are adhered to. -Ensure relevant staff are trained in procedures entailed in their duties. -Maintain records of all relevant environmental documentation for the project. -Reviewing the EMRP annually and amending the document when necessary. -Issuing fines to individuals who may be in breach of the EMP provision and, if necessary, removing such individuals from the site. -Cooperate with all relevant interested and affected parties/stakeholders. -Development and management of schedules for daily activities
Consulting Engineer (Tweya Consulting Engineers in a joint venture with Shield Force Consulting Engineers (TCE-SFCE JV))	The Consulting Engineer's responsibilities in implementing the EMP/EMRP will include (during the design and planning phase): -Reviewing the EMP by ensuring that the EMP is comprehensive, realistic, and aligns with the project's scope and legal requirements. -Adapting the EMP to the specific site conditions and project design. -Assisting the Proponent in obtaining environmental permits and clearances from regulatory bodies (ESIA study done under them to verify baseline

Role	Responsibilities
	conditions to benchmark pre-construction conditions, and obtaining an ECC). For the construction phase, the Consulting Engineer's responsibilities include: -Guiding the Contractor on implementing EMP requirements. -Conducting training or toolbox talks for site staff on environmental best practices and mitigation measures. -Site Supervision and Monitoring, i.e., monitoring the implementation of mitigation measures (e.g., erosion control, dust suppression, waste management). -Carrying out site inspections and audits to ensure compliance with EMP. -Overseeing or conducting regular monitoring of environmental parameters (air quality, noise levels, etc.) as per the EMP. -Identifying non-conformances and recommending corrective actions. -Ensuring the timely implementation of corrective measures by the Contractor. -Maintaining detailed records of environmental monitoring, inspections, incidents, and corrective actions.
Resident Engineer (RE)	The RE of the Engineering Consulting Team will act with restricted powers and responsibilities as delegated by the Engineer in writing. The RE may fulfil the function of the ECO, thereby taking responsibility for the ECO's duties (see below) on this project. Any on-site decisions regarding environmental management are ultimately the responsibility of the RE, with consultation with the environmental Consultant. Therefore, the RE must assign the role of ECO to a competent member of its site supervising team. The RE shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMRP: -Ensuring that the necessary environmental authorisations and permits have been obtained by the Contractor. -Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO, where necessary. -Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.

Role	Responsibilities
	-Issuing fines for transgressions of site rules and penalties for contravention of the EMRP.
Construction Contractor, or simply the ''Contractor'' who is also responsible for their subcontractors	The Contractor's representative or site supervisors (as appropriate) will be required to: -Ensure that the relevant commitments contained in the EMRP Action Plans are adhered to. -Compile relevant procedures and method statements for approval by the applicable phase site manager before initiation of project activities on the sites. -Ensure that all relevant staff are trained in procedures. -Maintain records of all relevant environmental documentation applicable to their work
Health, Safety, & Environmental (HSE) Officer, commonly referred to as Environmental Control Officer (ECO)	The Proponent may assign the responsibility of ensuring EMP compliance throughout the project life cycle to a designated member of staff or an external qualified and experienced person, referred to in this EMP as the ECO. This officer will have the following responsibilities: -Management and facilitation of communication between the Proponent and communities / I&APs and stakeholders regarding this EMRP. -Conducting site inspections of all areas concerning the implementation of this EMRP (monitor and audit its implementation). -Advising the Proponent or Project/Site Manager on the removal of person(s) and/or equipment not complying with the provisions of this EMRP. -Making recommendations to the Manager with respect to the issuing of fines for contraventions of the EMRP. -Undertaking an annual review of the EMRP and recommending additions and/or changes to this document.
Public Relations / Liaison Officer (PRO) / PLO	The PRO will be responsible for the following tasks: -Liaising between the stakeholders, communities, and the Proponent. -Ensure effective communication with stakeholders, media (if necessary), and the community. -Organising and overseeing public relations activities, -Managing public and community relations issues. -Preparing and submitting public relations reports, if required.

Role	Responsibilities
	-Collaborating with personnel and maintaining project-related open communication among personnel.

4.1 Financing of Environmental Control

The financing of environmental requirements, as outlined in this document, apart from the appointment of the Environmental Assessment Practitioner (Environmental Consultant) and specialists, is the sole responsibility of the Contractor appointed by the OUTC. Therefore, it is accepted that the cost incurred for implementing this EMRP by the Contractor would be allocated for in the tender document. Any responsibilities not defined in this document or where any uncertainties arise in this matter will be the responsibility of OUTC.

4.2 Amendments of the EMP (EMRP)

Any party involved with the project can suggest changes to the EMP (EMRP) via the Environmental Consultant or Resident Engineer. Therefore, such suggestions or changes will need to be discussed collectively. Approved changes will be drafted and incorporated into the existing EMP/EMRP in the form of an appendix or amendments.

4.3 Procedures for non-compliance with the EMP (EMRP)

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis, and any failure on his part to do so will entitle the Resident Engineer (RE) to impose a penalty. This applies to the Environmental Management & Rehabilitation Plan (EMP/EMRP).
In the event of non-compliance, the following recommended process shall be followed (as adopted from ESMP for DR3633: Tsandi Ongulumbashe road construction)[1]:

- The RE shall consult the environmental consultant and, if agreed, issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the RE with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects, and the expected results of the actions. A copy shall be provided to the ECO.

[1] *EnviroPlan Consulting. (2021). Environmental & Social Impact Assessment for the Upgrade to Low Volume Seal (LVS) Standard of the DR3633 Tsandi - Ongulumbashe (22km) in the Omusati Region, Namibia: Environmental and Social Management Plan (ESMP). Windhoek. MEFT.*

- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the RE shall impose a monetary penalty based on the conditions of the contract.
- In the case of the Contractor being unable to remedy the situation due to permanent environmental damage already incurred, the RE shall impose a monetary penalty based on the conditions of the contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the RE shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc., between any parties concerning or arising out of the interpretation of the conditions of the EMRP, disagreement regarding the implementation or method of implementation of conditions of the EMRP, etc., any party shall be entitled to require that the issue be referred to independent specialists for determination.
- The RE shall at all times have the right to stop work and/or certain activities on site in the case of safety and EMRP non-compliance or failure to implement remediation measures.

4.4 Fines and Penalties related to the EMRP Contraventions

The following fines and penalties are in place for transgressions listed below. It will be issued after the procedures contained herein have been duly followed, and only in severe cases and after repeated non-compliance. The gravity of the transgression is justified by each specific penalty.

4.4.1 Fines

Fines may be issued per incident at the discretion of the RE. Such fines will be issued in addition to any remedial costs incurred as a result of noncompliance with the EMP. The RE will inform the Contractor of the contravention and the amount of the fine and will deduct the amount from monies due under the Contract.

Fines for the activities detailed below will be imposed by the RE on the Contractor and/or his Subcontractors.

Any person, vehicle, plant, or thing related to the Contractor's operations within the designated boundaries of a "no-go" area.	**N$2,000**
Any vehicle guilty of reckless driving on and in the vicinity of the site, including excessive speeds.	**N$1,000**
Any vehicle being driven, and items of plant or materials being parked or stored outside the demarcated boundaries of the site.	**N$2,000**
Persons repeatedly walking outside the demarcated boundaries of the site.	**N$1,000**
Persistent and unrepaired spills of hazardous materials and materials causing pollution.	**N$3,000**
Persistent littering on the site.	**N$500**

Individuals repeatedly fail to make use of the designated toilet facilities.	**N$200**
Disposal of waste other than agreed upon in the waste management plan.	**N$5,000**
Deliberate lighting of illegal fires on site (e.g., outside of the designated campsite).	**N$2,000**

For each subsequent similar offence, the fine may, at the discretion of the RE, be doubled in value.

The RE shall be the judge as to what constitutes a transgression in terms of this document.

4.4.2 Penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is deemed NOT to have complied with this specification if:

- Within the boundaries of the site, site extensions, and haul/ access roads, there is evidence of contravention of the specification, environmental damage due to negligence,
- The safety of Contractor personnel and the public is being compromised due to negligence.
- the Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time,
- the Contractor fails to respond adequately to complaints from the public, and
- Payment of any fines in terms of the contract shall not absolve the offender from being liable for prosecution in terms of any law.

The RE will be responsible for a report on the non-repairable damage and/or non-compliance with visual and other evidence, as well as issuing the penalty to the Contractor with the report attached. The suggested penalties for transgressions regarding the biological, physical, and social components are provided in Table 4-2 below. A copy must be handed to the ECO.

Table 4-2: The penalties suggested for transgressions

Actions leading to erosion:	A penalty equivalent in value to the cost of rehabilitation plus 20%.
Oil spills:	A penalty equivalent in value to the cost of the clean-up operation plus N$1,000.
**Damage to indigenous vegetation:*	A penalty equivalent in value to the cost of restoration plus N$2,000.
Damage to trees:	A penalty of a maximum of N$5,000 shall be paid for each tree removed without prior permission, or a maximum of N$2,000 for damage to any tree, which is to be retained on site.

Damage to indigenous vegetation:	A penalty equivalent in value to the cost of the restoration operation plus N$2,000.
Damage to the sensitive environment:	A penalty equivalent in value to the cost of the restoration operation plus 20%.
Damage to cultural sites:	A penalty of a maximum of N$100,000 shall be paid for any damage to any cultural or historical site.
Damage to natural fauna:	A penalty of a maximum of N$2,000 for damages to any naturally occurring animal.
Accident due to safety negligence:	A penalty of a maximum of N$50,000 for injuries to personnel or the public.

*****_The cutting down of baobab trees is **STRICTLY PROHIBITED**. Therefore, these trees should be avoided at all costs, and the road should be diverted to avoid the baobab trees._

5 ENVIRONMENTAL MANAGEMENT MEASURES

5.1 Key Identified Potential Negative Impacts

The key potential negative impacts identified, described, and assessed in the EIA Report, for which the management measures (action plans) have been provided, are listed below:

- Soil and water pollution: improper handling of wastewater may lead to pollution of surrounding soils and eventually water resources systems (through wastewater runoff and infiltration).
- Water pollution: runoff from roads can carry pollutants such as oil, salt, and heavy metals into nearby streams and rivers, impacting aquatic ecosystems.
- Habitat destruction: excavation of road construction borrow pits can lead to the destruction of natural habitats for plants and animals. This can disrupt local biodiversity and reduce the availability of resources for animals and people.
- Displacement and loss of land: Dualisation of the roads will mean expansion/widening of the existing road routes. Thus, it may require land acquisition, which can result in the displacement of businesses, homes, fences, pipelines, and or productive farming land near/along the roads (within the anticipated new road reserves). This could result in conflicts over compensation and land ownership.
- Risks of soil erosion: road construction activities could disturb the soil and lead to erosion, especially during the rainy season. The removal of large amounts of soil and vegetation from borrow pits can increase the risk of soil erosion.

- Depletion of local groundwater table: excavation of borrow pits may affect the local water table, leading to changes in groundwater levels. This can impact the availability of water for vegetation that relies on groundwater as a water source in the area.
- Deforestation: road construction may require the clearing of trees and vegetation along the route, leading to habitat loss.
- Impact on air quality: dust and particulate matter generated during the excavation of materials (sand and gravel), movement and operation of heavy vehicles and machinery on unpaved areas can compromise air quality.
- Displacement of existing properties and infrastructure (building structures and service infrastructure).
- Displacement of roadside vendors in Outapi Town and along the road sections, which leads to socio-economic disruption.
- Noise associated with the movement of heavy machinery and trucks can disturb locals and animals.
- Disruption of hydrological systems by borrow pits can alter natural drainage patterns, causing changes in surface water flow and potentially exacerbating flooding or drought conditions in the area.
- General environmental pollution through mishandling of project-related waste associated with the project.
- Occupational and community health and safety: improper handling of materials and equipment may cause health and safety risks to workers and locals (communities/residents and businesses). Community safety can also be compromised by unfenced borrow pits or abandoned borrow pits (that are not properly rehabilitated to safe conditions).
- Archaeological or cultural heritage impact: borrow pits may impact local cultural heritage sites or traditional land use practices, potentially leading to social tensions or conflicts between the construction contractor and communities.

The management and mitigation measures are provided under the next chapter for implementation.

5.2 Environmental Management and Mitigation Measures

The management actions are aimed at avoiding the above-listed potential negative impacts, where possible, and where it is impossible to avoid these impacts, measures are provided to reduce the impacts' significance. Management and mitigation measures recommended for the potential impacts in the EIA Report were based on the:

- Planning and Design Phase (Table 5-1),

- Construction Phase (Table 5-2),
- Construction Phase (borrow pits establishment and use) - Table 5-3,
- Rehabilitation of the project-related borrow pits (Table 5-4).

5.2.1 Planning and Design: Management and mitigation measures for impacts from the road construction works

The measures proposed for implementation to manage and mitigate the environmental and social impacts during the planning phase are presented in Table 5-1.

Table 5-1: Planning and Design Management and mitigation measures for the impacts from road construction works

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
EMP implementation and training	Lack of EMP awareness and implications thereof	-EMRP training should be provided to all workers onsite. -All site personnel should be aware of the necessary health, safety, and environmental considerations applicable to their respective work. -The implementation of this EMRP should be monitored. The site should be inspected, and a compliance audit done throughout **the project activities (monthly) and biannually for overall EMRP implementation.** -The EMP non-compliance penalty system should be implemented.	-Records of EMP compliance/monitoring conducted biannually -The ECC is renewed every 3 years -Records of EMP training conducted.	-Outapi Town Council -Project Manager	Throughout the phase, and when deemed necessary
Employment opportunities	'Outsiders' are given employment opportunities at the expense of capable locals. Unfair employment practices between men and women	-During the preparation of tender documents, the consulting engineer includes provisions designed to maximise the use of local labour. All unskilled labour shall be sourced from local communities. -Specific recruitment procedures should be spelled out. -At least 25% of recruits must be women for non-strenuous jobs. -Employment contracts should be well prepared for every employee, and compensation should follow the stipulated minimum wage.	-The Contractors' tender makes provision for a detailed recruitment plan in their tender application	-Consulting Engineer with the advice of village leadership (headmen and women) and the local development committee to determine employment considerations (as suggested by the communities in the consultation meetings).	Pre-construction
Procurement of goods and services	The awarding of services and goods tenders to out-of-	-The procurement stage for the project construction works should follow a fair and transparent process. -Encourage the provision of goods and services that are locally available, and should be sourced from locally available	-Records of local or regional businesses involved in the service provision to the project	-Outapi Town Council Procurement Unit	Pre-construction, and where necessary throughout the

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
	area/region companies at the expense of local businesses	businesses, especially small and medium businesses in Outapi and nearby Towns in the Region. If the companies are not available in the Omusati Region, companies in nearby Towns such as Oshakati in the Oshana Region should be considered. -If the construction contract is awarded to an out-of-area company, they should be obliged to team up with an available local company to ensure capacity building for locals.		-Consulting Engineers -Construction Contractor (for subcontractors)	construction phase
Occupational health and safety	Health and safety risks to the workers and public due to uncontrolled access to the public during construction	-Before starting construction works, all construction workers should undergo environmental induction. -Ensure that Contractors who tender make provision for the co-opting of an HIV/AIDS health officer from the regional health office in their tender application -The tender preparation should make it mandatory for the Contractor to cost of personal protective equipment (PPE) for all workers, as well as first aid kits.	-Environmental, health, and safety inductions are carried out in the construction phase, but before work starts.	-Consulting Engineer	Pre-construction
Conflicts	Community conflicts owing to nuisances caused by the contractor Lack of communication between the Contractor and the community	-A meeting should be arranged with the community once the Contractor has been appointed. -The Contractor shall appoint an Environmental Control Officer/ECO from the construction team to take responsibility for the implementation of all provisions of this EMRP. -A public relations officer (or if the Environmental Control Officer will take up this role) should be introduced to the community, and their contact details provided to local leaders.	-The Contractor tender has made provision for the appointment of an Environmental Control Officer in their tender application -The meeting is arranged once the Contractor has been appointed	-Outapi Town Council -Consulting Engineer -Construction Contractor	Pre-construction
Compensation for land use (borrow pits	Lack of consultation, clear communication, and clarity on the compensation policy	-Compensation should be communicated and explained clearly to the affected landowner/land custodian (Headmen and women of the respective villages/local traditional authority). -The landowners should be compensated fairly and according to the policies, and ensure harmony throughout the process.	-The Construction Contractors have made provision for compensation for land loss due to construction activities -Consent for borrow pit(s) has been issued by the authorities	-Outapi Town Council -Consulting Engineer -Construction Contractor	Pre-construction

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Property and services displacement	Displacement of existing properties and infrastructure (building structures and service infrastructure).	-The surveying team should conduct a detailed asset survey and valuation, and timely engage affected land or property owners. -A fair and transparent compensation aligned with Namibia's Compensation Policy should be implemented for property loss or displacement. -Timely and advance notice to affected property owners should be given before displacement. -A grievance mechanism should be compiled and accessible to all. -Where possible, avoid or minimize displacement through alignment optimization.	-All affected structures and services are identified and documented before any clearing works. -All valuations completed by certified valuators and verified by the Proponent. -Affected property owners sign off on valuation records. -All eligible affected property owners are compensated before displacement, and all property owners are provided adequate support. -No unresolved cases at time of construction commencement	Outapi Town Council -Construction Contractor	Pre-construction
Displacement of roadside vendors in Outapi Town and along the road sections	Vendors along the road sections may lose their trading spaces due to the clearance of the corridor for road rehabilitation and subsequent dualisation.	-Conduct a detailed socio-economic census of all roadside vendors before construction begins (type of goods sold, business duration, daily income estimates). -The vendors should be timely engaged to plan relocation. -Identify suitable alternative trading sites, ideally within high-footfall areas and near public transport routes. -Hold formal consultation meetings with affected vendors to explain project timelines and relocation options. -Provide early notification (at least 3 months) before relocation. -Ensure vulnerable vendors (women, single parents, elderly) receive priority support. -Provide designated temporary trading spaces during construction, with minimal disruption. -Encourage vendors to take formal space in the already established Open market. If there is no space, consider	-Number of meetings held with vendors and authorities -Percentage of vendors informed about relocation at least 3 months in advance. -Availability of temporary trading sites before construction starts. -All vendors allocated safe trading spaces. -All vendors successfully relocated.	-Outapi Town Council	Pre-construction

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		establishing a new market structure where vendors can resume business safely. -Ensure vendors are not relocated to unsafe areas near moving traffic or construction zones. -Provide clear signage directing customers to temporary markets. -Establish a grievance system for vendors to report issues related to relocation, compensation, or business disruption. Document and resolve grievances within a fixed timeframe.	-No vendor is operating within unsafe construction areas. -All the grievances are resolved within 14 days. -No re-establishments of vendor stalls in restricted zones during construction.		
Irresponsible use of water resources	Water wastage due to careless practices during construction. Leaks from tanks and taps, and or water earth dam	-An agreement to be supplied water from the nearby water supply scheme should be obtained from the MAFWLR's Rural Water Supply and NamWater before abstracting and using the water for the project. -The costs associated with water supply should be included in the tender documents. Water storage tanks/taps, and earth dam and earth dam liner should also be included in the tender documents for the Contractor. -Water should be used sparingly and encourage the re-use and recycling of water for certain activities during construction, such as washing of non-greasy (non-hydrocarbon contaminated) equipment and vehicles, as well as dust suppression.	-All required water supply permits are obtained -The tender documents have made provision for water provision and supply -Water is used sparingly and reused-	-Outapi Town Council -Consulting Engineer -Construction Contractor	Pre-construction
Biodiversity	Loss of Flora due to unauthorized removal of protected species	-The area to be constructed on the site, as well as lay-down areas, access routes, etc., should be demarcated. The workforce must be instructed to operate within these boundaries. -Any activity resulting in the chopping down of trees or the removal of vegetation without the required authorisation is strictly prohibited. Therefore, a permit for removing protected trees should be **obtained from MEFT's Omusati Region's Forestry Office (in Outapi) upon their inspection and verification – see contact details in Table 3-1. Please refer to Appendix 2 for the list of protected tree species occurring along the project route and the broader area.**	-The permits for removing protected tree species (where extremely necessary) are issued -Barricading tape (to indicate working areas) is in place -Biodiversity conservation awareness is raised among workers/personnel	-Consulting Engineer -Construction Contractor -Environmental Control Officer	Pre-construction

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-With regards to the preceding point, a cost for a vegetation verification survey should be allowed for, so that the Forestry Directorate -With the help of the Forestry Directorate, all protected tree species should be tagged so that they are visible during construction works.			
Disruption of hydrological systems by borrow pits (BPs)	Altering natural drainage patterns, causing changes in surface water flow, and potentially exacerbating flooding	-The borrow pit site should be carefully sited to avoid areas that are part of natural drainage paths and floodplains. -Prioritize locations outside sensitive catchment areas or those with minimal impact on surface water flow. -Borrow pits should be designed with controlled slopes and drainage outlets to prevent water stagnation or rapid runoff. -Plan for the implementation of progressive rehabilitation, where parts of the pit are restored while others are still in use. -The rehabilitation of BPs should be costed for in the tender documentation, and funds should be kept aside for this activity (phase).	-The borrow pit sites are planned outside areas with natural drainage paths or floodplains -The recommended measures are implemented, and improvements are made throughout, as needed -There is a provision for rehabilitation funds	-Consulting Engineer -Construction Contractor	Pre-construction, and if new borrow pits are required during the next phase (construction), then continuing

5.2.2 Construction Phase: Management and mitigation measures for impacts stemming from the road construction works

The measures proposed for implementation to manage and mitigate the environmental and social impacts of road construction works are provided in Table 5-2.

Table 5-2: Management and mitigation measures for the impacts from road construction works – Construction Phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
EMP implementation and training	Lack of EMP awareness and implications thereof	-EMRP training should be provided to all workers on-site. -All site personnel should be aware of the necessary health, safety, and environmental considerations applicable to their respective work. -The implementation of this EMRP should be monitored.	-Records of EMP compliance/monitoring conducted biannually -The ECC is renewed every 3 years -Records of EMP training conducted.	-Site Manager -Construction Contractor	Throughout the phase, and when deemed necessary

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		The site should be inspected, and a compliance audit should be done throughout **the project activities (monthly) and biannually for overall EMRP implementation.** -The EMP non-compliance penalty system should be implemented.		-Environmental Control Officer	
Conflict	Communities are dissatisfied with the activities Nuisances caused by the Contractor	-Establish clear communication between the Contractor and community (and or through their leaders) on the anticipated schedule/timeframe for operations and the duration of the construction phase. This should be provided for in the form of a Public Consultation Plan, which should include at least: a) Means for lodging a complaint concerning materials extraction, and provision of feedback to the complainant from the Contractor stating how the issue is being addressed. b) Report back on issues raised and how addressed from the Contractor to the Resident Engineer and Proponent. -The detailed construction programme should be presented in ongoing meetings with the local communities or their leaders. -Engage local communities to confirm fair employment opportunities.	-There are records of engagement meeting minutes of meetings -There is a community communication plan related to road construction works	-Resident Engineer -Construction Contractor -Public Relations / Liaison Officer (PRO) / PLO	Throughout the phase
Construction progress	Delayed construction, which has cost implications and causes low community satisfaction	-Programme delays into the schedule and communicate this to the community.	-Resident Engineer and Contractor to constantly monitor delays and adapt the programme accordingly. -Constantly update communities (through the leaders) on delays and latest schedules.	-Resident Engineer -Construction Contractor -Public Liaison Officer	Throughout the phase
Borrow Pit Sites	Sand mining/road material mining	-The Contractor, in consultation with the environmental consultant and/or Resident Engineer, should visit all potential excavation sites before excavation (for new sites). The engineers and surveyors must then draft a plan for approval before commencement of excavations. This plan must indicate the required resources and sensitive areas that may not be mined (indication of the mature trees).	-The Contractor and environmental consultant are to visit all potential excavation sites during environmental monitoring	-Resident Engineer -Construction Contractor	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-No removal of trees with a stem diameter of 200mm or more. Protect clusters of trees and individual trees with a space buffer of at least 5m. -The top 150mm of topsoil must be stored separately for use to rehabilitate the borrow pit. -The removal of material at excavation sites shall be focused on where the least significant vegetation exists. -The Contractor should liaise with the applicable residents regarding the location of excavation sites.			
Soils	Physical soil/land disturbance and loss of topsoil	-Stockpiled topsoil and excavated materials should be used to backfill the excavated and disturbed sites after completing work on the pits. -Soils that are not within the intended footprints of the road and its reserve should be left undisturbed, and soil conservation implemented as far as possible. -Project vehicles/machinery should stick to the access route provided and not unnecessarily create further tracks on-site by driving everywhere, causing soil compaction and erosion. -The movement of vehicles to and across the site should be controlled. Construction material required should be moved to where it is needed, utilising wheelbarrows (when possible) instead of trucks, thereby minimizing the impact on the soil. -For the safety of the community members who utilize the existing access paths (to BP sites), the Contractor should create safer routes to be used by the road construction vehicles only and avoid the existing community paths, if possible.	-No proliferation of informal vehicle tracks created by project activities. -No new erosion gullies. -No signs of soil compaction -No disturbance to unmarked areas on-site.	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase
Soil and water resources	Soil and water pollution from garbage, cement, concrete, sewage, chemicals, fuels, oils, or any other	-Accidental spills must be cleaned immediately to avoid the pollution of the wetland and groundwater, since the soil around the site is highly permeable. -Hazardous waste should be disposed of in the prescribed manner to prevent contamination of soils (see waste management heading). -In case of accidental spills, the contaminated soil must be suitably disposed of in a container for hazardous waste	Inspection daily, reporting, and regular cleaning up	-Site Manager -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
	objectionable or undesirable material	-If fuel is stored at the construction camp, fuel tanks must be properly bunded. The volume of the bounded area must be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area must be impermeable, and the sides high enough to achieve 1.5 times the holding capacity. -Drip trays should be available for all equipment that is intended to be used during construction. These trays should be placed underneath each vehicle while the vehicles are parked. The drip trays should be cleaned every morning, and the spillage should be handled as hazardous waste. -Cement should not be mixed on open soil. A designated metal container should be made available for this purpose. -All cleaning of equipment should take place within the construction site, and the water from the washing operation should be collected in a tank and disposed of in an agreed manner.			
Irresponsible use of water resources	Water wastage due to careless practices during construction. Leaks from tanks and taps, and or water earth dam	-Educate the workforce on sustainable and effective use of water, e.g., clean equipment in containers. -Water should be used sparingly throughout construction. It is the responsibility of the site coordinator to ensure that water conservation is strictly enforced. -Water tanks/taps and earth dam liner breakages must be fixed immediately. The water tank or taps must have water meters and be accessible to visual inspection. All faulty and leaking taps and pipes shall be immediately repaired.	-Daily inspections and condition reports -Water conservation awareness to all personnel	-Construction Contractor	Throughout the phase
Biodiversity	Loss of Flora – protected species	-Avoid unnecessary removal and disturbance of site vegetation. -Vegetation found on the site, but not in the actual footprint, should not be disturbed; therefore, it should be avoided. -The area to be constructed on the site, as well as lay-down areas, access routes, etc., should be demarcated. The workforce must be instructed to operate within these boundaries. Any activity resulting in the chopping down of trees or the removal of vegetation without the required authorisation is strictly prohibited. Therefore, a permit for removing protected trees should be **obtained from MEFT's Omusati Region's**	-No complaints of unauthorised vegetation removal associated with project personnel. -No intentional disturbance and destruction of site vegetation -Barricading tape (to indicate working areas)	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
	Planting of alien flora species in the area	**<u>Forestry Office (in Outapi) upon their inspection – see contact details in Table 3-1.</u>** -**The Removal of Baobab trees is strictly prohibited. Therefore, these trees, regardless of their size and age, should be avoided.** -All protected tree species should be tagged so that they are visible during construction works. -Avoid leaving equipment or machinery leaning on vegetation. -Environmental awareness on biodiversity preservation (both plants and even small animals encountered onsite) should be provided to the workers and the Contractor during EMRP induction. -No alien vegetation may be introduced to the site in the form of seeds or plants, for beautification or any other reason. -At the end of construction, all alien vegetation that has established itself should be eradicated.	-Biodiversity conservation awareness is raised among workers/personnel -Regular review of photographic records. Take photographs before construction starts as a record. -No removal or damage to baobab trees along or near the road sections related to the project activities.		
	Impact on fauna: livestock, wild animals such as reptiles, birds, etc.	-The killing, snaring, trapping, and stealing of community livestock is strictly prohibited. -The illegal harvesting of wildlife is strictly prohibited. -Refrain from disturbing or killing small soil and animal species found on and around the site. -Visible breeding sites for birds and animals occurring on and around the sites should not be destroyed or disturbed. -Refrain from removing or destroying the bird nests on trees. -BPs and associated trenches should be secured and backfilled or levelled upon completion of works to prevent animals from falling into trenches or even drowning during rainy seasons. -The recommended speed of 40km/hr around, to and from road working sites, should be adhered to while looking out for animals and people (especially children) in the community. -Incorporate Environmental awareness and biodiversity preservation into the employment contracts of all workers.	-No complaints of stolen and killed livestock by the project workers. -No reports of illegal hunting or trapping of wild animals in the area associated with the project personnel -No intentional disturbance and destruction of habitats and faunal species	-Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Waste management	Construction waste: Incorrect or infrequent disposal of building rubble. Construction waste blown by wind (e.g., plastic bags and material seals).	-Construction waste should be stored in skips and should regularly be removed from the site for disposal at the nearest approved municipal waste disposal site (in Oshakati). -Empty cement bags, plastics, wrapping waste, strapping, etc., to be secured in containers for general waste to prevent wind-blown waste.	Regular inspection on site.	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase
	Domestic waste from the construction team: Increased general waste	-Waste should be separated according to cardboard/paper materials, plastic, bottles, and tins. -The various waste types should be disposed of at appropriate municipal and recycling facilities. -Appropriate containers should be placed on site for waste separation, and the workforce trained and sensitised accordingly. In other words, sufficient waste bins should be supplied along the road at each working site so that no waste or rubbish is thrown into the environment. -Only the general waste, which cannot be recycled, shall be disposed of at the nearest approved Town Council's waste disposal facility. -The workforce must be sensitised to dispose of waste responsibly and not to litter, not at the construction site, and not at the campsite or in the wider environment. -Domestic waste, which cannot be recycled, should be stored in a skip and removed via truck once a week to an approved waste disposal site. -After each day's work, ensure that there are no wastes left on-site or scattered within the site premises. -All domestic and general project waste produced daily should be contained on-site until such time that it is transported to designated waste sites. -No waste may be buried or burned on site or anywhere else.	-Daily inspection and clean up. -There are sufficient waste storage containers for different types of waste -No littering caused by project personnel -No visible litter around the project area -Provision of sufficient waste storage containers -Waste management awareness -Waste disposal permits to the municipality -Environmental, Health, and Safety Statements and Policy are in place	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-A penalty system for the irresponsible disposal of waste onsite and anywhere in the area should be implemented.			
	Hazardous waste: Accidental/negligent spillages from equipment working on site. Storage of hazardous materials.	-Spillages of any potentially toxic materials, whether by accident or through negligence, must be scooped up immediately into drums. -Contact Wesco Group https://www.wesco.com.na/page/waste-management and or Oiltech Namibia https://oiltech.com.na/ to salvage the spilled materials -Bitumen products waste, oil sludge, oily rags, contaminated spill clean-up materials, contaminated soils, and other hazardous materials waste must be kept off-site or in a dedicated separate container on-site. These containers must be locked and only accessible by the site foreman. Wesco Group or Oiltech should be approached to collect these wastes periodically or as needed	Daily inspection and clean up.	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase
	Ablution waste (sewage): Construction team.	-Open defecation and urinating in public are strictly prohibited. Workers should be provided with appropriate toilets for the project. -Only portable chemical toilets should be used on site (along the road) and at the campsite. Under no circumstances may the waste from these toilets be dumped in the veld. -The waste should be removed at least once a week to the nearest municipal sewage site for handling and treatment. Alternatively, it may be pumped out into sealable containers and stored until it can be removed by truck. If stored, the containers should be kept out of direct sunlight and should not be stored for longer than a month. People responsible for cleaning these toilets should be provided with latex gloves and masks. -Spillage or leakage is to be cleaned up and fixed immediately.	Daily inspections and clean-up. -There are sufficient toilets at the campsites and along the road for workers -No open defecation by project workers -There are sewage removal operators	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase
Air quality	Dust generation: Dust proliferation due to the fine content of soil, resulting in localized	-Soil stacks should be placed downwind from the main activity areas and the road detour. -All construction areas and soil stacks should be regularly wetted.	-Visual monitoring for dust nuisance and safety -Daily monitoring. -Complaints from neighbours	-Resident Engineer -Construction Contractor	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
	poor air quality and poor visual	-A reasonable amount of water should be used to suppress the dust along the road. -Vehicles should be driven at a speed of 40km/hr to avoid the generation of dust owing to high speeds. This is also to ensure road safety due to ongoing road works and many detours.	-Records of how complaints or grievances have been addressed.	-Environmental Control Officer	
Noise	Noise from vehicles and construction activities	-All machinery should be calibrated and maintained regularly. -Noise from vehicles and equipment on sites should be reduced to acceptable levels. -Construction activities, excavation, hauling, and transporting of materials from the BPs hours should be done between 07 am and 5 pm, and over weekends to prevent noise generated by equipment and movement of heavy vehicles. -When operating excavators and other noise-generating machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise.	-Daily monitoring. -Complaints from neighbours -Records of how complaints or grievances have been addressed -Workers operating machinery and noisy equipment are equipped with noisy PPE	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase
Vehicular traffic safety	Presence of heavy vehicles in the area	-Vehicle drivers and equipment operators should have valid and appropriate driving licenses or operating permits and adhere to the road safety rules. -Make provision for haul roads and maintain them so that the local small vehicles can continue to use their community roads. -Drivers should drive slowly (40km/hour or less) while on-site. -Vehicles should be in a roadworthy condition and serviced regularly to avoid accidents owing to mechanical faults. -Vehicle drivers should only make use of the designated site access roads provided and as agreed. -Vehicle drivers should not be allowed to operate vehicles while under the influence of alcohol. -Project vehicles should be parked within the boundary or demarcated areas for such purpose at sites. -Deliveries from and to the site should be done optimally during weekdays and between the hours of 8 am and 5 pm.	-No complaints from members of the public regarding vehicular traffic issues related to the project activities. -All personnel operating the project vehicles and machinery are appropriately licensed and possess valid driving licenses. -Demarcated areas for parking, offloading, and loading zones on-site.	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Occupational and local (community) health and safety associated with project activities	General health and safety for workers	-During induction, personnel should be provided with an awareness training of the risks of mishandling equipment and materials on site. -Appropriate and written warning signage should be placed on-site, where visible. -A fully furnished first aid kit should be placed at each working site to attend to minor injuries, while major injuries should be attended to at a nearby health centre (clinic or hospital). 1 or 3 site personnel should be trained on how to administer first aid. -Projected loads should be securely fastened to vehicles to avoid falling off and injuring people. -Heavy vehicles and equipment should be properly secured to prevent any harm or injury to both project personnel and locals. -When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, masks, gloves, safety boots, earplugs, safety glasses, and hard hats (helmets). -Personnel should not be allowed to consume alcohol or other intoxicants before and during working hours, as this may lead to mishandling of equipment, resulting in health and safety risks.	-A comprehensive health and safety plan for the activities is compiled. -Availability of fully furnished first aid kits -Trained workers to administer first aid	-Construction Contractor -Environmental Control Officer	Throughout the phase
	Community health and safety	-Construction trenches should be backfilled after completion of road works at sections of the road before proceeding further. -Ensure that goods and projected loads are securely fastened to vehicles to avoid falling and injuring people along the road. -Warning signage should be erected at dangerous site areas, such as open trenches on the road. -Make provision for temporary crossroads at growth centres or where a community vehicle access paths cross over the road so that the community can cross over safely. -The site areas that are considered temporary risks should be equipped with "danger" or "cautionary" signs written in languages such as *Oshiwambo*, and may be English.	-The road trenches are backfilled -There are sufficient, clear, and appropriate warning signs near risk site areas -The community is warned of road construction dangers and encouraged to stay away and exercise precautions at all times when crossing the road or walking nearby	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
	Potential increase of prevalence of HIV and AIDS, as well as other sexually transmitted diseases (STDs) prevalence	-Engage workers in sexual health talks and training about the dangers of engaging in unprotected sexual relations, which result in contracting HIV/AIDS and other sexually transmitted infections. -Provision of condoms and sex education through the distribution of pamphlets and health training. These pamphlets can be obtained from the nearest local health facility, such as local clinics and the Outapi District Hospital. -Emphasize the continued recruitment of locals to avoid the influx of out-of-area people into the community for casual work that can be carried out by local people. Thus, reducing the creation of new sexual relations between local women and out-of-area men results in the potential local transmission of STDs and HIV/AIDS.	-No new infections recorded linked to project workers -Occupational health and safety personnel -Sex and Health Education/Awareness -Provision of condoms at the campsite	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase
Fire management	Accidental fire outbreaks	-Portable and serviced fire extinguishers should be available at the working sites along the road and the construction camp. -No open fires should be created by project personnel on-site. -Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarettes' fire is completely put out and disposed of in the allocated bins on-site. -Consider using gas or paraffin cookers to prepare food instead of open fires. The fire on cookers/stoves should be put out before leaving the camp. -Personnel and visitors alike must be sensitised about responsible fire protection measures and good housekeeping, such as the removal of flammable materials (e.g., rubbish, plastics, papers, clothing, dry vegetation, and hydrocarbon-soaked soil) near hazardous substances' containment and handling areas. In other words, these flammable materials should not be left or thrown near the areas. Regular inspections should be carried out to check for these materials at the site. -Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarette's fire is completely put out and disposed of in the allocated bins at the smoking area.	-No veld fires recorded (due to the presence of project personnel) -Fire extinguishers (1 per vehicle) and a minimum of 2 extinguishers at the camp	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-Potential flammable areas and structures, such as fuel storage tanks, should be marked as such with visible signage. -Raise awareness among workers on the impact of careless handling of fires and flammable substances in the workplace.			
Archaeology and heritage	Accidental disturbance of archaeological or heritage objects	-If any archaeological materials, human burials, or skeletal remains are uncovered during earthworks, the work in the immediate area should be halted, and the finds would need to be reported to the NHC, which may require inspection by an Archaeologist. The ECO should have the area fenced off and contact NHC (Tel: +264 61 244 375), National Forensic Laboratory (+264 61 240 461) immediately. -Avoid direct damage to archaeological or heritage sites that may be encountered during excavations. -All accidental discoveries shall be reported immediately to an archaeologist/heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice, the Environmental Control Officer will advise the necessary actions to be taken. -The Construction Contractor and its subcontractor should adhere to the provisions of Section 55 of the National Heritage Act in the event significant heritage and cultural features are discovered in the course of project activities. -A heritage walk-over should be done along the project routes before construction to establish any heritage resources, such as graves, etc, and the chance-find procedure should be implemented. The communities should be continually engaged and consulted for any heritage and or cultural resources near the road sections.	-Preservation of all artefacts and objects that are discovered onsite -Salvage equipment -Flag tapes -GPS (site marking)	-Site Manager -Construction contractor -Environmental Control Officer	As and when required

5.2.3 Borrow Pits: Management and mitigation measures

The measures proposed for implementation to manage and mitigate the environmental and social impacts of borrow pits are provided in Table 5-3.

Table 5-3: Management and mitigation measures for borrow pits (BPs) – establishment and utilization

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
EMP implementation and training	Lack of EMP awareness and implications thereof	-EMP training should be provided to all workers involved in the project and its associated activities. -All site personnel should be aware of the necessary health, safety, and environmental considerations applicable to their respective work. -The implementation of this EMP should be monitored. The site should be inspected, and a compliance audit should be done throughout **the project activities, monthly and biannually, for overall EMP implementation.** -The EMP non-compliance penalty system should be implemented.	-Training of project personnel on the EMP -Records of EMP compliance/monitoring conducted biannually -The ECC is renewed every 3 years -Records of EMP training conducted.	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the operation phase, and when deemed necessary (for certain activities such as ECC renewal)
Conflict	Communities are dissatisfied with the activities. Nuisances caused by the excavation activities	-Establish clear communication between the Construction Contractor and community (and or through their leaders) on the anticipated timeframe for operations at the sites. This should be done as follows: a) Means for lodging a complaint concerning materials extraction, and provision of feedback to the complainant from the Contractor stating how the issue is being addressed. b) Report back on issues raised and how addressed from the Contractor to the Project/Site Manager and Proponent (Outapi Town Council). -The affected communities or neighbours to the site should be consulted before establishing a BP. The communication can be shared through their headmen, and then they decide together on what to do with the BPs after use (backfilled with stockpile material or rehabilitated into an earth dam).	-There are records of engagement meeting minutes of meetings -There is a community communication plan related to the BPs -Communities are consulted and or represented through their headmen (leaders) on BP activities and end use (post-excavation)	-Construction Contractor -Site Manager -Public relations/Liaison Officer	Throughout the phase
Soils	Physical soil/land disturbance and loss of topsoil	-Stockpiled topsoil and excavated materials should be used to backfill the excavated and disturbed sites after completing work on the pits. -Soils that are not within the intended footprints of the BPs should be left undisturbed, and soil conservation implemented as far as possible. -Project vehicles/machinery should stick to the access route provided and not unnecessarily create further tracks on-site by driving everywhere, causing soil compaction and erosion.	-No proliferation of informal vehicle tracks created by project activities. -No new erosion gullies. -No signs of soil compaction -No disturbance to unmarked areas on-site.	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Water resources	Lowering of the groundwater table owing to excavation activities	-The excavation depth should be limited to minimize the impact on the groundwater table. This can help in reducing the drawdown effect. -Excavate in phases rather than all at once. This allows for localized groundwater impacts to stabilize between phases. -For long-term activities at certain borrow pits, consider establishing retention ponds or sumps to collect water that seeps into the excavation area. This can help in maintaining a higher groundwater level nearby. -Upon completion of excavation activities, the site should be rehabilitated, thus restoring natural drainage patterns and vegetation, which can help to recharge groundwater.	-Monitoring of the water movement in the BPs and acting accordingly -Implementation of the provided measures, where possible.	-Construction Contractor -Site Manager	Throughout the phase
Disruption of hydrological systems by borrow pits	Altering natural drainage patterns, causing changes in surface water flow, and potentially exacerbating flooding or drought conditions in the area.	-Use perimeter drainage channels or bunds to divert surface water away from active borrow pits, reducing the risk of erosion or sediment transport downstream. -Avoid excavating below the water table or altering the natural infiltration capacity of the soil. -Limit the size and depth of pits to maintain surface hydrology balance. -Plan for the implementation of progressive rehabilitation, where parts of the pit are restored while others are still in use.	-Monitoring of the water movement in the BPs and acting accordingly -Implementation of the provided measures, where possible.	-Construction Contractor -Site Manager	Throughout the phase
Biodiversity	Loss of Flora	-Avoid unnecessary removal and disturbance of site vegetation. -Vegetation found on the site, but not in the actual footprint, should not be disturbed; therefore, it should be avoided. -The area to be constructed on the site, as well as lay-down areas, access routes, etc., should be demarcated. The workforce must be instructed to operate within these boundaries. Any activity resulting in the chopping down of trees or the removal of vegetation without the required authorisation is strictly prohibited. Therefore, a permit for removing protected trees should be **obtained from MEFT's Omusati Region's**	-No complaints of unauthorised vegetation removal associated with project personnel. -No intentional disturbance and destruction of site vegetation -Barricading tape (to indicate working areas)	-Site Manager -Construction contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		<u>Forestry Office (in Outapi) upon their inspection – see contact details in Table 3-1.</u> • Baobab trees (*Adansonia digitata*) – protected • Marula trees (Sclerocarya birrea) – protected • Mopane (*Colophospermum mopane*) trees • Makalani Palm (*Hyphaene petersiana*) trees • Bird Plum (*Phyllogeiton discolor*) trees – not protected. • Red-bark acacia (*Vachellia reficiens* and *erioloba*) shrubs and trees – not protected. • Jackalberry trees (*Diospyros mespiliformis*) – not protected. • Stinkbush (*Pechuel-loeschea*) – not protected. -All protected tree species should be tagged so that they are visible during construction works. -Avoid leaving equipment or machinery leaning on vegetation. -Environmental awareness on biodiversity preservation (both plants and even small animals encountered onsite) should be provided to the workers and Contractors during EMRP induction. -No alien vegetation may be introduced to the site in the form of seeds or plants, for beautification or any other reason. -At the end of construction, all alien vegetation that has established itself should be eradicated.			
	Impact on fauna: livestock, wild animals such as reptiles, birds, etc.	-The killing, snaring, trapping, and stealing of community livestock is strictly prohibited. -Refrain from disturbing or killing small soil and animal species found on and around the site. -Visible breeding sites for birds and animals occurring on and around the sites should not be destroyed or disturbed. -Refrain from removing or destroying the bird nests on trees.	No complaints of stolen and killed livestock by the project workers. -No intentional disturbance and destruction of habitats and faunal species	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-BPs and associated trenches should be secured and backfilled or levelled upon completion of works to prevent animals from falling into trenches or even drowning during rainy seasons. -The recommended speed of 40km/hr around, to and from sites, should be adhered to while looking out for animals and people (especially children) in the community. -Incorporate Environmental awareness and biodiversity preservation into the employment contracts of all workers.			
Vehicular traffic safety	Presence of heavy vehicles in the area	-Vehicle drivers and equipment operators should have valid and appropriate driving licenses and adhere to the road safety rules. -Make provision for haul roads and maintain them so that the local small vehicles can continue to use their community roads. -Drivers should drive slowly (40km/hour or less) on the roads. -Project vehicles should be in a roadworthy condition and serviced regularly to avoid accidents owing to mechanical faults. -Vehicle drivers should only make use of the designated site access roads provided and as agreed. -Vehicle drivers should not be allowed to operate vehicles while under the influence of alcohol. -Project vehicles should be parked within the boundary or demarcated areas for such purpose at sites. -Deliveries from and to the site should be done optimally during weekdays and between the hours of 8 am and 5 pm.	-No complaints from members of the public regarding vehicular traffic issues related to the project activities. -All personnel operating the project vehicles and machinery are appropriately licensed and possess valid driving licenses. -Demarcated areas for parking, offloading, and loading zones on-site.	-Site Manager -Construction Contractor	Throughout the phase
Occupational and local health and safety	General health and safety for workers	-During induction, personnel should be provided with an awareness training of the risks of mishandling equipment and materials on site. -Appropriate and written warning signage should be placed on-site, where visible. -A fully furnished first aid kit should be placed at each working site to attend to minor injuries, while major injuries should be attended to at a nearby health centre (clinic and hospital). 1 or 3 site personnel should be trained on how to administer first aid. -Projected loads should be securely fastened to vehicles to avoid falling off and injuring people.	-A comprehensive health and safety plan for the activities is compiled. -Availability of fully furnished first aid kits -Trained workers to administer first aid	-Site Manager -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-Heavy vehicles and equipment should be properly secured to prevent any harm or injury to both project personnel and locals. -When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, masks, gloves, safety boots, earplugs, safety glasses, and hard hats (helmets). -Personnel should not be allowed to consume alcohol or other intoxicants before and during working hours, as this may lead to mishandling of equipment, resulting in health and safety risks.			
	Community health and safety	-Construction trenches should be backfilled after completion of road works at sections of the road before proceeding further. -Ensure that goods and projected loads are securely fastened to vehicles to avoid falling and injuring people along the road. -Warning signage should be erected at danger site areas, such as open trenches on the road. -Make provision for temporary crossroads at growth centres or where a community vehicle access paths cross over the road so that the community can cross over safely. -The site areas that are considered temporary risks should be equipped with "danger" or "cautionary" signs written in languages such as *Oshiwambo* and may be English.	-The road trenches are backfilled -There are sufficient, clear, and appropriate warning signs near risk site areas -The community is warned of the dangers of walking around BP sites and encouraged to stay away and exercise precautions at all times	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase
	Potential increase of prevalence of HIV and AIDS, as well as other sexually transmitted diseases (STDs) prevalence	-Engage workers in sexual health talks and training about the dangers of engaging in unprotected sexual relations, which result in contracting HIV/AIDS and other sexually transmitted infections. -Provision of condoms and sex education through the distribution of pamphlets and health training. These pamphlets can be obtained from the nearest local health facility, such as the Outapi District Hospital in the Town. -Emphasize the continued recruitment of locals to avoid the influx of out-of-area people into the community for casual work that can be carried out by local people. Thus, reducing the creation of new sexual relations between local women and out-of-area men results in the potential local transmission of STDs and HIV.	-No new infections recorded linked to project workers -Occupational health and safety personnel -Sex and Health Education/Awareness -Provision of condoms at the campsite	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Fire management	Accidental fire outbreaks	-Portable and serviced fire extinguishers should be availed at the working sites along the road and campsite. -No open fires should be created by project personnel on-site. -Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarettes' fire is completely put out and disposed of in the allocated bins on-site. -Consider using gas or paraffin cookers to prepare food instead of open fires. The cooker/stove's fire should be put out before leaving the camp. -Personnel and visitors alike must be sensitised about responsible fire protection measures and good housekeeping, such as the removal of flammable materials (e.g., rubbish, plastics, papers, clothing, dry vegetation, and hydrocarbon-soaked soil) near hazardous substances' containment and handling areas. In other words, these flammable materials should not be left or thrown near the areas. Regular inspections should be carried out to check for these materials at the site. -Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarette' fire is completely put out and disposed of in allocated bins at the smoking area. -Potential flammable areas and structures, such as fuel storage tanks, should be marked as such with visible signage. -Raise awareness among workers on the impact of careless handling of fires and flammable substances in the workplace.	-No veld fires recorded (due to the presence of project personnel) -Fire extinguishers (1 per vehicle)	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase
Littering and waste management	Environmental Pollution	-Responsibly dispose of waste and do not litter. -After each daily work, ensure that there are no wastes left on-site or scattered within the site premises. -All domestic and general operational waste produced daily should be contained on-site until such time that it is transported to designated waste sites. -No waste may be buried or burned on site or anywhere else. -The site should be equipped with separate waste bins for solid and general/domestic waste.	-No visible litter around the project area -Provision of sufficient waste storage containers -Waste management awareness -Waste disposal permits to the nearest municipality	-Site Manager -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
		-A penalty system for the irresponsible disposal of waste onsite and anywhere in the area should be implemented.	-Environmental, Health, and Safety Statements and Policy		
	Sewage generated by workers	-Provide sufficient toilet facilities for workers while on-site (portable chemical toilet, if possible). -No open defecation is allowed on and around the site. Use the provided portable toilets for the workers at the BP sites and along the road. -Sewage waste should be stored as per the portable chemical toilets supplied on site and regularly disposed of at the nearest treatment facility.	-Adequate toilets and basic ablution facilities at sites -Chemical toilets Sewage removal operator -Waste treatment agents/chemicals.	-Construction Contractor -Environmental Control Officer	Throughout the phase
Noise	Noise from project activities	-Noise from vehicles and equipment on sites should be reduced to acceptable levels. -Excavation, hauling, and transporting of materials from the BPs hours should be done between 07 am and 5 pm to prevent noise generated by equipment and movement of heavy vehicles. -When operating excavators and other noise-generating machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise.	-No complaints of noise associated with the project	-Construction Contractor -Environmental Control Officer	Throughout the phase
Air quality	Dust generation: Dust proliferation due to the fine content of soil, resulting in localized poor air quality and poor visual	-Soil stacks should be placed downwind from the main activity areas and the road detour. -All site areas and soil stacks should be regularly wetted. -During windy days, materials transporting trucks from BPs should be covered to prevent dust release from wind-blown loaded material. -A reasonable amount of water should be used to suppress the dust along the road/ -Vehicles from and to BP sites should be driven at a speed of 40km/hr to avoid the generation of dust owing to high speeds. This is also to ensure road safety due to ongoing road works and many detours.	-Visual monitoring for dust nuisance and safety -Daily monitoring. -Complaints from neighbours -Records of how complaints or grievances have been addressed.	-Resident Engineer -Construction Contractor -Environmental Control Officer	Throughout the phase

Aspect	Impact	Management and Mitigation Measure(s)	Key Performance Indicator (KPI)	Implementation Responsibility	Timeline
Archaeology and heritage	Accidental disturbance of archaeological or heritage objects	-If any archaeological materials or human burials, or skeletal remains are uncovered during earthworks, the work in the immediate area should be halted, and the finds would need to be reported to the NHC may require inspection by an Archaeologist. The ECO should have the area fenced off and contact NHC (Tel: +264 61 244 375), National Forensic Laboratory (+264 61 240 461) immediately. -Avoid direct damage to archaeological or heritage such that may be encountered during excavations. -All accidental discoveries shall be reported immediately to an archaeologist/heritage practitioner so that an investigation and evaluation of the finds can be made, acting upon which the Environmental Control Officer will advise the necessary actions to be taken. -The Construction Contractor and the Subcontractor should adhere to the provisions of Section 55 of the National Heritage Act in the event significant heritage and cultural features are discovered in the course of project activities.	-Preservation of all artefacts and objects that are discovered onsite -Salvage equipment -Flag tapes -GPS (site marking)	-Site Manager -Construction Contractor -Environmental Control Officer	As and when required, i.e., before site establishment.

5.2.4 Borrow Pits Site Rehabilitation: Management Measures

The measures proposed for implementation to decommission and rehabilitate the borrow pit sites are provided in Table 5-4.

Table 5-4: Management and mitigation measures for borrow pits rehabilitation

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
Unsightly borrow areas	Unstable slopes of an unrehabilitated borrow pit. Loose sediment washed away from unstable slopes.	-Shape all sides of the borrow pit to 30° to the horizontal. Rip the terrain and access routes, and replace the stored topsoil evenly over the terrain. -The stockpiled topsoil should be levelled soon after completion of works at sites. Some of the stockpile materials should be used for rehabilitation	Inspection by the Resident Engineer and, Environmental consultant after rehabilitation	-Construction Contractor -Consulting Engineer	Throughout this phase and before abandoning the area
Rehabilitation of borrow pits	Unfenced/unsecured and unrehabilitated borrow pits	-Since complete rehabilitation of borrow pits is impossible (because one would need to get materials elsewhere to fill up the pit, and this leaves another pit in the area where one gets materials). Therefore, the Contractor should level the BPs as far as possible to make them less dangerous so that the BPs or some of them can be used for future purposes, such as rainwater storage structures for the communities, where possible. -BPs can also be rehabilitated by using stockpiled materials that were removed from the top layers of the BPs to raise the base or fence off the borrow pits that pose a hazard to the communities and cannot be safely rehabilitated. -Refill or reshape pits post-use to prevent them from becoming artificial catchments or stagnant water bodies, which can attract disease vectors or disrupt downstream flow. -Respective community leaders should be consulted to approve and sign off on BP Rehabilitation Completion to their satisfaction.	Inspection by the Resident Engineer and, Environmental consultant after rehabilitation	-Construction Contractor -Environmental Control Officer	Throughout this phase and before abandoning the area
	Disruption of surface water runoff	-During rehabilitation, restore original contours and re-establish drainage lines to closely mimic pre-disturbance hydrology. -Use natural vegetation to stabilize soil and slow runoff, enhancing water infiltration and reducing erosion			

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
	Community dissatisfaction and persistent complaints	-Involve local communities in reporting water-related issues and incorporate traditional knowledge about seasonal water movement. -Coordinate with local authorities (MAFWLR) for integrated water resource management.			
Monitoring of borrow pits and action	Lack of monitoring of the efficiency/success of the borrow pit rehabilitation	-Annual inspections should be carried out on all rehabilitated BPs to determine rehabilitation success and assess any potential weed infestations. -Additional seeding may be carried out using local species if adequate vegetation growth has not been achieved using the seed bank in topsoil. -Any weeds present, weed control measures to be undertaken.			
	Altered hydrological flows	-Establish monitoring programs to assess changes in surface water flow and drainage post-construction (post-cessation of materials extraction from the borrow pits). -If the impact is observed, adapt management strategies, such as adding additional drainage or reinforcing certain areas with erosion control structures.	Inspection by the Resident Engineer and, Environmental consultant after rehabilitation	-Construction Contractor -Environmental Control Officer	Throughout this phase and before abandoning the area

5.2.5 Cumulative Impacts: Management and Mitigation Measures

The measures proposed for implementation for the cumulative impacts are provided in Table 5-5.

Table 5-5: Management and mitigation measures for cumulative impacts

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
Economic benefits (jobs, reduced transport costs, market access): positive cumulative effect	There is a potential for regional development, increased trade, easier access to services and schools, potential rise in land values.	-Prioritize the hiring of local workers and skills (development) training to continue their services at other similar future projects in the Town, surroundings, and region in general. -Support micro-enterprises by making provision for planned roadside markets to ensure continued income generation to maintain livelihood for economic growth.	-Verify the percentage of local labourers hired via monthly labour audits -Inspect and confirm designated market areas. -Engage vendors during progress meetings	-Construction Contractor -Outapi Town Council, with the assistance of Local Small-Medium Enterprises (SME)/Business Development Units	Throughout the construction phase and the first year of operation/implementation
Vegetation loss and biodiversity fragmentation	potential incremental loss of large, often protected trees and linear habitat, a reduction in habitat connectivity for fauna, and edge effects that extend into the adjacent vegetation.	-Trees should be retained as much as possible -Where possible, protected trees such as palm trees should be transplanted. -Establish vegetation buffer strips -Establish animal (livestock) crossing structures	-Pre-construction vegetation mapping (focusing on protected species) -Bi-weekly inspection of clearing limits to ensure no unauthorised removal of vegetation.	-Construction Contractor (Environmental Control Officer) with the assistance of the MEFT Forestry Outapi -Resident Engineer	Pre-construction, during the construction phase, and 6 to 12 months post-construction
Loss/damage to protected and culturally important trees (baobab,	The permanent loss of legally protected species and culturally valuable trees, community	-A pre-construction tree survey should be undertaken with the supervision of the MEFT's Forestry Outapi Office.	-Verify MEFT forestry permits -Bi-weekly inspection of fenced/protected trees	-Construction Contractor (with the assistance of the MEFT Forestry Outapi)	Pre-construction survey and continuous during construction

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
marula, makalani)	opposition, and legal complications.	-Establish protective fencing near protected tree species along the road sections where such tree species occur. -If unavoidable, a licence to remove protected trees such as palm, bird plum, marula, and jackal berry should be obtained from the MEFT's Forestry Office in Outapi. **THE REMOVAL OF BAOBAB TREES IS STRICTLY PROHIBITED. Therefore, these trees should be avoided at all costs.**	-Maintain a protected-tree register for inspection by the MEFT Forestry and Environmental Consultant.	-Resident Engineer	
Increased traffic, noise, and air quality impacts	The impact on degraded residential amenity in Outapi and roadside settlements; health impacts (respiratory) for sensitive groups; cumulative noise along long stretches.	-Implement dust suppression measures, and problematic dust surfaces should be sealed -The vegetation between the road and nearby communities should be left to act as a green buffer for air quality control.	-Daily dust monitoring (visual inspections) -Log complaints in the community register -Spot checks on dust suppression frequency	-Construction Contractor -Environmental Control Officer (ECO) -Outapi Town Council Environmental Department	During the Construction phase and ongoing for the first 6 months of operation (6 months post-construction)
Surface water, drainage, and hydrology changes (erosion, altered flows)	The increased erosion downstream, siltation of ponds and channels (such as culturally important Onelungo ponds), impacts on local water-dependent habitats, and potential flood-path changes.	-There should be proper hydraulic design and sediment traps. -Construction activities should be done in phases/stages to reduce cumulative erosion and water flows.	-Inspect drainage design before construction -Weekly erosion and sediment trap inspections, especially after rains -Photo monitoring of downstream water points (e.g., Onelungo ponds)	-Construction Contractor -Resident Engineer (Hydrology/Drainage) -Outapi Town Council	During the planning and design phase, construction, and the first 2 years of the rainy seasons

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
Heritage and archaeology impacts (known and chance finds)	The loss of cultural heritage sites and social conflict; the loss magnified is expected, if multiple projects remove remaining intact sites.	-A heritage walk-over should be done along the project routes before construction to establish any heritage resources, such as graves, etc, and the chance-find procedure should be implemented. The communities should be continually engaged and consulted for any heritage and or cultural resources near the road sections. -Establish buffer zones around known heritage and or cultural sites along the project routes.	-Confirm pre-construction heritage survey completed -Daily monitoring during excavations -Immediate stop-work and reporting procedure for finds to the NHC.	-Construction Contractor -Resident Engineer (reporting to the -National Heritage Council (NHC)	Pre-construction, and throughout construction (continuous)
Social and livelihood impacts (access, safety, land take)	The short-term disruption to farming, grazing, and property access; longer-term benefits (reduced travel time), but also potential for land-use change, loss of grazing, and pressure on social services.	-Affected land or property owners should be fairly compensated -Land required for the road reserves should be acquired legally and amicably from either landowner or custodian (traditional authority/village headmen.	-Maintain compensation records -Weekly monitoring of access routes -Community consultations once every 3 months	-Outapi Town Council, with the assistance of the Traditional Authority (village headmen of respective road sections falling under rural settings, i.e., outside the current Town developed areas.	Pre-construction (compensation), Throughout the construction phase and the early operational phase of the rehabilitated road sections
Induced development and urbanisation pressure	The conversion of agricultural/communal land to urban uses, pressure on water, sanitation, waste management, and local ecosystems.	-Proper land-use and infrastructure planning should be done properly	-Coordinate planning meetings quarterly -Review planning schemes for compliance -Monitor informal settlement growth near the road corridors.	Outapi Town Council: Town and Infrastructure Planning Departments	During the planning and design phase, as well as throughout the construction phase, and long-term operation

Aspect	Impact	Management and Mitigation Measure(s)	Monitoring actions and Methods	Implementation Responsibility	Timeline
Noise, visual, and landscape character change (loss of rural character)	There is an incremental loss of rural/heritage landscape character when combined with town expansion and other linear infrastructure.	-Maintain vegetation buffers -Avoid early morning (before 07:00) and nighttime construction works, i.e., no construction activities before 07:00 AM and after 17:00 (5 pm).	-Visual inspection of buffer integrity -Monitor noise complaints	-Construction Contractor -ECO -Outapi Town Council	Throughout the construction phase and in the first year of operation
Cumulative traffic safety and accident risk	There is a cumulative impact of more severe road traffic accidents if safety measures are not integrated, particularly where roads pass settlements or schools.	-The road should have sufficient pedestrian crossings, speed calming (humps), road signs/markings, and fencing at cattle crossing points during construction.	-Monthly inspection of road signs, markings, and temporary safety controls -Monitor accident/incident records -Community feedback through safety meetings	-Construction Contractor -Outapi Town Council, with the assistance of the Roads Authority (Traffic Safety Division), and the Namibia Police (Traffic Unit)	Construction and continuous operation
Impact of unrehabilitated borrow pits (BPs) on the community and animals (livestock)	An unrehabilitated BP can pose a threat to the community (children) during rainy seasons and drown when the BPs are filled with water. Deep and steep-sided BPs can cause accidents such as drowning, especially for children or animals, if they fall into the BPs in the future.	- Rehabilitate and fence BPs- Slope stabilisation	-Post-extraction inspections -Verify BP backfilling and contouring -Ensure that fencing is done, if the BP is unsafe, and warning signage is installed	-Construction Contractor -Resident Engineer -Outapi Town Council	Immediately after the borrow pit closure, with monitoring up to 6 months post-rehabilitation

5.3 Environmental Monitoring Actions

To ensure that the implementation of recommended environmental management measures is working and produces the desired results (minimizing the "medium" and upholding the "low" significance ratings of impacts), certain key impacts will need to be monitored and reported on. The ‘’Observation*, compliance status, and ‘’Recommended Action*’’ columns will be completed for every monitoring done on site. Monitoring reports are to be compiled by the project Environmental Control Officer, audited by an Independent Environmental Consultant, and submitted to the DEAF for archiving on a bi-annual basis (every 6 months throughout the project operations) or as required by the Environmental Commissioner (as per the ECC conditions). The environmental components or features provided in the Table will be updated accordingly once the project commences.

6 RECOMMENDATIONS AND CONCLUSION

Based on the assessment of potential impacts by the environmental consultants, the project has some adverse (negative) impacts on the biological, physical, and social environment. However, to minimize the significance of these impacts while maximizing the benefits of the project activities, there should not be significant environmental degradation. It is for this reason that this EMRP was developed for implementation to ensure sustainable land use for the road rehabilitation works and associated works for prosperity.

6.1 Recommendations

To mitigate the adverse impacts that may emanate from the road rehabilitation and associated activities, the Construction Contractor and Outapi Town Council should follow the recommendations as follows:

6.1.1 Environment Management Plan Recommendations

To ensure a healthy and safe environment in the road area and its environs, a plan for environmental management has to be instituted through monitoring. This involves the collection and analysis of relevant environmental data as well as periodic documentation and reporting.

- External Auditing: The key to a successful EMRP is appropriate monitoring and review to ensure effective functioning of the EMRP and to identify and implement corrective measures promptly. If discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.
  An audit of the environmental management actions undertaken is essential to ensure that they are effective in operation, are meeting specified goals, and are performed following relevant regulations

and standards. Audits should be conducted during the operational phase of the facility to ensure adherence to the management measures contained in the EMP.

6.1.2 Conclusion

Considering the potential impacts of the project and its associated activities, the mitigation measures contained in this EMRP are considered sufficient to manage and mitigate these impacts. Therefore, Serja Consultants recommends that the Environmental Commissioner approve the proposed rehabilitation and Dualisation of Road Sections: MR92: 5km from the traffic light intersection towards Oshikuku, MR92: 5km from the traffic light intersection towards Ruacana, and MR123: 5km from the traffic light intersection towards Tsandi from Outapi Townlands, and issue an ECC on condition that the Proponent will ensure full compliance with the developed EMRP.

APPENDIX 1: CHANCE FINDS PROCEDURE (AFTER KINAHAN, 2020)

Areas of project activities are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during development (operations and decommissioning) works. The procedure set out here covers the reporting and management of such finds.

Scope: The "*chance finds*" procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The "chance finds" procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): "*a person who discovers any archaeological …. object ……must as soon as practicable report the discovery to the Council*". The procedure of reporting set out below must be observed so that heritage reported to the NHC is correctly identified in the field.

The Site Manager/Supervisor must report the findings to the following competent authorities:

- **National Heritage Council of Namibia:** Head Office: +264 61 244 375

  Technical Office +264 61 301 903
- National Museum (+264 61 276 800)
- National Forensic Laboratory (+264 61 240 461)

Responsibility:

Operator:	To exercise due caution if archaeological remains are found
Foreman:	To secure the site and advise management timely manner
Superintendent	To determine safe working boundaries and request an inspection
Archaeologist	To inspect, identify, advise management, and recover remains

Procedure:

<u>Action by a person identifying archaeological or heritage material</u>

a) If operating machinery or equipment, stop work

b) Identify the site with a flag tape

c) Determine the GPS position if possible

d) Report findings to the foreman

Action by the foreman

a) Report findings, site location, and actions taken to the superintendent

b) Cease any works in the immediate vicinity

Action by the superintendent

a) Visit the site and determine whether work can proceed without damage to findings

b) Determine and mark the exclusion boundary

c) Site location and details to be added to the project GIS for field confirmation by an archaeologist

Action by an Archaeologist

a) Inspect the site and confirm the addition to the project GIS

b) Advise NHC and request written permission to remove findings from the work area

c) Recovery, packaging, and labelling of findings for transfer to the National Museum

In the event of discovering human remains

a) Actions as above

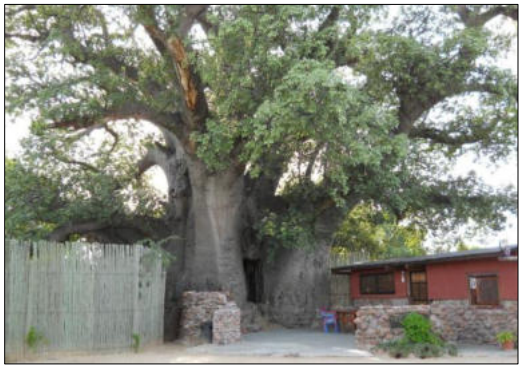
b) Field inspection by an archaeologist to confirm that the remains are human

c) Advise and liaise with NHC and Police

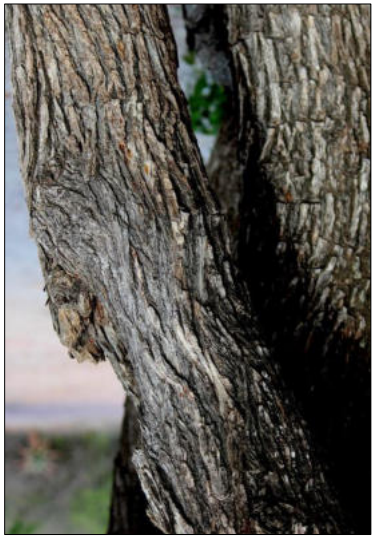
d) Recovery of remains and removal to the National Museum or the National Forensic Laboratory, as directed.

APPENDIX 2: PHOTOS OF SOME IDENTIFIED PROTECTED TREE SPECIES ALONG THE PROPOSED ROAD SECTIONS AND SURROUNDINGS

Baobab trees (*Adansonia digitata*) are mainly concentrated in Outapi Town and along or near the MR92 section towards Tsandi and on the MR92 towards Ruacana. *Local name: Omukwa* – protected species



Mopane (*Colophospermum mopane*), *along the MR123 section towards Tsandi and the MR92 section towards Ruacana.* Local name*: Omusaati – protected species*



Makalani Palm (*Hyphaene petersiana*) on the MR92 section towards Oshikuku and in Outapi Town (particularly on the MR123 towards Tsandi) - protected species; Local name: *Omulunga*

Marula tree (*Sclerocarya birrea*) on the MR92 section towards Oshikuku- protected species; Local name: *Omugongo*

Bird Plum (*Phyllogeiton discolor*) trees on the MR123 section towards Tsandi and other project site routes/areas - protected species; Local name: *Omuye/Omuve/Omumwe*